

AGREEMENT

SERVICES AGREEMENT

THIS SERVICES AGREEMENT is made as of _____, **2022** By and between Pinellas County, a political subdivision of the State of Florida (“County”), and Badger Meter, Inc., Milwaukee, WI (“Contractor”), (individually, “Party,” collectively, “Parties”).

WITNESSETH:

WHEREAS, the County requested proposals pursuant to (RFP - Formal/Informal) No. **21-0057-P** for **Advanced Metering Infrastructure**; and

WHEREAS, based upon the County's assessment of Contractor's proposal, the County selected the Contractor to provide the Services as defined herein; and

WHEREAS, Contractor represents that it has the experience and expertise to perform the Services as set forth in this Agreement.

NOW, THEREFORE, in consideration of the above recitals, the mutual covenants, agreements, terms and conditions herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby mutually acknowledged, the Parties agree as follows:

1. Definitions.

- A. **“Agreement”** means this Agreement, including all Exhibits, which are expressly incorporated herein by reference, and any amendments thereto.
- B. **“County Confidential Information”** means any County information deemed confidential and/or exempt from Section 119.07, Florida Statutes, and Section 24(a), Article 1 of the Florida Constitution, or other applicable law, including, but not limited to, any other information designated in writing by the County as County Confidential Information.
- C. **“Contractor Confidential Information”** means any Contractor information that is designated as confidential and/or exempt by Florida's public records law, including information that constitutes a trade secret pursuant to Chapter 688, Florida Statutes, and is designated in this Agreement or in writing as a trade secret by Contractor (unless otherwise determined to be a public record by applicable Florida law). Notwithstanding the foregoing, Contractor Confidential Information does not include information that: (i) becomes public other than as a result of a disclosure by the County in breach of the Agreement; (ii) becomes available to the County on a non-confidential basis from a source other than Contractor, which is not prohibited from disclosing such information by obligation to Contractor; (iii) is known by the County prior to its receipt from Contractor without any obligation or confidentiality with respect thereto; or (iv) is developed by the County independently of any disclosures made by Contractor.
- D. **“Contractor Personnel”** means all employees of Contractor, and all employees of subcontractors of Contractor, including, but not limited to temporary and/or leased employees, who are providing the Services at any time during the project term.
- E. **“Services”** means the work, duties and obligations to be carried out and performed safely by Contractor under this Agreement, as described throughout this Agreement and as specifically described in Exhibit A (“Statement of Work”) attached hereto and incorporated herein by reference. As used in this Agreement, Services shall include any component task, subtask, service, or function inherent, necessary, or a customary part of the Services, but not specifically described in this Agreement, and shall include the provision of all standard day-to-day administrative, overhead, and internal expenses, including costs of bonds and insurance as required herein, labor, materials, equipment, safety equipment, products, office supplies, consumables, tools, postage, computer hardware/software, telephone charges, copier usage, fax charges, travel, lodging, and per diem and all other costs required to perform Services except as otherwise specifically provided in this Agreement.

2. Conditions Precedent

This Agreement, and the Parties' rights and obligations herein, are contingent upon and subject to the Contractor securing and/or providing the performance security, if required in Section 3, and the insurance coverage(s) required in Section 13, within 10 days of the Effective Date. No Services shall be performed by the Contractor and the County shall not incur any obligations of any type until Contractor satisfies these conditions. Unless waived in writing by the

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County, in the event the Contractor fails to satisfy the conditions precedent within the time required herein, the Agreement shall be deemed not to have been entered into and shall be null and void.

3. Services

- A. **Services** - The County retains Contractor, and Contractor agrees to provide the Services. All Services shall be performed to the satisfaction of the County and shall be subject to the provisions and terms contained herein and the Exhibits attached hereto.
- B. **Services Requiring Prior Approval** - Contractor shall not commence work on any Services requiring prior written authorization in the Statement of Work without approval from Contract Administrator or Designee.
- C. **Additional Services** - From the Effective Date and for the duration of the project, the County may elect to have Contractor perform Services that are not specifically described in the Statement of Work attached hereto but are related to the Services ("Additional Services"), in which event Contractor shall perform such Additional Services for the compensation specified in the Statement of Work attached hereto. Contractor shall commence performing the applicable Additional Services promptly upon receipt of written approval as provided herein.
- D. **De-scoping of Services** - The County reserves the right, in its sole discretion, to de-scope Services upon written notification to the Contractor by the County. Upon issuance and receipt of the notification, the Contractor and the County shall enter into a written amendment reducing the appropriate Services Fee for the impacted Services by a sum equal to the amount associated with the de-scoped Services as defined in the payment schedule in this Agreement, if applicable, or as determined by mutual written consent of both Parties based upon the scope of work performed prior to issuance of notification.
- E. **Independent Contractor Status and Compliance with the Immigration Reform and Control Act** - Contractor is and shall remain an independent contractor and is neither agent, employee, partner, nor joint venturer of County. Contractor acknowledges that it is responsible for complying with the provisions of the Immigration Reform and Control Act of 1986 located at 8 U.S.C. 1324, et seq, and regulations relating thereto, as either may be amended from time to time. Failure to comply with the above provisions shall be considered a material breach of the Agreement.
- F. **Non-Exclusive Services** - This is a non-exclusive Agreement. During the term of this Agreement, and any extensions thereof, the County reserves the right to contract for another provider for similar services as it determines necessary in its sole discretion.
- G. **Project Monitoring** - During the term of the Agreement, Contractor shall cooperate with the County, either directly or through its representatives, in monitoring Contractor's progress and performance of this Agreement.

4. Term of Agreement

- A. **Initial Term. The term of this Agreement shall commence on the effective date as follows or until termination of the Agreement, whichever occurs first:**
 - 1. Proof of Concept services shall commence upon notice to proceed; all installation and operational functionality shall be completed within two hundred eighty-seven (287) calendar days after start date as stipulated in the notice to proceed.
 - 2. Advanced Metering Infrastructure Implementation services shall commence upon successful completion and Pinellas County acceptance of Proof of Concept, and upon notice to proceed; and continue for an initial one thousand two hundred forty-four (1244) calendar days period.
 - 3. System Support Services through the BEACON Master Agreement (Exhibit G) shall commence upon successful communication of the first ORION endpoint to BEACON installed under the project and will continue for an initial ten (10) year period.
- B. **Term Extension** - The Parties may extend the term of this Agreement for one (1) additional ten(10) year period(s) pursuant to the same terms, conditions, and pricing set forth in the Agreement by mutually executing an amendment to this Agreement, as provided herein. The extension shall be exercised only if all prices, terms, and conditions remain the same and approval is granted by the County Administrator or Director of Administrative Services.

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5. Compensation and Method of Payment

- A. **Services Fee** - As total compensation for the Services, the County shall pay the Contractor the sums as provided in this Section 5 ("Services Fee"), pursuant to the terms and conditions as provided in this Agreement and the Statement of Work. It is acknowledged and agreed by Contractor that this compensation constitutes a limitation upon County's obligation to compensate Contractor for such Services required by this Agreement but does not constitute a limitation upon Contractor's obligation to perform all of the Services required by this Agreement. In no event will the Services Fee paid exceed the not-to-exceed sums set out in subsections 5.B. and C., unless the Parties agree to increase this sum by written amendment as authorized in Section 21 of the Agreement.
- B. The County agrees to pay the Contractor the total not-to-exceed sum of \$62,845,720.73 (with an annual not to exceed amount of \$22,000,000 per year) for Services completed and accepted as provided in Section 15 herein if applicable, payable as set out in Exhibit C, payable upon submittal of an invoice as required herein.
- C. **Travel Expenses** - The Services Fee includes all travel, lodging and per diem expenses incurred by Contractor in performing the Services.
- D. **Taxes** - Contractor acknowledges that the County is not subject to any state or federal sales, use, transportation and certain excise taxes.
- E. **Payments** - Contractor shall submit invoices for payments due as provided herein and authorized reimbursable expenses incurred with such documentation as required by County. Invoices shall be submitted to the designated person as set out in Section 18 herein.
For time and materials Services, all Contractor Personnel shall maintain logs of time worked, and each invoice shall state the date and number of hours worked for Services authorized to be billed on a time and materials basis. All payments shall be made in accordance with the requirements of Section 218.70 et seq., Florida Statutes, "The Local Government Prompt Payment Act." The County may dispute any payments invoiced by Contractor in accordance with the County's Invoice Payments Dispute Resolution Process established in accordance with Section 218.76, Florida Statutes, and any such disputes shall be resolved in accordance with the County's Dispute Resolution Process.
- F. Contractor's pricing is limited only to the quantities defined in the Agreement, and Contractor reserves the right to increase pricing if the County has needs beyond the Agreement quantities.

6. E-Verify

The contractor and subcontractor must register with and use the E-verify system in accordance with Florida Statute 448.095. A contractor and subcontractor may not enter into a contract with the County unless each party registers with and uses the E-verify system.

If a contractor enters a contract with a subcontractor, the subcontractor must provide the contractor with an affidavit stating that the Subcontractor does not employ, contract with, or subcontract with unauthorized aliens. The contractor must maintain a copy of the affidavit for the duration of the contract.

If the County, Contractor, or Subcontractor has a good faith belief that a person or entity with which it is contracting has knowingly violated Florida Statute 448.09(1) shall immediately terminate the contract with the person or entity. If the County has a good faith belief that a Subcontractor knowingly violated this provision, but the Contractor otherwise complied with this provision, the County will notify the Contractor and order that the Contractor immediately terminate the contract with the Subcontractor.

A contract terminated under the provisions of this section is not a breach of contract and may not be considered such. Any contract termination under the provisions of this section may be challenged to Section 448.095(2)(d), Florida Statute. Contractor acknowledges upon termination of this agreement by the County for violation of this section by Contractor, Contractor may not be awarded a public contract for at least one (1) year. Contractor acknowledges that Contractor is liable for any additional costs incurred by the County as a result of termination of any contract for a violation of this section.

Contractor or Subcontractor shall insert in any subcontracts the clauses set forth in this section, requiring the subcontracts to include these clauses in any lower tier subcontracts. Contractor shall be responsible for compliance by any Subcontractor or Lower Tier Subcontractor with the clause set for in this section.

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7. Termination

A. Contractor Default Provisions and Remedies of County

1. Proof of Concept. In the event the Proof of Concept results do not confirm compliance with the RFP requirements, the County may terminate this Agreement in whole, effective upon receipt by Contractor of written notice of termination.
2. Events of Default - Any of the following shall constitute a "Contractor Event of Default" hereunder:
 - i. Contractor fails to maintain the staffing necessary to perform the Services as required in the Agreement, fails to perform the Services as specified in the Agreement, or fails to complete the Services within the completion dates as specified in the Agreement;
 - ii. Contractor breaches Section 9 (Confidential Information);
 - iii. Contractor fails to gain acceptance of a deliverable per Section 15, if applicable, for 2 consecutive iterations; or (iv) Contractor fails to perform or observe any of the other material provisions of this Agreement.
3. Cure Provisions - Upon the occurrence of a Contractor Event of Default as set out above, the County shall provide written notice of such Contractor Event of Default to Contractor ("Notice to Cure"), and Contractor shall have 30 calendar days after the date of a Notice to Cure to correct, cure, and/or remedy the Contractor Event of Default described in the written notice.
4. Termination for Cause by the County - In the event that Contractor fails to cure a Contractor Event of Default as authorized herein, or upon the occurrence of a Contractor Event of Default as specified in Section 7.A.1.(iii), the County may terminate this Agreement in whole or in part, effective upon receipt by Contractor of written notice of termination pursuant to this provision, and may pursue such remedies at law or in equity as may be available to the County.
Failure of the Contractor to comply with any of the provisions of this Agreement is considered a material breach of Agreement and is cause for immediate termination of the Agreement at the sole discretion of County.

In addition to all other legal remedies available to the County, the County reserves the right to terminate and obtain from another source any services which have not been provided within the period of time stated in the proposal, or if no such time is stated, within a reasonable period of time from the date of request, as determined by the County.

B. Termination for Convenience

1. Notwithstanding any other provision herein, the County may terminate this Agreement, without cause, by giving 30 days advance written notice to the Contractor of its election to terminate this Agreement pursuant to this provision.

8. Time is of the Essence

Time is of the essence with respect to all provisions of this Agreement that specify a time for performance, including the Services as described in Exhibits attached hereto; provided, however, that the foregoing shall not be construed to limit a Party's cure period allowed in the Agreement.

A. Liquidated Damages:

The County shall be entitled to assess, as liquidated damages, but not as a penalty, one thousand two hundred dollars (\$1,200.00) for each Calendar day after the Contract Time. The Project shall be deemed to be completed on the date the Work is deemed complete to the satisfaction of the Design Professional/Engineer/Project Manager. The Contractor hereby expressly waives and relinquishes any right which it may have to seek to characterize the above-noted liquidated damages as a penalty. The parties agree that the liquidated damages sum represents a fair and reasonable estimate of the County's actual damages at the time of contracting if the Contractor fails to complete the Work in a timely manner.

Liquidated Damages shall apply solely to Advanced Metering Infrastructure Implementation services phase.

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9. Confidential Information and Public Records

- A. County Confidential Information - Contractor shall not intentionally disclose to any third party County Confidential Information that Contractor, through its Contractor Personnel, has access to or has received from the County pursuant to its performance of Services pursuant to the Agreement, unless approved in writing by the County Contract Manager. All such County Confidential Information will be held in trust and confidence from the date of disclosure by the County, and discussions involving such County Confidential Information shall be limited to Contractor Personnel as is necessary to complete the Services.
- B. Contractor Confidential Information - All Contractor Confidential Information received by the County from Contractor will be held in trust and confidence from the date of disclosure by Contractor and discussions involving such Contractor Confidential Information shall be limited to the members of the County's staff and the County's subcontractors who require such information in the performance of this Agreement. The County acknowledges and agrees to respect the copyrights, registrations, trade secrets and other proprietary rights of Contractor in the Contractor Confidential Information during and after the term of the Agreement and shall at all times maintain the confidentiality of the Contractor Confidential Information provided to the County, subject to federal law and the laws of the State of Florida related to public records disclosure. Contractor shall be solely responsible for taking any and all action it deems necessary to protect its Contractor Confidential Information except as provided herein. Contractor acknowledges that the County is subject to public records legislation, including but not limited to Chapter 119, Florida Statutes, and the Florida Rules of Judicial Administration, and that any of the County's obligations under this Section may be superseded by its obligations under any requirements of said laws.
- C. Public Records - Contractor acknowledges that information and data it manages as part of the services may be public records in accordance with Chapter 119, Florida Statutes and Pinellas County public records policies. Contractor agrees that prior to providing services it will implement policies and procedures to maintain, produce, secure, and retain public records in accordance with applicable laws, regulations, and County policies, including but not limited to the Section 119.0701, Florida Statutes. Notwithstanding any other provision of this Agreement relating to compensation, the Contractor agrees to charge the County, and/or any third parties requesting public records only such fees allowed by Section 119.07, Florida Statutes, and County policy for locating and producing public records during the term of this Agreement.
If the Contractor has questions regarding the application of Chapter 119, Florida Statutes, to the Contractor's duty to provide public records relating to this contract, contact the Pinellas County Board of County Commissioners, Purchasing and Risk Management Department, Operations Manager custodian of public records at 727-464-3311, purchase@pinellascounty.org, Pinellas County Government, Purchasing and Risk Management Department, Operations Manager, 400 S. Ft. Harrison Ave, 6th Floor, Clearwater, FL 33756.

10. Audit

Contractor shall retain all records relating to this Agreement for a period of at least 5 years after final payment is made. All records shall be kept in such a way as will permit their inspection, at the County's sole expense, pursuant to Chapter 119, Florida Statutes. In addition, County reserves the right to examine and/or audit such records at the County's sole expense.

11. Compliance with Laws

Contractor shall comply with all applicable federal, state, county and local laws, ordinances, rules and regulations in the performance of its obligations under this Agreement, including the procurement of permits and certificates where required, and including but not limited to laws related to Workers Compensation, Americans with Disabilities Act (ADA), Section 504 of the Rehabilitation Act of 1973, Minority Business Enterprise (MBE), occupational safety and health and the environment, equal employment opportunity, privacy of medical records and information, as applicable. Failure to comply with any of the above provisions shall be considered a material breach of the Agreement.

12. Public Entities Crimes

Contractor is directed to the Florida Public Entities Crime Act, Section 287.133, Florida Statutes, as well as Florida Statute 287.135 regarding Scrutinized Companies, and represents to County that Contractor is qualified to transact business with public entities in Florida, and to enter into and fully perform this Agreement subject to the provisions state therein. Failure to comply with any of the above provisions shall be considered a material breach of the Agreement.

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13. Liability and Insurance

Contractor agrees to indemnify, pay the cost of defense, including attorney's fees, and hold harmless the County, its officers, employees and agents from all damages, suits, actions or claims, including reasonable attorney's fees incurred by the County, of any character brought on account of any injuries or damages received or sustained by any person, persons, or property, or in any way relating to or arising from the Agreement; or on account of any negligent act or omission, gross negligence or misconduct of Contractor; or by, or on account of, any claim or amounts recovered under the Workers' Compensation Law; or of any other laws, regulations, ordinance, order or decree; or arising from or by reason of any actual or claimed trademark, patent or copyright infringement or litigation based thereon; or for any violation of requirements of the Americans with Disabilities Act of 1990, as may be amended, and all rules and regulations issued pursuant thereto (collectively the "ADA") except when such injury, damage, or violation was caused by the sole negligence of the County.

14. County's Funding

The Agreement is not a general obligation of the County. It is understood that neither this Agreement nor any representation by any County employee or officer creates any obligation to appropriate or make monies available for the purpose of the Agreement beyond the fiscal year in which this Agreement is executed. No liability shall be incurred by the County, or any department, beyond the monies budgeted and available for this purpose. If funds are not appropriated by the County for any or all of this Agreement, the County shall not be obligated to pay any sums provided pursuant to this Agreement beyond the portion for which funds are appropriated. The County agrees to promptly notify Contractor in writing of such failure of appropriation, and upon receipt of such notice, this Agreement, and all rights and obligations contained herein, shall terminate without liability or penalty to the County.

15. Acceptance of Services

For all Services deliverables that require County acceptance as provided in the Statement of Work, the County, through the Contract Administrator or designee, will have 10 calendar days to review the deliverable(s) after receipt or completion of same by Contractor, and either accept or reject the deliverable(s) by written notice to. If a deliverable is rejected, the written notice from the County will specify any required changes, deficiencies, and/or additions necessary. Contractor shall then have 7 calendar days to revise the deliverable(s) to resubmit and/or complete the deliverable(s) for review and approval by the County, who will then have 7 calendar days to review and approve, or reject the deliverable(s); provided however, that Contractor shall not be responsible for any delays in the overall project schedule that result from the County's failure to timely approve or reject deliverable(s) as provided herein. Upon final acceptance of the deliverable(s), the County will accept the deliverable(s) in writing. For invoicing purposes County agrees to the procedures defined in the Scope of Work.

16. Subcontracting/Assignment

- A. Subcontracting - Contractor is fully responsible for completion of the Services required by this Agreement and for completion of all subcontractor work, if authorized as provided herein. Contractor shall not subcontract any work under this Agreement to any subcontractor other than the subcontractors specified in the proposal and previously approved by the County, without the prior written consent of the County, which shall be determined by the County in its sole discretion.
- B. Assignment - This Agreement, and all rights or obligations hereunder, shall not be assigned, transferred, or delegated in whole or in part, including by acquisition of assets, merger, consolidation, dissolution, operation of law, change in effective control of the Contractor, or any other assignment, transfer, or delegation of rights or obligations, without the prior written consent of the County. The Contractor shall provide written notice to the County within 15 calendar days of any action or occurrence assigning the Agreement or any rights or obligations hereunder as described in this section. In the event the County does not consent to the assignment, as determined in its sole discretion, the purported assignment in violation of this section shall be null and void, and the County may elect to terminate this Agreement by providing written notice of its election to terminate pursuant to this provision upon 15 days' notice to Contractor.

17. Survival

The following provisions shall survive the expiration or termination of the Term of this Agreement: 7, 9, 10, 12 19, 22, and any other which by their nature would survive termination.

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18. Notices

All notices, authorizations, and requests in connection with this Agreement shall be deemed given on the day they are: (1) deposited in the U.S. mail, postage prepaid, certified or registered, return receipt requested; or (2) sent by air express courier (e.g., Federal Express, Airborne, etc.), charges prepaid, return receipt requested; or (3) sent via email and addressed as set forth below, which designated person(s) may be amended by either Party by giving written notice to the other Party:

For County: Construction Administrator - Utilities Engineering

Attn: Robert Armstrong

14 South Fort Harrison, 6th floor

Clearwater, FL 33756

with a copy to:

Purchasing Director

Pinellas County Purchasing Department

400 South Fort Harrison Avenue

Clearwater, FL 33756

For Contractor: Badger Meter Inc.

4545 W. Brown Deer Rd.

Milwaukee, WI 53223

Attn: Legal Department

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19. Conflict of Interest

- A. The Contractor represents that it presently has no interest and shall acquire no interest, either direct or indirect, which would conflict in any manner with the performance of the Services required hereunder, and that no person having any such interest shall be employed by Contractor during the agreement term and any extensions.
- B. The Contractor shall promptly notify the County in writing of any business association, interest, or other circumstance which constitutes a conflict of interest as provided herein. If the Contractor is in doubt as to whether a prospective business association, interest, or other circumstance constitutes a conflict of interest, the Contractor may identify the prospective business association, interest or circumstance, the nature of work that the Contractor may undertake and request an opinion as to whether the business association, interest or circumstance constitutes a conflict of interest if entered into by the Contractor. The County agrees to notify the Contractor of its opinion within (10) calendar days of receipt of notification by the Contractor, which shall be binding on the Contractor.

20. Right to Ownership

County and Contractor agree that all work regarding the BEACON portal are Contractor's property and County is granted a license to that software in the SLA. All other work created, originated and/or prepared by Contractor in performing Services pursuant to the Agreement, including Standard and other documentation or improvements related thereto, to the extent that such work, products, documentation, materials or information are described in or required by the Services (collectively, the "Work Product") shall be County's property when completed and accepted, if acceptance is required in this Agreement, and the County has made payment of the sums due therefore. The ideas, concepts, know-how or techniques developed during the course of this Agreement by the Contractor or jointly by Contractor and the County may be used by the County without obligation of notice or accounting to the Contractor. Any data, information or other materials furnished by the County for use by Contractor under this Agreement shall remain the sole property of the County.

21. Amendment

This Agreement may be amended by mutual written agreement of the Parties hereto.

22. Severability

The terms and conditions of this Agreement shall be deemed to be severable. Consequently, if any clause, term, or condition hereof shall be held to be illegal or void, such determination shall not affect the validity or legality of the remaining terms and conditions, and notwithstanding any such determination, this Agreement shall continue in full force and effect unless the particular clause, term, or condition held to be illegal or void renders the balance of the Agreement impossible to perform.

23. Applicable Law and Venue

This Agreement shall be governed by and construed in accordance with the laws of the State of Florida (without regard to principles of conflicts of laws). The Parties agree that all actions or proceedings arising in connection with this Agreement shall be tried and litigated exclusively in the state or federal (if permitted by law and a Party elects to file an action in federal court) courts located in or for Pinellas County, Florida. This choice of venue is intended by the Parties to be mandatory and not permissive in nature, and to preclude the possibility of litigation between the Parties with respect to, or arising out of, this Agreement in any jurisdiction other than that specified in this section. Each Party waives any right it may have to assert the doctrine of forum non-conveniens or similar doctrine or to object to venue with respect to any proceeding brought in accordance with this section.

24. Waiver

No waiver by either Party of any breach or violation of any covenant, term, condition, or provision of this Agreement or of the provisions of any ordinance or law, shall be construed to waive any other term, covenant, condition, provisions, ordinance, or law, or of any subsequent breach or violation of the same.

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25. Due Authority

Each Party to this Agreement represents and warrants that: (i) it has the full right and authority and has obtained all necessary approvals to enter into this Agreement; (ii) each person executing this Agreement on behalf of the Party is authorized to do so; (iii) this Agreement constitutes a valid and legally binding obligation of the Party, enforceable in accordance with its terms.

26. No Third-Party Beneficiary

The Parties hereto acknowledge and agree that there are no third-party beneficiaries to this Agreement. Persons or entities not a party to this Agreement may not claim any benefit from this Agreement or as third-party beneficiaries hereto.

27. Entire Agreement

This Agreement constitutes the entire Agreement between the Parties and supersedes all prior negotiations, representations, or agreements either oral or written.

28. Exhibits

The documents comprising this Agreement, which shall be known as the "Contract Documents", include the entirety of County's RFP pursuant to which this Agreement is awarded, including any addenda, and Contractor's submittal thereto. The following portions of the Contract Documents are listed for the purposes of determining priority, with this Agreement taking precedence:

CHANGE ORDERS

EXHIBIT A – STATEMENT OF WORK

RFP ADDENDA

RFP SECTION B – SPECIAL CONDITIONS

RFP SECTION E – SCOPE OF WORK

RFP ATTACHMENT A

RFP ATTACHMENT B

RFP ATTACHMENT C

RFP ATTACHMENT D

EXHIBIT G – SERVICE LEVEL AGREEMENT

EXHIBIT H - SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT COOPERATIVE FUNDING INITIATIVE PROJECT AGREEMENT

EXHIBIT I - PRODUCT DATA SHEETS, PRODUCT WARRANTY SHEETS, INSTALLATION GUIDES

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29. Cooperative Purchasing

With regard to Section A.14. General Conditions/Provision for other agencies in the original RFP, Contractor will extend bid pricing to participating agencies based on similarly situated products, including exact product specifications and similar quantities, as per this Agreement. Further, Contractor reserves to right increase the contract prices for the other agencies on at least an annual basis in proportion to the increase in the Consumer Price Index for All Urban Consumers as reported by the U.S. Department of Labor. The base index shall be the February 2022 index of 283.716.

(Signature Page Follows)

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IN WITNESS WHEREOF, the Parties hereto have executed this Agreement the day and year first written.

PINELLAS COUNTY, FLORIDA
By and through its
Board of County Commissioners

Badger Meter, Inc.

Name of Firm

By _____

By: KCB
Ken Bockhorst (May 25, 2022 14:51 EDT)

Signature

Kenneth C. Bockhorst

Print Name

President and Chief Executive Officer

Title

ATTEST:
Ken Burke,
Clerk of the Circuit Court

By: _____
Deputy Clerk

Approved as to Form

APPROVED AS TO FORM

By: Keiah Townsend
Office of the County Attorney

By: _____
Office of the County Attorney

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EXHIBIT A - STATEMENT OF WORK

Services Agreement - Exhibit A - Statement of Work follows:

Project Approach / Statement of Work

Pinellas PCU Utilities

Prepared By: Badger Meter



5/23/2022

All information herein is proprietary to Badger Meter, Inc. and is disclosed in confidence to recipient only for evaluation purposes approved in advance by Badger Meter, Inc. Recipient agrees not to (1) use such information for any other purpose, (2) disclose any of such information to others, (3) reproduce this document in whole or part, and (4) transfer such information to other documentation.

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1. Introduction and Scope

1.1 Document Scope

This preliminary project plan describes the Badger Meter SOW for PCU. Deliverables, process, requirements and general project information have been included.

Badger Meter has a history of successful AMR/AMI implementations over the past 20 years, beginning when AMR systems were first deployed. Badger Meter has managed turnkey deployments as small as 100 meters and as large as 155,000 meters, with implementation project durations ranging from a few weeks to five years. To date, all of our managed projects have been completed on time and Badger Meter has not incurred any liquidated damages due to poor performance. We pride ourselves on not only completing projects on time, but also with the highest level of customer satisfaction. We view a deployment not as a one-time project, but rather as the first phase of an ongoing relationship that will ultimately result in our ability to work with the utility when the next meter reading technology needs to be deployed. Our project management group averages over 20 years of project experience with an average of more than eight years within the water industry specifically.

Our Installation Partner, PVI is well known throughout the city and PCU governments. Over 50 utilities with 500,000+ meters installed have relied on PVI to manage and install their AMR and AMI systems. Their all-inclusive approach to project execution will ensure that you receive the utmost attention to detail while enabling you to maintain operations during the installation.

1.2 Introduction to Project & Products

Badger Meter will provide PCU our BEACON AMA Cellular solution system implementation that will cover approximately 124,375-meter services over an approximate 48-month period. The first approximately three months will be for system testing and validation, followed by approximately two months for the Proof of Concept, and approximately 30 months of installations and clean-up. By choosing the BEACON AMA Cellular solution with ORION Cellular endpoints, PCU does not need to utilize any infrastructure to support the product. This will provide PCU time savings on the overall project and installation schedule.

In addition, the County has chosen to leverage the VertexOne customer self-service portal. This is available to customers through a mobile and web application interface, provides a single place for customers to see consumption, check and resolve leaks, view bills, sign up for paperless billing, complete forms, and receive targeted messages about utility promoted events and programs.

1.3 Project Objectives

To ensure the project remains on schedule, there are certain objectives all parties must adhere to as detailed below.

Computer Information System (CIS) interfaces must be completed within three months of the written Notice to Proceed (NTP), which will require ongoing coordination, support and resources allocated for the project by PCU, PVI, Cityworks, and SAP HANA along with Badger Meter. Badger Meter shall be responsible for the coordinating the effort required for the connections between the software owned by Badger Meter, PCU, PVI, VertexOne, Cityworks, and SAP HANA in order to maintain and support project milestones.

Timely responses (acknowledged or responded to within five business days) for review, along with any/all necessary approvals by PCU for all project related action items including but not limited to change orders, special account approvals as they may relate to the inability to locate a meter pit, or plumbing work needed at a specific site location and additional work otherwise not noted in this SOW are required to ensure the project stays on schedule.

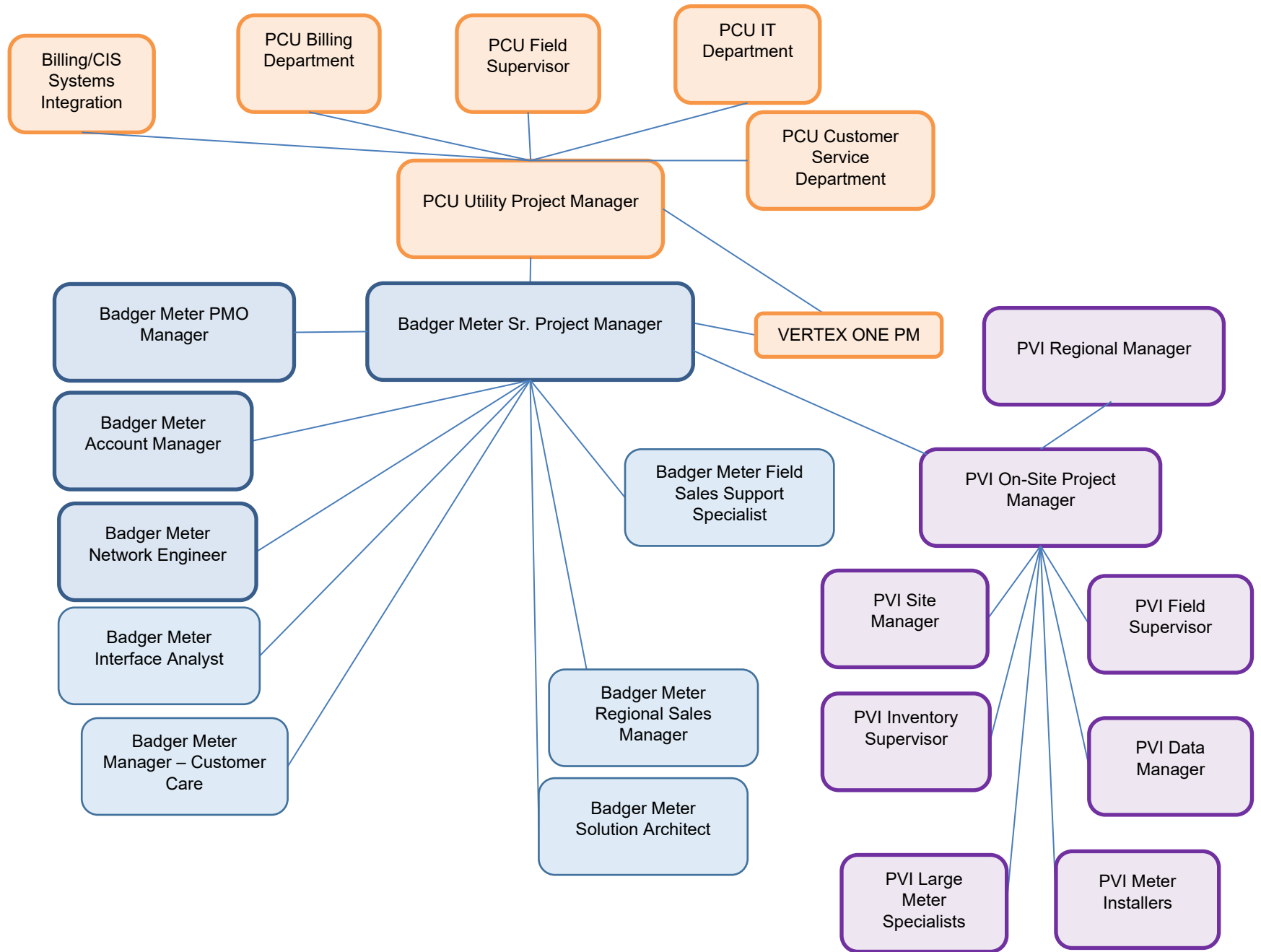
Installation services on all in-target accounts shall be completed within the specified contractual timeframe as outlined in the project schedule, which shall not exceed 48 months from date of the written NTP. PCU shall release routes for installation in a timely manner and as specified in the SOW, which shall be mutually agreed upon during the pre-construction meeting by and among PCU, Badger Meter, VertexOne Cityworks, SAP HANA, and PVI.

2. Project Resources & Stakeholders

Contact	Title	Department	Responsibilities
Shauna Griffin	Senior Director of Utility Sales	Sales	Senior Account Executive responsible for the overall project success and customer experience.
Mark McMillen	Senior Manager - Utility Solutions for National Strategic Accounts	Sales	Senior Client Partner – Ensures the proposed solution meets or exceed customer’s expectations.
Morrice Blackwell	Senior Manager - Utility Solutions for National Strategic Accounts	Sales	Ensures the proposed solution meets or exceed customer’s expectations.
Joe DeVito	Senior Manager Utility Solutions for National Strategic Accounts	Sales	Ensures the proposed solution meets or exceeds customer’s expectations.
Patrick Williamson, PMP	Solution Architect	Sales	Ensures the proposed solution meets or exceed customer’s expectations.
Brad Lowe	Account Manager	Sales	Account Management for PCU.
Santiago Speranza, PMP	PMO Manager	PMO	The PMO Manager will manage and support the Sr. Project Manager, and assist with integrating high level issues within other Badger Meter departments along with providing best in class customer support.
Khadija Lemgendez, PMP	Senior Project Manager	PMO	Primary point of contact and interface between PCU’s team and Badger Meter. Responsible for requirements gathering, project plans, and managing timelines with the support of the PMO Manager.
Joe Lucia	Supervisor, Field Services Sales Support (FSSS)	FSSS	Supports project activities through training activities.
Jenny Awah-Manga	Contract Manager	Bids and Contracts	Manages the Contract alongside the Project Manager throughout the project to ensure all project deliverables are being met and

			successfully provided.
Thomas Dilleuth	Senior Manager - Customer Care	Customer Service	The Sr. Customer Care Manager ensures product is ordered, invoiced and available to meet the timelines setforth in the project

2.1 Team Organizational Chart (Pinellas County Items Are Subject to Change)



3. Project Assumptions

- Badger Meter and PCU will provide suitably trained and skilled resources to support the project effort and timeline agreed upon by both parties. PCU's technical and business resources shall be familiar with their present IT operations as it relates to the project components.
- The project manager assigned to this project, Khadija Lemgendez, PMP, will be responsible for the management of all Badger Meter and PVI resources, Badger Meter deliverables and action items, and the contractual obligations of the project plan that are under the control of Badger Meter. With regard to VertexOne, although Badger Meter has no privity of contract with VertexOne, VertexOne has agreed to allow their Project Manager to report to Badger Meter's project manager for the one-time services that will be delivered by VertexOne as part of the AMI project, to allow PCU one point of contact for this project. Badger Meter makes no claims or representations with regard to the VertexOne product or services, and disclaims all liability associated with the VertexOne product, services, or the VertexOne Project Manager.
- Badger Meter will identify and be responsible for any third-party contractors/consultants contracted by Badger Meter for the project.
- Badger Meter will perform most project work off-site, including the interface workshops, software training activities, and other action items determined under the scope as appropriate.
- Quantities provided by PCU are best available estimates on actual quantities Badger Meter may locate. Should quantities vary throughout the project, the unit prices shall remain as presented under the final price proposal.
- Pricing assumes that water meter exchanges are like for like with the same lay and length without major plumbing or excessive excavation (any work beyond two feet of either side of the meter) needed to complete the exchange.
- Pricing does not include testing of new or removed meters. Pricing for such services is available upon request.
- For integration work, BEACON AMA and VertexOne on-boarding work to begin, PCU will need to provide a purchase order (PO), NTP, completed BEACON AMA on-boarding form, product order, and installation by Pedal Valve for 10-24 meters and endpoints.
- Ongoing support and responsiveness shall be provided by PCU with respect to its billing vendor as necessary for all project requirements and interfacing with PVI and Badger Meter.
Billing System Integrations:
 - Badger Meter will need timely responses from SAP HANA with the import file (CSV sync file), data validation, and data clean up within five business days of each validation. This may require several iterations
 - It is SAP HANA's responsibility to assist PCU with any field alterations needed in the billing system
 - SAP HANA will need to provide the data schema and mapping specifications
 - Badger Meter can highlight what fields need to be addressed by SAP HANA and PCU
 - Badger Meter will provide SAP HANA with the data validation results within three business days of receiving the import file from SAP HANA

- Once the import file is confirmed by Badger Meter, SAP HANA, and PCU, a Configured Export will be created by Badger Meter within three business days
- The Configured Export will be provided to SAP HANA for final validation to be approved within three business days.
- Written acknowledgement will be provided by PCU to Badger Meter of project milestones met throughout the project as requested by the project manager within five business days of the request.
- Ongoing support and responsiveness shall be provided by PCU with respect to its billing vendor as necessary for all project requirements and interfacing with PVI and Badger Meter.

4. Project Milestones & Deliverables

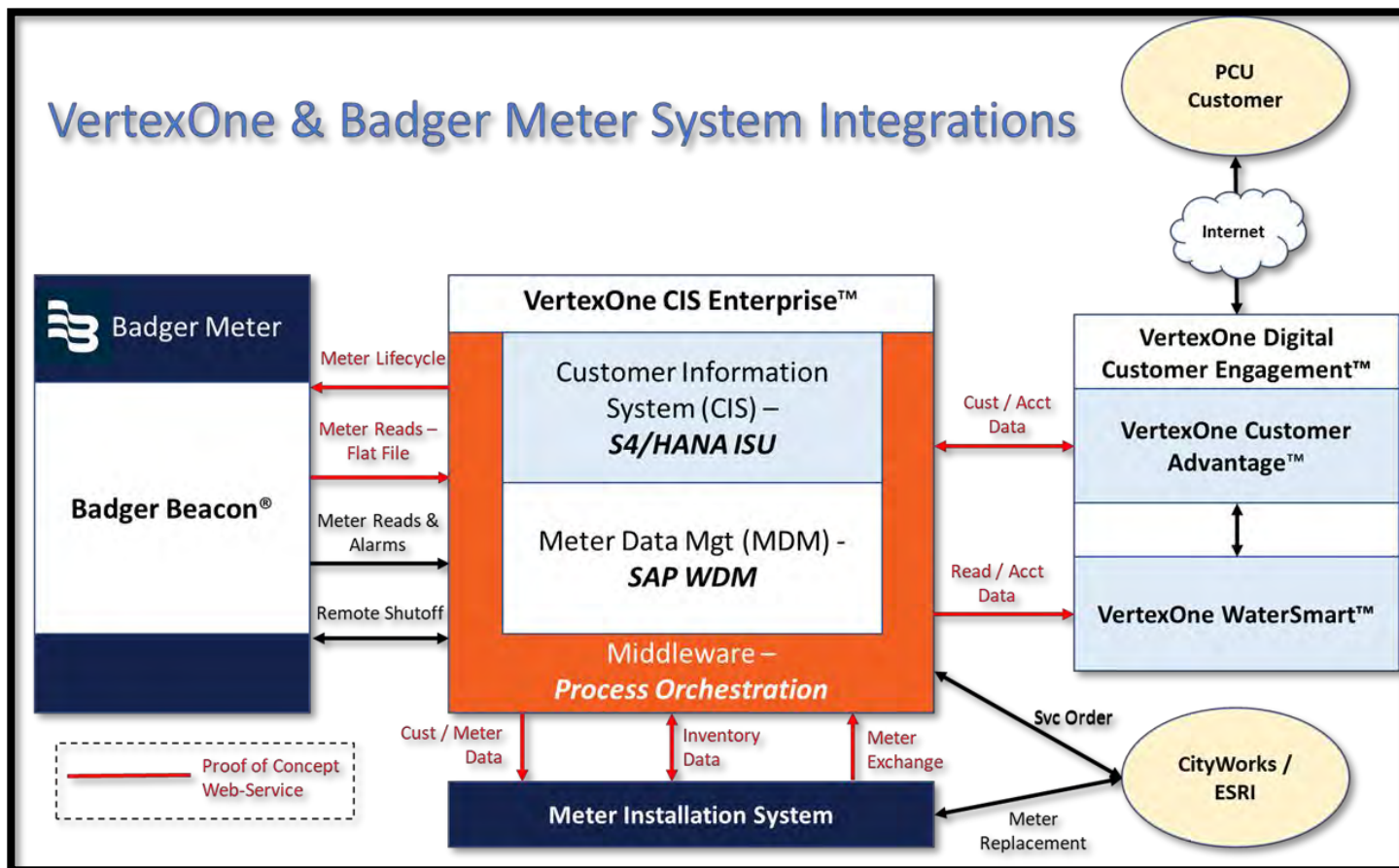
4.1 Project Milestones

- BEACON AMA system configuration, SAP HANA, TrackPoint to CityWorks, and SAP HANA to VertexOne MDMS Interfaces: Estimated completion is 90 to 120 calendar days from the date of the pre-construction meeting.
 - PVI mobilization: Estimated completion is 30 to 45 calendar days from the date of the pre-construction meeting.
 - Installation of approximately 120 meters for the Proof of Concept phase: Estimated completion is 60 calendar days from the date of completion of interface work.
 - Installation of approximately 24,000 meters: Estimated completion is 365 calendar days from the NTP for mass meter installation phase.
 - Installation of approximately 100,000 meters: Estimated completion is 3 calendar years from the date of completion of first 24,000 meters.
 - System testing and final acceptance by PCU: Estimated completion is 15 calendar days from the end of the meter installations.
- Training phase I to be completed within 90 days from the beginning of meter installations.
- Training phase II to be completed once a minimum of 5,000 meters are installed and operating in the BEACON AMA System.
- Training phase III can be utilized by PCU, as deemed necessary for new employee onboarding and system training, all training sessions must be completed within three years of the date of the NTP.
- Key objectives of this project include:
 - Community awareness and support for the project led by PCU
 - Personnel awareness and support of the project by PCU
 - Minimal disruption/impacts to PCU residents and businesses by all project parties involved
 - Smooth transition to AMI with minimal disruptions/impacts to PCU
 - Successful meter installations and network activation of endpoints completed by PVI and Badger Meter
 - Substantial route completion (meter installations)
 - Personnel acceptance and utilization of the new technology in conjunction with current best practices in place by PCU

- Badger Meter will manage a successful implementation of the VertexOne Software from Start of the Project to the Final System Test and Acceptance per the Project Timeline & Schedule which is estimated to run up to 50 months.

Workshops

Workshop	Description
Pre-Construction Meeting	Meeting with all project personnel to review and agree on timeframes for work, CIS integration, installation roll out, and all applicable trainings
Interface Design see integration diagram below	Discussions with PCU and vendors on Mass Meter Change Out (MMCO) and billing Integrations (Badger Meter to SAP HANA, SAP HANA to VertexOne, TrackPoint to Cityworks), data elements, business rules, formats, processes, etc.
Interface Test Planning	Use case development, testing environment/data requirements, and test execution planning
Deployment Planning	Includes field tools and procedures, "slow start" phase plans, QA/QC processes, installer training, and community outreach planning
Badger Meter Training	Training of PCU employees on all Badger Meter products both hardware and software

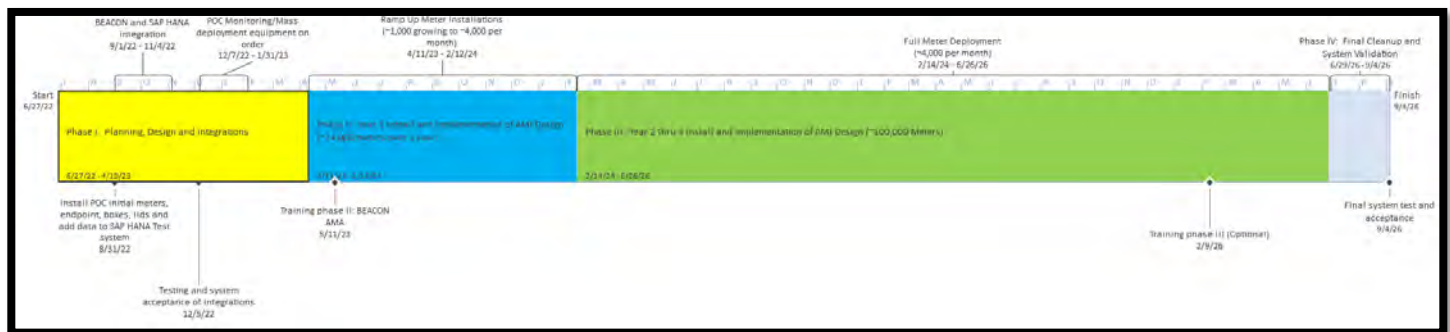


4.2 Summary of Key Document Deliverables

- Documents provided by Badger Meter, VertexOne, or PVI teams to PCU and/or SAP HANA must be acknowledged and approved within ten business days (Sooner as possible). Some examples of documents provided are listed below:
 - Interface testing/validation process
 - Field QA/QC process
 - Installer SOPs
 - Installer training manuals
 - Badger Meter product documentation

5. Project Timeline & Schedule

The contractual project length is 50 months. A full version of the project timeline is attached as Attachment A. A preliminary project timeline is below.



6. Pre-Construction Meeting & Team Communication Plan

6.1 Pre-Construction Meeting

- Badger Meter and PVI will provide PCU a detailed scheduling and installation plan at the pre-construction meeting.
- Project Team Communications Plan: Badger Meter will provide a project communication plan at the pre-construction meeting. This plan will contain the following sections:
 - Badger Meter shall provide PCU a preliminary schedule once PCU provides the NTP. The schedule will need to be approved before construction can begin.
 - Weekly, Badger Meter will provide PCU an email stating the accounts that were completed for that week along with any approved work. This will serve as the official data file that will be used for PCU's weekly installation review and reconciliation of completed accounts (from PVI to Badger Meter and PCU). Installation data files will be downloaded from the web portal on a weekly basis by Badger Meter and PCU.
 - PVI will email the full monthly data file to the Badger Meter project manager and the project management office monthly for invoice backup (from PVI to Badger Meter).

- As requested by PCU, Badger Meter will provide periodic additional reporting related to installation, project performance, and other items deemed relevant to the project.
- Weekly, Badger Meter, PCU, and PVI will use the web portal to track completed accounts along with meeting minutes/recaps.
- Badger Meter will provide PCU weekly status reports on daily installations completed, unable to complete accounts, route completion, installation metrics, installation forecast and updated schedule.
- Badger Meter will be conducting quality assurance checks with the meter and endpoint installations to ensure PCU's approval is met on quality installations.
- Badger Meter will inspect all installations of meters and endpoints throughout the installation phase of the project. All findings of which accounts were audited, as well as which accounts have issues will be provided to PCU weekly.

Team Communication Plan

Communication	Stakeholders Involved	Purpose	Frequency	Type/Method
Initiation meeting	All primary stakeholders, sponsors	Gather information for initiation plan	Before project start date	Meeting
Pre-construction meeting	All stakeholders	Distribute project plan	Pre-construction meeting	Meeting
Project kick off	Badger Meter, VertexOne, SAP HANA, PCU, and PVI	Communicate plans and stakeholder roles/responsibilities	Near project start date	Meeting
Status reports	Project team	Update stakeholders on progress of the project	Monthly	Meeting/report
Team meetings	Project team	To review detailed plans (tasks, assignments, and action items)	Weekly	Meeting
Quarterly project review	Project team	Review overall health of the project and highlight areas requiring action	Quarterly	Meeting/report
Post project review	Project team, key stakeholders, and sponsors	Identify improvement plans, lessons learned and review accomplishments	End of project	Meeting/report

7. Quality Control, Customer Support & Risk Management Plan

7.1 Quality Control

The project will utilize the Badger Meter standard quality management plan. Quality control is utilized across all aspects of the project including installation processes, auditing, data checking, training, and automated systems.

PVI will actively manage all project data in an electronic method that eliminates data errors. PVI is responsible for preventing, identifying, and correcting all data errors. All data will be collected electronically. Proactive and continued improvement of data management processes will be provided.

PVI will manage the following types of data:

- Installation account data
- Inventory data
 - PVI is expected to manage inventory data (meter serial number) from the time of acceptance through installation, to the time of invoice to Badger Meter
- GPS data
- Invoice data
- Quality control metrics
- Project work metrics

PVI will handle the specifics noted in Section E of the RFP as follows:

1. Endpoint – Verify there are no duplicates in the system. PVI's proprietary software flags any duplicate endpoint ID's sent in by the technician for review. The duplicate is flagged for follow-up and correction via photo or field visit.
2. Endpoint – Utilize Certification File from manufacturer and / or supplier to ensure data accuracy. Endpoint cert files are imported into PVI's material database and are used to confirm the endpoint installed is part of project inventory. Any endpoint sent in that is not part of certified inventory is automatically flagged for review by PVI data analysts.
3. New Meter – Verify there are no duplicates in the system. PVI proprietary software flags any duplicate meter numbers sent in by the technician for review. The duplicate is flagged for follow-up and correction via photo or field visit.
4. New Meter – Utilize Certification File from manufacturer and / or supplier to ensure data accuracy. New Meter cert files are imported into PVI's material database and are used to confirm the meter installed is part of project inventory. Furthermore, the meter size/meter make/meter model are also imported and propagated to the customer's CIS system.
5. Final Read – Compare final read to a threshold, including an upper and lower limit, to prevent erroneous reads from inadvertently entering billing. High/Low threshold values are requested via the customer meter exchange sync file. If these values are

available from customer CIS, they are used to QC the high/low limits via Pedal Valves' proprietary software. If these values are not available, PVI utilizes internal high/low thresholds from which to QC.

6. Meter Attributes – Utilize Certification File from manufacture and / or supplier to ensure data accuracy. New meter certification files are imported into PVI's material database and are used to confirm the meter installed is part of project inventory. Furthermore, the meter size/meter make/meter model (and any other available attributes) are also imported and propagated to the customer's CIS system.

Most importantly, our processes ensure all installation data reported is accurate. Installation data includes but is not limited to the following:

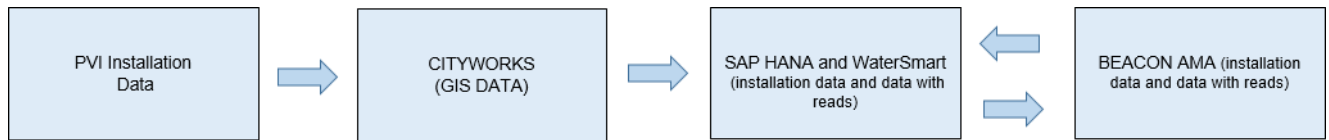
- New and old meter serial numbers
- New encoder and endpoint serial numbers
- Material number provided by PCU
- Pipe material identified on both sides of meter
- GPS coordinates
- Account data
- Time data
- Final read picture
- Final meter read
- New meter read
- Installation notes
- Installation type
- Skipped installation reason and description

Any installation accounts with inaccurate or missing account data will not be accepted and will require a PVI installer to correct the data within 24 hours after notification. PVI is expected to utilize automated methods to ensure data integrity is upheld.

PVI is expected to adhere to the following best practices to help ensure data integrity:

- All pertinent data is required to be stored by PVI in a redundant back-up system to prevent data loss
- Use of images for meter, encoder, and transmitter serial numbers
- Keystroke verification to identify mistyped data
- GPS data collected at time of original installation
- Duplicate data checking
- Verification of meter, encoder, and transmitter serial numbers by comparing to inventory data provided by Badger Meter
- Data verification will be completed by a PVI quality specialist
- PVI is expected to retain all project data for the duration of the project

PVI will transmit electronic installation data to PCU on a weekly basis in the file format acceptable to PCU.



7.2 Customer Support

7.2.1 TWENTY-FOUR HOUR CUSTOMER ACCESS DURING INSTALLATION PROCESS

The Contractor must respond on a 24-hour-per-day basis to calls from the County or from the customer associated with that installation, concerning leaks, loss of service, low pressure, and other problems associated with installation. Installation Contractor shall contact the customer within 30 minutes of receiving the call to assess the situation as immediate need or low priority. In the event of immediate need, Contractor shall make every attempt to respond onsite within thirty (30) minutes but not later than sixty (60) minutes. Some examples of immediate need are: major leak, low pressure, or no water. In the event of a low priority, Contractor shall visit the site the next morning before any new installations for the day. Some examples of low priority are: general questions about installation, meter box needs revisit for adjusting, or additional seeding/dirt/sod. The Contractor will provide the County the Customer Access phone number.

7.2.2 RESPONSE TO COMPLAINTS

Should the Installation Contractor receive a call or complaint from a customer or the County regarding installation, the Installation Contractor shall immediately log the call, including caller's name, address, phone number, account number if available, date and time of call, nature of problem and the action taken. Copies of all call logs shall be forwarded to the County, not less than once per day.

7.2.3 CUSTOMER SUPPORT

The Installation Contractor is required to offer 24-hours per day, 7-days per week customer support. Installation Contractor shall be required to correct all discrepancies with the property owners within 24-hours of notice. Documentation of each complaint and corrective measures shall be maintained by the Installation Contractor and provided to the County monthly, as part of the Contractor's monthly pay request. The Contractor shall be responsible for investigating all customer complaints with respect to remote and/or meter replacement and correcting such deficiencies including, but not limited to, leaks, restoration, debris in the customer building (see previous information about the licensed plumber) or any work directly related to the meter or meter box/lid replacement. Customer support shall be initiated, starting with the Proof of Concept and be available throughout the duration of the Project.

7.3 Risk Management Plan

7.3.1 Purpose of the Risk Management Plan

A risk is an event or condition that, if occurs, could have a positive or negative effect on a project's objectives. Risk management is the process of identifying, assessing, responding to, monitoring, and reporting risks. This risk management plan defines how risks associated with PCU project will be identified, analyzed, and managed. It outlines how risk management activities will be performed, recorded, and monitored throughout the lifecycle of the project and provides best practices for recording and prioritizing risks.

The risk management plan is created by the Badger Meter project manager and is monitored and updated throughout the project.

7.3.2 Risk Management Process

The Badger Meter project manager will work with the project team to ensure that risks are accurately identified, analyzed, and managed throughout the life of the project. Risks will be identified as early as possible in the project so as to minimize their impact. The steps for accomplishing this are outlined in the following sections.

7.3.3 Risk Identification

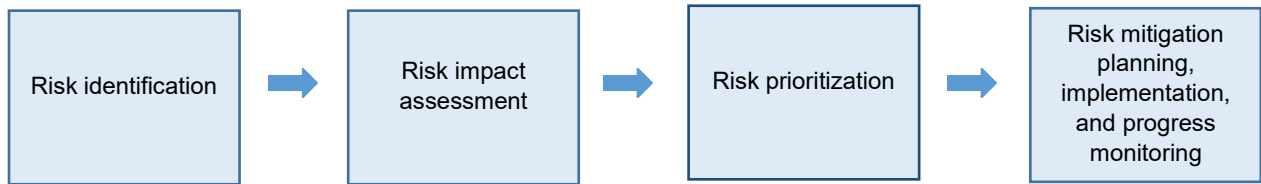
Risk identification will involve the project team, appropriate stakeholders, and will include an evaluation of environmental factors, organizational culture, and the project management plan including the project scope. Careful attention will be given to the project deliverables, assumptions, constraints, cost/effort estimates, resource plan, and other key project documents.

A Risk Management Log will be generated and updated as needed and will be stored electronically in the project library.

7.3.4 Risk Analysis

All risks identified will be assessed to identify the range of possible project outcomes. Qualification will be used to determine which risks are the top risks to pursue and respond to and which risks can be less of a focus.

Below is the Badger Meter Risk Management process:



7.4 Project Pre-Installation Survey

- Survey SOW: Survey crews will be deployed within 30 to 45 days upon either the NTP or the release of work orders identifying which surveys can be conducted. It is necessary to have the entire service territory released immediately to provide the best transition to meter installations. Technicians will spend no more than five minutes locating a meter. Accounts that cannot be located will be returned to PCU for assistance in locating the meters. We will arrange to have a technician available to work with PCU in locating meters that we are unable to find.
- At a minimum, the survey shall consist of the identification of the box and lid dimensions, lid type, register type, and location of the meter. Captured coordinates shall be within sub-foot of the actual meter location. If accessible without digging or removing soil, the technician shall collect the meter type. If the pit needs to be dug out, the technician shall identify if the pit requires the removal of soil, in which case it will be the responsibility of the installation crew to remove the soil during the time of installation.
- The technician will collect six photos of the box and lid and their immediate surroundings, as well as a photo of the pit with the lid removed. Additional photos can be collected for an additional fee. Survey data can be incorporated into the installation data or provided directly to PCU in an Excel document within two weeks of the survey being completed.

8. Ordering of Equipment/Materials

Badger Meter will manage and communicate product lead times to PCU when orders are received. Badger Meter will be primarily responsible for placing orders with enough lead time to prevent schedule delays. Badger Meter will abide by the estimated production lead times listed below as best as possible based on ongoing product demand and other factors that could affect order lead times. Each order will be reviewed and approved by PCU before it is released.

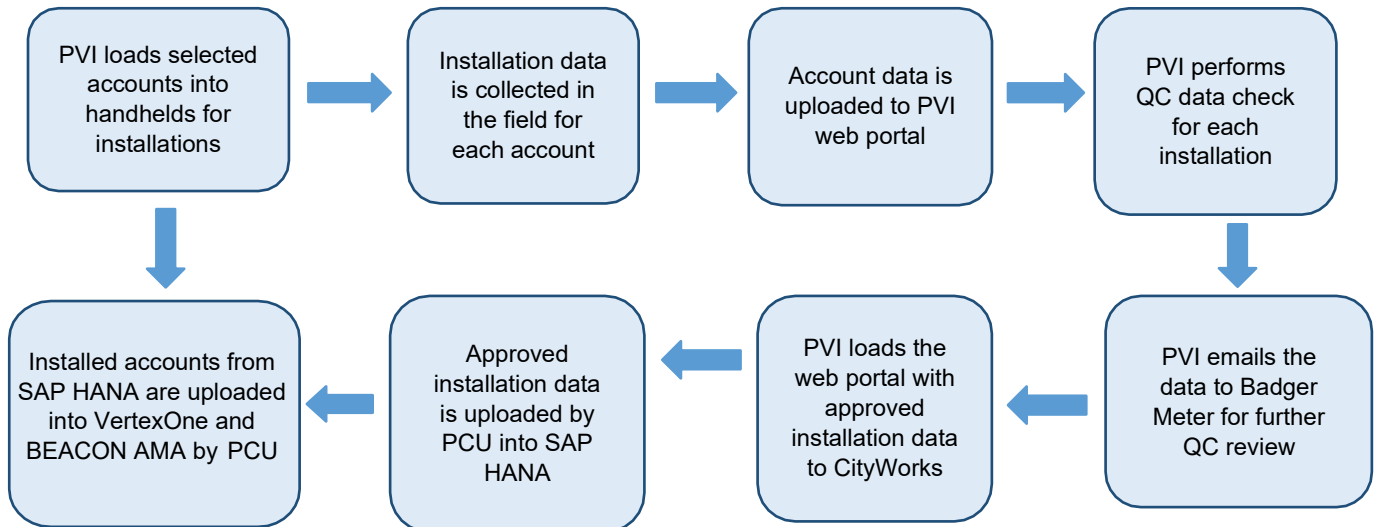
Deliverables	Lead Times
5/8 inch to 1-inch meters	~10 – 12 weeks
ORION Cellular endpoints	~18 – 20 weeks
HRE-LCD registers	~10 – 12 weeks
Competitive registers for Retrofits	~10 – 14 weeks
Training	~6 weeks
Boxes and lids	~20 – 22 weeks

9. Data Workflow

The following chart defines the method in which PCU will be provided installation data to upload to its billing system at a mutually agreed upon frequency. The time from installation or meter change for an account to the time the data is provided to PCU to enter into SAP HANA will not exceed 1 week. It will be PCU's responsibility to release the installation data into SAP HANA and then into the BEACON AMA system.

Installation Data Workflow: Standard Operating Procedure

The following flow chart displays how the installation data will move throughout the project beginning with PVI's database to its installer(s) back through its checks and balances system, out to its web portal for customer access and finally into SAP HANA and BEACON AMA.



The above Workflow is subject to change. This may vary from the requirements within the Request For Proposal document. The final workflow process to be determined as noted in the following paragraphs.

During the Proof of Concept (POC), Badger Meter will provide the required data input meter exchange files in a flat file (example csv). These exchanges can then be processed in one of the below options:

- **Option 1** – Processed manually in CityWorks, and CityWorks pushes these updates to VertexOne CIS Enterprise.
- **Option 2** - Upload meter exchanges to VertexOne CIS Enterprise. The corresponding updates will then be processed in CityWorks and GIS with meter exchange as manual tasks.

Once the Proof of Concept is complete, the meter exchange process following the Proof of Concept will be automated through web-services. Solutioning for these integrations will take place during the project.

This section will supersede other references to this workflow within the Statement of Work document or within Section 4 as noted below.

For information on the Software, Interfaces, & Testing and Proof of Concept; please see Section 4 of the overall Proposal.

10. Acceptance Criteria of Badger Meter Deliverables

In order to facilitate installation acceptance, on a monthly basis, Badger Meter shall provide PCU with an electronic submission of a list of verified installation data which includes installations completed in the prior month. Following PCU's receipt of the data, each installation set forth therein will be accepted by PCU provided the following occurs:

1. Satisfactory inspection by PCU to be completed within 10 days.
2. Successful capture of a confirming meter reading or sequence of meter readings from

that meter and endpoint by PCU operating the BEACON AMA system in a normal way;
and

3. Confirmation that data has been correctly captured in SAP HANA for each service location.

Installation Conditional Acceptance: Within 10 days from its receipt of the installation data, PCU will promptly notify Badger Meter of any installations set forth that do not meet PCU's acceptance as listed above so that Badger Meter may resolve any discrepancies. If, with respect to installations set forth, PCU does not (1) inspect the installations; (2) attempt to obtain confirming readings; or (3) confirm that the correct information for the installations have been captured in SAP HANA, in each case, within 10 business days of PCU's receipt of the installation data, through no fault of Badger Meter, the installations set forth shall be deemed by PCU to be conditionally accepted. The intent of this paragraph regards the payment for an installation and does not relieve Badger Meter of their responsibility to correct a deficiency, if any.

Payments: Monthly, Badger Meter must provide PCU an electronic invoice that itemizes conditionally accepted installations and affirmatively accepted installations and any authorized additional work for which payment has not yet been processed. All acceptable invoiced items shall be processed and paid by PCU. If, at any time within three months after PCU's acceptance of any installations, PCU finds with respect to such installations that such installations do not meet the criteria of acceptance set forth above, then PCU must remand the work to Badger Meter for correction, which Badger Meter must do at its own expense. Provided, however, that if, in performing such corrections, Badger Meter replaces equipment provided by Badger Meter, or repairs the installation of equipment which, in either case, is not covered by warranty, Badger Meter may invoice PCU for the same. The aforementioned does not supersede the product warranty. All pricing increases by the CONTRACTOR are subject to prior written approval by BADGER METER and per the agreement between BADGER METER and the Customer/Utility. BADGER METER reserves the right to reject any pricing increases not previously approved.

Milestone Acknowledgment: Written acknowledgment of project milestones met through the project will be provided by PCU to Badger Meter as requested by the Badger Meter project manager within five business days of the request.

11. System Performance & Acceptance

11.1 Initial Deployment Phase

Prior to the commencement of full-scale installation, PVI shall replace meters and install endpoints on one or more of PCU's routes, comprising approximately 2,700 meters, following the procedures proposed by Badger Meter. During this test and for a period no longer than 10 business days following it, PCU and Badger Meter shall evaluate the procedures for public notification, scheduling installations, meter and endpoint installation, data transfer to SAP HANA, meter reading over the system, installation data management, and problem resolution to ensure they are working and effective. In addition, PCU may require modification to any procedures that it deems are deficient, ineffective, or otherwise unacceptable to PCU. No work will commence on other routes until the AMI system equipment is deemed operational and approved by PCU to performance requirements on the test route, the project control procedures, and systems.

1. At least three months in advance of planned installations, PCU must provide the details of the routes to be released.
2. Badger Meter will provide PCU an implementation plan and schedule requiring, but not limited to, portion sequencing, testing requirements, deployment strategies, project closeout sequencing and requirements. Monthly Installation Sequence Plans will also be required to be submitted to PCU. Implementer shall conduct installations by groups of accounts (e.g., portions, meter read routes). Installations will be planned outside of blackout (five days before or after planned meter read). Plans will be reviewed on a weekly basis during installation meetings to accommodate any unexpected changes.
3. Badger Meter, PCU, SAP HANA, VertexOne and PVI will complete the full interface work within four months.
4. Badger Meter will place an order for products based on the determined meter sizes in the route released by PCU, and in parallel, PVI will begin mobilization of on-site resources for meter installations deployment.
5. Badger Meter will establish PCU's BEACON AMA portfolio and ensure proper testing with PCU, PVI, VertexOne, and SAP HANA to ensure proper data flow between all applicable systems.
6. After the first day's installs, a "live test" meter swap file is generated and will be processed through SAP HANA's test environment, and once approved will be processed into their live production environment.
7. PVI will perform a network analysis on the first day's installs to validate all installs from that day are online and communicating properly with the BEACON AMA system.
8. BEACON AMA integration will then be completed with generating a live sync file from SAP HANA to BEACON AMA.
9. The team will review all procedures used and results to identify potential changes required prior to the start of full deployment.

10. Badger Meter can provide a brief training overview of the BEACON AMA system to PCU upon the successful completion of the SAP HANA integration being conducted by PVI, SAP HANA, PCU, and Badger Meter.
11. Badger Meter and PVI team will provide full project support throughout the entire initial deployment phase to ensure all support necessary to ensure a successful implementation and eventual rollout to the full-scale deployment phase.
12. Upon successful review of the Proof of Concept of the BEACON AMA system by PCU, Badger Meter will request a formal acknowledgement by PCU's project manager to allow the beginning of the full project deployment along with the release of all additional routes for meter installations.
13. VERTEX One Project Manager will report in through the Badger Meter Senior PM in support of Pinellas County (Customer to Badger Meter and VERTEX One) in support of the overall system deployment.

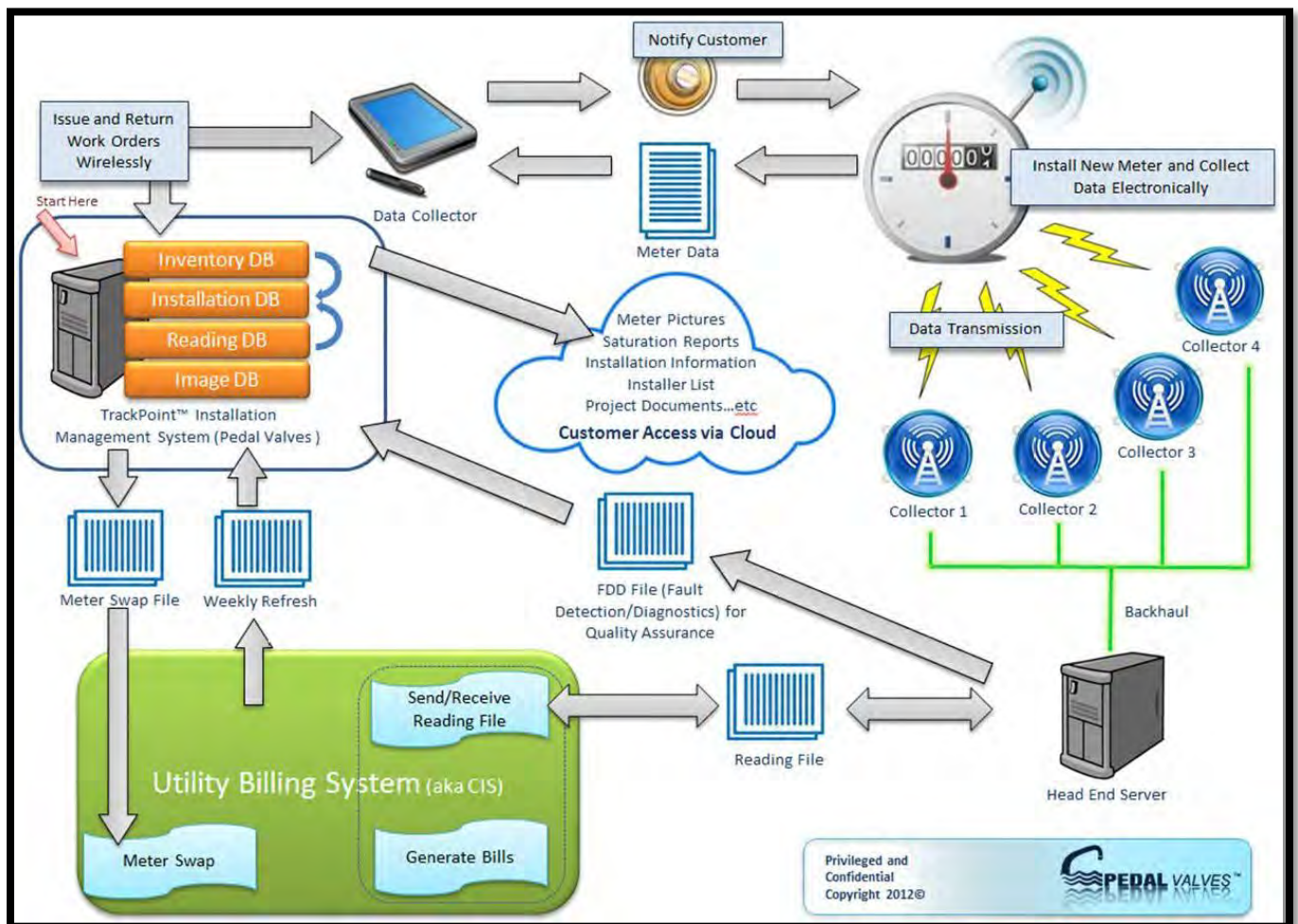
12. Meter Installations

- ORION Cellular endpoints are to be mounted through a composite lid in a meter pit by PVI.
- Please note: Endpoints must be installed per the ORION Water Endpoint Installation Manual.
- All installation crews will carry PCU's badge with them at all times.
- Installation Schedule Availability: Installers will be available for evening and weekend installations as needed (specific hours and days for work during the pre-construction meeting can be discussed to ensure all teams agree with stated times and working conditions based on sunlight available year-round).
 - Regular schedules include Monday through Friday from 8:00 a.m. until 5:00 p.m. EST as well as additional hours/days necessary to provide appointments for residents who are not available during normal business hours.
 - Number of crews for installations shall be proposed to PCU during the pre-construction meeting by PVI and Badger Meter.
- Installation Quality Control
 - PVI will inspect the meter setting, piping, and valves before the installation of a meter.
 - If any work is required above and beyond a standard installation, PVI will need to stop the installation and notify PCU of the issue(s) found and that PCU can provide resolution so that PVI can complete the work.
 - If the installation cannot be completed, the installation manager shall contact PCU's field contact immediately to ensure that the installation can be reviewed, and the work can be completed.
- Installation Data
 - The meter team at PCU will need to work with PVI and Badger Meter to do their best to determine what meter sizes will be needed at what location and in what quantities overall so that orders can be placed accurately and timely.
- PVI WOMS (TrackPoint) collects the following data:
 - Date the order was initiated and completed
 - Final read of old meter
 - Old meter serial number
 - New meter serial number

- Endpoint ID
- GPS coordinates
- Meter location code
- Meter reading code
- Results of tamper inspection
- Follow-up installations
- Comment section
- Meter material number
- Photos of new installation (For each meter installation, there shall be a minimum of six pictures taken at each property to include: overall site conditions of the area surrounding the old meter box, inside the old meter box and existing meter read, inside the new meter box assembly and new meter read and MIU, and the overall restored site conditions of the area surrounding the new meter box. All letters and numbers regarding the meter readings and MIU's shall be legible in all pictures taken by the Contractor.)
- Pipe material (upstream and downstream)
- Meter and Endpoint Installation Schedule
 - 44-month installation schedule (including ramp-up and down)
 - Start the initial deployment meter installations in October 2022 and complete installations in August 2026
 - Approximately 2,000 to 7,000 installations per month
 - Badger Meter is able to accept a 90 percent route saturation/completion before being provided additional routes, provided that all route releases will be targeted to be a minimum of 12,000 accounts per release to ensure a steady installation pace to meet the schedule requirements.
- PVI uses a customized work order system designed specifically for quality control of both meter installation workmanship and data. The system is built around a group of seasoned data analysts that are assigned to specific projects. The data analyst assigned to your project will work closely with the utility billing department throughout the project to ensure any data integration issues are handled swiftly and correctly. All data is captured wirelessly via cellular handheld devices and posted to an online repository that is accessible by the customer within minutes of installation. Although PVI receives real-time data and photos from the field, all data is stored, reviewed, and certified before being released into the customer's CIS system via our meter exchange process. PVI's QC process utilizes a certification engine to ensure data quality where automation makes sense, but the photo inspection process is only performed by PVI team members scanning through a minimum of five-meter photos per account. PVI's Data Management Operations are broken down into 6 categories as follows:

Data Collection	Quality Assurance / Quality Control	Meter Exchange Integration with CIS System
Inventory Management	Reporting To Customer	Commissioning and System Acceptance

- Below is an overview of the PVI work order system known as TrackPoint:



- Inventory Management

The best way to track assets going into the customer's system is to know exactly what product is on hand before it is installed. This small but often overlooked component can create large problems when left unmanaged. PVI goes through a data procurement process before each project begins. All inventory data (endpoint id, meter size, type, serial number, model, register ID, etc.) is imported into the PVI database when the product is received and then monitored throughout the project. Every asset in PVI's possession is scanned and matched against inventory before it leaves the warehouse. As these components are installed, the meter is flagged as installed in inventory and begins the QA/QC process that we term "certification."

- QA/QC

PVI’s Certification and Rules engine makes sure the data is “just perfect” for each unique record in our customer’s database. This means that PVI does not apply “blanket logic” to validate installations.

When PVI’s mechanics complete the electronic work order, every effort is made to reduce the opportunity for recording error. The only number that needs to be manually recorded is the existing reading from the old meter. All other numbers are collected via barcode scanner and validated against the meter inventory file using PVI’s TrackPoint software. By using the barcode number as the inventory key, PVI can minimize installation time and maximize data accuracy by inputting less data and pulling data from the file. By scanning the bar code, PVI receives the AMR/AMI number, the Serial number, manufacture date, ship date (for warranty), test certification (up to six different flow rates), and a host of other data specifically for that meter. Due to the potential for manual error in recording the existing reading, PVI will request high and low reading thresholds for each account. If this data is not available, PVI can often analyze historical data to define baseline values. If the final reading of the old meter exceeds the threshold value, TrackPoint flags the account and sends out a warning for that meter and we recheck the data from the old meter. This functionality is controlled through PVI’s meter Certification and Rules engine. The above steps ensure a smooth transition of accurately maintained data used in updating the billing system.

- Reporting to the Customer and Project Stakeholders:

PVI offers a host of reporting capabilities to the utility that keep the customer informed during the project and enables the customer real-time access to data in a variety of formations including web, FTP, email, cloud storage, etc. Custom reports regarding water theft, illegal connections, pit conditions, and other project issues are available upon request.

- Daily Email Reports:

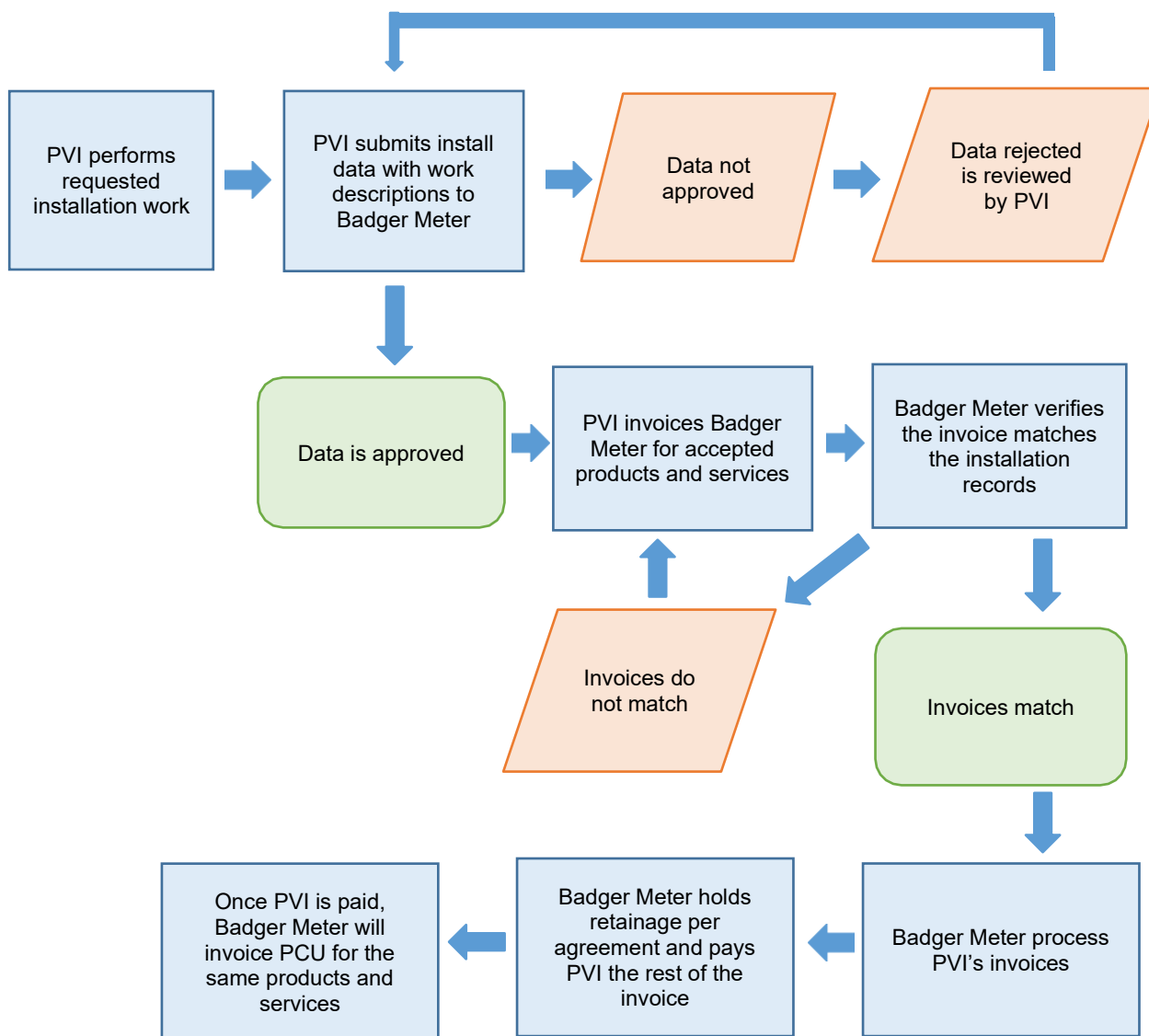
Customers on PVI projects will receive a daily report via email that contains the following information:

• Small meters installed	• QA/QC status	• Route saturation
• Large meters installed	• Percentage complete	• Custom route saturation
• Total meters installed	• Overall project summary	• Location access summary

13. Payments & Invoicing

13.1 Contractor Invoicing – Workflow

The below workflow diagram outlines how Badger Meter expects PVI to handle invoicing for installation work performed. PVI will invoice Badger Meter for accepted installation work only.



PVI is required to submit documentation of installation work performed including but not limited to:

- Account number of installations
- Work order ID
- Type of installation performed

- Type of product used
- Installation address
- Serial number of products installed
- Installation date and time
- Verification of QC check (as applicable)

Invoicing for non-installation related work will occur in the same manner with a work summary and detailed account breakdown included with PVI's invoice. Badger Meter will reject all invoices without proper work documentation.

13.2 Invoicing Procedure

The parties shall agree on a standard billing format for the contractor to invoice PCU for work performed and accepted. On a monthly basis, Badger Meter shall submit invoices to PCU for work performed and accepted by PCU.

Since Badger Meter is responsible for all product orders on behalf of PCU, PCU will only be invoiced for product after it is installed. This provides a great value to PCU by not owning any uninstalled product. In addition, the benefit and of not paying upfront in one lump sum but only as the product is installed limits PCU's financial liability. Installations will be signed off by Badger Meter and PCU and then invoicing will be processed accordingly.

13.3 Internal Project Acceptance

All work will be accepted and considered complete when the letter of substantial completion is received, payment is received from customer, and invoicing and inventory are reconciled.

13.4 External Project Acceptance

All work outlined in contract is performed to the acceptable standards of PCU.

Installation Invoices: Badger Meter receives installation data from PVI via email based on installation data once per month. The Badger Meter project manager and the project management office will check installation data for errors. Validated installation data will be provided to PCU for approval. Badger Meter will then approve the invoices from PVI and have the Badger Meter project management office forward to the Badger Meter accounts payable department for processing. At the end of each month, the Badger Meter project manager will create a pay request. Once the pay request is approved by PCU, the Badger Meter project management office will work with the Badger Meter customer care representative to generate a customer invoice that will only be generated for internal purposes. Once that internal invoice is generated, it will be reviewed and approved by the Badger Meter project manager.

14. Change Management

A change in scope can generally be defined as a requested alteration to a project that has an effect on the cost, schedule, quality, performance, or reputation of the project. Any change not covered in the project scope can be considered a scope change.

In the event a change is needed, Badger Meter will follow the predefined change management plans outlined in the subsections below.

14.1 Internal Change Management

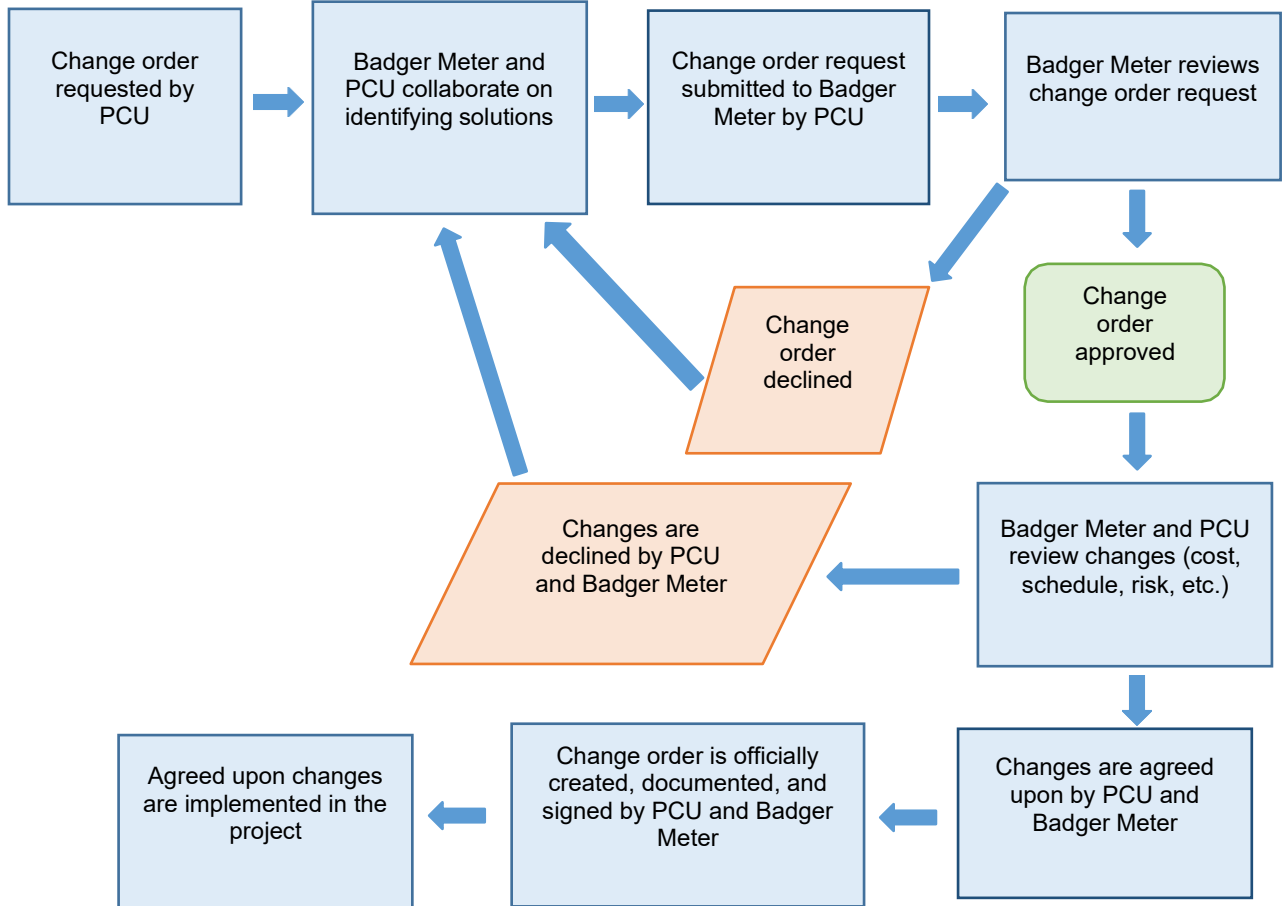
Potential changes in scope will be reviewed by the following Badger Meter parties (as needed): PMO Manager, Project Manager, Account Manager, Bids and Contracts, PVI personnel, along with the appointed personnel representing PCU.

14.2 External Change Management

If a change is initiated by PCU, the change order process flow chart provided on the following page will be used.

14.3 Change Order – Workflow

The below workflow diagram outlines how Badger Meter expects to handle change orders with PCU for work performed on the project.



15. Training

Badger Meter prefers a “demonstrate and perform” type of training methodology. Badger Meter, along with PVI, will conduct an introductory training to ensure that everyone at PCU has a solid understanding of the BEACON AMA software, services, and products. Our subject matter experts can customize training agendas to fit the needs of PCU that will provide more focused training sessions (in-person or virtual) for each specific group. We also encourage PCU to record each training session so that it can be used in the future for reference.

- All training will be conducted with PCU’s BEACON AMA software and ORION Cellular endpoints.
- Initial training sessions will include verbal or written tests for each trainee and evaluations of the training. Failures in either will be discussed with PCU representative and sessions will be repeated upon the request of PCU representative.
- Training documents, when applicable, will be provided by Badger Meter for all initial training sessions and, when applicable, for follow-up training sessions. All Badger Meter product literature, manuals, and installation documentation are available online at www.badgermeter.com and www.beaconama.net for our cloud software platform.
- If the group of trainees is too large for one session, that session will be repeated to accommodate the size of the group or for office coverage. This may increase the total amount of training hours for the project.
- Badger Meter proposes three training phases:
- Phase 1: Endpoint installation for installation and BEACON AMA overview for billing clerks
- Phase 2: BEACON AMA in depth training
- Phase 3: BEACON AMA follow up and refresher

15.1 Training Phase I: Endpoint Installation

- Endpoint Installation: Using Badger Meter documents and recommended practices, the installers are trained in the installation of meters and ORION Cellular endpoints for various applications. Training will include demonstration of the correct way to perform the installation, followed by observation of the trainee performing the installations. Each attendee will receive hardcopies of the appropriate training material.
- Based on class size, the Field Installation training may be split into two groups (24 installers per group), with the first group being trained on Day 1 and the second group being trained on Day 2. The third day of training will be performing prerequisite BEACON AMA training with the billing clerks.

Sample Endpoint Installation Phase I Day 1 (First group) & Day 2 (Second group)

Times	Subject	Notes	Suggested Attendees	Possible Other Attendees
30 min	Overview of ORION Cellular	General explanation of how the endpoints function and interact with the BEACON AMA software	Installers, meter readers	Managers
30 min	Assets	Endpoints: <ul style="list-style-type: none"> • Available • Pre-provisioned • Provisioned 	Installers, meter readers	Managers
1 hour	Installation of meters and endpoints (in classroom)	<ul style="list-style-type: none"> • Installation considerations • Activation FOB • Installation form splicing wire • Endpoint status tool 	Installers, meter readers	Managers
4 hours	Installation of meters and endpoints	At meter locations and with trainer supervision	Installers, meter readers	Managers
1 hour	Review & quiz		Installers, meter readers	Managers

Total training: 7 hours

Sample BEACON AMA Overview Phase I, Day 3:

Times	Subject	Notes	Suggested Attendees	Possible Other Attendees
1 hour	BEACON AMA overview	General overview of BEACON AMA software	Billing clerks	BEACON AMA admin
2 hours	Billing cycle	Steps of a billing cycle	Billing clerks	Customer service BEACON AMA admin
30 min	Users	<ul style="list-style-type: none"> • Staff • Customers 	Billing clerks	Customer service BEACON AMA admin
30 min	Questions		Billing clerks	Customer service BEACON AMA admin

Total training: 4 hours

15.2 Training Phase II: BEACON AMA and VertexOne Software

- Software Operation: Software training is provided to different groups at different levels. PCU and Badger Meter will develop a training plan that considers dates, times, number of trainees, and software features to be trained. Training documents will be provided by Badger Meter.
- Billing Clerk training will include all BEACON AMA subjects in order to complete a successful billing cycle.

BEACON AMA Software Phase II, Day 1 (Billing Clerks):

Times	Subject	Notes	Suggested Attendees	Possible Other Attendees
1 hour	BEACON AMA overview	General overview of BEACON AMA	Billing clerks	BEACON AMA and VertexOne admin
3 hours	Billing cycle	Includes import from: <ul style="list-style-type: none"> • SAP HANA • Billing export to SAP HANA 	Billing clerks	BEACON AMA and VertexOne admin
30 min	At A Glance	Modules and their features	Billing clerks	BEACON AMA and VertexOne Admin
1 hour	Monitor	All sections covered: <ul style="list-style-type: none"> • Facets • Water usage graph • Downloads • Results/cards 	Billing clerks	BEACON AMA and VertexOne admin
30 min	Assets	<ul style="list-style-type: none"> • Endpoint status • Service • Utility settings 	Billing clerks	BEACON AMA and VertexOne admin
1 hour	Review/quiz	Includes evaluation of trainees' BEACON AMA	Billing clerks	BEACON AMA and VertexOne admin

Total training: 7 hours

BEACON AMA Software Phase II

Day 2 (Customer Service – AM and PM sessions if desired by PCU):

Times	Subject	Notes	Suggested Attendees	Possible Other Attendees
30 min	BEACON AMA overview	General overview of BEACON AMA	Customer service	BEACON AMA and VertexOne admin
1 hour	At A Glance	Modules and their features	Customer service	BEACON AMA and VertexOne admin
1 hour	Monitor	All sections covered: <ul style="list-style-type: none"> • Facets • Water usage Graph • Downloads • Results/cards 	Customer service	BEACON AMA and VertexOne admin
1 hour	Assets	Endpoint status	Customer service	BEACON AMA and VertexOne admin
30 min	Review/quiz	Includes evaluation of trainees BEACON AMA	Customer service	BEACON AMA and VertexOne admin

Total training: 4 hours

15.3 Training Phase III: BEACON AMA Software

- If needed, this phase will be used to train new BEACON AMA users or it may be used for any additional training requested by PCU.
- After a minimum of three to six months of using the BEACON AMA system, a three-day training will be coordinated between PCU and the Badger Meter project manager. At that time, PCU will provide a list of questions or list of items requiring further training. If there are additional BEACON AMA users requiring training, this session can be used for that. Training documents, when applicable, will be provided by Badger Meter.

16. Project Closeout

16.1 Project Completion

- In pursuit of closing out the project, the Badger Meter and PVI teams will follow these procedures:
 - Review all project deliverables and validate that the deliverables have been completed per the defined acceptance criteria (this will occur throughout the project).
 - Obtain substantial route completion signoff from PCU throughout the project per the defined acceptance criteria (this will occur throughout the project).
 - After the review of the list of accounts previously defined as (Return-to-Utility) RTU and upon mutual agreement, such accounts shall be removed from scope for PCU to manage or rescheduled for PVI to complete.
 - Review any pending action items and agree on the resolution (this will occur throughout the project).
 - Review inventory status and disposition, and discuss/resolve discrepancies (this will occur throughout the project).
 - Review financial status/budget, discuss/resolve discrepancies (this will occur throughout the project).
 - PVI to deliver all data and pictures obtained throughout the project to PCU and Badger Meter.
 - PVI to deliver closeout/project book to Badger Meter and PCU, which may include scope summary, technical documentation, and billing procedures, and provide account/route signoff summary and distribute list of key contacts.
- Should PCU disagree on the completion criteria of any item, the following resolution methods are suggested:
 - A list of items of unacceptable work will need to be provided by PCU to Badger Meter and PVI along with scheduling a meeting to review and discuss a proper solution and project closeout
 - Escalation path through PVI, Badger Meter, and PCU for detailed discussion, contract review, and mutually agreeable resolution.

16.2 Project Closeout Activities

- During the installation project, as batches of accounts are installed, PCU will be asked to review and provide signoff per route.
- Once all the routes have been substantially completed and signed off, a closeout meeting will be scheduled for all parties.
- Closeout Meeting Agenda:
 - Review project scope
 - Review final project deliverables and route completion
 - Review project metrics and overall project status
 - Review RTU list

- Review any pending action items
- Review inventory status and disposition
- Discuss project documentation
- Conduct project lessons learned session
- Obtain formal acceptance of project completion
- Project Closeout Criteria:
 - All meter change outs processed in the TrackPoint system
 - All routes substantially complete
 - Meter data available in BEACON AMA
 - All inventory reconciled and dispersed
 - No pending action items
 - No outstanding assist/RTU accounts
 - Training of PCU staff is completed
 - Installation pictures delivered to PCU

17. Installation Services Statement of Work

17.1 Outside Meter Installation

Installation of outside set water meters sized 5/8 inch to 1 inch.

17.1.1 Statement of Work

- Small meters (up to and including 1 inch).
 - Utilize an electronic WOMS (TrackPoint) for work order assignment and data collection.
 - Validate that the meter serial number and address match the WOMS data.
 - Remove the old meter and gaskets and replace with a new meter, gaskets, and endpoint device.
 - Sanitize meter spuds and couplings with approved solution.
 - Take the following pictures and store in the WOMS:
 - Old meter installation area with old meter read
 - New meter installation with new meter read and MIU
 - Post-installation area
 - New meter number
 - Endpoint ID
 - Pipe material (upstream and downstream)
 - Photos of new installation (For each meter installation, there shall be a minimum of six pictures taken at each property to include: overall site conditions of the area surrounding the old meter box, inside the old meter box and existing meter read, inside the new meter box assembly and new meter read and MIU, and the overall restored site conditions of the area surrounding the new meter box. All letters and numbers regarding the meter readings and MIU's shall be legible in all pictures taken by the Contractor.)
 - Activate the endpoint.
 - Digitally record old meter and new meter/endpoint information.

- Apply wire-seal to the register for security purposes.

17.1.2 Deliverables

- Provide electronic change out data to PCU.

17.1.3 Assumptions

- Meters being replaced are like for like (same size, lay length, etc.).
- Badger Meter is able to accept a 90 percent route saturation/completion before being provided additional routes, provided all route releases will be at a minimum 12,000 accounts per release to ensure a steady installation pace to meet the schedule requirements.
- New, composite, pre-drilled lids are available at the time of meter installation.
- PCU prepared to provide required support to resolve meter assist/RTU/escalation requests within ten business days of notification.
- Any unique customer accounts shall be explicitly identified.
- Recommended pictures are noted above; however, PVI can take additional photos if required.
- Work will occur during normal, approved work hours, however, scheduled appointments for intermediate and large meters may be out of normal work hours with no additional cost to PCU.

17.2 Outside Meter Retrofit (Encoder, Endpoint & Lid)

Retrofit of small, intermediate, and large water meters ranging in size from 5/8 inch to 10 inch, all types including but not limited to Positive Displacement, Turbine, Mag, and Compound meters.

17.2.1 Statement of Work (All Meters up to 10")

- Utilize an electronic WOMS (TrackPoint) for work order assignment and data collection.
- Validate that the meter serial and address match the WOMS data.
- Remove the old endpoint and replace with a new endpoint.
- Take the following pictures and store in the WOMS:
 - Old meter installation area with old meter read
 - New meter installation with new meter read and MIU
 - Post-installation area
 - New meter number
 - Endpoint ID
 - Pipe material (upstream and downstream)
 - Photos of new installation (For each meter installation, there shall be a minimum of six pictures taken at each property to include: overall site conditions of the area surrounding the old meter box, inside the old meter box and existing meter read, inside the new meter box assembly and new meter read and MIU, and the overall restored site conditions of the area surrounding the new meter box. All letters and numbers regarding the meter readings and

- MIU's shall be legible in all pictures taken by the Contractor.)
- Apply wire-seal to the register for security purposes.
- Activate the endpoint.
- Digitally record old meter and new meter/endpoint information.

17.2.2 Deliverables

- Provide electronic change out data to PCU.

17.2.3 Assumptions

- Badger Meter will adhere to SAP HANA's upload file format for retrofits.
- Recommended pictures are noted above, however, Badger Meter can take additional photos if required.

17.3 New Service (Cut-In) Outside Meter Installation

Installation of outside set water meters sized 5/8 inch to 1 inch.

17.3.1 Statement of Work

- Small meters (up to and including 1 inch).
 - Utilize TrackPoint for work order assignment and data collection.
 - Validate that the meter serial number and address match the WOMS data.
 - Cut the line and install a new meter, boxes & lids, gaskets, couplings, curb-stops and endpoint device.
 - Take the following pictures and store in the WOMS:
 - Old meter installation area with old meter read
 - New meter installation with new meter read and MIU
 - Post-installation area
 - New meter number
 - Endpoint ID
 - Pipe material (upstream and downstream)
 - Photos of new installation (For each meter installation, there shall be a minimum of six pictures taken at each property to include: overall site conditions of the area surrounding the old meter box, inside the old meter box and existing meter read, inside the new meter box assembly and new meter read and MIU, and the overall restored site conditions of the area surrounding the new meter box. All letters and numbers regarding the meter readings and MIU's shall be legible in all pictures taken by the Contractor.)
 - Activate the endpoint.
 - Digitally record new meter/endpoint information.
 - Apply wire-seal to the register for security purposes.

17.3.2 Deliverables

- Provide electronic change out data to PCU.

17.3.3 Assumptions

- Meters being replaced are like for like (same size, lay length, etc.).
- Badger Meter is able to accept a 90 percent route saturation/completion before being provided additional routes, provided all route releases will be at a minimum 12,000 accounts per release to ensure a steady installation pace to meet the schedule requirements.
- New, composite, pre-drilled lids are available at the time of meter installation.
- PCU prepared to provide required support to resolve meter assist/RTU/escalation requests within ten days of notification.
- Any unique customer accounts shall be explicitly identified.
- Recommended pictures are noted above; however, PVI can take additional photos if required.
- Work will occur during normal, approved work hours, however, scheduled appointments for intermediate and large meters may be out of normal work hours with no additional cost to PCU.

17.4 Inventory Management

17.4.1 Statement of Work

- Utilize a defined process to track and manage meter inventory throughout the project and will include the following:
 - Warehousing
 - Provide all warehouse space
 - Receiving
 - Receive, count, and quarantine as necessary all delivered meter materials
 - Record inventory serial numbers in TrackPoint (when it arrives at the warehouse)
 - Verify and reconcile all products received against the packing list or bill of lading
 - Daily Issue
 - Issue meter stock daily to field installation technicians
 - Issue all meters and ancillary items from the secure storage facility to the field technician by PVI's project manager
 - Track inventory that is transferred to the client
 - Nightly Reconciliation
 - Perform a daily physical count by each field technician and validate counts against the daily production report
 - Confirm accuracy of the daily physical count by PVI's project manager
 - Warehouse Reconciliation
 - Perform a weekly physical count and reconciliation of warehouse meter stock by the Pedal Valve's project manager
 - Warranty Process
 - Collaborate with the client to determine an agreeable process for warranty returns back to the AMI vendor throughout the installation project
 - Inventory Forecasts

- Installation/inventory forecast and meter delivery schedules are based upon the projected quantity of installers and installation rates. PVI recommends a six- to eight-week supply of inventory to be retained in the warehouse. PVI will make forecast and purchase plan available to PCU upon request.

17.4.2 Assumptions

- Scrap metal recycling to be provided by PVI under supervision of Badger Meter.

17.5 Professional Services

Professional services to include warehousing facilities, printing, and storage.

17.5.1 Statement of Work

- PVI provides and places all post installation door hangers for meter installation services 7-days prior to the start of the work.
- Includes PVI inventory management services.

17.6 Electronic Mass Meter Change Out (MMCO) Interface

Electronic MMCO Interface pricing is included in all installation and retrofit applications.

17.6.1 Statement of Work

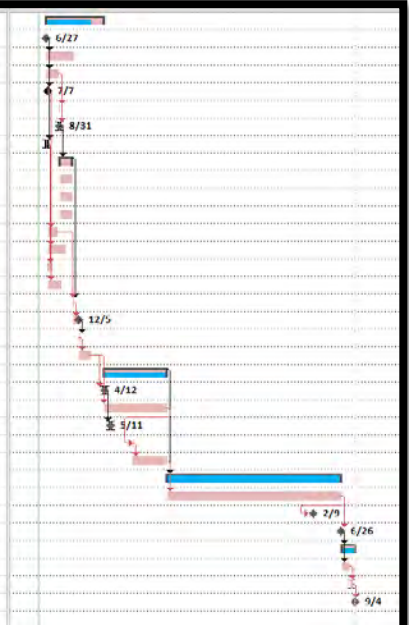
- Obtain SAP HANA meter and account data.
- Perform data gap analysis to identify missing and/or improperly formatted data.
- Load SAP HANA data into TrackPoint.
- Load new meter and endpoint inventory data into TrackPoint.
- Perform data QA/QC validity audits on meter exchange data collected.
- Perform network validation QA/QC on installed meters/endpoints.
- Troubleshoot and correct data exceptions.

17.6.2 Deliverables

- Generate MMCO files with validated installation data and properly formatted to the required specification.
- Transmit the MMCO files periodically to PCU for processing in CityWorks.

Attachment A – Schedule

Task	Start Date	End Date	Duration	Dependencies	Notes
Phase I: Planning, Design and Integrations	Mon 6/21/22	Mon 4/10/23	206 days		
Notice to Proceed #1 w/Pilot (NTP)/County issues PD - 120 meters	Mon 6/27/22	Mon 6/27/22	0 days		
Initial order (~120 Lids & Boxes)	Mon 6/27/22	Fri 11/11/22	100 days		
Initial order (~120 meters & endpoints)	Mon 6/27/22	Fri 8/26/22	45 days		
Pre-construction meeting	Wed 7/6/22	Thu 7/7/22	2 days	2FS+7 days	
Subject Matter Expert Installation Training	Mon 8/29/22	Mon 8/29/22	1 day		
Install POC initial meters, endpoint, boxes, lids and add data to SAP HANA Test system	Mon 8/29/22	Wed 8/31/22	3 days		
BEACON system configuration	Mon 6/27/22	Wed 6/29/22	3 days		
BEACON and SAP HANA integration	Thu 9/1/22	Fri 11/4/22	47 days		
Billing Interface (Meter Lifecycle and Meter Consumption Reads)	Thu 9/1/22	Fri 11/4/22	47 days		
Customer Portal Interface (Meter Alarms, Meter Interval Reads, Meter Exceptions, etc.)	Thu 9/1/22	Fri 11/4/22	47 days		
Bi-Directional Integration of Valve Shutoff between BEACON & SAP	Thu 9/1/22	Fri 11/4/22	47 days		
Trackpoint (Pedal Valve/PVI Work Order Management System (WOMS)) integration with C	Fri 7/8/22	Thu 8/18/22	30 days		
VertexOne/WaterSmart Planning & Integration	Fri 7/8/22	Thu 9/29/22	60 days		
Develop a customer communications and public relations program	Thu 6/30/22	Wed 7/27/22	20 days		
Secure PVI warehouse	Fri 7/8/22	Thu 9/8/22	45 days		
Subject Matter Expert Training BEACON	Mon 11/7/22	Mon 11/7/22	1 day		
Testing and system acceptance of integrations	Tue 11/8/22	Mon 12/5/22	20 days		
Finalize deployment plans for phase II	Tue 12/6/22	Tue 12/6/22	1 day		
POC Monitoring/Mass deployment equipment on order	Wed 12/7/22	Tue 1/31/23	40 days		
Phase II: Year 1 Install and Implementation of AMI Design (~24,000 meters over 1 year)	Thu 4/11/23	Tue 2/13/24	221 days		
Training phase I: Installation Training	Tue 4/11/23	Wed 4/12/23	2 days		
Ramp Up Meter Installations (~1,000 growing to ~4,000 per month)	Tue 4/11/23	Mon 2/12/24	220 days		
Training phase II: BEACON AMA	Thu 5/11/23	Thu 5/11/23	1 day	22FS+20 day	
Finalize deployment plans for phase III	Tue 8/29/23	Tue 8/29/23	1 day	23FS-120 day	
Order and Ship phase III equipment	Wed 8/30/23	Tue 2/13/24	120 days		
Phase III: Year 2 thru 4 Install and Implementation of AMI Design (~100,000 Meters)	Wed 2/14/24	Fri 6/26/26	618 days		
Full Meter Deployment (~4,000 per month)	Wed 2/14/24	Fri 6/26/26	618 days		
Training phase III (Optional)	Mon 2/9/26	Mon 2/9/26	1 day	28FS-100 day	
Substantial completion	Fri 6/26/26	Fri 6/26/26	0 days		
Phase IV: Final Cleanup and System Validation	Mon 6/29/26	Fri 9/4/26	50 days		
Ramp down production	Mon 6/29/26	Fri 8/7/26	30 days		
Provide final AMI system cleanup	Mon 8/10/26	Fri 8/21/26	10 days		
Final system test and acceptance	Mon 8/24/26	Fri 9/4/26	10 days		



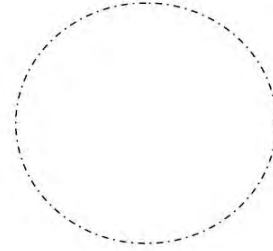
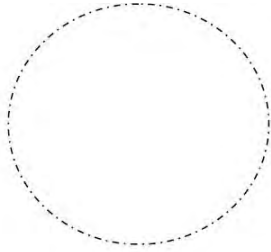
Attachment B – Sample Communication Letter

NEWSPAPER / RADIO / INTERNET / BILLING MAIL-OUT / POSTCARD ANNOUNCEMENT

<UTILITY NAME> Water Meter Replacement

Starting in **xxxxx**, the **UTILITY NAME** will begin work to replace and/or upgrade water meters in our city. Work will be done by workers wearing blue shirts marked with the logo “PVI Meter Team”. Trucks marked with the logo, “Pedal Valves”, will be used during meter swap outs. Meter replacement is anticipated to take approximately 30 minutes at each location. Commercial meter customers will be scheduled and notified of water shutoffs in advance. Anyone having special needs for water should notify the Water Department at _____. Please pardon any inconvenience during this upgrade to your service.

Attachment C – Sample Doorhanger

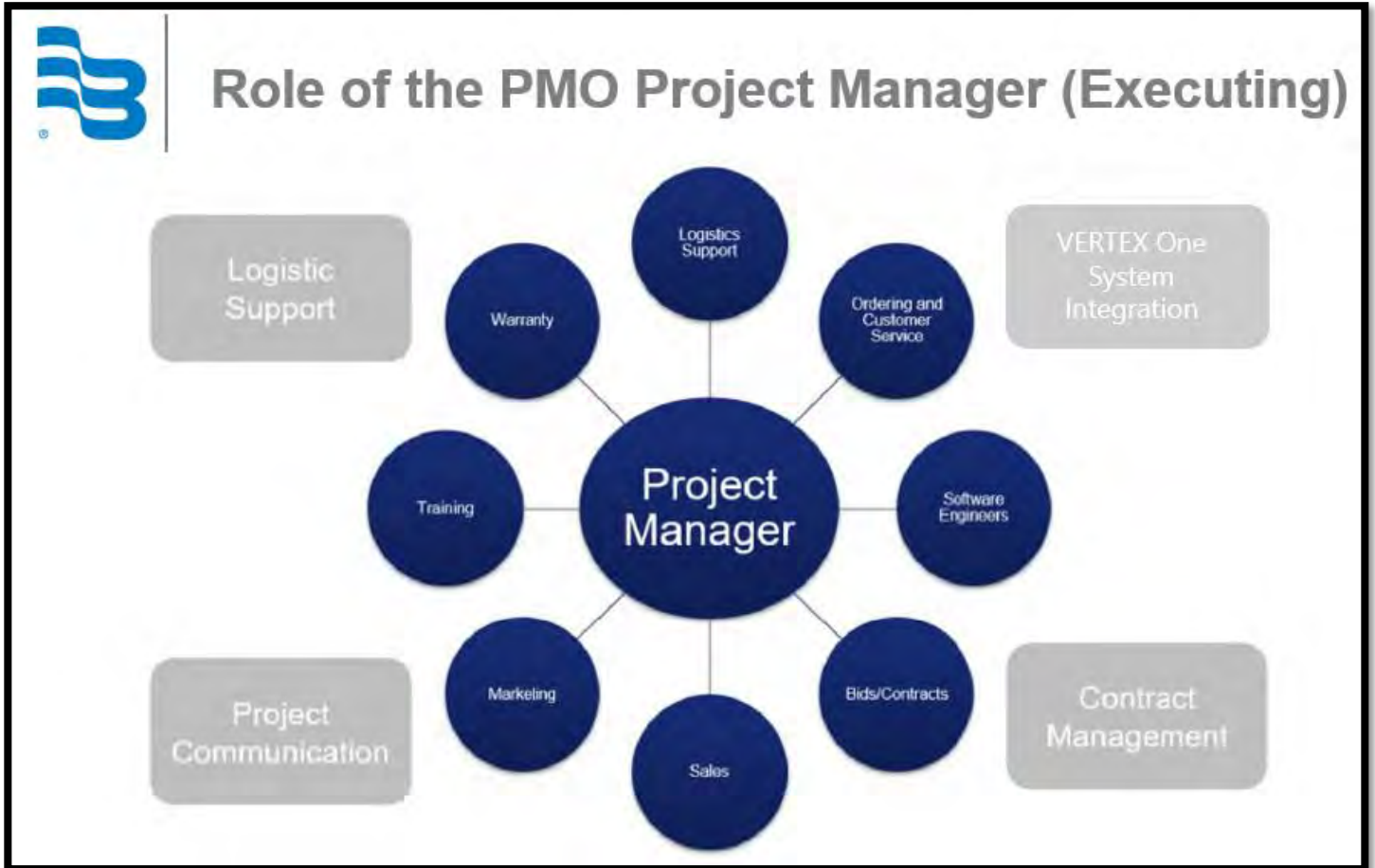


WATER METER INSTALLATION PROJECT
<p>Dear Customer,</p> <p>We are pleased to inform you that XXXX is currently implementing a meter installation project.</p> <p>Your water was temporarily shut off during installation. Please run an outside spigot or your bathtub for 5 to 10 seconds to flush your line.</p> <p>If you were not home, or did not answer your door at the time of installation, you received this written notification. If you have any questions, please contact us at ??-??-???.</p> <p>Sincerely, Meter Installation Crew</p>
<p>SPECIAL NOTE:</p> <p>DATE: _____</p> <p><input type="checkbox"/> Meter Installation completed.</p> <p><input type="checkbox"/> Problem corrected.</p> <p><input type="checkbox"/> The issue you called about was not found – please contact Water Department.</p> <p><input type="checkbox"/> Water left off – Please Call:</p> <p>Comments: _____</p> <p>_____</p>

WATER METER INSTALLATION PROJECT
<p>Dear Customer,</p> <p>We are pleased to inform you that XXXX is currently implementing a meter installation project.</p> <p>Your water was temporarily shut off during installation. Please run an outside spigot or your bathtub for 5 to 10 seconds to flush your line.</p> <p>If you were not home, or did not answer your door at the time of installation, you received this written notification. If you have any questions, please contact us at ??-??-???.</p> <p>Sincerely, Meter Installation Crew</p>
<p>SPECIAL NOTE:</p> <p>DATE: _____</p> <p><input type="checkbox"/> Meter Installation completed.</p> <p><input type="checkbox"/> Problem corrected.</p> <p><input type="checkbox"/> The issue you called about was not found – please contact Water Department.</p> <p><input type="checkbox"/> Water left off – Please Call:</p> <p>Comments: _____</p> <p>_____</p>

Attachment D – PMO Hub

The Badger Meter Project Manager is the primary point of contact and interface between PCU's team and Badger Meter. Responsible for requirements gathering, project plans, and managing timelines with the support of the PMO Manager.



Statement of Work/Project Plan, Pinellas PCU Utilities, 5/23/2022

SMART WATER IS BADGER METER

Trademarks appearing in this document are the property of their respective entities. Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding contractual obligation exists.
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www.badgermeter.com

AGREEMENT

EXHIBIT B - INSURANCE REQUIREMENTS

LIMITATIONS ON LIABILITY. Proposer acknowledges and agrees that the services will be provided without any limitation on Proposer's liability, except as defined in the SLA and Proposers standard product warranties.

INDEMNIFICATION. Proposer acknowledges and agrees to be bound by and subject to the County's indemnification provisions as set out in the Services Agreement and the SLA.

INSURANCE:

Proposer must provide a certificate of insurance and endorsement in accordance with the insurance requirements listed below, prior to award of contract. Failure to provide the required insurance within the requested timeframe may result in your submittal being deemed non-responsive.

The contracted Proposer shall obtain and maintain, and require any sub-contractors to obtain and maintain, at all times during its performance of the Agreement, insurance of the types and in the amounts set forth. For projects with a Completed Operations exposure, Contractor shall maintain coverage and provide evidence of insurance for two (2) years beyond final acceptance. All insurance policies shall be from responsible companies duly authorized to do business in the State of Florida and have an AM Best rating of A- VIII or better.

Proposal submittals should include the Proposer's current Certificate(s) of Insurance in accordance with the insurance requirements listed below. If Proposer does not currently meet insurance requirements, Proposer shall also include verification from their broker or agent that any required insurance not provided at that time of submittal will be in place prior to the award of contract.

Proposer shall email certificate that is compliant with the insurance requirements to jjust@pinellascounty.org If certificate received with bid was a compliant certificate no further action may be necessary. The Certificate(s) of Insurance shall be signed by authorized representatives of the insurance companies shown on the Certificate(s). **A copy of the endorsement(s) referenced in paragraph d) for Additional Insured shall be attached to the certificate(s) referenced in this paragraph.** The certificate must name Pinellas County, a Political Subdivision of the State of Florida **400 S Fort Harrison Avenue Clearwater, FL 33756**, as certificate holder. Certificate marked "Sample", or blank certificate holder information are not compliant.

Approval by the County of any Certificate(s) of Insurance does not constitute verification by the County that the insurance requirements have been satisfied or that the insurance policy shown on the Certificate(s) of Insurance is in compliance with the requirements of the Agreement. County reserves the right to require a certified copy of the entire insurance policy, including endorsement(s), at any time during the RFP and/or contract period.

All policies providing liability coverage(s), other than professional liability and workers compensation policies, obtained by the Proposer and any subcontractors to meet the requirements of the Agreement shall be endorsed to include **Pinellas County a Political subdivision of the State of Florida** as an Additional Insured.

If any insurance provided pursuant to the Agreement expires or cancels prior to the completion of the Work, you will be notified by CTrax, the authorized vendor of Pinellas County. Upon notification, renewal Certificate(s) of Insurance and endorsement(s) shall be furnished to Pinellas County Risk Management at InsuranceCerts@pinellascounty.org and to CTrax c/o JDi Data at PinellasSupport@ididata.com by the Proposer or their agent prior to the expiration date.,

Proposer's policies expire on 12/31 each year and are reissued the next day, and Proposer will email its most current insurance cert to the county upon its reissue. . Notice shall be emailed to Pinellas County Risk Management at InsuranceCerts@Pinellascounty.org.

Should the Proposer, at any time, not maintain the insurance coverages required herein, the County may terminate the Agreement, or at its sole discretion may purchase such coverages necessary for the protection of the County and charge the Proposer for such purchase or offset the cost against amounts due to proposer for services completed. The County shall be under no obligation to purchase such insurance, nor shall it be responsible for the coverages purchased or the insurance company or companies used. The decision of the County to purchase such insurance shall in no way be construed to be a waiver of any of its rights under the Agreement.

AGREEMENT

The County reserves the right, but not the duty, to review and request a copy of the Contractor's most recent annual report or audited financial statement when a self-insured retention (SIR) or deductible exceeds \$50,000.

If subcontracting is allowed under this RFP, the Prime Proposer shall obtain and maintain, at all times during its performance of the Agreement, insurance of the types and in the amounts set forth; and require any subcontractors to obtain and maintain, at all times during its performance of the Agreement, insurance limits as it may apply to the portion of the Work performed by the subcontractor; *but in no event will the insurance limits be less than \$500,000 for Workers' Compensation/Employers' Liability, and \$1,000,000 for General Liability and Auto Liability if required below.*

All subcontracts between Proposer and its subcontractors shall be in writing and are subject to the County's prior written approval. Further, all subcontracts shall (1) require each subcontractor to be bound to Proposer to the same extent Proposer is bound to the County by the terms of the Contract Documents, as those terms may apply to the portion of the Work to be performed by the subcontractor; (2) provide for the assignment of the subcontracts from Proposer to the County at the election of Owner upon termination of the Contract; (3) provide that County will be an additional indemnified party of the subcontract; (4) provide that the County will be an additional insured on all insurance policies required to be provided by the subcontractor except workers compensation and professional liability; (5) provide waiver of subrogation in favor of the County and other insurance terms and/or conditions as outlined below; (6) assign all warranties directly to the County; and (7) identify the County as an intended third-party beneficiary of the subcontract. Proposer shall make available to each proposed subcontractor, prior to the execution of the subcontract, copies of the Contract Documents to which the subcontractor will be bound by this Section C and identify to the subcontractor any terms and conditions of the proposed subcontract which may be at variance with the Contract Documents.

Each insurance policy and/or certificate shall include the following terms and/or conditions:

The Named Insured on the Certificate of Insurance and insurance policy must match the entity's name that responded to the solicitation and/or is signing the agreement with the County. If Proposer is a Joint Venture per Section A. titled Joint Venture of this RFP, Certificate of Insurance and Named Insured must show Joint Venture Legal Entity name and the Joint Venture must comply with the requirements of Section B with regard to limits, terms and conditions, including completed operations coverage.

Companies issuing the insurance policy, or policies, shall have no recourse against County for payment of premiums or assessments for any deductibles which all are at the sole responsibility and risk of Contractor.

The term "County" or "Pinellas County" shall include all Authorities, Boards, Bureaus, Commissions, Divisions, Departments and Constitutional offices of County and individual members, employees thereof in their official capacities, and/or while acting on behalf of Pinellas County.

The policy clause "Other Insurance" shall not apply to any insurance coverage currently held by County or any such future coverage, or to County's Self-Insured Retentions of whatever nature.

All policies shall be written on a primary, non-contributory basis.

Any Certificate(s) of Insurance evidencing coverage provided by a leasing company for either workers compensation or commercial general liability shall have a list of covered employees certified by the leasing company attached to the Certificate(s) of Insurance. The County shall have the right, but not the obligation to determine that the Proposer is only using employees named on such list to perform work for the County. Should employees not named be utilized by Proposer, the County, at its option may stop work without penalty to the County until proof of coverage or removal of the employee by the contractor occurs, or alternatively find the Proposer to be in default and take such other protective measures as necessary.

Insurance policies, other than Professional Liability, shall include waivers of subrogation in favor of Pinellas County from both the Proposer and subcontractor(s).

The minimum insurance requirements and limits for this Agreement, which shall remain in effect throughout its duration and for two (2) years beyond final acceptance for projects with a Completed Operations exposure, are as follows:

Workers' Compensation Insurance

AGREEMENT

Limit Florida Statutory

Employers' Liability Limits

Per Employee	\$ 500,000
Per Employee Disease	\$ 500,000
Policy Limit Disease	\$ 500,000

Commercial General Liability Insurance including, but not limited to, Independent Contractor, Contractual Liability Premises/Operations, Products/Completed Operations, and Personal Injury. **No explosion, collapse, or underground damage exclusions.**

Limits

Combined Single Limit Per Occurrence	\$ 1,000,000
Products/Completed Operations Aggregate	\$ 2,000,000
Personal Injury and Advertising Injury	\$ 1,000,000
General Aggregate	\$ 2,000,000

Business Automobile or Trucker's/Garage Liability Insurance covering owned, hired, and non-owned vehicles. If the Proposer does not own any vehicles, then evidence of Hired and Non-owned coverage is sufficient. Coverage shall be on an "occurrence" basis, such insurance to include coverage for loading and unloading hazards, unless Proposer can show that this coverage exists under the Commercial General Liability policy.

Limit

Combined Single Limit Per Accident	\$ 1,000,000
------------------------------------	--------------

Excess or Umbrella Liability Insurance excess of the primary coverage required, in paragraphs (1), (2), and (3) above: **No explosion, collapse, or underground damage exclusions.**

Limits

Each Occurrence	\$ 5,000,000
General Aggregate	\$ 5,000,000

AGREEMENT

Pollution Legal/Environmental Legal Liability Insurance held by installation subcontractor for pollution losses arising from all services performed to comply with this contract. Coverage shall apply to sudden and gradual pollution conditions including the discharge, dispersal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants, or pollutants into or upon land, the atmosphere or any watercourse or body of water, which results in Bodily Injury or Property Damage. If policy is written on a Claims Made form, a retroactive date is required, and coverage must be maintained for 3 years after completion of contract or "tail coverage must be purchased. Coverage should include and be for the at least the minimum limits listed below:

Bodily injury, sickness, disease, mental anguish, or shock sustained by any person, including death; property damage including physical injury to or destruction of tangible property including the resulting loss of use thereof, cleanup costs, and the loss of use of tangible property that has not been physically injured or destroyed.

Defense including costs, charges and expenses incurred in the investigation, adjustment, or defense of claims for such compensation damages.

Cost of Cleanup/Remediation.

Limits		
	Per Claim or Occurrence	\$ 5,000,000
	General Aggregate	\$ 5,000,000

For acceptance of Pollution Legal/Environmental Legal Liability coverage included within another policy coverage required herein, a statement notifying the certificate holder must be included on the certificate of insurance and the total amount of said coverage per occurrence must be greater than or equal to the amount of Pollution Legal/Environmental Legal Liability and other coverage combined.

For herbicide and pesticide spraying operations only, an endorsement to the Commercial General Liability policy that provides Pollution Liability coverage for herbicide and pesticide spraying is acceptable.

Cyber Risk Liability (Network Security/Privacy Liability) Insurance including cloud computing and mobile devices, for protection of private or confidential information whether electronic or non-electronic, network security and privacy; privacy against liability for system attacks, digital asset loss, denial or loss of service, introduction, implantation or spread of malicious software code, security breach, unauthorized access and use; including regulatory action expenses; and notification and credit monitoring expenses with at least minimum limits as follows:

Limits		
	Each Occurrence	\$ 5,000,000
	General Aggregate	\$ 5,000,000

For acceptance of Cyber Risk Liability coverage included within another policy required herein, a statement notifying the certificate holder must be included on the certificate of insurance and the total amount of said coverage per occurrence must be greater than or equal to the amount of Cyber Risk Liability and other coverage combined.

Property Insurance Proposer will be responsible for all damage to its own property, equipment and/or materials.

AGREEMENT

EXHIBIT C - STATEMENT OF VALUES

EXHIBIT C - STATEMENT OF VALUES follows:

Contractor Name: Badger Meter
 Contractor Address: 4545 West Brown Deer Rd
 Milwaukee, WI 53224
 Owner: Pinellas County, FL

ITEM NO.	DESCRIPTION	QUANTITY PER CONTRACT	UNIT	TOTAL UNIT PRICE IN CONTRACT	TOTAL UNIT PRICE IN CONTRACT (EXT)
1	Model 25 bronze, 5/8" x 3/4", pl. bottom, HR-E LCD Nicor connector – POTABLE WATER	92,617	EA	\$67.00	\$6,205,339.00
2	Model 25 bronze, 5/8" x 3/4", brz bottom, HR-E LCD Nicor connector – RECLAIMED WATER	1	EA	\$80.00	\$80.00
3	Model 55, 1", brz bottom, HR-E LCD Nicor connector – POTABLE WATER	4,469	EA	\$120.00	\$536,280.00
4	Model 55, 1", brz bottom, HR-E LCD Nicor connector – RECLAIMED WATER	11	EA	\$127.00	\$1,397.00
5	Model 55, 1", brz bottom, HR-E LCD Nicor connector – RECLAIMED WATER (Cut-ins - unmetered)	14,397	EA	\$127.00	\$1,828,419.00
6	E-Series, 5/8" x 3/4", Nicor-6" connector, Potable Water or Reclaimed Water	0	EA	\$147.87	\$0.00
7	E-Series, 5/8" x 3/4", Nicor-6" connector, Potable Water or Reclaimed Water, with Pressure/Temperature	5	EA	\$197.87	\$989.35
8	E-Series Plus, 5/8" x 3/4" Nicor connector, POTABLE Water, with remote valve	5	EA	\$417.90	\$2,089.50
9	E-Series SS, 1" (10-3/4), Thk Wshr, Enc, 4CXN2 ORION, 9D-0.1 Gal, SN Yr 9D & PBB, Nicor-6", BMI STD,	0	EA	\$190.34	\$0.00
10	E-Series SS, 1-1/2" EL(13), Enc, 4CXN2 ORION, 9D-0.1 Gal, SN Yr 9D & PBB, Nicor-6", BMI STD,	0	EA	\$456.01	\$0.00
11	E-Series SS, 2" EL(17), Enc, 4CXN2 ORION, 9D-0.1 Gal, SN Yr 9D & PBB, Nicor-6", BMI STD	0	EA	\$612.56	\$0.00
12	E-Series Brz, 3" RND(12), TP Prsr, Enc, 4CXN2 ORION, 9D-0.1 Gal, SN Yr 9D & PBB, Nicor-6", BMI STD	74	EA	\$1,565.19	\$115,824.06
13	E-Series Brz, 3" RND(17), TP Prsr, Enc, 4CXN2 ORION, 9D-0.1 Gal, SN Yr 9D & PBB, Nicor-6", BMI STD	0	EA	\$1,590.92	\$0.00
14	E-Series Brz, 4" RND(14), TP Prsr, Enc, 4CXN2 ORION, 9D-0.1 Gal, SN Yr 9D & PBB, Nicor-6", BMI STD	73	EA	\$1,908.36	\$139,310.28
15	E-Series Brz, 4" RND(20), TP Prsr, Enc, 4CXN2 ORION, 9D-0.1 Gal, SN Yr 9D & PBB, Nicor-6", BMI STD	6	EA	\$1,934.09	\$11,604.54
16	E-Series Brz, 6"x18" RND Prsr, Enc, 4CXN2 ORION, 9D-1 Gal, SN Yr 9D & PBB, Nicor-6", BMI STD,	27	EA	\$2,883.31	\$77,849.37
17	E-Series Brz, 6"x24" RND Prsr, Enc, 4CXN2 ORION, 9D-1 Gal, SN Yr 9D & PBB, Nicor-6", BMI STD,	3	EA	\$3,050.71	\$9,152.13
18	E-Series Brz, 8"x20" RND, TP Prsr, Enc, 4CXN2 ORION, 9D-1 Gal, SN Yr 9D & PBB, Nicor-6", BMI STD	21	EA	\$3,552.91	\$74,611.11
19	ORION Cellular LTE-M endpoints w/ Nicor connector (for new meters above, item nos. 1-18)	111,346	EA	\$80.00	\$8,907,680.00
20	ORION Cellular LTE-MS endpoints w/ Nicor connector (Alternative endpoint, for meters above, item nos. 1-6)	363	EA	\$80.00	\$29,040.00
21	IR Communication device kit (Activation Fob and Endpoint Harness)	10	EA	\$100.00	\$1,000.00
22	IR Communication Cable	10	EA	\$150.00	\$1,500.00
23	ORION Cellular LTE-M endpoints w/ Nicor connector (retrofit to existing Neptune potable and reclaimed meters - 5/8" x 3/4" - 1" AMI ready meters, assumes one per meter)	13,150	EA	\$80.00	\$1,052,000.00
24	ORION Cellular LTE-M endpoints w/ Nicor connector (retrofit to existing Neptune potable and reclaimed meters 1.5" - 2" AMI ready meters, assumes one per meter)	1,199	EA	\$80.00	\$95,920.00
25	ORION Cellular LTE-M endpoints w/ Nicor connector (retrofit to existing Neptune potable and reclaimed meters - 3" and larger AMI ready meters, assumes 1 per meter)	123	EA	\$80.00	\$9,840.00
26	ORION Cellular LTE-M endpoints w/ Nicor connector - 1-1/2" & 2", (County to self install during the project timeline, assumes 1 per meter)	2,489	EA	\$80.00	\$199,120.00
27	ORION Cellular LTE-M endpoints w/ Nicor connector - 3" and larger meters (County to self-install during project timeline, assumes 1 per meter)	342	EA	\$80.00	\$27,360.00
28	Model 120, 1-1/2", ellip long or hex with HR-E LCD, 6" Nicor connector POTABLE	1,114	EA	\$309.00	\$344,226.00
29	Model 120, 1-1/2", ellip long or hex with HR-E LCD, 6" Nicor connector RECLAIMED	86	EA	\$314.00	\$27,004.00
30	Model 170, 2", ellip long or hex with HR-E LCD, 6" Nicor connector POTABLE	1,198	EA	\$442.00	\$529,516.00
31	Model 170, 2", ellip long or hex with HR-E LCD, 6" Nicor connector RECLAIMED	91	EA	\$447.00	\$40,677.00
32	2" Turbo Series Meter with HR-E LCD, 6" Nicor connector POTABLE (unknown qty)	0	EA	\$547.00	\$0.00
33	2" Turbo Series Meter with HR-E LCD, 6" Nicor connector RECLAIMED (unknown qty)	0	EA	\$552.00	\$0.00
34	3" Fire Hydrant Meter with HR-E LCD, 6" Nicor connector POTABLE (no reclaimed)	0	EA	\$941.00	\$0.00
35	4" Turbo Series Meter with HR-E LCD, 6" Nicor connector POTABLE	0	EA	\$998.00	\$0.00
36	4" Turbo Series Meter with HR-E LCD, 6" Nicor connector RECLAIMED	0	EA	\$1,003.00	\$0.00
37	6" Turbo Series Meter with HR-E LCD, 6" Nicor connector POTABLE	0	EA	\$2,394.00	\$0.00
38	6" Turbo Series Meter with HR-E LCD, 6" Nicor connector RECLAIMED	0	EA	\$2,399.00	\$0.00
39	8" Turbo Series Meter with HR-E LCD, 6" Nicor connector POTABLE	0	EA	\$2,691.00	\$0.00
40	8" Turbo Series Meter with HR-E LCD, 6" Nicor connector RECLAIMED	0	EA	\$2,696.00	\$0.00
41	10" Turbo Series Meter with HR-E LCD, 6" Nicor connector POTABLE	9	EA	\$3,688.00	\$33,192.00
42	10" Turbo Series Meter with HR-E LCD, 6" Nicor connector RECLAIMED	4	EA	\$3,693.00	\$14,772.00
43	4" Fire Service Assembly, 1" M70 bypass with (2) HR-E LCD POTABLE	0	EA	\$5,031.00	\$0.00
44	6" Fire Service Assembly, 1" M70 bypass with (2) HR-E LCD POTABLE	111	EA	\$7,060.00	\$783,660.00
45	8" Fire Service Assembly, 1" M70 bypass with (2) HR-E LCD POTABLE	8	EA	\$9,204.00	\$73,632.00
46	10" Fire Service Assembly, 1" M70 bypass with (2) HR-E LCD POTABLE	0	EA	\$13,501.00	\$0.00
47	VertexOne Program Management	1	EA	\$39,362.00	\$39,362.00
48	VertexOne SAP EDM (MDM) Implementation	1	EA	\$96,728.00	\$96,728.00
49	VertexOne WaterSmart Platform Setup	1	EA	\$22,000.00	\$22,000.00
50	VertexOne Water Reports Setup	1	EA	\$14,400.00	\$14,400.00
51	BEACON Managed Solution Service Unit Pricing (128,800 services used for quantity)	13,665,315	EA	\$0.40	\$5,466,126.00
52	BEACON Engagement Fee	1	EA	\$8,700.00	\$8,700.00
53	Billing Integration Fee	1	EA	\$19,500.00	\$19,500.00
54	Training, 5 days	1	EA	\$4,500.00	\$4,500.00
55	Export Data Service API SaaS Licensing Fee for a 10-year term from Badger Meter	120	EA	\$750.00	\$90,000.00
56	Meter scrap credit (dirty brass)	130,034	EA	-\$1.15	-\$149,539.10
57	Cast Iron scrap credit (per lb.)	1	EA	-\$0.06	-\$0.06
58	Install Small Meter Change for 3/4" and 1" Analog to AMI changeouts	97,108	EA	\$49.47	\$4,803,932.76
59	Replace Meter Box and Lid in Dirt for 3/4" and 1" Analog to AMI changeouts	63,356	EA	\$31.58	\$2,000,782.48
60	Replace Meter Box and Lid in Concrete	9,818	EA	\$178.95	\$1,756,931.10
61	Replace Lid Only (OPTIONAL)	33,754	EA	\$4.21	\$142,104.34
62	Meter Cut-Ins - reclaimed water/potable meters (typical condition where a service box exists and is removed/replaced with a new meter box and lid)	14,397	EA	\$321.99	\$4,635,690.03
63	Meter Cut-Ins* - reclaimed water/potable water meters (if cut-in is required on the County-side of the existing service box)	1	EA	\$436.73	\$436.73
64	Prenotification Mailer (1" and smaller meters)	124,655	EA	\$1.05	\$130,887.75
65	Post Notification Tag (1" and smaller meters)	124,655	EA	\$0.47	\$58,587.85
66	Epoxy Fill Recessed Gaps & Non Slip Tape (new lids)	111,505	EA	\$1.84	\$205,169.20
67	Warehousing	48	EA	\$11,842.11	\$568,421.28
68	Mobilization	1	LS	\$52,631.58	\$52,631.58
69	Adder for 5 Years Insurance on Professional Liability, Cyber, and Pollution	1	EA	\$105,263.16	\$105,263.16
70	Subfoot GPS Coordinate Adder (1" and smaller meters)	124,655	EA	\$8.42	\$1,049,595.10
71	Pre-Survey Meter Locations (1" and smaller meters)	124,655	EA	\$5.26	\$655,685.30
72	Provide Neptune E-Coder Registers for current AMI-Type Meters - All sizes in County Meter Reading	14,478	EA	\$74.70	\$1,081,506.60
73	Install Neptune Register and Endpoint Retrofit for existing Neptune potable and reclaimed meters - 5/8" x 3/4" - 1" AMI ready meters, assumes one per meter (item no. 23)	13,150	EA	\$25.26	\$332,169.00
74	Disposal of Neptune E-Coder Registers	13,150	EA	\$2.23	\$29,324.50
75	Recycle Cardboard & Cast Iron removed from field	1	EA	\$52,631.58	\$52,631.58
76	Construction Disposal (Concrete, plastic, miscellaneous materials)	1	EA	\$82,105.26	\$82,105.26
77	11" x 21" boxes, Tier 8	55,004	EA	\$60.93	\$3,351,393.72
78	11" x 21" boxes, Tier 8 (offset holes)	2,946	EA	\$60.93	\$179,499.78
79	11" x 21" boxes, Tier 22	18,692	EA	\$73.38	\$1,371,618.96
80	11" x 21" boxes, Tier 22 (offset holes)	981	EA	\$73.38	\$71,985.78
81	13" x 24" boxes, Tier 8	46	EA	\$90.15	\$4,146.90
82	13" x 24" boxes, Tier 8 (offset holes)	7	EA	\$90.15	\$631.05
83	13" x 24" boxes, Tier 22	14	EA	\$105.58	\$1,478.12
84	13" x 24" boxes, Tier 22 (offset holes)	4	EA	\$105.58	\$422.32
85	11" x 21" lids, Tier 8	72,547	EA	\$42.16	\$3,058,581.52

ITEM NO.	DESCRIPTION	QUANTITY PER CONTRACT	UNIT	TOTAL UNIT PRICE IN CONTRACT	TOTAL UNIT PRICE IN CONTRACT (EXT)
86	11" x 21" lids, Tier 22	24,524	EA	\$47.13	\$1,155,816.12
87	13" x 24" lids, Tier 8	65	EA	\$65.33	\$4,246.45
88	13" x 24" lids, Tier 22	20	EA	\$52.35	\$1,047.00
89	11" x 21" Tier 8 reclaimed lid	10,744	EA	\$43.10	\$463,066.40
90	11" x 21" Tier 22 Reclaimed lid	3,580	EA	\$48.30	\$172,914.00
91	13" x 24" Tier 8 Reclaimed lid	10	EA	\$70.44	\$704.40
92	13" x 24" Tier 22 Reclaimed lid	5	EA	\$55.01	\$275.05
93	Replace Defective Curb Stops/Ball Valves/Gate Valves - 3/4" - Labor	9,361	EA	\$57.89	\$541,908.29
94	Replace Defective Curb Stops/Ball Valves/Gate Valves - 1" - Labor	457	EA	\$57.89	\$26,455.73
95	Replace Defective Curb Stops/Ball Valves/Gate Valves - 1.5" - Labor	0	EA	\$168.42	\$0.00
96	Replace Defective Curb Stops/Ball Valves/Gate Valves - 2" - Labor	0	EA	\$168.42	\$0.00
97	Replace Defective Curb Stops/Ball Valves/Gate Valves - 3" - Labor	0	EA	\$168.42	\$0.00
98	Replace Defective Curb Stops/Ball Valves/Gate Valves - 4" - Labor	0	EA	\$168.42	\$0.00
99	Replace Defective Curb Stops/Ball Valves/Gate Valves - 6" - Labor	0	EA	\$252.63	\$0.00
100	Replace Defective Curb Stops/Ball Valves/Gate Valves - 8" - Labor	0	EA	\$252.63	\$0.00
101	Replace Defective Curb Stops/Ball Valves/Gate Valves - 3/4" - Material	9,361	EA	\$68.42	\$640,479.62
102	Replace Defective Curb Stops/Ball Valves/Gate Valves - 1" - Material	457	EA	\$94.74	\$43,296.18
103	Replace Defective Curb Stops/Ball Valves/Gate Valves - 1.5" - Material	0	EA	\$163.16	\$0.00
104	Replace Defective Curb Stops/Ball Valves/Gate Valves - 2" - Material	0	EA	\$214.74	\$0.00
105	Replace Defective Curb Stops/Ball Valves/Gate Valves - 3" - Material	0	EA	\$470.53	\$0.00
106	Replace Defective Curb Stops/Ball Valves/Gate Valves - 4" - Material	0	EA	\$470.53	\$0.00
107	Replace Defective Curb Stops/Ball Valves/Gate Valves - 6" - Material	0	EA	\$855.79	\$0.00
108	Replace Defective Curb Stops/Ball Valves/Gate Valves - 8" - Material	0	EA	\$1,197.89	\$0.00
109	Replacing Defective/Broken Meter Boxes 1.5" & 2" - Labor	0	EA	\$57.89	\$0.00
110	Replacing Defective/Broken Meter Boxes 3" - Labor	0	EA	\$89.47	\$0.00
111	Replacing Defective/Broken Meter Boxes with Dual Boxes - Labor	0	EA	\$47.37	\$0.00
112	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 1.5" - Labor	0	EA	\$252.63	\$0.00
113	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 2" - Labor	0	EA	\$252.63	\$0.00
114	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 3" - Labor	0	EA	\$336.84	\$0.00
115	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 4" - Labor	0	EA	\$336.84	\$0.00
116	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 6" - Labor	0	EA	\$673.66	\$0.00
117	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 8" - Labor	0	EA	\$673.66	\$0.00
118	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 1.5" - Material	0	EA	\$151.58	\$0.00
119	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 2" - Material	0	EA	\$160.00	\$0.00
120	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 3" - Material	0	EA	\$187.37	\$0.00
121	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 4" - Material	0	EA	\$213.68	\$0.00
122	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 6" - Material	0	EA	\$249.47	\$0.00
123	Pipe Length Modifications to accommodate changes in meter type; Convert threaded to flanged or repipe improper screwed meter connections 8" - Material	0	EA	\$284.21	\$0.00
124	Pull and reinstall existing meter box due to misposition in relation to meter (meter boxes only, not including vaults); box resets 5/8" & 1" - Labor	1,798	EA	\$31.58	\$56,780.84
125	Pull and reinstall existing meter box due to misposition in relation to meter (meter boxes only, not including vaults); box resets 1.5" & 2" - Labor	0	EA	\$57.89	\$0.00
126	Pull and reinstall existing meter box due to misposition in relation to meter (meter boxes only, not including vaults); box resets 3" - Labor	0	EA	\$89.47	\$0.00
127	Pull and reinstall existing meter box due to misposition in relation to meter (meter boxes only, not including vaults); box resets Dual Boxes - Labor	1,798	EA	\$47.37	\$85,171.26
128	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 5/8" - Labor	14,042	EA	\$94.74	\$1,330,339.08
129	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 1" - Labor	685	EA	\$94.74	\$64,896.90
130	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 1.5" - Labor	0	EA	\$336.84	\$0.00
131	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 2" - Labor	0	EA	\$336.84	\$0.00
132	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 3" - Labor	0	EA	\$505.26	\$0.00
133	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 4" - Labor	0	EA	\$505.26	\$0.00
134	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 6" - Labor	0	EA	\$673.68	\$0.00
135	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 8" - Labor	0	EA	\$673.68	\$0.00
136	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 5/8" - Material	14,042	EA	\$82.11	\$1,152,988.62
137	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 1" - Material	685	EA	\$124.21	\$85,083.85
138	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 1.5" - Material	0	EA	\$214.74	\$0.00
139	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 2" - Material	0	EA	\$291.58	\$0.00
140	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 3" - Material	0	EA	\$573.68	\$0.00
141	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 4" - Material	0	EA	\$778.95	\$0.00
142	Replace existing defective or leaking pipe/pipe modifications/repping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 6" - Material	0	EA	\$1,172.63	\$0.00

ITEM NO.	DESCRIPTION	QUANTITY PER CONTRACT	UNIT	TOTAL UNIT PRICE IN CONTRACT	TOTAL UNIT PRICE IN CONTRACT (EXT)
143	Replace existing defective or leaking pipe/pipe modifications/repiping a direct connected meter on customer side/this item includes breaks that occur during construction due to deteriorated piping (we will submit locations to the PM for pre-approval before proceeding with the installation) - 8" - Material	0	EA	\$1,685.26	\$0.00
144	Raise Meter Set Service (labor & material for piping only) - 3/4" Labor	200	EA	\$210.53	\$42,106.00
145	Raise Meter Set Service (labor & material for piping only) - 1" Labor	5	EA	\$263.16	\$1,315.80
146	Lower Meter Set Service (labor & material for piping only) - 3/4" Labor	200	EA	\$210.53	\$42,106.00
147	Lower Meter Set Service (labor & material for piping only) - 1" Labor	5	EA	\$263.16	\$1,315.80
148	Replace Meter Coupling; shorter couplings used for tight meter access - 3/4" Labor	5,664	EA	\$26.32	\$149,076.48
149	Replace Meter Coupling; shorter couplings used for tight meter access - 1" Labor	286	EA	\$26.32	\$7,527.52
150	Replace Meter Coupling; shorter couplings used for tight meter access - 3/4" Material	5,851	EA	\$15.79	\$92,387.29
151	Replace Meter Coupling; shorter couplings used for tight meter access - 1" Material	286	EA	\$21.05	\$6,020.30
152	Drilling/Coring/Plasma Cutting Lids for Transmitter	1	EA	\$4.21	\$4.21
153	Brackets for above-ground meters	465	EA	\$23.00	\$10,695.00
154	Project Management	48	EA	\$15,277.78	\$733,333.44
155	Bonding	1	EA	\$525,071.17	\$525,071.17
156	Concrete Sidewalk and Driveways, 4" Thick (See note 5.g. below regarding final pricing determination)	833	SY	\$289.00	\$240,737.00
157	Concrete Sidewalk and Driveways, 6" Thick (See note 5.g. below regarding final pricing determination)	278	SY	\$360.00	\$100,080.00
158	Contingency	1	EA	\$2,500,000.00	\$2,500,000.00
				\$62,845,720.73	
				Total Contract Value	

*Item No. 62 breakdown	Qty	Unit	Unit Price	Total Price
1" PVC x PVC Compression	14,397	EA	\$14.41	\$207,460.77
1" PVC Slip X FIP	14,397	EA	\$1.98	\$28,506.06
Insert Stiffener	14,397	EA	\$3.00	\$43,191.00
Meter Couplings (2)	14,397	EA	\$59.24	\$852,878.28
Excavation, Box & Lid Installation, and Haul Off (Includes added employee for vehicle and dump trailer)	14,397	EA	\$68.25	\$982,595.25
Meter Valve Cut-In Labor Only	14,397	EA	\$49.70	\$715,530.90
Meter & Endpoint Install with Activation	14,397	EA	\$49.47	\$712,219.59
Customer Side Piping Modification	14,397	EA	\$49.69	\$715,386.93
Adder for Miscellaneous Direct Costs and Consumables	14,397	EA	\$26.25	\$377,921.25
Total			\$321.99	\$4,635,690.03

Item No.	Descriptions of the Work. The following items were provided in the Badger Meter, Inc. Proposal and are listed above.
1	Item nos. 1-5, 8 represent the new meters for changeout conditions (analog to electric). Item no. 5 represents the new reclaimed water meters for locations where a reclaimed water service box exists but is not metered.
2	Item nos. 1-5, 8, 19-46, 72, 77-92 represent prices for materials. These unit prices remain for the duration of the approximate 48-month project. Items 72 and 77-92 are provided by third-party suppliers (Neptune and Hubbell respectively) and are subject to change after 12/31/22.
3	Item nos. 32-46 represent prices for materials and are provided should Pinellas County desire to purchase these materials during the project timeline.
4	Item nos. 47-50 represent one-time costs for VertexOne for implementation of the Software as a Service component related to Badger Meter's analytic solution.
5	Item no. 51 is based on 128,800 endpoints for a 10-year timeline. This is an estimated quantity. Partial installation quantities are considered during the implementation phase. The actual quantities to be based on the endpoint activation as those occur during the project timeline.
6	Item nos. 52-53 are integration fees. These are one-time costs. The total amount is not-to-exceed.
7	Item no. 54 represents training for Pinellas County staff. Descriptions are provided in Badger Meter Inc.'s
8	Item no. 55 represents monthly costs for the Software as a Service (SaaS) fees that are provided by Badger Meter. The quantity and total amount are based on a 10-year timeline.
9	Item nos. 56 and 57 represent credit items. Badger Meter to credit these items on a quarterly basis and provide appropriate documentation.
10	Item nos. 58-63, 73, 74 represent installation prices. These costs represent all work associated with the installation of the material, in accordance with the requirements of the Request for Proposal document and Badger Meter Inc.'s Statement of Work.
11	Item no. 60 represents the removal and replacement costs of concrete, asphalt, or pavers in the situation where a meter could be located in a sidewalk, driveway, or parking area. The cutout dimension is based on a 2' x 3' area and for meters 1" and smaller in size. Replacement of the removed surface material with a similar and equal, or better, material will be required. Other line items apply for the labor required to remove and replace the box and meter. The quantity is estimated and based on approximately 9% of locations have this condition.
12	Item no. 61 represents the labor charge in the situation where an existing box remains, but the lid needs to be replaced.
13	Item no.63 represents a situation similar to item no. 62, except the existing reclaimed water service box would remain. In this condition, a cut-in would be required on the upstream side of the box. The unit price and description of work was included in the Badger Meter, Inc. Proposal. This would also apply to a similar situation for a cut-in of a potable water meter where an existing meter box would remain.
14	Item nos. 64 and 65 represent the costs for the notifications that are required for the contract in accordance with the Request for Proposal document. The quantities do not include meters larger than 1-inch size.
15	Item no. 66 represents a furnish and install cost. The work is described in the Request for Proposal document. This work may not be required. This will be at the County's discretion.
16	Item nos. 67 and 154 are broken out monthly. The total amount is a not-to-exceed amount unless agreed to by both parties. These items are described in Badger Meter Inc.'s Statement of Work.
17	Item no. 68 represents the contractor's cost to mobilize equipment, personnel, etc. for the Work. Demobilization is included in this not-to-exceed amount. Payment for this item will be made at the lump sum price proportional to the completion percentages approved by the Owner. The Contractor shall provide a breakdown in sufficient measurable detail that is acceptable to the Owner.
18	Item no. 69 is based on the total contract amount.
19	Item no. 70 represents the costs to obtain coordinates for the locations of the new and retrofitted meters. This level of accuracy is a requirement of the Request for Proposal document.
20	Item no. 71 represents the costs for Badger Meter Inc. to capture information for the installations in advance of the meter installation work, per Badger Meter Inc.'s Statement of Work.
21	Item nos. 75 and 76: The total amounts are not-to-exceed amounts. These items are planned to be billed on a quarterly basis.
22	Item nos. 81-84, 87, 88, 91, 92 are provided if the County chooses to use a larger box in certain situations.
23	Item nos. 93-152 represent items that may be encountered during the project. These specific items are not included in the other unit prices for the basic materials and installation line items. The quantities are estimated.
24	For item nos. 144 and 145 – Raising a set would only be performed if the Utility has a deep meter, and the Utility wants to raise the meter in the box. There are multiple ways to do this: a) use a resetter and bring the meter set higher in the box (this is less labor intensive but more cost in material) or b) modify the piping on both sides and bring the meter set higher in the box (this is generally less expensive on materials but requires more labor). These unit charges cover either scenario.
25	For item nos. 146 and 147 – Lowering a set would be required if the utility believes the meter is too high or the meter is hitting the lid after installation. These can be done using the same types of methods above a) or b) but going down instead of raising.

ITEM NO.	DESCRIPTION	QUANTITY PER CONTRACT	UNIT	TOTAL UNIT PRICE IN CONTRACT	TOTAL UNIT PRICE IN CONTRACT (EXT)
26	Item no. 154 represents the costs for Badger Meter Inc.'s Project Management. The quantity represents 48 months. The total amount is a not-to-exceed amount unless agreed to by the parties in the				
27	Item no. 155 is based on the total contract amount.				
The following items from the Request For Proposal, Attachment H (Addendum No. 4) apply:					
The Tier 22 boxes to be considered to be located in traffic areas. Saw cutting of concrete, asphalt, bricks/pavers to be expected. Replacement of the removed surface material with a similar and equal, or better, material will be required. Item nos. 60, 156, and 157 provide the unit prices for this work.					
1	The contractor will be compensated for the actual amount installed of the items of work based on the line item prices.				
2	The quantities listed are provided for the purposes of pricing and will be adjusted to actual quantities during implementation. This list is not encompassing of all items necessary for each proposal or the				
3	entire scope of work outlined in the RFP. It is the responsibility of the Proposer to account for all costs required to complete the scope of work as outlined in the RFP and to provide these costs in the pricing forms.				
4	Other requirements, such as restoration, maintenance of traffic, testing, meter installation, etc. are also noted in the Request for Proposal. Applicable addenda also apply.				
Descriptions of the Work - Other. The following items were not provided in the Badger Meter, Inc. Proposal and are listed above.					
1	For items 7 and 8, the warranty is 20 years and 6 months on housing, transducers, register and meter accuracy. Valve and power module is 5 years and 6 months or maximum of 240 open/close actuations.				
2	Item nos 6, 7, 9-18, 153 represent prices for materials and are provided should Pinellas County desire to purchase these materials during the project timeline. These unit prices remain for the duration of the 48-month project.				
3	Item no. 62 represents the condition for a new reclaimed water meter installation. In this situation, the existing service box would be removed. A new 11" x 21" box and lid would be placed in the approximate location of the removed service box. The contractor shall attempt to position the new box/lid in alignment with the adjacent potable water meter box/lid so that the final product is neat in appearance. The lid, box, meter, and endpoints materials will be accounted for separately by the appropriate line items. <u>This would also apply to a similar situation for a potable water meter.</u>				
4	Line item no. 153 represents a situation where the County may purchase a bracket to mount an endpoint in an above-ground situation for a meter. The County would install the bracket in this situation.				
5	Item nos. 156 and 157. These items include full width sidewalk and driveway replacement. Construction is per 2020 FDOT Standard Specifications for Road and Bridge Construction, Section 522, and per Pinellas County Standard Technical Specifications for Roadway and General Construction. At a minimum, these items include:				
a. 3000 psi concrete at 28-day compressive strength. Concrete mix to be approved. On-site mixing of bag mix only if approved.					
b. 6x6x10 WWF.					
c. Sawcutting, removal of existing material, maintenance of traffic (including pedestrians), furnish and installation of the material.					
d. The quantity to be paid in square yards, completed and accepted. A 5' wide x 5' long section x 300 locations for item no. 156 and 100 locations for item no. 157 are used for the basis of the quantities.					
e. Materials testing, if needed, to be provided by the County.					
f. Pricing shown is currently a placeholder. Quantities are subject to change and will be based upon results from the pre-installation survey.					
g. PVI will find a local contractor to perform the DOT concrete work after meter and box replacement. PVI will directly manage the contractor and all activities associated with this work. Final pricing to be determined at that time. Actual invoices will be submitted for payment upon completion from the subcontractor with the markups noted for OH and profit. A maximum ten percent (10%) markup for all overhead and profit for all subcontractors' direct labor and material costs and actual equipment costs shall be permitted, with a maximum five percent (5%) markup thereon by the Contractor for all of its overhead and profit, for a total overall maximum markup of fifteen percent (15%) of the amount of change Work. Sales and use taxes are not subject to the markup allowance. Material provided by the Contractor, for use by the Subcontractor, is only allowed the ten percent (10%) markup by the Contractor. All compensation due the Contractor and any Subcontractor or sub-subcontractor for field and home office overhead is included in the markups noted above.					
6	Item no. 158 is for the County's discretion. This line item will only be utilized when the County provides written directive to the contractor.				

AGREEMENT

EXHIBIT D - PAYMENT/INVOICES

PAYMENT/INVOICES:

SUPPLIER shall submit invoices for payment due as provided herein with such documentation as required by Pinellas County and all payments shall be made in accordance with the requirements of Section 218.70 et. seq, Florida Statutes, "The Local Government Prompt Payment Act." Invoices shall be submitted to the address below unless instructed otherwise on the purchase order, or if no purchase order, by the ordering department:

Finance Division Accounts Payable
Pinellas County Board of County Commissioners
P. O. Box 2438
Clearwater, FL 33757

Each invoice shall include, at a minimum, the Supplier's name, contact information and the standard purchase order number. In order to expedite payment, it is recommended the Supplier also include the information shown in below. The County may dispute any payments invoiced by SUPPLIER in accordance with the County's Dispute Resolution Process for Invoiced Payments, established in accordance with Section 218.76, Florida Statutes, and any such disputes shall be resolved in accordance with the County's Dispute Resolution Process.

INVOICE INFORMATION:

Supplier Information Company name, mailing address, phone number, contact name and email address as provided on the PO

Remit To Billing address to which you are requesting payment be sent

Invoice Date Creation date of the invoice

Invoice Number Company tracking number

Shipping Address Address where goods and/or services were delivered

Ordering Department Name of ordering department, including name and phone number of contact person

PO Number Standard purchase order number

Ship Date Date the goods/services were sent/provided

Quantity Quantity of goods or services billed

Description Description of services or goods delivered

Unit Price Unit price for the quantity of goods/services delivered

Line Total Amount due by line item

Invoice Total Sum of all of the line totals for the invoice

Pinellas County offers a credit card payment process (ePayables) through Bank of America. Pinellas County does not charge vendors to participate in the program; however, there may be a charge by the company that processes your credit card transactions. For more information, please visit Pinellas County purchasing website at www.pinellascounty.org/purchase.

AGREEMENT

EXHIBIT E - DISPUTE RESOLUTION FOR PINELLAS COUNTY BOARD OF COUNTY COMMISSIONERS IN MATTERS OF INVOICE PAYMENTS:

Payment of invoices for work performed for Pinellas County Board of County Commissioners (County) is made, by standard, in arrears in accordance with Section 218.70, et. seq., Florida Statutes, the Local Government Prompt Payment Act.

If a dispute should arise as a result of non-payment of a payment request or invoice the following Dispute Resolution process shall apply:

- A. Pinellas County shall notify a vendor in writing within 10 days after receipt of an improper invoice, that the invoice is improper. The notice should indicate what steps the vendor should undertake to correct the invoice and resubmit a proper invoice to the County. The steps taken by the vendor shall be that of initially contacting the requesting department to validate their invoice and receive a sign off from that entity that would indicate that the invoice in question is in keeping with the terms and conditions of the agreement. Once sign off is obtained, the vendor should then resubmit the invoice as a "Corrected Invoice" to the requesting department which will initiate the payment timeline.
 1. Requesting department for this purpose is defined as the County department for whom the work is performed.
 2. Proper invoice for this purpose is defined as an invoice submitted for work performed that meets prior agreed upon terms or conditions to the satisfaction of Pinellas County.
- B. Should a dispute result between the vendor and the County about payment of a payment request or an invoice then the vendor should submit their dissatisfaction in writing to the Requesting Department. Each Requesting Department shall assign a representative who shall act as a "Dispute Manager" to resolve the issue at departmental level.
- C. The Dispute Manager shall first initiate procedures to investigate the dispute and document the steps taken to resolve the issue in accordance with section 218.76 Florida Statutes. Such procedures shall be commenced no later than 45 days after the date on which the payment request or invoice was received by Pinellas County and shall not extend beyond 60 days after the date on which the payment request or invoice was received by Pinellas County.
- D. The Dispute Manager should investigate and ascertain that the work, for which the payment request or invoice has been submitted, was performed to Pinellas County's satisfaction and duly accepted by the Proper Authority. Proper Authority for this purpose is defined as the Pinellas County representative who is designated as the approving authority for the work performed in the contractual document. The Dispute Manager shall perform the required investigation and arrive at a solution before or at the 60 days' timeframe for resolution of the dispute, per section 218.76, Florida Statutes. The County Administrator or his or her designee shall be the final arbiter in resolving the issue before it becomes a legal matter. The County Administrator or his or her designee will issue their decision in writing.
- E. Pinellas County Dispute Resolution Procedures shall not be subject to Chapter 120 of the Florida Statutes. The procedures shall also, per section 218.76, Florida Statutes, not be intended as an administrative proceeding which would prohibit a court from ruling again on any action resulting from the dispute.
- F. Should the dispute be resolved in the County's favor interest charges begin to accrue 15 days after the final decision made by the County. Should the dispute be resolved in the vendor's favor the County shall pay interest as of the original date the payment was due.
- G. For any legal action to recover any fees due because of the application of sections 218.70 et. seq., Florida Statutes, an award shall be made to cover court costs and reasonable attorney fees, including those fees incurred as a result of an appeal, to the prevailing party. If it is found that the non-prevailing party held back any payment that was the reason for the dispute without having any reasonable lawful basis or fact to dispute the prevailing party's claim to those amounts.

AGREEMENT

EXHIBIT F - CONTRACT PROVISIONS FOR CONTRACTS UNDER FEDERAL AWARDS - AMERICAN RESCUE PLAN ACT (ARPA):

PROPOSAL NUMBER: 21-0057-P (JJ)
PROPOSAL TITLE: Advanced Metering Infrastructure

This solicitation is either fully or partially funded with federal funds from the Coronavirus Local Fiscal Recovery Funds made available under the American Rescue Plan Act (ARPA). In addition to other terms and conditions required by Pinellas County and the applicable federal agency, all contracts awarded to the qualified bidder are subject to the following provisions, as applicable to the services provided.

Equal Employment Opportunity: Except as otherwise provided under 41 CFR Part 60, all contracts that meet the definition of “federally assisted construction contract” in 41CFR Part 60-1.3 must include the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order 11246, “Equal Employment Opportunity” (30FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, “Amending Executive Order 11246 Relating to Equal Employment Opportunity,” and implementing regulations at 41 CFR part 60, “Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor.”

If this contract meets the definition of a “federally assisted construction contract”, during the performance of this contract, the Contractor agrees as follows:

- (1) The CONTRACTOR will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The CONTRACTOR will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The CONTRACTOR agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- (2) The CONTRACTOR will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
- (3) The CONTRACTOR will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

AGREEMENT

(4) The CONTRACTOR will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The CONTRACTOR will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor. (6) The CONTRACTOR will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the CONTRACTOR's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the CONTRACTOR may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The CONTRACTOR will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor.

Davis-Bacon Act as amended (40 U.S.C. 3141-3148): When required by federal program legislation, for all prime construction contracts awarded in excess of \$2,000, Contractors are required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, Contractors must be required to pay wages not less than once a week. If the applicable grant award contains Davis-Bacon provisions, the County will place a copy of the current prevailing wage determination issued by the Department of Labor in the solicitation document. The decision to award a contract shall be conditioned upon the acceptance of the wage determination [Appendix II to 2 CFR Part 200].

Copeland Anti Kick Back Act: If Davis-Bacon is applicable, CONTRACTOR shall also comply with all the requirements of 29 CFR Part 3 which are incorporated by reference to this contract. Contractors are prohibited from inducing by any means any person employed in the construction, completion, or repair of public work to give up any part of the compensation to which he or she is otherwise entitled [Appendix II to 2 CFR Part 200].

Contract Work Hours and Safety Standards Act (40 U.S.C. 3701–3708): Where applicable, all contracts awarded in excess of \$100,000 that involve the employment of mechanics or laborers must be in compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each CONTRACTOR is required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence [Appendix II to 2 CFR Part 200].

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Clean Air Act (42 U.S.C. 7401–7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251–1387): As amended—The CONTRACTOR agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401–7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251–1387). Violations must be reported to the federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA) [Appendix II to 2 CFR Part 200].

Debarment and Suspension (Executive Orders 12549 and 12689): A contract award (see 2 CFR 180.220) will not be made to parties listed on the government wide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), “Debarment and Suspension.” SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549. If applicable, the CONTRACTOR must verify that none of their subcontractors (for contracts expected to equal or exceed \$25,000), appear on the federal government’s Excluded Parties List. The Excluded Parties List is accessible at <http://www.sam.gov> [Appendix II to 2 CFR Part 200].

Byrd Anti-Lobbying Amendment (31 U.S.C. 1352): CONTRACTORS that apply or bid for an award **exceeding \$100,000** must submit a completed “Disclosure of Lobbying Activities” [Form SF-LLL]. Each tier certifies to the tier above that it will not and has not used federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier must also disclose any lobbying with *non-federal funds* that takes place in connection with obtaining any federal award. Such disclosures are forwarded from tier to tier up to the non-federal award. [Appendix II to 2 CFR Part 200]. **The bidder shall complete Form SF-LLL and submit with bid. Bidders may be deemed nonresponsive for failure to submit this certification.**

Conflict of Interest [2 CFR §200.112]: The CONTRACTOR must disclose in writing any potential conflict of interest to the Federal awarding agency or COUNTY in accordance with applicable Federal awarding agency policy.

Mandatory Disclosures [2 CFR §200.113]: The CONTRACTOR must disclose in writing all violations of federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the federal award. Failure to make required disclosures can result in any of the remedies described in 2 CFR §200.339 - Remedies for noncompliance, including suspension or debarment.

Certifications and representations. [2 CFR § 200.209]

Unless prohibited by the U.S. Constitution, Federal statutes or regulations, CONTRACTOR may be required to submit certifications and representations required by this agreement, Federal statutes, or regulations on an annual basis. Submission may be required more frequently if the CONTRACTOR fails to meet a requirement of these provisions for contracts under federal awards.

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Protected Personally Identifiable Information (Protected PII) [CFR §200.303(e)]: The CONTRACTOR must take reasonable measures to safeguard protected personally identifiable information and other information the federal awarding agency or COUNTY designates as sensitive, or the County considers sensitive consistent with other applicable federal, state, and local laws regarding privacy and obligations of confidentiality. Per 2 CFR § 200.82, Protected PII means an individual's first name or first initial and last name in combination with any one or more of types of information, including, but not limited to, social security number, passport number, credit card numbers, clearances, bank numbers, biometrics, date and place of birth, mother's maiden name, criminal, medical and financial records, educational transcripts. This does not include PII that is required by law to be disclosed.

Prohibition on utilization of time and material type contracts [2 CFR §200.318 (j) (1)]: The COUNTY will not award contracts based on a time and material basis if the contract contains federal funding.

Contracting with Small and Minority Businesses, Women's Business Enterprises, and Labor Surplus Area Firms [2 CFR § 200.321]: If using subcontractors, the CONTRACTOR must take all necessary affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible. Affirmative steps must include:

- (1) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
- (2) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
- (3) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;
- (4) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises;
- (5) Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.
- (6) Affirmative Action Requirements per 41 CFR 60-4.1 Goals for Women and Minorities in Construction (for contracts in excess of \$10,000): Goals and timetables for minority and female utilization may be set which shall be based on appropriate workforce, demographic or other relevant data and which shall cover construction projects or construction contracts performed in specific geographical areas. The goals, which shall be applicable to each construction trade in a covered Contractor's or subcontractor's entire workforce which is working in the area covered by the goals and timetables, shall be published as notices in the Federal Register, and shall be inserted by the contracting officers and applicants, as applicable, in the Notice required by 41 CFR 60-4.2. Covered construction Contractors performing construction work in geographical areas where they do not have a federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Information regarding certified M/WBE firms can be obtained from:

- Florida Department of Management Services (Office of Supplier Diversity);
- Florida Department of Transportation;
- Minority Business Development Center in most large cities; and
- Local Government M/DBE programs in many large counties and cities.

AGREEMENT

Domestic preferences for procurements. [2 CFR § 200.322]

(a) As appropriate and to the extent consistent with law, the non-Federal entity should, to the greatest extent practicable under a Federal award, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products). The requirements of this section must be included in all subawards including all contracts and purchase orders for work or products under this award.

(b) For purposes of this section:

- (1) “Produced in the United States” means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.
- (2) “Manufactured products” means items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

Procurement of Recovered Materials [2 CFR §200.323]: CONTRACTOR must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

Prohibition on utilization of cost plus a percentage of cost contracts [2 CFR §200.324 (d)]: The COUNTY will not award contracts containing federal funding on a cost plus percentage of cost basis.

Retention of Records [2 CFR 200.334]: Financial records, supporting documents, statistical records, and all other records pertinent to a Federal award must be retained for a period of three years from the date of submission of the final expenditure report or invoice. Record retention may be required to be longer if any of the provisions of 2 CFR 200.334(a)-(f) apply.

Access to Records [2 CFR 200 § 200.337]: The County, Pass-through agency or Federal awarding agency have the right of timely and unrestricted access to any documents, papers or other records, including electronic records, of the CONTRACTOR which are pertinent to the Federal award in order to make audits, investigations, examinations, excerpts, transcripts, and copies of such documents.

This right also includes timely and reasonable access to the CONTRACTOR’S personnel for the purpose of interview and discussion related to such documents. This right of access shall continue as long as records are required to be retained.

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Remedies for noncompliance. [2 CFR § 200.339]

If CONTRACTOR fails to comply with the U.S. Constitution, Federal statutes, regulations or the terms and conditions of a Federal award, the Federal awarding agency or COUNTY may impose additional conditions, as described in 2 CFR § 200.208. If the Federal awarding agency or COUNTY determines that noncompliance cannot be remedied by imposing additional conditions, the Federal awarding agency or COUNTY may take one or more of the following actions, as appropriate in the circumstances:

- (a) Temporarily withhold cash payments pending correction of the deficiency by the CONTRACTOR or more severe enforcement action by the Federal awarding agency or COUNTY.
- (b) Disallow (that is, deny both use of funds and any applicable matching credit for) all or part of the cost of the activity or action not in compliance.
- (c) Wholly or partly suspend or terminate the Agreement.
- (d) Initiate suspension or debarment proceedings as authorized under 2 CFR part 180 and Federal awarding agency regulations (or in the case of the COUNTY, recommend such a proceeding be initiated by a Federal awarding agency).
- (e) Take other remedies that may be legally available.

AGREEMENT

EXHIBIT G - SERVICE LEVEL AGREEMENT:

EXHIBIT G - SERVICE LEVEL AGREEMENT to follow:

SERVICE LEVEL AGREEMENT





BADGER METER
BEACON AMA MANAGED SOLUTION
MASTER AGREEMENT

Pinellas County

This BEACON AMA MANAGED SOLUTION MASTER AGREEMENT (“SLA”) is entered into as of the _____ day of _____, 2022 (the “Effective Date”) by and between Badger Meter, Inc. , a Wisconsin corporation with offices located at 4545 W. Brown Deer Road, Milwaukee, Wisconsin 53223 (“**Badger Meter**”) , and Pinellas County, with offices located at 14 South Fort Harrison Ave. Clearwater, FL 33756, and as applicable its officers, directors, members, board members, governing members, trustees, commissioners, elected and appointed officials, employees, agents, consultants and other representatives (“**Customer**”).

(1) SERVICE. Badger Meter and its cellular service aggregator and data-hosting service providers (“**Suppliers**”) have developed a hosted, on-demand, web-based service website (“**Portal**”) accessible to its customers to provide metering and water usage service information, communicated through a cellular network, for its customers (“**Service**”), and documentation to assist customers in using the Portal and the Service (“**Documentation**”).

(2) RIGHT TO ACCESS AND USE THE PORTAL AND SERVICE. In consideration of the payment of the Service Fees as set forth in Section (5), Badger Meter grants to Customer, its employees and contractors that Customer approves as users of the Service (“**Authorized User**”) and Customer’s approved end-user water customers (“**Authorized Consumer**”) the right to remotely access and use the Service from the Portal (as currently configured) for Customer’s internal business use and for the benefit of its Authorized Consumers in accordance with this Agreement. Any rights and obligations in this Agreement relative to Customer and its Authorized Consumers will only be in effect when Customer affirmatively enables the EyeOnWater Service, and as of the Effective Date of the Agreement, Customer will not enable the EyeOnWater Service.

(3) OWNERSHIP OF PORTAL AND SERVICE.

(a) Badger Meter Service. Badger Meter owns all rights, title and interest in the Portal, Service and Documentation, including all associated intellectual property rights. Neither Customer, nor its Authorized Users or Authorized Consumers will obtain any rights, title or interest in the Portal, Service, or Documentation or any associated intellectual property rights, other than the right to access and use the Portal, Service and Documentation, subject to the terms of this Agreement.

(b) Suggestions. If Customer provides Badger Meter any suggested improvements (“**Suggestions**”) to the Portal, Service or Documentation, Customer agrees that Badger Meter will own all rights, title and interest in and to the Suggestions, even if Customer has designated the Suggestions as confidential. Badger Meter will be entitled to use the Suggestions without restriction. By entering into this SLA, Customer irrevocably assigns, conveys and transfers to Badger Meter all right, title and interest in and to the Suggestions and agrees to provide Badger Meter with commercially reasonable assistance to document, perfect and maintain Badger Meter’s rights in the Suggestions.

(4) TERM. The term of this Agreement begins on the Effective Date and shall commence upon notice to proceed and continues for a ten (10) year term unless earlier terminated in accordance with Section (7) of the Agreement and Section (14) of this SLA (the “**Term**”).

(5) FEES.

(a) Service Fees. In consideration for the right to access and use the Portal, Service and Documentation, Customer agrees to pay Badger Meter certain fees (“**Service Fees**”) to obtain enterprise-wide access to the Portal, Service and Documentation, authorizing all of its Authorized Users and Authorized Consumers to use the Portal and Service and Documentation in accordance with the terms of the Agreement, pursuant to the pricing set forth in **Exhibit 1 - Fees**.

(b) Updated Schedule of Fees. At least ninety(90) days prior to the expiration date of the Term (“**Anniversary Date**”), Badger Meter will provide Customer with an updated Schedule of Fees for the Service for the upcoming contract term.

(6) RESTRICTIONS ON RIGHT TO USE. Customer agrees that Customer, its Authorized Users and Authorized Consumers will not use or permit or assist another to use the Portal, Service or Documentation in violation of this SLA and will not:

(a) Sell, license, resell, sublicense, or otherwise permit any third parties other than Authorized Users or Authorized Consumers to access or use the Portal, Service, or Documentation.

(b) Remove patent, copyright, trademark or other intellectual property markings from the Portal, Service or Documentation.

(c) Modify, alter, tamper with, repair or otherwise create derivatives from the Portal, Service or Documentation.

(d) Copy, reverse engineer, disassemble or decompile the Portal, Service or Documentation or apply any other process or procedure to derive the source code from any software included in the Portal or Service.

(e) Use the Portal or Service in a manner that violates any applicable international, federal, state or local laws, rules or regulations.

(f) Assert or authorize, assist or encourage any third party to assert against Badger Meter, its affiliates, customers, vendors, business partners, Servicers or licensors any intellectual property infringement Claim regarding the Portal, Service or Documentation.

- (g) Transmit content or messages that are illegal, fraudulent, threatening, abusive, defamatory, or obscene.
- (h) Make any unauthorized connection to Badger Meter’s information technology architecture (“**Network**”)
- (i) Communicate any unsolicited commercial, voice, SMS, or other message.
- (j) Upload or transmit any “virus,” “worm,” or malicious code or access, alter, or interfere with the communications of and/or information about another customer.
- (k) Take actions that could cause damage to or adversely affect Badger Meter, the Service, Portal, Suppliers, Network or the property or reputation of Badger Meter or its Suppliers.

Customer and Badger Meter agree to make good faith efforts to minimize abuse or fraudulent use of the Portal and Service, to promptly report to each other any such abuse or fraudulent use of which they become aware, and to fully cooperate in any investigation or prosecution initiated by Badger Meter, its Suppliers or Customer related to abuse or fraudulent use of the Portal and Service.

(7) **CUSTOMER SUPPORT.** Badger Meter will provide Customer the support services described in **Exhibit 2 - Service Level Agreement**.

(8) **CUSTOMER DATA.**

- (a) **Customer Data Defined.** Customer, its Authorized Users and Authorized Consumers may provide Badger Meter and its Suppliers certain, customer billing information, personally identifiable information or other content (“**Customer Data**”).
- (b) **Ownership.** The Parties agree that the Customer Data is and shall remain the sole and exclusive property of Customer and/or its licensors or Authorized Consumers, including but not limited to any intellectual rights in the Customer Data.
- (c) **Use of Customer Data by Badger Meter.** Customer, its Authorized Users and Authorized Consumers consent to Badger Meter and its Suppliers’ right to host, access, store, copy and use the Customer Data as reasonably necessary to provide, maintain, repair and enhance the Portal, Service and Documentation. Badger Meter may disclose certain Customer Data only to provide the Service to Customer, its Authorized Users and Authorized Consumers or to comply with the law or request of a governmental or regulatory body (including subpoenas or court orders as described in Section 9.)
- (d) **Customer Responsibilities.** Customer is solely responsible for the development, content, operation and maintenance of the Customer Data, including but not limited to the technical operation of the Customer Data, and ensuring that calls made to the Service from Customer’s

network are compatible with then-current API's for the Service. Customer is responsible to ensure that Customer, its Authorized Users and Authorized Consumers comply with the Badger Meter Terms of Use Policy, the Badger Meter Privacy Policy or any other policies referenced in this SLA and the law.

(9) CONFIDENTIALITY.

Traffic Information. All de-identified data (generally, aggregated system data stripped of PII) generated or collected by Badger Meter through operation of the Portal and Service is referred to as the "**Traffic Data.**" All Traffic Data shall be the Confidential Information of and owned exclusively by Badger Meter.

(10) CUSTOMER'S REPRESENTATIONS AND WARRANTIES. Customer represents and warrants to Badger Meter that:

(a) Authority. Customer has the right and authority to enter into this Agreement and to meet its financial and legal obligations under this SLA.

(b) Ownership. Customer, its licensors or its Authorized Consumers, own all rights, title and interest in and to the Customer Data. Customer has all rights in the Customer Data necessary to grant the rights to Badger Meter contemplated under this SLA.

(c) Compliance with Badger Meter Policies. None of the Customer Data or the use of the Customer Data, the Portal or Service by Customer, its Authorized Users or its Authorized Consumers will violate Badger Meter's BEACON Terms of Use <https://beaconama.net/termsfuse.html> or Privacy Policy <https://beaconama.net/privacy/privacy.html>.

(d) Compliance with the Law. Neither Customer, the Authorized Users nor the Authorized Consumers will access or use the Portal, Service or Documentation in any manner that violates any applicable international, federal, state or local laws and/or regulations, including but not limited to all applicable data protection, intellectual property and privacy laws.

(11) REPRESENTATIONS AND WARRANTIES OF BADGER METER.

(a) Authority. Badger Meter represents and warrants to Customer that it has the right and authority to enter into this SLA and to perform its obligations under this Agreement.

(b) Service Warranty. Badger Meter represents and warrants to Customer that the Portal and Service will be provided pursuant to **Exhibit 2 - Service Level Agreement**. In providing the Portal and Service, Badger Meter will maintain sufficient data storage capacity to satisfy the technical requirements and required storage capacity to host the Portal and Service, in its reasonable discretion. If Customer allows unauthorized users to access the Portal, Service or Documentation, this

express limited warranty will immediately become null and void.

(c) Remedy for Breach of the Express Limited Warranty. If the Portal, Service or Documentation fail to meet the terms of the express limited warranty set forth in Section 11(b), Customer is required to notify Badger Meter promptly as defined in **Exhibit 2 – Service Level Agreement**. Customer’s exclusive remedy for a breach of the express limited warranty is a Service credit to be calculated in accordance with **Exhibit 2 – Service Level Agreement**.

(d) DISCLAIMER OF IMPLIED WARRANTIES. EXCEPT FOR THE EXPRESS LIMITED WARRANTY SET FORTH IN SECTION 11(b), BADGER METER MAKES NO OTHER EXPRESS OR IMPLIED REPRESENTATIONS OR WARRANTIES AS TO THE PORTAL, SERVICE OR DOCUMENTATION. BADGER METER EXPRESSLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTIES WITH REGARD TO THE PORTAL, SERVICE OR DOCUMENTATION, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, TITLE, NON-INFRINGEMENT, FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT, OR IMPLIED WARRANTIES ARISING FROM A COURSE OF DEALING, INDUSTRY PRACTICE OR USAGE OF TRADE.

BADGER METER EXPRESSLY DISCLAIMS THAT THE PORTAL AND SERVICE WILL BE UNINTERRUPTED, ERROR FREE OR FREE OF HARMFUL COMPONENTS, AND EXPRESSLY DISCLAIMS ANY WARRANTIES AS TO THE RELIABILITY, QUALITY, SECURITY, CONDITION, DESIGN, SUITABILITY, INTER-OPERABILITY, AVAILABILITY, COMPLETENESS OF THE PORTAL OR SERVICE OR THAT ANY DATA, INCLUDING THE CUSTOMER DATA, WILL BE SECURE OR NOT OTHERWISE LOST OR DAMAGED.

(e) ESSENTIAL TERMS. THE ENFORCEABILITY OF THIS SECTION (11) IS ESSENTIAL TO BADGER METER’S WILLINGNESS TO ENTER INTO THIS SLA WITH CUSTOMER.

(12) LIMITATION OF LIABILITY

(a) DIRECT DAMAGES. IF ANY PARTY DEFAULTS IN ITS OBLIGATIONS UNDER THIS SLA, THE NON-BREACHING PARTY WILL BE ENTITLED TO RECOVER FROM THE BREACHING PARTY ONLY THE ACTUAL AND DIRECT DAMAGES THAT THE NON-BREACHING PARTY MAY INCUR AS A RESULT OF SUCH BREACH.

(b) CAP ON DAMAGES. NEITHER PARTY’S NOR ANY OF ITS RESPECTIVE AFFILIATES ANNUAL LIABILITY UNDER THIS AGREEMENT WILL EXCEED THE LESSER OF (A) THE AMOUNTS THE CUSTOMER ACTUALLY PAYS BADGER METER UNDER THIS SLA FOR THE SERVICE THAT GAVE RISE TO THE CLAIM DURING THE 12 MONTHS PRECEDING THE CLAIM, OR (B) US \$250,000. NOTHING IN THIS SECTION 12 WILL LIMIT CUSTOMER’S OBLIGATION TO PAY BADGER METER FOR USE OF THE SERVICES



PURSUANT TO SECTION 5.

(c) LIMITS ON DAMAGES. NEITHER PARTY NOR ANY OF ITS RESPECTIVE AFFILIATES, SUPPLIERS OR LICENSORS WILL BE LIABLE TO THE OTHER PARTY, AN AUTHORIZED USER, AUTHORIZED CONSUMER OR ANY THIRD PARTY FOR ANY CLAIMS, DEMANDS, ACTIONS, LOSSES, DAMAGES, FINES, JUDGMENTS SETTLEMENTS, COSTS, EXPENSES, ATTORNEY'S FEES, AND COURT COSTS OR ANY OTHER LIABILITIES OF ANY NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO THE PORTAL, SERVICE, DOCUMENTATION, OR THE SUBJECT MATTER OF THIS SLA ("CLAIM").

FURTHER, NEITHER PARTY NOR ANY OF EITHER PARTY'S RESPECTIVE AFFILIATES, SUPPLIERS OR LICENSORS SHALL BE LIABLE TO THE OTHER PARTY, AN AUTHORIZED CONSUMER OR ANY THIRD PARTY FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, EXEMPLARY, PUNITIVE OR ENHANCED DAMAGES, LOST REVENUE OR PROFITS OR DIMINUTION OF VALUE, OR OTHER ECONOMIC ADVERSITY, CLAIMS RESULTING FROM LOSS OF CUSTOMER DATA, OR BREACH OF CONFIDENTIALITY, ARISING OUT OF, OR RELATING TO, AND/OR IN CONNECTION WITH ANY BREACH OF THIS SLA, REGARDLESS OF WHETHER SUCH DAMAGES WERE FORESEEABLE, WHETHER OR NOT THE PARTY WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND THE LEGAL OR EQUITABLE THEORY (CONTRACT, TORT OR OTHERWISE) UPON WHICH THE CLAIM IS BASED.

NEITHER BADGER METER NOR ANY OF ITS AFFILIATES, SUPPLIERS OR LICENSORS WILL BE RESPONSIBLE FOR ANY COMPENSATION, REIMBURSEMENT OR DAMAGES ARISING IN CONNECTION WITH: (A) CUSTOMER'S INABILITY TO USE THE PORTAL OR SERVICE, INCLUDING AS A RESULT OF ANY: (i) TERMINATION OR SUSPENSION OF THIS SLA OR CUSTOMER'S USE OF OR ACCESS TO THE SERVICE ; OR (ii) WITHOUT LIMITING ANY OBLIGATIONS UNDER THE SERVICE LEVEL AGREEMENT, ANY UNANTICIPATED OR UNSCHEDULED DOWNTIME OF ALL OR A PORTION OF THE SERVICE FOR ANY REASON, INCLUDING BUT NOT LIMITED TO AS A RESULT OF A POWER OUTAGE, SYSTEM FAILURE OR OTHER INTERRUPTION; (B) THE COST OF PROCUREMENT OF SUBSTITUTE SERVICES; (C) ANY INVESTMENTS, EXPENDITURES OR COMMITMENTS MADE BY CUSTOMER IN CONNECTION WITH THIS AGREEMENT OR CUSTOMER'S USE OF OR ACCESS TO THE SERVICE OR (D) ANY UNAUTHORIZED ACCESS TO, ALTERATION OR THE DELETION, DESTRUCTION, DAMAGE, LOSS OR FAILURE TO STORE ANY OF CUSTOMER'S DATA.

(13) CUSTOMER'S INDEMNIFICATION OBLIGATIONS

County hereby agrees to indemnify the Contractor for claims brought against the Contractor only to the extent that they are found to result from the sole negligence of the County, its governing body, or its employees. This indemnification shall not be construed to be an indemnification for the acts, or omissions of third parties, independent contractors or third party agents of the County. This indemnification shall not be construed as a waiver of the County's sovereign immunity, and shall be interpreted as limited to only such traditional liabilities for which the County could be liable under the common law interpreting the limited waiver of sovereign immunity. Any claims against the County must comply with the procedures found in 5768.28, Florida Statutes. In order to comply with the requirements of §129.06, Florida Statutes, and Article VII, section 10 of the Florida Constitution, the value of this indemnification is limited to the lesser of the amount payable by either party under the substantive provisions of this Agreement, or the limitations of 8768.28, Florida Statutes. In addition, this indemnification shall be construed to limit recovery by the indemnified party against the County to only those damages caused by County's sole negligence, and specifically not include any attorney's fees or costs associated therewith.

(14) TERMINATION.

Termination for Cause. A party is in default under this Agreement if it materially breaches or materially fails to perform its obligations under this Agreement, which includes any failure to make undisputed payments pursuant to Section (5) ("**Event of Default**").

(a) Termination. Upon delivery of the Termination: (i) Badger Meter may cease providing Services to Customer, its Authorized Users and Authorized Consumers; (ii) Customer, its Authorized Users and Authorized Consumers will have no further right to use the Portal, Service or Documentation, will immediately cease using the Portal, Service and Documentation, and will receive no further Service; (iii) Customer will deliver to Badger Meter any Confidential Information of Badger Meter's in its possession or control, and (iv) Badger Meter may cease gathering data from Customer's endpoints, within a reasonable time, up to one hundred twenty (120) days after termination. Within a reasonable time after termination, at Badger Meter's discretion, Badger Meter will scrub the personally identifiable information from the Customer Data. Customer must immediately return all Documentation provided to Customer by Badger Meter. Customer will remain liable for any previously approved and budgeted Service Fees incurred prior to termination.

(b) Post - Termination Assistance. At either the expiration of the Term without renewal, or upon a default by Customer and subsequent termination, Badger Meter will provide post-termination data retrieval assistance to Customer for an additional fee, which shall be invoiced at the rate of \$200/hour, with the number of hours required determined by the amount of data Customer wishes to extract from the Service. Any additional post-termination assistance from Badger Meter is subject to mutual agreement by the parties.

(c) Reinstatement Fee. If Customer desires to reinstate access to the Portal and Service after termination, a reinstatement fee of \$7.50 per endpoint reinstated will apply.

(15) SUSPENSION OF SERVICES.

(a) Nonpayment. Badger Meter may suspend the Service and access to the Portal and shall not be obligated to provide access to the Portal and Service to Customer, its Authorized Users or Authorized Consumers until all outstanding undisputed invoices for the Service have been paid in full, including any fees associated with suspension of the Service.

(b) Network Protection. Customer acknowledges that Badger Meter (and any of its Suppliers) may restrict, or suspend all or a portion of the Service or limit the Service as may be reasonably necessary to prevent or limit suspected fraud or any problem that materially and adversely affects the performance of the Service and/or is likely to do substantial damage to Badger Meter, Badger Meter's customers or Suppliers. Some of these actions may interrupt or prevent legitimate communications and usage. Such situations may arise: (a) if a device deployed on the Service is materially out of compliance with the technical requirements; (b) in case of actual or suspected fraudulent use; or (c) in case of disruptive or damaging operation.

(c) Notification. In the event that Badger Meter or one of its Suppliers restricts, suspends or cancels any portion of the Service or limits the operation of the Service, Badger Meter shall use reasonable efforts to (i) promptly notify Customer in advance; (ii) provide reasonable information regarding its identification of the issue that resulted in the actions taken; and (iii) reinstate Service upon resolution of the issue as soon as practicable and in any case within a reasonable timeframe.

(d) Immediate Suspension. Badger Meter may suspend Customer's or an Authorized Users or Authorized Consumers right to access or use the Service immediately upon notice to Customer if Badger Meter determines:

(i) Use of the Service poses a security risk to the Service, the Network or any third party, adversely impacts the Service, the Network or data of any other Badger Meter customer, or subjects Badger Meter or any third party to liability or fraud.

(ii) Customer or one of its Authorized Users or Authorized Customers is in breach of this Agreement or is delinquent on its payments for more than fifteen (15) days.

(iii) Badger Meter ceases to operate in the ordinary course, has an assignment for the benefit of creditors or similar disposition of its assets or becomes the subject of any bankruptcy, reorganization, liquidation dissolution or similar proceeding.

(e) Reinstatement. Badger Meter will use commercially reasonable efforts to restore Customer's rights to use and access those portions of the Service or accounts that gave rise to the suspension promptly after Customer has resolved the problem giving rise to the suspension.



(f) **Effect of Suspension.** If Badger Meter suspends Customer’s right to access or use all or any portion of the Service or the Portal:

- (i) Customer remains responsible for all Service Fees and undisputed charges incurred through the date of suspension.
- (ii) Customer remains responsible for any applicable Service Fees and charges for any Services to which Customer has continued access as well as applicable reinstatement fees .
- (iii) Customer will not be entitled to any service credits under the Service Level Agreement for any period of suspension.
- (iv) Badger Meter’s right to suspend the Services is in addition to Badger Meter’s right to terminate this Agreement.

(16) COMPLIANCE WITH REGULATIONS; DATA PRIVACY. Each party is responsible for complying with industry standards and such applicable laws and regulations, including, but not limited to, the generally accepted practices in the information technology service management industry for providing secure data handling and management, including meeting or exceeding Information Technology Infrastructure Library (ITIL) standards for logical and physical security and all requirements regarding the protection of data in its possession or under its control. A party will not be liable for any failure of the other party to comply with this requirement.

(17) DATA SECURITY AND RECOVERY.

(a) **Data Security.** In order to protect the Customer Data and prevent unauthorized access to or use of the Customer Data, Portal or Service, Badger Meter has implemented commercially reasonable internal procedures and systems designed to protect the privacy and security according to the requirements set forth in **Exhibit 3 - BEACON AMA Managed Solution Security Policy** (“**Security Standards**”), consistent with applicable international, federal, state and local laws. The purpose of the security policy is to identify reasonably foreseeable and internal risks to security and unauthorized access to Badger Meter’s Network and minimize security risks, including through risk assessment and regular testing. Badger Meter will designate one or more employees to coordinate and be accountable for the security program.

(b) **Protection of Customer Data.** Badger Meter will implement reasonable and appropriate measures for the Badger Meter Network designed to help Customer secure the Customer Data against accidental or unlawful loss, access, or disclosure in accordance with Badger Meter’s Security Standards. Badger Meter may modify its Security Standards from time to time but will continue to provide at least the same level of security as described in the Security Standards as of the Effective Date. The security and data privacy provisions in this Section contain Badger Meter, and its Suppliers entire obligation regarding the security, privacy, and confidentiality of the Customer Data.

(c) **Data Storage.** Badger Meter will employ commercially reasonable storage (including backup, archive, and redundant data storage) and commercially reasonable precautions to prevent the loss of or alteration of Customer Data, but does not guarantee against any such loss or alteration. Badger Meter will not serve as Customer's official record keeper. Customer will maintain source documents of the Confidential Information (such as billing information) hosted by Badger Meter under this Agreement. Badger Meter acknowledges that such information may be subject to Chapter 119, Florida Statutes and Pinellas County public records policies.

(d) **Customer Responsibilities.** Customer is responsible for properly configuring and using the Service and taking steps to maintain appropriate security, protection and backup of the Customer Data, including but not limited to the use of encryption technology to protect Customer Data from unauthorized access and will perform routine archiving of the Customer Data. Further, Customer is responsible for regularly auditing its Authorized Users, and will enact internal procedures to remove Authorized Users from the Service if their job duties change and access is no longer appropriate, or if an Authorized User separates from Customer.

(e) **Data Transmission Risks.**

(i) Cellular Transmissions. Badger Meter cellular endpoints conform to the AES256 encryption standards or the latest AES standard in effect. Customer acknowledges that neither Badger Meter nor its Suppliers can guarantee the privacy or security of any cellular transmissions as part of the Service. Customer acknowledges that cellular transmissions are capable of being intercepted by third parties without the knowledge or permission of Badger Meter or its Suppliers. Badger Meter and its Suppliers shall not be liable to Customer, the Authorized Users, the Authorized Consumers or any third party for interception or unauthorized use of any data transmitted through the cellular network, as part of the Service.

(ii) Internet Transmissions. Customer acknowledges that security of transmissions over the Internet cannot be guaranteed. Badger Meter is not responsible for: (i) Customer's access to the Internet; (ii) interception, unauthorized use or interruptions of communications through the Internet; or (iii) changes or losses of data through the Internet, in each case other than to the extent caused solely by Badger Meter. In order to protect Customer Data, Badger Meter may suspend Customer, Customer's Authorized Users or Authorized Consumers access to or use of the Badger Meter Portal or Service via the Internet immediately, without prior notice, pending an investigation of any potential security breach.

(f) **Coverage Availability.** The Service is provided using a wireless network. Actual signal availability in the Service Area will depend on the device used to access the Service as well as coverage for the applicable wireless network provided in specific geographic regions. Coverage may be refused, interrupted or limited by environmental factors such as signal strength,

buildings, weather, geography, topography, or by factors affecting the Suppliers, such as usage concentration or by facilities changes, modifications, updates, relocations, repairs, maintenance or other similar activities necessary for the proper or improved operation of the Supplier's facilities. Any such factors may result in dropped and blocked connections or slower data speeds. Neither Badger Meter nor any of its Suppliers will be responsible to Customer or any of Customer's Authorized Users or Authorized Consumers for any such lapses in or obstructions to coverage. The Service Area is subject to change from time to time. Should Badger Meter receive notice from its Supplier that such Supplier intends to discontinue its support for the Badger Meter Service in all or part of the Service Area, Badger Meter will provide Customer with as much advance notice as practicable under the circumstances.

(g) Password Protection. Customer, its Authorized Users and Authorized Consumers will be required to select and use certain user names, passwords or codes to access and use the Service and Portal. Customer assumes sole responsibility for the selection, management and use of any codes or passwords as may be permitted or required for the access to and use of the Portal and Service by Customer, its Authorized Users and its Authorized Consumers. Customer agrees to maintain the privacy of usernames and passwords associated with the Badger Meter Portal and Service. Customer shall remain responsible for all activities that occur under Customer's password or Internet account. Customer will immediately notify Badger Meter of any unauthorized use of Customer's password or Internet account or any other breach of security, and ensure that Customer exits from Customer's Internet account at the end of each session. Badger Meter shall not be liable for any damages incurred by Customer or any third party arising from Customer's failure to comply with this Section.

(h) Third Party Access. To the extent that Customer requests that Badger Meter provide any Customer Data to Authorized Users, Authorized Consumers or third parties or any non-U.S. location, Customer represents that it has acquired any consents or provided any notices required to transfer such content or information and that such transfer does not violate any applicable international, federal, state or local laws and/or regulations.

(i) Security Breach. If Badger Meter becomes aware of a security breach or that compromises the security, confidentiality or integrity of the Customer Data ("Breach"), Badger Meter will promptly notify Customer in writing and take appropriate actions to resolve the Breach. Badger Meter will reasonably cooperate with Customer to investigate the nature and scope of any Breach. In its initial notification to Customer, Badger Meter will provide Customer with: (i) a description of the Breach; (ii) the estimated impact of the Breach on Customer's Data; (iii) the name and contact information of the person at Badger Meter who will be primarily responsible for resolving the issues for Customer; and (iv) the investigation taken and the suggested corrective action. Badger Meter will provide commercially reasonable cooperation to Customer in investigating, assisting with notification of the Breach and taking corrective action as requested by Customer.

(j) **Notification of Breach.** In the event that applicable law requires notification to individuals of a Breach or if requested by Customer, Badger Meter will take additional mitigation steps for the benefit of Customer, including, but not limited to, providing reasonable assistance with drafting, and sending of required notifications.

(18) CHANGES.

(a) **Right to Make Changes.** Badger Meter may from time to time make changes, without Customer's approval, to the Terms of Use, the Privacy policies, the Portal, Service or Documentation, provided that such changes: (i) do not increase Customer's total costs of accessing and using the Portal and Service during the Term of this Agreement ; (ii) do not require Customer to make any material changes to its systems, software, equipment, policies or procedures ; (iii) do not have a material adverse impact on the functionality, interoperability, performance, reliability, security or resource efficiency of the Portal and Service ; (iv) do not materially reduce the scope of the Portal and Service; and (v) are otherwise consistent with the Agreement. Badger Meter will publicize any changes by a notice given to Customer or by a prominent announcement on the Portal. Any such changes will not take effect until thirty (30) days after posting of notice on the Portal. By continuing to use the Service after the effective date of the modification to a policy, Customer agrees to be bound by the modified policies. It is Customer's responsibility to check the Badger Meter site regularly for modifications to the policies.

(b) **Emergency Changes; System Improvement.** Notwithstanding the foregoing, Badger Meter and its Suppliers may make temporary changes to the Portal and Service required by an emergency or threat to the security or integrity of the Portal or Service, to respond to Claims, litigation or loss of license rights related to third party intellectual property rights or to comply with the law or requests of a government entity, as well as take actions deemed reasonably necessary to protect or optimize the Service. Some of these actions may interrupt or prevent legitimate communications and usage, including, for example, use of message filtering/blocking software to prevent SPAM or viruses, limitations on throughput, and scheduled maintenance. Badger Meter will provide notice by sending a message to the email address then associated with Customer's account and by posting it on Badger Meter's Portal. Badger Meter will provide Customer with: (i) at least thirty (30) days' advance notice of planned maintenance by Badger Meter; and (ii) as much advance notice as reasonably possible of emergency changes or maintenance by Badger Meter or its Suppliers. Any actions resulting in permanent changes shall only be made in compliance with Section (19) (a).

(19) RIGHT TO SUBCONTRACT. Badger Meter may subcontract the performance of any of its cellular or web-services duties or obligations under this Agreement and will use commercially reasonable efforts to subcontract only with subcontractors that have the requisite skills to perform any subcontracted obligations in accordance with the terms of this Agreement.

(20) GENERAL.

(a) Affiliates. This Agreement covers only the employees and agents of Customer. If Customer wishes to have any entity that directly or indirectly controls, is controlled by or is in common control with Customer to access the Portal and use the Service, Customer's Affiliate must execute a separate agreement with Badger Meter.

(b) No Claims Against or Liability of Badger Meter Suppliers. Customer acknowledges that the Service utilizes services that are furnished to Badger Meter and one or more Suppliers pursuant to agreements between Badger Meter and its Suppliers. Neither Customer nor any Authorized Users or Authorized Consumers has a contractual relationship with Badger Meter's Suppliers and neither Customer nor its Authorized Users or Authorized Consumers is a third party beneficiary of or will have any claim against Badger Meter's Suppliers in the event any such agreement expires or is terminated. Customer further acknowledges that the Suppliers disclaim all liability of any nature, whether legal or equitable, to Customer, its Authorized Users or Authorized Consumers, whether direct, indirect, incidental or consequential, arising out of the use of Badger Meter Portal or Service by Customer, its Authorized Users or Authorized Consumers, including any liability for personal injury or death, failure to be able to use the Service or otherwise. Customer agrees that neither it nor any Authorized Users or Authorized Consumers shall have any Claim against the Supplier of any kind with respect thereto, whether arising out of breach of contract, warranty, negligence, and tort or otherwise.

(c) Dispute Resolution.

(i) Initial Resolution Efforts. The parties shall act in good faith and use commercially reasonable efforts to promptly resolve any claim, dispute, controversy, or disagreement (each a "**Dispute**") between the parties or any of their respective subsidiaries, affiliates, successors and assigns under or related to this Agreement or any document executed pursuant to this Agreement or any of the transactions contemplated hereby.

(21) FORCE MAJEURE. Neither party shall be liable to the other or any third party by reason of any failure or delay of its obligations under this Agreement where the delay or failure results from any cause beyond its reasonable control, including, but not limited to, acts of God, fires, storms, floods or other acts of nature, explosions, systemic electrical telecommunications or other utility failures, earthquakes, hurricanes, tornados, natural disasters, strikes, shortage of materials, work stoppage or other labor dispute, embargoes, riots, insurrections, acts of war or terrorism, or any action or restraint by court order or public or governmental authority ("**Force Majeure Event**"). The party subject to the Force Majeure Event agrees to use commercially reasonable efforts to minimize the impact of the Force Majeure Event on the other party.



Badger Meter

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IN WITNESS WHEREOF, the authorized representatives of the parties hereby bind the parties to this BEACON AMA Managed Solution Master Agreement by signing below:

BADGER METER, INC

PINELLAS COUNTY

KRB

Ken Bockhorst (May 25, 2022 14:51 EDT)

Signature

Signature

Kenneth C. Bockhorst

Printed Name

Printed Name

President and Chief Executive Officer

Title

Title

May 25, 2022

Date

Date



*BADGER METER
BEACON AMA MANAGED SOLUTION
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Pinellas County

EXHIBIT 1

FEES

- 1. Service Fees.** Customer agrees to pay the following Service Fees, as consideration for the right to access and use the Portal, Service and Documentation during the Term, as well as applicable Taxes.
- 2. Invoicing.** Badger Meter shall issue invoices to Customer for Service and Support Fees on a monthly basis. In accordance with the requirements of Section 218.70 et seq., Florida Statutes, "The Local Government Prompt Payment Act."

BEACON Monthly Endpoint Subscription Fee

15-minute Data, transmitted four times a day per weekday and once a day on weekends: : \$0.40 per endpoint per month

Invoicing for monthly endpoint subscription fee starts at time of endpoint activation or 6 months from date of shipment, whichever comes first.

EXHIBIT 2

SERVICE LEVEL AGREEMENT

This Service Level Agreement (“SLA”) will go into effect upon completion of Endpoint Provisioning, which is the point during meter installation when the endpoint is installed and verified to provide data to the BEACON AMA Managed Solution.

1. CUSTOMER SUPPORT.

Service Levels. Within one (1) hour after a request for Customer Support Services from Customer, Badger Meter will respond to such request in accordance with the procedures set forth below. Customer may report the problem by phone, email or website provided by Badger Meter to Customer. Badger Meter will use commercially reasonable efforts to meet the response and resolution times set forth below:

Severity Level	Response Time	Resolution Time
Level 1 - Service is unavailable	one (1) hour	six (6) hours
Level 2 - certain interruptions but service is still available	twenty-four (24) hours	twenty-four (24) hours
Level 3 - minor intermittent malfunction	twenty-four (24) hours	three (3) days
Level 4 - suggestions for new features or enhancements to BEACON Portal and Service	twenty-four (24) hours	Evaluated, scheduled and prioritized for potential inclusion in upcoming releases.

2. BEACON PORTAL AND SERVICE AVAILABILITY PROMISE.

Badger Meter will use commercially reasonable efforts to fulfill the following Service Promise:

- BEACON Portal and Service Availability of 99.9% within each calendar month, excluding any Emergency Downtime, Scheduled Downtime, any unavailability of the Portal and Service due to any Force Majeure Event and any unavailability of the Portal and Service less than fifteen (15) minutes in duration following written notice thereof.

Definitions

“**Availability**” is the monthly uptime percentage with normal functionality of the Portal and the Service, calculated as described below.

“**Emergency Downtime**” means any unavailability of the Portal or Service due to a temporary suspension by Badger Meter to perform maintenance to address any, urgent and unexpected issue with the Portal or Service.

“**Scheduled Downtime**” means any unavailability of the Portal or Service due to scheduled maintenance. Scheduled maintenance may occur between 10:00 p.m. on Saturday to 4:00 a.m. on Sunday (Pacific Time) every week. Badger Meter shall have the right to change the scheduled maintenance times upon notice to Customer posted on the BEACON Portal.

CALCULATION of BEACON Portal and Service Availability:

Availability is measured by Badger Meter through standard monitoring software that tests the application availability at least every five (5) minutes and logs unavailability incidents (date and UTC time) for each monitored component.

Availability is calculated as the percentage of uptime in the applicable calendar month, excluding scheduled downtime:

$$1 - \frac{\textit{Total Unavailability Minutes}}{\textit{Total Minutes of Service Month} - \textit{Total Minutes of Approved Downtime}}$$

Where:

“**Total Unavailability Minutes**” is the cumulative unavailability time in minutes in the applicable month where the Portal and Service are not available due to unplanned outages or from systematic errors on the part of Badger Meter,

“**Total Minutes of Service Month**” is the cumulative time in minutes in the month in question, calculated by taking the number of days in month x 24 hours/day x 60 minutes/hour, and



“**Total Minutes of Approved Downtime**” is the cumulative time in minutes in the applicable month where the Supplier applications are not available due to scheduled downtime ; other planned scheduled outages, or approved exclusion conditions as defined in this Agreement.

In order to be included within the Total Unavailability Minutes: (a) Customer shall notify Badger Meter, in writing, via email(techsupport@badgermeter.com) of the unavailability of the Portal or the Service; (b) such unavailability shall be greater than fifteen (15) minutes in duration following Badger Meter’s receipt of such notice; and (c) Customer shall notify Badger Meter, in writing, via email within twenty-four (24) hours of such unavailability that it should be included within the Total Unavailability Minutes unless such unavailability is due to any Emergency Downtime, Scheduled Downtime, or any unavailability of the Services due to any Force Majeure Event.

Service Credits

If Badger Meter fails to meet the BEACON Portal and Service Availability Promise, the following Service Credits will be calculated as follows:

Service Credit = Endpoint Service Units Consumed in the Month * (1 - Availability) rounded to the next whole number

For example;

Availability	Service Credit (Service Units per 1,000 Service Units consumed in the month)
95%	50
90%	100
80%	200
70%	300
60%	400
50%	500

Service Credit will be added to Customer’s account in the form of pre-paid Service Units for the same endpoint type(s).

3. MONTHLY BILLING DATA SERVICE PROMISE.

Badger Meter will use commercially reasonable efforts to fulfill the following Service Promise:

- The BEACON AMA Managed Solution will successfully provide Monthly Billing Data for at least 98.5% of provisioned accounts at the time of billing request to the BEACON AMA Managed Solution.

Definitions

“**Managed Solution**” is a system that consists of a network deployment using fixed network and/or cellular endpoints, where Badger Meter maintains the responsibility for managing the reading hardware and software for system operation over the Term of the Agreement.

“**Provisioned Accounts**” are accounts with cellular or fixed network endpoints that are discovered by the network, fully able to communicate with the network, and completely entered correctly in the BEACON AMA Managed Solution.

“**Monthly Billing Data**” is a valid meter reading obtained within three (3) days of the billing as performed through the BEACON AMA Managed Solution to provisioned accounts.

CALCULATION of Monthly Billing Data Service Promise for Provisioned Accounts:

Monthly Billing Data success rate is calculated by the count of accounts in the billing cycle with meter read data within three (3) days (“**Count of Billing Reads**”) divided by the number of active and Provisioned Accounts in the billing cycle (“**Count of Total Billing Cycle**”).

$$\frac{\textit{Count of Billing Reads}}{\textit{Count of Total Billing Cycle}}$$

Where:

“**Count of Billing Reads**” is the total number of accounts in the billing file with valid data that a billing quality reading is supplied for managed solution endpoints.

“**Count of Total Billing Cycle**” is the total number of accounts with valid data in the billing file being processed for managed solution endpoints.

If Customer suspects that the Monthly Billing Data Service Promise has not been met for a particular Billing Cycle, (a) Customer shall notify Badger Meter, in writing, within twenty-four (24) hours of the occurrence, via email (techsupport@badgermeter.com) of the Count of Billing Reads and Count of Total Billing Cycle of managed solution endpoints; (b) the specific time and date when the billing



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read file was generated.

Service Credits

If Badger Meter fails to meet the Monthly Billing Data Service Promise, Service Credits will be calculated as follows:

Service Credit = Managed Solution Endpoint Service Units Consumed in the Month * (1 - Monthly Billing Data Success Rate) rounded to the next whole number

For example;

Monthly Billing Data Success Rate	Service Credit (Service Units per 1,000 Service Units consumed in the month)
95%	50
90%	100
80%	200
70%	300
60%	400
50%	500

Service Credit will be added to Customer’s account in the form of pre-paid Service Units for the same endpoint type(s).

4. MISCELLANEOUS.

Exclusions

The BEACON Portal and Service Availability Promise and Monthly Billing Data Service Promise do not apply to any of the following performance issues, in addition to other exclusions herein:

- (i) Resulting from any actions or inactions of Customer, its Authorized Users or Authorized Consumers in accordance with the restrictions and requirements of this Agreement;
- (ii) Resulting from Customer or its suppliers equipment, software, or other technology and/or Customer's third party equipment, software, or other technology outside of Badger Meter's control;
- (iii) Caused by failures, including, but not limited to, internet connectivity, port availability, or firewall configuration at Customer's location;
- (iv) Resulting from Customer's breach of any term or condition under the Agreement;
- (v) Caused by unexpected or unintentional RF interference or signal obstruction caused by sources not present or not in use during endpoint installation;
- (vi) Caused by intentional RF interference or signal obstruction not present during endpoint installation, caused by third parties;
- (vii) Caused by Customer, an Authorized User's or an Authorized Consumer's misuse or abuse of the Portal or Service;
- (viii) During an event triggering a disaster recovery and for a twenty-four (24) hour period after the resumption of the Service following such an event to allow for the system to return to normal operating ranges;
- (ix) Arising from Badger Meter's suspension or termination of Customer's right to use the BEACON Managed Solution in accordance with the Agreement;
- (x) Arising from failure of Customer to follow Badger Meter's published installation, operation and maintenance instructions and Clarifications from Badger Meter's Preliminary Network Design;
- (xi) When outdoor temperatures either exceed or are below the endpoint operating temperature range as described in the applicable product data sheet.
- (xii) Accounts read using manual, touch read, handheld and mobile technology are not included as part of the Monthly Billing Data Service Promise, as these reading technologies are outside of Badger Meter's control.

In the event Badger Meter does not meet a Service Promise hereunder, Badger Meter will conduct a commercially reasonable root cause analysis of the Service promise failure. If Badger Meter's analysis is inconclusive, or if Badger Meter concludes that circumstances outside of Badger Meter's control caused the Service promise failure, or if Badger Meter concludes that a failure falls under any other exclusions described hereunder, Customer will not be entitled to a Service Credit. If Badger Meter's analysis is conclusive and that circumstances within Badger Meter's control caused the Service failure, Customer will be eligible to receive a Service Credit as described above.

EXCEPT AS EXPRESSLY PROVIDED IN THIS SLA, THE SERVICE CREDITS SPECIFIED IN THIS



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SLA WILL BE CUSTOMER'S SOLE AND EXCLUSIVE REMEDY FOR BADGER METER'S FAILURE TO MEET THE SERVICE PROMISE SPECIFIED IN THIS SLA.

Badger Meter will report Service Promises and applicable Service Credits upon request and upon a commercially reasonable frequency. Following each report, upon Customer request, the parties will discuss such performance and the extent to which any Service Credits either are appropriate or should be modified due to circumstances not captured by the reporting methodology.

Upon agreement concerning the Service Credits due, such Service Credits will be applied against Badger Meter's charges in the months following the month in which the credits were incurred.

EXHIBIT 3

BEACON AMA MANAGED SOLUTION SECURITY POLICY

1. **BEACON AMA Portal and Service Information Security Program.** Badger Meter maintains an information security program (including the adoption and enforcement of internal policies and procedures) designed to (a) support the BEACON AMA Managed Solution, (b) identify reasonably foreseeable and internal risks to the BEACON Portal and Service security and unauthorized access to the Badger Meter Network, and (c) minimize security risks. The BEACON Portal and Service information security program includes the following measures:
 - 1.1 **Network Security.** The Badger Meter Network is electronically accessible to employees, and contractors necessary to provide the Portal and Service. Badger Meter maintains access controls and policies to manage what access is allowed to the Badger Meter Network from each network connection and user, including the use of firewalls or functionally equivalent technology and authentication controls. Badger Meter maintains corrective action and incident response plans to respond to potential security threats.
 - 1.2 **Physical Security.**
 - 1.2.1 **Physical Access Controls.** Physical components of the Badger Meter Network are housed in nondescript facilities (the “**Facilities**”). Physical barrier controls are used to prevent unauthorized entrance to the Facilities both at the perimeter and at building access points. Passage through the physical barriers at the Facilities requires either electronic access control validation (e.g., card access systems, etc.) or validation by human security personnel (e.g., contract or in-house security guard service, receptionist, etc.). Employees and contractors are assigned photo-ID badges that must be worn while the employees and contractors are at any of the Facilities. Visitors are required to sign in with designated personnel, must show appropriate identification, and are assigned a visitor ID badge that must be worn while the visitor is at any of the Facilities, and are continually escorted by authorized employees or contractors while visiting the Facilities.
 - 1.2.2 **Limited Employee and Contractor Access.** Badger Meter provides access to the Facilities to those employees and contractors who have a legitimate business need for such access privileges. When an employee or contractor no longer has a business need for access privileges, the access privileges are promptly revoked, even if the employee or contractor continues to be an employee of Badger Meter or its affiliates.
 - 1.2.3 **Physical Security Protections.** All major access points (other than main entry doors) are maintained in a secured (locked) state. Access points to the Facilities are monitored by video surveillance cameras designed to record all individuals accessing the Facilities. All physical access to the Facilities by employees and contractors is logged and routinely audited.
 - 1.2.4 **Pre-Employment Screening.** Badger Meter conducts criminal background checks, as



permitted by applicable law, as part of pre-employment screening practices for

employees commensurate with the employee's position and level of access to the Facilities. Badger Meter will not permit an employee to have access to the non-public Customer Data or perform material aspects of the Service if such employee has failed to pass such background check.

2. **Continued Evaluation.** Badger Meter will conduct periodic reviews of the security of its Badger Meter Network and adequacy of its information security program as measured against industry security standards and its policies and procedures. Badger Meter will continually evaluate the security of its Badger Meter Network and associated Service to determine whether additional or different security measures are required to respond to new security risks or findings generated by the periodic reviews.
3. **Customer Responsibilities.** System security is a shared responsibility between Badger Meter and Customer. Customer shall assign a systems service administrator to be responsible for establishing access and usage policies. Customer shall develop commercially reasonable policies and procedures to insure physical security, establishing account access approvals and procedures, conduct regular reviews of access rights, and provide security awareness training for staff using the Service. The administrator shall also be responsible for policies and procedures related to Authorized Consumers access to their individual data resident on the Network.

AGREEMENT

**EXHIBIT H - SOUTHWEST FLORIDA WATER AMANGEMENT DISTRICT
COOPERATIVE FUNDING INITIATIVE PROJECT AGREEMENT**

EXHIBIT H - SOUTHWEST FLORIDA WATER AMANGEMENT DISTRICT COOPERATIVE FUNDING INITIATIVE PROJECT AGREEMENT to follow:

Southwest Florida Water Management District Cooperative Funding Initiative (CFI) Project Agreement (Type 1-3)

This Agreement, including any exhibits referenced, attached, or incorporated herein (Agreement) is entered into by and between the Southwest Florida Water Management District (District), 2379 Broad Street, Brooksville, Florida 34604, and the Cooperator named below.

Project Information

Cooperator Name:	<u>Pinellas County</u>
Cooperator Address:	<u>14 South Fort Harrison Avenue</u>
	<u>Clearwater, Florida 33756</u>
Project Number:	<u>Q245</u>
Project Name:	<u>Pinellas County AMI Metering Analytics Project</u>
Entity Type:	<u>Public</u>
Project Description:	<u>This Project consists of implementation of a software program that will promote and encourage water conservation by utility customers. This project will allow software platform setup, including a utility side dashboard, and associated training and will be available for 112,900 retail potable water customers.</u>
Electronic Signature:	<u>Yes</u>

Funding/Agreement Information

Effective Date:	<u>10/1/2021</u>	Expiration Date:	<u>2/1/2029</u>
Type/Risk Level (1-3):	<u>Type 1</u>	O&M Expiration Date:	<u></u>
Anticipated Total Project Cost:	<u>\$278,828</u>	Multi-Year Funded Project:	<u>No</u>
District's Maximum Share:	<u>\$139,414</u>	Funding Approved:	<u>FY: 2022 \$139,414</u>
		District Funding:	<u>50%</u>
State Funding:	<u>No</u>	CSFA #:	<u></u> Title: <u></u>
Federal Funding:	<u>No</u>	CFDA #:	<u></u> Title: <u></u>
Cooperator's Total Share:	<u>\$139,414</u>	Land Acquisition Cost:	<u>No</u>
Third Party Review:	<u>No</u>	Conservation Easement:	<u>No</u>

Party Contacts

District Contract Manager

Name:	<u>Cassidy Hampton, Environmental Scientist</u>
Address:	<u>2379 Broad Street</u>
	<u>Brooksville, Florida 34604</u>
Phone:	<u>1-800-423-1476 x4406</u>
Email:	<u>Cassidy.Hampton@swfwmd.state.fl.us</u>

Cooperator Project Manager

Name:	<u>Ted Armstrong</u>
Address:	<u>14 South Fort Harrison Avenue</u>
	<u>Clearwater, Florida 33756</u>
Phone:	<u>(727) 464-8577</u>
Email:	<u>tarmstrong@pinellascounty.org</u>

The Parties agree to comply with the terms and conditions of the following checked exhibits and attachments, which are incorporated herein by reference:

X	Exhibit A - CFI Standard Terms and Conditions (Public Cooperator)
	Exhibit A - CFI Standard Terms and Conditions (Private Cooperator)
	Exhibit B - CFI Special Terms and Conditions – Standard Construction, Restoration, or Conservation with Construction
	Exhibit B - CFI Special Terms and Conditions – Construction (Water Quality/Flood Protection)
	Exhibit B - CFI Special Terms and Conditions – Construction (Reclaimed Water)
	Exhibit B - CFI Special Terms and Conditions – Construction (Aquifer Storage & Recovery and Recharge)
X	Exhibit B - CFI Special Terms and Conditions – Non-Construction (Study, Conservation, Watershed Management Plan, or Third-Party Review {design only})
	Exhibit B - CFI Special Terms and Conditions – Construction/Non-Construction (Septic to Sewer)
X	Exhibit C - Project Plan
	Exhibit D - State Funding Terms and Conditions
	Exhibit E - Federal Funding Terms and Conditions
	Exhibit F - Special Audit Requirements
	Exhibit G - Miscellaneous
	Additional Exhibits (if necessary)
	Attachment 1 - Contingency Funds Justification Form
X	Attachment 2 - Minority/Women Owned and Small Business Utilization Report Form
	Attachment 3 - Sample Conservation Easement
X	Attachment 4 - Cooperative Funding Agreement Checklist
	Additional Attachments (if necessary)

IN WITNESS WHEREOF, the parties hereto, or their lawful representatives, have executed this Agreement on the day and year set forth next to their signatures below.

Southwest Florida Water Management District

DocuSigned by:
 By: Amanda Rice
ABDAF9C82EBF43D
 Name: Amanda Rice Date: 03/15/2022
 Title: Assistant Executive Director

Pinellas County

By: Charlie Justice
 Name: Charlie Justice Date: February 22, 2022
 Title: Chairman, Board of County Commissioners

Attest:

By: [Signature]
 Deputy Clerk
 APPROVED AS TO FORM

By: [Signature]
 Office of the County Attorney



Exhibit A
Southwest Florida Water Management District
Standard Terms and Conditions
Public Cooperator

1. Project Contacts and Notices.

The individuals identified in the CFI Project Agreement are the prime contacts for matters relating to this Agreement. Each party shall provide notice to the other party of any changes to the prime contact information. All notices under this Agreement shall be in writing to the other party's prime contact and shall be sent by email or overnight mail, except for cure and default notices which shall be sent by certified mail. Unless otherwise indicated in this Agreement, reports may be provided by email. Notices and reports are effective upon receipt. Any notice or report delivered by email shall request a receipt thereof confirmed by email or in writing by the recipient and the effective date shall be the date of receipt, provided such receipt has been confirmed by the recipient.

2. Contact Authority.

The Cooperator's Project Manager is authorized to affirm the invoice certification required by this Agreement. The District's Contract Manager is authorized to approve requests to extend a Project task deadline or to adjust a line item amount of the Project Budget. The District's Contract Manager is not authorized to approve any time extension that will extend a Project task beyond the expiration date of this Agreement or which will result in a change to the total Project cost or the parties' funding shares as identified in the CFI Project Agreement. Changes authorized by this Paragraph do not require a formal written amendment but must be in writing and signed in accordance with each party's signature authority.

3. Agreement Term.

The effective date of this Agreement is identified in the CFI Project Agreement. The expiration date is the date identified in the CFI Project Agreement, or upon the satisfactory completion of the Project and subsequent final reimbursement to the Cooperator, whichever occurs first. If Exhibit B requires the Cooperator to operate and maintain the Project after its completion, the operation and maintenance obligation shall survive the above-referenced expiration date for 20 years, beginning on the date provided in Exhibit B (O&M Period). The Cooperator is not eligible for reimbursement for any Project work conducted or costs incurred prior to the effective date of this Agreement.

4. Scope of Work.

The Cooperator shall perform the services necessary to complete the Project in accordance with Exhibit C, the Project Plan. The Cooperator shall commence and complete Project tasks in accordance with the Project Schedule, including any properly authorized extensions of time. Time is of the essence in the performance of each obligation under this Agreement. The Cooperator shall promptly advise the District of issues that arise that may impact the successful and timely completion of the Project. The Cooperator shall be solely responsible for managing and controlling the Project and its operation and maintenance, including the engagement and supervision of any consultants or contractors.

5. Funding.

5.1. The anticipated total cost of the Project is identified in the CFI Project Agreement. The District's maximum funding share is identified in the CFI Project Agreement, subject to Paragraph 6 below. The Cooperator shall provide all remaining funds necessary for the satisfactory completion of the Project.

5.2. Any state or federal appropriations or grant funds received by the Cooperator for the Project will be applied to reduce each party's share in accordance with their respective funding percentages as described in the CFI Project Agreement. If the District is a recipient of state

or federal appropriations or grant funds for the Project, the District's reimbursement obligation of such funding amounts is contingent upon the District's receipt of such funds.

- 5.3. Reimbursement for expenditures of contingency funds is contingent upon the District's approval and determination, in its sole discretion, that the expenditures were necessary to achieve the resource benefit of the Project and were not in excess of what was reasonably necessary to complete the Project. The term "contingency funds" shall include funds that are allocated for unanticipated or extra work needed to complete the Project. Items not considered for reimbursement include those unrelated to the resource benefit or resulting from design errors and defects in the work. The Cooperator may submit up to 5% of the anticipated total cost of the Project for contingency reimbursement. The District's total reimbursement obligation of contingency expenses is limited to its funding percentage identified in CFI Project Agreement. If an invoice includes expenditures of contingency funds, the Cooperator shall complete and submit the Contingency Funds Justification Form exhibit to explain the basis of each line item expenditure.
- 5.4. The Cooperator shall evaluate the cost benefit of utilizing owner direct purchases for the Project and shall advise the District as to the reason the Cooperator did or did not choose to utilize owner direct purchase for major Project components.
- 5.5. Costs associated with in-kind services provided by the Cooperator are not reimbursable by the District and may not be included in the Cooperator's share of Project funding.
- 5.6. Unless otherwise indicated in this Agreement, the District shall withhold a retainage of 10% of its funding share until all submittals and deliverables required by this Agreement have been provided and the District's Contract Manager verifies their compliance with this Agreement.
- 5.7. If the Project Plan requires the District to contract with a consultant to perform a third-party review of the 30% design package:
 - 5.7.1. The District shall withhold reimbursement of the costs associated with the 30% design package in an amount equivalent to half the cost of the third-party review.
 - 5.7.2. The District has the right to terminate this Agreement without further payment obligation at the option of the District Governing Board, in its sole discretion, after being presented with the third-party review. If the Board decides to terminate this Agreement, the District shall not be obligated to reimburse the Cooperator for any post-30% design work.

6. Funding Contingency.

The District's performance and payment pursuant to this Agreement are contingent upon the District's Governing Board appropriating funds in its approved budget for the Project in each fiscal year of this Agreement. The District's funding percentage is subject to change due to subsequent Governing Board approvals. However, once funds are appropriated for the Project in a given fiscal year and the Cooperator has expended allowable Project costs, the appropriated amount will not be reduced. If the District does not approve additional funds needed for the Project in a future fiscal year, the District is obligated to reimburse its share of Cooperator expenses incurred in the amount of funds the District appropriated as of the date of the District's non-appropriation. In this event, the District and the Cooperator, by mutual agreement, may reduce the Project scope. The Cooperator's performance and payment pursuant to this Agreement are contingent on the Cooperator's governing body or the Florida Legislature, as applicable, lawfully appropriating legally available funds.

7. Invoice and Payment.

- 7.1. The District shall reimburse the Cooperator for its share of allowable Project costs in accordance with the Project Budget, subject to its right to withhold funds as provided in this Agreement; however, at no point in time will the District's expenditure amounts under this Agreement exceed the District's funding percentage identified in the CFI Project Agreement.
- 7.2. Each invoice must include the following certification:

"I certify that the costs requested for reimbursement and the Cooperator's matching funds are directly related to the performance under the Agreement between the Southwest Florida Water Management District and the Cooperator (Agreement No. _____), are allowable, allocable, properly documented, and are in accordance with the approved Project Budget. This invoice includes \$__ of contingency funds expenditures."

If the invoice includes the use of federal or state appropriations or grant funds, the certification must also include the following sentence:

"The Cooperator received a total of \$__ in federal and state appropriations or grant monies for the Project and \$__ has been allocated to this invoice, reducing the District's and Cooperator's share of this invoice to \$__ / \$__ respectively."

- 7.3. With the exception of the payment of contingency funds, the District shall reimburse the Cooperator within 45 days of receipt of an invoice with adequate supporting documentation to satisfy auditing purposes and submitted in the manner prescribed by this Agreement. The District shall reimburse the Cooperator for expenditures of contingency funds within a reasonable time to accommodate the process provided for in Subparagraph 5.3. The Cooperator shall submit original invoices to the District every 3 months electronically at invoices@WaterMatters.org. If the Cooperator does not have the capability to submit invoices electronically, the invoices may be mailed to the Accounts Payable Section, Southwest Florida Water Management District, Post Office Box 15436, Brooksville, Florida 34604-5436. Copies of invoices may also be submitted to the District's Contract Manager to expedite the review process.
- 7.4. Any travel expenses authorized under this Agreement will be reimbursed in accordance with Section 112.061, Florida Statutes (F.S.), as may be amended from time to time.
- 7.5. Surcharges added to third party invoices are not considered an allowable cost under this Agreement.
- 7.6. The Cooperator shall comply with applicable procurement laws when procuring consultants and contractors to accomplish the Project. The District shall only be obligated to reimburse the Cooperator for costs incurred under contracts for Project work that is included in the Project Plan and is necessary to achieve the resource benefits of the Project, to be determined by the District in its sole discretion. Additionally, the District shall only be obligated to reimburse the Cooperator for costs that are reasonable, to be determined by the District in its sole discretion. In order for the District to make the above determinations, the Cooperator shall provide all solicitations to the District prior to posting, and contracts prior to execution, unless the solicitation has been posted or contract has been executed before the parties' execution of this Agreement, in which case, the documents must be provided within 30 days of execution of this Agreement. The District shall provide a response to the Cooperator within 21 days of receipt of the solicitation or contract. Upon written District approval, the budget amounts for the Project work set forth in a contract will refine the Project Budget and be incorporated herein by reference. The District shall not reimburse the Cooperator for costs incurred under consultant and contractor contracts until the requirements of this Subparagraph are satisfied.

8. Dispute Resolution.

If an issue or dispute arises during the course of the Project, including whether expenses are reimbursable under this Agreement, the Cooperator shall continue to perform the Project work in accordance with the Project Plan. The Cooperator shall seek clarification and resolution of any issue or dispute by providing the details and basis of the issue or dispute to the District's Contract Manager no later than 10 days after the issue or dispute arises. If not resolved by the District's Contract Manager, in consultation with his or her Bureau Chief, within 10 days of receipt of notice, the dispute will be forwarded to the District's Assistant Executive Director. The District's Assistant Executive Director in consultation with the District's Office of General Counsel will issue the District's final determination. The Cooperator's continuation of the Project work as required under

this Paragraph will not constitute a waiver of any legal remedy available to the Cooperator concerning the dispute.

9. Force Majeure.

In the event of hurricanes, tornados, floods, acts of God, acts of war, or other such catastrophes, or other man-made emergencies such as labor strikes or riots which are beyond the control of the party obligated to perform the work, the party's obligation to meet the timeframes provided in this Agreement shall be suspended for the period of time the condition continues to exist. When the party is able to resume performance of its obligations under this Agreement, in whole or in part, it shall immediately give the other party written notice to that effect and shall resume performance no later than 2 days after the notice is delivered. The suspension of the party's obligations provided for in this Paragraph shall be the party's sole remedy for the delays set forth herein.

10. Project Records and Audit.

The Cooperator, upon request, shall permit the District to examine or audit all Project related records and documents during or following Project completion at no cost to the District. These records shall be available at all reasonable times for inspection, review, or audit. "Reasonable" shall be construed according to circumstances, but ordinarily shall mean normal business hours of 8:00 a.m. to 5:00 p.m., local time, Monday through Friday. The Cooperator shall similarly require its consultants and contractors to maintain and allow access to such records for inspection, review, or audit purposes. Payments made to the Cooperator under this Agreement shall be reduced for amounts found to be not allowable under this Agreement by an audit. If an audit is undertaken by the District, all required records shall be maintained until the audit has been completed and all questions arising from it are resolved. The Cooperator shall maintain all such records and documents for at least 5 years following completion of the Project. If an audit has been initiated and audit findings have not been resolved at the end of the 5 years, the records shall be retained until resolution of the audit findings, which would include an audit follow-up by the inspector general if the findings result from an external auditor, or any litigation. The Cooperator understands and will comply with its duty, pursuant to Section 20.055(5), F.S., to cooperate with the inspector general in any investigation, audit, inspection, review, or hearing. The Cooperator shall similarly require its consultants and contractors to comply with their duty, pursuant to Section 20.055(5), F.S., to cooperate with the inspector general in any investigation, audit, inspection, review or hearing. This Paragraph shall survive the expiration or termination of this Agreement.

11. Reports.

11.1. The Cooperator shall provide the District with a quarterly report describing the progress of the Project tasks, adherence to the Project Schedule and any developments affecting the Project. Quarterly means the calendar quarters ending March 31, June 30, September 30 and December 31. The Cooperator shall submit quarterly reports to the District's Contract Manager no later than 30 days following the completion of the applicable quarter.

11.2. Upon request by the District, the Cooperator shall provide the District with copies of data, reports, models, studies, maps and other documents resulting from the Project. This Subparagraph shall survive the expiration or termination of this Agreement.

11.3. If required in the Project Plan, the Cooperator shall submit all water resource data collected under this Agreement to the District for upload to District databases, and to the Florida Department of Environmental Protection's (FDEP) database for water quality data in accordance with Rule 62-40.540, Florida Administrative Code. This Subparagraph shall survive the expiration or termination of this Agreement.

11.4. The Cooperator shall provide the documents referenced in this Paragraph at no cost to the District.

12. Risk, Liability, and Indemnity.

12.1. To the extent permitted by Florida law, the Cooperator assumes all risks relating to the Project and shall be solely liable for, and shall indemnify and hold the District harmless from all claims, loss, damage and other expenses, including attorneys' fees and costs and attorneys' fees and

costs on appeal, arising from the design, construction, operation, maintenance or implementation of the Project; provided, however, that the Cooperator shall not indemnify for that portion of any loss or damages proximately caused by the negligent act or omission of the District's officers, employees, contractors and agents. The acceptance of the District's funding by the Cooperator does not in any way constitute an agency relationship between the District and the Cooperator.

- 12.2. The Cooperator shall indemnify and hold the District harmless, to the extent allowed under Section 768.28, F.S., from all claims, loss, damage and other expenses, including attorneys' fees and costs and attorneys' fees and costs on appeal, arising from the negligent acts or omissions of the Cooperator's officers, employees, contractors and agents related to its performance under this Agreement.
- 12.3. This Paragraph, including all subparagraphs, shall not be construed as a waiver of the Cooperator's sovereign immunity or an extension of the Cooperator's liability beyond the limits established in Section 768.28, F.S. Additionally, this Paragraph, including all subparagraphs, will not be construed to impose contractual liability on the Cooperator for underlying tort claims as described above beyond the limits specified in Section 768.28, F.S., nor be construed as consent by the Cooperator to be sued by third parties in any manner arising out of this Agreement.
- 12.4. Nothing in this Agreement shall be interpreted as a waiver of the District's sovereign immunity or an extension of its liability beyond the limits established in Section 768.28, F.S., nor be construed as consent by the District to be sued by third parties in any manner arising out of this Agreement.
- 12.5. This Paragraph, including all subparagraphs, shall survive the expiration or termination of this Agreement.

13. Default.

A party may terminate this Agreement upon another party's failure to comply with any term or condition of this Agreement, provided the terminating party is not in default of this Agreement at the time of termination. The terminating party shall provide the defaulting party with a written notice stating its intent to terminate and describing all terms and conditions with which the defaulting party has failed to comply (Notice of Termination). If the defaulting party has not remedied its default within 30 days after receiving the Notice of Termination, this Agreement shall automatically terminate. If a default cannot reasonably be cured within 30 days, then the cure time may be extended at the terminating party's discretion if the defaulting party is pursuing a cure of the default with reasonable diligence. The rights and remedies in this Paragraph are in addition to any other rights and remedies provided by law or this Agreement.

14. Release of Information.

The parties will not initiate any oral or written media interviews or issue press releases on or about the Project without providing notices or copies to the other party no later than 3 business days prior to the interview or press release. This Paragraph shall not be construed as preventing the parties from complying with the public records disclosure laws set forth in Chapter 119, F.S.

15. District Recognition.

The Cooperator shall recognize District funding in any reports, models, studies, maps or other documents resulting from this Agreement, and the form of said recognition shall be subject to District approval.

16. Permits and Real Property Rights.

The Cooperator shall obtain all permits, local government approvals and all real property rights necessary to complete and operate the Project prior to commencing any construction of the Project. The District shall not reimburse the Cooperator for allowable costs under this Agreement until the Cooperator has obtained all permits, approvals, and property rights necessary to complete the Project. This Paragraph shall survive the expiration or termination of this Agreement.

17. Law Compliance.

The Cooperator shall comply with all applicable federal, state and local laws, rules, regulations and guidelines related to performance under this Agreement.

18. Diversity in Contracting and Subcontracting.

The District is committed to supplier diversity in the performance of all contracts associated with District cooperative funding projects. The Cooperator shall encourage Project participation of minority owned and woman owned and small business enterprises, as prime contractors and subcontractors, in accordance with applicable laws.

18.1. If requested, the District shall assist the Cooperator by sharing information to help the Cooperator ensure that minority owned and woman owned and small businesses are afforded an opportunity to participate in the performance of this Agreement.

18.2. If the District's share of Project costs is greater than or equal to \$100,000, the Cooperator shall provide the District with the Minority/Women Owned and Small Business Utilization Report attached as an exhibit, indicating all contractors and subcontractors who performed Project work, the amount paid to each contractor or subcontractor, and to the extent such information is known, whether each contractor or subcontractor was a minority owned or woman owned or small business enterprise. The report is required upon Project completion prior to final payment, or within 30 days of the execution of any amendment that increases the total Project cost, for information up to the date of the amendment and prior to the disbursement of any additional funds by the District.

19. Assignment.

No party may assign any of its rights or obligations under this Agreement, including any operation or maintenance obligations, without the prior written consent of the other party. Any attempted assignment in violation of this Paragraph is void. This Paragraph shall survive the expiration or termination of this Agreement.

20. Miscellaneous.

Nothing in this Agreement shall be construed or implied to create any relationship between the District and any consultant or contractor of the Cooperator. Nothing in this Agreement shall be construed to benefit any person or entity not a party to this Agreement. This Agreement is governed by Florida law and venue for resolving disputes under this Agreement shall be exclusively in Hillsborough County, Florida. Unless otherwise stated in this Agreement, if a court of competent jurisdiction deems any term or condition of this Agreement to be invalid, illegal, or unenforceable, the remaining terms and conditions are severable and shall remain in full force and effect. This Paragraph shall survive the expiration or termination of this Agreement.

21. Lobbying Prohibition.

Pursuant to Section 216.347, F.S., the Cooperator is prohibited from using funds provided by this Agreement for the purpose of lobbying the Legislature, the judicial branch or a state agency.

22. Counterparts and Authority to Sign.

The signatures of all parties need not appear on the same counterpart. Unless otherwise indicated in the CFI Project Agreement, in accordance with the Electronic Signature Act of 1996, electronic signatures, including facsimile transmissions, may be used and shall have the same force and effect as a written signature. Each person signing this Agreement warrants that he or she is duly authorized to do so and to bind the respective party to this Agreement.

23. Entire Agreement.

This Agreement, including the attached, referenced, and incorporated exhibit(s), constitutes the entire agreement between the parties and, unless otherwise provided herein, may only be amended through a formal amendment, signed by all parties to this Agreement. In the event of a conflict of contract terminology, priority shall be given first to the CFI Project Agreement; the exhibits, in the order presented in the CFI Project Agreement, except that Exhibit B shall take precedence over Exhibit A, and then the attachments in the order presented in the CFI Project Agreement.

Exhibit B
Southwest Florida Water Management District
Special Terms and Conditions
Non-Construction
Study, Conservation, Watershed Management Plan, or
Third-Party Review (design only)

1. Project Funding.

The District Governing Board approved the funding of this Project based upon the expectation that the Measurable Benefit as provided in the Project Plan would be achieved. The Cooperator is solely responsible for implementing the Project in such a manner that the Measurable Benefit is achieved. If at any point during the progression of the Project, the District determines that it is likely that the Measurable Benefit will not be achieved, the District shall provide the Cooperator with 15 days advance written notice that the District will withhold payments to the Cooperator until such time as the Cooperator demonstrates that the Project will achieve the Measurable Benefit.

2. Repayment.

2.1. The Cooperator shall repay the District all funds the District paid to the Cooperator under this Agreement if: a) the Cooperator fails to complete the Project in accordance with the terms and conditions of this Agreement; b) the District determines, in its sole discretion, that the Cooperator has failed to maintain scheduled progress of the Project thereby endangering the timely completion of the Project; c) if the Cooperator is a public entity, the Cooperator fails to appropriate sufficient funds to meet the Project task deadlines; d) the District determines, in its sole discretion, that a permit, approval, or property right legal challenge has caused an unreasonable delay or cancellation of the Project; or e) any contractual requirement or expectation of the resource benefits resulting from the Project, including any requirement applicable to reclaimed water projects, is held to be invalid, illegal or unenforceable during the term of this Agreement, including any O&M Period. Should any of the above conditions exist that require the Cooperator to repay the District, this Agreement shall terminate in accordance with the procedure set forth in the Default Paragraph.

2.2. Notwithstanding the above, if the Project fails to achieve the Measurable Benefit, the Cooperator may request the District Governing Board waive the repayment obligation, in whole or in part.

2.3. If the Cooperator is obligated to repay the District under any Paragraph of this Agreement, the Cooperator shall repay the District within a reasonable time, as determined by the District in its sole discretion.

2.4. The Cooperator shall pay attorneys' fees and costs incurred by the District, including appeals, resulting from the Cooperator's failure to repay the District as required by this Agreement.

2.5. This Paragraph, including all subparagraphs, shall survive the expiration or termination of this Agreement.

3. Compensatory Treatment Mitigation.

If the Project progresses into the construction phase, the Project shall not be used by the Cooperator or any other entity as compensatory water quality treatment or wetland mitigation, or any other required mitigation due to impacts for any projects. The Project shall not be used for water use permitting withdrawal credits. The Project can be used for self-mitigation due to impacts specifically associated with the construction of the Project. This Paragraph shall survive the expiration or termination of this Agreement.

4. Additional Clauses. *Checked paragraphs apply.*

Feasibility Study Alternatives.

The parties acknowledge that the Project is a feasibility study. If, during the course of the Project, an alternative is determined not to be feasible due to cost, water quality, permitability, supply availability, or other pertinent considerations, the Cooperator shall notify the District and cease work on the infeasible alternative. The Cooperator may request reallocating funds to another alternative in accordance with this Agreement. The approval of such request for reallocation of funds shall be in the District's sole discretion.

Ownership of Documents and Other Materials.

All documents and goods or products, including the associated intellectual property rights, developed in connection with this Agreement shall be the property of the District and the Cooperator, jointly. Notwithstanding the above, all Project infrastructure shall be the sole property of the Cooperator. This Paragraph shall survive the expiration or termination of this Agreement.

Project Deliverables.

The Cooperator shall provide the District with each deliverable set forth under the Deliverables for District Comments section in the Project Plan, including any supporting documentation. The District shall provide a written response to the Cooperator within:

- 15 days of receipt.
- 30 days of receipt.

The Cooperator shall provide a written response to the District's questions and concerns within:

- 10 days of receipt.
- 20 days of receipt.

Florida Single Audit Act.

Funding for this Agreement includes state financial assistance and is therefore subject to the Florida Single Audit Act (FSAA), Section 215.97, F.S. The Cooperator is a subrecipient of state financial assistance under this Agreement and therefore may be subject to audits and monitoring as described in the Special Audit Requirements exhibit. The Cooperator must also use the attached Florida Single Audit Act Checklist for Non-State Organizations – Recipient/Subrecipient vs. Vendor Determination to evaluate the applicability of the FSAA to non-state organizations to which the Cooperator provides State resources to assist in carrying out activities related to this Agreement. If the Cooperator has a question related to the grant or subgrant of State funding, contact the individual identified below:

Grants Compliance Accountant
Southwest Florida Water Management District
2379 Broad Street, Brooksville, Florida 34604
Phone: (352) 796-7211, Ext. 4104
GrantsAccounting@watermatters.org

The Cooperator shall provide the District with its grant contact information within 30 days of execution of this Agreement.

EXHIBIT C PROJECT PLAN

PROJECT DESCRIPTION

The Project is the implementation of a software program that will promote and encourage water conservation by utility customers. The Project will allow software platform setup, including a utility side dashboard and associated training, and will be available for 112,900 retail potable water customers. The software will: notify customers of suspected leaks as they occur; regularly analyze actual daily or hourly water use and notify customers of potential violations of watering restrictions; alert customers to a pre-set threshold usage amount; alert customers about faulty rain or soil moisture sensor based on weather data and daily water use; compare individual customer water use to that of similar households (social norming); and provide a customer portal log-in and graph customers water use over time.

The Project will conserve an estimated 111,100 gallons per day if the Project is fully implemented.

MEASURABLE BENEFIT

The implementation of the program and completion of the Cooperator's final report in accordance with the requirements of this Agreement.

PROJECT TASKS

Key tasks to be performed by the Cooperator:

1. **SOFTWARE PROGRAM SETUP** – The Cooperator shall contract with a qualified software provider to develop the software program in accordance with the requirements under this Agreement. The contract with the software provider will be provided to the District for comment prior to execution. The Cooperator will provide necessary data, including but not limited to billing, property appraiser, and customer water usage data as needed to the software provider. Relevant utility customers shall be made aware of the software program. The Cooperator shall also train relevant utility staff on software functionality and operation.
2. **IMPLEMENTATION OF PROGRAM** – The Cooperator shall maintain the software program in a live state for a minimum of one year for each of the 112,900 retail potable water accounts. During this time, the Cooperator shall: 1) provide access to the software program for selected customers; 2) provide the District with either access to or a tutorial of the software program; 3) notify customers of suspected leaks as they occur; 4) regularly analyze actual daily or hourly water usage and notify customers of potential violations of watering restrictions; 5) alert customers to a pre-set threshold usage amount; 6) alert customers about faulty rain or soil moisture sensor based on weather data and daily water use; 7) compare individual customer water use to that of similar households in an effort to provide social norming; 8) graph customers water use over time
3. **SAVINGS ANALYSIS** – The Cooperator shall be responsible for a water savings analysis based on one full year of pre-implementation water use data and one full year of post-implementation water use data. The program implementation period is also included in this analysis. This includes obtaining customer water use data and performing the subsequent data analysis.

4. **DRAFT/FINAL REPORTS** – The Cooperator shall provide a draft final report and final report. The report shall contain the following information: 1) number of customer accounts signed up for the software; 2) full accounting of all funds expended under this Agreement; 3) description of all public awareness efforts; 4) customer surveys to determine the satisfaction with the software and Project; 5) water use data and water savings based on one full year of pre-implementation water use data and one full year of post-implementation water use data; 6) all pertinent information regarding the program findings, associated conclusions and recommendations for future programs; 7) detailed accounting of the number of alerts and notifications sent to customers broken out by item as described in Task 2.

DELIVERABLES

The Cooperator shall provide

- Draft final report
- Final report

PROJECT SCHEDULE

DESCRIPTION	COMMENCE	COMPLETE
Software Program Set Up, including training	10/01/2021	10/01/2024
Implementation of the Program	10/01/2021	10/01/2025
Savings Analysis	10/01/2025	10/01/2026
Draft Final Report	10/01/2026	01/01/2027
Final Report	01/01/2027	02/01/2028

PROJECT BUDGET

DESCRIPTION	DISTRICT	COOPERATOR	TOTAL
Software Program Set-up, including training, and Program Implementation	\$139,414	\$139,414	\$278,828
Savings Analysis	\$0	\$0	\$0
Draft Final Report	\$0	\$0	\$0
Final Report	\$0	\$0	\$0
TOTAL PROJECT COSTS	\$139,414	\$139,414	\$278,828

ATTACHMENT 2 MINORITY/WOMEN OWNED AND SMALL BUSINESS UTILIZATION REPORT

Projects receiving \$100,000 or more in cooperative funding from the Southwest Florida Water Management District require the submission of the following information within 30 days of any amendment increasing project funding and with the final invoice. Questions regarding use of this form should be directed to Contracts Administration, Phone (352) 796-7211 ext. 4133.

COOPERATOR: _____ AGREEMENT NO.: _____ PROJECT NAME: _____ TOTAL PROJECT COST: _____		INDICATE THE ONE CATEGORY THAT BEST DESCRIBES EACH ORGANIZATION LISTED*												
		BUSINESS CLASSIFICATION		CERTIFIED MBE					NON-CERTIFIED MBE					UNKNOWN
		NON-MINORITY	SMALL BUSINESS Section 288.703(1) F.S.	AFRICAN AMERICAN	HISPANIC AMERICAN	ASIAN/HAWAIIAN AMERICAN	NATIVE AMERICAN	AMERICAN WOMAN	AFRICAN AMERICAN	HISPANIC AMERICAN	ASIAN/HAWAIIAN AMERICAN	NATIVE AMERICAN	AMERICAN WOMAN	
NAMES OF CONTRACTORS AND SUBCONTRACTORS UTILIZED	TOTAL AMOUNT PAID													

* Our organization does not collect minority status data.

Signature

Date

Print Name and Title

Attachment 4: Cooperative Funding Agreement Checklist

This checklist is to be used as a tool by the Cooperator and District Contract Manager to monitor and track Agreement terms throughout Project implementation.

Cooperator**District****For Studies and Design:**

- Copy of contract with consultant. If contract is not provided to the District prior to execution, the Cooperator may be executing a contract with consultant that includes items that are not reimbursable
- All Draft and Final Reports and/or design drawings per the Exhibit C Project Plan

For Construction Reimbursement:

- Copy of bid documents and bid form. If bid documents and bid form are not provided to the District prior to bidding, the Cooperator may be advertising for items that are not reimbursable
- Copy of contract with contractor. If contract is not provided to the District prior to execution, the Cooperator may be executing a contract with contractor that includes items that are not reimbursable
- Copy of Notice to Proceed to contractor
- Owner Direct Purchase Statement
- Copy of construction permits
- If land acquisition included, review and comment from District's Real Estate Services on appropriate land value
- Any state or federal appropriations or grant funds received by the Cooperator for the Project will be applied to reduce each party's share in accordance with their respective funding percentages as described in the CFI Project Agreement
- Copy of all required federal, state, and local environmental permit approvals and permitted drawings

During Project Work:

- Monthly (see Exhibit A paragraph 11) status reports
- Invoices for reimbursement (per Exhibit A paragraph 7)
- Contingency Form for each contingency item
- Request(s) for changes to prime contacts
- Request(s) to extend project task deadline and/or adjustments to line item budget
- Request(s) for changes to scope, budget, and/or schedule requiring an amendment to the agreement
- M/W/SME Form must be submitted to the District if an amendment is executed that increases the total Project cost. This will apply to amendments when authorizing post-TPR work

Close Out:

Prior to Final Payment Reimbursement the Cooperator will provide to the District:

- Minority/Women Owned and Small Business Utilization Report (If District's share is \$100,000 or greater)
- All Deliverables listed in Exhibit C Project Plan as described in the tasks

Survival of the Agreement:

Per Exhibit B, the DISTRICT upon request may review the biennial Operation and Maintenance Report

AGREEMENT

EXHIBIT I - PRODUCT DATA SHEETS, PRODUCT WARRANTY SHEETS, INSTALLATION GUIDES

EXHIBIT I - PRODUCT DATA SHEETS, PRODUCT WARRANTY SHEETS, INSTALLATION GUIDES to follow:

LITERATURE – PRODUCT DATA SHEETS



BEACON® Advanced Metering Analytics

With ORION® Network as a Service (NaaS)

OVERVIEW

The BEACON® Advanced Metering Analytics (AMA) Solution with ORION® Network as a Service (NaaS) presents a simple, yet powerful solution to bring a new level of utility optimizing information to light.

The solution combines our intuitive BEACON AMA Software as a Service (SaaS) with a NaaS approach using proven ORION Cellular endpoints to deliver greater visibility and control over utility management.

Built-in infrastructure management services and a system design that keeps you in step with technology advancements, allows you to do what you do best—manage your water utility. Plus, built-in consumer engagement tools help enhance customer service, increase satisfaction and reduce costs.

SOFTWARE APPLICATIONS

BEACON Advanced Metering Analytics (AMA)

With tools beyond meter reading and network management, BEACON AMA software offers targeted Advanced Metering Analytics. BEACON AMA software puts interval meter data to work to increase efficiency in day-to-day utility operations and address demands for actionable intelligence.

- **Problem solver** – User intuitive data tools place the power of water consumption data at your fingertips, allowing you to rapidly respond to customer inquiries and quickly resolve—and even eliminate—many billing issues.
- **Customized design** – A customizable dashboard delivers information configured to user security access level in a format matched to the utility's individual requirements, providing data management integrity, security and control.
- **Works with you** – Integration with utility systems—billing, work order, inventory, Customer Relationship Management (CRM) and Geographic Information Systems (GIS)—streamlines and improves utility operations without disrupting the current utility billing interface file transfer process.
- **Find out fast** – Alert conditions can be set to monitor and notify users of system exceptions, including continuous flow, for faster leak detection.
- **Innovation at your service** – Secure, hosted platform with automatic software upgrades ensures the latest technology and features are always available.

EyeOnWater®

The BEACON AMA software suite includes informative consumer outreach tools to improve customer service consisting of the EyeOnWater consumer engagement website, smartphone mobile apps, and email or SMS text alerts, providing easy access to personal consumption data and alerts to potential leaks. With these tools, water consumers are able to view their usage activity, and gain greater understanding and control of what they use and the value you provide.

BEA-DS-00554-EN-10 (August 2020)



HARDWARE

ORION NaaS is powered by the proven ORION system for interval data capture and two-way communication. The solution employs cellular endpoints which, as they leverage the public cellular network and require no proprietary gateways to operate, dramatically reduce infrastructure requirements compared to a traditional fixed network. This speeds installations and simplifies expansion as a system evolves.

- **High resolution data** – ORION Cellular endpoints are programmed to automatically broadcast 15-minute meter reading and event data to the BEACON software up to four (4) times per day. The high resolution data helps identify potential customer-side leaks and other anomalies in water use, and provides the utility with a potent tool to enhance its customer service.
- **Two-way communication** – BEACON AMA software communicates with ORION Cellular endpoints to accomplish a number of system tasks, including requesting additional information from the endpoint and synchronizing the internal endpoint clock. If needed, the ORION two-way system architecture sends upgrades to the endpoint firmware over the air via the network, utilizing the powerful BEACON AMA software suite.
- **Data integrity** – Each message from the ORION Cellular endpoint is securely transported to the BEACON AMA software only via private network and never over the public internet.

SECURITY

BEACON AMA is ISO 27001 certified and SOC 2 examined for security, availability and confidentiality.

BEACON® Advanced Metering Analytics, With ORION® Network as a Service (NaaS)

TECHNICAL SUPPORT AND TRAINING

Configured for the utility, safe and secure BEACON AMA SaaS provides utilities with regular software updates, long-term support and maintenance. Comprehensive BEACON AMA training courses are available for online or on-site delivery at the time of system deployment. To maintain best practices, a library of online resources and options for group web-based training and support are also available. Once deployed, our technical support specialists can be contacted by phone, email and web to provide ongoing, customer-friendly support. Customized one-on-one training is available (fee applies) to further enhance user expertise.

Additionally, Badger Meter offers extended customized training to further enhance user expertise.

TECHNICAL REQUIREMENTS

BEACON AMA

Developed as a hosted software platform, BEACON AMA is a cloud-based application accessed through a standard web browser. Internet access is required. User logins provide secure access.

BEACON AMA supported web browsers include the latest and next previous major releases of Google® Chrome, Microsoft® Edge, Mozilla® Firefox®, Microsoft® Internet Explorer® (IE 11 only); and Apple® Safari®.

EyeOnWater Consumer Engagement

The EyeOnWater consumer engagement website is a cloud-based application accessed through a standard web browser. Internet access is required. Water consumer user logins provide secure access to their information.

Supported web browsers include the latest and next previous major releases of Google® Chrome, Microsoft® Edge, Mozilla® Firefox®, Microsoft® Internet Explorer® (IE 11 only); and Apple® Safari®.

EyeOnWater smartphone applications require Android 6.0 or iOS 9.1 or later, and can be downloaded from Google Play or the Apple Store.

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HR-E[®] LCD Encoder

DESCRIPTION

Applications: The High Resolution encoder (HR-E LCD) is a fully electronic, solid-state encoder with no moving parts. It is designed for use with all current Badger Meter Recordall[®] Disc, Turbo Series, Compound Series, Combo Series and Fire Service meters and assemblies. The HR-E LCD provides connectivity with Badger Meter ORION[®] and GALAXY[®] AMR/AMI endpoints and other AMR/AMI technology solutions approved by Badger Meter.

NOTE: For more detailed information, refer to the document *HR-E LCD Encoder User Manual*, available at www.badgermeter.com.

Field Programmable: The HR-E LCD encoder comes standard as factory programmed to customer specifications, with the option for field programming the unit of measure, meter type, meter model, digit resolution from the encoder, billing units, and rate-of-flow time and units. Programming is performed through the IR port via a computer.

Electronic Resolution: Standard encoded output from the HR-E LCD is nine digits.

Status Indicators: Status indicators are sent as part of the encoder extended message to AMR/AMI systems such as ORION Cellular, Fixed Network and Migratable endpoints that are capable of receiving an extended message. The details can also be read through an IR interface.

Mounting: Icons on the HR-E LCD encoder face indicate encoder status and alarm conditions. The fully potted encoder assembly has a bayonet mount compatible with all Recordall Disc, Turbo Series, Compound Series, Combo Series and Fire Series meters and assemblies. The bayonet mount positions the encoder in any of four orientations for visual reading convenience. The HR-E LCD encoder can be removed from the meter without disrupting water service.

Magnetic Drive Communication: The HR-E LCD encoder detects movement of the wet side meter magnet with magnetic sensors to provide reliable and dependable encoded communication.

Tamper-resistant Features:

Unauthorized removal of the HR-E LCD encoder is inhibited by a tamper-resistant Torx[®] seal screw. Torx seal screws are provided as standard accessories. Optional proprietary tamper-proof screws are also available.

Magnetic sensors detect and report an attempted encoder removal. In addition, the HR-E LCD encoder is resistant to magnetic tampering. The encoder detects an attempted tamper—as well as encoder removal—and sends a tamper alarm in either situation. Approved endpoints capable of receiving the alarms, such as ORION Cellular, Fixed Network and Migratable endpoints, can then report the tamper condition to the meter reading software.



SPECIFICATIONS

Encoder type	Straight reading, permanently sealed, electronic LCD absolute encoder with field-programmable option
Encoder display	Status indicators, unit of measure, billing units, automatic toggle between 9-digit and 6-digit consumption (segmented leak detector in this mode), rate of flow, meter model
Unit of measure	U.S. gallons, Imperial gallons, cubic feet, cubic meters, and liters clearly identified on register face
Flow rate	Seconds, minutes, and hours
Numerals	7 mm (0.28 in.) high
Weight	11 ounces
Humidity	0...100% condensing
Temperature	Storage: -40...60° C (-40...140° F) Max. ambient for 1 hr: 70° C (158° F) Electronics & Display: -10...60° C (14...140° F)
Status indicators	Electronic and visual icons for: meter functioning correctly, meter alarm (indicates temperature limits exceeded, magnetic tamper or encoder removal), reverse flow, suspected leak, 30-day no usage, end of battery life
Signal output	Industry standard ASCII format
Signal type	Three-wire synchronous for AMR/AMI solutions Red = clock/power; Black = ground; Green = data
Battery	Lithium thionyl chloride AA cell, fully encapsulated within encoder housing
Battery Life	20 years (calculated)



Badger Meter

ENC-DS-01763-EN-06 (January 2021)

Product Data Sheet

HR-E® LCD Encoder

Construction: The housing of the HR-E LCD encoder is constructed of an engineered polymer enclosure and a polycarbonate lens. For long-term performance, the enclosure is fully encapsulated, weatherproof, and UV-resistant to withstand harsh environments and to protect the electronics in flooded or submerged pit applications. An epoxy potting (patented design - 8,482,908) comprises the encoder bottom. Due to this unique sealing, the HR-E LCD exceeds all applicable requirements of AWWA Standard C706 and C707.

Wire Connections: The HR-E LCD encoder is available with an in-line connector for easy connection and installation to AMR/AMI endpoints. It is also available with a flying lead for a field splice connection, or fully prewired to an AMR/AMI endpoint.

Operating Characteristics: The HR-E LCD encoder is shipped in storage mode so a meter status alarm is not triggered. In storage mode, the meter model screen is displayed. Upon sensing two revolutions of the meter magnet, the encoder goes into normal operation mode. The display then automatically toggles between these four modes:

- 9-digit consumption displays for 45 seconds.
- 6-digit consumption (segmented leak detector in this mode) displays for 5 seconds.
- Rate of flow displays for 5 seconds.
- Meter model displays for 5 seconds.

DIMENSIONAL DRAWINGS

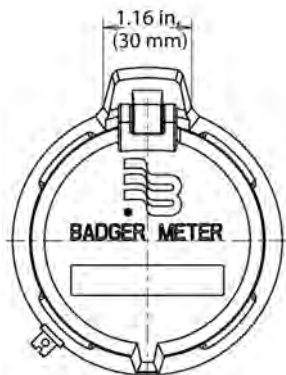


Figure 1: Top view

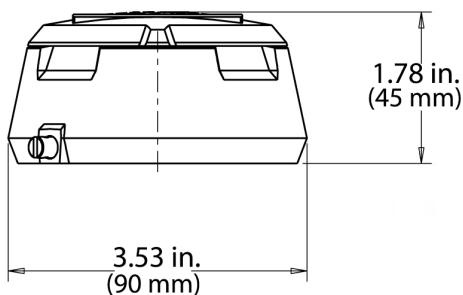


Figure 2: Front view

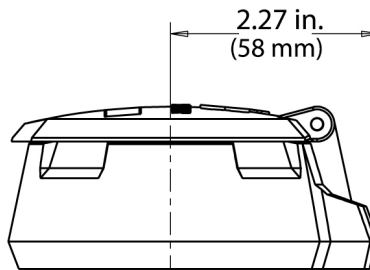


Figure 3: Left side view

MEASUREMENT RESOLUTION

The electronic encoder output resolution of the HR-E LCD is as noted below.

Recordall Disc Series	Size (in.)	9-dial encoder output (gal)	9-dial encoder output (ft ³)	9-dial encoder output (m ³)
LP	5/8, 5/8 x 3/4	0.01	0.001	0.0001
M25	5/8, 5/8 x 3/4	0.01	0.001	0.0001
M35	3/4	0.01	0.001	0.0001
M40	1	0.01	0.001	0.0001
M55	1	0.01	0.001	0.0001
M70	1	0.01	0.001	0.0001
M120	1-1/2	0.1	0.01	0.001
M170	2	0.1	0.01	0.001

Recordall Turbo Series	Size (in.)	9-dial encoder output (gal)	9-dial encoder output (ft ³)	9-dial encoder output (m ³)
T160	1-1/2	0.1	0.01	0.001
T200	2	0.1	0.01	0.001
T450	3	0.1	0.01	0.001
T1000	4	0.1	0.01	0.001
T2000	6	1	0.1	0.01
T3500	8	1	0.1	0.01
T5500	10	1	0.1	0.01
T6200	12	10	1	0.01
T6600	16	10	1	0.01
T10000	20	10	1	0.01

Recordall Compound Series	Size (in.)	9-dial encoder output (gal)	9-dial encoder output (ft ³)	9-dial encoder output (m ³)
High Side T200	2	0.1	0.01	0.001
Low Side M25	2	0.01	0.001	0.0001
High Side T450	3	0.1	0.01	0.001
Low Side M25	3	0.01	0.001	0.0001
High Side T1000	4	0.1	0.01	0.001
Low side M35	4	0.01	0.001	0.0001
High Side T2000	6	1	0.1	0.01
Low Side M35	6	0.01	0.001	0.0001
High Side T3500	8	1	0.1	0.01
Low side M120	8	0.1	0.01	0.001

NOTE: For Fire Service Meters and Assemblies, please refer to appropriate Disc and TSM information provided above.

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www.badgermeter.com

Legacy Document Number: LCD-T-01



ORION® Water Endpoints

Cellular LTE-M and LTE-MS Endpoints

DESCRIPTION

ORION® Cellular LTE-M and LTE-MS endpoints are innovative, two-way endpoints for smart water applications. The endpoints utilize existing IoT (Internet of Things) cellular infrastructure to efficiently and securely deliver meter reading data to the utility in a Network as a Service (NaaS) approach. Leveraging existing cellular infrastructure, the NaaS solution offers all the performance benefits of AMI, while eliminating network-related maintenance and technology concerns and enhancing deployment flexibility.

Cellular endpoints are members of the time-tested ORION family of products from Badger Meter, designed for maximum flexibility. Since 2002, the ORION product family has provided comprehensive Advanced Metering Analytics (AMA) for interval meter reading and data capture using both one-way and two-way communications.

FUNCTIONALITY

Operation: ORION Cellular LTE-M and LTE-MS endpoints communicate with the encoder and capture 15-minute interval read data and meter status information. The endpoints then automatically broadcast the information, including endpoint status information, via the cellular network to BEACON AMA. ORION NaaS is powered by the proven ORION system for interval data capture and two-way communication. The solution employs cellular endpoints which, as they leverage the public cellular network and require no proprietary gateways to operate, dramatically reduce infrastructure requirements compared to a traditional fixed network. This speeds installations and simplifies expansion as a system evolves.

The endpoints are designed to call in four times each workday and feature a configurable schedule that enables utility customers to select call-in times that best support their processes.

Activation: All ORION Cellular LTE-M and LTE-MS endpoints are shipped in an inactive, non-transmitting state. The Badger Meter IR Communication Device can be used to activate the endpoints and verify the encoder connection. Successful endpoint function can be confirmed through a web app demonstrating that communication has been verified to both the encoder and the network.

Alternatively, the endpoints offer a Smart Activation feature. After installation, the endpoints begin broadcasting data when the encoder senses the first usage of water. No field programming or special tools are required.

Broadcast Mode: ORION Cellular LTE-M and LTE-MS endpoints broadcast fixed network reading data through the secure cellular network within the service area. Based on the results of cellular coverage analysis, there are primary and secondary carrier options to support full network coverage. Primary carrier is the LTE-M endpoint. Secondary carrier is the LTE-MS endpoint. The endpoints also transmit a mobile message to facilitate troubleshooting in the field.



LTE-M endpoint is pictured

Data Storage: The endpoints store 42 days of 15-minute data.

Output Message: ORION Cellular LTE-M and LTE-MS endpoints broadcast a unique serial number, meter reading data, and applicable status indicators. As an advanced data security measure, each message is securely transported to the BEACON AMA software only via private network and never over the public internet.

APPLICATION

Configurations: ORION Cellular LTE-M and LTE-MS endpoints are multi-purpose endpoints that can be deployed in indoor, outdoor and pit (non-metal pit lid) applications. The electronics and battery assembly are fully encapsulated in epoxy for environmental integrity. The endpoints are available with a connector assembly for ease of installation.

Meter Compatibility: When attached to Badger Meter High Resolution Encoders, ORION Cellular LTE-M and LTE-MS endpoints are compatible with all current Badger Meter Recordall® Disc, Turbo Series, Compound Series, Combo Series and Fire Service meters and assemblies, and with E-Series® Ultrasonic, E-Series® Ultrasonic Plus, and M-Series® Electromagnetic flow meters.

Encoder Compatibility: ORION Cellular LTE-M and LTE-MS endpoints are suitable for use with Badger Meter High Resolution Encoders as well as the following Badger Meter approved three-wire encoder registers that have a manufacture date within 10 years of the current date as long as the encoder has three wires connected to it and is programmed into the three-wire output mode for AMR/AMI: Honeywell® (Elster) ScanCoder® encoder with Sensus® protocol module and evoQ4 meter (encoder output); Master Meter® Octave® Ultrasonic meter encoder output; Metron-Farnier Hawkeye; Mueller Systems 420 Solid State Register (SSR) LCD; Neptune® ProRead, E-Coder®, ARB-V®, and ProCoder; and Sensus iPerl®.

ORION® Water Endpoints, Cellular LTE-M and LTE-MS Endpoints

SPECIFICATIONS

Dimensions	5.125 in. (130 mm) (H) 1.75 in. (44 mm) Diameter at top 2.625 in. (W) x 2.875 in. (D) at base (67 mm (W) x 73 mm (D) at base)
Broadcast Network	Primary LTE-M cellular network, NB-IoT (Narrow Band-Internet of Things) Mobile backup frequency is FCC-regulated 902...928 MHz frequency hopping modulation
Operating Temperature Range	
• Storage, Meter Reading and Mobile Backup	-40...60° C (-40...140° F)
• Cellular Communications	-20...60° C (-4...140° F)
Humidity	0%...100% condensing
Battery	One (1) lithium thionyl chloride D cell (nonreplaceable)

FEATURES

Smart City Ready	Future-proof technology
Communication Type	Two-way
Application Type	Control/Monitor
Endpoint Communication	Configurable call-in schedule, up to four times each workday
Reading Interval Type	15-minute
Encoder Compatibility	Absolute
Fixed Network Reading	✓
Cut-Wire Indication	✓
Encoder Error	✓
Low Battery Indication	✓
Remote Clock Synchronization	✓
Firmware Upgrades	✓

Construction: All ORION Cellular LTE-M and LTE-MS endpoints are housed in an engineered polymer enclosure with an ORION RF board, battery and antenna. For long-term performance, the enclosure is fully potted to withstand harsh environments and to protect the electronics in flooded or submerged pit applications.

Wire Connections: ORION Cellular LTE-M and LTE-MS endpoints are available with in-line connectors (Twist Tight® or Nicor®) for easy installation and connection to compatible encoders/meters. The endpoints are also available with flying leads for field splice connections. Other wire connection configurations may be available upon request.

License Requirements: ORION Cellular LTE-M, LTE-MS and LTE endpoints comply with Part 15, Part 22, Part 24, and Part 27 of the FCC Rules. No license is required by the utility to operate an ORION meter reading system. This device complies with Industry Canada license-exempt RSS standard(s).

Transportation: **WARNING:** The operation of transmitters and receivers on airlines is strictly prohibited by the Federal Aviation Administration. As such, the shipping of radios and endpoints via air is prohibited. Please follow all Badger Meter return and/or shipping procedures to prevent exposure to liability.

Warning: To reduce the possibility of electrical fire and shock hazards, never connect the cable from the endpoint to any electrical supply source. The endpoint cable provides SELV low voltage limited energy power to the load and should only be connected to passive elements of a water meter register.

Caution: The endpoint batteries are *not* replaceable. Users should make no attempt to replace the batteries. Changes or modifications to the equipment that are not expressly approved by Badger Meter could void the user's authority to operate the equipment.

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Badger Meter

Recordall® Disc Meters

Lead-Free Bronze Alloy, Sizes 5/8, 5/8 x 3/4, 3/4 & 1 inch
NSF/ANSI Standards 61 and 372 Certified



Model 25—5/8 in., 5/8 x 3/4 in.



Model 35—3/4 in.



Model 55—1 in.



Model 70—1 in.

DESCRIPTION

The Recordall Disc Series meters meet or exceed the most recent revision of AWWA Standard C700 and are available in a lead-free bronze alloy. The meters comply with the lead-free provisions of the Safe Drinking Water Act, are certified to NSF/ANSI Standards 61 and 372 (Trade Designations: M25-LL, M35-LL, M55-LL, M70-LL) and carry the NSF-61 mark on the housing. All components of the lead-free bronze alloy meter (housing, measuring element, seals, and so on) comprise the certified system.

Applications: For use in measurement of potable cold water in residential, commercial and industrial services where flow is in one direction only.

Operation: Water flows through the meter's strainer and into the measuring chamber where it causes the disc to nutate. The disc, which moves freely, nutates on its own ball, guided by a thrust roller. A drive magnet transmits the motion of the disc to a follower magnet located within the permanently sealed register. The follower magnet is connected to the register gear train. The gear train reduces the disc nutations into volume totalization units displayed on the register or encoder face.

Operating Performance: The Recordall Disc Series meters meet or exceed registration accuracy for the low flow rates (95%), normal operating flow rates ($100 \pm 1.5\%$), and maximum continuous operation flow rates as specifically stated in AWWA Standard C700.

Construction: Recordall Disc meter construction, which complies with ANSI/AWWA standard C700, consists of three basic components: meter housing, measuring chamber and permanently sealed register or encoder. The meter is available in a lead-free bronze alloy with externally threaded spuds. A corrosion-resistant engineered polymer material is used for the measuring chamber.

Magnetic Drive: Direct magnetic drive, through the use of high-strength magnets, provides positive, reliable and dependable register coupling for straight-reading or AMR/AMI meter reading options.

Tamper-Proof Features: Unauthorized removal of the register or encoder is inhibited by the option of a tamper detection seal wire screw, TORX® tamper-resistant seal screw or the proprietary tamper-resistant keyed seal screw. Each can be installed at the meter site or at the factory.

Maintenance: Badger Meter Recordall Disc Series meters are designed and manufactured to provide long-term service with minimal maintenance. When maintenance is required, it can be performed easily either at the meter installation or at any other convenient location.

To simplify maintenance, the register, measuring chamber, and strainer can be replaced without removing the meter housing from the installation. No change gears are required for accuracy calibration. Interchangeability of parts among like-sized meters and meter models also minimizes spare parts inventory investment. The built-in strainer has an effective straining area of twice the inlet size.

Connections: Tailpieces/Unions for installations of meters on various pipe types and sizes, including misaligned pipes, are available as an option.

Meter Spud and Connection Sizes

Model	Size Designation (in.)	×	"L" Laying Length (in.)	"B" Bore Dia. (in.)	Coupling Nut and Spud Thread (in.)	Tailpiece Pipe Thread (NPT) (in.)
25	5/8	×	7-1/2	5/8	3/4 (5/8)	1/2
	5/8 x 3/4	×	7-1/2	5/8, 3/4	1 (3/4)	3/4
35	3/4	×	7-1/2	3/4	1 (3/4)	3/4
	3/4	×	9	3/4	1 (3/4)	3/4
	3/4 x 1	×	9	3/4	1-1/4 (1)	1
55	1	×	10-3/4	1	1-1/4 (1)	1
70	1	×	10-3/4	1	1-1/4 (1)	1

Recordall® Disc Meters, Lead-Free Bronze Alloy, Sizes 5/8, 5/8 x 3/4, 3/4 & 1 inch

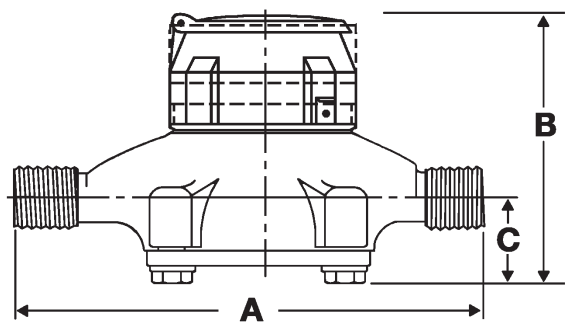
SPECIFICATIONS

	Model 25 (5/8 in. & 5/8 x 3/4 in.)	Model 35 (3/4 in.)	Model 55 (1 in.)	Model 70 (1 in.)
Typical Operating Range (100% ±1.5%)	0.5...25 gpm (0.11...5.7 m ³ /hr)	0.75...35 gpm (0.17...7.9 m ³ /hr)	1...55 gpm (0.23...12.5 m ³ /hr)	1.25...70 gpm (0.28...16 m ³ /hr)
Low Flow	0.25 gpm (0.057 m ³ /hr) Min. 98.5%	0.375 gpm (0.085 m ³ /hr) Min. 97%	0.5 gpm (0.11 m ³ /hr) Min. 95%	0.75 gpm (0.17 m ³ /hr) Min. 95%
Maximum Continuous Operation	15 gpm (3.4 m ³ /hr)	25 gpm (5.7 m ³ /hr)	40 gpm (9.1 m ³ /hr)	50 gpm (11.3 m ³ /hr)
Pressure Loss at Maximum Continuous Operation	5/8 in. size: 3.5 psi @ 15 gpm (0.24 bar @ 3.4 m ³ /hr) 5/8 x 3/4 in. size: 2.8 psi @ 15 gpm (0.19 bar @ 3.4 m ³ /hr)	5 psi @ 25 gpm (0.37 bar @ 5.7 m ³ /hr)	3.4 psi @ 40 gpm (0.23 bar @ 9.1 m ³ /hr)	6.5 psi @ 50 gpm (0.45 bar @ 11.3 m ³ /hr)
Maximum Operating Temperature	80° F (26° C)			
Maximum Operating Pressure	150 psi (10 bar)			
Measuring Element	Nutating disc, positive displacement			
Meter Connections	<i>Available in NL bronze and engineered polymer to fit spud thread bore diameter sizes:</i>			
	5/8 in. size: 5/8 in. (DN 15 mm) 5/8 x 3/4 in. size: 3/4 in. (DN 15 mm)	3/4 in. (DN 20 mm)	1 in. (DN 25 mm)	1 in. (DN 25 mm)

MATERIALS

	Model 25 (5/8 in. & 5/8 x 3/4 in.)	Model 35 (3/4 in.)	Model 55 (1 in.)	Model 70 (1 in.)
Meter Housing	Lead-free bronze alloy			
Housing Bottom Plates	Cast iron, lead-free bronze alloy, engineered polymer	Cast iron, lead-free bronze alloy		
Measuring Chamber	Engineered polymer			
Disc	Engineered polymer			
Trim	Stainless steel			
Strainer	Engineered polymer			
Disc Spindle	Stainless steel	Stainless steel	Engineered polymer	Stainless steel
Magnet	Ceramic	Ceramic	Ceramic	Ceramic
Magnet Spindle	Engineered polymer	Stainless steel	Engineered polymer	Stainless steel
Register Lid and Shroud	Engineered polymer, bronze			

DIMENSIONS



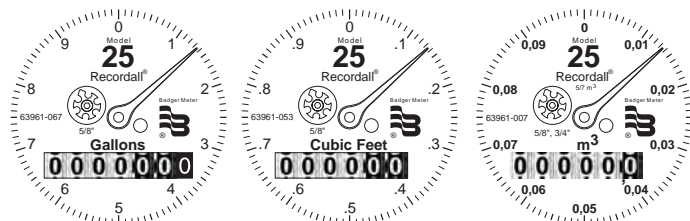
Meter Size	Model	A Laying Length	B Height Reg.	C Centerline Base	Width	Approx. Shipping Weight
5/8 in. (15 mm)	25	7-1/2 in. (190 mm)	4-15/16 in. (125 mm)	1-11/16 in. (42 mm)	4-1/4 in. (108 mm)	4-1/2 lb (2 kg)
5/8 in. x 3/4 in. (15 mm)		7-1/2 in. (190 mm)	4-15/16 in. (125 mm)	1-11/16 in. (42 mm)	4-1/4 in. (108 mm)	4-1/2 lb (2 kg)
3/4 in. (20 mm)	35	7-1/2 in. (190 mm)	5-1/4 in. (133 mm)	1-5/8 in. (41 mm)	5 in. (127 mm)	5-1/2 lb (2.5 kg)
3/4 in. (20 mm)		9 in. (229 mm)	5-1/4 in. (133 mm)	1-5/8 in. (41 mm)	5 in. (127 mm)	5-3/4 lb (2.6 kg)
3/4 in. x 1 in. (20 mm)		9 in. (229 mm)	5-1/4 in. (133 mm)	1-5/8 in. (41 mm)	5 in. (127 mm)	6 lb (2.7 kg)
1 in. (25 mm)	55	10-3/4 in. (273 mm)	6 in. (152 mm)	2-1/32 in. (52 mm)	6-1/4 in. (159 mm)	8-3/4 lb (3.9 kg)
1 in. (25 mm)	70	10-3/4 in. (273 mm)	6-1/2 in. (165 mm)	2-5/16 in. (59 mm)	7-3/4 in. (197 mm)	11-1/2 lb (5.2 kg)

REGISTERS / ENCODERS

Standard—Sweep-Hand Registration

The standard register is a straight-reading, permanently sealed magnetic drive register. Dirt, moisture, tampering and lens fogging problems are eliminated. The register has a six-odometer wheel totalization display, 360° test circle with center sweep hand, and flow finder to detect leaks. Register gearing is made of self-lubricating engineered polymer, which minimizes friction and provides long life. The multi-position register simplifies meter installation and reading. The register capacity is 10,000,000 gallons (1,000,000 ft³, 100,000 m³).

A Model 25 register is used in the following example:



Model	Gallon	Cubic Feet	Cubic Meter
25 (5/8 in.)	10	1	0.1/0.01
25 (5/8 x 3/4 in.)	10	1	0.1/0.01
35	10	1	0.1
55	10	1	0.1
70	10	1	0.1

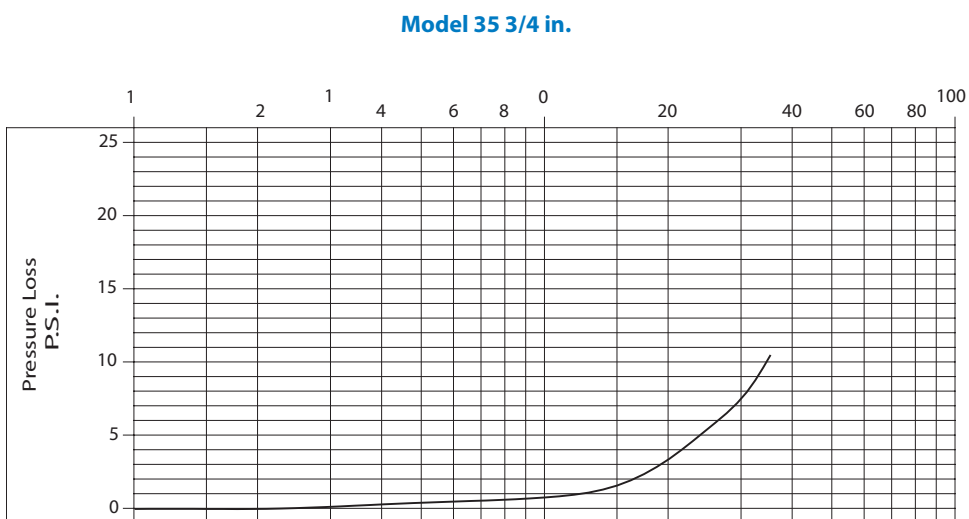
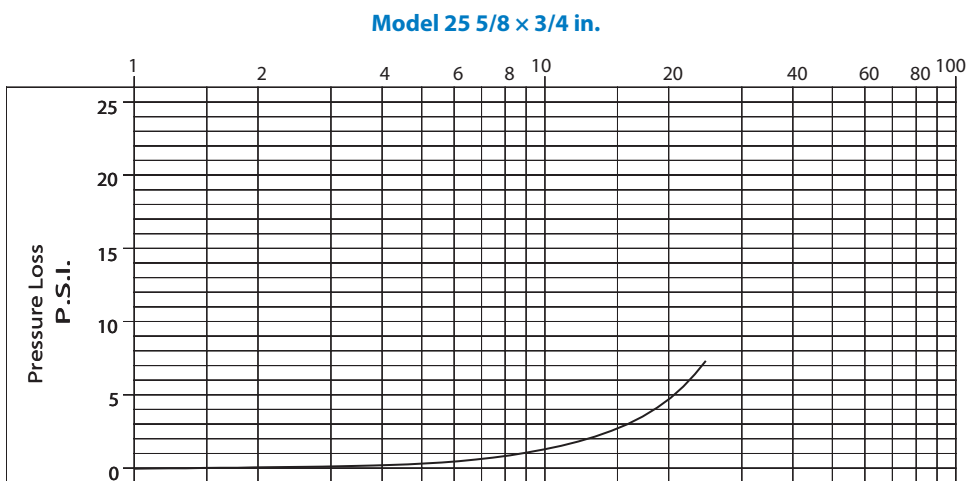
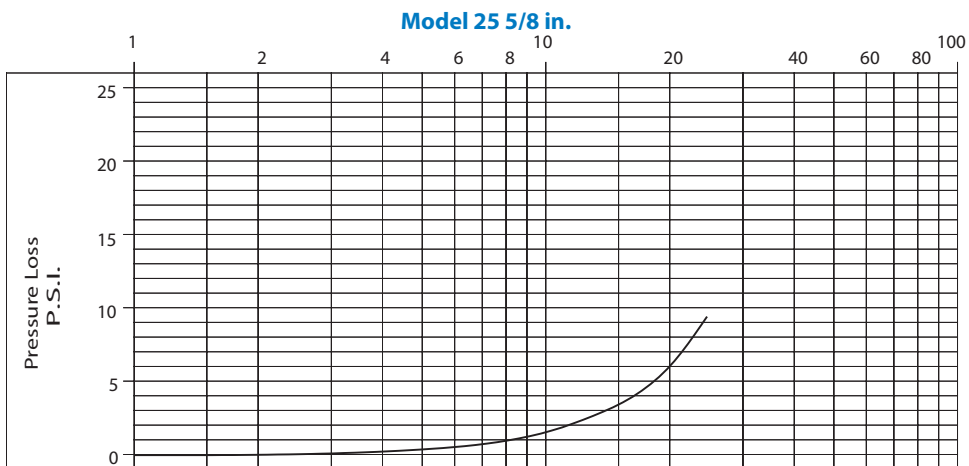
Optional—Encoders for AMR/AMI Reading Solutions

AMR/AMI solutions are available for all Recordall Disc Series meters. All reading options can be removed from the meter without disrupting water service. Badger Meter encoders provide years of reliable, accurate readings for a variety of applications. See details at www.badgermeter.com.

Recordall® Disc Meters, Lead-Free Bronze Alloy, Sizes 5/8, 5/8 x 3/4, 3/4 & 1 inch

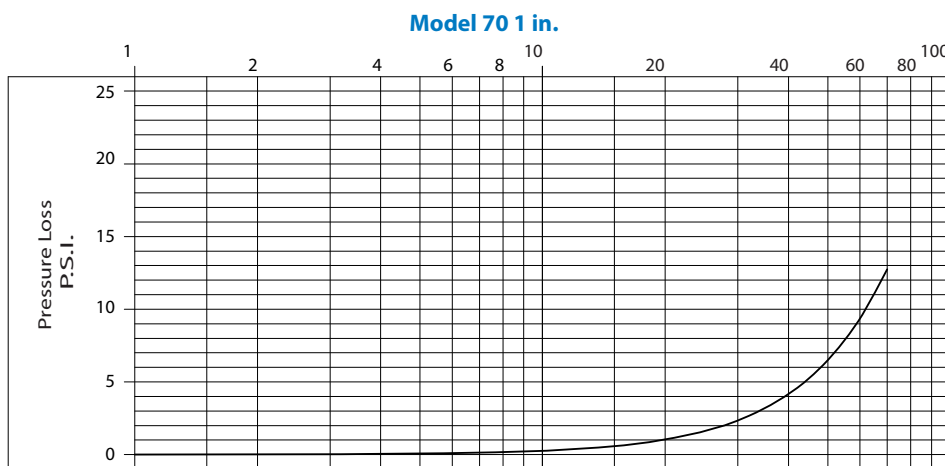
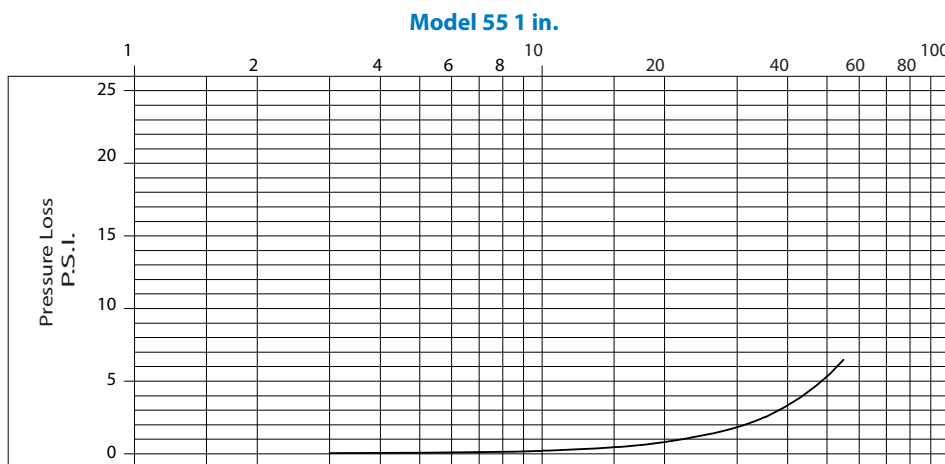
PRESSURE LOSS CHARTS

Rate of Flow in Gallons per Minute



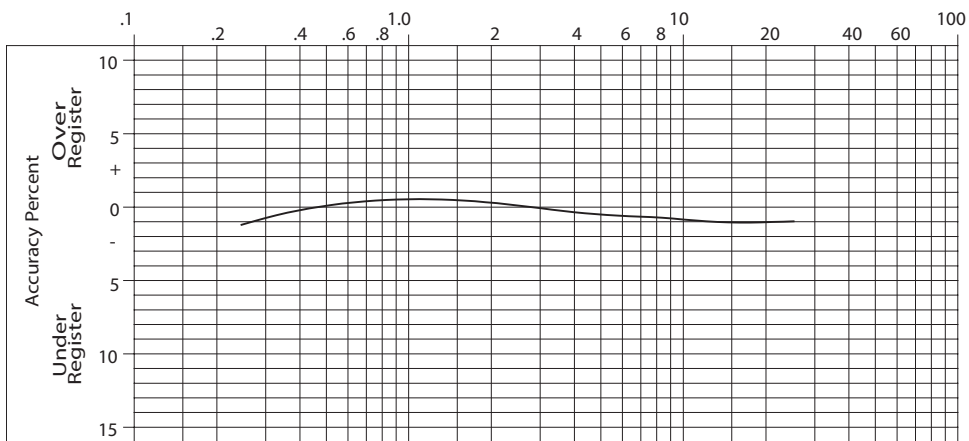
PRESSURE LOSS CHARTS (CONTINUED)

Rate of Flow in Gallons per Minute

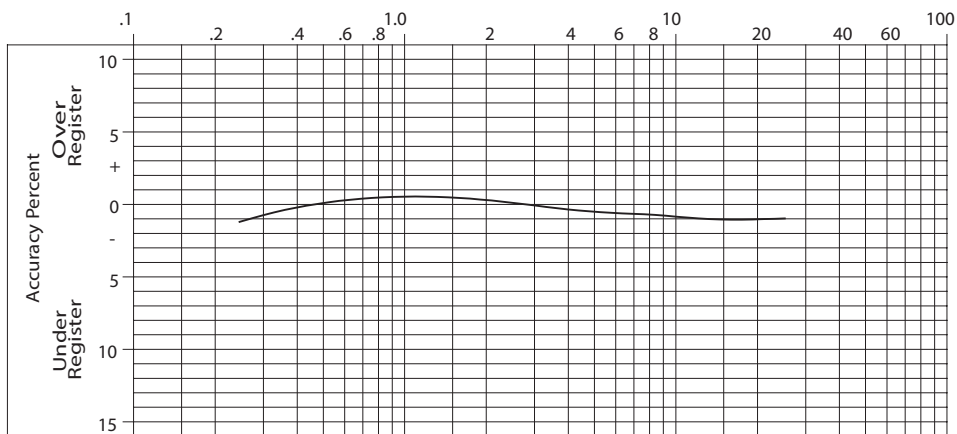


ACCURACY CHARTS

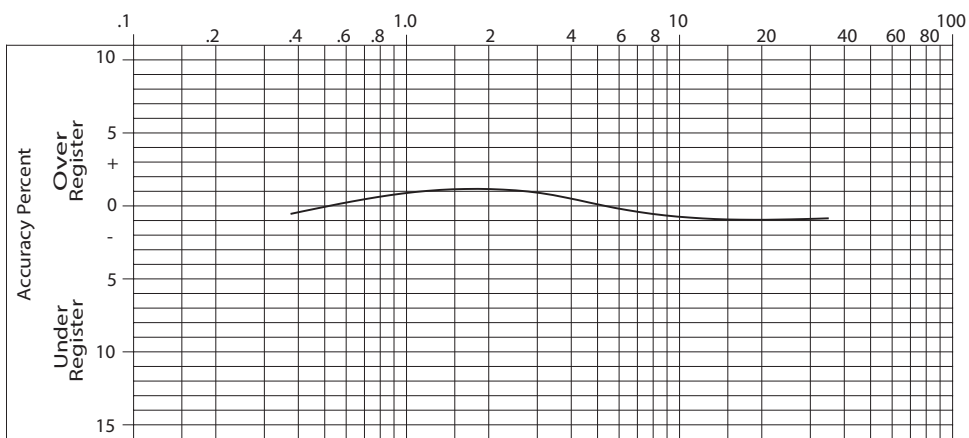
Model 25 5/8 in.



Model 25 5/8 x 3/4 in.

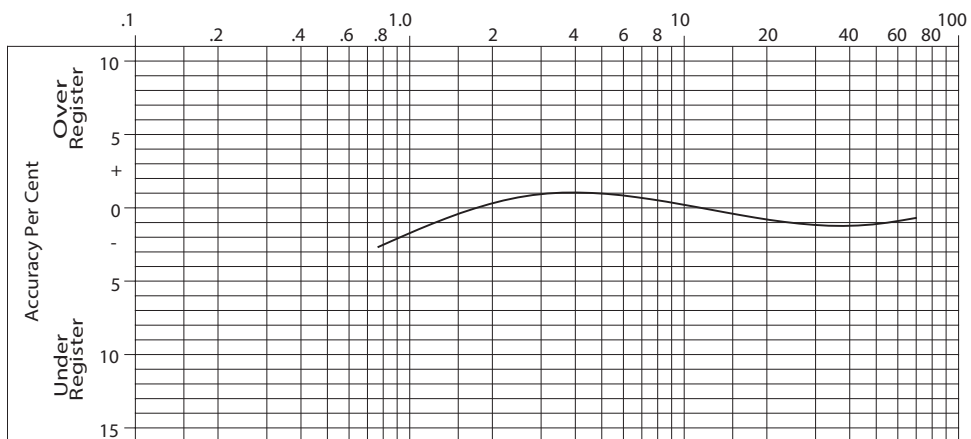


Model 35 3/4 in.

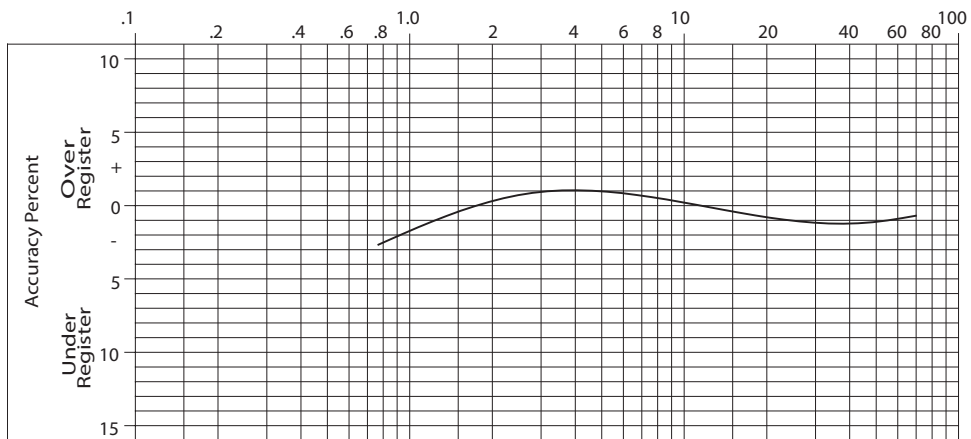


ACCURACY CHARTS (CONTINUED)

Model 55 1 in.



Model 70 1 in.



Recordall® Disc Meters, Lead-Free Bronze Alloy, Sizes 5/8, 5/8 x 3/4, 3/4 & 1 inch

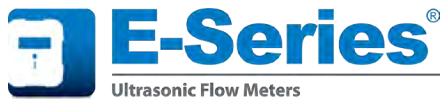
SMART WATER IS BADGER METER

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Legacy Document Numbers: RDM-DS-00062, 63, 64, 65, 66, and 74



E-Series® Ultrasonic Plus Meter with Integrated Valve

5/8 × 3/4 in., 3/4 × 7-1/2 in., 3/4 × 9 in.

DESCRIPTION

The E-Series® Ultrasonic Plus meter uses solid-state ultrasonic transit time technology to measure cold potable water and incorporates an integrated valve into the lay length of the meter. The integrated valve allows remote flow restriction of water service in residential utility applications.

Authorized utility personnel can actuate the valve via a command sent from BEACON® AMA (Advance Metering Analytics) to an ORION® Cellular LTE-M endpoint connected to the meter.

BEACON AMA displays the status of the valve (open, partial or restricted) and upon a command to transition the valve, confirms the success of that actuation. Status of the valve is also indicated on the physical meter via a position-indicating LED.

E-Series Ultrasonic Plus meters comply with the lead-free provisions of the Safe Drinking Water Act, are certified to NSF/ANSI Standards 61 and 372, and carry the NSF 61 marking. All components of the meter comprise the certified system. E-Series Ultrasonic Plus meters comply with the applicable portions of the most recent revision of AWWA Standard C715.

All electronic components utilized in the meter and RF Transceiver design comply with applicable FCC Part 15 standards and AWWA C707 for encoded remote reading systems.

Features

- Delivers precision accuracies with extended flow ranges
- Gate valve integrated into standard lay length of meter—no cut-ins required
- Patented magnetically coupled valve to extend field life (US Patent No. 10,161,777.B2)
- Patented flow restriction valve technology supports open, restricted and partially restricted options (US Patent No. 8,539,827)
- Does not require infrastructure
- Valve position-indicating LED
- Modular design allows installing the meter first, then the valve later
- Field-serviceable valve
- Fully submersible—electronics completely encapsulated to withstand harsh, flooded pit environments
- Low pressure loss
- Easy-to-read, 9-digit display presents consumption, rate of flow, reverse flow indication and alarms
- High resolution industry standard ASCII encoder protocol



APPLICATIONS

The E-Series Ultrasonic Plus meter provides a cost-effective, non-confrontational, safe method for water utilities to temporarily restrict an end consumer's water service. The most common application is for authorized utility personnel to inhibit water service of repeat delinquent accounts to encourage prompt payment from the property owner. Other applications may include actuating the valve as tenants change, or accommodating end-customer requests for temporary water restriction.

CONSTRUCTION

The E-Series Ultrasonic Plus meter features lead-free bronze alloy meter housing, ultrasonic transducers, a meter-control circuit board with associated wiring, LCD, and battery. Electronic components are housed and fully potted within a molded, engineered polymer enclosure, which is attached to the meter housing. The transducers extend through the housing and are sealed by O-rings, enabling turbulence-free water flow through the tube. The open flow tube design prevents obstruction of flow to reduce pressure loss and provide long-term accuracy.

The gate valve incorporated into the outlet side of the meter is designed to be field serviceable. The internal valve components (magnetic power screw assembly, gate) are accessible by removal of the potted motor, battery, PCB and valve bonnet.

OPERATION AND PERFORMANCE

As water flows into the measuring tube, ultrasonic signals are sent consecutively, in forward and reverse directions of flow. Velocity is then determined by measuring the time difference between the measurement in the forward and reverse directions. Total volume is calculated from the measured flow velocity using water temperature and pipe diameter. The LCD shows total volume, rate of flow and alarm conditions.



ESM-DS-02022-EN-04 (February 2021)

E-Series® Ultrasonic Plus Meter with Integrated Valve

A battery-powered DC motor module drives the dry-side magnetic coupling that is completely separated from the pressure vessel. The dry-side magnet couples to a mating wet-side magnetic assembly consisting of a magnetic disc, power screw and gate. The combined dry-side and wet-side magnetic coupling transfers torque from the motor to turn the power screw inside the pressure vessel, which ultimately drives the gate into the open, restricted* or partially restricted positions based on a command prompted by the connected ORION Cellular LTE-M endpoint via BEACON AMA. If necessary, actuation of the valve can be also be performed at the meter site.

System screens within BEACON AMA indicate the position of the valve and record the date and time for all valve actuations. In addition, the position of the valve can also be determined by physical inspection of the meter via the valve position LED.

*When the valve is in restricted position, typical water flow is restricted to 0.125 gpm (0.03 m³/hr) or less for humanitarian, life-sustaining measures.

INSTALLATION

The E-Series Ultrasonic Plus meter is completely submersible and can be installed using horizontal or vertical piping, with flow in the up direction.

The meter will not measure flow when an empty pipe (flow sensors are not fully submerged) condition is experienced.

SPECIFICATIONS

E-Series Ultrasonic Plus Meter Size	5/8 in. x 3/4 in. (15 mm)	3/4 in. (20 mm)
Normal Test Flow Limits	0.1...25 gpm (0.023... 5.68 m ³ /h)	0.1...32 gpm (0.023... 7.27 m ³ /h)
Minimum Test Flow Limits	0.05 gpm (0.014 m ³ /h)	0.05 gpm (0.014 m ³ /h)
Safe Maximum Operating Condition (SMOC)	25 gpm (5.68 m ³ /hr)	32 gpm (7.27 m ³ /hr)
Typical Pressure Loss	4.0 psi at 15 gpm (0.28 bar at 3.41 m ³ /h)	2.8 psi at 15 gpm (0.19 bar at 3.41 m ³ /hr)
Reverse Flow - Maximum Rate	4.0 gpm (0.91 m ³ /hr)	4.0 gpm (0.91 m ³ /hr)
Operating Performance	In the normal temperature range of 45...122° F (7...50° C), new meter consumption measurement is accurate to: <ul style="list-style-type: none"> • ±1.5% over the normal flow range • ±3.0% from the extended low flow range to the minimum flow value 	
Typical Flow Rate in Restricted Position	0.125 gpm (0.03 m ³ /hr) or less for humanitarian, life-sustaining measures	
Typical Flow Rate in Partially Restricted Position	0.35 gpm (0.08 m ³ /hr)	
Storage Temperature	– 40...140° F (– 40...60° C)	
Maximum Ambient Storage (Storage for One Hour)	150° F (66° C)	
Measured-Fluid Temperature Range	34...140° F (1...60° C)	
Humidity	0...100% condensing; meter is capable of operating in fully submerged environments	
Maximum Operating Pressure of Meter Housing	175 psi (12 bar)	
Register Type	Straight reading, permanently sealed electronic LCD; digits are 0.28 in. (7 mm) high	
Register Display	<ul style="list-style-type: none"> • Consumption (up to nine digits) • Rate of flow • Alarms • Unit of measure factory programmed for gallons, cubic feet and cubic meters 	
Register Capacity	<ul style="list-style-type: none"> • 10,000,000 gallons • 1,000,000 cubic feet • 100,000 cubic meters 	
Totalization Display Resolution	<ul style="list-style-type: none"> • Gallons: 0.XX • Cubic feet: 0.XXX • Cubic meters: 0.XXXX 	
Meter Battery	3.6-volt lithium thionyl chloride battery is fully encapsulated within the register housing and is not replaceable; 20-year battery life	
Valve Battery	3.6-volt lithium thionyl chloride battery within the power module. Battery is replaceable by replacing the entire power module; 20-year battery life, based upon 480 actuations	

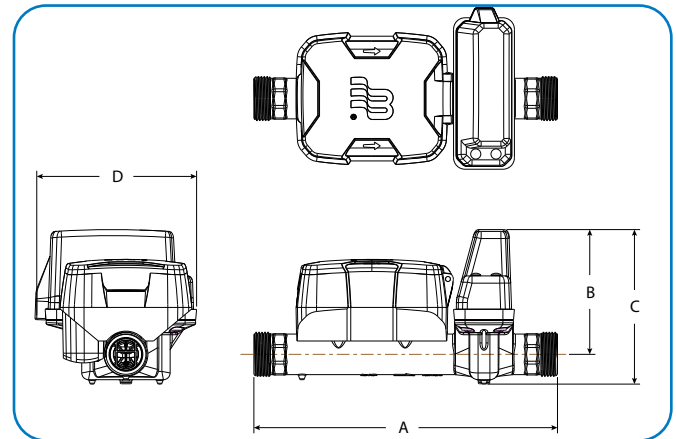
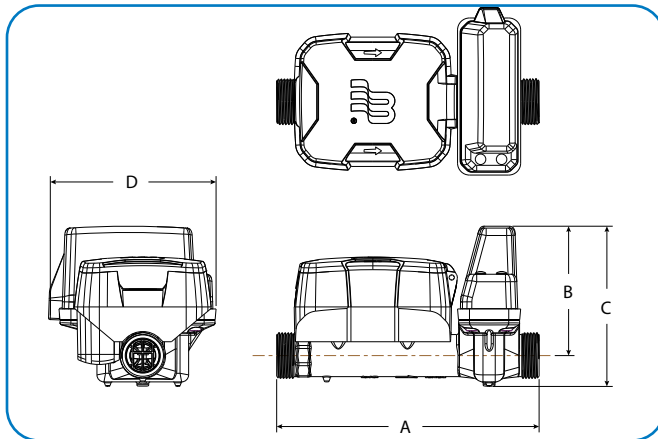
MATERIALS

Meter Housing	Lead-free bronze alloy
Valve Bonnet	Lead-free bronze alloy
Bonnet Seal	EPDM O-ring
Register Housing	Engineered polymer
Power Control Module Housing	Engineered polymer
Gate	PTFE
Power Screw	316 stainless steel

PHYSICAL DIMENSIONS

E-Series Ultrasonic Plus Meter Size	5/8 in. × 3/4 in. (15 mm)	3/4 in. (20 mm)	
Size Designation X Lay Length	5/8 in. × 3/4 in. × 7-1/2 in. (15.9 mm × 19 mm × 190.5 mm)	3/4 in. × 7-1/2 in. (19 mm × 190.5 mm)	3/4 in. × 9 in. (19 mm × 228.6 mm)
Weight (without endpoint)	4.2 lb (1.91 kg)	4.2 lb (1.91 kg)	4.4 lb (1.99 kg)
<i>See illustration below for Measurement Designations</i>			
Length (A)	7.5 in. (190.5 mm)	7.5 in. (190.5 mm)	9.0 in. (228.6 mm)
Height (B)	3.69 in. (93.73 mm)	3.69 in. (93.73 mm)	3.69 in. (93.73 mm)
Height (C)	4.57 in. (116.08 mm)	4.57 in. (116.08 mm)	4.57 in. (116.08 mm)
Width (D)	4.728 in. (120.09 mm)	4.728 in. (120.09 mm)	4.728 in. (120.09 mm)
Bore Size	3/4 in. (19 mm)	3/4 in. (19 mm)	3/4 in. (19 mm)
Coupling Nut & Spud Thread	1 in. × 11-1/2 NPSM	1 in. × 11-1/2 NPSM	1 in. × 11-1/2 NPSM
Tailpiece Pipe Thread (NPT)	3/4 in. (19 mm)	3/4 in. (19 mm)	3/4 in. (19 mm)
Service Pipe Thread (NPT)	3/4 in. (19 mm)	3/4 in. (19 mm)	3/4 in. (19 mm)

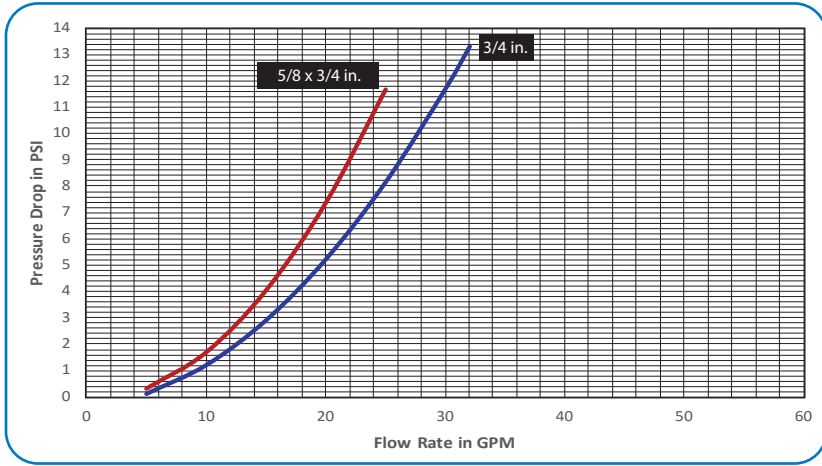
Measurement Designations



E-Series® Ultrasonic Plus Meter with Integrated Valve

PRESSURE LOSS CHART

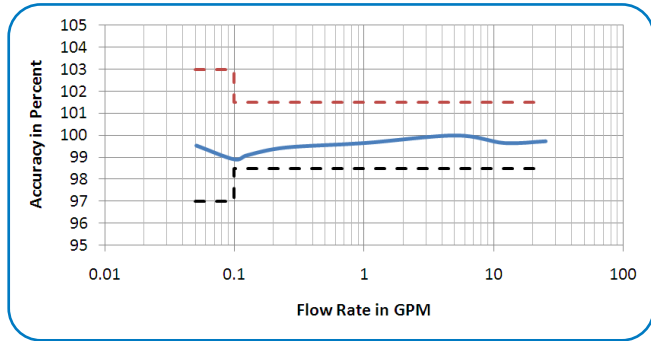
Typical Rate of Flow in Gallons per Minute (gpm)



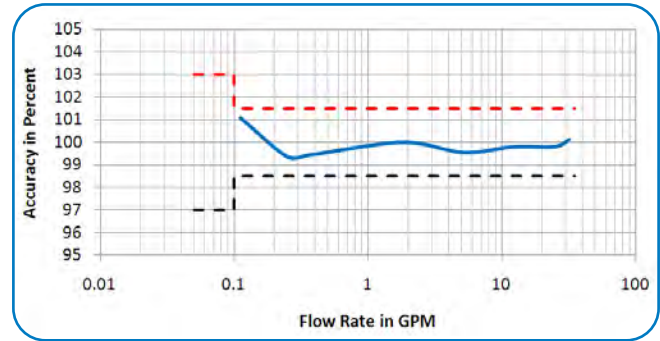
ACCURACY CHARTS

Typical Curve—Rate of Flow in Gallons per Minute (gpm)

5/8 x 3/4 in. Meter



3/4 in. Meter



SMART WATER IS BADGER METER

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Recordall® Fire Series Assemblies (FSAA)

Cold Water Meter & Strainer with Disc Bypass

UL Certified & FM 1044 Standard Approved for Fire Service Applications
NSF/ANSI Standards 61 and 372 Certified

DESCRIPTION

Recordall® Fire Series assemblies meet or exceed all pressure and performance requirements as stated in the most recent revision of AWWA Standard C703. The assembly's primary turbine meter features cast iron housing, while the disc bypass meter is cast in a lead-free bronze alloy. Fire Series assemblies comply with the lead-free provisions of the Safe Drinking Water Act and are also certified to NSF/ANSI Standards 61 and 372. These assemblies carry the NSF-61 Mark, Trade Designation: FSAA-01.

Badger Meter® Fire Series assemblies also conform to UL 327 and FM 1004. The strainer conforms to UL 321 and FM 5551. The valve conforms to UL 312 and FM 1045.

Offered in five sizes, Fire Series assemblies are designed for revenue-generating flexibility and control on high volume fire service water measurement applications and feature:

- Direct coupled turbine based on an exclusive “floating rotor” design that reduces bearing friction—and associated wear and tear for optimal performance during fire service events.
- Disc meter bypass. The disc meter conforms to AWWA C700.
- Low head loss for optimum pressure during fire extinguishing.
- Integral fire service strainer to protect the meter element from debris and prevent downstream blockage.
- Tamper-resistant calibration vane allowing in-line accuracy adjustments while under pressure.
- Factory-calibrated and tested measuring elements that are unitized for simplified installation and inventory.
- Meters and encoders are compatible with Badger Meter ORION® family of endpoints and other approved technologies

Applications

Use the Recordall Fire Series assembly for measuring potable cold water in your vital fire protection systems. Select this assembly when the fire service main is used for both high-volume fire applications, such as sprinkler systems, and low-volume domestic services, such as general purpose plumbing.

Operation & Performance

If water enters the meter at a low flow rate, a spring-loaded check valve on the downstream side holds the clapper assembly in a closed position. Based on size of the assembly the water is diverted through either a 1 inch, 1-1/2 inch or 2 inch disc bypass meter. This enables accurate registration of domestic use, leakage or misuse of water intended for stand-by fire protection. When a major flow is required, the resulting water pressure opens the check valve and allows water to flow through the main turbine chamber at full pipe capacity. A small amount of water continues to flow through the bypass when the clapper assembly is fully open.



Direct magnetic drive is achieved when the magnet carrier is driven by a gear train coupled to the rotor. The gear train consists of two sets of gears connected by a vertical transmission shaft. One gear set is at the magnet carrier, the other is a worm gear set at the rotor shaft. When water enters the main turbine chamber at high volume rates, it contacts a multi-vaned rotor. The resulting rotor rotation is then transmitted by magnetic coupling to a sealed register or encoder. The direct magnetic drive provides a reliable meter-to-registration coupling.

Construction

Recordall Fire Series assemblies consist of the following basic components: meter housing, an AWWA Class II measuring chamber, a check valve with bypass piping, valve assembly, two isolation valves, a disc bypass measuring chamber and sealed registers or encoders. The assembly also includes a strainer, which features an open area at least six times the area of the nominal pipe size. The strainer is equipped with a flushing outlet port (or optional valve) for flushing debris from the upstream side of the strainer screen.

To simplify maintenance, the registers or encoders and measuring elements can be removed without removing the meter housing. Interchangeability of certain parts between meters also minimizes spare parts inventory investment.

Tamper-Proof Features

Unauthorized removal of the register or encoder is inhibited by the optional tamper-detection seal wire screw, TORX® tamper-resistant seal screw or the proprietary tamper-resistant keyed seal screw. Each can be installed at the meter site or at the factory.

Meter Installation

The meter is designed for installations where flow is in one direction only. Companion flanges for installation of meters on various pipe types and sizes are available in cast iron or NL bronze as an option. See the “Recordall® Fire Series Assemblies (FSAA) User Manual” for installation guidelines.



Recordall® Fire Series Assemblies (FSAA), Cold Water Meter & Strainer with Disc Bypass

SPECIFICATIONS

FSAA Model	4 in. (100 mm)	6 in. (150 mm)	6 in. (150 mm)	8 in. (200 mm)	10 in. (250 mm)
Includes Disc Bypass Meter					
Meter Flanges , AWWA C207 Class D	4 in. (100 mm)	6 in. (150 mm)	6 in. (150 mm)	8 in. (200 mm)	10 in. (250 mm)
Disc Bypass Meter	1 in. (25 mm)	1 in. (25 mm)	1-1/2 in. (38 mm)	2 in. (50 mm)	2 in. (50 mm)
Typical Operating Range (100% ± 1.5%)	1.25...1250 gpm (0.28...284 m ³ /h)	1.25...2500 gpm (0.28...568 m ³ /h)	2.5...2500 gpm (0.57...568 m ³ /h)	2.5...4500 gpm (0.57...1022 m ³ /h)	2.5...7000 gpm (0.57...1590 m ³ /h)
Typical Low Flow (95% minimum)	0.75 gpm (0.17 m ³ /h)	0.75 gpm (0.17 m ³ /h)	1.5 gpm (0.34 m ³ /h)	1.5 gpm (0.34 m ³ /h)	1.5 gpm (0.34 m ³ /h)
Maximum Continuous Flow	1000 gpm (227 m ³ /h)	2000 gpm (454 m ³ /h)	2000 gpm (454 m ³ /h)	3500 gpm (795 m ³ /h)	5500 gpm (1249 m ³ /h)
Maximum Intermittent Flow	1250 gpm (284 m ³ /h)	2500 gpm (568 m ³ /h)	2500 gpm (568 m ³ /h)	4500 gpm (1022 m ³ /h)	7000 gpm (1590 m ³ /h)
Maximum Operating Pressure	175 psi (12 bar)				
Maximum Operating Temperature	120° F (49° C)				
Pressure Loss at Crossover	3 psi (0.28 bar)				
Check Valve	Valve body conforms to UL 312 and FM 1044.				
Bypass Line	Specify right-facing (standard, as shown) or left-facing assembly.				
Strainer	Screen open area is at least six times the area of the nominal pipe size. Equipped with a 2 in. (4 in. model) or 3 in. (all other models) flushing port to flush debris from upstream side of strainer screen. Optional flush valve assembly available.				

MATERIALS

Meter Housing	Fusion-bonded epoxy coated ductile cast iron
Bypass Meter Housing & Cover	Lead-free bronze alloy
Bypass Measuring Chamber	Injection-molded thermoplastic
Bypass	Water works brass piping conforming to AWWA C800
Nose Cone & Straightening Vanes	Thermoplastic
Rotor	Thermoplastic
Rotor Radial Bearings	Lubricated thermoplastic
Rotor Thruster Bearing	Sapphire jewels
Rotor Bearing Pivots	Passivated 316 stainless steel
Calibration Mechanism	Stainless steel & thermoplastic
Magnet	Ceramic
Turbine Shaft & Bolts	Stainless steel
Clapper Assembly (clapper, spring, hinge & pins)	Stainless steel
Clapper Seal	Elastomeric, EPDM
Valve Seat	Stainless steel
Valve & Strainer Cover Plate	Fusion-bonded epoxy coated steel
Valve & Strainer Cover Plate Gasket	Elastomeric sheet / O-ring
Valve Body	Fusion-bonded epoxy coated steel / stainless steel
Strainer Screen & Trim	Stainless steel
Strainer Body	Fusion-bonded epoxy coated steel
Trim	Zinc-plated steel or (optional) all stainless steel

REGISTERS / ENCODERS

Standard—Sweep-Hand Registration

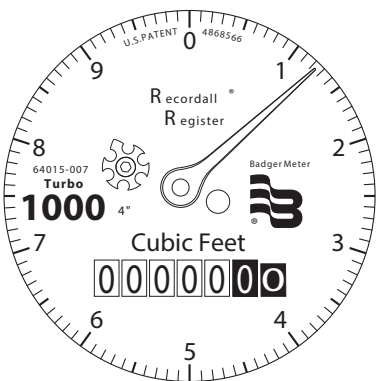
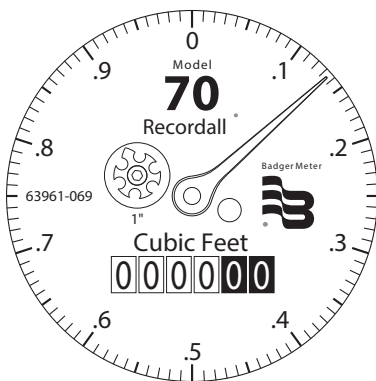
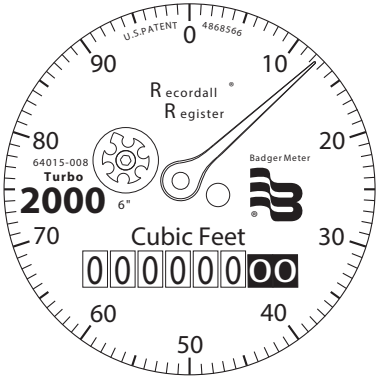
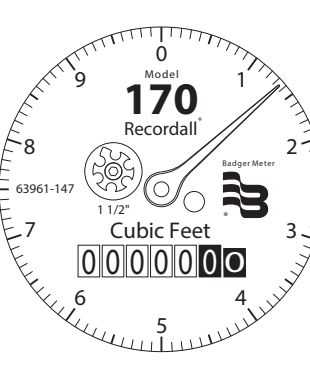
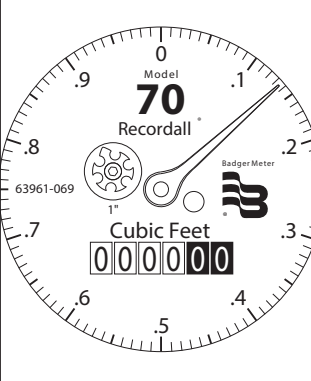
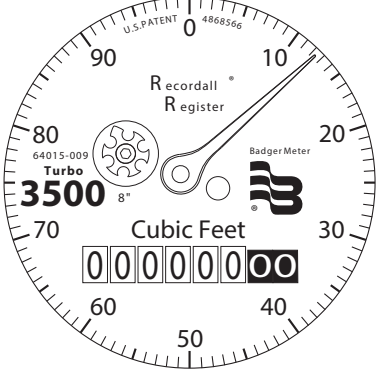
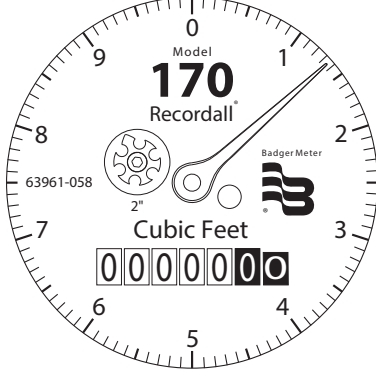
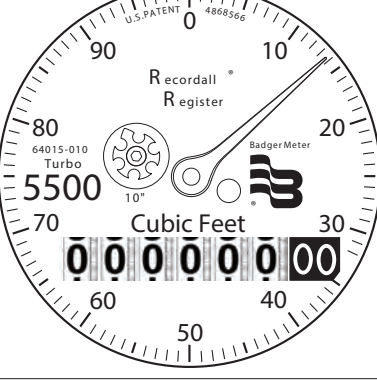
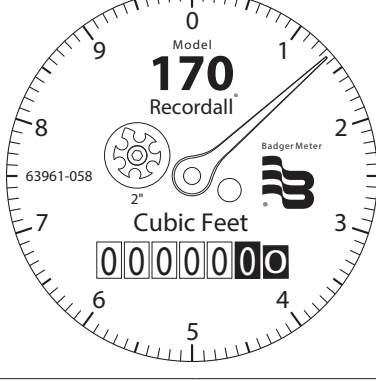
The standard register is a straight-reading, permanently sealed magnetic drive register. Dirt, moisture, tampering and lens fogging problems are eliminated. The register has a six-odometer wheel totalization display, 360° test circle with center sweep hand, and flow finder to detect leaks. Register gearing is made of self-lubricating engineered polymer, which minimizes friction and provides long life. The multi-position register simplifies meter installation and reading. The register capacity is 10,000,000 gallons (1,000,000 ft³, 100,000 m³).

Registers—Gallons

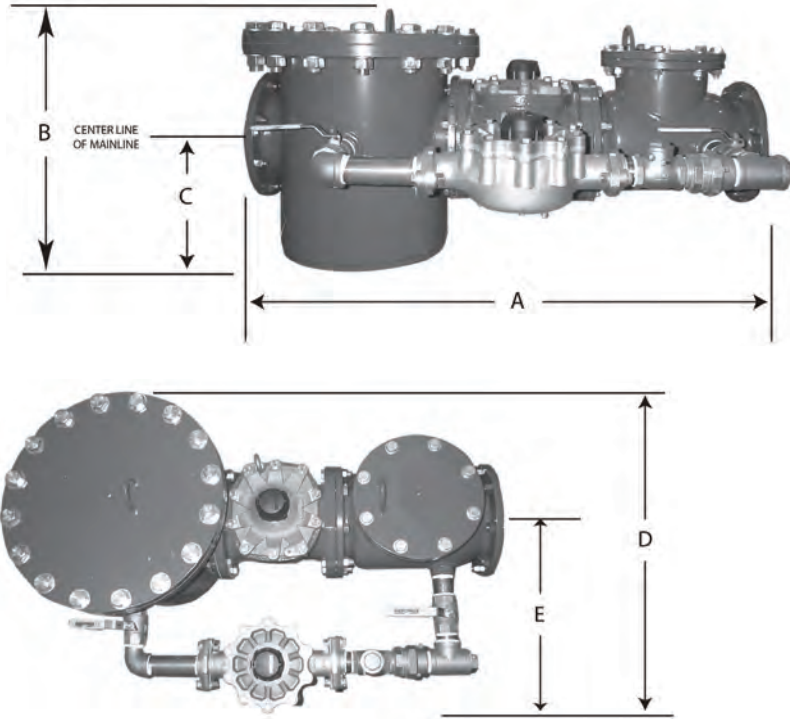
	High Flow	Low Flow	
4 in.	<p>U.S. PATENT 4868566 Recordall® Register Badger Meter 64015-002 Turbo 1000 4" Gallons 00000000</p>	<p>Model 70 Recordall® Register Badger Meter 63961-068 1" Gallon 00000000</p>	
6 in.	<p>U.S. PATENT 4868566 Recordall® Register Badger Meter 64015-003 Turbo 2000 6" Gallons 00000000</p>	<p>Model 170 Recordall® Register Badger Meter 63961-146 1 1/2" Gallons 00000000</p>	<p>Model 70 Recordall® Register Badger Meter 63961-068 1" Gallon 00000000</p>
8 in.	<p>U.S. PATENT 4868566 Recordall® Register Badger Meter 64015-004 Turbo 3500 8" Gallons 00000000</p>	<p>Model 170 Recordall® Register Badger Meter 63961-057 2" Gallons 00000000</p>	
10 in.	<p>U.S. PATENT 4868566 Recordall® Register Badger Meter 64015-005 Turbo 5500 10" Gallons 00000000</p>	<p>Model 170 Recordall® Register Badger Meter 63961-057 2" Gallons 00000000</p>	

Recordall® Fire Series Assemblies (FSA), Cold Water Meter & Strainer with Disc Bypass

Registers—Cubic Feet

	High Flow	Low Flow
4 in.	 <p>U.S. PATENT 4868566 Recordall® Register 64015-007 Turbo 1000 4" Cubic Feet 00000000 Badger Meter</p>	 <p>Model 70 Recordall® 63961-069 1" Cubic Feet 00000000 Badger Meter</p>
6 in.	 <p>U.S. PATENT 4868566 Recordall® Register 64015-008 Turbo 2000 6" Cubic Feet 00000000 Badger Meter</p>	 <p>Model 170 Recordall® 63961-147 1 1/2" Cubic Feet 00000000 Badger Meter</p>  <p>Model 70 Recordall® 63961-069 1" Cubic Feet 00000000 Badger Meter</p>
8 in.	 <p>U.S. PATENT 4868566 Recordall® Register 64015-009 Turbo 3500 8" Cubic Feet 00000000 Badger Meter</p>	 <p>Model 170 Recordall® 63961-058 2" Cubic Feet 00000000 Badger Meter</p>
10 in.	 <p>U.S. PATENT 4868566 Recordall® Register 64015-010 Turbo 5500 10" Cubic Feet 00000000 Badger Meter</p>	 <p>Model 170 Recordall® 63961-058 2" Cubic Feet 00000000 Badger Meter</p>

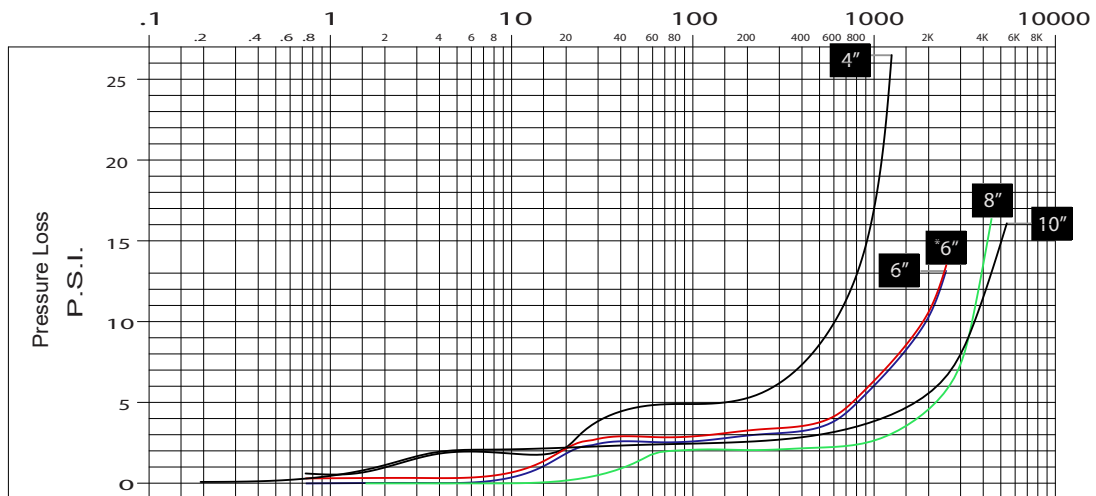
DIMENSIONS



FSAA Model	4 in. (100 mm)	6 in. (150 mm)	6 in. (150 mm)	8 in. (200 mm)	10 in. (250 mm)
Includes Disc Bypass Meter					
Meter & Pipe Size	4 in. (100 mm)	—	6 in. (150 mm)	8 in. (200 mm)	10 in. (250 mm)
Disc Bypass Meter	1 in. (25 mm)	1 in. (25 mm)	1-1/2 in. (38 mm)	2 in. (50 mm)	2 in. (50 mm)
Shipping Weigh Fully Assembled	312 lb (142 kg)	507 lb (230 kg)	507 lb (230 kg)	767 lb (348 kg)	1073 lb (487 kg)
Length (A)	33 in. (838 mm)	45 in. (1143 mm)	45 in. (1143 mm)	53 in. (1346 mm)	68 in. (1727 mm)
Height (B)	20-5/8 in. (524 mm)	22-3/8 in. (568 mm)	22-3/8 in. (568 mm)	25-1/16 in. (637 mm)	25-5/16 in. (643 mm)
Height (C)	10-5/8 in. (270 mm)	11-1/16 in. (281 mm)	11-1/16 in. (281 mm)	12-1/16 in. (306 mm)	14-13/16 in. (376 mm)
Height (D)	23-3/16 in. (589 mm)	30 in. (762 mm)	34-1/4 in. (870 mm)	35-1/2 in. (902 mm)	34-1/2 in. (876 mm)
Height (E)	16-7/16 in. (418 mm)	20-1/2 in. (521 mm)	24-3/4 in. (629 mm)	23 in. (584 mm)	20-3/4 in. (527 mm)

PRESSURE LOSS CHART

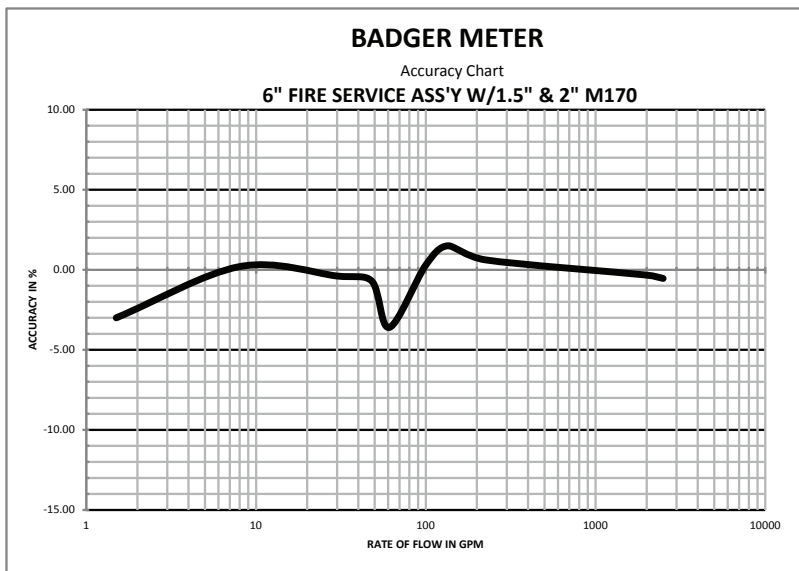
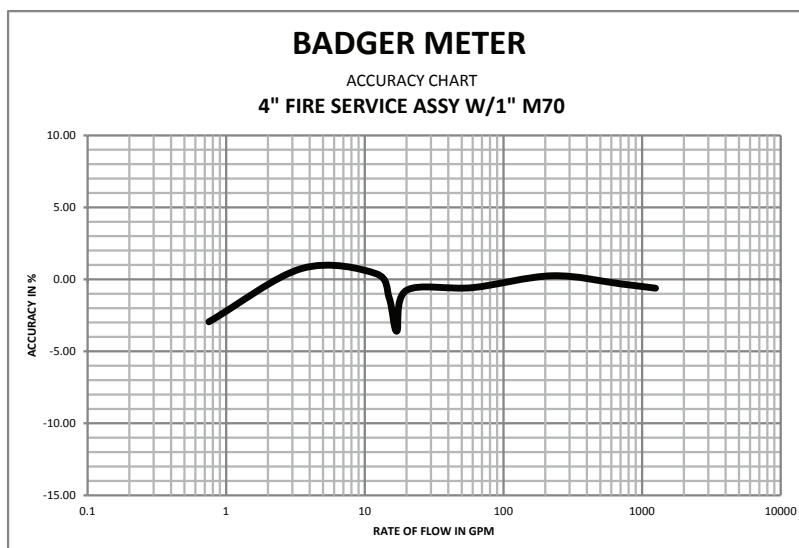
Rate of flow in gallons per minute (gpm).



Recordall® Fire Series Assemblies (FSAA), Cold Water Meter & Strainer with Disc Bypass

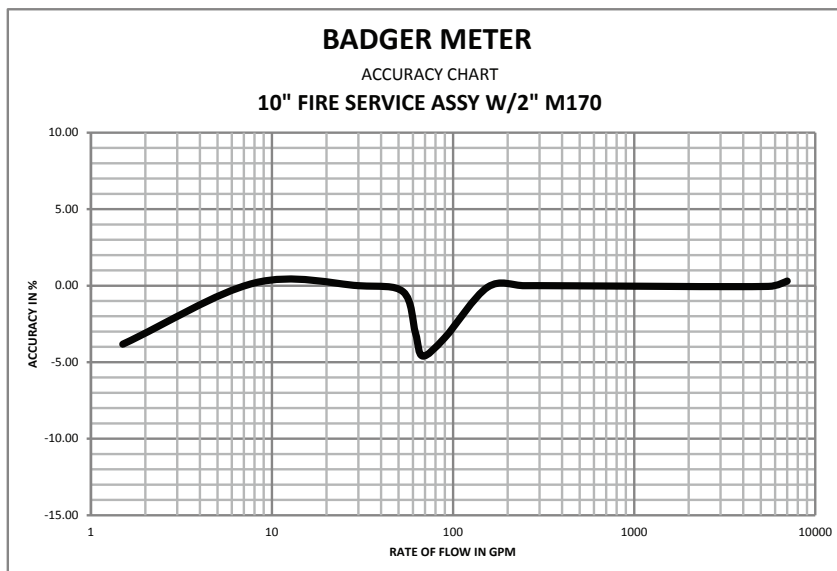
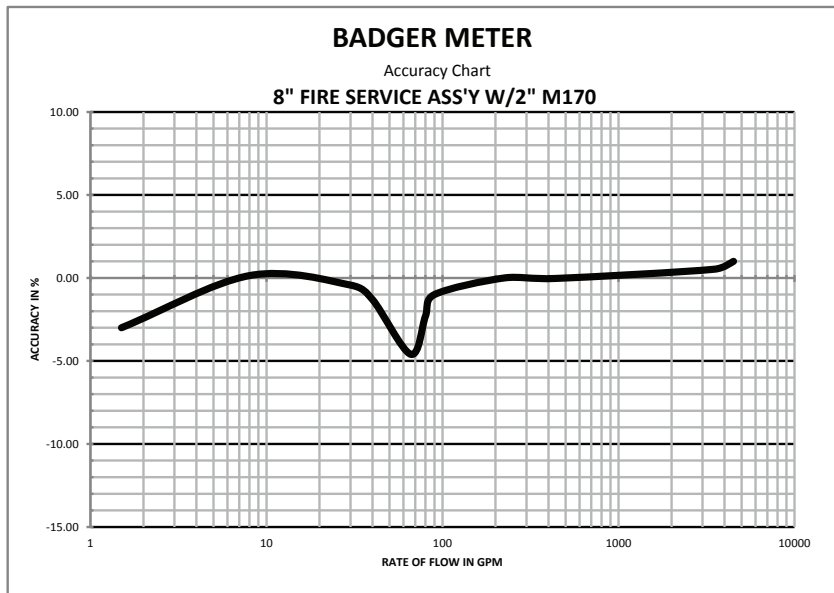
ACCURACY CHARTS

Rate of flow in gallons per minute (gpm).



ACCURACY CHARTS (CONTINUED)

Rate of flow in gallons per minute (gpm).



Recordall® Fire Series Assemblies (FSAA), Cold Water Meter & Strainer with Disc Bypass

Making Water Visible®

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Legacy Document Number: FSAA-DB-T-04, -06, -08, -10



Badger Meter

Recordall® Disc Meters

Lead-Free Bronze Alloy Models 120 & 170, Sizes 1-1/2" (40 mm) & 2" (50 mm), NSF/ANSI Standards 61 and 372 Certified

DESCRIPTION

The Recordall Models 120 and 170 Disc Series meters meet or exceed the most recent revision of AWWA Standard C700 and are available in a lead-free bronze alloy. Both meters comply with the lead-free provisions of the Safe Drinking Water Act, are certified to NSF/ANSI Standards 61 and 372 (Trade Designations: M120-LL and M170LL) and carry the NSF-61 mark on the housing. All components of the lead-free bronze alloy meter (housing, measuring element, seals, and so on) comprise the certified system.

Applications: For use in measurement of potable cold water in residential, commercial and industrial services where flow is in one direction only.

Operation: Water flows through the meter's strainer and into the measuring chamber where it causes the disc to nutate. The disc, which moves freely, nutates on its own ball, guided by a thrust roller. A drive magnet transmits the motion of the disc to a follower magnet located within the permanently sealed register. The follower magnet is connected to the register gear train. The gear train reduces the disc nutations into volume totalization units displayed on the register or encoder face.

Operating Performance: The Recordall Disc Series meters meet or exceed registration accuracy for the low flow rates (95%), normal operating flow rates ($100 \pm 1.5\%$), and maximum continuous operation flow rates as specifically stated in AWWA Standard C700.

Construction: Recordall Disc meter construction, which complies with ANSI/AWWA standard C700, consists of three basic components: meter housing, measuring chamber, and permanently sealed register or encoder. The water meter is available in a lead-free bronze alloy. A corrosion-resistant engineered polymer material is used for the measuring chamber.

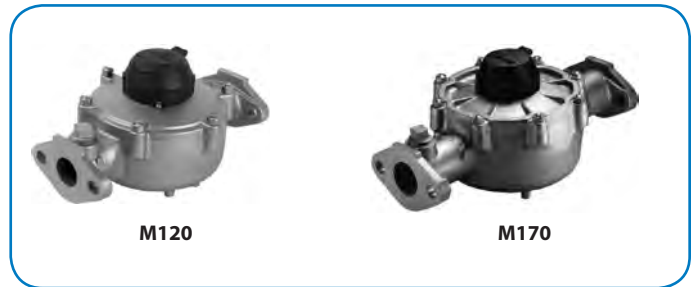
Magnetic Drive: Direct magnetic drive, through the use of high-strength magnets, provides positive, reliable and dependable register coupling for straight-reading or AMR/AMI meter reading options.

Tamper-Proof Features: Unauthorized removal of the register or encoder is inhibited by the option of a tamper detection seal wire screw, TORX® tamper-resistant seal screw or the proprietary tamper-resistant keyed seal screw. Each can be installed at the meter site or at the factory.

Maintenance: Badger Meter Recordall Disc Series meters are designed and manufactured to provide long-term service with minimal maintenance. When maintenance is required, it can be performed easily either at the meter installation or at any other convenient location.

To simplify maintenance, the register, measuring chamber, and strainer can be replaced without removing the meter housing from the installation. No change gears are required for accuracy calibration. Interchangeability of parts among like-sized meters minimizes spare parts inventory investment. The built-in strainer has an effective straining area of twice the inlet size.

Connections: Companion flanges in cast iron or NL bronze are available as options. Straight connection sets are available in NL bronze.



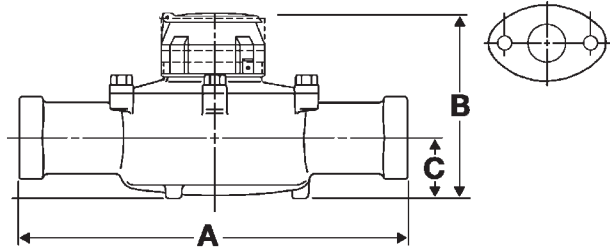
SPECIFICATIONS

Meter Model	M120	M170
Typical Operating Range (100% ± 1.5%)	2.5...120 gpm (0.57...27 m ³ /hr)	2.5...170 gpm (0.57...39 m ³ /hr)
Low Flow (Min. 95%)	1.25 gpm (0.28 m ³ /hr)	1.5 gpm (0.34 m ³ /hr)
Maximum Continuous Operation	80 gpm (18 m ³ /hr)	100 gpm (23 m ³ /hr)
Pressure Loss at Maximum Continuous Operation	4.8 psi at 80 gpm (0.33 bar at 18 m ³ /hr)	3.3 psi at 100 gpm (0.23 bar at 23 m ³ /hr)
Maximum Operating Temperature	80° F (26° C)	80° F (26° C)
Maximum Operating Pressure	150 psi (10 bar)	150 psi (10 bar)
Measuring Element	Nutating disc, positive displacement	Nutating disc, positive displacement
Meter Connections	1-1/2" AWWA two-bolt elliptical flange, drilled or 1-1/2...11-1/2 NPT internal pipe threads	2" AWWA two-bolt elliptical flange, drilled or 2...11-1/2 NPT internal pipe threads
Test Plugs	Optional 1" NPT test plug (TP)	Optional 1" NPT test plug (TP)

Materials

Meter Housing	Lead-free bronze alloy
Housing Top Plates	Lead-free bronze alloy
Measuring Chamber	Engineered polymer
Disc	Engineered polymer
Trim	Stainless steel
Strainer	Engineered polymer
Disc Spindle	Stainless steel
Magnet	Ceramic
Magnet Spindle	Stainless steel
Register Lid and Shroud	Engineered polymer, bronze

DIMENSIONS



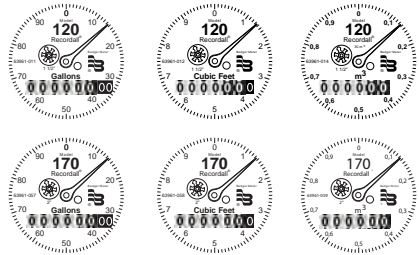
Meter Size	Meter Model	A Laying Length	B Height Reg./RTR	C Centerline Base	Width	Approx. Shipping Weight
1-1/2" (40 mm)	120 EL, Hex 120 EL, TP	12-5/8" (321 mm)	7" (178 mm)	2-3/8" (60 mm)	8-3/4" (222 mm)	19 lb (8.6 kg)
1-1/2" (40 mm)	120 ELL 120 ELL, TP	13" (330 mm)	7" (178 mm)	2-3/8" (60 mm)	8-3/4" (222 mm)	19 lb (8.6 kg)
2" (50 mm)	170 EL, Hex 170 EL, TP	15-1/4" (387 mm)	8" (203 mm)	2-7/8" (73 mm)	9-1/2" (241 mm)	30 lb (13.6 kg)
2" (50 mm)	170 ELL 170 ELL, TP	17" (432 mm)	8" (203 mm)	2-7/8" (73 mm)	9-1/2" (241 mm)	30 lb (13.6 kg)

EL = Elliptical ELL = Elliptical Long Hex = Hexagon, 1-1/2...11-1/2" NPT Thread TP=Test Plug 1"

REGISTERS / ENCODERS

Standard—Sweep-Hand Registration

The standard register is a straight-reading, permanently sealed magnetic drive register. Dirt, moisture, tampering and lens fogging problems are eliminated. The register has a six-odometer wheel totalization display, 360° test circle with center sweep hand, and flow finder to detect leaks. Register gearing is made of self-lubricating engineered polymer, which minimizes friction and provides long life. The multi-position register simplifies meter installation and reading. The register capacity is 10,000,000 gallons (1,000,000 ft³, 100,000 m³).



Meter Model	Gallon	Cubic Feet	Cubic Meter
120	100	10	1/0.1
170	100	10	1

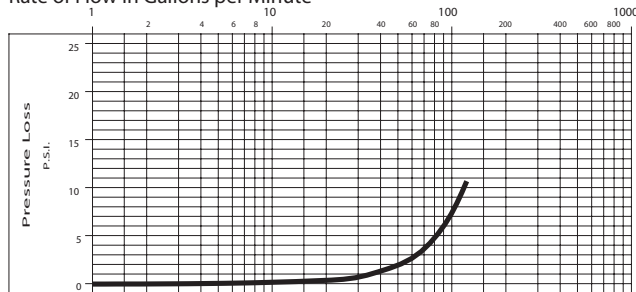
Optional—Encoders for AMR/AMI Reading Solutions

AMR/AMI solutions are available for all Recordall Disc Series meters. All reading options can be removed from the meter without disrupting water service. Badger Meter encoders provide years of reliable, accurate readings for a variety of applications and are also available pre-wired to Badger Meter approved AMR/AMI solutions. See details at www.badgermeter.com.

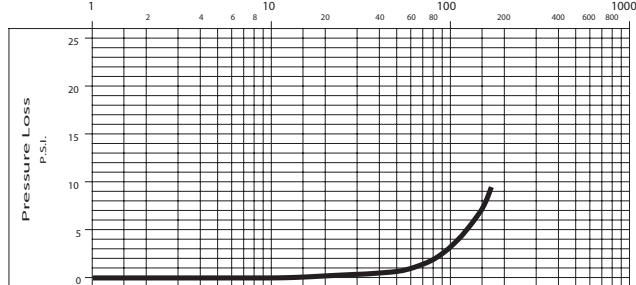
PRESSURE LOSS CHARTS

1-1/2" Meter

Rate of Flow in Gallons per Minute



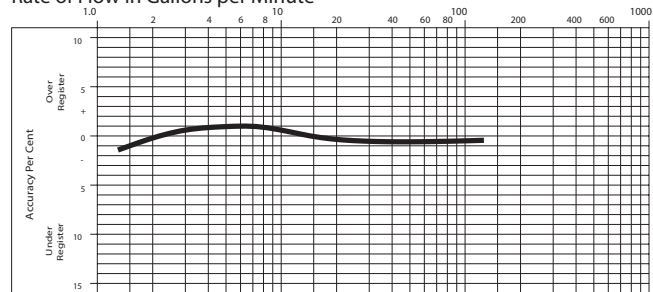
2" Meter



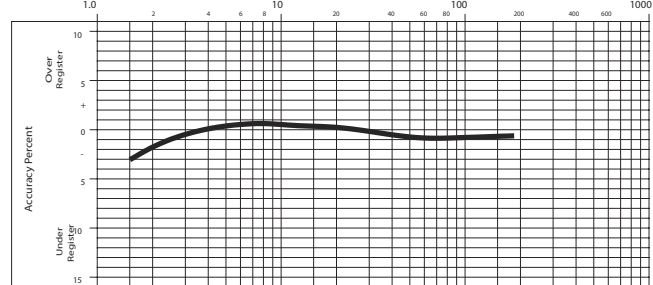
ACCURACY CHARTS

1-1/2" Meter

Rate of Flow in Gallons per Minute



2" Meter



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Badger Meter

Recordall® Turbo Series Meters

Models 160 (1-1/2 in.), 200 (2 in.), 450 (3 in.), 1000 (4 in.), 2000 (6 in.), 3500 (8 in.), 5500 (10 in.) and 6200 (12 in.)
NSF/ANSI Standards 61 and 372 Certified

DESCRIPTION

Recordall Turbo Series meters meet or exceed the most recent revision of AWWA Standard C701 Class II Standards and are available in a lead-free bronze alloy for sizes 1-1/2 in. through 10 in. and cast iron for 12 in. meters. Turbo Series meters comply with the lead-free provisions of the Safe Drinking Water Act. Sizes 1-1/2 in. through 10 in. meters are also certified to NSF/ANSI Standards 61 and 372 (Trade Designation: Turbo Series LL-NS) and carry the NSF-61 mark on the housing. All components of the lead-free alloy meter (housing, measuring element, seals and so on) comprise the certified system.

Models 160 through 6200 are designed for 1-1/2 in. through 12 in. applications. These meters feature:

- Direct coupled turbine based on an exclusive “floating rotor” design that reduces bearing friction—and associated wear and tear.
- Low pressure loss for improved system efficiency.
- Exceptional registration accuracy across low flow rate, normal operating flow rate and maximum continuous operation flow.
- Permanently sealed, tamper-resistant register or encoder.
- Integral strainer helps protect your system from damaging debris and related downtime. Integral strainer is standard on 1-1/2 in. meter, and optional on 2 in. through 4 in. meters.
- Meters and encoders are compatible with Badger Meter AMR/AMI meter reading systems and other approved reading technologies.

Applications: Recordall Turbo Series meters are designed for cold water, commercial and industrial applications where flows are consistent medium to high flows. Applications include hotels, apartment buildings, irrigations centers and manufacturing and processing plants. Turbo Series meters help reduce day-to-day maintenance costs while delivering accurate and efficient performance.

Operation & Performance: Direct magnetic drive is achieved when the magnet carrier is driven by a gear train coupled to the rotor. The gear train consists of two sets of gears connected by a vertical transmission shaft. One gear set is at the magnet carrier, the other is a worm gear set at the rotor shaft. When water flows into the Turbo Series meter measuring element, it contacts the multi-vaned rotor. The resulting rotor rotation is then transmitted by magnetic coupling to a sealed register or encoder. The direct magnetic drive is built to provide a reliable meter-to-registration coupling.



Tamper-Proof Features: Unauthorized removal of the register or encoder is inhibited by the option of a tamper detection seal wire screw, TORX® tamper-resistant seal screw or the proprietary tamper-resistant keyed seal screw. Each can be installed at the meter site or at the factory.

Construction: The Recordall Turbo Series meter is constructed in compliance with ANSI and AWWA C701 standards. It consists of the following basic components: meter housing, interchangeable, unitized measuring element and permanently sealed direct reading registers or encoders.

The measuring element consists of the transmission coupling, rotor, inlet and outlet straightening vanes with nose cones, and calibration ring assembly. The unique inlet and outlet straightening vanes minimize swirl from piping arrangements upstream as well as downstream.

A strainer is recommended to help ensure optimal flow conditioning and protection for the measuring element. The integral strainer is standard on the 1-1/2 in. meter and an available option on the 2 in. through 4 in. meters. The stainless steel strainer is built into the inlet end and includes a removable cover plate to permit easy access for routine cleaning. External strainers are available in sizes 2 in. through 12 in.

To simplify maintenance, the registers or encoders and measuring elements can be removed without removing the meter housing. Interchangeability of certain parts between meters also minimizes spare parts inventory investment.

Meter Installation: The meter is designed for installations where flow is in one direction only. Companion flanges for installation of meters on various pipe types and sizes are available in cast iron or NL bronze as an option. See the *Recordall Turbo Series Meters User Manual* available at www.badgermeter.com for specific instructions.

Recordall® Turbo Series Meters

SPECIFICATIONS

Turbo Series Model	160 1-1/2 in. (40 mm)	200 2 in. (50 mm)	450 3 in. (80 mm)	1000 4 in. (100 mm)	2000 6 in. (150 mm)	3500 8 in. (200 mm)	5500 10 in. (250 mm)	6200 12 in. (300 mm)
Meter Flanges AWWA 125 Pound Class	Elliptical	Elliptical or Round	Round	Round	Round	Round	Round	Round AWWA 125 lb class
Typical Operating Range (100% ± 1.5%)	4...200 gpm (0.9...45.4 m ³ /h)	4...310 gpm (0.9...70.4 m ³ /h)	5...550 gpm (1.1...124.9 m ³ /h)	10...1250 gpm (2.3...284 m ³ /hr)	20...2500 gpm (4.5...568 m ³ /h)	30...4500 gpm (6.8...1022 m ³ /h)	50...7000 gpm (11.4...1590 m ³ /h)	90...8800 gpm (20.5...1998 m ³ /h)
Typical Low Flow (95% min.)	2.5 gpm (0.6 m ³ /h)	2.5 gpm (0.6 m ³ /h)	4 gpm (0.9 m ³ /h)	6 gpm (1.4 m ³ /h)	12 gpm (2.7 m ³ /h)	20 gpm (4.5 m ³ /h)	30 gpm (6.8 m ³ /h)	65 gpm (14.8 m ³ /h)
Max. Continuous Flow	160 gpm (36 m ³ /h)	200 gpm (45.4 m ³ /h)	450 gpm (102.2 m ³ /h)	1000 gpm (227.1 m ³ /h)	2000 gpm (454 m ³ /h)	3500 gpm (795 m ³ /h)	5500 gpm (1250 m ³ /h)	6200 gpm (1408 m ³ /h)
Maximum Intermittent Flow	200 gpm (45.4 m ³ /h)	310 gpm (70.4 m ³ /h)	550 gpm (124.9 m ³ /h)	1250 gpm (284 m ³ /h)	2500 gpm (568 m ³ /h)	4500 gpm (1022 m ³ /h)	7000 gpm (1590 m ³ /h)	8800 gpm (1988 m ³ /h)
Pressure Loss at Max. Continuous Flow	3.8 psi (0.26 bar)	3.1 psi (0.21 bar)	1.8 psi (0.12 bar)	7.3 psi (0.50 bar)	4.8 psi (0.33 bar)	2.5 psi (0.17 bar)	1.6 psi (0.11 bar)	0.8 psi (0.05 bar)
Pressure Loss at Max. Continuous Flow: With Integral Strainer	9.9 psi (0.68 bar)	8.3 psi (0.57 bar)	5 psi (0.43 bar)	17.8 psi (1.2 bar)	—			
Max. Operating Pressure	150 psi (10 bar)							
Max. Operating Temperature	120° F (49° C)							
Integral Strainer	Optional on 2 in. through 4 in. meters. Built into inlet end. Removable cover plate permits access to strainer for cleaning.				—			
Optional External Strainer	—	Available for Models 200, 450, 1000, 2000, 3500, 5500 and 6200.						
NPT Test Port	Standard with integral strainer; optional for other models.				Optional for Models 2000 and 3500.		—	

MATERIALS

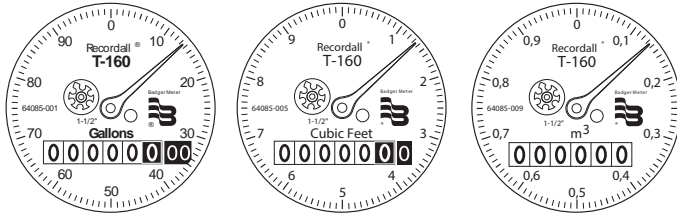
Meter Housing	Lead-free alloy (EXCEPTION: Model 6200 meter housing is blue epoxy-coated cast iron)
Turbo Head	Lead-free alloy
Nose Cone & Straightening Vanes	Thermoplastic
Rotor	Thermoplastic
Rotor Radial Bearings	Lubricated thermoplastic
Rotor Thruster Bearing	Sapphire jewels
Rotor Bearing Pivots	Passivated 316 stainless steel
Calibration Mechanism	Stainless steel & thermoplastic
Magnet	Ceramic
Trim	Stainless steel
Register Housing & Cover	Thermoplastic or bronze
Integral Strainer & Trim	Stainless steel

REGISTERS / ENCODERS

Standard—Sweep-Hand Registration

The standard register is a straight-reading, permanently sealed magnetic drive register. Dirt, moisture, tampering and lens fogging problems are eliminated. The register has a six-odometer wheel totalization display, 360° test circle with center sweep hand, and flow finder to detect leaks. Register gearing is made of self-lubricating engineered polymer, which minimizes friction and provides long life. The multi-position register simplifies meter installation and reading. The register capacity for the 1-1/2 in., 2 in., 3 in. and 4 in. meters is 100,000,000 gallons (10,000,000 ft³, 1,000,000 m³). The register capacity for the 6 in., 8 in., and 10 in. meters is 1,000,000,000 gallons (100,000,000 ft³, 10,000,000 m³). The high-flow register capacity for the 12 in. meter is 10,000,000,000 gallons (1,000,000,000 ft³, 10,000,000 m³).

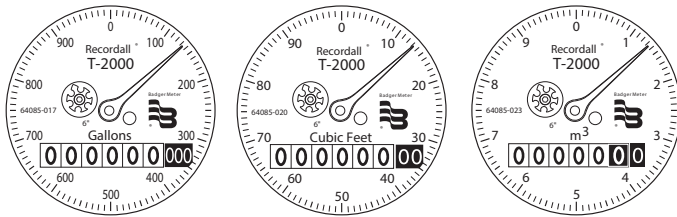
Registers for 1-1/2 in., 2 in., 3 in. and 4 in. Meters



Sweep Hand Revolution

Meter Model	Gallon	Cubic Feet	Cubic Meter
160	100	10	1
200	100	10	1
450	100	10	1
1000	100	10	1

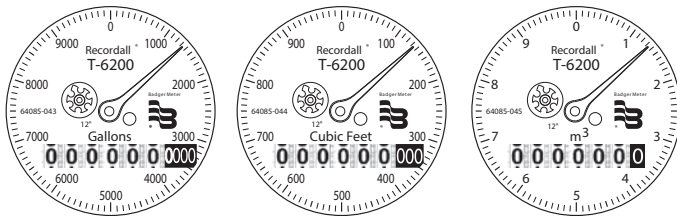
Registers for 6 in., 8 in. and 10 in. Meters



Sweep Hand Revolution

Meter Model	Gallon	Cubic Feet	Cubic Meter
2000	1000	100	10
3500	1000	100	10
5500	1000	100	10

Registers for 12 in. Meters



Sweep Hand Revolution

Meter Model	Gallon	Cubic Feet	Cubic Meter
6200	10000	1000	10

Optional—Encoders for AMR/AMI Reading Solutions

AMR/AMI solutions are available for all Recordall Disc Series meters. All reading options can be removed from the meter without disrupting water service. Badger Meter encoders provide years of reliable, accurate readings for a variety of applications and are also available pre-wired to Badger Meter approved AMR/AMI solutions. See details at www.badgermeter.com.

Recordall® Turbo Series Meters

PHYSICAL DIMENSIONS OF METERS WITHOUT STRAINER

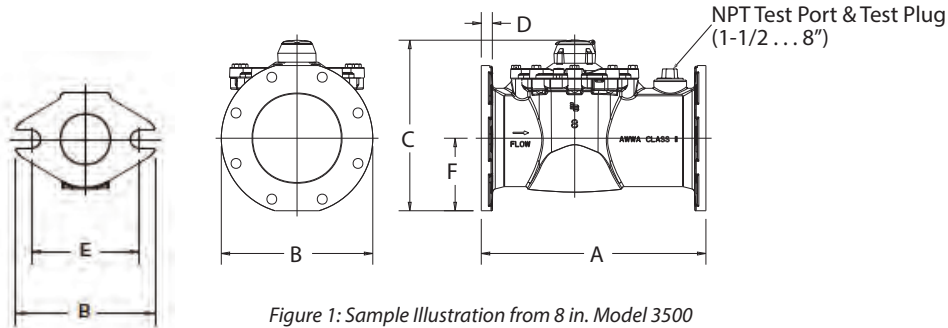


Figure 1: Sample Illustration from 8 in. Model 3500

Turbo Series Model	200	200	450	1000	2000	3500	5500	6200
Meter Flanges	2 in. Elliptical	2 in. Round	3 in. Round	4 in. Round	6 in. Round	8 in. Round	10 in. Round	12 in. Round
Meter & Pipe Size	2 in. (50 mm)	2 in. (50 mm)	3 in. (80 mm)	4 in. (100 mm)	6 in. (150 mm)	8 in. (200 mm)	10 in. (250 mm)	12 in. (300 mm)
Net Weight	14.9 lb (6.8 kg)	17.4 lb (7.9 kg)	31 lb (14.1 kg)	40 lb (18.1 kg)	77 lb (35 kg)	123 lb (55.7 kg)	210 lb (95.3 kg)	262 lb (118.8 kg)
Shipping Weight	16.4 lb (7.4 kg)	18.9 lb (8.6 kg)	34 lb (15.4 kg)	45 lb (20.4 kg)	89 lb (40.4 kg)	147 lb (66.6 kg)	235 lb (106.6 kg)	286 lb (129.7 kg)
Qty. of Bolts	2	4	4	8	8	8	12	12
NPT Test Port (optional)	1-1/2 in. (40 mm)	1-1/2 in. (40 mm)	2 in. (50 mm)	2 in. (50 mm)	2 in. (50 mm)	2 in. (50 mm)	—	—
Length (A)	10 in. (254 mm)	10 in. (254 mm)	12 in. (305 mm)	14 in. (356 mm)	18 in. (457 mm)	20 in. (508 mm)	26 in. (660.4 mm)	19-11/16 in. (500 mm)
Width (B)	5-27/32 in. (148 mm)	6 in. (152 mm)	7-1/2 in. (191 mm)	9 in. (229 mm)	11 in. (280 mm)	13-1/2 in. (343 mm)	16 in. (406.4 mm)	19 in. (482 mm)
Height (C)	6-1/2 in. (165 mm)	7-3/32 in. (180 mm)	8-11/16 in. (220 mm)	9-21/32 in. (245 mm)	13-5/16 in. (338 mm)	15-3/16 in. (385 mm)	17-15/32 in. (443 mm)	19-11/16 in. (500 mm)
Flange (D)	25/32 in. (20 mm)	5/8 in. (16 mm)	3/4 in. (19 mm)	13/16 in. (21 mm)	7/8 in. (22 mm)	1 in. (25 mm)	1-1/16 in. (27 mm)	1.26 in. (32 mm)
Bolt Circle (E)	4-1/2 in. (114 mm)	4-3/4 in. (121 mm)	6 in. (152 mm)	7-1/2 in. (191 mm)	9-1/2 in. (241 mm)	11-3/4 in. (298 mm)	14-1/4 in. (362 mm)	17 in. (432 mm)
Centerline (F)	2-1/16 in. (52 mm)	2-5/8 in. (67 mm)	3-11/32 in. (85 mm)	4-5/16 in. (109 mm)	5-1/4 in. (133 mm)	6-3/8 in. (162 mm)	7-7/8 in. (199.4 mm)	8-7/8 in. (226 mm)

PHYSICAL DIMENSIONS OF METERS WITH INTEGRAL STRAINER

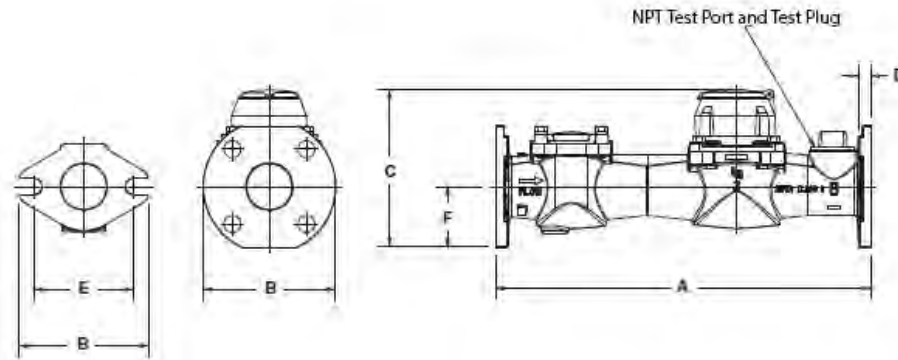


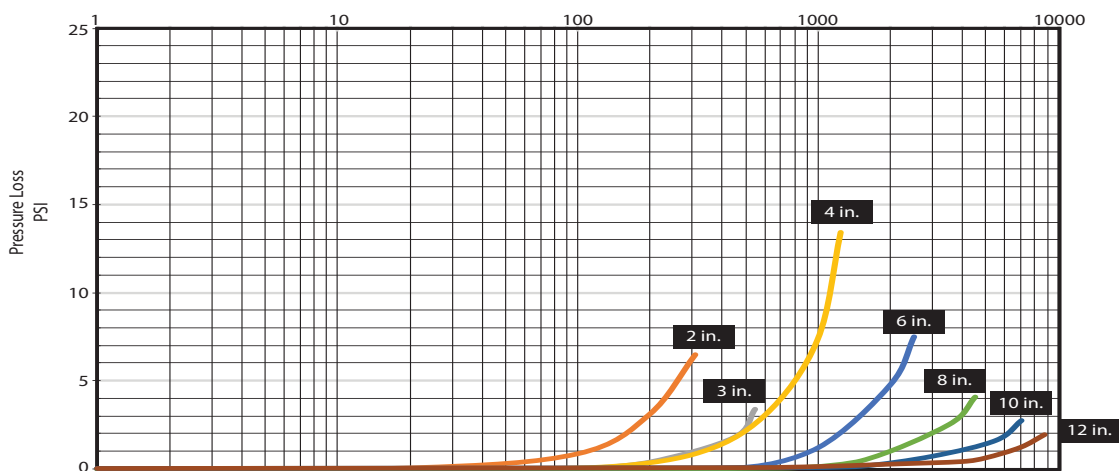
Figure 2: Physical dimensions

Turbo Series Model	160	200	200	450	1000
Meter Flanges	Elliptical	Elliptical	Round	Round	Round
Meter & Pipe Size	1-1/2 in. (40 mm)	2 in. (50 mm)	2 in. (50 mm)	3 in. (80 mm)	4 in. (100 mm)
Net Weight	14.3 lb (6.5 kg)	24 lb (11 kg)	26 lb (12 kg)	49 lb (22 kg)	60 lb (27.22 kg)
Shipping Weight	16.8 lb (7.6 kg)	28 lb (13 kg)	30 lb (14 kg)	55 lb (25 kg)	70 lb (31.75 kg)
Number of Bolts	2	2	4	4	8
NPT Test Port (Standard)	1 in. (25.4 mm)	1-1/2 in. (40 mm)	1-1/2 in. (40 mm)	2 in. (50 mm)	2 in. (50 mm)
Length (A)	13 in. (330 mm)	17 in. (432 mm)	17 in. (432 mm)	19 in. (483 mm)	23 in. (584 mm)
Width (B)	5-7/32 in. (133 mm)	5-27/32 in. (148 mm)	6 in. (152 mm)	7-1/2 in. (191 mm)	9 in. (229 mm)
Height (C)	6-9/32 in. (159 mm)	6-1/2 in. (165 mm)	7-3/32 in. (180 mm)	8-15/16 in. (227 mm)	9-21/32 in. (245 mm)
Flange (D)	51/64 in. (20 mm)	27/32 in. (47 mm)	5/8 in. (16 mm)	27/32 in. (21 mm)	13/16 in. (21 mm)
Bolt Circle (E)	4 in. (102 mm)	4-1/2 in. (114 mm)	4-3/4 in. (121 mm)	6 in. (152 mm)	7-1/2 in. (191 mm)
Centerline (F)	1-27/32 in. (47 mm)	2-1/16 in. (52 mm)	2-5/8 in. (67 mm)	3-19/32 in. (91 mm)	4-5/16 in. (109 mm)

Recordall® Turbo Series Meters

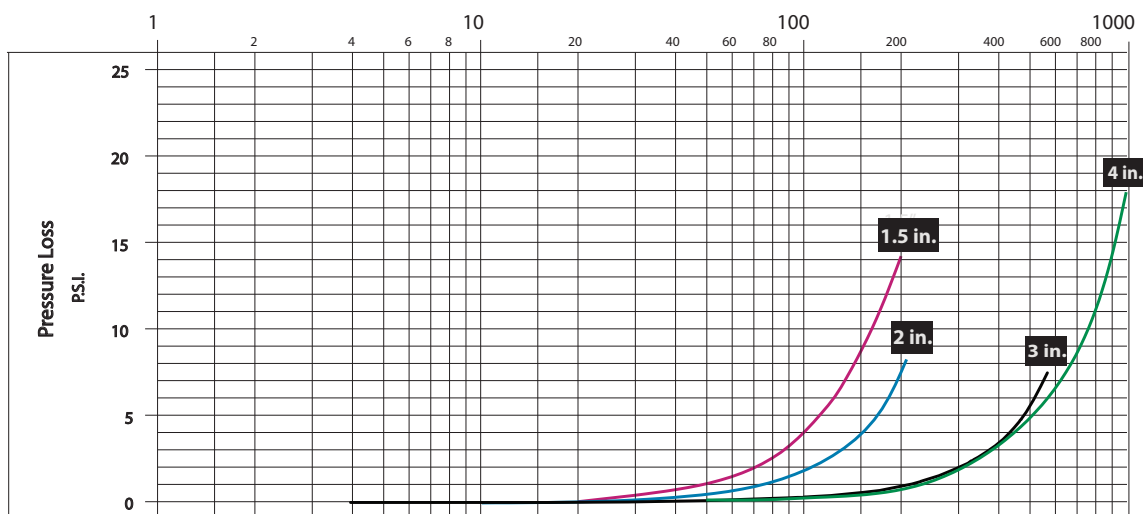
PRESSURE LOSS CHART FOR METERS WITHOUT STRAINER

Rate of flow in gallons per minute (gpm)



PRESSURE LOSS CHART FOR METERS WITH INTEGRAL STRAINER

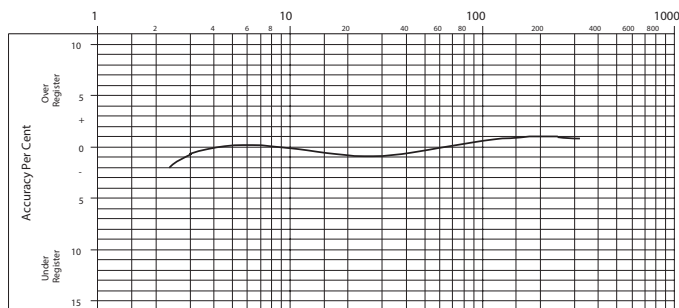
Rate of flow in gallons per minute (gpm)



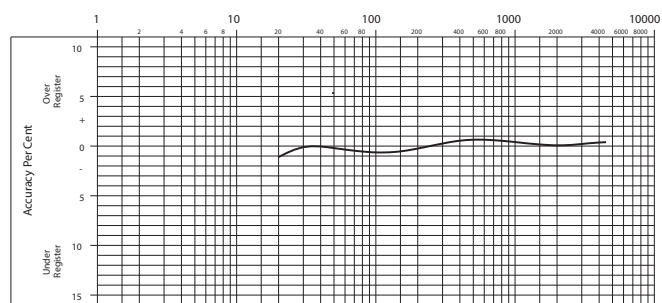
ACCURACY CHARTS FOR METERS WITHOUT STRAINER

Rate of flow in gallons per minute (gpm)

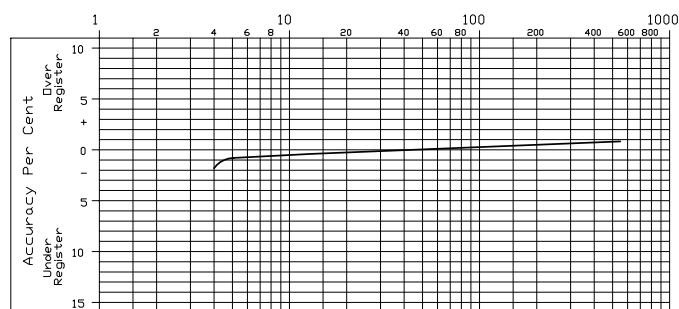
2 in. Meter



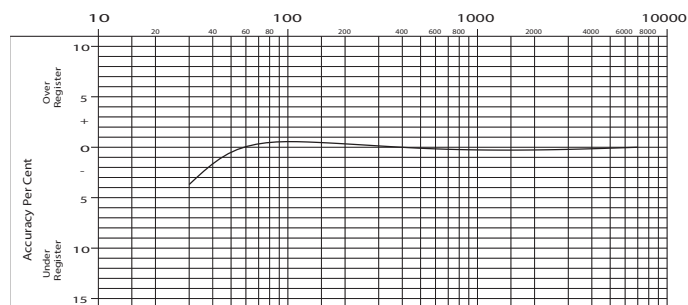
8 in. Meter



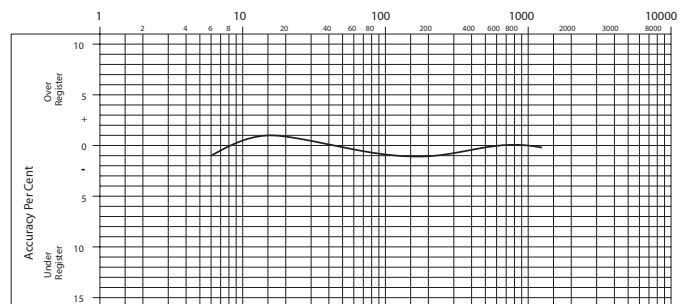
3 in. Meter



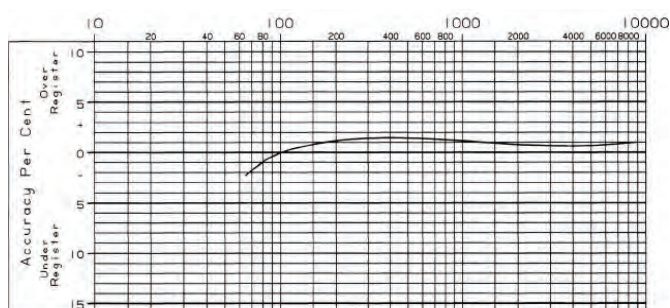
10 in. Meter



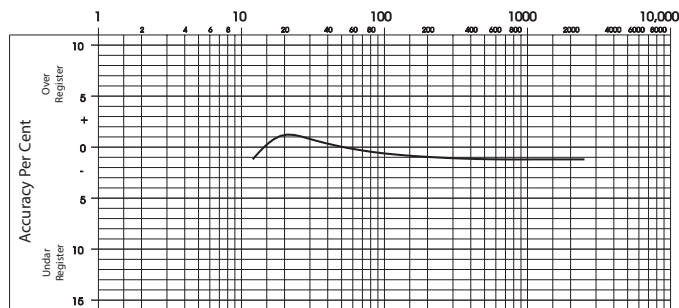
4 in. Meter



12 in. Meter



6 in. Meter

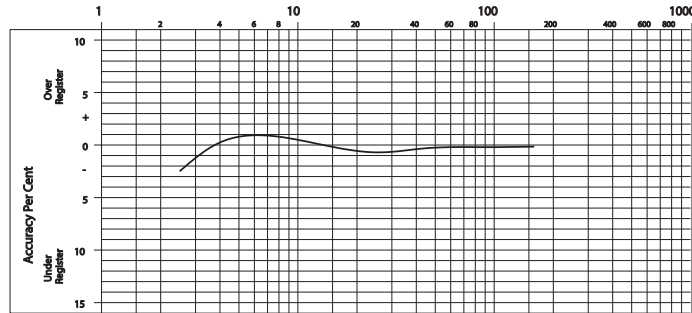


Recordall® Turbo Series Meters

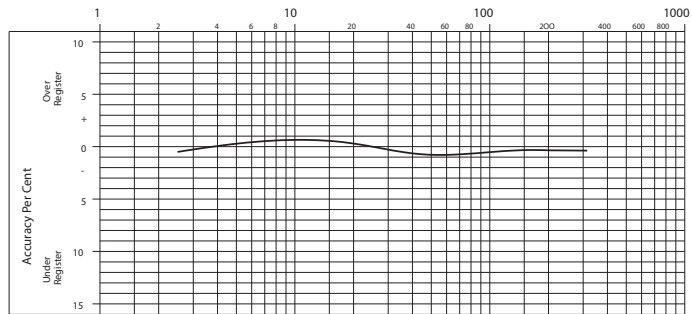
ACCURACY CHARTS FOR METERS WITH INTEGRAL STRAINER

Rate of flow in gallons per minute (gpm)

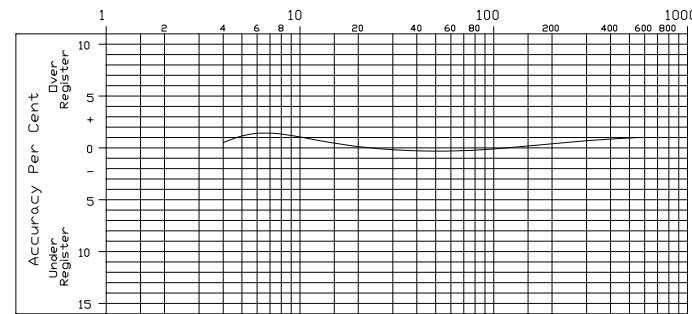
1-1/2 in. Meter



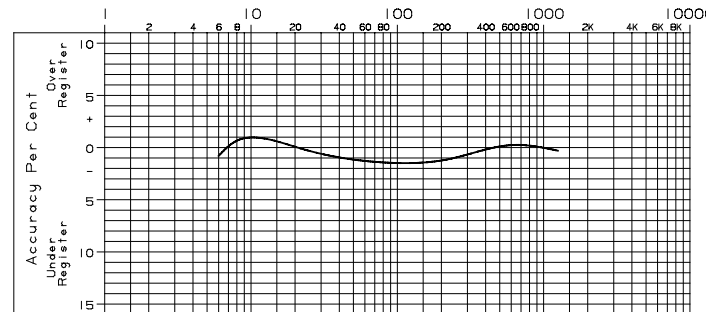
2 in. Meter



3 in. Meter



4 in. Meter



SMART WATER IS BADGER METER

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Recordall® Turbo Series Meter

Model 450 Fire Hydrant Meter, 3"

DESCRIPTION

The Badger Meter Model 450 fire hydrant meter is designed for use in measuring potable cold water from a fire hydrant or other non-permanent installation where flow is in one direction.

Operation

Water flows into the meter's measuring element where flow readings are obtained by rotor revolutions transmitted by magnetic drive coupling through the meter's cover plate to the sealed register. Magnetic drive is achieved by a right angle worm drive, coupling the rotor to the vertical transmission spindle. A ceramic magnet on the spindle rotates around the vertical axis. Through the magnetic coupling, rotor rotation is transmitted to a follower magnet which transmits rotation to the register gearing.

Operating Performance

The Model 450 fire hydrant meters meet or exceed registration accuracy for the low flow rate, normal operating flow rate, and maximum continuous operation flow rate as specifically stated in AWWA Standard C701.

Construction

The Model 450 fire hydrant meter construction consists of three basic components: meter housing, measuring element, and permanently sealed register. The housing is light-weight heat treated aluminum alloy, compact and easy to handle. The measuring element consists of the transmission coupling, measuring element insert, rotor, straightening vane, and calibration vane assembly. The straightening vanes minimize swirl from piping arrangements upstream.

Magnetic Drive

Direct magnetic drive, through the use of high-strength magnets, provides positive, reliable and dependable register coupling.

Restriction Plate

A permanent orifice, positioned in the outlet side of the meter housing, limits the maximum flow of water through the meter. This is provided to protect the measuring element from overspeeding when the meter discharges to atmosphere.

Sealed Register

The standard register consists of a straight-reading odometer-type totalization display, 360° test circle with center sweep hand and flow finder to detect leaks. Register gearing consists of self-lubricating thermoplastic gears to minimize friction and provide long life. Permanently sealed; dirt, moisture, tampering and lens fogging problems are eliminated. Multi-position register simplifies meter installation and reading.

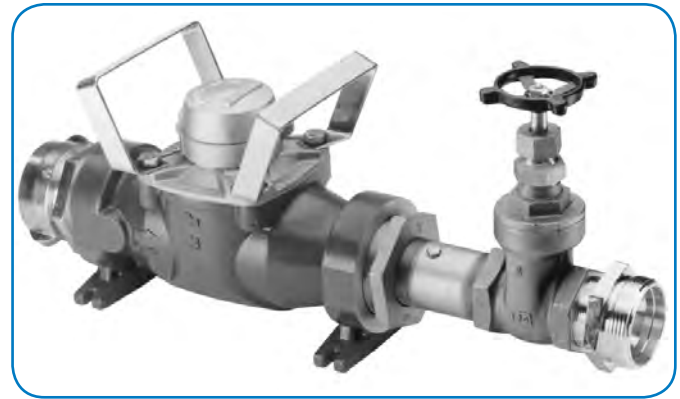
Tamper-Resistant Features

Removal of the register to obtain free water is prevented when the tamper detection seal wire screw or TORX® tamper-resistant seal screw is added to the meter. A tamper-resistant calibration plug seal provides protection from unauthorized personnel use.

Strainer

A compression fit double layer stainless steel strainer is installed in the inlet housing tube. The strainer insures optimum long-term field performance.

RTS-DS-00546-EN-02 (November 2013)



Maintenance

The Model 450 fire hydrant meters are designed and manufactured to provide long-term service with minimal maintenance. When maintenance is required, it can be performed easily either at the meter installation or at any other convenient location. As an alternative to repair by the utility, Badger Meter offers various maintenance and meter component exchange programs to fit the needs of the utility.

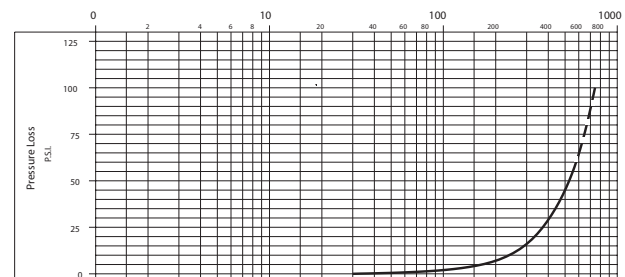
Hose Couplings

The meter is available with standard (2-1/2" – 7-1/2 NST) fire hose swivel couplings, unless otherwise specified. Complete thread specifications (listed on the back page of this document) must be furnished for special fire hose fittings.

Options: 2" or 2-1/2" gate valve, check valve.

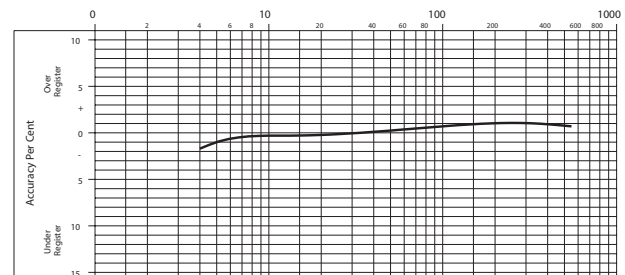
Pressure Loss Chart

Rate of flow in gallons per minute (gpm)



Accuracy Chart

Rate of flow in gallons per minute (gpm)



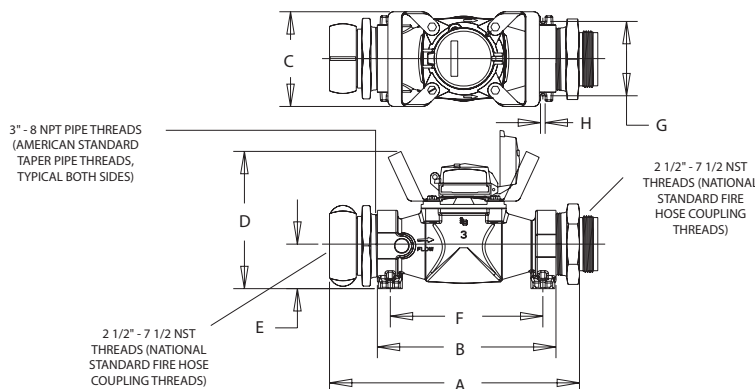
SPECIFICATIONS

Typical Operating Range (100%±1.5%)	5...660 gpm (1.1...150 m ³ /hr)
Maximum Continuous Flow	500 gpm (102 m ³ /hr)
Maximum Intermittant Flow	660 gpm (150 m ³ /hr)
Typical Low Flow (Min. 95%)	4 gpm (0.9 m ³ /hr)
Pressure Loss at Max. Continuous Operation	37 psi @ 450 gpm (2.55 bar @ 102 m ³ /hr) (standard couplings with orifice and screen) Note: 27 psi @ 350 gpm
Maximum Operating Pressure	150 psi (10 bar)
Standard Hose Coupling	2-1/2" - 7-1/2 NST threads (78P - 3.4 mm) (National standard fire hose coupling thread)
Register	Straight-reading, permanently sealed magnetic drive standard.
Registration	100,000,000 gallons; 100 gallons/sweep hand revolution. 10,000,000 cubic feet; 10 cubic ft/sweep hand revolution. 1,000,000 m ³ ; 1 m ³ /sweep hand revolution.
Flow Restriction (Orifice)	Limits flow through the meter to 660 gpm @ 85 psi (150 m ³ /hr @ 59 bar) system pressure with standard couplings.

Materials

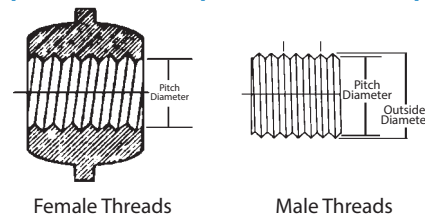
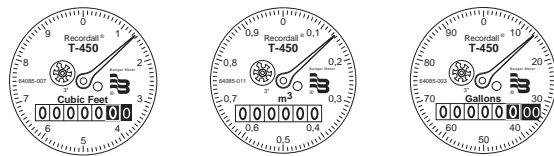
Housing	Heat treated aluminum alloy
Nose Cone and Straightening Vanes	Thermoplastic
Rotor	Thermoplastic
Rotor Radial Bearings	Lubricated thermoplastic
Rotor Thrust Bearings	Sapphire jewels
Rotor Bearing Pivots	Passivated 316 stainless steel
Calibration Mechanism	Stainless steel and thermoplastic
Magnet	Ceramic
Register Cover	Bronze
Options	2" gate valve, 2-1/2" gate valve, 2" check valve, bronze
Trim	Stainless steel
Inlet Screen	Stainless steel with Elastomer

DIMENSIONS



Meter & Pipe Size	Length		Width C	Height D	Ctrline E	F	G	H	Net Weight			Shipping Weight		
	w/coupl. A	w/o coupl. B							w/o Fittings	w/Fittings	w/Valve	w/o Fittings	w/Fittings	w/Valve
3" (DN 80)	17" (432 mm)	12" (305 mm)	6-3/8" (162 mm)	9.0" (229 mm)	2-15/16" (73 mm)	10-1/4" (260 mm)	5" (127 mm)	11/32" (9 mm)	14.2 lb (6.44 kg)	20.6 lb (9.34 kg)	31.6 lb (14.33 kg)	17.2 lb (7.80 kg)	23.6 lb (10.7 kg)	34.6 lb (15.7 kg)

Specifications for Special Fire Hose Coupling Threads



Required Information

- Number of threads per inch and thread form, if other than American National Standard.
- Outside diameter of male threads.
- Pitch diameter of male threads.
- Pitch diameter of female threads.

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Legacy Document Number: RTS-T-3FH-EN



Badger Meter

Recordall® Disc and Turbo Series Meters for Reclaimed Water

Sizes 5/8...12" (DN 15...300 mm)

Applications

For use in measurement of cold water in reclaimed water distribution systems. Meters are available for residential, commercial and industrial services where flow is in one direction only.

The meter and its internal components are for use in the measurement of non-potable water only. Caution must be exercised not to mingle non-potable and potable water meters and especially their internal components.

Utility Impacts

Utilities faced with rising water costs and limited water resources are developing non-potable, reclaimed water distribution systems. Accurate, dependable metering is needed to bill customers for these alternate supplies.

Special coloring and markings are designed to distinguish potable water meters from reclaimed water meters in accordance with current industry standards. The utility must develop appropriate operational procedures to ensure that potable water meters and reclaimed water meters and their internal components are not mingled.

Warranty

Due to the lack of a uniform definition of the composition of reclaimed water, the warranties associated with reclaimed water meters are different than the potable water Recordall meter line. Please review the warranty statement for this important difference.

Specifications

5/8...2" Recordall Disc Series Meters

1-1/2...12" Recordall Turbo Series Meters

For meter specifications for each Recordall size and type meter, see the Product Data Sheet for that specific meter.

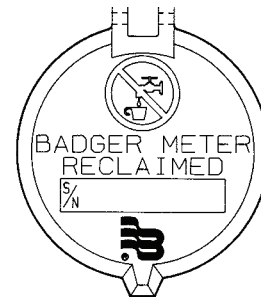
Thermoplastic shroud and lid only.

Special Markings

Local register	Lavender lid and shroud, "RECLAIMED" on dial face & non-potable water symbol on register lid
HR-E & HR-E LCD encoders	Lavender lid
Chamber assembly	Has designation for non-potable water only
Meter housings	"RCLM" etched on housings, bronze covers and bottoms
Cast iron bottoms (5/8...1" disc meters)	Lavender

Register Type

The Reclaimed water meter line supports the same types of registration and reading systems as the potable meter line.



Meter with local register

Recordall® Disc and Turbo Series Meters

Making Water Visible®

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Legacy Document Number: RR-T-02



Badger Meter

IR Communication Device

The IR Communication Device (**68891-001**) can be used with ORION® Cellular (LTE-M, LTE-MS, LTE, INTL) endpoints and E-Series® Ultrasonic 3 and 4 inch meters. See general information about the device below. See the other side of this document for instructions.

HOW TO USE

1. Point the device toward the endpoint/meter IR communication port as shown in [Figure 1](#). **Range: 1/2 to 3 inches**
2. Press a numbered button to activate. See instructions on [page 2](#).

LED Indicator

- Solid **green** LED = success
- Blinking **green** LED = in process
- Blinking **red** LED = fail, error

When activated, the LED indicators next to the numbered buttons light up for 10 seconds. Another command can be issued at any time, which will clear the last command.

Point this end toward the IR communication port of the meter or endpoint



Micro USB port for downloading files

Figure 1: IR Communication Device

Optional Tools

- **ORION Cellular Endpoint IR Alignment Tool (68779-091)** is recommended for use with ORION endpoints. Available from Badger Meter.
- **E-Series Ultrasonic Meter IR Alignment Tool (68877-001)** is recommended for use with E-Series meters. Available from Badger Meter.
- Small (#1) Phillips screwdriver (customer supplied) to remove device back and replace CR2450 3V lithium coin battery.
- Micro B USB cable (customer supplied) to connect IR Communication Device to a computing device for file download or IR communications.

Go to <https://youtu.be/IY4o4apKpql> or scan the QR code to see a short tutorial about using the IR Communication Device with the ORION Cellular Endpoint.



About the IR Communication Device

- Has micro USB port for extracting data files ([Figure 1](#)). Requires micro B USB cable to download files.
- Not rechargeable. Uses replaceable CR2450 3V lithium coin battery. Remove back of device to replace.
- Functions with Windows®10 devices.
 - USB IR passthrough COM device: Functions the same as IR programming cable when micro B USB cord is attached.
 - USB storage: Stores log files from network sessions. Use micro USB port to extract files. Requires micro B USB cable to download files.

NOTE: Network logs are stored on the device and must be periodically downloaded/cleared via the micro USB port.

IR Communication Device

ORION® CELLULAR LTE ENDPOINTS (LTE-M, LTE-MS, LTE, INTL)

NOTE: IR Communication Devices shipped prior to January 15, 2019 require a firmware update to support use with ORION Cellular LTE-M endpoints. Contact BMI Technical Support (800-616-3837) or your National Meter Field Support Team Rep.

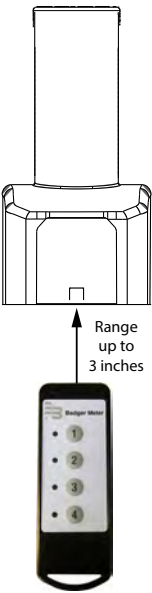
	Button	Press Length	Command	Operation
	1	SHORT*		Start/Active/Run
LONG**			n/a	n/a
2	SHORT*		Pause	One SHORT press will PAUSE the endpoint radio signal.
	LONG**		Stop/Sleep	One LONG press will STOP the endpoint radio signal.
3	SHORT*		Force Encoder Read	One SHORT press checks status of the attached encoder. If error occurs (red blinking), press/release again after initial process is complete.
	LONG**		n/a	n/a
4	SHORT*		Run Network Session	One SHORT press forces endpoint to run a network session. Network session generates a log file: ICD_SerialNumber_n.log. If error occurs (red blinking), press/release again after initial process is complete.
	LONG**		n/a	n/a

Figure 2: Using device with ORION endpoint

E-SERIES® ULTRASONIC METERS

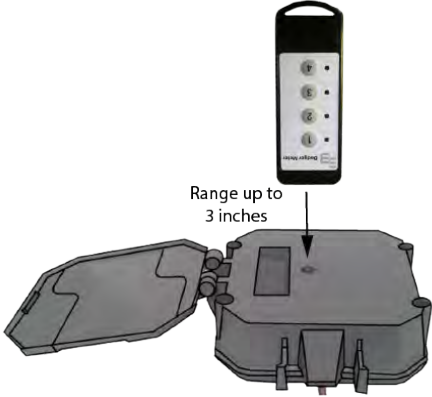
	Button	Press Length	Command	Operation
	1	SHORT*		Start/Active/Run
LONG**			Storage	One LONG press sets the meter into STORAGE mode.
2	SHORT*		Clear All Alarms	One SHORT press clears all alarms set for meter. Alarm icons displayed on the meter LCD are removed and replaced with the OK symbol.
	LONG**		Download Data Profile	One LONG press extracts the full data profile of meter and writes a log file.
3	SHORT*		Display Next Screen	One SHORT press displays the next available information screen on the meter LCD.
	LONG**		Display Standard Totalizer	One LONG press displays the information screen that contains the standard totalizer on the meter LCD.
4	SHORT*		None	n/a
	LONG**		None	n/a

Figure 3: Using device with E-Series Ultrasonic meter

* **SHORT** = Press and release ** **LONG** = Press and hold for (at least) 5 seconds

SMART WATER IS BADGER METER

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www.badgermeter.com

The following Terms & Conditions apply to the BEACON® Advanced Metering Analytics (AMA) Solution, composed of BEACON AMA Software as a Service (SaaS) and ORION® Network as a Service (NaaS) with ORION Cellular endpoints sold by Badger Meter, Inc. (“Badger Meter”) or one of its authorized distributors to a utility or non-utility customer (“Customer”) and are in addition to those found at <https://www.badgermeter.com/certifications-legal/> and as appropriate, the BEACON General Agreement and/or BEACON Master Agreement executed by Customer.

ONE-TIME FEES

BEACON ENGAGEMENT FEE

A one-time BEACON AMA Engagement Fee, invoiced by Badger Meter or one of its authorized distributors, is required for all deployments of the BEACON AMA Solution with ORION NaaS. This fee includes setup and activation of Customer’s BEACON AMA portfolio. Billing Integration professional services are separate and an additional fee. Fees charged to a Customer by its utility billing vendor for an interface file are separate and are the responsibility of the Customer.

SERVICE UNITS

Recurring service fees are based on asset type and assessed monthly (“Service Units”). Asset types are identified by unique Service Unit part numbers as represented in this section. Service Units will be invoiced by Badger Meter or one of its authorized distributors.

ORION NaaS SUBSCRIPTION FEE SERVICE UNITS

Customers deploying a BEACON AMA Solution with ORION NaaS will be assessed NaaS Subscription Fee Service Units, which include Customer’s license and access to the BEACON AMA software, software updates, hosting of Customer’s metering data, and technical support. NaaS Subscription Fee Service Units (68886-101, 68886-104 and 68886-201) will be assessed monthly, per eligible ORION NaaS endpoint in Customer’s BEACON AMA portfolio. Such an endpoint will consume one or more Service Units each month, based on data interval and call-in frequency, and will be assessed on the 26th of each month. Service Units will be consumed for endpoints that have been activated or are more than six months past their original manufacturer ship date. Service Unit price may vary if purchase increment is changed.

FIXED NETWORK GATEWAY TRANSCEIVERS (if applicable)

Supply, installation, backhaul communication and maintenance of ORION® fixed network gateway transceivers deployed as part of a NaaS solution are included in the NaaS endpoint pricing and monthly subscription fee Service Units.

EyeOnWater® CONSUMER ENGAGEMENT

An EyeOnWater® License is included in the BEACON AMA Solution with ORION NaaS. The license includes software licensing, setup and activation of EyeOnWater consumer engagement module for NaaS accounts in Customer’s BEACON AMA portfolio. The Customer is required to have appropriate data fields provided from billing software to support EyeOnWater. Fees charged to a Customer by its utility billing vendor for interface file are separate and are the responsibility of the Customer.

SERVICE UNIT PRICING AND PAYMENT

Customer will be required to submit a PO to Badger Meter or one of its authorized distributors for applicable Service Units. Initial Service Unit pricing will be held for the first 36-month term at quoted purchase increment, then subject to change thereafter.

Service Units may be purchased in Customer-defined increments except where minimum multiple purchase increments have been stated. Reorder increments will be established at time of initial purchase and may be modified at a later date. Service Unit price may vary if purchase increment is changed.

Service Unit pricing is Net to Customer and will be invoiced by Badger Meter or one of its authorized distributors based on Customer-defined Service Unit purchase increments or minimum multiple purchase increments as noted. Service Unit part numbers are denoted as 68886 and have been included in this document for cross reference with Customer pricing proposal.

Service Units will be consumed on a monthly basis, as applicable to each asset type.

Service Units are non-refundable and non-transferable to another entity without Badger Meter approval.

Service Units may be converted to like-valued, or higher, Service Units of a different asset type with Badger Meter approval.

Service Units expire ten (10) years from date of purchase. Expired Service Units will be forfeited unless converted prior to expiration.

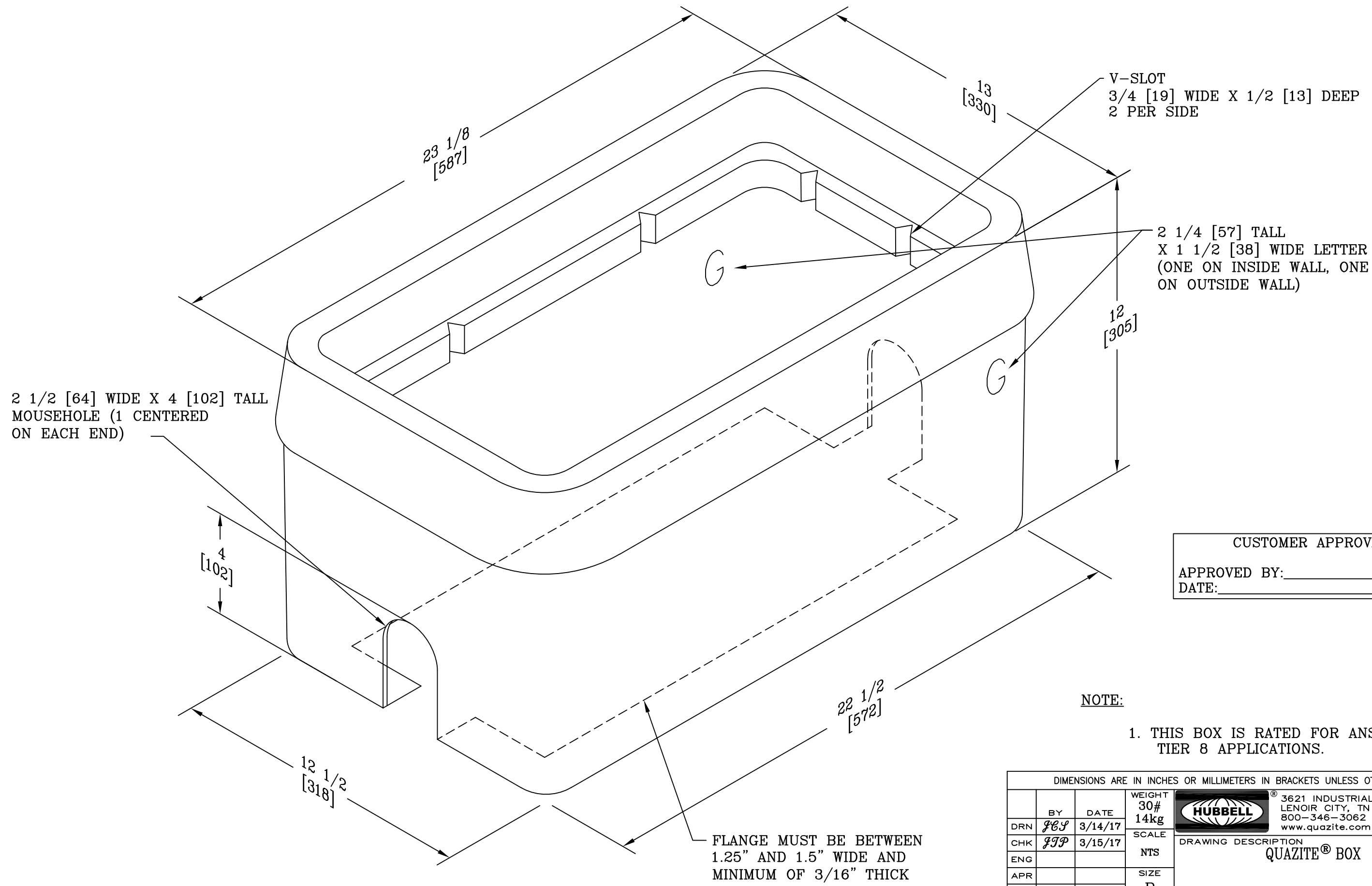
Upon termination of a Customer's BEACON AMA services, for whatever cause, unused Service Units will be forfeited if not converted to Badger Meter future purchase credit within ninety (90) days.

Failure to renew services at term expiration, or pay for services invoiced by Badger Meter or one of its authorized distributors, may result in termination of services and limited access to Customer's BEACON AMA portfolio at the discretion of Badger Meter.

Once deactivated by the network carrier, ORION Cellular endpoints cannot be reactivated.


REPLACEMENT OF ENDPOINTS UNDER NETWORK GUARANTEE

The following applies only to endpoints replaced under the network guarantee described in the ORION Cellular LTE-M, LTE-MS and LTE Endpoints warranty document (ORI-WR-02596-EN), BEACON AMA Managed Solution with ORION Cellular CDMA N and Fixed Network (SE) Water Endpoints warranty document (BEA-WR-02097-EN), or with ORION Cellular CDMA and Fixed Network (SE) Water Endpoints warranty document (BEA-WR-00719-EN). For those endpoints replaced under the network guarantee, the Customer shall be responsible for fees related to communication, including the most recently published replacement endpoint activation fee to initiate endpoint communication, and a minimum of 60 Service Units per replacement endpoint, 12 per year for five (5) years. Purchase fees for a minimum of 12 Service Units per endpoint will be billed at the time replacement endpoints are shipped, and will thereafter be billed annually in 12-unit increments at a minimum per endpoint.

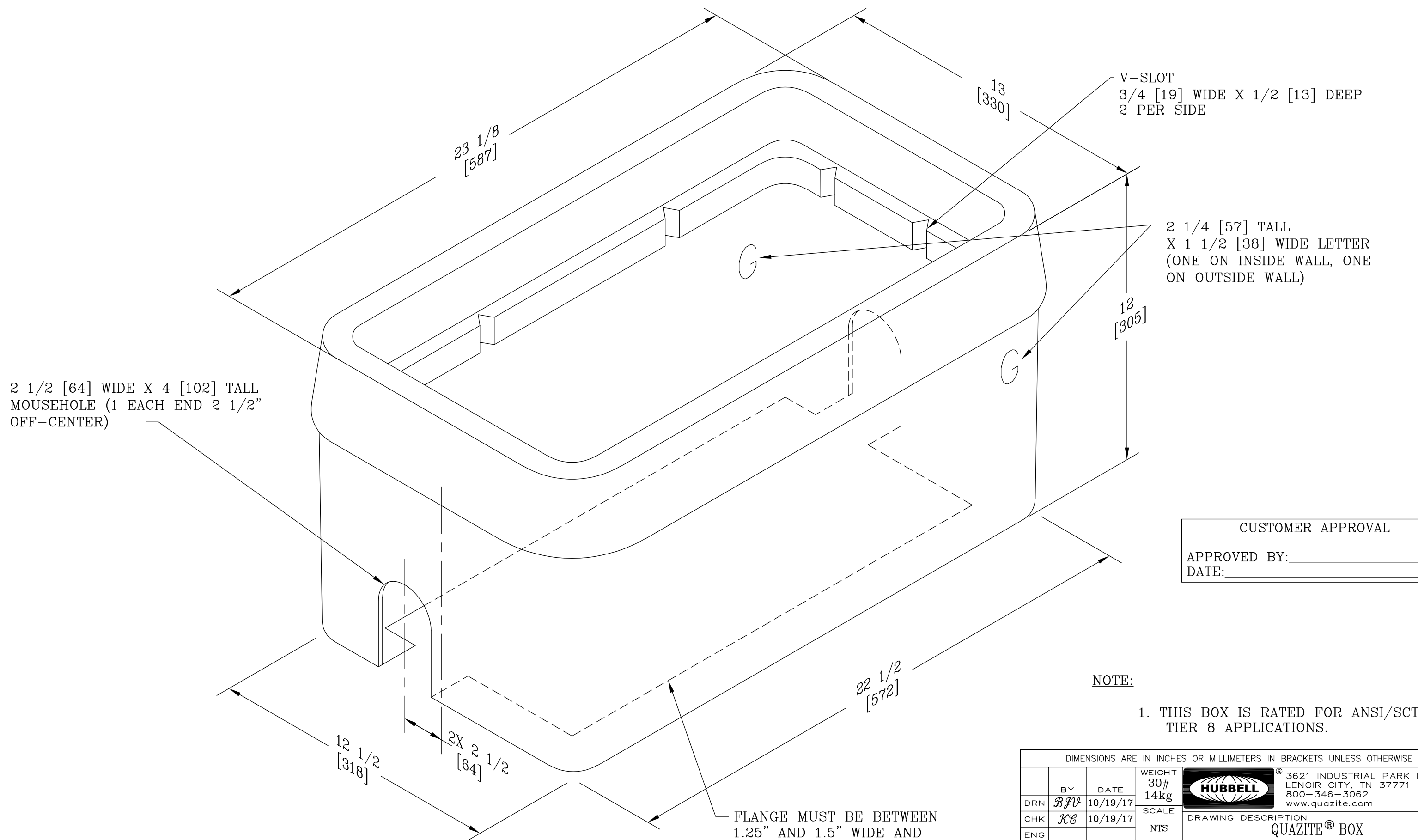


CUSTOMER APPROVAL
 APPROVED BY: _____
 DATE: _____

NOTE:
 1. THIS BOX IS RATED FOR ANSI/SCTE 77 TIER 8 APPLICATIONS.

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.					
DRN	BY	DATE	WEIGHT	 3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	LOC
CHK	ENG	APR	30# 14kg		LC
APR	APR	ESR OR PROJECT NUMBER	SCALE	DRAWING DESCRIPTION	REV
		116922	NTS		QUAZITE® BOX
			SIZE		7/19
			B		
DRAWING NUMBER			SHEET 1 OF 1		DRAWING NUMBER
B031121502-G					B031121502-G

FLANGE MUST BE BETWEEN 1.25" AND 1.5" WIDE AND MINIMUM OF 3/16" THICK



CUSTOMER APPROVAL

APPROVED BY: _____

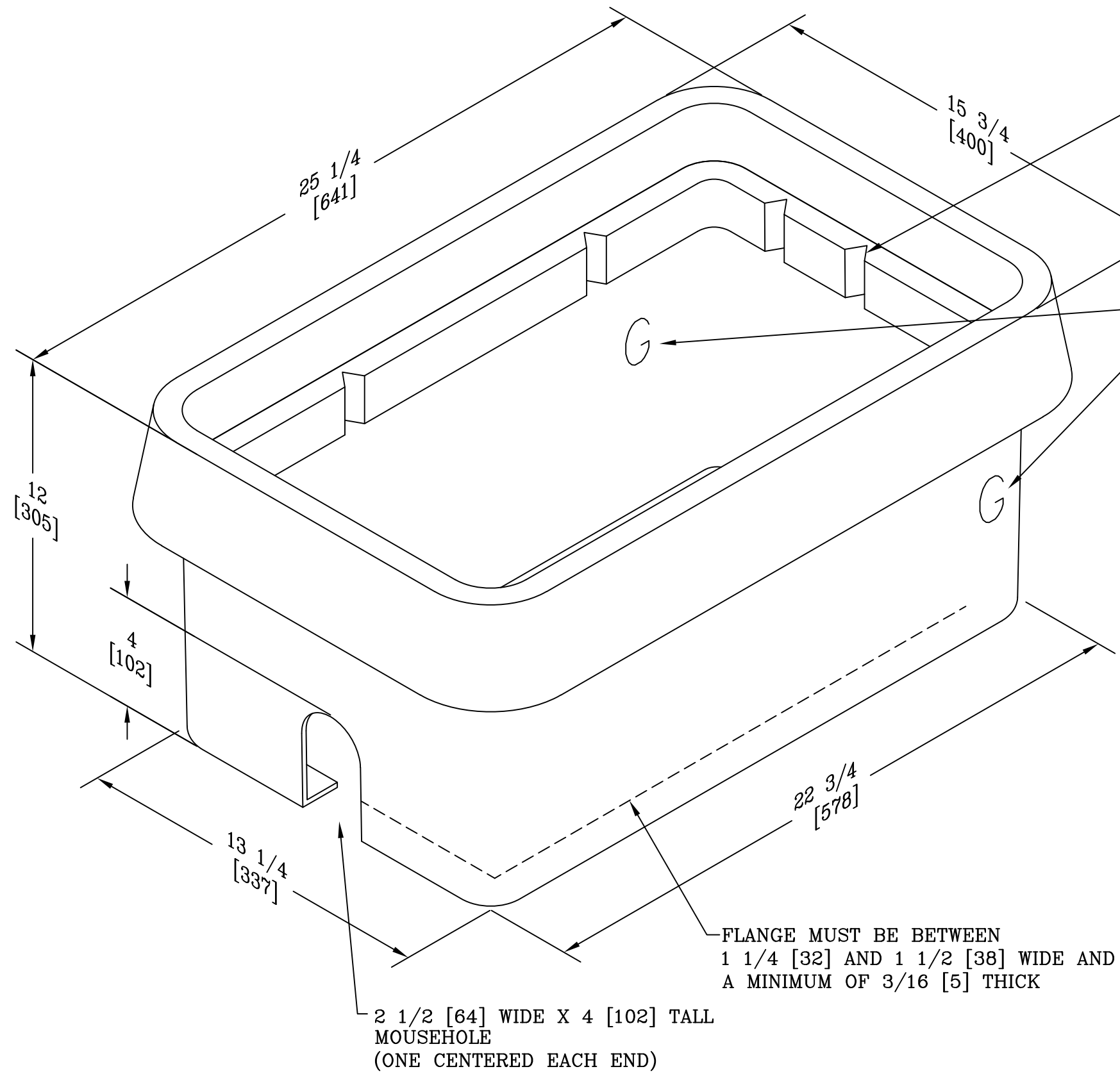
DATE: _____

NOTE:

1. THIS BOX IS RATED FOR ANSI/SCTE 77 TIER 8 APPLICATIONS.

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.					
	BY	DATE	WEIGHT 30# 14kg		3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com
DRN	<i>BFV</i>	10/19/17	SCALE	DRAWING DESCRIPTION QUAZITE® BOX	LOC
CHK	<i>KC</i>	10/19/17	NTS		LC
ENG			SIZE		S
APR			B		REV
APR					C
PROJECT NUMBER 116922			DRAWING NUMBER B031121503-G		7/19
				SHEET 1 OF 1	

FLANGE MUST BE BETWEEN 1.25" AND 1.5" WIDE AND MINIMUM OF 3/16" THICK




V-SLOT
 3/4 [19] DEEP X 1/2 [13] WIDE
 2 PER SIDE

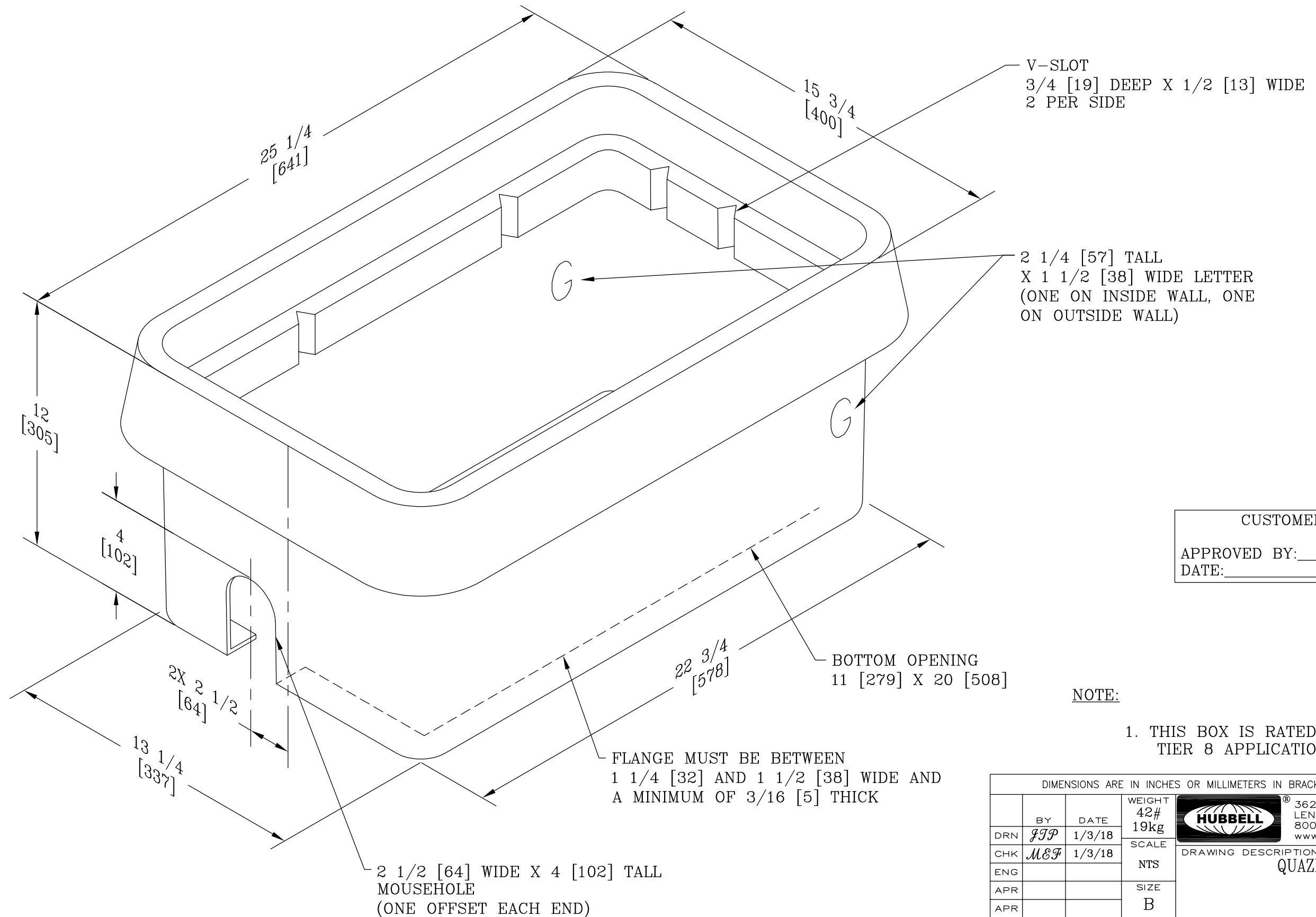
2 1/4 [57] TALL
 X 1 1/2 [38] WIDE LETTER
 (ONE ON INSIDE WALL,
 ONE ON OUTSIDE WALL)

CUSTOMER APPROVAL
 APPROVED BY: _____
 DATE: _____

NOTE:

1. THIS BOX IS RATED FOR ANSI/SCTE 77 TIER 8 APPLICATIONS.

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.					
DRN	BY	DATE	WEIGHT	 3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	LOC
CHK	ENG	APR	APR		LC
			SCALE	DRAWING DESCRIPTION	REV
			NTS		QUAZITE® BOX
			SIZE		7/19
			B		
ESR OR PROJECT NUMBER			DRAWING NUMBER		
116922			B031324507-G		
SHEET 1 OF 1					




V-SLOT
 3/4 [19] DEEP X 1/2 [13] WIDE
 2 PER SIDE

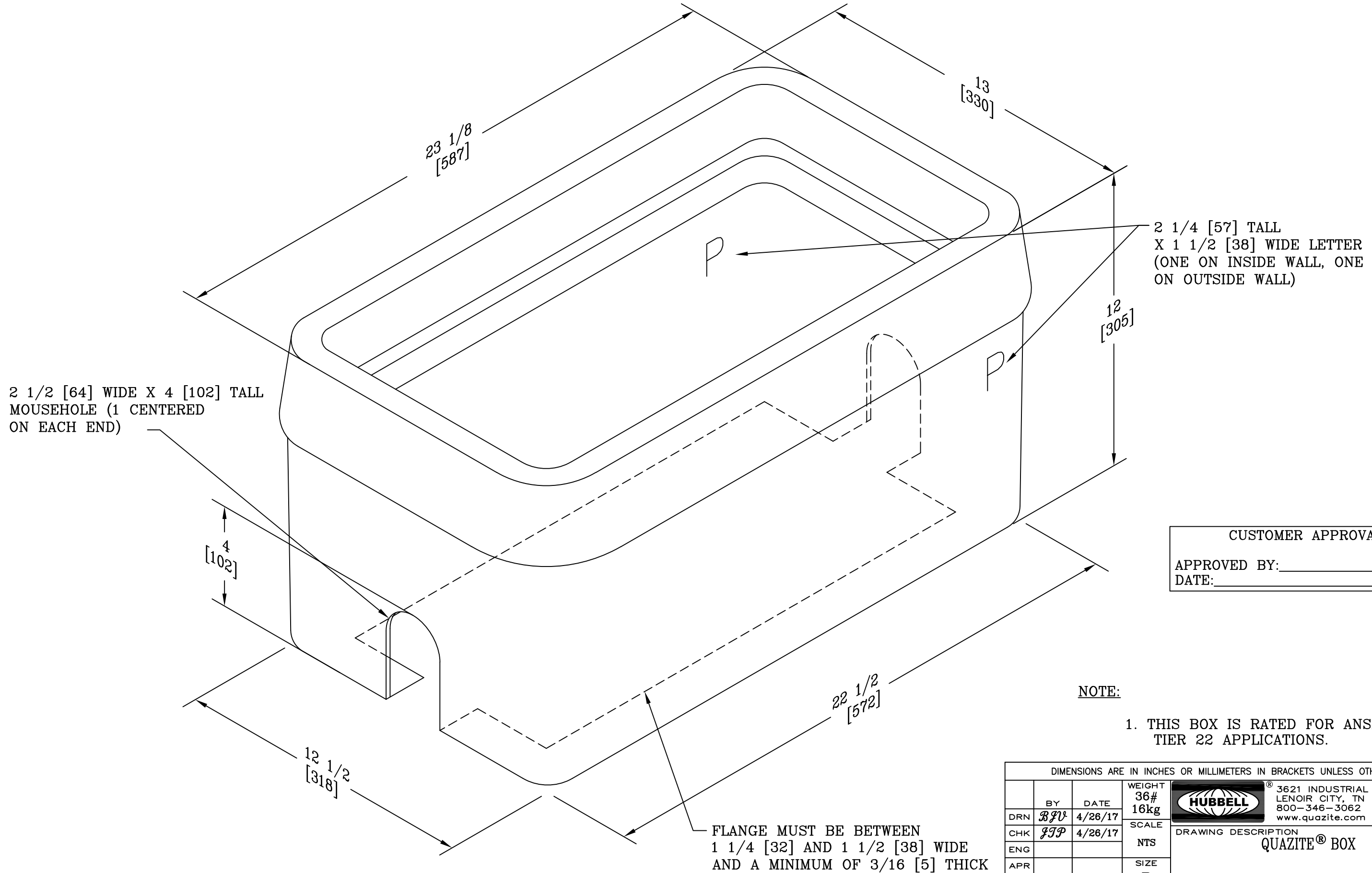
2 1/4 [57] TALL
 X 1 1/2 [38] WIDE LETTER
 (ONE ON INSIDE WALL, ONE
 ON OUTSIDE WALL)

CUSTOMER APPROVAL
 APPROVED BY: _____
 DATE: _____

NOTE:


1. THIS BOX IS RATED FOR ANSI/SCTE 77
 TIER 8 APPLICATIONS.

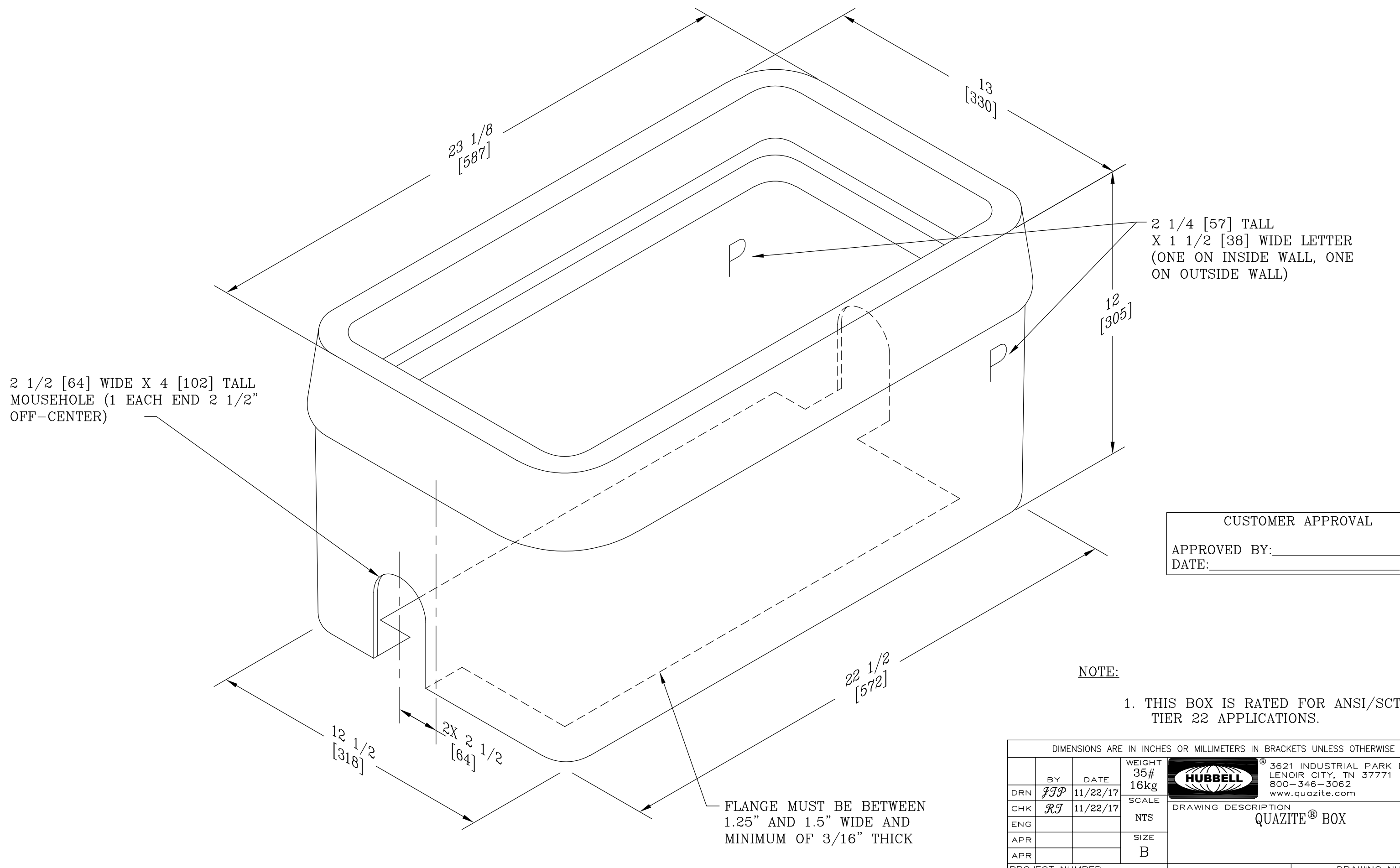
DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.					
DRN	BY	DATE	WEIGHT	 3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	LOC
CHK	MEF	1/3/18	42# 19kg		LC
ENG			SCALE		REV
APR			NTS		C
APR			SIZE		7/19
PROJECT NUMBER			DRAWING DESCRIPTION		
119765			QUAZITE® BOX		
SHEET 1 OF 1			DRAWING NUMBER		
			B031324508-G		



CUSTOMER APPROVAL
 APPROVED BY: _____
 DATE: _____

NOTE:
 1. THIS BOX IS RATED FOR ANSI/SCTE 77 TIER 22 APPLICATIONS.


DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.						
DRN	BY	DATE	WEIGHT		3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	LOC
CHK	ENG	APR	36# 16kg			LC
APR	APR	ESR OR PROJECT NUMBER	SCALE	DRAWING DESCRIPTION QUAZITE® BOX		REV
		117576	NTS			C
			SIZE	DRAWING NUMBER B061121500-P		7/19
			B			SHEET 1 OF 1



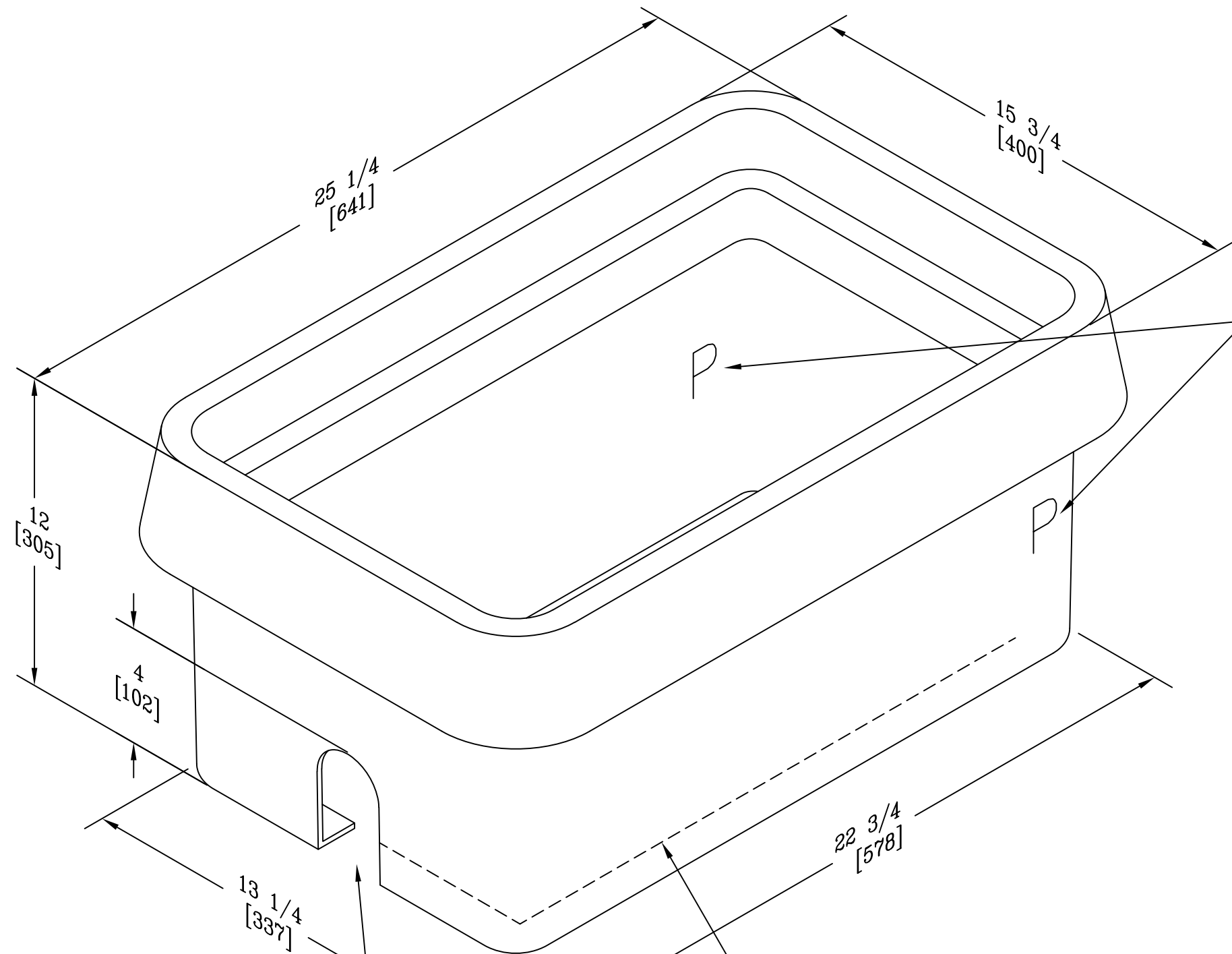
CUSTOMER APPROVAL
 APPROVED BY: _____
 DATE: _____

NOTE:

- 1. THIS BOX IS RATED FOR ANSI/SCTE 77 TIER 22 APPLICATIONS.

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.					
	BY	DATE	WEIGHT	 3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	LOC
DRN	JJP	11/22/17	35#		LC
CHK	RJ	11/22/17	16kg		S
ENG			SCALE		REV
APR			NTS		B
APR			SIZE		7/19
PROJECT NUMBER			DRAWING DESCRIPTION		
119549			QUAZITE® BOX		
SHEET 1 OF 1			DRAWING NUMBER		
			B061121503-P		

FLANGE MUST BE BETWEEN 1.25" AND 1.5" WIDE AND MINIMUM OF 3/16" THICK



2 1/4 [57] TALL
 X 1 1/2 [38] WIDE LETTER
 (ONE ON INSIDE WALL, ONE
 ON OUTSIDE WALL)


CUSTOMER APPROVAL
 APPROVED BY: _____
 DATE: _____

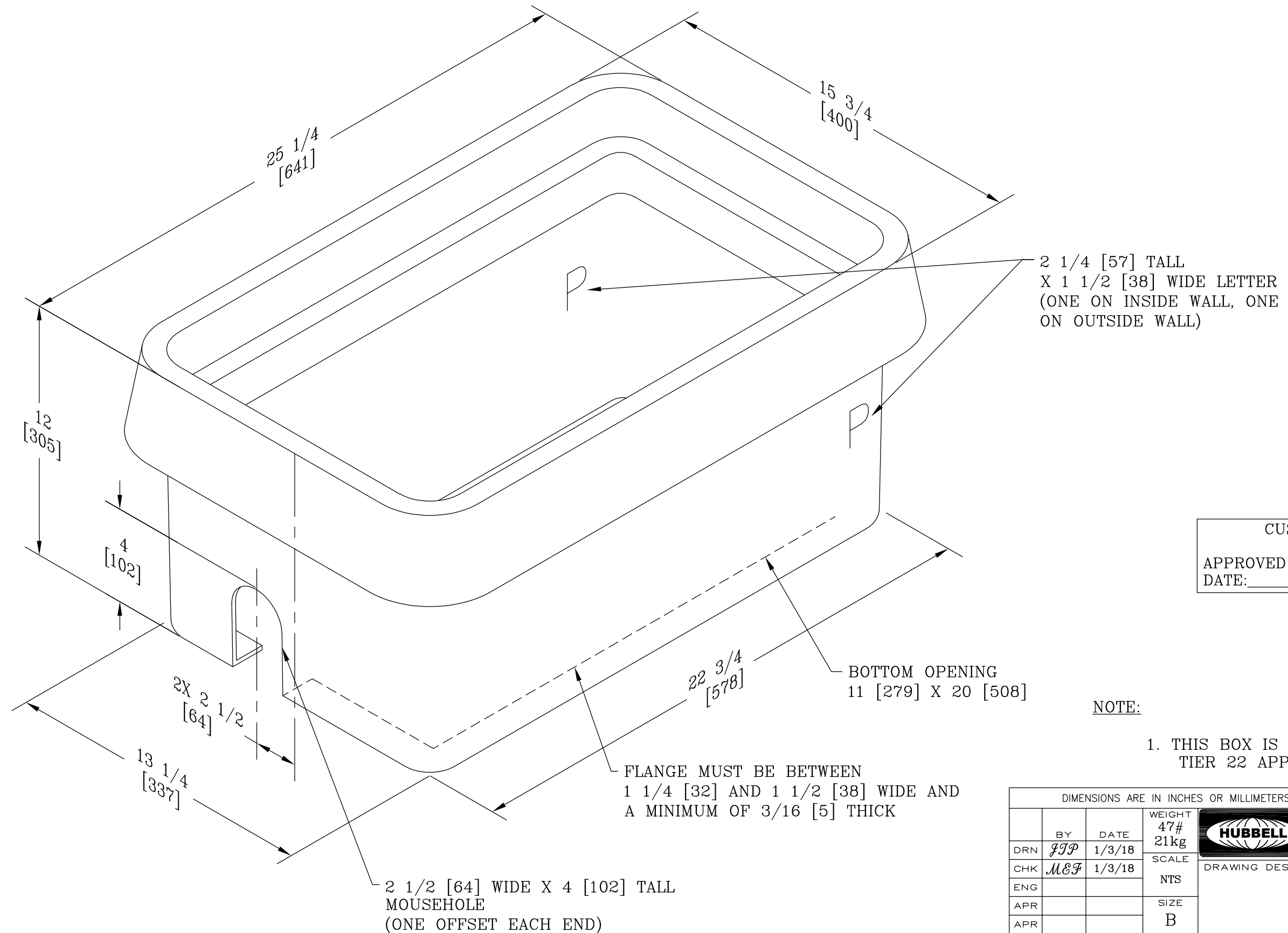
NOTE:

1. THIS BOX IS RATED FOR ANSI/SCTE 77 TIER 22 APPLICATIONS.

FLANGE MUST BE BETWEEN
 1 1/4 [32] AND 1 1/2 [38] WIDE AND
 A MINIMUM OF 3/16 [5] THICK

2 1/2 [64] WIDE X 4 [102] TALL
 MOUSEHOLE
 (ONE CENTERED EACH END)

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.					
DRN	BY	DATE	WEIGHT		3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com
CHK	APP	4/26/17	47# 21kg		
ENG			SCALE	DRAWING DESCRIPTION QUAZITE® BOX	LOC
APR			NTS		REV
APR			SIZE		C
ESR OR PROJECT NUMBER			B		7/19
117576					
SHEET 1 OF 1				DRAWING NUMBER B061324500-P	




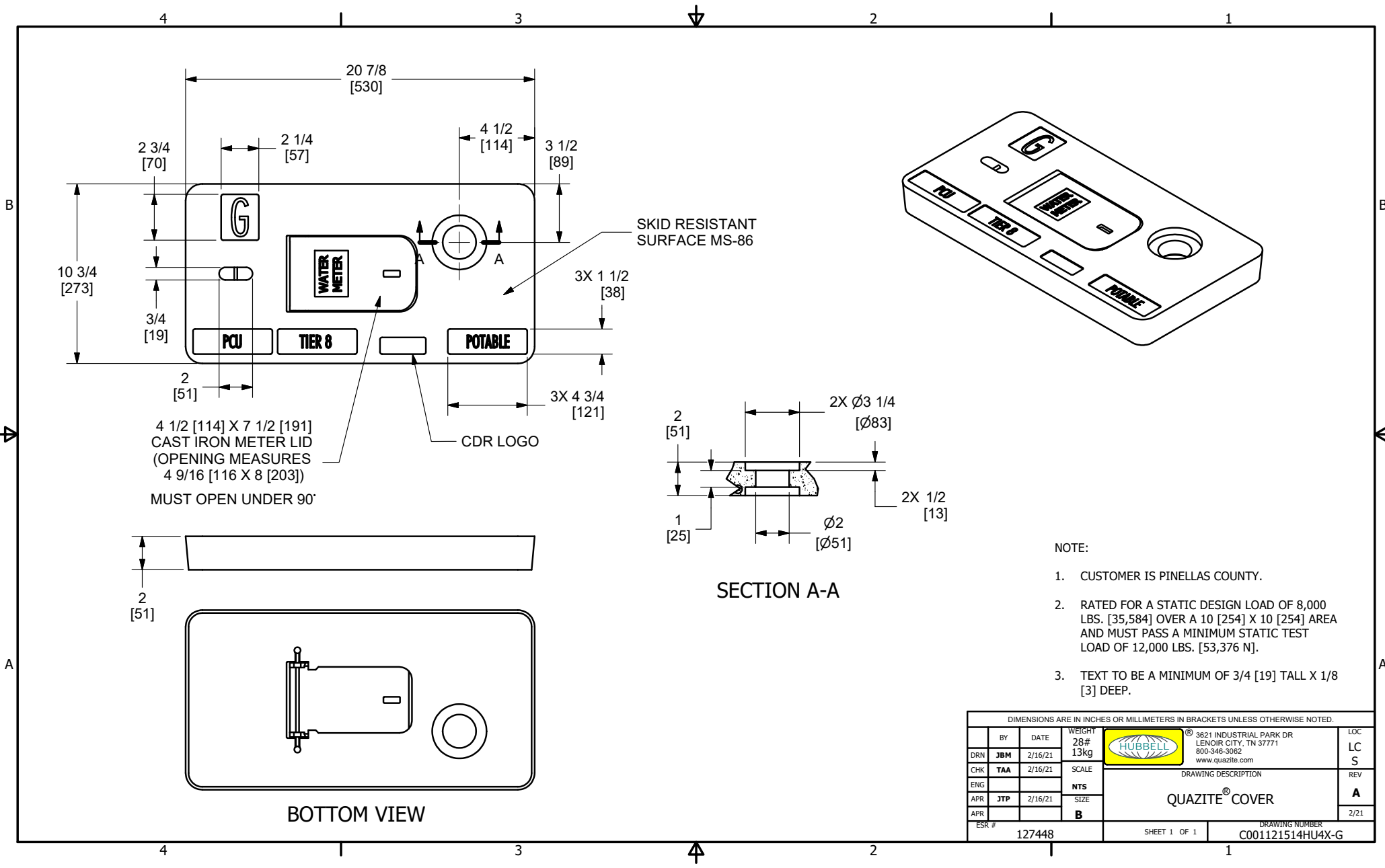
2 1/4 [57] TALL
 X 1 1/2 [38] WIDE LETTER
 (ONE ON INSIDE WALL, ONE
 ON OUTSIDE WALL)

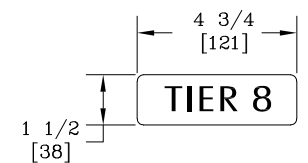
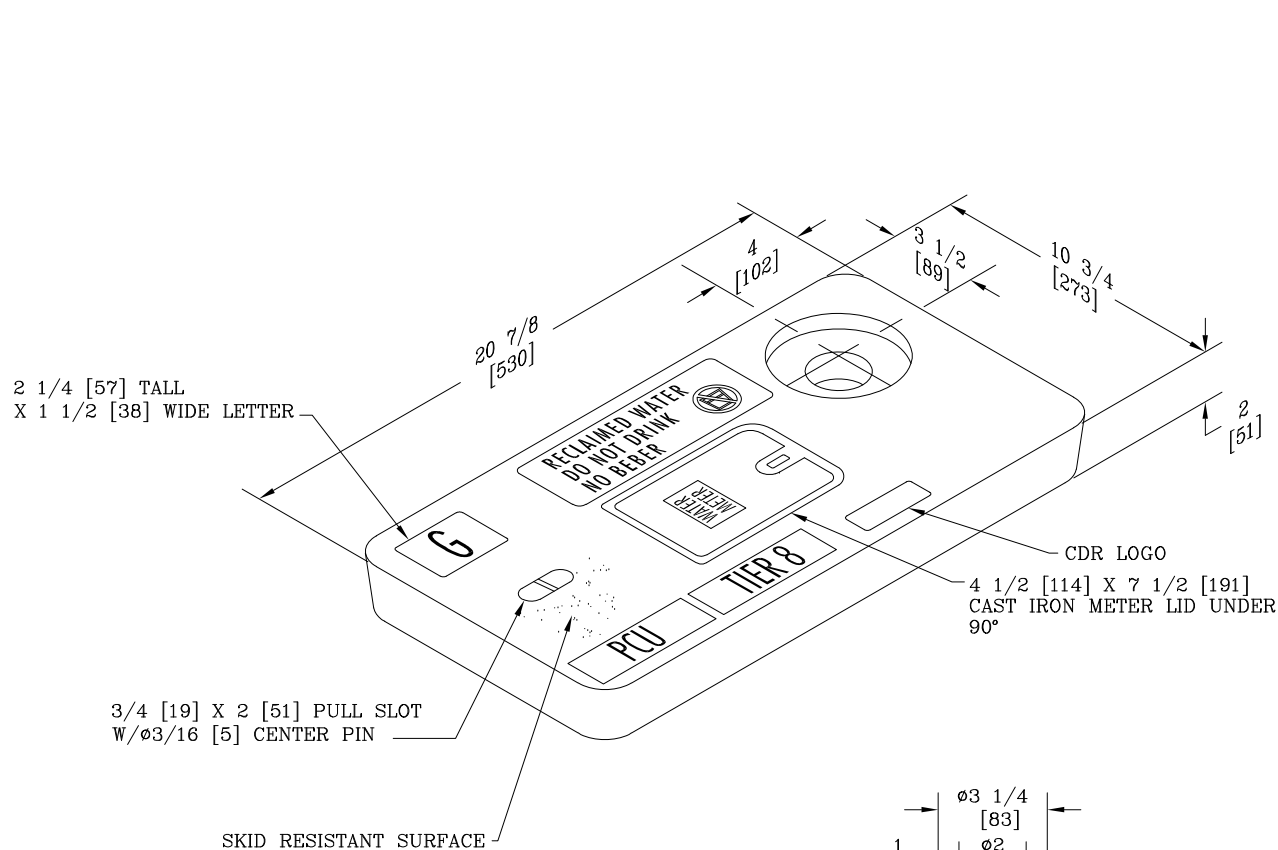
CUSTOMER APPROVAL
 APPROVED BY: _____
 DATE: _____

NOTE:

1. THIS BOX IS RATED FOR ANSI/SCTE 77
 TIER 22 APPLICATIONS.

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.				 3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	LOC
DRN	BY	DATE	WEIGHT		LC
CHK	MEF	1/3/18	47# 21kg	S	
ENG			SCALE	REV	
APR			NTS	C	
APR			SIZE	7/19	
			B		
PROJECT NUMBER			DRAWING DESCRIPTION		
119765			QUAZITE® BOX		
SHEET 1 OF 1			DRAWING NUMBER		
			B061324501-P		





LOGO DETAIL
2 PLACES

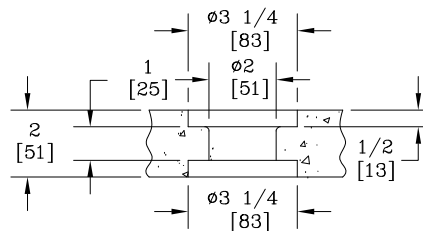
CUSTOMER APPROVAL

APPROVED BY: _____

DATE: _____


NOTES:

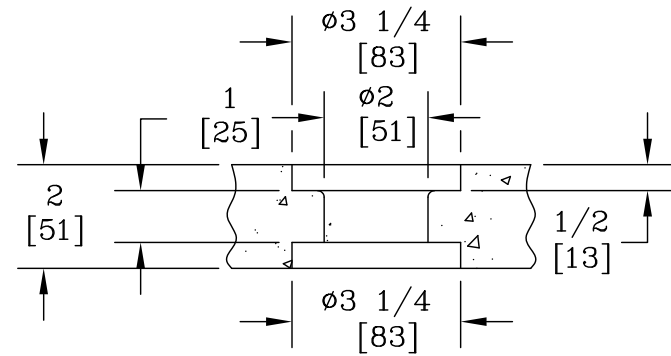
1. CUSTOMER IS PINELLAS COUNTY.
2. THIS COVER IS RATED FOR A STATIC DESIGN LOAD OF 8,000 LBS. [35,548 N] OVER A 10 [254] X 10 [254] AREA AND MUST PASS A MINIMUM STATIC TEST LOAD OF 12,000 LBS. [53,376 N]
3. TEXT TO BE A MINIMUM OF 3/4 [19] TALL X 1/8 [3] DEEP UNLESS OTHERWISE SPECIFIED.
4. COVER TO BE PANTONE 522C PURPLE IN COLOR. COLOR TO BE FULL DEPTH OF COVER.



READER DETAIL

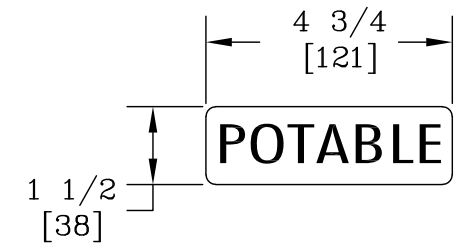
SCALE: NTS

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.				LOC	
DRN	BY	DATE	WEIGHT	 3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	LC
CHK	FAA	3/4/21	26# 12kg		S
ENG			SCALE	DRAWING DESCRIPTION QUAZITE® COVER LIGHT PURPLE COLOR	REV
APR	GGP	3/4/21	NTS		A
APR			SIZE		3/21
PROJECT NUMBER				DRAWING NUMBER	
127379				SHEET 1 OF 1	C001121517HR4X-G



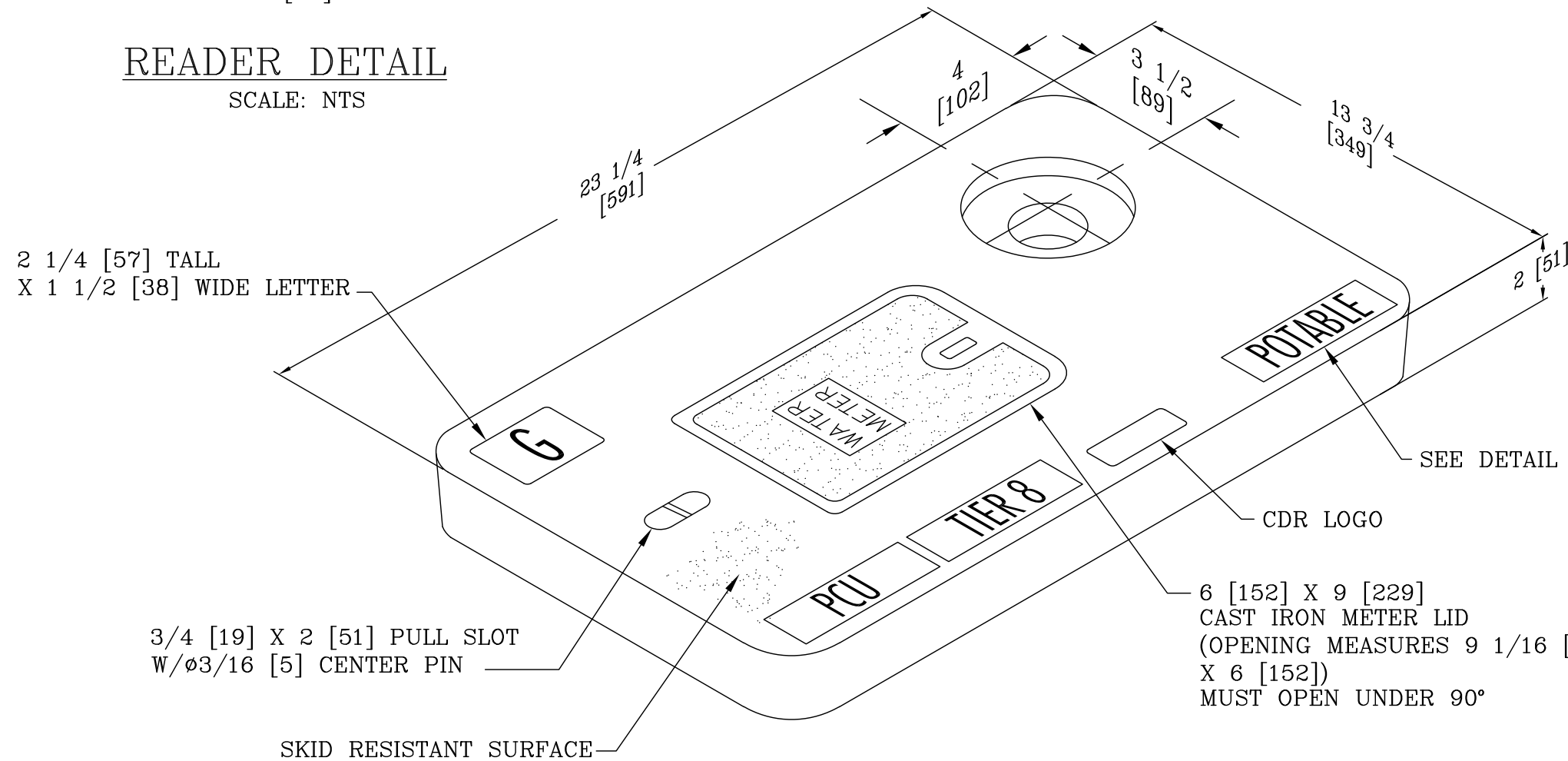
READER DETAIL

SCALE: NTS



LOGO DETAIL

3 PLACES



2 1/4 [57] TALL
X 1 1/2 [38] WIDE LETTER

3/4 [19] X 2 [51] PULL SLOT
W/ø3/16 [5] CENTER PIN

SKID RESISTANT SURFACE

6 [152] X 9 [229]
CAST IRON METER LID
(OPENING MEASURES 9 1/16 [230]
X 6 [152])
MUST OPEN UNDER 90°


CUSTOMER APPROVAL

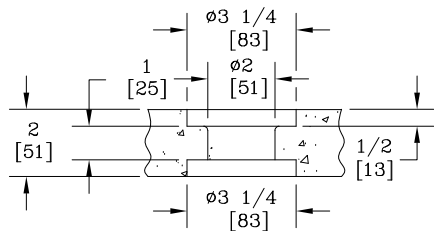
APPROVED BY: _____

DATE: _____

NOTES:

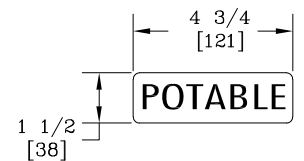
1. CUSTOMER IS PINELLAS COUNTY.
2. THIS COVER IS RATED FOR A STATIC DESIGN LOAD OF 8,000 LBS. [35,548 N] OVER A 10 [254] X 10 [254] AREA AND MUST PASS A MINIMUM STATIC TEST LOAD OF 12,000 LBS. [53,376 N]
3. TEXT TO BE A MINIMUM OF 3/4 [19] TALL X 1/8 [3] DEEP.
4. PCU LID FOR BOX 2, J3, TIER 8, POTABLE
13 [330] X 24 [610] X 2 [51]

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.								
DRN	BY	DATE	WEIGHT	 3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	LOC			
CHK	ENG	APR	SCALE		DRAWING DESCRIPTION	LC		
APR	APR	APR	NTS			QUAZITE® COVER	S	
			SIZE				A	
			B			2/21		
ESR OR PROJECT NUMBER				DRAWING NUMBER				
127379				C001324532HT4X-G				
SHEET 1 OF 1								



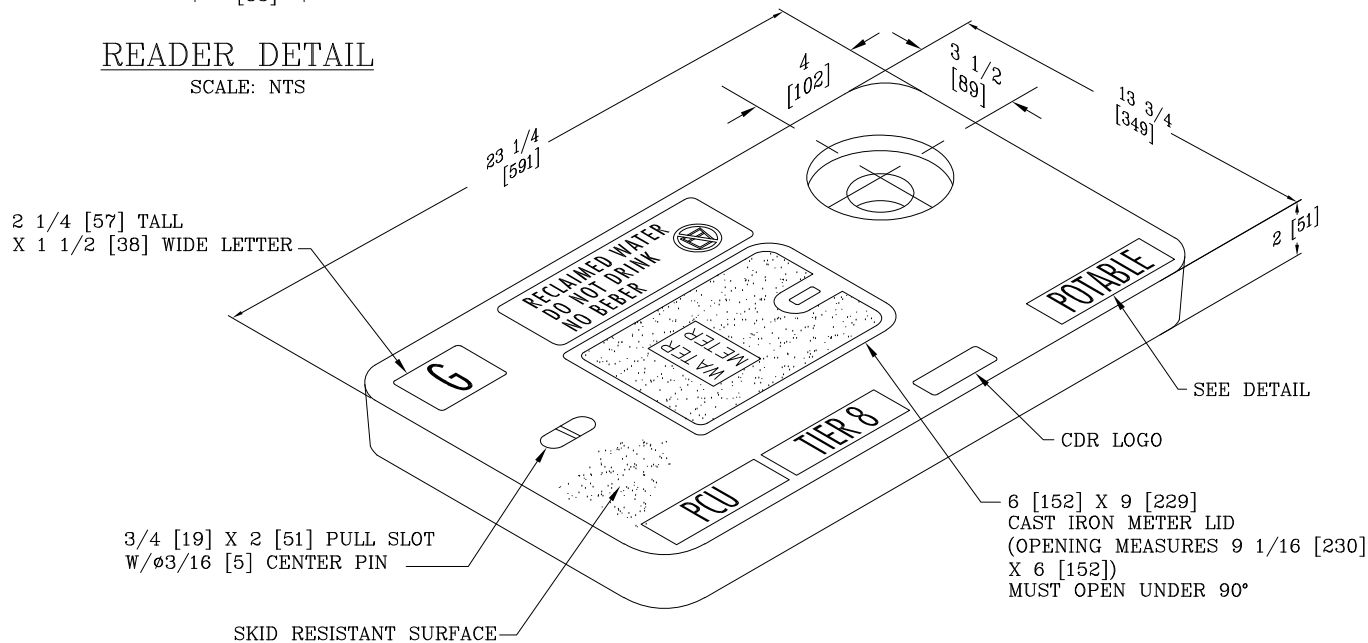
READER DETAIL

SCALE: NTS



LOGO DETAIL

3 PLACES



2 1/4 [57] TALL
X 1 1/2 [38] WIDE LETTER

3/4 [19] X 2 [51] PULL SLOT
W/Ø3/16 [5] CENTER PIN

SKID RESISTANT SURFACE

6 [152] X 9 [229]
CAST IRON METER LID
(OPENING MEASURES 9 1/16 [230]
X 6 [152])
MUST OPEN UNDER 90°


CUSTOMER APPROVAL

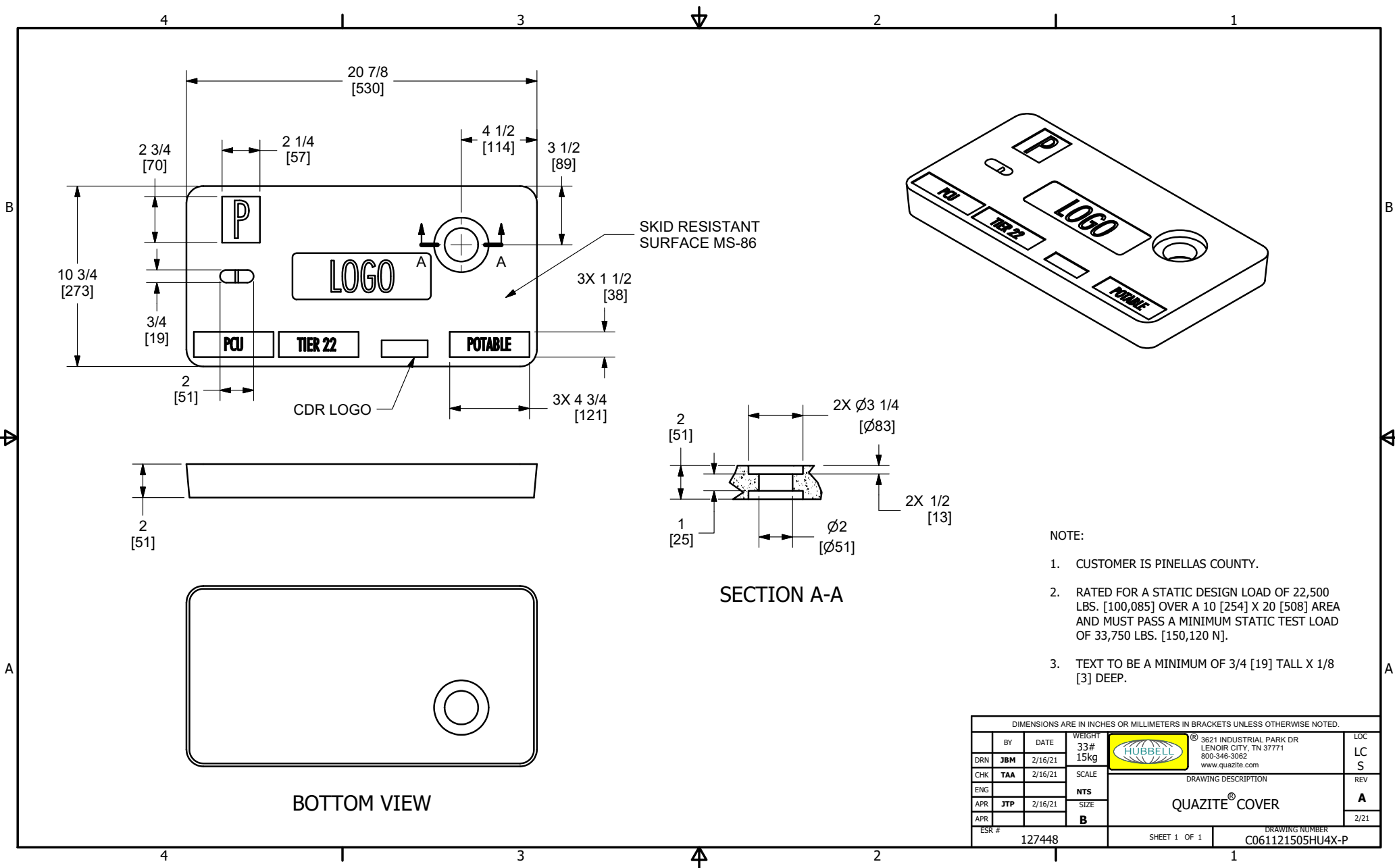
APPROVED BY: _____

DATE: _____

NOTES:


1. CUSTOMER IS PINELLAS COUNTY.
2. THIS COVER IS RATED FOR A STATIC DESIGN LOAD OF 8,000 LBS. [35,548 N] OVER A 10 [254] X 10 [254] AREA AND MUST PASS A MINIMUM STATIC TEST LOAD OF 12,000 LBS. [53,376 N]
3. TEXT TO BE A MINIMUM OF 3/4 [19] TALL X 1/8 [3] DEEP.
4. PCU LID FOR BOX 2, J3, TIER 8, POTABLE 13 [330] X 24 [610] X 2 [51].
5. COVER TO BE PANTONE 522C PURPLE IN COLOR. COLOR TO BE FULL DEPTH OF COVER.

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.				 3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com		LOC
DRN	BY	DATE	WEIGHT	DRAWING DESCRIPTION	QUAZITE® COVER	LC
CHK	<i>J.A.A.</i>	3/3/21	41# 19kg			REV
ENG		3/3/21	SCALE			A
APR	<i>J.J.P.</i>	3/3/21	NTS			
APR			SIZE			3/21
ESR OR PROJECT NUMBER				DRAWING NUMBER		
127379				C001324535HR4X-G		
SHEET 1 OF 1						



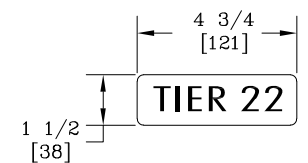
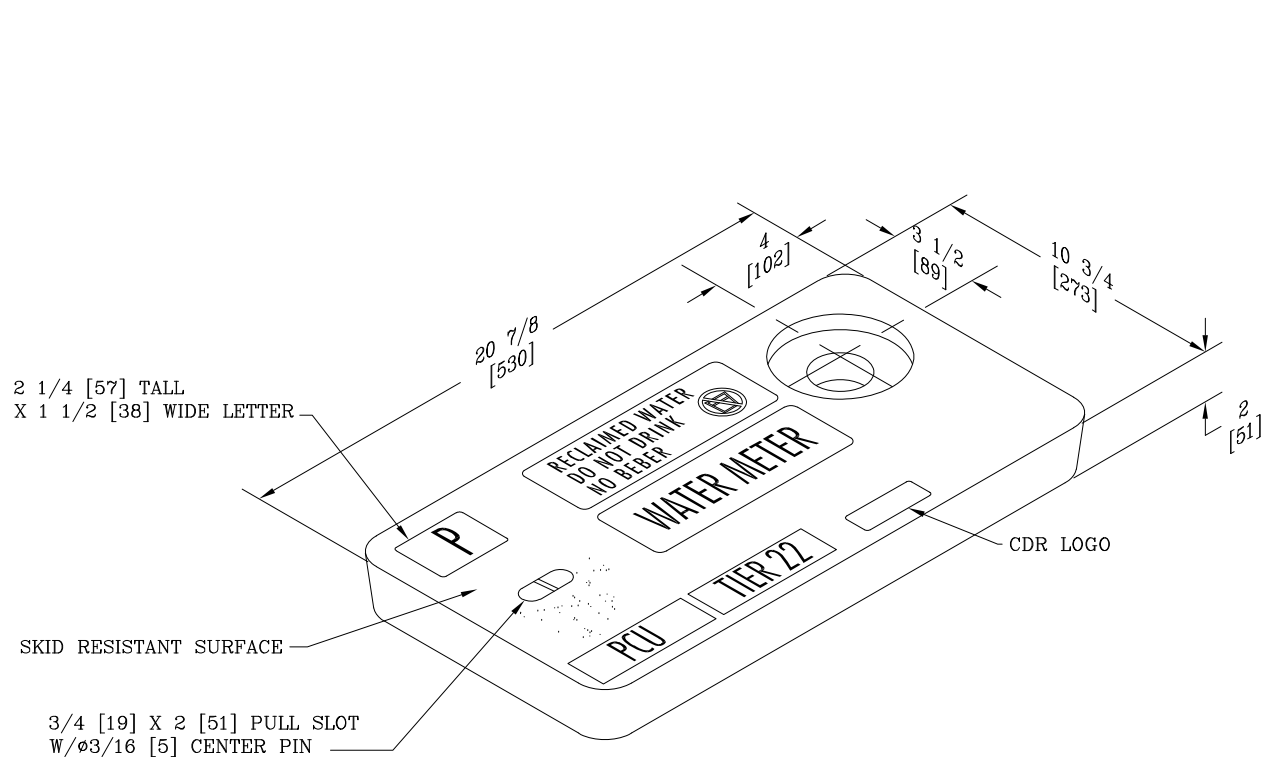
NOTE:

1. CUSTOMER IS PINELLAS COUNTY.
2. RATED FOR A STATIC DESIGN LOAD OF 22,500 LBS. [100,085] OVER A 10 [254] X 20 [508] AREA AND MUST PASS A MINIMUM STATIC TEST LOAD OF 33,750 LBS. [150,120 N].
3. TEXT TO BE A MINIMUM OF 3/4 [19] TALL X 1/8 [3] DEEP.

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.					
BY	DATE	WEIGHT	 3821 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	LOC	
DRN	JBM	2/16/21		33# 15kg	LC S
CHK	TAA	2/16/21	SCALE	REV	
ENG			NTS	A	
APR	JTP	2/16/21	SIZE	2/21	
APR			B		
ESR #	127448	SHEET 1 OF 1		DRAWING NUMBER C061121505HU4X-P	

BOTTOM VIEW

SECTION A-A



LOGO DETAIL
2 PLACES

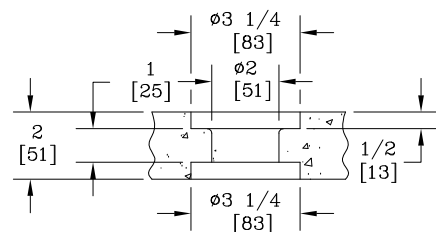
CUSTOMER APPROVAL

APPROVED BY: _____


DATE: _____

NOTES:

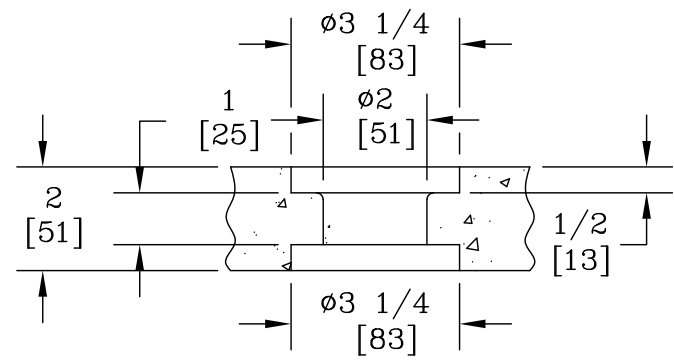
1. CUSTOMER IS PINELLAS COUNTY.
2. THIS COVER IS RATED FOR A STATIC DESIGN LOAD OF 22,500 LBS. [100,080 N] OVER A 10 [254] X 20 [508] AREA AND MUST PASS A MINIMUM STATIC TEST LOAD OF 33,750 LBS. [150,120 N]
3. TEXT TO BE A MINIMUM OF 3/4 [19] TALL X 1/8 [3] DEEP UNLESS OTHERWISE SPECIFIED.
4. COVER TO BE PANTONE 522C PURPLE IN COLOR. COLOR TO BE FULL DEPTH OF COVER.



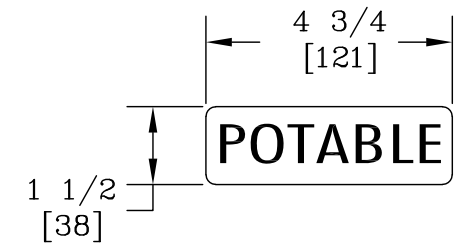
READER DETAIL
SCALE: NTS

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.			
DRN	BY	DATE	WEIGHT
CHK	FWP	3/4/21	26# 12kg
ENG	JAA	3/4/21	SCALE
APR	JJP	3/4/21	NTS
PROJECT NUMBER		DRAWING DESCRIPTION	
127379		 3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	
SHEET 1 OF 1		DRAWING NUMBER	
		C061121509HV4X-P	

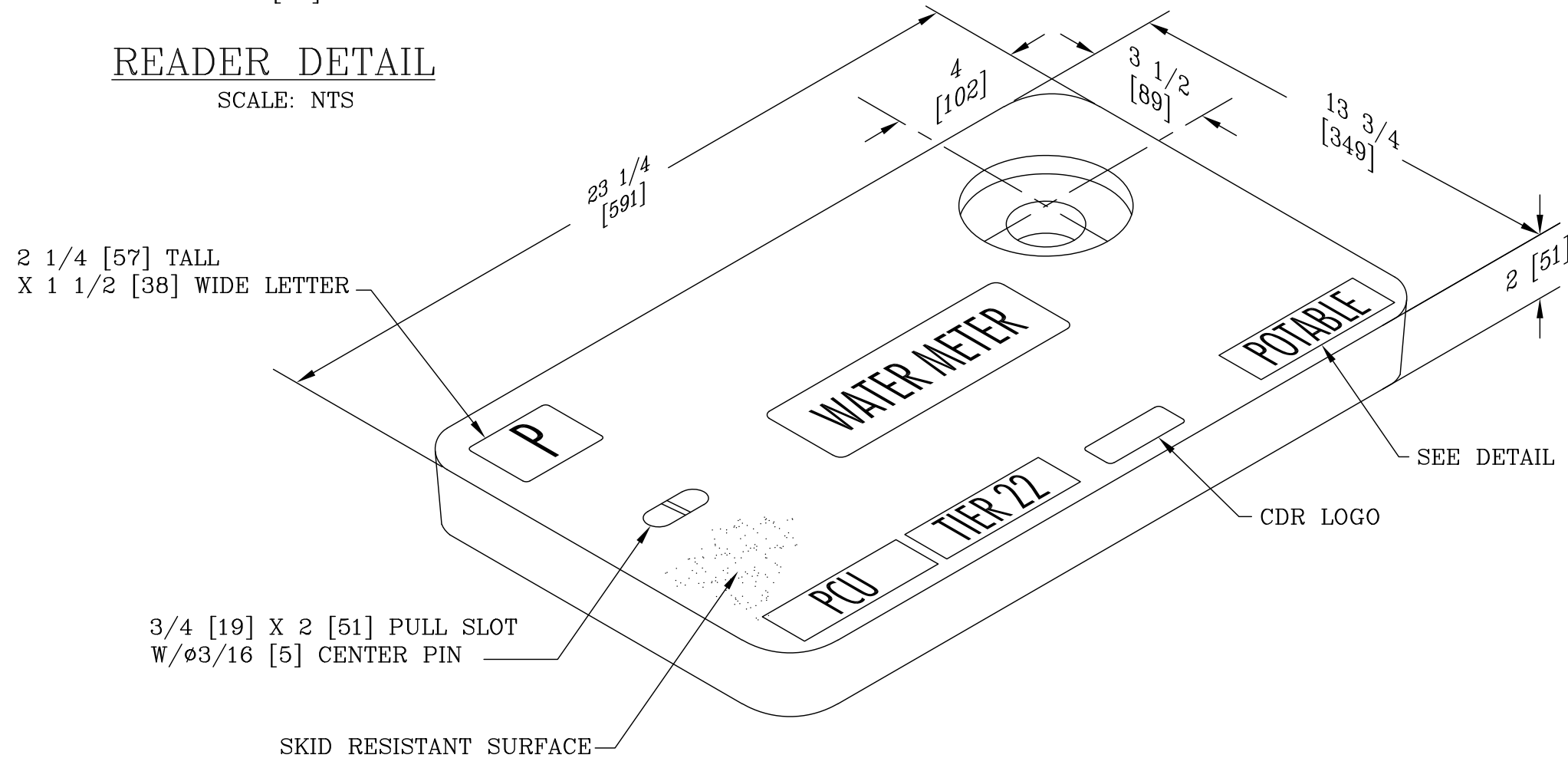
LOC
LC
S
REV
A
3/21



READER DETAIL
SCALE: NTS



LOGO DETAIL
3 PLACES




CUSTOMER APPROVAL

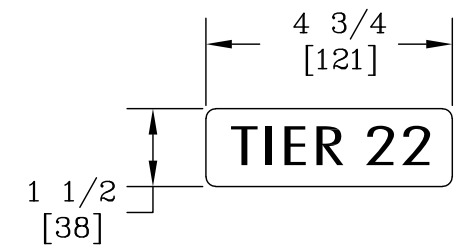
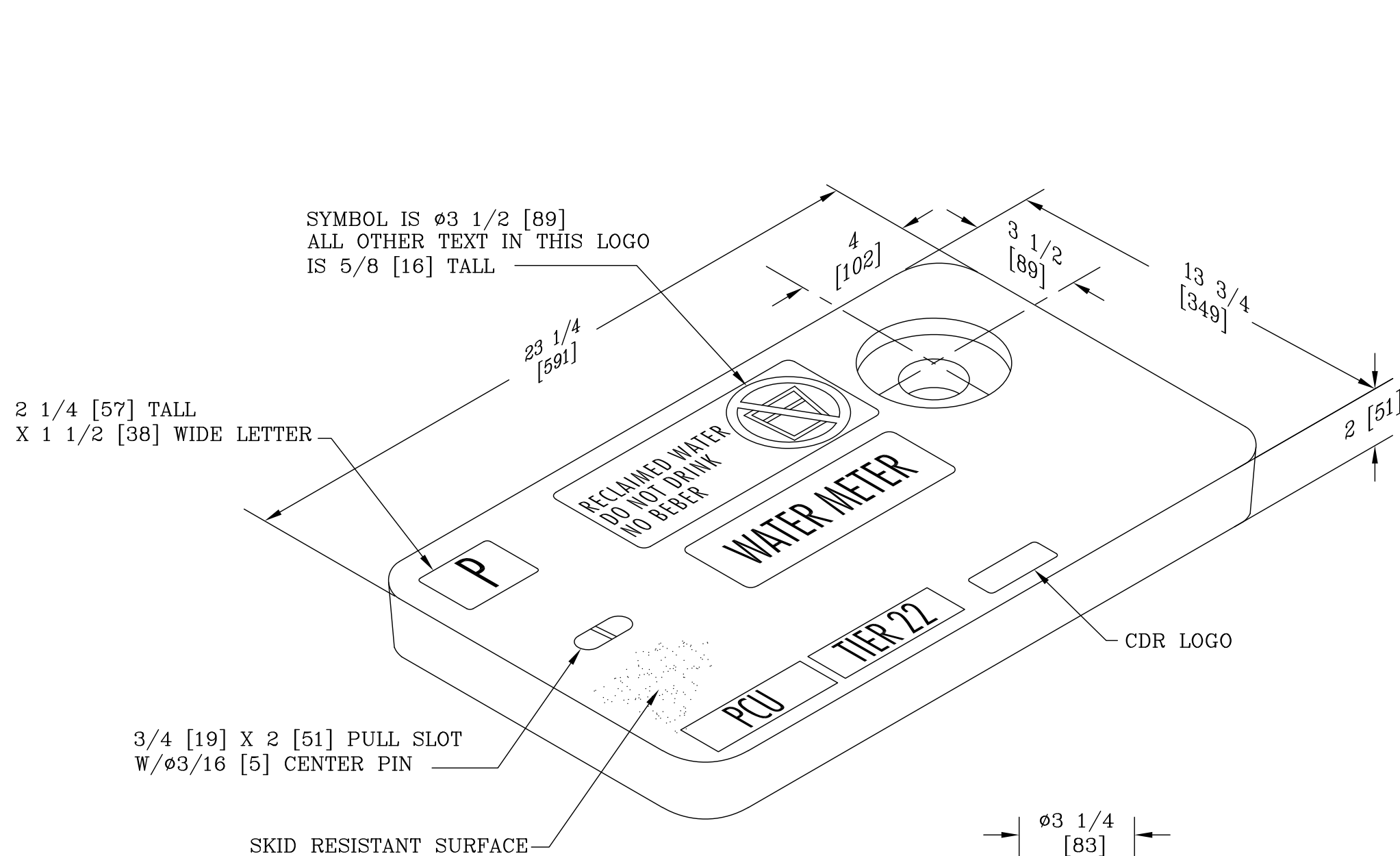
APPROVED BY: _____

DATE: _____

NOTES:

1. CUSTOMER IS PINELLAS COUNTY.
2. THIS COVER IS RATED FOR A STATIC DESIGN LOAD OF 22,500 LBS. [100,080 N] OVER A 10 [254] X 20 [508] AREA AND MUST PASS A MINIMUM STATIC TEST LOAD OF 33,750 LBS. [150,120 N]
3. TEXT TO BE A MINIMUM OF 3/4 [19] TALL X 1/8 [3] DEEP.

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.					
DRN	BY	DATE	WEIGHT	 3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	LOC
JAA	JAA	2/4/21	50# 23kg		LC
CHK	JWP	2/4/21	SCALE	DRAWING DESCRIPTION QUAZITE® COVER	REV
ENG			NTS		A
APR			SIZE		
APR			B		2/21
ESR OR PROJECT NUMBER			DRAWING NUMBER		
127379			C061324508HU4X-P		
SHEET 1 OF 1					



LOGO DETAIL
2 PLACES

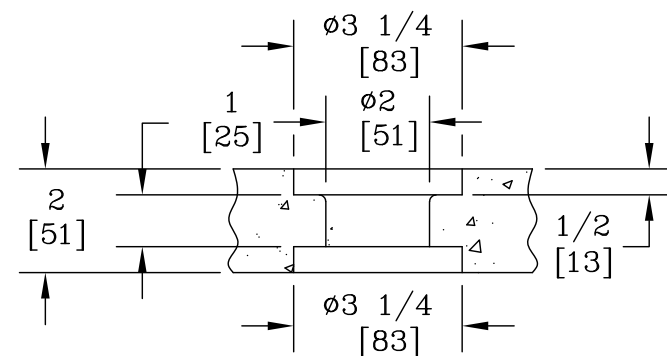
CUSTOMER APPROVAL

APPROVED BY: _____


DATE: _____

NOTES:

1. CUSTOMER IS PINELLAS COUNTY.
2. THIS COVER IS RATED FOR A STATIC DESIGN LOAD OF 22,500 LBS. [100,080 N] OVER A 10 [254] X 20 [508] AREA AND MUST PASS A MINIMUM STATIC TEST LOAD OF 33,750 LBS. [150,120 N]
3. TEXT TO BE A MINIMUM OF 3/4 [19] TALL X 1/8 [3] DEEP UNLESS OTHERWISE SPECIFIED.
4. COVER TO BE PANTONE 522C PURPLE IN COLOR. COLOR TO BE FULL DEPTH OF COVER.



READER DETAIL
SCALE: NTS

DIMENSIONS ARE IN INCHES OR MILLIMETERS IN BRACKETS UNLESS OTHERWISE NOTED.					
DRN	BY	DATE	WEIGHT	 3621 INDUSTRIAL PARK DR LENOIR CITY, TN 37771 800-346-3062 www.quazite.com	LOC
JAA	JAA	2/4/21	50# 23kg		LC
CHK	JWP	2/4/21	SCALE	DRAWING DESCRIPTION QUAZITE® COVER	REV
ENG			NTS		A
APR	JJP	2/5/21	SIZE		2/21
APR			B		
ESR OR PROJECT NUMBER			DRAWING NUMBER		
127379			C061324509HV4X-P		
SHEET 1 OF 1					

Recycled Material in Meter Boxes and Lids

Hubbell, Inc. advises that there is limited, and possibly no recycled content included in the meter boxes and lids they manufacture. The manufacturers they use for the rebar put into the covers may include some recycled material content, however Hubbell has no visibility to that amount and any contribution to the overall product would be minimal.

LITERATURE – PRODUCT WARRANTY SHEETS



Badger Meter

Fire Series Meters and Fire Series Meter Assemblies

PRODUCTS COVERED

This warranty shall apply to all Badger Meter Fire Series Meters, sizes 3 inch through 10 inch, Fire Series Meter Assemblies, sizes 4 inch through 12 inch, and the local registers and encoders used with these meters (collectively "Product") sold on or after October 1, 2015. This warranty is extended only to utilities, municipalities, other commercial users and authorized Badger Meter, Inc. distributors, hereafter referred to as "Customer" and does NOT apply to consumers or any person or entity who is not an original customer of Badger Meter or its authorized distributors.

MATERIALS AND WORKMANSHIP

Badger Meter warrants Product to be free from defects in materials and workmanship appearing within the following time frames:

Housings

One (1) year and six (6) months after shipment from Badger Meter.

Local Registers for Turbo Series Meters Supplied with the Meters Listed Herein

Five (5) years and six (6) months after shipment from Badger Meter.

Local Registers for Disc Series Meters Supplied with the Meters Listed Herein

Twenty-five (25) years and six (6) months after shipment from Badger Meter.

METER ACCURACY

The meter Product will meet or exceed accuracy standards of AWWA Standard C703 for one (1) year and six (6) months after shipment from Badger Meter.

PRODUCT RETURNS

Any Product proved to the satisfaction of Badger Meter to have failed the foregoing warranties will, at the option of Badger Meter, be repaired or replaced without charge to the Customer. The obligation hereunder of Badger Meter shall be limited to such repair and replacement and shall be conditioned upon Badger Meter receiving written notice of any alleged defect within ten (10) days after its discovery. This exclusive remedy shall not be deemed to have failed its essential purpose so long as Badger Meter is willing and able to replace defective products or issue a credit to purchaser within a reasonable time of proof to Badger Meter that a defect is involved. Product returns must be shipped by the Customer prepaid F.O.B. to the nearest Badger Meter factory or distribution center. The Customer shall be responsible for all direct and indirect costs associated with removing original product and reinstalling the repaired or replacement Product.

LIMITS OF LIABILITY

This warranty shall not apply to Product repaired or altered by any party other than Badger Meter. This warranty applies only to the extent that the Product is installed, serviced and operated strictly in accordance with AWWA Standard C703 and AWWA M6 Manual. The warranty shall not apply and shall be void with respect to Product exposed to conditions other than those detailed in Badger Meter Product technical literature, or which have been subject to vandalism, negligence, accident, acts of God, improper installation, operation or repair, alteration, or other circumstances which are beyond the reasonable control of Badger Meter. With respect to Product not manufactured by Badger Meter, the warranty obligations of Badger Meter shall in all respects conform and be limited to the warranty extended to Badger Meter by the supplier.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (except warranties of title).

Any description of the Product, whether in writing or made orally by Badger Meter or Badger Meter agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets or similar materials used in connection with any Customer's order are for the sole purpose of identifying the Product and shall not be construed as an express warranty. Any suggestions by Badger Meter or agents of Badger Meter agents regarding use, application, or suitability of the Product shall not be construed as an express warranty unless confirmed to be such in writing by Badger Meter.

Exclusion of Consequential Damages and Disclaimer of Other Liability. The liability of Badger Meter with respect to breaches of the foregoing warranty shall be limited as stated herein. The liability of Badger Meter shall in no event exceed the contract price. **BADGER METER SHALL NOT BE SUBJECT TO AND DISCLAIMS: (1) ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR OF WARRANTY, (2) ANY OBLIGATIONS WHATSOEVER ARISING FROM TORT CLAIMS (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR ARISING UNDER OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY BADGER METER, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO, AND (3) ALL CONSEQUENTIAL, INCIDENTAL, AND CONTINGENT DAMAGES WHATSOEVER.**

Fire Series Meters and Fire Series Assemblies

Making Water Visible®

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Slovakia | Badger Meter Slovakia s.r.o. | Racianska 109/B | 831 02 Bratislava, Slovakia | +421-2-44 63 83 01
Asia Pacific | Badger Meter | 80 Marine Parade Rd | 21-06 Parkway Parade | Singapore 449269 | +65-63464836
China | Badger Meter | 7-1202 | 99 Hangzhong Road | Minhang District | Shanghai | China 201101 | +86-21-5763 5412

Legacy Document Number: FS-W-03



Badger Meter

Recordall® Turbo Series Meters

PRODUCTS COVERED

This warranty shall apply to all Recordall® Turbo Series Meters, sizes 1-1/2...20 inch, Turbo Series head assemblies and the local registers used with these meters (collectively "Product") sold on or after February 24, 2020. This warranty is extended only to utilities, municipalities, other commercial users and authorized Badger Meter, Inc. distributors, hereafter referred to as "Customer" and does NOT apply to consumers or any person or entity who is not an original customer of Badger Meter or its authorized distributors.

MATERIALS AND WORKMANSHIP

Badger Meter warrants Product to be free from defects in materials and workmanship appearing within the following time frames:

Bronze Housing

One (1) year and six (6) months after shipment from Badger Meter.

Local Registers Supplied with the Meters Listed Herein

Five (5) years and six (6) months after shipment from Badger Meter.

METER ACCURACY

The meter Product will meet or exceed accuracy standards of AWWA Standard C701 for one (1) year and six (6) months after shipment from Badger Meter. AWWA does not provide a standard for 1-1/2 inch turbo meters. However, the typical operating range for the 1-1/2 inch Recordall Turbo Series Meter meets the accuracy requirements of this standard.

PRODUCT RETURNS

Any Product proved to the satisfaction of Badger Meter to have failed the foregoing warranties will, at the option of Badger Meter, be repaired or replaced without charge to the Customer. Any eligible Product repaired or replaced by Badger Meter will retain the original Product's warranty based on the original Product purchase date, at Badger Meter's sole discretion. The Badger Meter obligation hereunder shall be limited to such repair and replacement and shall be conditioned upon Badger Meter receiving written notice of any alleged defect within ten (10) days after its discovery. This exclusive remedy shall not be deemed to have failed its essential purpose so long as Badger Meter is willing and able to replace defective products or issue a credit to purchaser within a reasonable time of proof to Badger Meter that a defect is involved. Product returns must be shipped by the Customer prepaid F.O.B. to the nearest Badger Meter factory or distribution center. The Customer shall be responsible for all direct and indirect costs associated with removing the original Product and reinstalling the repaired or replacement Product.

LIMITS OF LIABILITY

This warranty shall not apply to Product repaired or altered by parties other than Badger Meter. The foregoing warranty applies only to the extent that the Product is installed, serviced and operated strictly in accordance with AWWA Standard C715 and AWWA M6 Manual, as applicable. The warranty shall not apply and shall be void with respect to Product exposed to conditions other than those detailed in the Badger Meter Product technical and/or operational literature, or which have been exposed to adverse installation conditions, damaged by any water conditions and/or water quality, including but not limited to foreign matter in the water such as dirt, sand, minerals, debris, deposits, biofilms, extreme corrosivity, or other impurities, or which have been subject to passage of high-speed air slugs, vandalism, negligence, accident, acts of God, alteration, improper installation, operation or repair, or other circumstances which are beyond the reasonable control of Badger Meter. With respect to Product not manufactured by Badger Meter, the warranty obligations of Badger Meter shall in all respects conform and be limited to the warranty extended to Badger Meter by the supplier.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (except warranties of Title).

Any description of Product, whether in writing or made orally by Badger Meter or its agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets, or similar materials used in connection with any Customer's order are for the sole purpose of identifying Product and shall not be construed as an express warranty. Any suggestions by Badger Meter or its agents regarding use, application or suitability of Product shall not be construed as an express warranty unless confirmed to be such in writing by Badger Meter.

Exclusion of Consequential Damages and Disclaimer of Other Liability

Badger Meter liability with respect to breaches of the foregoing warranty shall be limited as stated therein. Badger Meter liability shall in no event exceed the contract price. BADGER METER SHALL NOT BE SUBJECT TO AND DISCLAIMS: (1) ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR OF WARRANTY (2) ANY OBLIGATIONS WHATSOEVER ARISING FROM TORT CLAIMS (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR ARISING UNDER OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY BADGER METER, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO, AND (3) ALL CONSEQUENTIAL, INCIDENTAL AND CONTINGENT DAMAGES WHATSOEVER.

Recordall® Turbo Series Meters

SMART WATER IS BADGER METER

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Europe, Middle East and Africa | Badger Meter Europa GmbH | Nurtinger Str 76 | 72639 Neuffen | Germany | +49-7025-9208-0
Europe, Middle East Branch Office | Badger Meter Europe | PO Box 341442 | Dubai Silicon Oasis, Head Quarter Building, Wing C, Office #C209 | Dubai / UAE | +971-4-371 2503
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Switzerland | Badger Meter Swiss AG | Mittelholzerstrasse 8 | 3006 Bern | Switzerland | +41-31-932 01 11

Legacy Document #: RTS-W-1-EN



Badger Meter

Recordall® Disc and Turbo Series Meters for Reclaimed Water

Sizes 5/8...12" (DN 15...300 mm)

PRODUCTS COVERED

This warranty shall apply to all Recordall® bronze disc meters, models 25...170, and Turbo Series meters, 1-1/2"...12", when used to measure non-potable water, and the local registers used with these meters (collectively "Product") sold on or after September 15, 2014. This warranty is extended only to utilities, municipalities, other commercial users and authorized Badger Meter, Inc. distributors, hereafter referred to as "Customer" and does NOT apply to consumers or any person or entity who is not an original customer of Badger Meter or its authorized distributors.

MATERIALS AND WORKMANSHIP

Badger Meter warrants Product to be free from defects in materials and workmanship for one (1) year and six (6) months after shipment from Badger Meter.

PRODUCT RETURNS

Any Product proved to the satisfaction of Badger Meter to have failed the foregoing warranties will, at the option of Badger Meter, be repaired or replaced without charge to the Customer. The obligation hereunder of Badger Meter shall be limited to such repair and replacement and shall be conditioned upon Badger Meter receiving written notice of any alleged defect within ten (10) days after its discovery. This exclusive remedy shall not be deemed to have failed its essential purpose so long as Badger Meter is willing and able to replace defective products or issue a credit to purchaser within a reasonable time of proof to Badger Meter that a defect is involved. Product returns must be shipped by the Customer prepaid F.O.B. to the nearest Badger Meter factory or distribution center. The Customer shall be responsible for all direct and indirect costs associated with removing original product and reinstalling the repaired or replacement Product.

LIMITS OF LIABILITY

This warranty shall not apply to Product repaired or altered by any party other than Badger Meter. The foregoing warranty applies only to the extent that the Product is installed, serviced and operated strictly in accordance with AWWA Standards C700 or C701 as applicable, except the requirements relating to potable water.

The warranty shall not apply and shall be void with respect to Product exposed to conditions other than those detailed in Badger Meter Product technical literature, or which have been subject to vandalism, negligence, accident, acts of God, improper installation, operation or repair, alteration, or other circumstances which are beyond the reasonable control of Badger Meter. With respect to Product not manufactured by Badger Meter, the warranty obligations of Badger Meter shall in all respects conform and be limited to the warranty extended to Badger Meter by the supplier.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (except warranties of title).

Any description of the Product, whether in writing or made orally by Badger Meter or Badger Meter agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets or similar materials used in connection with any Customer's order are for the sole purpose of identifying the Product and shall not be construed as an express warranty. Any suggestions by Badger Meter or agents of Badger Meter regarding use, application, or suitability of the Product shall not be construed as an express warranty unless confirmed to be such in writing by Badger Meter.

Exclusion of Consequential Damages and Disclaimer of Other Liability. The liability of Badger Meter with respect to breaches of the foregoing warranty shall be limited as stated herein. The liability of Badger Meter shall in no event exceed the contract price. **BADGER METER SHALL NOT BE SUBJECT TO AND DISCLAIMS: (1) ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR OF WARRANTY, (2) ANY OBLIGATIONS WHATSOEVER ARISING FROM TORT CLAIMS (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR ARISING UNDER OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY BADGER METER, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO, AND (3) ALL CONSEQUENTIAL, INCIDENTAL, AND CONTINGENT DAMAGES WHATSOEVER.**

Recordall® Disc and Turbo Series Meters

Making Water Visible®

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Czech Republic | Badger Meter Czech Republic s.r.o. | Mařikova 2082/26 | 621 00 Brno, Czech Republic | +420-5-41420411
Slovakia | Badger Meter Slovakia s.r.o. | Racianska 109/B | 831 02 Bratislava, Slovakia | +421-2-44 63 83 01
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Legacy Document Number: RR-W-01



Recordall® Turbo 450

Fire Hydrant Meter

PRODUCTS COVERED

This warranty shall apply to all Recordall® Turbo 450 fire hydrant meters and the registers and encoders used with these meters (collectively "Product") sold on or after September 15, 2017. This warranty is extended only to utilities, municipalities, other commercial users and authorized Badger Meter, Inc. distributors, hereafter referred to as "Customer" and does NOT apply to consumers or any person or entity who is not an original customer of Badger Meter or its authorized distributors.

MATERIALS AND WORKMANSHIP

Badger Meter warrants Product to be free from defects in materials and workmanship appearing within one (1) year and six (6) months after shipment from Badger Meter.

Aluminum Housing

One (1) year and six (6) months after shipment from Badger Meter.

Local Registers Supplied with the Meters Listed Herein

Five (5) years and six (6) months after shipment from Badger Meter.

METER ACCURACY

The meter Product will meet or exceed accuracy standards of AWWA Standard C701 for one (1) year and six (6) months after shipment from Badger Meter.

PRODUCT RETURNS

Any Product proved to the satisfaction of Badger Meter to have failed the foregoing warranties will, at the option of Badger Meter, be repaired or replaced without charge to the Customer. The obligation hereunder of Badger Meter shall be limited to such repair and replacement and shall be conditioned upon Badger Meter receiving written notice of any alleged defect within ten (10) days after its discovery. This exclusive remedy shall not be deemed to have failed its essential purpose so long as Badger Meter is willing and able to replace defective products or issue a credit to purchaser within a reasonable time of proof to Badger Meter that a defect is involved. Product returns must be shipped by the Customer prepaid F.O.B. to the nearest Badger Meter factory or distribution center. The Customer shall be responsible for all direct and indirect costs associated with removing original product and reinstalling the repaired or replacement Product.

LIMITS OF LIABILITY

This warranty shall not apply to Product repaired or altered by any party other than Badger Meter. The foregoing warranty applies only to the extent that the Product is installed, serviced and operated strictly in accordance with AWWA Standard C701 and the AWWA M6 Manual. The warranty shall not apply and shall be void with respect to Product exposed to conditions other than those detailed in Badger Meter Product technical literature, or which have been subject to vandalism, negligence, accident, acts of God, improper installation, operation or repair, alteration, or other circumstances which are beyond the reasonable control of Badger Meter. With respect to Product not manufactured by Badger Meter, the warranty obligations of Badger Meter shall in all respects conform and be limited to the warranty extended to Badger Meter by the supplier.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (except warranties of title).

Any description of the Product, whether in writing or made orally by Badger Meter or Badger Meter agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets or similar materials used in connection with any Customer's order are for the sole purpose of identifying the Product and shall not be construed as an express warranty. Any suggestions by Badger Meter or agents of Badger Meter regarding use, application, or suitability of the Product shall not be construed as an express warranty unless confirmed to be such in writing by Badger Meter.

Exclusion of Consequential Damages and Disclaimer of Other Liability

The liability of Badger Meter with respect to breaches of the foregoing warranty shall be limited as stated herein. The liability of Badger Meter shall in no event exceed the contract price.

BADGER METER SHALL NOT BE SUBJECT TO AND DISCLAIMS: (1) ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR OF WARRANTY, (2) ANY OBLIGATIONS WHATSOEVER ARISING FROM TORT CLAIMS (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR ARISING UNDER OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY BADGER METER, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO, AND (3) ALL CONSEQUENTIAL, INCIDENTAL, AND CONTINGENT DAMAGES WHATSOEVER.

Recordall® Turbo 450, Fire Hydrant Meter

Making Water Visible®

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Europe, Middle East and Africa | Badger Meter Europa GmbH | Nurtinger Str 76 | 72639 Neuffen | Germany | +49-7025-9208-0
Europe, Middle East Branch Office | Badger Meter Europe | PO Box 341442 | Dubai Silicon Oasis, Head Quarter Building, Wing C, Office #C209 | Dubai / UAE | +971-4-371 2503
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Legacy Document Number: RTS-W-02



Badger Meter

Lead-Free Bronze Disc Meters

PRODUCTS COVERED

This warranty shall apply to all Recordall® Lead-Free Bronze Disc Meters, models 25 through 170, when used to measure potable water, including the registers used with these meters (collectively "Product") sold on or after January 25, 2019. This warranty is extended only to utilities, municipalities, other commercial users and authorized Badger Meter, Inc. distributors, hereafter referred to as "Customer" and does NOT apply to consumers or any person or entity who is not an original customer of Badger Meter or its authorized distributors.

MATERIALS AND WORKMANSHIP

Badger Meter warrants Product to be free from defects in materials and workmanship appearing within the following time frames and those listed in the table below:

Housings

Twenty-five (25) years and six (6) months after shipment from Badger Meter.

Local Registers Supplied with the Meters Listed Herein

Twenty-five (25) years and six (6) months after shipment from Badger Meter.

	AWWA New Meter Accuracy	AWWA Repaired Meter Accuracy (AWWA M6 Manual)	Badger Meter Extended Low Flow Meter Accuracy
Recordall Meter Model, Size	<i>The meter product will meet or exceed new meter accuracy standards set forth in AWWA Standard C700 for the following periods:</i>	<i>The meter product will meet or exceed repaired meter accuracy standards set forth in AWWA Manual M-6, Chapter 5, Table 5.3 for the following periods:</i>	<i>Badger Meter further warrants the meter product to meet or exceed the following extended low flow accuracies in excess of AWWA standard:</i>
Model 25, 5/8 in. and 5/8 x 3/4 in.	Five (5) years from date of shipment or registration of 750,000 gallons, whichever occurs first.	Fifteen (15) years from date of shipment or registration of 2,500,000 gallons, whichever occurs first, with a 25 gpm safe maximum operating capacity and a 15 gpm maximum rate for continuous operation.	Badger Meter warrants Product low flow accuracy of 98.5% at a rate of 1/4 gpm and low flow accuracy of 95.0% at a rate of 1/8 gpm for five (5) years from date of shipment or registration of 675,000 gallons, whichever occurs first.
Model 35, 3/4 in.	Five (5) years from date of shipment or registration of 750,000 gallons, whichever occurs first.	Fifteen (15) years from date of shipment or registration of 2,500,000 gallons, whichever occurs first, with a 35 gpm safe maximum operating capacity and a 25 gpm maximum rate for continuous operation.	Badger Meter warrants Product low flow accuracy of 97% at a rate of 3/8 gpm for five (5) years from date of shipment or registration of 675,000 gallons, whichever occurs first.
Model 55, 1 in.	Five (5) years from date of shipment or registration of 1,000,000 gallons, whichever occurs first.	Fifteen (15) years from date of shipment or registration of 3,000,000 gallons, whichever occurs first, with a 55 gpm safe maximum operating capacity and a 40 gpm maximum rate for continuous operation.	Badger Meter warrants Product low flow accuracy of 95% at a rate of 1/2 gpm for three (3) years from date of shipment or registration of 575,000 gallons, whichever occurs first.
Model 70, 1 in.	Five (5) years from date of shipment or registration of 1,100,000 gallons, whichever occurs first.	Fifteen (15) years from date of shipment or registration of 3,250,000 gallons, whichever occurs first, with a 70 gpm safe maximum operating capacity and a 50 gpm maximum rate for continuous operation.	Badger Meter warrants Product low flow accuracy of 95% at a rate of 3/4 gpm for three (3) years from date of shipment or registration of 1,100,000 gallons, whichever occurs first.
Model 120, 1-1/2 in.	Two (2) years from date of shipment or registration of 1,600,000 gallons, whichever occurs first.	Fifteen (15) years from date of shipment or registration of 5,600,000 gallons, whichever occurs first, with a 120 gpm safe maximum operating capacity and a 80 gpm maximum rate for continuous operation.	Badger Meter warrants Product low flow accuracy of 95% at a rate of 1-1/4 gpm for two (2) years from date of shipment or registration of 1,440,000 gallons, whichever occurs first.
Model 170, 2 in.	Two (2) years from date of shipment or registration of 2,100,000 gallons, whichever occurs first.	Fifteen (15) years from date of shipment or registration of 10,400,000 gallons, whichever occurs first, with a 170 gpm safe maximum operating capacity and a 100 gpm maximum rate for continuous operation.	Badger Meter warrants Product low flow accuracy of 95% at a rate of 1-1/2 gpm for two (2) years from date of shipment or registration of 1,890,000 gallons, whichever occurs first.

PRODUCT RETURNS

Any Product proved to the satisfaction of Badger Meter to have failed the foregoing warranties will, at the option of Badger Meter, be repaired or replaced without charge to the Customer. Any eligible Product repaired or replaced by Badger Meter will retain the original Product's warranty based on the original Product purchase date, at Badger Meter's sole discretion. The Badger Meter obligation hereunder shall be limited to such repair and replacement and shall be conditioned upon Badger Meter receiving written notice of any alleged defect within ten (10) days after its discovery. This exclusive remedy shall not be deemed to have failed its essential purpose so long as Badger Meter is willing and able to replace defective products or issue a credit to purchaser within a reasonable time of proof to Badger Meter that a defect is involved. Product returns must be shipped by the Customer prepaid F.O.B. to the nearest Badger Meter factory or distribution center. The Customer shall be responsible for all direct and indirect costs associated with removing the original Product and reinstalling the repaired or replacement Product.

LIMITS OF LIABILITY

This warranty shall not apply to Product repaired or altered by parties other than Badger Meter. The foregoing warranty applies only to the extent that the Product is installed, serviced and operated strictly in accordance with AWWA Standard C700 and AWWA M6 Manual, as applicable. The warranty shall not apply and shall be void with respect to Product exposed to conditions other than those detailed in the Badger Meter Product technical and/or operational literature, or which have been exposed to adverse installation conditions, damaged by any water conditions and/or water quality, including but not limited to foreign matter in the water such as dirt, sand, minerals, debris, deposits, biofilms, extreme corrosivity, or other impurities, or which have been subject to passage of high-speed air slugs, vandalism, negligence, accident, acts of God, alteration, improper installation, operation or repair, or other circumstances which are beyond the reasonable control of Badger Meter. With respect to Product not manufactured by Badger Meter, the warranty obligations of Badger Meter shall in all respects conform and be limited to the warranty extended to Badger Meter by the supplier.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (except warranties of Title).

Any description of Product, whether in writing or made orally by Badger Meter or its agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets, or similar materials used in connection with any Customer's order are for the sole purpose of identifying Product and shall not be construed as an express warranty. Any suggestions by Badger Meter or its agents regarding use, application or suitability of Product shall not be construed as an express warranty unless confirmed to be such in writing by Badger Meter.

Exclusion of Consequential Damages and Disclaimer of Other Liability

Badger Meter liability with respect to breaches of the foregoing warranty shall be limited as stated therein. Badger Meter liability shall in no event exceed the contract price.

BADGER METER SHALL NOT BE SUBJECT TO AND DISCLAIMS:

- (1) ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR OF WARRANTY
- (2) ANY OBLIGATIONS WHATSOEVER ARISING FROM TORT CLAIMS (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR ARISING UNDER OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY BADGER METER, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO, AND
- (3) ALL CONSEQUENTIAL, INCIDENTAL AND CONTINGENT DAMAGES WHATSOEVER.

Making Water Visible®

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E-Series® Ultrasonic Plus Meter

with Integrated Valve

5/8 x 3/4 in., 3/4 in.

PRODUCTS

This warranty shall apply to all Badger Meter E-Series® Ultrasonic Plus lead-free meters with integrated valve, sizes 5/8 × 3/4 inch and 3/4 inch, when used to measure potable water, and the internal register/encoder and battery used with these meters (collectively "Product"), sold on or after May 11, 2020. This warranty is not transferable and is extended only to utilities, municipalities, other commercial users and authorized distributors, hereafter referred to as "Customer," and does NOT apply to consumers or any person or entity who is not an original customer of Badger Meter or its authorized distributors.

MATERIALS AND WORKMANSHIP

Badger Meter, Inc. ("Badger Meter") warrants Product to be free from defects in materials and workmanship for the time period stated.

Lead-Free Housing	20 years and 6 months after shipment
Battery ¹	20 years and 6 months after shipment
Transducers ¹	20 years and 6 months after shipment
Encoder Register ¹	20 years and 6 months after shipment
Meter Accuracy ^{1,2}	20 years and 6 months after shipment
Valve and Valve Power Module	5 years and 6 months after shipment or a maximum of 240 valve open and close actuation cycles

¹ Badger Meter will repair or replace, at its discretion, a non-performing Product at no cost during the first ten (10) years, and at a prorated price during the last ten (10) years of the warranty. Badger Meter will apply these prorated price discounts to the Product list prices at the time of Product return and according to the following prorated price discount schedule: Years 11 through 12 - 75% discount; Years 13 through 15 - 50% discount; Year 16 - 40% discount; Year 17 - 30% discount; Year 18 - 20% discount; and Years 19 through 20 - 10% discount. Replacement Products are warranted for and under the balance of the original applicable Product warranty.

² The Product will meet or exceed all applicable specifications outlined in AWWA Standard C715 in addition to meeting the meter accuracy as set forth in the Operating Performance Specifications of the Badger Meter current published product data sheet ([ESM-DS-02022-EN](#)).

PRODUCT RETURNS

Any Product proved to the satisfaction of Badger Meter to have failed the foregoing warranties will, at the option of Badger Meter, be repaired or replaced without charge to the Customer. Any eligible Product repaired or replaced by Badger Meter will retain the original Product's warranty based on the original Product purchase date, at Badger Meter's sole discretion. The Badger Meter obligation hereunder shall be limited to such repair and replacement and shall be conditioned upon Badger Meter receiving written notice of any alleged defect within ten (10) days after its discovery. This exclusive remedy shall not be

deemed to have failed its essential purpose so long as Badger Meter is willing and able to replace defective products or issue a credit to purchaser within a reasonable time of proof to Badger Meter that a defect is involved. Product returns must be shipped by the Customer prepaid F.O.B. to the nearest Badger Meter factory or distribution center. The Customer shall be responsible for all direct and indirect costs associated with removing the original Product and reinstalling the repaired or replacement Product.

LIMITS OF LIABILITY

This warranty shall not apply to Product repaired or altered by parties other than Badger Meter, or read by equipment not explicitly approved or licensed by Badger Meter. The foregoing warranty applies only to the extent that the Product is installed, serviced and operated strictly in accordance with AWWA Standard C715 and AWWA M6 Manual, as applicable. The warranty shall not apply and shall be void with respect to Product exposed to conditions other than those detailed in the Badger Meter Product technical and/or operational literature, or which, as determined at Badger Meter's sole discretion, have affected the ability of the Product to perform, including, but not limited to: exposure to adverse installation conditions; misuse; vandalism; negligence; accident; acts of God; alteration; improper installation, operation or repair; damage from passage of high-speed air slugs; damage by water quality conditions, including but not limited to: aggressive water, foreign matter, biofilms, or extreme corrosivity; damage caused by actions not in accordance with the intended use; or other circumstances which are beyond the reasonable control of Badger Meter, as determined at Badger Meter's sole discretion. With respect to product not manufactured by Badger Meter, the warranty obligations of Badger Meter shall in all respects conform and be limited to the warranty extended to Badger Meter by the supplier of product.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (except warranties of Title).

Any description of Product, whether in writing or made orally by Badger Meter or its agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets, or similar materials used in connection with any Customer's order are for the sole purpose of identifying Product and shall not be construed as an express warranty. Any suggestions by Badger Meter or its agents regarding use, application or suitability of Product shall not be construed as an express warranty unless confirmed to be such in writing by Badger Meter.

E-Series® Ultrasonic Plus Meter 5/8 x 3/4 in., 3/4 in.

Exclusion of Consequential Damages and Disclaimer of Other Liability

Badger Meter liability with respect to breaches of the foregoing warranty shall be limited as stated therein. Badger Meter liability shall in no event exceed the contract price. BADGER METER SHALL NOT BE SUBJECT TO AND DISCLAIMS: (1) ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR OF WARRANTY (2) ANY OBLIGATIONS WHATSOEVER ARISING FROM TORT CLAIMS (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR ARISING UNDER OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY BADGER METER, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO, AND (3) ALL CONSEQUENTIAL, INCIDENTAL AND CONTINGENT DAMAGES WHATSOEVER.

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Badger Meter

HR-E[®] LCD

High Resolution ELCD encoder

PRODUCTS COVERED

This Badger Meter warranty shall apply to the High Resolution ELCD encoder (HR-E LCD) ("Product"), sold on or after April 20, 2016. The warranty is extended only to utilities, municipalities, or other commercial users, and authorized Badger Meter, Inc. (Badger Meter[®]) distributors, hereinafter referred to as "Customer," and does NOT apply to consumers or any person or entity who is not an original customer of Badger Meter or its authorized distributors.

MATERIALS AND WORKMANSHIP

Badger Meter warrants the Product to be free from defects in materials and workmanship appearing within ten (10) years and six (6) months after shipment from Badger Meter.

PRODUCT RETURNS

Product failures must be proven and verified to the satisfaction of Badger Meter. The Badger Meter obligation hereunder shall be limited to such repair and replacement and shall be conditioned upon Badger Meter receiving written notice of any asserted defect within 10 (ten) days after its discovery. If the defect arises and a valid claim is received within the Warranty Period, at its option, Badger Meter will either (1) exchange the Product with a new, used or refurbished Product that is at least functionally equivalent to the original Product, or (2) refund the purchase price of the Product.

Product returns must be shipped by the Customer prepaid F.O.B. to the nearest Badger Meter factory or distribution center. The Customer shall be responsible for all direct and indirect costs associated with removing the original Product and reinstalling the repaired or replacement Product. A replacement Product assumes the remaining warranty of the original Product, or ninety (90) days from the date of replacement, whichever provides longer coverage.

LIMITS OF LIABILITY

This warranty shall not apply to any Product repaired or altered by any party other than Badger Meter. The foregoing warranty applies only to the extent that the Product is installed, serviced and operated strictly in accordance with Badger Meter instructions. The warranty shall not apply and shall be void with respect to a Product exposed to conditions other than those detailed in applicable technical literature, or which have been subject to vandalism, negligence, accident, acts of God, improper installation, operation or repair, alteration, or other circumstances which are beyond the reasonable control of Badger Meter.

With respect to products not manufactured by Badger Meter, the warranty obligations of Badger Meter shall in all respects conform and be limited to the warranty extended to Badger Meter by the supplier.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (except warranties of title).

Any description of a Product, whether in writing or made orally by Badger Meter or its agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets or similar materials used in connection with any Customer's order are for the sole purpose of identifying the Product and shall not be construed as an express warranty. Any suggestions by Badger Meter or its agents regarding use, application or suitability of the Product shall not be construed as an express warranty unless confirmed to be such, in writing, by Badger Meter.

EXCLUSION OF CONSEQUENTIAL DAMAGES AND DISCLAIMER OF OTHER LIABILITY

Badger Meter liability with respect to breaches of the foregoing warranty shall be limited as stated herein. Badger Meter liability shall in no event exceed the contract price. BADGER METER SHALL NOT BE SUBJECT TO AND DISCLAIM: (1) ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR OF WARRANTY, (2) ANY OBLIGATIONS WHATSOEVER ARISING FROM TORT CLAIMS (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR ARISING UNDER OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY BADGER METER, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO, AND (3) ALL CONSEQUENTIAL, INCIDENTAL AND CONTINGENT DAMAGES WHATSOEVER.

HR-E® LCD, High Resolution ELCD encoder

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Legacy document number: LCD-W-01



ORION® Cellular LTE-M, LTE-MS and LTE Endpoints

Network as a Service (NaaS)

PRODUCTS

This warranty shall apply to Badger Meter ORION® Cellular LTE-M, LTE-MS and LTE water endpoints and endpoint assemblies sold on or after August 3, 2020. Endpoint assemblies are water endpoints factory-connected or connected via a Badger Meter approved connector to Badger Meter HR-E® LCD and HR-E® encoders, or E-Series® Ultrasonic meters.

This warranty is not transferable and is extended only to utilities, municipalities, other commercial users and authorized distributors, hereafter referred to as "Customer" and does NOT apply to consumers or any person or entity who is not an original Customer of Badger Meter or its authorized distributors.

MATERIAL AND WORKMANSHIP

Badger Meter warrants all ORION Cellular LTE-M, LTE-MS and LTE water endpoints, including battery (configured to the standard mode of operation set by the factory at time of shipment) and endpoint assemblies, hereafter referred to as "Product(s)" as listed below, to be free from defects in material and workmanship for the time period stated.

ORION Water Endpoints ^{1,2}	20 years and 6 months after shipment
ORION Endpoint Assemblies ¹	20 years and 6 months after shipment

¹ Products are warranted to be free from defects in material and workmanship for twenty (20) years and six (6) months after shipment from Badger Meter. Badger Meter will repair or replace, at its discretion, a non-performing Product at no cost during the first ten (10) years, and at a prorated price during the last ten (10) years of the warranty. Badger Meter will apply these prorated price discounts to the Product list prices at the time of Product return and according to the following prorated price discount schedule:

Year	Discount %	Year	Discount %
11	70	16	45
12	65	17	40
13	60	18	35
14	55	19	30
15	50	20	25
		>20	0

Replacement Products are warranted for and under the balance of the original applicable Product warranty.

² ORION water endpoints that are sold factory-connected to an E-Series® meter are warranted per the 20-year proration shown above. Refer to the appropriate E-Series Ultrasonic Meter Warranty for meter, electronics and battery coverage.

GUARANTEE OF NETWORK PERFORMANCE

If the communication network that supports any ORION Cellular LTE-M, LTE-MS or LTE water endpoint in the Customer's meter service area ("Network") explicitly and publicly discontinues operation during the Product warranty time period stated herein, thereby rendering any endpoint unable to successfully transmit meter reading data ("Shut Down"), then for each Shut Down endpoint, as confirmed in writing by the Network operator and verified in writing by Badger Meter, Badger Meter will provide the following guarantee in exchange for applicable fees and minimum purchase commitments as described in the most current BEACON AMA Solution with ORION NaaS Pricing Terms and Conditions document from Badger Meter.

Badger Meter will supply a replacement endpoint that is supported by the most current technology readily available for full-scale use in the

Customer's meter service area affected by Shut Downs ("Replacement endpoints") at no charge to the Customer for such Replacement endpoints during the first ten (10) years of the Product warranty time period, and according to the prorated price discount schedule stated herein, during the last ten (10) years of the Product warranty time period. Replacement endpoints are warranted for and under the balance of the original applicable endpoint warranty.

The Customer shall be responsible for all other direct and indirect costs associated with the Replacement endpoints, including but not limited to costs associated with installation and maintenance. If the Customer agrees to pay for shipping and the most current Badger Meter published disposal fee per Replacement endpoint, Badger Meter will properly dispose of returned Shut Down endpoints.

PRODUCT RETURNS

Product failures must be proven and verified to the satisfaction of Badger Meter. The Badger Meter obligation hereunder shall be limited to such repair and replacement and shall be conditioned upon Badger Meter receiving written notice of any asserted defect within 10 (ten) days after its discovery. This exclusive remedy shall not be deemed to have failed its essential purpose so long as Badger Meter is willing and able to replace the defective Product for the Customer within a reasonable time, after receipt of proof that a defect is involved. Product returns must be shipped by the Customer prepaid F.O.B. to the nearest Badger Meter factory or distribution center. The Customer shall be responsible for all direct and indirect costs associated with removing the Product and reinstalling the repaired or replacement Product.

LIMITS OF LIABILITY

This warranty shall not apply to any Product repaired or altered by any Party other than Badger Meter. The foregoing warranty applies only to the extent that the Product is installed, serviced and operated strictly in accordance with Badger Meter instructions. The warranty shall not apply and shall be void with respect to Products exposed to conditions other than those detailed in Product technical literature or which have been subject to vandalism, negligence, accident, acts of God, improper installation, operation or repair, alteration or other circumstances which are beyond the reasonable control of Badger Meter. With respect to products not manufactured by Badger Meter, the warranty obligations of Badger Meter shall in all respects conform and be limited to the warranty extended to Badger Meter by the supplier.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (except warranties of Title).

Any description of the Product, whether in writing or made orally by Badger Meter or its agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets or similar materials used in connection with any Customer's order are for the sole purpose of identifying the Product and shall not be construed as an express warranty. Any suggestions by Badger Meter or its agents regarding use, application or suitability of the Product shall not be construed as an express warranty unless confirmed to be such, in writing, by Badger Meter.

ORION® Cellular LTE-M, LTE-MS and LTE Endpoints, Network as a Service (NaaS)

Exclusion of Consequential Damages and Disclaimer of Other Liability

The liability of Badger Meter with respect to breaches of the foregoing warranty shall be limited as stated herein. Badger Meter liability shall in no event exceed the contract price. BADGER METER SHALL NOT BE SUBJECT TO AND DISCLAIMS: (1) ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR OF WARRANTY, (2) ANY OBLIGATIONS WHATSOEVER ARISING FROM TORT CLAIMS (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR ARISING UNDER OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY BADGER METER, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO, AND (3) ALL CONSEQUENTIAL, INCIDENTAL AND CONTINGENT DAMAGES WHATSOEVER.

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HUBBELL LENOIR CITY, INC. TERMS & CONDITIONS OF SALES

Hubbell Lenoir City, Inc. (hereinafter called HLC) hereby gives notice of its exception to any different or additional terms and conditions other than as stated herein. All sales are expressly made conditional on Buyer's assent to the following terms and conditions. Buyer's acceptance of the provisions of HLC's terms and conditions as recited herein shall be conclusively presumed upon Buyer's receipt of the goods, or if no written objection is received by HLC within fifteen (15) days from the date on HLC's order acknowledgment, whichever event shall first occur. These terms and conditions constitute the entire agreement between HLC and Buyer, and supersede other communications between the two parties, whether written or oral.

PRICING

Refer to appropriate Price Schedule, unless otherwise quoted.

TERMS

HLC's payment terms are net 30 days. Invoices will be dated the day of shipment. A service charge of 1-1/2% per month or, if such rate exceeds the maximum lawful rate, the maximum lawful rate shall be assessed on all past due accounts and shall be payable on demand.

QUOTATIONS

Unless otherwise stated in writing, HLC's quotations are subject to acceptance by the Buyer within thirty (30) days from the date of issue.

SALES AND SIMILAR TAXES

HLC's prices do not include any sales, use, excise or similar taxes. Consequently, in addition to the price specified herein, the amount of any present or future sales, use, excise or other similar tax applicable to the sale or use of the goods hereunder, shall be paid by the Buyer, or in lieu thereof the Buyer shall provide HLC with a tax exemption certificate acceptable to the taxing authorities.

ACCEPTANCE OF ORDERS

All orders are subject to acceptance by HLC at its main office at 3621 Industrial Park Drive, Lenoir City, TN, USA, and to "HLC Terms and Conditions of Sales". Any other terms proposed by Buyer are rejected unless expressly accepted in writing. Orders shall be deemed to be executed in the State of Tennessee and shall be construed and performed in accordance with the Laws of that State. Acceptance of any order is subject to availability of product and the ability of HLC to deliver. Orders will be billed at prices in effect at time of shipment unless otherwise agreed. Unless, otherwise stated in writing, HLC reserves the right to ship plus or minus 10% of specified quality for special products that are made to order.

SALES BY AGENTS

Sales by agents or through overseas representatives shall be at prices, terms and conditions of sale specified by HLC. All invoices will be issued by and payment remitted to HLC.

DELAY

HLC will use reasonable efforts to meet shipment or delivery dates specified by HLC, but such dates are estimates only. HLC shall in no event be liable for any delay or nondelivery if such delay or nondelivery is caused directly or indirectly by Acts of God, fire, flood, strike or lockout or other labor dispute, accident, civil commotion, riot, war, governmental regulation or order, whether or not it later proves to be invalid, or from any other cause or causes (whether or not similar to any of the foregoing) beyond HLC's control. In no case will HLC be liable for loss of profits or any special or consequential damages on account of any delay in delivery or nondelivery whether or not excused hereunder.

SHIPPING DEFERMENT

Buyer requests for shipping deferment must be approved by HLC and are subject to price negotiation.

LIMITED WARRANTY AND LIMITATION OF LIABILITY

MATERIAL: HLC warrants all products sold by it to be merchantable (as such term is defined in the Uniform Commercial Code) and to be free from defects in material and workmanship for a period of one (1) year (or as otherwise specified) from the date of original shipment by HLC when stored, installed, operated or maintained in accordance with recommendations of HLC and standard industry practice and when used under proper and normal use. Buyer must notify HLC promptly of any claim under this warranty. NO OTHER WARRANTY, WHETHER EXPRESS OR ARISING BY OPERATION OF THE LAW, COURSE OF DEALING, USAGE OF TRADE OR OTHERWISE IMPLIED, SHALL EXIST IN CONNECTION WITH HLC'S PRODUCTS OR ANY SALE OR USE THEREOF. HLC SHALL IN NO EVENT BE LIABLE FOR ANY LOSS OF PROFITS OR CONSEQUENTIAL OR SPECIAL DAMAGES INCURRED BY BUYER. HLC's warranty shall run only to the first Buyer of a product from retain cosmetic imperfections that do not impact the Product's performance;

Effective May 16, 2019



HLC, from HLC's Buyer, or from an original goods manufacturer reselling HLC's product, and is non-assignable and non-transferable and shall be of no force and effect if asserted by any person other than such first Buyer. This warranty applies only to the use of the product as intended by HLC and does not cover any modification, misapplication, alteration, repair or misuse of said product by Buyer or others, or for damage caused thereto by negligence, accident, or improper use by Buyer or others. This warranty does not include reimbursement for the expenses of labor, transportation, removal or reinstallation of products. Products may contain certain cosmetic imperfections that do not impact the Product's performance; these cosmetic imperfections are not considered defects in material or workmanship and shall not be covered by any HLC warranty.

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Effective May 16, 2019



INSTALLATION GUIDES

**Badger Meter**

High Resolution LCD Encoders

HR-E[®] LCD, HR-E[®] LCD 4-20

IMPORTANT

For proper handling of the higher reading resolution and the extended status indicator capabilities of the HR-E LCD encoder, the following software versions are required for your reading system:

Reading Data Management Software

- ReadCenter[®] Data: Version 1.11.12.27 or higher (does not include extended status indicator capabilities)
- ReadCenter Analytics and ReadCenter Analytics Mobile: Version 2.12.7.6 or later

Mobile Reading Systems

- ORS: Version 2.2.1 or later

Handheld Reading Systems

- Badger Meter Field Application Suite: Version 2.2.3 or later
- ORION Field Application route reading software: Version 2.2.3 or later
- ORION Endpoint Utility programming & quick read software: Version 2.2.2 or later
- Please contact Badger Meter Technical Support at 1-800-456-5023 or the appropriate endpoint provider if you need assistance.

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INTRODUCTION

This is the user manual for the High Resolution (HR) LCD encoders.

Audience and Purpose

This manual is intended to be used by utilities for installing and using HR-E LCD and HR-E LCD 4-20 encoders.

Product Unpacking and Inspection

Upon opening the shipping container, visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts, or any other sign of damage that may have occurred during shipment.

NOTE: If damage is found, request an inspection by the carrier's agent within 48 hours of delivery and file a claim with the carrier. A claim for equipment damage in transit is the sole responsibility of the purchaser.

License Requirements

This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Any changes made by the user not approved by Badger Meter can void the user's authority to operate the equipment.

DESCRIPTION

High resolution encoders are fully electronic, solid-state devices with no moving parts. The devices come standard as factory programmed, with the option for programming in the field. Programming is performed through the device IR port via a computer. The programming kit (**PN: 67660-001**) can be ordered through Customer Service.

NOTE: Refer to the document, *High Resolution LCD Encoder Programmer Manual*, available at www.badgermeter.com, for programming instructions.

HR-E LCD

The HR-E LCD is a permanently sealed, electronic LCD absolute encoder with field-programmable options that produces an industry standard ASCII encoded output. HR-E LCD encoders are designed for use with all current Badger Meter Recordall® Disc, Turbo Series, Compound Series, Combo Series and Fire Service meters and assemblies. The encoders provide connectivity with Badger Meter ORION® and GALAXY® AMR/AMI endpoints and other AMR/AMI technology solutions approved by Badger Meter.

HR-E LCD 4-20

The HR-E LCD 4-20 is a permanently sealed, electronic LCD absolute encoder that produces an industry standard ASCII encoded output as well as an analog 4-20 mA DC output signal with a dual output wire design. HR-E LCD 4-20 encoders are designed for use with all current Badger Meter Recordall® Disc, Turbo Series, Compound Series, Combo Series and Fire Service meters and assemblies. The encoders provide connectivity with Badger Meter ORION AMR/AMI endpoints and other AMR/AMI technology solutions approved by Badger Meter.

PRODUCT OVERVIEW

LCD Display

HR-LCD encoders have a nine-digit Liquid Crystal Display (LCD) to show consumption, flow and alarm information.

There is no need to activate the display. The display automatically toggles between consumption (segmented leak detector in this mode), rate of flow and meter model.

NOTE: Devices are shipped in storage mode so that a meter status alarm is not triggered. In storage mode, the meter model screen is displayed.

Multiplier Value

Depending on the meter model, size and unit of measure, a multiplier value may also be shown. Multiply the displayed value by the multiplier value to calculate the reading to the nearest gallon, cubic foot, or cubic meter.

Example: 123456 (displayed value) x 10 (multiplier value) = 1234560

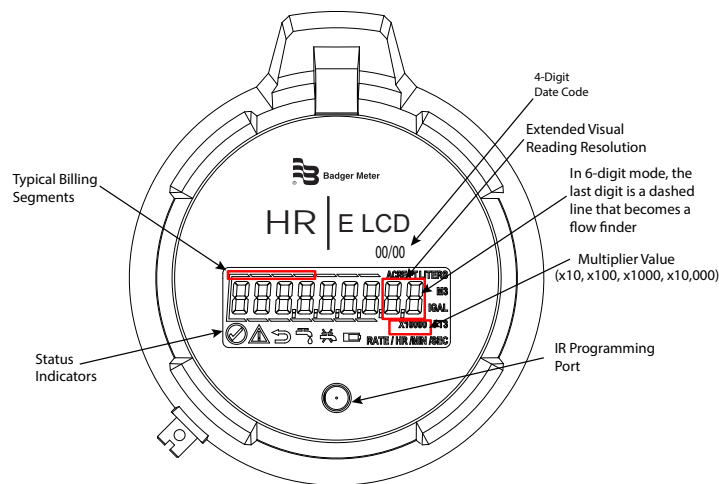


Figure 1: HR-E LCD encoder face

Visual Display

Units of Measure

The units of measure are factory-programmed and user-programmable. Options include U.S. gallons, Imperial gallons, cubic feet, cubic meters and liters.

9-Digit Totalization

The consumption display includes all nine digits and a decimal point (based on meter model, size and unit of measure). The displayed value is the sum of the forward flow minus any reverse flow. This screen displays for 45 seconds.

Model 25 Disc Series Meter Calibrated in Gallons



6-Digit Totalization

6-digit totalization mode is used to represent the typical 6 wheel odometer registration as seen on a mechanical encoder. When water is flowing through the meter, the display includes a series of moving segments to represent a flow finder. This screen displays for 5 seconds. 6-digit totalization mode is active on the HR-E LCD and HR-E LCD 4-20 encoders.

Model 25 Disc Series Meter Calibrated in Gallons



In 9- and 6-digit totalization mode, the display also includes indicator lines above and below the digits to provide the electronic equivalent of the white and black number wheels on a mechanical encoder. The segmented lines above and below the numbers represent what the white number wheels do for mechanical encoders—typical utility standard billing units.

For more detailed information on the visual totalizer displays, see the application brief, *How to Read an Encoder*, available at www.badgermeter.com.

Rate of Flow

The rate of flow is factory programmed to gallons per minute. The device displays both the unit of measure and rate of flow. The rate of flow display is shown without leading zeros. A reverse flow is indicated by a minus sign before the flow rate. The displayed rate will be based on the average flow rate for the prior minute (since the last time the flow rate was displayed). This screen displays for 5 seconds.

Model 25 Disc Series Meter Calibrated in Gallons



Meter Model Information

The meter model information screen identifies the meter for which the encoder was programmed and displays for 5 seconds. The display shows the meter type (turbo, disc, compound), the meter model, digit resolution from the device, and the unit of measure (gal, ft³, m³, imp, liter). Disc meters are indicated by a **d**, Turbo meters are indicated by a stylized **T** (only the right half of the horizontal line appears) and Compound meters are indicated by a **C**. See examples below:

Model 25 Disc Series Meter Calibrated in Gallons



Model 450 Turbo Series Meter Calibrated in Gallons



2 in. Low Side Compound Series Meter Calibrated in Cubic Feet



The meter model information screen also displays the digit resolution sent from the encoder.

NOTE: Resolution sent to the reading data management software is dependent on the endpoint connected to the device. See "[Endpoint Reading Resolution](#)" on [page 7](#) and [page 10](#) for more information.

INSTALLING THE ENCODER

Bayonet Mount

The fully potted assembly has a bayonet mount compatible with all Recordall Disc, Turbo Series, Compound Series, Combo Series and Fire Series meters and assemblies.

The bayonet mount positions the encoder in any of four orientations for visual reading convenience. The device can be removed from the meter without disrupting water service.

The device is permanently sealed to eliminate the intrusion of moisture, dirt or other contaminants, and is suitable for installation in all environments, including meter pits subject to continuous submergence.

Install the device on the water meter and secure it using the tamper-proof screw provided.

Wire Connections

The following connection options are available. For more information on in-line connectors, refer to the document, *ORION Water Endpoints Installation Manual*, available at www.badgermeter.com.

HR-E LCD

The HR-E LCD encoder has a single cable, available with three different wiring options. Refer to [Figure 2](#).

- In-line connector
- Flying lead for field splice connection
- Prewired to an AMR/AMI endpoint

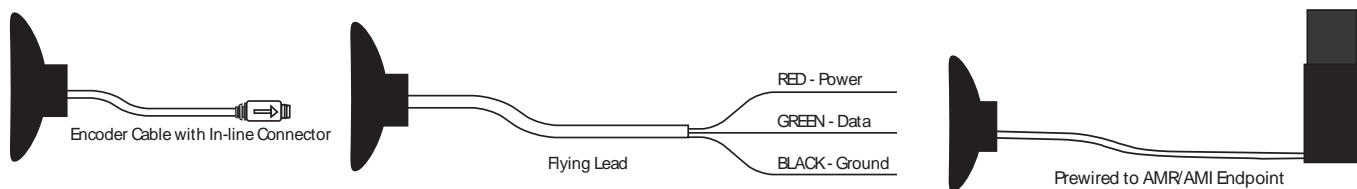


Figure 2: HR-E LCD wiring options

HR-E LCD 4-20

The HR-E LCD 4-20 encoder is available with dual output wire connections. Refer to [Figure 3](#).

Encoder side cable

- In-line connector
- Flying lead for field splice connection

4-20 side cable

- Flying lead for field splice connection



Figure 3: HR-E LCD 4-20 wiring options

HR-E LCD

The HR-E LCD is a permanently sealed, electronic LCD absolute encoder which produces an industry standard ASCII encoded output.

Measurement Resolution

Recordall Disc Series	Size (in.)	9-Digit Encoder		
		Gallons	Cubic Feet	Cubic Meters
LP	5/8, 5/8 x 3/4	0.01	0.001	0.0001
M25	5/8, 5/8 x 3/4	0.01	0.001	0.0001
M35	3/4	0.01	0.001	0.0001
M40	1	0.01	0.001	0.0001
M55	1	0.01	0.001	0.0001
M70	1	0.01	0.001	0.0001
M120	1-1/2	0.1	0.01	0.001
M170	2	0.1	0.01	0.001

Recordall Turbo Series	Size (in.)	9-Digit Encoder		
		Gallons	Cubic Feet	Cubic Meters
T160	1-1/2	0.1	0.01	0.001
T200	2	0.1	0.01	0.001
T450	3	0.1	0.01	0.001
T1000	4	0.1	0.01	0.001
T2000	6	1	0.1	0.01
T3500	8	1	0.1	0.01
T5500	10	1	0.1	0.01
T6200	12	10	1	0.01
T6600	16	10	1	0.01
T10000	20	10	1	0.01

Recordall Compound Series	Size (in.)	9-Digit Encoder		
		Gallons	Cubic Feet	Cubic Meters
High Side T200	2	0.1	0.01	0.001
Low Side M25	2	0.01	0.001	0.0001
High Side T450	3	0.1	0.01	0.001
Low Side M25	3	0.01	0.001	0.0001
High Side T1000	4	0.1	0.01	0.001
Low side M35	4	0.01	0.001	0.0001
High Side T2000	6	1	0.1	0.01
Low Side M35	6	0.01	0.001	0.0001
High Side T3500	8	1	0.1	0.01
Low side M120	8	0.1	0.01	0.001

Endpoint Reading Resolution

IMPORTANT

The standard electronic encoder output resolution of the HR-E LCD encoder is 9 digits. Though the encoder output is 9-digit resolution, the reading resolution sent to the reading software is dependent on the endpoint that the encoder is connected to. Readings reported from the endpoints are the left-most significant digits of the encoder reading.

Endpoint Technology	Reading Resolution Reported to Reading Software
ORION Cellular	9-digit reading, plus the extended message capability
ORION Migratable (ME)/Fixed Network (SE)	8-digit reading, plus the extended message capability
ORION Classic (CE)	7-digit reading
GALAXY	6-digit reading

See the application brief, *HR-E LCD Encoder Test Circle Codes*, available at www.badgermeter.com, for the appropriate test circle code/reading resolutions for the HR-E LCD encoder with ORION or GALAXY endpoints. Other output options are available for certain applications.

HR-E LCD







Status Indicators

Status indicators are sent as part of the encoder message to AMR/AMI systems that are capable of receiving an extended message, such as ORION Cellular, Fixed Network (SE) and Migratable (ME) endpoints. The details can also be read through an IR interface.

Status indicators appear in the display as symbols that illuminate when the condition is active and dim when the condition is eliminated.

All HR-E LCD encoders are delivered in storage mode so that a meter alarm is not triggered. During storage mode, the meter model displays on the encoder. As water begins to flow through the meter, the encoder switches from storage mode to normal operation upon sensing two (2) revolutions of the meter magnet.

The following chart indicates the HR-E LCD encoder conditions when connected to a Badger Meter ORION Cellular, Fixed Network or Migratable endpoint. The chart does *not* apply to ORION Classic (CE) or GALAXY endpoints, or HR-E LCD encoders programmed to a resolution lower than a 9-digit output. The HR-E LCD encoder displays the information, but the extra information is not reported through the endpoints.

Status Indicator	Icon	Status Description	HR-E LCD Display	HR-E LCD with ORION Cellular or Fixed Network* and Migratable* Endpoints <small>*Firmware version 1.8 or higher required</small>
Meter functioning correctly		Encoder operating correctly.	Continuous display on encoder as long as no other status indicators are triggered.	Indicator status not sent to the endpoint.
Encoder alarm		Several potential conditions may exist, including: Encoder removal Temperature limit exceeded (34...140° F) Magnetic tamper	Encoder alarm remains active for 35 days. The alarm automatically clears after 35 days if any of the 3 conditions has not recurred.	Encoder alarm sent to the endpoint.
Reverse flow		Encoder detects reverse flow.	Reverse flow alarm remains active for 35 days. The alarm automatically clears after 35 days if reverse flow condition has not recurred.	Encoder detects reverse flow and sends alarm message to the endpoint.
Suspected leak		Encoder detects 24 hours without one 15-minute interval of no flow.	The alarm clears automatically when a 15-minute no-flow interval occurs.	Encoder detects suspected leak and sends alarm message to the endpoint. If condition clears before message is sent to the endpoint, it is not reported.
30 day no usage		No measured flow in past 30 days.	The alarm is automatically cleared once flow occurs.	Encoder detects 30 days no usage and sends alarm to the endpoint.
End of life battery indicator		Indicated battery life based on pre-calculated consumption.	Alarm activated at 19 years and does not clear.	Encoder sends alarm to the endpoint.

HR-E LCD 4-20

The HR-E LCD 4-20 is a permanently sealed, electronic LCD absolute encoder which produces an industry standard ASCII encoded output as well as a 4-20 mA DC output signal through a dual output wire design.

Measurement Resolution

Standard encoded output is 9 digits. The 4-20 signal from the encoder is proportional to the flow of fluid passing through the meter. Power for the 4-20 output signal device can be obtained from a 9...50V DC control loop. The default 20 mA setting of the signal is defined in the resolution chart.

Recordall Disc Series	Size (in.)	Encoder Output			Analog Output
		9-dial (gal)	9-dial (ft ³)	9-dial (m ³)	20 mA Set point (gpm)
LP	5/8, 5/8 x 3/4	0.01	0.001	0.0001	20
M25	5/8, 5/8 x 3/4	0.01	0.001	0.0001	25
M35	3/4	0.01	0.001	0.0001	35
M40	1	0.01	0.001	0.0001	40
M55	1	0.01	0.001	0.0001	55
M70	1	0.01	0.001	0.0001	70
M120	1-1/2	0.1	0.01	0.001	120
M170	2	0.1	0.01	0.001	170

Recordall Turbo Series	Size (in.)	Encoder Output			Analog Output
		9-dial (gal)	9-dial (ft ³)	9-dial (m ³)	20 mA Set point (gpm)
T160	1-1/2	0.1	0.01	0.001	200
T200	2	0.1	0.01	0.001	310
T450	3	0.1	0.01	0.001	550
T1000	4	0.1	0.01	0.001	1250
T2000	6	1	0.1	0.01	2500
T3500	8	1	0.1	0.01	4500
T5500	10	1	0.1	0.01	7000
T6200	12	10	1	0.01	8800
T6600	16	10	1	0.01	13200
T10000	20	10	1	0.01	19800

Recordall Compound Series	Size (in.)	Encoder Output			Analog Output
		9-dial (gal)	9-dial (ft ³)	9-dial (m ³)	20 mA Set point (gpm)
High Side T200	2	0.1	0.01	0.001	200
Low Side M25	2	0.01	0.001	0.0001	25
High Side T450	3	0.1	0.01	0.001	450
Low Side M25	3	0.01	0.001	0.0001	25
High Side T1000	4	0.1	0.01	0.001	1000
Low side M35	4	0.01	0.001	0.0001	35
High Side T2000	6	1	0.1	0.01	2000
Low Side M35	6	0.01	0.001	0.0001	35
High Side T3500	8	1	0.1	0.01	—
Low side M120	8	0.1	0.01	0.001	—

Analog Output

- The input pulses generated within the transmitter assembly are converted to a standard 4-20 mA control signal.
- This signal is proportional to the flow of fluid passing through the flow meter.
- Power for the device can be obtained from a 9...50V DC control loop.
- The default 20mA setting of the signal is defined in the registration section.

Endpoint Reading Resolution

IMPORTANT

The standard electronic encoder output resolution of the HR-E LCD 4-20 encoder is 9 digits. Though the encoder output is 9-digit resolution, the reading resolution sent to the reading software is dependent on the endpoint that the encoder is connected to. Readings reported from the endpoints are the left-most significant digits of the encoder reading.

Endpoint Technology	Reading Resolution Reported to Reading Software
ORION Cellular	9-digit reading, plus the extended message capability
ORION Migratable (ME)/Fixed Network (SE)	8-digit reading, plus the extended message capability
ORION Classic (CE)	7-digit reading

See the application brief, *HR-E LCD Encoder Test Circle Codes*, available at www.badgermeter.com, for the appropriate test circle code/reading resolutions for the encoder with ORION endpoints. Other output options are available for certain applications.







Status Indicators

Status indicators are sent as part of the encoder message to AMR/AMI systems that are capable of receiving an extended message, such as ORION Cellular, Fixed Network (SE) and Migratable (ME) endpoints. The details can also be read through an IR interface.

Status indicators appear in the display as symbols that illuminate when the condition is active and dim when the condition is eliminated.

All HR-E LCD 4-20 encoders are delivered in storage mode so that a meter alarm is not triggered. During storage mode, the meter model displays on the encoder. As water begins to flow through the meter, the encoder switches from storage mode to normal operation upon sensing two (2) revolutions of the meter magnet.

The following chart indicates the HR-E LCD 4-20 encoder conditions when connected to a Badger Meter ORION Cellular, Fixed Network or Migratable endpoint. The chart does *not* apply to ORION Classic (CE) or GALAXY endpoints, or HR-E LCD 4-20 encoders programmed to a resolution lower than a 9-digit output. The HR-E LCD 4-20 encoder displays the information, but the extra information is not reported through the endpoints.

Status Indicator	Icon	Status Description	HR-E LCD 4-20 Display	HR-E LCD 4-20 with ORION Cellular or Fixed Network* and Migratable* Endpoints <small>*Firmware version 1.8 or higher required</small>
Meter functioning correctly		Encoder operating correctly.	Continuous display on encoder as long as no other status indicators are triggered.	Indicator status not sent to the endpoint.
Encoder alarm		Several potential conditions may exist, including: Encoder removal Temperature limit exceeded (34...140° F) Magnetic tamper	Encoder alarm remains active for 35 days. The alarm automatically clears after 35 days if any of the 3 conditions has not recurred.	Encoder alarm sent to the endpoint.
Reverse flow		Encoder detects reverse flow.	Reverse flow alarm remains active for 35 days. The alarm automatically clears after 35 days if reverse flow condition has not recurred.	Encoder detects reverse flow and sends alarm message to the endpoint.
Suspected leak		Encoder detects 24 hours without one 15-minute interval of no flow.	The alarm clears automatically when a 15-minute no-flow interval occurs.	Encoder detects suspected leak and sends alarm message to the endpoint. If condition clears before message is sent to the endpoint, it is not reported.
30 day no usage		No measured flow in past 30 days.	The alarm is automatically cleared once flow occurs.	Encoder detects 30 days no usage and sends alarm to the endpoint.
End of life battery indicator		Indicated battery life based on pre-calculated consumption.	Alarm activated at 19 years and does not clear.	Encoder sends alarm to the endpoint.

High Resolution LCD Encoders, HR-E® LCD, HR-E® LCD 4-20

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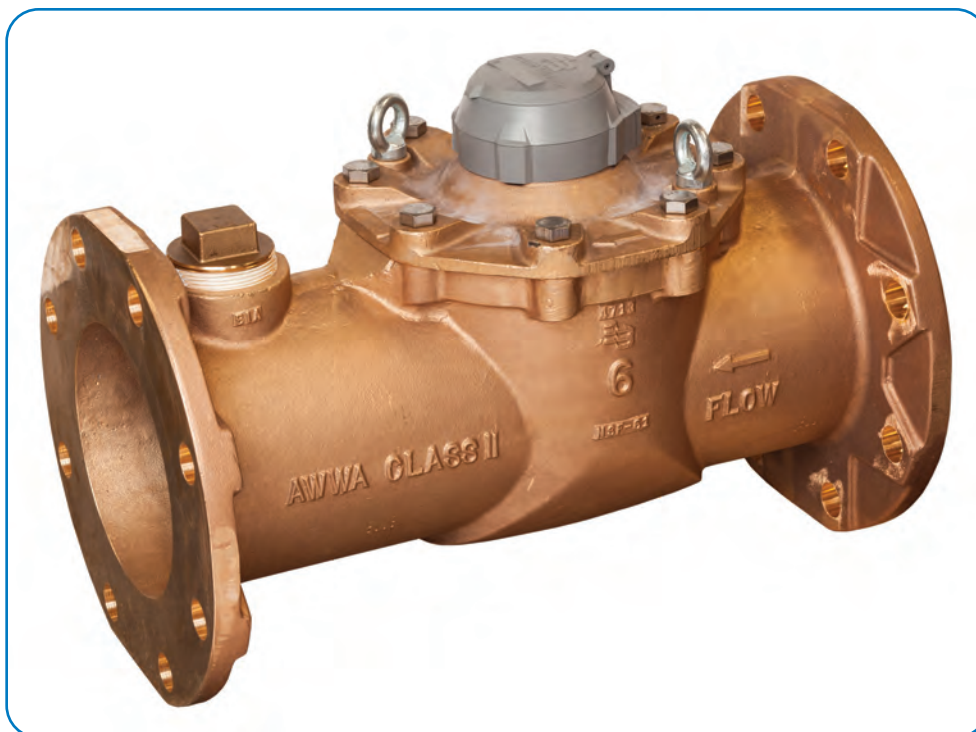
Legacy Document Number: LCD-IOM-01-EN



Badger Meter

Recordall® Turbo Series Meters

Models 160 (1-1/2 in.), 200 (2 in.), 450 (3 in.), 1000 (4 in.),
2000 (6 in.), 3500 (8 in.), 5500 (10 in.) and 6200 (12 in.)



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SCOPE OF THIS MANUAL

This manual contains installation, operation and maintenance procedures for the Badger Meter® Recordall® Turbo Series meters with magnetic drives. To provide efficient operation of the meters, read and understand the instructions in this manual. Retain the manual in a location where it is readily available.

PRODUCT INFORMATION

Product Description

The Recordall Turbo Series meters use proven design features such as thrust-compensated rotor geometry, direct drive magnetic coupling, and dual outboard rotor bearings to achieve high accuracy over a broad flow range. Extended product service life is achieved at higher levels of accuracy, in addition to lower meter maintenance costs. The Turbo meters are available in 1-1/2, 2, 3, 4, 6, 8, 10 and 12 inch sizes.

Incorporating unitized construction with corrosion-resistant assemblies, the basic components of the Recordall Turbo Series consist of the housing and the completely removable measuring element. The meter housing and cover plate are lead-free bronze (1-1/2...10 inch sizes). The 12 inch meter housings are cast iron with a heat fused epoxy coating. The measuring element is constructed of high-impact strength thermoplastics. Recordall Turbo Series meters are also equipped with an integral calibration mechanism for in-line accuracy calibration.

In the operation of a turbo meter, water flows through the straightening vanes and a nose cone at the inlet side of the meter so that the swirling effect of upstream piping is minimized. The water then strikes the rotor blades, causing the rotor to turn. A downstream nose cone includes straightening vanes to limit the downstream effects of flow profile distortions. Optional NPT test ports are provided for field performance testing.

Motion of the rotor is transferred by means of a worm drive to a vertical shaft driving a gear set, which transmits the rotation to the meter's registration device. The direct drive magnetic coupling provides accurate flow registration during line surges, and allows the permanently sealed register to be easily removed to facilitate in-line service.

Accessories

Meters and encoders are compatible with Badger Meter AMR/AMI meter reading systems and other approved reading technologies. All reading options can be removed from the meter without disrupting water service. Badger Meter encoders provide years of reliable, accurate readings for a variety of applications. See details at www.badgermeter.com.

A strainer is recommended to provide optimal flow conditioning and protection for the measuring element. An integral strainer is standard with the 1-1/2 inch meter and an available option for 2...4 inch meter sizes. The stainless steel strainer is built into the inlet end and includes a removable cover plate to permit easy access for routine cleaning. External strainers are available in sizes 2...12 inch.

Related Literature

Related literature is available at www.badgermeter.com.

- The *Recordall Turbo Series Meters Product Data Sheet* contains information on operating principle, meter construction, materials, tolerances and specifications.
- The *Recordall Turbo Series Meters Parts List* contains illustrations of parts, part numbers and part descriptions.

Safety Information

The installation of the Recordall Turbo Series meter must comply with all applicable federal, state and local rules, regulations and codes.

Failure to read and follow these instructions can lead to misapplication or misuse of the meter, resulting in personal injury and damage to equipment.

Unpacking and Inspection

To avoid damage in transit, Badger Meter Recordall Turbo Series meters are shipped to the customer in special shipping containers. Upon receipt of shipment, be sure to follow these unpacking and inspection procedures:

- NOTE:** If damage to a shipping container is evident upon receipt of a meter, request that a representative of the carrier be present when the meter is unpacked.
- a. Carefully open the shipping container, following any instructions that may be marked on the container. Remove all cushioning material surrounding the meter and carefully lift the meter from the container. Keep the container and all packing material for possible use in reshipment or storage.
 - b. Visually inspect the meter and applicable accessory devices for any signs of damage such as scratches, loose or broken parts or other physical damage that may have occurred during shipment.

NOTE: If damage is found, request an inspection by carrier's agent within 48 hours of delivery. Then file a claim with the carrier. A claim for equipment damaged in transit is the responsibility of the customer.

INSTALLATION

Procedures for installing Recordall Turbo Series meters are essentially the same for all meter sizes. Any special instructions required for the installation or connection of accessory devices such as AMR/AMI technologies or strainers is provided in the literature for those devices. *Figure 1* shows a recommended meter installation.

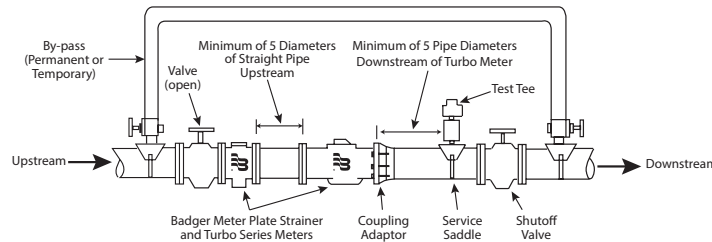


Figure 1: Recommended meter installation

Preinstallation Considerations

Before proceeding any further with the installation, first read the instructions in the paragraphs immediately following to become familiar with the requirements and procedures involved.

IMPORTANT

The meter must be installed horizontally in the line with the register upright.

- Be sure that the meter flow range and size of the meter coincide with the intended service and demand for water.

CAUTION

THE LIFE OF THE TURBO METER WILL BE CURTAILED IF OPERATED AT FLOW RATES HIGHER THAN SPECIFIED.

- The meters are designed for use in cold water service (up to 120° F or 49° C) within the applicable flow requirements for Turbo meters. For use with water at higher temperatures, consult Badger Meter Tech Support.
- If solid material is present in the water to be metered, a strainer must be installed in the service piping upstream of the meter. The strainer, in addition to protecting the meter from debris in the line, minimizes the effect of velocity profile distortions or turbulence caused by changes in pipe direction or valving resulting in more accurate registration.
- Avoid locating the meter in close quarters. Allow sufficient space to permit access for meter reading, testing, and maintenance.
- Because of the need to test large meters periodically to verify their performance, it is recommended that a bypass system be incorporated into the piping arrangement. This will also provide a means of performing periodic clean out and routine maintenance without interrupting service to the customer. An optional test port is incorporated in the meter housing and can be used for field accuracy testing.
- The Recordall Turbo Series meter is accuracy and pressure tested prior to shipment, therefore no field adjustments are required. As turbine performance is directly related to the flow conditions of the water stream entering the meter, upstream fittings and piping changes can adversely affect flow registration. For valid registration and proper performance, consider the following installation considerations:
 - When installing the meter with a separate plate strainer or integral strainer, a minimum of 5 pipe diameters of straight, unobstructed pipe is recommended upstream of the meter. For optimum protection and accuracy, this straight pipe spool piece should be installed between the separate strainer and meter (see *Figure 1*). A minimum of 10 pipe diameters (minimum of 25 pipe diameters for smallest size) of straight unobstructed pipe is recommended upstream of a meter installed without a plate strainer. The deletion of a strainer, however, is not recommended. This allows for dampening of velocity profile distortions caused by elbows, pumps and dirt traps upstream of the meter. Where spiral flows are created by three dimensional elbows or rotary pumps, additional distance to dampen the effect is beneficial. If a basket or Y-type strainer is used, place it 5 to 10 pipe diameters upstream of the meter to dampen velocity profile distortions created by this design.

Installation

- Do not install check valves or pressure reducing devices upstream of the meter.
- Valves immediately upstream of the meter should only be fully-open gate valves. Butterfly valves are acceptable if they are 5 pipe diameters or more upstream from the meter. Downstream, fully open gate or butterfly valves can be used.
- The service saddle (or reducing tee), which is used for field accuracy testing, should be at least 2 pipe diameters downstream of the meter's outlet flange.
- Unweighted check valves should not be located closer than 3 pipe diameters downstream of the meter.
- Externally weighted check valves and pressure reducing devices should not be located closer than 5 pipe diameters of the meter.
- When installing a Turbo meter and plate strainer of a size smaller than the pipe installation, to reduce the effect of jetting caused by the increase in flow velocity, a minimum of 5 pipe diameters of pipe equal in size to the meter, is required upstream of the meter. Additional length is required if a sharp contraction or an eccentric reducer, rather than a concentric, tapered reducer is used.

Installing the Meter

Overall dimensions and laying lengths of each meter size are listed in the Recordall Turbo Series Meter Product Data Sheet. Review the dimensional requirements, choose an installation point in the piping, and proceed as follows:

1. Measure precisely the overall length of the meter with gaskets attached to the inlet and outlet flange connections.
2. Provide proper gap length in service piping.
3. Install meter in the pipeline so that the flow arrow on the meter housing points in the same direction as water flow.
4. With meter and gaskets in place, tighten flange connection bolts.
5. To relieve possible strain on the piping, position a meter support under the meter housing where appropriate.

⚠ CAUTION

TURBINE METERS MUST OPERATE IN A COMPLETELY FILLED LINE AT ALL TIMES. THE DOWNSTREAM PIPING MUST ALWAYS BE ARRANGED TO PROVIDE SUFFICIENT BACK PRESSURE TO MAINTAIN A FULL LINE AT THE METER. BY ELIMINATING AIR IN THE LINE, AS WELL AS SUDDEN FLOW SURGES, INACCURATE REGISTRATION AND DAMAGE TO THE TURBINE MECHANISM CAN BE AVOIDED.

Performance Checks

Any valves or devices controlling the flow of water through a Turbo meter must always be opened and closed SLOWLY to prevent shock loads that may damage the meter's rotor assembly.

Complete the following checks to ensure that a Turbo meter is properly installed and operational:

- Slowly open the upstream valve to apply water pressure to the meter and check for leaks. Tighten the flange bolts as required.
- Perform a functional test of the meter. Slowly open valve on downstream side of the meter to evacuate any air that may have been trapped in the service line. To effectively evacuate the air, run a minimum of 25% of the rated flow rate of the meter for at least 2 minutes. When air has been eliminated, increase demand flow rate by further opening the downstream valve or valves. Observe the register for correct direction of flow. Continue to open the demand side valves to a fully open position. The high flow pointer will now move in the proper direction. Now open all applicable service valves.
- Check the flow rate to verify that the flow does not exceed the maximum continuous duty specification. The rate of flow can be quickly checked by timing the quantity registered through the meter in one minute.

MAINTENANCE

This section is limited to information pertaining to the general maintenance of Badger Meter Recordall Turbo Series meters. An exploded view of the meter, along with part numbers and descriptions, are provided in the *Recordall Turbo Series Meters Parts List*.

Maintenance Equipment

The tools and equipment recommended for use in servicing and maintaining of Recordall Turbo Series meters consist of the usual complement of hand tools used by plumbers and mechanics.

Preventive Maintenance

The purpose of preventive maintenance is to ensure efficient operation and long life of the meter by detecting and correcting any defect that might damage the meter or cause it to fail. Preventive maintenance consists of periodic inspection, accuracy testing and cleaning procedures.

Periodic Inspection

- Visually inspect the meter for missing hardware, loose screws, broken or scratched register lenses or any other signs of wear or deterioration.
- Verify that the meter is operating at the proper flow rate and pressure. A loss in pressure, coupled with a decrease in flow rate, may indicate that the screen in the upstream pipeline—or the meter itself—is clogged with foreign material and needs cleaning.

Cleaning

- Clean all dirt, grease, moisture or other foreign material from the exterior of the meter. After cleaning, rinse thoroughly with water.
- In the event that system pressure has been reduced and the upstream filter or meter is clogged, the foreign material must be flushed out. To flush the screen, open the cleanout plug and purge the foreign material with fresh water from the service line. If cleaning the screen does not restore system pressure, the Turbo meter also should be flushed by purging with fresh service water through the cleanout plugs located on the housing.
- Integral Strainer Units: Before attempting service/maintenance of strainer section, system pressure must be removed. After system pressure is removed, remove cover bolts and cover. Clean out/flush strainer section of all loose particles/debris. After cleaning is complete, reinstall screen and reassemble. Return meter to normal service.

Shutdown Instructions

If the turbo meter is to be shut down for an extended period of time or if it is being removed from service, Badger Meter recommends that the meter and measuring components be thoroughly flushed to prevent the settling out of undissolved solids or the accumulation of corrosive deposits. If there is an upstream strainer in the line, it also should be flushed at this time.

Calibration Check and Adjustment

The accuracy of the Recordall Turbo Series meters is tested at the factory before shipment. However, after a long period of service, it may be necessary to recalibrate a meter. The meter can be tested for accuracy using appropriate connections with either a test tank of known volume or a test meter. The meter can be tested in the setting by running output flow through the optional test port, if so equipped. The Recordall Turbo Series integral calibration mechanism can be adjusted under line pressure, simplifying and reducing calibration time. The following instructions are provided to assist in performing a calibration check and adjustment.

Accuracy Test

CAUTION

IF THE OPTIONAL TEST PORT IS TO BE USED, UPSTREAM AND DOWNSTREAM VALVES MUST BE CLOSED PRIOR TO REMOVING PLUG AND INSTALLING APPROPRIATE CONNECTIONS. FAILURE TO DO SO CAN LEAD TO PLUG BEING EJECTED FROM HOUSING, CAUSING PERSONAL INJURY AND/OR PROPERTY DAMAGE. WHEREVER AN INSTALLATION IS EQUIPPED WITH A DRAIN VALVE FOR METER FLUSHING, OPEN THE DRAIN VALVE TO RELIEVE PRESSURE WITHIN THE METER. IF THE INSTALLATION DOES NOT HAVE A DRAIN VALVE, CAREFULLY LOOSEN TEST PLUG UNTIL IT BEGINS LEAKING. STOP AND WAIT FOR PRESSURE TO BLEED DOWN, THEN CONTINUE TO SLOWLY LOOSEN, MAKING CERTAIN THE PRESSURE IS COMPLETELY BLED OFF BEFORE REMOVING.

1. After installing the appropriate connections, test the meter by closing the downstream valve (if using integral test port) and slowly opening the upstream valve. Slowly open the test circuit downstream valve to throttle flow for test purposes.
2. Place a test tank of known volume at the output of the meter. An alternative is to connect a calibrated test meter to the output. Accuracy testing requires test volumes at least as large as the register test circle.
3. As in testing the accuracy of any meter, the Recordall Turbo Series meter must first be purged of air by running water through the meter. To effectively evacuate the air, run a minimum of 25% of the rated flow rate of the meter for at least 2 minutes.

NOTE: Good test practices, such as those outlined in the AWWA M6 manual, are required to perform reliable field accuracy tests. Register "jump" can occur in some instances if valves are abruptly opened or closed. While this jump is not accumulative (no affects in service billing), it can affect accuracy results (1% per division on a one test circle volumetric test).

4. Operate the meter until the test tank is filled to the calibrated level or the predetermined quantity has registered on the calibrated test meter. Because accuracy may vary slightly with flow rate, it is recommended that the meter be tested at low, intermediate and high flows.
5. Record the quantity registered on the meter during the test.
6. Perform the following calculations to determine meter accuracy:
$$\text{(Quantity Registered on Meter)} / \text{(Test Tank or Test Meter Quantity)} \times 100 = \text{Meter Accuracy}$$

Calibration

The meter's calibration ring is preset and sealed at the factory. In normal service, it should not have to be reset. If a retest is required in which a calibrated test stand reveals that the meter needs recalibration, proceed as follows (see [Figure 2](#)):

The total range of the calibration adjustment is about 10%. Tested and calibrated at the factory, the calibration mechanism will allow for a $\pm 5\%$ adjustment in the field. Due to the floating rotor design principle, the calibration mechanism contains some clearance for proper part fit resulting in some hysteresis or "deadband" when changing directions with calibration shaft. Adjustments should be made in small increments in one direction to avoid need for counter rotation. If desired setting is exceeded, counter rotations in small increments should be made, even though first reverse setting may result in no apparent change. This is normal, and subsequent changes will cause reverse accuracy curve shift.

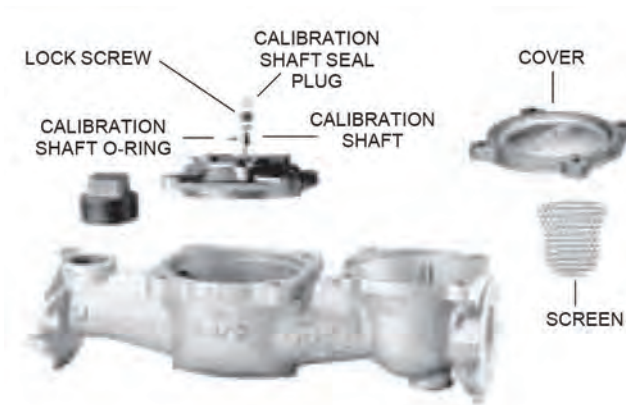


Figure 2: Calibrating turbo meter, shown with optional test plug and integral strainer

Calibrating turbo meter, shown with optional test plug and integral strainer

1. Remove the calibration shaft seal plug by puncturing the plug in the slot provided and twisting or prying the plug from the hole.
2. Loosen the calibration shaft lock screw.
3. Adjust the calibration ring with a screwdriver as follows:
 - To increase the registration, turn the calibration shaft clockwise. This speeds up the rotor, increasing registration.
 - To decrease the registration, turn the calibration shaft counterclockwise. This slows down the rotor, decreasing registration.
4. With the calibration shaft turned to the desired setting, tighten the lock screw while maintaining the calibration shaft position.
5. Retest the meter to confirm the accuracy of the calibration setting. If the meter is still out of calibration, repeat the procedure.
6. Replace the calibration shaft seal plug with a new one.

SERVICING PARTS AND ASSEMBLIES

When the performance of a Turbo meter indicates a need for servicing, refer to the following instructions pertaining to removal, inspection and installation of service parts and assemblies. Also see the *Recordall Turbo Series Meter Parts List* for part numbers of replaceable components and correct ordering information. If satisfactory repair cannot be made, contact Badger Meter.

Removing the Meter Head

Recordall Turbo Series meters can be serviced without removing them from the line. A typical installation would be equipped with drain and piping valves. To inspect or replace components of the head assembly, close the upstream and downstream valves. However, if the installation does not have a drain valve, proceed as follows to relieve pressure:

⚠ WARNING

UPSTREAM AND DOWNSTREAM VALVES MUST BE CLOSED BEFORE ATTEMPTING TO REMOVE METER HEAD FROM HOUSING. FAILURE TO DO SO CAN LEAD TO THE HEAD BEING "EJECTED" FROM HOUSING, CAUSING PERSONAL INJURY AND/OR PROPERTY DAMAGE!

1. Loosen each of the head bolts about 2-3 turns. Do not completely remove the bolts.
2. If the O-ring between the meter head and the housing is secure and not leaking, pry the measuring element assembly loose by inserting a screwdriver blade where the head and housing join together.

⚠ CAUTION

BE SURE THAT ANY WATER COMING OUT OF THE METER HEAD DOES NOT SPRAY ONTO ELECTRICAL EQUIPMENT AND CREATE A SHOCK HAZARD.

3. Allow the meter to drain and relieve internal pressure.
4. When pressure is relieved, remove the head bolts. Lift the measuring element assembly from the housing.

Removing the Local Register or Encoder

The Recordall Turbo Series meter registers and encoders are easily removable to facilitate in-line service.

1. Remove the register lid and shroud by removing the seal screw.
2. Remove the shroud by rotating the register assembly counterclockwise until it stops. This provides clearance so it can be lifted off the measuring element assembly. See [Figure 3](#).

To reinstall the register, follow the above procedure in reverse order.

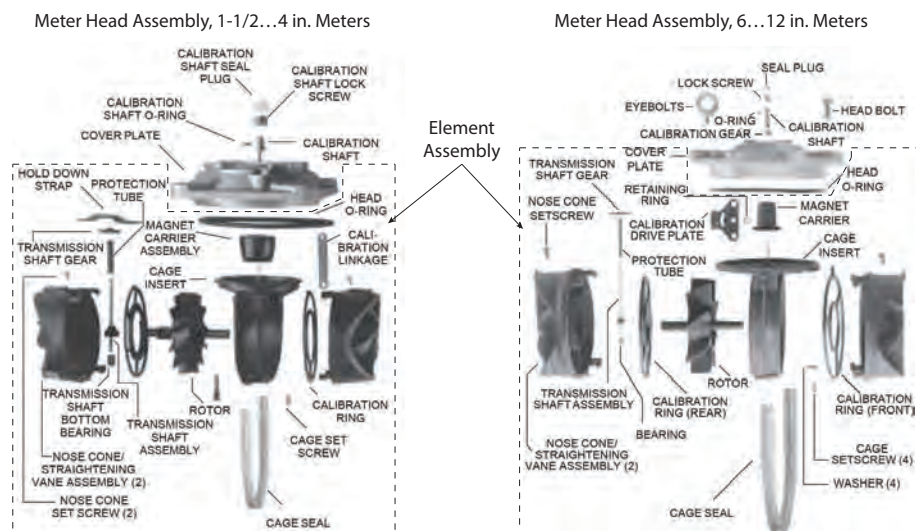


Figure 3: Meter head assembly

Removing the Measuring Element Assembly from the Cover Plate

NOTE: A cage seal is installed in the 1-1/2...8 inch Recordall Turbo Series so that the entire water volume flows through the measuring element.

1. Remove the O-ring and cage seal.
2. Check for damage and clean or replace prior to reassembly.
3. To remove the measuring element from the cover, remove the calibration shaft seal plug and the lock screw (for 1-1/2...4 inch sizes). See [Figure 3](#).
4. Place the cover register-side down on a table or flat surface.
5. Lightly tap or press the calibration shaft from the wet side out of the bore in the cover (1-1/2...4 inch only). Do not strike or bend the calibration linkage.

NOTE: If leakage was observed in the calibration shaft hole of the cover, replace the O-ring on the calibration shaft during re-install.

6. The measuring element insert can be removed from the cover plate for service or replacement by removing the cage set screws (quantity of one for 1-1/2...4 inch, quantity of 4 for the 6...12 inch size). See [Figure 3](#).
7. Holding the cover plate in one hand, rotate the thermoplastic element counter-clockwise until the bayonet-like tabs are aligned with open areas of the cover plate (1-1/2...4 inch only).
8. Remove the element from the cover plate.

Removing the Magnet Carrier

1. To remove the magnet carrier from the measuring element insert, lift it off the stainless steel pin. See [Figure 3](#).
2. Check the condition of the magnet and gear on the magnet carrier for damage or wear. If significant wear or damage is present, replace the magnet carrier.
3. Remove the hold-down strap (for the 1-1/2...4 inch only). See [Figure 3](#).
4. Check the condition of the transmission shaft gear for damage or wear. If significant wear or damage is present, replace the element assembly.

Removing the Straightening Vanes/Nose Cone

The straightening vanes are an integral part of the upstream and downstream nose cone assemblies. See [Figure 3](#).

To gain access to them, remove the measuring element from the cover.

Removing the upstream nose cone provides access to the rotor, calibration ring and the transmission assembly.

Removing the upstream nose cone

1. Remove the upstream nose cone setscrew. For 1-1/2...4 inch meters, slide the calibration linkage into the cage insert stop.
2. Take hold of the nose cone/straightening vanes and turn them clockwise, thereby disengaging the calibration linkage from the pin on the calibration ring and unlocking the bayonets of the nose cones from the cage (see [Figure 4](#)).
3. If the pin of the calibration ring has not disengaged the linkage, rotate the ring carefully by pushing the struts at the interior of the element (between the straightening vanes and the rotor). Pull the nose cone assembly out from the measuring element insert.
4. For 6...12 inch meters, remove the retaining ring that holds down the calibration drive plate, located under magnet carrier. See [Figure 3](#) and [Figure 5](#). Remove drive plate. Rotate calibration ring until pin clears slot of cage. Take hold of the nose cone/straightening vanes and turn clockwise. Pull the nose cone assembly out from the measuring element insert. Remove rotor assembly.

Removing the Calibration Mechanism

To disassemble the calibration ring assembly (see [Figure 3, "Removing the Meter Head" on page 10](#) and ["Removing the Straightening Vanes/Nose Cone" on page 11](#)):

1. For 1-1/2...4 inch sizes only, remove the calibration shaft seal plug and unscrew the calibration shaft lock screw from the cover plate.
2. Remove the calibration shaft thrust washer and calibration shaft. Press the calibration shaft out of the cover plate from below.
3. If a leak exists at the calibration shaft hole, remove the calibration shaft O-ring. Before reinstalling the O-ring, apply a light coat of silicon grease to it.
4. Clean all parts.

To gain access to the calibration ring, remove the straightening vane/nose cone. Follow the instructions in ["Removing the Straightening Vanes/Nose Cone" on page 11](#).

To remove the calibration ring from the nose cone assembly:

1. Align the ring slots with the bayonets of the nose cone assembly (located on inner ring of calibration ring).
2. Carefully lift the calibration ring from the nose cone assembly.
3. Inspect the drive pin on the calibration ring. If it is worn, replace the element assembly.

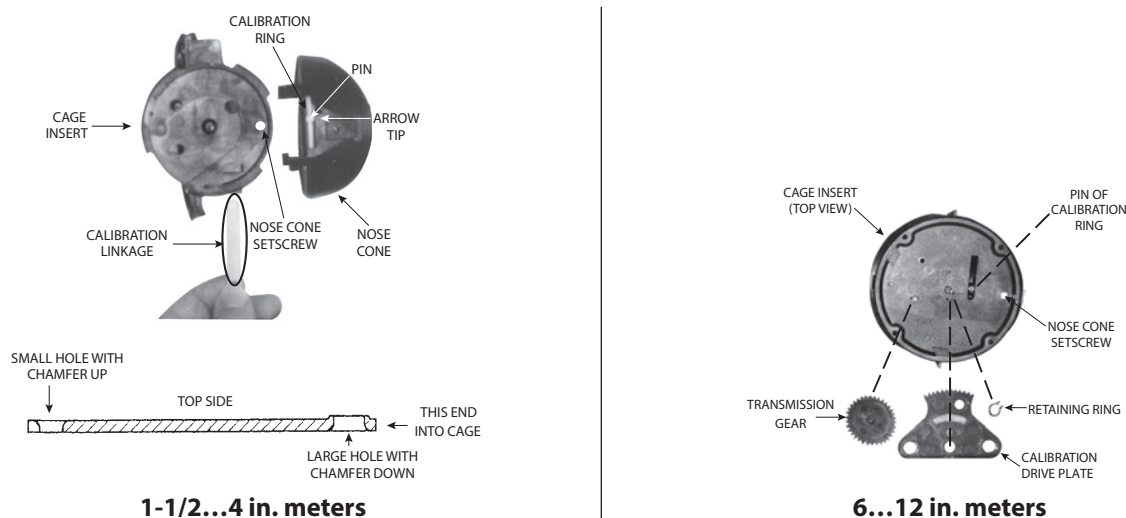


Figure 4: Calibration ring/linkage assemblies

Reassembling the Calibration Mechanism

1. Align the pin on the perimeter of the calibration ring with the arrow tip on the nose cone assembly (see [Figure 4](#)).
2. For 1-1/2...4 inch sizes, install the calibration linkage into the cage with the larger hole first to engage the calibration ring pin, with the side of chamfered edge of the hole towards the nose cone assembly (see [Figure 4](#)).

See ["Reassembling the Rotor and Bearings" on page 13](#) before installing nose cones.

3. For 1-1/2...4 inch sizes, with the calibration linkage fully inserted to the cage stop, install the nose cone onto the cage and rotate it counter-clockwise to engage the pin of the ring to the calibration linkage. Install the nose cone set screw.
4. For 6...12 inch sizes, reinstall the nose cone onto the cage, rotating it counterclockwise to engage the bayonet of the cone with the cage. Install the set screw. Reinstall the calibration drive plate onto the cage center pin boss, aligning the drive plate hole with the pin of the calibration ring. The pin must be fully engaged with the hole of the drive plate for proper operation.
5. To attach the element assembly to the cover, install the magnet carrier, then follow—in reverse order—the procedure for ["Removing the Measuring Element Assembly from the Cover Plate" on page 11](#).

After servicing or replacing the calibration mechanism, check the accuracy and calibration according to the instructions in ["Calibration Check and Adjustment" on page 8](#).

Inspecting the Rotor and Bearings

To inspect the rotor, remove the nose cone assembly from the measuring element insert as described in ["Removing the Straightening Vanes/Nose Cone"](#) on page 11.

Check the rotor worm and blades for signs of damage and wear. Also inspect the bearing bushings in the front and rear shaft. If damage or wear has occurred, replace the element assembly (see [Figure 5](#)). If water deposits are found, remove any mineral deposits from the rotor blade surfaces, cage insert interior disc, and nose cone vanes and mating surfaces.

Inspect the rotor bearing pins in the straightening vane and nose cone assembly for signs of damage and wear (see [Figure 5](#)). The spherical end of the bearing pin must not show any drag lines, large flat spots and/or wear. If the bearing pin shows any of these conditions, replace the element assembly.

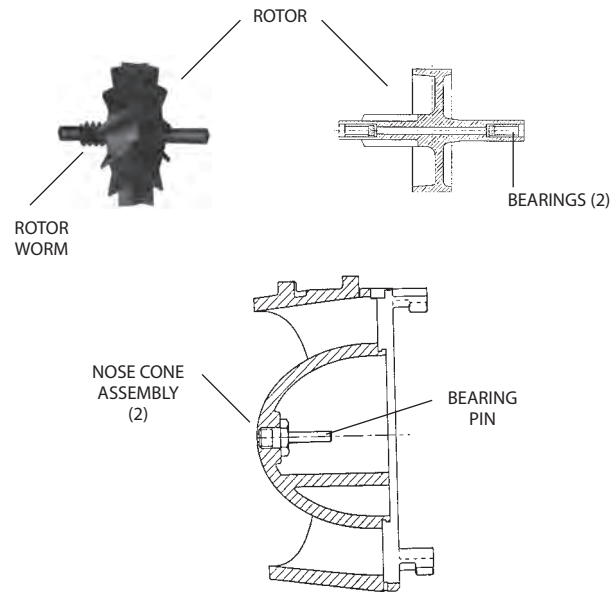


Figure 5: Rotor and nose cone assembly (1-1/2, 2, 3, 4 and 6 inch turbo head assemblies)

NOTE: Only highly-polished bearing pin ends provide a minimum of friction and optimal meter performance. Bearing pins are an integral part of the straightening vane and nose cone assembly. If the bearing pin shows any wear or damage, replace the element assembly.

Reassembling the Rotor and Bearings

1. Place the rotor assembly with the worm gear side leading through the cage.
2. Place the rotor assembly on the rear rotor bearing pin, while tipping the assembly back so that the opening is up. See ["Removing the Calibration Mechanism"](#) on page 12 for instructions on assembling the calibration rings with the nose cone assembly.
3. Insert the front nose cone assembly partially onto the cage insert, engaging the bearing pin with the front bearing of the rotor.
4. Tilt the measuring element insert assembly forth and back to verify that the rotor now engages the bearing pins on the straightening vane/nose cones and is free to rotate and slide.

CAUTION

DO NOT FORCE THE NOSE CONE ASSEMBLY INTO THE CAGE INSERT. BE SURE THAT THE ROTOR ENGAGES BOTH THE FRONT AND REAR ROTOR BEARING PINS PRIOR TO PRESSING THE NOSE CONE ASSEMBLY FULLY INTO THE CAGE INSERT.

5. Press the nose cone assembly fully into the cage insert and turn it counter-clockwise, catching the calibration linkage in the slot.
6. Verify that the rotor spins freely. If it does not, remove the nose cone assembly and repeat the procedure.
7. Install and tighten the nose cone assembly setscrew.

8. Holding the cover plate in one hand, align the thermoplastic cage bayonet-like tabs with the slots in the cover plate (1-1/2...4 inch only).
9. Rotate the element clockwise until the cage setscrew hole is aligned. Install and tighten the cage setscrews (quantity of 1 for 1-1/2...4 inch meters, quantity 4 for 6...12 inch meters).

Reinstalling the Turbo Meter Head Assembly

- Use a new O-ring after each teardown and reassembly.
- To provide a tight seal, make sure the surfaces of the housing and meter head are clean and free of any old O-ring material.
- Be careful not to force the measuring element insert into the meter housing. If you experience any binding, do not force the element into the housing. Remove the element from the housing and properly reinsert the unit.

NOTE: Head bolts should be tightened similar to that on car tire. First insert the bolts and snug-fit each. Then, using a crisscross pattern, tighten the bolts down. Following this pattern, the meter head will not turn and the rotor will remain perpendicular to the flow, eliminating any potential flow distortion. Tighten the head bolts to:

- 10...11 ft-lb for the 1-1/2 and 2 inch sizes
 - 35...40 ft-lb for the 3, 4 and 6 inch sizes
 - 65...76 ft-lb for the 8...12 inch sizes
- Reinstall the local register or encoder to the meter.

Placing the Meter Back in Service

1. Close the flushing system drain valve.
2. Open the upstream valve partially, then open the downstream valve slightly to purge air from the service line.
3. Open both valves completely.

SPECIFICATIONS

1-1/2 in. to 12 in. Meters

Turbo Series Model	160 1-1/2 in. (40 mm)	200 2 in. (50 mm)	450 3 in. (80 mm)	1000 4 in. (100 mm)	2000 6 in. (150 mm)	3500 8 in. (200 mm)	5500 10 in. (250 mm)	6200 12 in. (300 mm)
Meter Flanges AWWA 125 Pound Class	Elliptical	Elliptical or Round	Round	Round	Round	Round	Round	Round AWWA 125 lb class
Typical Operating Range (100% ± 1.5%)	4...200 gpm (0.9...45.4 m ³ /h)	4...310 gpm (0.9...70.4 m ³ /h)	5...550 gpm (1.1...124.9 m ³ /h)	10...1250 gpm (2.3...284 m ³ /hr)	20...2500 gpm (4.5...568 m ³ /h)	30...4500 gpm (6.8...1022 m ³ /h)	50...7000 gpm (11.4...1590 m ³ /h)	90...8800 gpm (20.5...1998 m ³ /h)
Typical Low Flow (95% min.)	2.5 gpm (0.6 m ³ /h)	2.5 gpm (0.6 m ³ /h)	4 gpm (0.9 m ³ /h)	6 gpm (1.4 m ³ /h)	12 gpm (2.7 m ³ /h)	20 gpm (4.5 m ³ /h)	30 gpm (6.8 m ³ /h)	65 gpm (14.8 m ³ /h)
Maximum Continuous Flow	160 gpm (36 m ³ /h)	200 gpm (45.4 m ³ /h)	450 gpm (102.2 m ³ /h)	1000 gpm (227.1 m ³ /h)	2000 gpm (454 m ³ /h)	3500 gpm (795 m ³ /h)	5500 gpm (1250 m ³ /h)	6200 gpm (1408 m ³ /h)
Maximum Intermittent Flow	200 gpm (45.4 m ³ /h)	310 gpm (70.4 m ³ /h)	550 gpm (124.9 m ³ /h)	1250 gpm (284 m ³ /h)	2500 gpm (568 m ³ /h)	4500 gpm (1022 m ³ /h)	7000 gpm (1590 m ³ /h)	8800 gpm (1988 m ³ /h)
Pressure Loss at Maximum Continuous Flow	3.8 psi (0.26 bar)	3.1 psi (0.21 bar)	1.8 psi (0.12 bar)	7.3 psi (0.50 bar)	4.8 psi (0.33 bar)	2.5 psi (0.17 bar)	1.6 psi (0.11 bar)	0.8 psi (0.05 bar)
Pressure Loss at Maximum Continuous Flow: With Integral Strainer	9.9 psi (0.68 bar)	8.3 psi (0.57 bar)	5 psi (0.43 bar)	17.8 psi (1.2 bar)	—			
Maximum Operating Pressure	150 psi (10 bar)							
Maximum Operating Temperature	120° F (49° C)							
Integral Strainer	Optional on 2 in. through 4 in. meters. Built into inlet end. Removable cover plate permits access to strainer for cleaning.				—			
Optional External Strainer	— Available for Models 200, 450, 1000, 2000, 3500, 5500 and 6200.							
NPT Test Port	Standard with integral strainer; optional for other models.				Optional for Models 2000 and 3500.		—	

Materials

Meter Housing	Lead-free alloy (EXCEPTION: Model 6200 meter housing is blue epoxy-coated cast iron)
Turbo Head	Lead-free alloy
Nose Cone and Straightening Vanes	Thermoplastic
Rotor	Thermoplastic
Rotor Radial Bearings	Lubricated thermoplastic
Rotor Thruster Bearing	Sapphire jewels
Rotor Bearing Pivots	Passivated 316 stainless steel
Calibration Mechanism	Stainless steel and thermoplastic
Magnet	Ceramic
Trim	Stainless steel
Register Housing and Cover	Thermoplastic or bronze
Integral Strainer and Trim	Stainless steel

Recordall® Turbo Series Meters

SMART WATER IS BADGER METER

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Legacy Document Number: RTS-IOM-5



Badger Meter

Recordall® Disc Series Meters

Cold Water Disc Meters, 5/8 in. to 2 in.



SAFETY INFORMATION

The installation of the Recordall® Disc Series Meters must comply with all applicable federal, state, and local rules, regulations, and codes.

Failure to read and follow these instructions can lead to misapplication or misuse of the Recordall® Disc Series Meters, resulting in personal injury and damage to equipment.

PRODUCT UNPACKING AND INSPECTION

Upon opening the shipping container, visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts, or any other sign of damage that may have occurred during shipment.

NOTE: If damage is found, request an inspection by the carrier's agent within 48 hours of delivery and file a claim with the carrier. A claim for equipment damage in transit is the sole responsibility of the purchaser.

METER PRE-INSTALLATION

Take into account the following considerations before you begin an installation:

- Inspect the piping around the meter for suitable conditions. The service line, valves, connections and meter must be watertight. Repair the piping system if pipes are corroded or damaged.
- Install the meter in the pipeline in a horizontal position so that the flow arrow on the meter housing points in the same direction as water flow. Registration should be upright and protected from damage, freezing, and tampering.
- Position the meter so it is accessible for installation, removal and reading.
- Verify that a suitable electrical grounding wire is properly attached to the upstream and downstream pipe connections of the meter. The grounding wire provides an alternative path for any electrical current that may exist across the opening in the line.
- Close the curb (shutoff) valve to relieve water pressure in the line before starting the cutting operation. Provide a high-quality upstream shut-off valve with a low pressure drop.
- When cutting into a new section of service pipe, flush the pipe to clear chips, pipe dope or other plumbing residue.
- The installed meter must not be an obstacle or a hazard to the customer or interfere with public safety.

CAUTION

- **DO NOT ATTEMPT TO USE ANY METER AS A LEVER OR CROWBAR TO STRAIGHTEN A MISALIGNED METER POSITION. THIS COULD DAMAGE THE METER.**
- **DO NOT ATTEMPT TO INSTALL A METER INTO AN OPENING THAT IS TOO LONG BY FORCING THE PIPING INTO PLACE WITH THE METER'S COUPLING NUTS. THIS WILL CAUSE SERIOUS DAMAGE TO THE THREADED ENDS OF THE METER AND HOUSING.**
- **TO AVOID POTENTIAL PROBLEMS, CORRECT ANY IRREGULARITIES IN PIPE SPACING AND MISALIGNMENT BEFORE PLACING THE METER INTO ITS POSITION.**

Recordall® Disc Series Meters, Cold Water Disc Meters, 5/8 in. to 2 in.

SPECIAL INSTRUCTIONS FOR REMOVING A METER

⚠ WARNING

DEPRESSURIZE THE LINE BEFORE STARTING ANY DISASSEMBLY OPERATION. REMOVING A METER THAT IS UNDER LINE PRESSURE CAN RESULT IN COMPONENTS BECOMING PROJECTILES, CAPABLE OF CAUSING PERSONAL INJURY.

SPECIAL FITTINGS AND ACCESSORIES

To accommodate 5/8 in., 3/4 in. and 1 in. meter installations, special fittings and accessories are available. Metal meter setters, re-setters, horns and meter yokes are available for holding the service pipe in proper alignment to the meter and laying length spacing. The metal setters and meter yokes can provide an electrical continuity to protect meters and consumers from electrical shocks.

NL bronze connections are available from Badger Meter. To compensate for minor service pipe and setting misalignment for a 5/8 in., 3/4 in. and 1 in. meter, plastic swivel connections are also available.

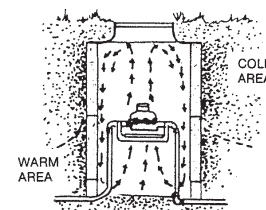
Cast iron or NL bronze companion flanges are available for a 1-1/2 in. and 2 in. meter.

INSTALLING RECORDALL DISC SERIES METERS

Outdoor Installations

When installed outdoors in a meter box, the disc meter should have a two- to three-inch clearance to avoid damage or strain to the service piping or meter, and to accommodate any "settling" that may occur after installation.

The service pipe in the meter box should be properly bedded to ensure that it is not axially misaligned and that it lays evenly on the bottom of the pipe trench. The backfill material covering the pipe should be placed appropriately to maintain pipe alignment in the event of eventual ground shifts. This will prevent damage to the pipe.



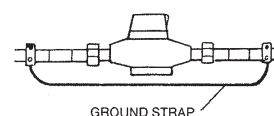
The service lines and the water meter must be protected from freezing. The earth covering the service line must be adequate to prevent frost penetration. Due to the smaller volume of water, service line pipes will freeze sooner than the main distribution line.

For those locations in which a remote possibility of freezing exists, thermoplastic or lead-free bronze alloy meters with cast iron bottoms are recommended.

The meter box pit should be excavated below the frost line. Even though the meter itself may be positioned above the frost line, the warmer air rising from the earth below the frost line will reduce the possibility of freezing.

Indoor Installations

As a precautionary measure when working with metallic pipes, indoor settings must be checked for electrical continuity through the service pipe before you remove or service a meter. American Water Works Association (AWWA) policy specifies that service pipes must not be used as an electrical ground. Check your local codes and practices. A permanent ground strap or metal setter must be used if electrical grounding to water services is required in your community. This is especially important for the engineered polymer meter.



To prevent floor damage, close the valve downstream from the meter before installing or removing a meter.

INSTALLATION INSTRUCTIONS

To prepare for meter installation, follow these steps:

1. Close the meter's inlet-side valve.
2. Open a faucet and wait until water flow stops, to depressurize the system. Do not remove the meter until the flow stops.
3. Check valves and make necessary repairs to the curb (shut-off) valve or inlet side valve if necessary.
4. Close the meter's outlet-side valve. Protect the floor below the meter against potential spills or leaks that could occur. Protect the coupling area from debris, so that the new meter will not be damaged or contaminated.
5. To replace an existing meter, continue with Step 6. To install a new meter, skip to Step 8.
6. Loosen meter couplings or flange bolts and remove the meter and the old gaskets in the coupling nuts.

IMPORTANT

Replace the entire connection set when you replace the meter (or earlier, if necessary).

7. Clean the coupling nuts or flange ends, removing any pipe dope or dirt from the threads or flange ends.
8. Check the existing setting for proper alignment and spacing. Correct any misalignment and spacing in the setting.
9. Place the new connection gaskets inside the connection coupling nuts.
10. Install the meter in the pipeline in a horizontal position so that the flow arrow on the meter housing points in the same direction as water flow.

5/8 in. to 2 in. Threaded Ends

11. Start the coupling nuts at the threaded meter ends. Verify that the nuts are properly aligned to avoid cross-threading or damage to the meter ends. This is especially important for the engineered polymer meter.

An effective method for starting a coupling nut is:

- a. Position the nut squarely against the meter's spud end.
- b. Turn the nut counterclockwise (in reverse) while holding the nut against the meter spud end. When the first threads on both the nut and the spud end coincide, you will hear a slight click and feel the nut move into the starting position.
- c. Tighten the nut by hand until it is snug.
- d. With an open-end wrench, apply a partial turn. Do not over tighten. For plastic swivel connections, a one-quarter turn is usually sufficient.

1-1/2 in. to 2 in. Elliptical Flange Ends

12. With meter and gaskets in place, tighten the flange connection bolts. Verify the nuts are properly aligned to avoid damage to the flanged ends.

PROTECT AGAINST LEAKAGE

Before turning on the service water, use care to protect against potential leakage.

1. Shut off the valves on both the inlet and outlet sides of the meter.
2. Open the curb (shutoff) valve slowly to pressurize the service line to the meter.
3. Slowly open the meter's inlet-side valve to fill the meter.
4. Check for leaks around the meter and its connections.
5. Slowly open the meter's outlet-side valve to pressurize the consumer side of the system.
6. Open a faucet to allow entrapped air to escape.
7. Once water is flowing normally, turn off the faucet.

Recordall® Disc Series Meters, Cold Water Disc Meters, 5/8 in. to 2 in.

Making Water Visible®

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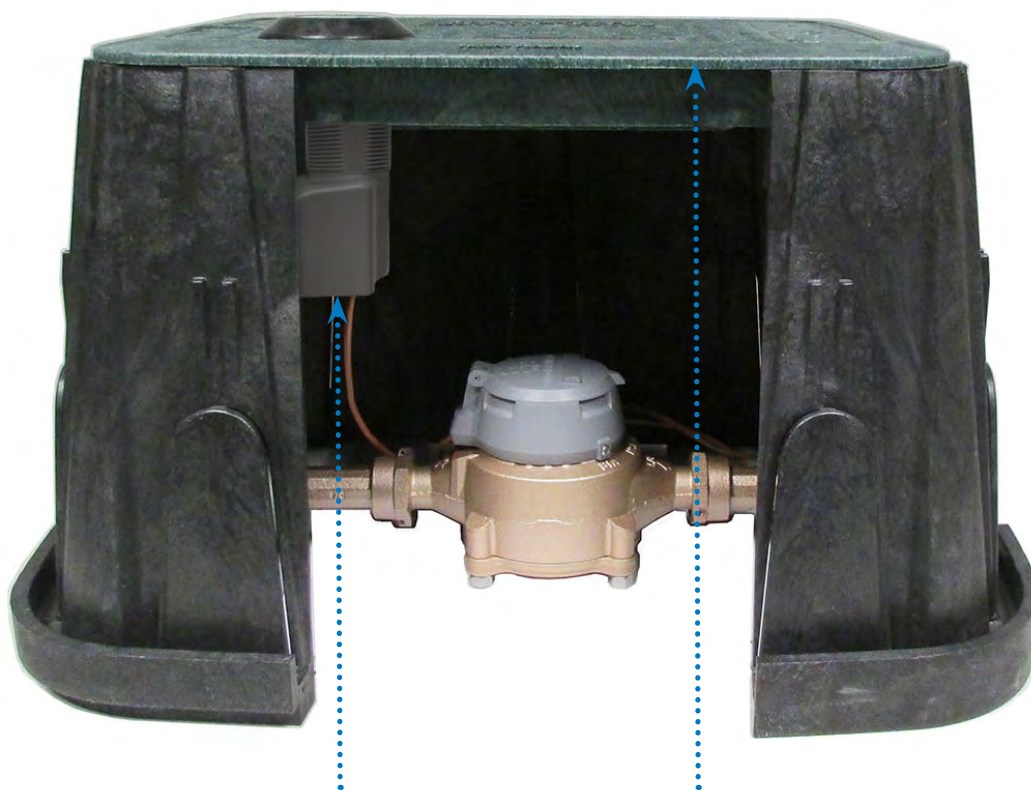
**Badger Meter****ORION® Water Endpoints**

Image shown represents ORION Cellular LTE endpoint installed, as per instructions, through non-metal pit lid

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SCOPE OF THIS MANUAL

This manual contains installation instructions for ORION® Cellular endpoints: LTE-M, LTE-MS, LTE and the ORION Fixed Network (SE), Migratable (ME) and Classic (CE) water endpoints.



ORION endpoints installation must comply with all applicable federal, state and local rules, regulations and codes.

Failure to read and follow these instructions can lead to misapplication or misuse of this product, resulting in personal injury and damage to equipment.

Proper performance and reliability of ORION endpoints depend upon installation in accordance with these instructions. Endpoints not properly installed may not be covered under warranty.

WARNING: The operation of transmitters and receivers on airlines is strictly prohibited by the Federal Aviation Administration. As such, the shipping of radios and endpoints via air is prohibited. Please follow all Badger Meter return and/or shipping procedures to prevent exposure to liability.

Related Literature

These related documents are available in the Resource Library at www.badgermeter.com.

- *ORION Water Endpoint Installation Kits Ordering Guide*
- *ORION Cellular CDMA Endpoints Installation Manual*
- *ORION Water Endpoint Parts List*
- *ORION Cellular INTL Installation Manual*
- *ORION Endpoint Utility Software Manual*, software version 2.7.3 or later required for ORION Cellular LTE-M, LTE-MS endpoints

PRODUCT UNPACKING AND INSPECTION

Upon receipt of the product, perform the following unpacking and inspection procedures.

NOTE: If damage to shipping container is evident upon receipt, request the carrier to be present when product is unpacked. Carefully open the shipping package, following any instructions that may be marked on the exterior. Remove all cushioning material surrounding the product.

ORION Endpoints: Carefully remove the pre-wired ORION endpoint or ORION endpoint encoder assembly from the container and inspect for damage. Retain the contents of the installation kit for use in mounting the endpoint in the field.

Other products: Carefully lift the product from the package. Visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts or any other sign of damage that may have occurred during shipment. Retain the package and all packing material for possible use in reshipment or storage.

NOTE: If damage is found, request an inspection by the carrier's agent within 48 hours of delivery and file a claim with the carrier. A claim for equipment damage in transit is the sole responsibility of the purchaser.

LICENSE REQUIREMENTS

ORION Cellular LTE-M, LTE-MS and LTE endpoints comply with Part 15, Part 22, Part 24, and Part 27 of FCC Rules. ORION Fixed Network, Migratable and Classic endpoints comply with Part 15 of FCC Rules. Operation is subject to the following conditions: (1) These devices may not cause harmful interference, and (2) these devices must accept any interference received, including interference that may cause undesired operation of the device.

In accordance with FCC Regulations, "Code of Federal Regulations" Title 47, Part 2, Subpart J, Section 1091, transmitters pass the requirements pertaining to radiation exposure. However, to avoid public exposure in excess of limits for general population (uncontrolled exposure), a 20 centimeter distance between the transmitter and the body of the user must be maintained during operation.

No FCC license is required by a utility to operate an ORION meter reading system.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Identification

IDENTIFICATION

Endpoints

The ORION water endpoint is a three-wire metering device (Figure 1) for indoor/outdoor use. Each endpoint has a unique numeric serial number on the tag attached to the cable harness (wire) and etched on the endpoint housing. Endpoints require connection to an encoder to complete the assembly. Badger Meter encoders are shown in Figure 4.

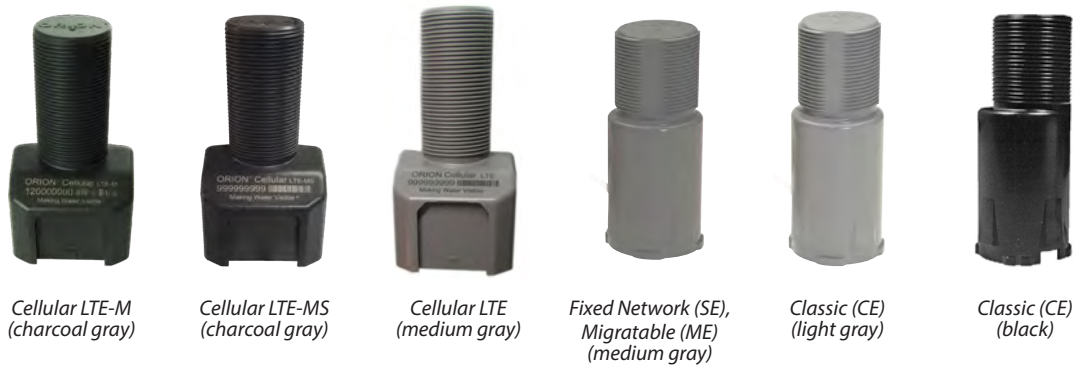


Figure 1: ORION water endpoints

Endpoint Dimensions

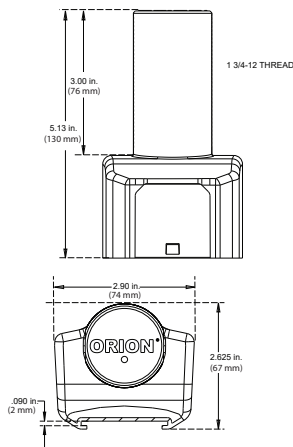


Figure 2: ORION Cellular LTE-M, LTE-MS, LTE endpoint dimensions

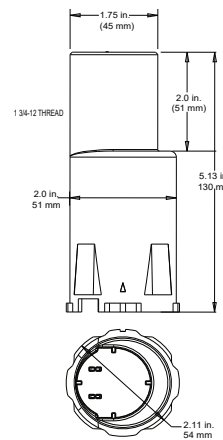


Figure 3: ORION endpoint dimensions (all except ORION Cellular LTE-M, LTE-MS, LTE)

Encoders/Register

The encoder connects to the endpoint to complete the assembly. Each Badger Meter encoder is identified on the face of the register with an assembly number, unit of measure and meter model. Current and legacy products are shown in Figure 4.

Current Products

Legacy Products



Figure 4: Encoders and register

ORION CELLULAR ENDPOINTS: LTE-M, LTE-MS, LTE

This section covers configuration, encoder compatibility and installation for ORION Cellular LTE-M, LTE-MS and LTE endpoints.

The serial number is engraved on one side of the endpoint base, and the FCC label is displayed on the other side. The LTE-M and LTE endpoints have yellow FCC labels. The LTE-MS endpoint has a white FCC label. (See [Figure 5](#)).

ORION Cellular LTE serial numbers range upward from 11xxxxxx. ORION Cellular LTE-M and LTE-MS serial numbers range upward from 12xxxxxx.



Figure 5: ORION Cellular LTE-M, LTE-MS, LTE endpoint FCC labels

Endpoint Configurations

The following configuration options are available.

Endpoint Configurations

Endpoint only with in-line connector
(Twist Tight® or Nicor®)

Endpoint only with flying lead for field splice

Endpoint/encoder assembly
with in-line connector

Encoder Connection

Connect the endpoint to an encoder using the in-line connector.
See ["In-line Connectors" on page 30](#).

See [Field Wiring, Encoder Connectivity and Read Resolution](#) below.

Endpoint/encoder assemblies (endpoints connected by an in-line connector to a Badger Meter encoder) are shipped from the factory, ready for installation. See [Field Wiring, Encoder Connectivity and Read Resolution](#) and ["In-line Connectors" on page 30](#).

Field Wiring, Encoder Connectivity and Read Resolution

ORION Cellular LTE-M, LTE-MS and LTE endpoints with flying leads are shipped from the factory pre-programmed. Connect all three endpoint wires to an encoder to complete installation. The endpoint connection can be made to existing wires from the encoder or directly to the encoder terminal screws, depending on the application and manufacturer. Endpoints can be connected to Badger Meter high resolution encoders and E-Series Ultrasonic meters as well as a number of competitive encoders.

See the wiring chart on the next page.

NOTE: For instructions on field wiring using gel connectors, see ["Using Gel Caps to Connect an Encoder" on page 32](#). Follow the manufacturer's instructions provided with the gel cap/field splice kit you are using.

ORION endpoint wires: Red = Power/Clock; Black = Ground; Green = Data

Endpoint Label	Encoder Connectivity	Endpoint Wire Colors			Reading Resolution
		Red	Black	Green	
ORION Cellular LTE-M, LTE-MS, LTE	Badger Meter HR-E LCD or HR-E encoders or E-Series Ultrasonic and Ultrasonic Plus Meter with High Resolution output	Red	Black	Green	Up to nine (9) most significant digits
	Honeywell® (Elster) and ScanCoder® encoders with Sensus® protocol module and evoQ4 meter (encoder output)*	Green	Black	Red	Up to nine (9) most significant digits
	Metron-Farnier Hawkeye*	Red	Black	Green	Up to nine (9) most significant digits
	Mueller Systems 420 Solid State Register (SSR) LCD*	Red	Black	Green	Up to nine (9) most significant digits
	Neptune ProRead, E-coder, ARB-V* or ProCoder with encoder output	Black	Green	Red	Up to nine (9) most significant digits
	Neptune registers with Nicor connector	Red	Black	Green	Up to nine (9) most significant digits
	Sensus iPerl®	Red	Black	Green	Up to nine (9) most significant digits
	Master Meter® Octave® Ultrasonic meter (encoder output)*	Red	Black	Green	Up to eight (8) most significant digits
	Hersey Translator*	Due to the customized, factory wire configurations of the Hersey Translator, the terminal posts may not match the ORION endpoint wire colors. Please contact Hersey for the terminal post wiring schematic of your encoders to determine how the posts correspond to ORION endpoint wires.			

NOTE: Competitive encoder output is determined by the encoder configuration.

*ORION Cellular endpoints are compatible with the encoders/meters noted above that have a manufacture date within 10 years of the current date as long as the encoder has three wires connected to it and is programmed into the three-wire output mode for AMR/AMI. Encoder registers with two-wire mode of operation require programming by the Utility, including registers that support auto two- or three-wire detection systems that do not automatically switch to three-wire mode of operation when a compatible endpoint is connected for ORION connectivity.

Installation Guidelines (Indoor, Outdoor, Pit)

Install the endpoint/encoder assembly according to these guidelines:

- **Indoor/Outdoor Installation:**
 - Indoor installation is **recommended**. Mount endpoints indoors, in the floor joist on an outside wall, near a window, if possible, and away from large metal objects.
 - Outdoor installation is acceptable and may be required where signal strength does not support an indoor installation. See "[64394-032 Wall Cover Install Kit](#)" on page 14 for mounting kit information.

- **Pit Installation**

IMPORTANT

- Mount ORION Cellular LTE-M, LTE-MS, LTE endpoints through a NON-METAL pit lid—**REQUIRED**.
- **Install at or above grade level.**

NOTE: See the installation troubleshooting document, *ORION Cellular Endpoint Installation Do's and Don'ts*, available at www.badgermeter.com. Endpoints not properly installed may not be covered under warranty.

Endpoint Activation

See "[Activating Endpoints](#)" on page 11 for details of the process.

ORION FIXED NETWORK AND MIGRATABLE ENDPOINTS

This section includes configuration, encoder compatibility and installation information for ORION Fixed Network (SE) and ORION Migratable (ME) endpoints.

The serial number is engraved on the endpoint body. Serial numbers range from 30000000 to 59999999.

Endpoint Configurations

The following configuration options are available.



Figure 6: ORION Fixed Network (SE) and ORION Migratable (ME) endpoint

Endpoint Configurations

Endpoint only with in-line connector
(Twist Tight, Nicor, 308)

Endpoint only with flying lead for field splice

Endpoint/encoder assembly with
in-line connector

Prewired integral endpoint/encoder assembly

Encoder Connection

Connect the endpoint to an encoder using the in-line connector.
See ["In-line Connectors" on page 30](#).

See [Field Wiring, Encoder Connectivity and Read Resolution](#) below.

Endpoint/encoder assemblies (endpoints connected by an in-line connector to a Badger Meter encoder) are shipped from the factory, ready for installation.

Mount the assembly on the bayonet of the meter. See ["Integral Endpoint Installation" on page 24](#) for details.

Field Wiring, Encoder Connectivity and Read Resolution

ORION SE and ME endpoints with flying leads are shipped from the factory pre-programmed. Connect all three wires to an encoder to complete installation. The endpoint connection can be made to existing wires from the encoder or directly to the encoder terminal screws, depending on the application and manufacturer. Endpoints can be connected to Badger Meter high resolution encoders and E-Series Ultrasonic meters as well as a number of competitive encoders.

See the wiring chart on the next page.

NOTE: For instructions on field wiring using gel connectors, see ["Using Gel Caps to Connect an Encoder" on page 32](#). Follow the manufacturer's instructions provided with the gel cap/field splice kit you are using.

ORION endpoint wires: **Red** = Power/Clock; **Black** = Ground; **Green** = Data

Endpoint Label	Encoder Connectivity	Endpoint Wire Colors			Reading Resolution
		Red	Black	Green	
ELCD or ENC	Badger Meter HR-E LCD or HR-E encoders, or E-Series Ultrasonic Meter with High Res output	Red	Black	Green	Up to eight (8) most significant digits
ADE or ENC	Badger Meter ADE or E-Series Ultrasonic Meter with ADE output	Red	Black	Green	Up to six (6) most significant digits
RTR	Badger Meter RTR or E-Series Ultrasonic Meter with RTR output	Red	Black	Green	Up to seven (7) most significant digits
ADE or ENC	Honeywell (Elster)/AMCo ScanCoder or InVISION*and evoQ4 meter (encoder output)*	Green	Black	Red	Up to eight (8) most significant digits
C700D	Honeywell (Elster)/AMCo C700 Digital*	Red	Black	Not used – cut green wire flush with outer sheath	Up to seven (7) most significant digits
ADE or ENC	Master Meter Octave Ultrasonic meter (encoder output)*	Red	Black	Green	Up to eight (8) most significant digits
ADE or ENC	Metron Hawkeye*	Red	Black	Green	Up to eight (8) most significant digits
ADE or ENC	Mueller Systems 420 Solid State Register (SSR) LCD*	Red	Black	Green	Up to eight (8) most significant digits
ADE or ENC	Neptune ProRead, E-coder or ARB-V*	Black	Green	Red	Up to eight (8) most significant digits
ADE or ENC	Sensus Electronic Register encoder (ECR) or ICE*	Red	Black	Green	Up to eight (8) most significant digits
ADE or ENC	Hersey Translator*	Due to the customized, factory wire configurations of the Hersey Translator, the terminal posts may not match the ORION endpoint wire colors. Please contact Hersey for the terminal post wiring schematic of your encoders to determine how the posts correspond to ORION endpoint wires.			

NOTE: Competitive encoder output is determined by the encoder configuration.

*ORION SE and ME ADE or ENC endpoints are compatible with the encoders/meters noted above with a manufacture date within 10 years of the current date as long as the encoder is programmed into the three-wire output mode for AMR/AMI and has three wires connected to it. Encoder registers with two-wire mode of operation require programming by the Utility, including registers that support auto two- or three-wire detection systems that do not automatically switch to three-wire mode of operation once a compatible endpoint is connected for ORION connectivity.

Installation Guidelines (Indoor, Outdoor, Pit)

Install the endpoint/encoder assembly according to these guidelines:

- **Indoor/Outdoor Installation:** Mount outside the building, or indoors in the floor joist near an outside wall and away from large metal objects.
- **Pit Installation, ORION SE Endpoints:** Mount through a NON-METAL pit lid—**REQUIRED**.
- **Pit Installation, ORION ME Endpoints:** Mount through a NON-METAL pit lid—**Recommended**.

NOTE: Endpoints not properly installed may not be covered under warranty.

Endpoint Activation

See "[Activating Endpoints](#)" on page 11 for details of the process.

ORION CLASSIC ENDPOINTS

This section includes configuration, encoder compatibility and installation information for ORION Classic (CE) endpoints.

The serial number is engraved on the endpoint body. Serial numbers range from 70000000 to 89999999.

Endpoint Configurations

The following configuration options are available.



Figure 7: ORION Classic (CE) Endpoint

Endpoint Configurations

Endpoint only with in-line connector
(Twist Tight, Nicor, 308)

Endpoint only with flying lead for field splice

Endpoint/encoder assembly with
in-line connector

Prewired integral endpoint/encoder assembly

Encoder Connection

Connect the endpoint to an encoder using the in-line connector.
See ["In-line Connectors" on page 30](#).

See [Field Wiring, Encoder Connectivity and Read Resolution](#).

Factory prewired endpoints, connected to a Badger Meter encoder, are shipped, ready for installation. No splicing required.

Mount the assembly on the bayonet of the meter. See ["Integral Endpoint Installation" on page 24 for details](#).

Field Wiring, Encoder Connectivity and Read Resolution

ORION CE endpoints with flying leads are shipped from the factory pre-programmed. Connect all three wires to an encoder to complete installation. The endpoint connection can be made to existing wires from the encoder or directly to the encoder terminal screws, depending on the application and manufacturer. Endpoints can be connected to Badger Meter high resolution encoders and E-Series Ultrasonic meters as well as a number of competitive encoders as shown in the wiring chart on the next page.

NOTE: For instructions on field wiring using gel connectors, see ["Using Gel Caps to Connect an Encoder" on page 32](#).

ORION endpoint wires: **Red** = Power/Clock; **Black** = Ground; **Green** = Data

Endpoint Label	Encoder Connectivity	Endpoint Wire Colors			Reading Resolution
		Red	Black	Green	
ADE	Badger Meter ADE, HR-E LCD or HR-E encoders, or E-Series Ultrasonic Meter with High Res or ADE output	Red	Black	Green	Up to seven (7) most significant digits
RTR	Badger Meter RTR or E-Series Ultrasonic Meter with RTR output	Red	Black	Green	Up to seven (7) most significant digits
UNIV*	Honeywell (Elster)/AMCo ScanCoder or InVISION	Green	Black	Red	Up to seven (7) most significant digits
UNIV*	Master Meter Octave Ultrasonic meter (encoder output)	Red	Black	Green	Up to seven (7) most significant digits
UNIV*	Metron Hawkeye	Red	Black	Green	Up to seven (7) most significant digits
UNIV*	Mueller Systems 420 Solid State Register (SSR) LCD	Red	Black	Green	Up to seven (7) most significant digits
ARB-V*/**	Neptune ARB-V for connectivity to ORION endpoint > serial number 80000000	Black	Green	Red	Up to seven (7) most significant digits
ARB-V*/**	Neptune ARB-V for connectivity to ORION endpoint < serial number 79999999	Red	Black	Green	Up to seven (7) most significant digits
UNIV*	Neptune ProRead or E-coder	Black	Green	Red	Up to seven (7) most significant digits
UNIV*	Sensus Electronic Register Encoder (ECR) or ICE	Red	Black	Green	Up to seven (7) most significant digits
UNIV*	Hersey Translator	Due to the customized, factory wire configurations of the Hersey Translator, the terminal posts may not match the ORION endpoint wire colors. Please contact Hersey for the terminal post wiring schematic of your encoders to determine how the posts correspond to ORION endpoint wires.			

NOTE: Competitive encoder output is determined by the encoder configuration.

*ORION Classic UNIV and ARB-V endpoints are compatible with the encoders/meters noted above with a manufacture date within 10 years of the current date as long as the encoder is programmed into the three-wire output mode for AMR/AMI and has three wires connected to it. Encoder registers that are currently in two-wire mode of operation require programming by the Utility, including registers that support auto two- or three-wire detection systems that do not automatically switch to three-wire mode of operation once a compatible endpoint is connected for ORION connectivity.

**A separate ORION CE Universal endpoint is available for connectivity to the Neptune ARB-V encoder. Make sure the ORION Classic endpoint has "ARB-V" on the harness label when wiring to an ARB-V encoder. Wiring differs depending on the serial number of the ORION endpoint you are connecting to the ARB-V encoder, so make sure to verify wiring is correct per the above chart.

Installation Guidelines (Indoor, Outdoor, Pit)

Install the endpoint/encoder assembly according to these guidelines:

- **Indoor/Outdoor Installation:** Mount outside the building, or indoors in the floor joist, near an outside wall, and away from large metal objects.
- **Pit Installation:** Mount through a NON-METAL pit lid—**Recommended**.

NOTE: Endpoints not properly installed may not be covered under warranty.

Endpoint Activation

See "[Activating Endpoints](#)" on page 11 for details of the process.

ACTIVATING ENDPOINTS

Activation is dependent on whether the endpoint is in “Pause” (soft sleep) or “Stop” (hard sleep) radio mode. The ORION Endpoint Utility software can be used to identify the endpoint radio mode.

Smart Activation for Endpoints in Pause Mode

All ORION endpoints offer a Smart Activation feature which utilizes consumption to automatically start an endpoint in Pause mode. After installation, the endpoint radio “wakes up” and begins broadcasting data when the encoder to which it is connected detects enough water usage from the register. No field programming or special tools are required, but the amount of water consumption depends on the encoder output and meter size so activation times will vary. Infrared (IR) activation tools are available for use if immediate activation is desired. See the *ORION Endpoint Utility User Manual*, available in the Resource Library at www.badgermeter.com.

NOTE: Using the IR Alignment Tool (68779-001) is recommended for IR activation.

Endpoint/Encoder Assemblies

An initial encoder read is stored by the endpoint at the time the encoder and endpoint are factory connected and the endpoint is placed in Pause mode. While in Pause mode, the endpoint monitors the encoder for consumption, checking once every fifteen minutes. When the endpoint/encoder assembly is installed and sufficient water is running through the meter, the endpoint automatically “wakes up” and transitions to its operational mode when the required consumption is registered (see table below).

Encoder Output	Dial Change Required to Activate
7-dial	Any 1 unit change in the least significant digit
8-dial	Any 5 unit change in the least significant digit
9-dial	Any 5 unit change in the least significant digit

Table 1: Activation consumption thresholds

Endpoint Only

Like endpoint/encoder assemblies, ORION endpoint only configurations can be shipped in Pause mode. The initial encoder read will be established the first time an endpoint is field connected to an encoder.

NOTE: It may take up to fifteen (15) minutes for an endpoint to recognize the initial encoder read. To expedite this process, Badger Meter recommends connecting an ORION endpoint to an encoder in advance of field installation so the baseline encoder read can be captured before installing the endpoint.

After the initial encoder read is stored, the endpoint monitors the encoder for consumption, checking for a change in the encoder read once every fifteen minutes thereafter. The endpoint automatically “wakes up” and transitions to its operational mode once the required amount of consumption is registered (see [Table 1](#)).

Activation for Endpoints in Stop Mode

Endpoints in Stop mode must be manually activated via IR communication using either the Badger Meter IR Communication Device (68891-001) or the ORION Endpoint Utility software with an ORION handheld or mobile reading system. The software can also be used to identify the endpoint radio mode. For more information, see the *ORION Endpoint Utility User Manual for Handheld or Tablet/Laptop* in the Resource Library at www.badgermeter.com.

IMPORTANT

Badger Meter IR Communication Devices that shipped prior to January 15, 2019 require a firmware update to use with ORION Cellular LTE-M and LTE-MS endpoints. Contact Badger Meter Utility Technical Support (800-616-3837) or your National Meter Field Support Team Representative for help.

Confirming Installation - ORION Cellular LTE-M, LTE-MS, LTE

Before leaving the installation site, the installer can confirm endpoints are active and communicating.

1. BEACON® AMA users can check ORION Cellular endpoint activation status with the **ORION Endpoint Status** tool. Endpoints do not need to be provisioned in BEACON AMA to display using the tool. See "[Endpoint Status Tool for ORION Cellular Endpoints](#)" on [page 28](#) for more information.
2. The IR Communication Device (68891-001) can be used to confirm endpoint activation and verify the encoder connection. Instructions are included with the device. See the **IMPORTANT** note on [page 11](#) regarding required device firmware update.

Active endpoints automatically transition to the appropriate network.

Confirming Installation - ORION SE, ME, CE

Before leaving the installation site, the installer can use an ORION handheld or ORION Mobile Reading system to confirm the endpoint is broadcasting RF data for reading. See the appropriate handheld or ORION Mobile Reading system user manuals, available in the Resource Library at www.badgermeter.com, for more information.

Active Endpoints

ORION Cellular LTE-M, LTE-MS, LTE

When the endpoint transitions to *Active* mode, it begins the network registration process. BEACON AMA assigns a daily call-in time to the endpoint as part of this process. An active operating ORION Cellular endpoint obtains a current encoder read every 15 minutes.

ORION SE, ME and CE

When the endpoint transitions to *On-Mobile* mode, it begins broadcasting its message for fixed network or mobile data collection. An active operating ORION endpoint obtains a current encoder read once an hour.

CHANGING REGISTRATION FOR AN EXISTING ENDPOINT ASSEMBLY

ORION Cellular LTE-M, LTE-MS, LTE

If you change the encoder connected to an ORION Cellular endpoint, the endpoint will recognize the new encoder, once connected, and report previous and current interval data.

ORION SE, ME, CE

If you change the encoder connected to an ORION Fixed Network, Migratable or Classic endpoint that has previously logged historical profile data, best practice recommends following this process:

1. Extract and save the historical profile data from the endpoint. See the *ORION Endpoint Utility User Manual* for handheld or tablet/laptop, available at www.badgermeter.com, if you need help.
2. Clear the profile data from the endpoint.
3. Connect the new encoder. Follow applicable installation instructions in this manual. The endpoint will recognize the new encoder, once connected, and record interval data.

ENDPOINT INSTALLATION KITS

Type	For Use With	Description	Kit Part Number
REMOTE	All ORION endpoints	64394-032 Wall Cover Install Kit	64394-032
REMOTE	64394-032, 66009-004	67625-001 IR Holder for Wall Cover Install Kit	67625-001
REMOTE	ORION Cellular LTE-M, LTE-MS, LTE	64394-031 Wall Bracket Install Kit - ORION Cellular LTE	64394-031
REMOTE	ORION SE, ME, CE	69406-001 Mounting Bracket Install Kit for ORION Endpoint and E-Series Ultrasonic Meter	69406-001
REMOTE or PIT	SE, ME, CE	69406-001 Mounting Bracket Install Kit for ORION Endpoint and E-Series Ultrasonic Meter - ORION	64394-029
REMOTE	All ORION endpoints	64394-008 C-Clamp Wall Bracket Install Kit - ORION	64394-008
REMOTE or PIT	All ORION endpoints	64394-003 Pipe Install Kit-ORION	64394-003
REMOTE	All ORION endpoints	64394-023 Commercial Meter Mounting Bracket Install Kit-ORION	64394-023
PIT	All ORION endpoints	64394-030 Thru-the-Lid Install Kit	64394-030
PIT	ORION SE, ME, CE	64394-009 Integrated Pit Lid Hanger Install Kit	64394-009

Instructions for using each installation kit follow in this section.

Refer to the *ORION Water Endpoints Installation Kit Ordering Guide* and the *ORION Water Endpoint Parts List* for individual endpoint kit components. Both documents are available in the *Resource Library* at www.badgermeter.com.

64394-032 WALL COVER INSTALL KIT

Wall Cover Install Kit (64394-032) is recommended for proper mounting of an endpoint for indoor and outdoor remote applications, and is designed to provide an environmentally protected area for gel splice connections (if needed). Outside dimensions are shown in [Figure 9](#).

For use with: All ORION endpoints



Figure 8: 64394-032 wall cover enclosure

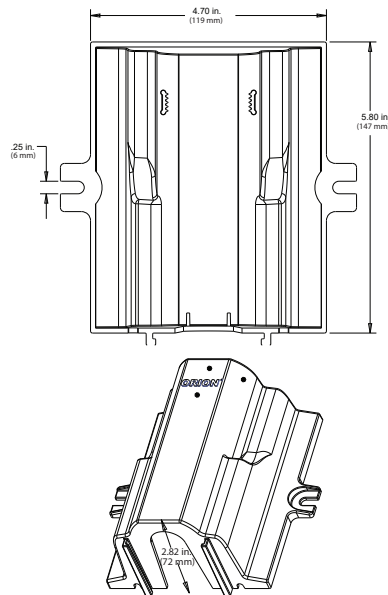


Figure 9: 64394-032 Outside dimensions

To install an ORION endpoint, follow these steps.

1. Choose an appropriate installation location within the limits of the endpoint cable/connector harness.
2. Verify the proper orientation ([Figure 10](#)). The bottom of the enclosure has an opening for IR programming. The opening gives access to the endpoint IR LED port ([Figure 13](#) and [Figure 14](#)) without having to disassemble the unit.
3. Place the endpoint into the wall cover enclosure, antenna (threaded portion) up.

Cellular LTE-M, LTE-MS, LTE endpoints: [Figure 10](#) shows the correct endpoint placement.

All other ORION endpoints: Make sure the flat side of the endpoint faces in and fits up against the inside wall of the enclosure.

- NOTE:** If double-sided tape is included in the kit, you can use the tape to temporarily secure the endpoint inside the enclosure before mounting.
4. Position the endpoint cable.
 - Route the endpoint cable through the cutout on the bottom of the wall cover.

NOTE: If you are drilling a hole through the wall behind the enclosure for the endpoint cable, the cable does not need to route through the cutout at the bottom.

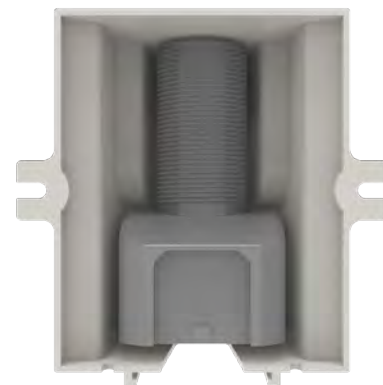


Figure 10: ORION Cellular LTE endpoint orientation

- If the endpoint has an in-line connector, place the connector *inside* with the endpoint and route the connector cable through the cutout on the bottom.

NOTE: If used, place gel splice connections inside the enclosure.

NOTE: See "[Outdoor Installation for Endpoint with In-line Connector](#)" on [page 16](#) for additional information about installing the endpoint outdoors with the wall cover enclosure.

5. Make sure the wall cover is properly positioned, with the endpoint antenna straight up and the endpoint IR LED port visible through the bottom opening.
6. Secure the wall cover using customer-supplied screws.
Installation is complete.



Figure 11: 64394-032 installation complete

67625-001 IR Holder for Wall Cover Install Kit

IR Holder for Wall Cover Install Kit (67625-001) is an optional part which can be ordered for use with the Wall Cover install kit (**64394-032**). The IR holder bracket fits on the wall cover adapter rails to hold an IR programming head in correct alignment with the endpoint LED port.

1. Place the optical head of an IR programming cable into the holder. The nubs on the optical head fit into the cutouts on the holder.



(67625-001) IR holder bracket



Optical head of the IR programming cable



Optical head in the bracket

Figure 12: IR holder and programming cable optical head

2. Slide the bracket into the adapter rails at the bottom of the wall cover enclosure (64394-032) so the IR optical head is aligned with the endpoint LED port. See [Figure 13](#) and [Figure 14](#).
3. Connect the IR programming cable to a Badger Meter mobile reading device to perform IR functions. Refer to the *ORION Endpoint Utility User Manual*, available in the Resource Library at www.badgermeter.com, for IR programming instructions.



Figure 13: IR LED port ORION Cellular LTE endpoint (bottom up view)



Figure 14: IR LED port ORION ME endpoint (bottom up view)

Outdoor Installation for Endpoint with In-line Connector

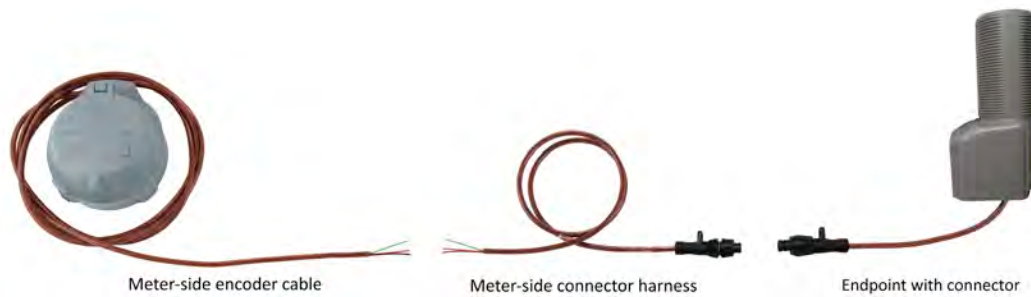


Figure 15: Outdoor endpoint installation

Meter-side connector harnesses are available with Twist Tight and Nicor connectors in the following lengths.

Harness with Twist Tight Connector

Part Number	Harness Lead Length
68307-006	10 ft harness
68307-003	25 ft harness

Harness with Nicor Connector

Part Number	Harness Lead Length
66488-006	10 ft harness
66488-003	25 ft harness

Follow these recommended installation steps for an outdoor endpoint installation and refer to the image in [Figure 15](#).

NOTE: The Twist Tight connector is pictured above. The installation steps also apply to endpoints with Nicor and 308 connectors as well. See ["In-line Connectors"](#) on page 30 for more information.

1. Choose an appropriate outdoor location, within the limits of the connector harness, and mount the endpoint.

NOTE: If using a wall cover enclosure, see ["64394-032 Wall Cover Install Kit"](#) on page 14 for additional information on mounting.

2. Join the endpoint connector with the connector mate of the encoder cable.
If you are using a wall cover enclosure, place the in-line connector inside the enclosure.
3. Drill a small hole in the wall of the house/structure to accommodate the endpoint/encoder cable.
4. Pass the cable end with the flying leads through the wall of the house.
5. Inside the house, connect the encoder wires. Depending on the encoder connection, use a field splice kit or connect the wires directly to the encoder terminal screws. See the appropriate wiring charts in this manual if you need help.

NOTE: Refer to the *Field Splice Kit Application Data Sheet*, available in the Resource Library at www.badgermeter.com, for field splice instructions.

When the meter, encoder and endpoint are installed and connected, installation is complete.

64394-031 WALL BRACKET INSTALL KIT - ORION CELLULAR LTE

Wall Bracket Kit 64394-031 ([Figure 16](#)) is available for mounting ORION Cellular LTE-M, LTE-MS, LTE endpoints.

For use with: ORION Cellular LTE-M, LTE-MS, LTE endpoints only

The bracket clips into the slot on the endpoint and can be used to attach the endpoint to a wall. A screwdriver and two (2) customer-supplied screws are required. Drill pilot holes for the screws (**recommended**) before attaching the wall bracket and endpoint.

The bracket can also be used to mount the endpoint to a pole with cable ties (customer supplied) threaded through the bracket openings.



Figure 16: 64394-031

69406-001 MOUNTING BRACKET INSTALL KIT FOR ORION ENDPOINT AND E-SERIES ULTRASONIC METER

Mounting Bracket Install Kit (69406-001) is designed to securely install an ORION endpoint to an E-Series Ultrasonic meter for non-submerged indoor and outdoor remote applications. The bracket can be used for installations in any nonmetallic joist, wall or pit application.

For use with: ORION SE, ME and CE endpoints



Figure 17: Mounting bracket with locking clip in place

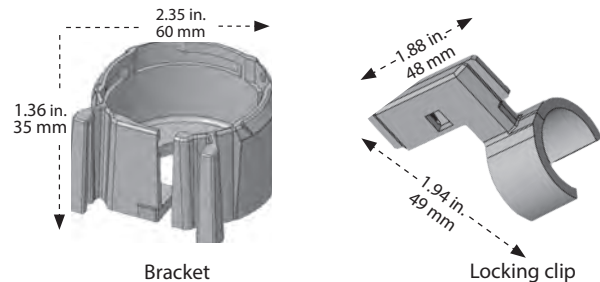


Figure 18: Mounting bracket and locking clip dimensions

To connect the bracket to the meter and endpoint, follow these steps.

NOTE: The kit components are the mounting bracket (**68789-001**) and the locking clip (**68790-001**). Keep the two pieces separate when you start.

1. Feed the endpoint wiring cable through the mounting bracket central opening.

You will see a small triangle on the underside of the bracket (Figure 19) and at the bottom of the endpoint.

Align the triangles, push the bracket and endpoint together and twist the endpoint clockwise until the endpoint clicks into place.



Figure 19: Triangle on underside of bracket

2. Align the tabs of the mounting bracket to the tabs on the side of the E-Series register (Figure 20). Then slide the mounting bracket/endpoint down into place on the register.
3. Once the endpoint is mounted on the E-Series register, insert the locking clip underneath the mounting bracket in the space between the mounting bracket and the register. The flat side of the locking clip should face the mounting bracket and fit in the mounting bracket grooves. It will click into place and lock.



Figure 20: E-Series Ultrasonic meter register tabs

NOTE: The endpoint is secure and cannot be removed until you remove the locking clip.

4. Make sure the endpoint antenna is upright in its final position.



Figure 21: ORION endpoint mounted on E-Series meter register

64394-029 WALL BRACKET INSTALL KIT

Wall Bracket Install Kit (64394-029) can be used to securely install an ORION endpoint. For non-submerged indoor and outdoor applications, the bracket can be used in any indoor or outdoor *nonmetallic* joist, wall or pit application.

For use with: All ORION endpoints **except** ORION Cellular LTE-M, LTE-MS, LTE endpoints

You will need the following items.

- Wall Bracket install kit
- Two customer-supplied screws
- Screwdriver and drill

To connect the bracket to the endpoint and mount, follow these steps.

1. Using the screw holes of the wall bracket as a guide, drill two pilot holes on the joist or wall where the bracket is to be installed.



Figure 22: Endpoint wall bracket

Connect the endpoint

2. Carefully slide the encoder cable harness through the slit in the bracket with the screw holes at the bottom ([Figure 23](#)).
3. Locate the small triangle and hole underneath the bracket ([Figure 24](#)). The triangle is used to align the bracket with the endpoint.
4. Locate the small raised triangle at the bottom of the ORION endpoint housing ([Figure 25](#)).



Figure 23: Threading cable harness



Figure 24: Aligning triangle



Figure 25: Housing triangle

5. Align the endpoint and bracket triangles. Then push the bracket and endpoint together. This should be easy.
6. With one hand holding the bracket, use the other hand to twist the endpoint approximately 1/4 turn clockwise until you feel it lock into place ([Figure 27](#)).

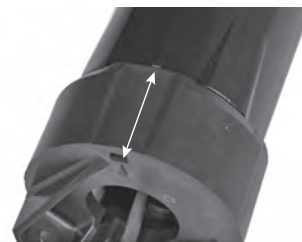


Figure 26: Align triangles and push bracket onto endpoint

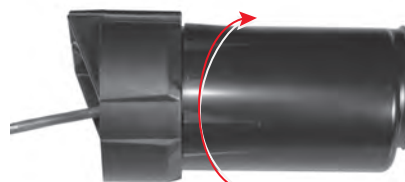


Figure 27: Twist endpoint to lock

Mount the endpoint assembly

7. Make sure the endpoint antenna is upright (*Figure 28*) when you place it into its final position.
8. Using two customer-supplied screws, secure the bracket assembly using the pilot holes you drilled in Step 1.

Installation is complete.



Figure 28: Endpoint positioning

64394-008 C-CLAMP WALL BRACKET INSTALL KIT

C-Clamp Wall Bracket Install Kit (64394-008) can be used when mounting an endpoint to a wall.

For use with: All ORION endpoints. For ORION Cellular endpoints, the kit can be used for indoor and remote installations, but should NOT be used in a vault.

To mount an ORION endpoint using this kit, follow these steps and refer to *Figure 29*.

1. Choose an appropriate location on the wall for the endpoint. Using an appropriate size fastener and washer (customer-supplied), mount the C-clamp to the wall through the opening at the back. When mounting in a vault, install the C-clamp close to the top to prevent damage when accessing the meter is required.

NOTE: ORION Cellular endpoints should NOT be mounted in a vault.
2. Place the neoprene spacer from the installation kit around the endpoint, approximately 1/2 inch (13 mm) from the top of the endpoint. Hold the neoprene spacer in place with your fingers.
3. Thread the lock nut onto the endpoint until it makes contact with the neoprene spacer.
4. Insert the endpoint into the C-clamp, making sure the neoprene spacer stays inside the C-clamp.
5. Close the C-clamp and lock it in place so that it closes over the neoprene spacer and securely holds the endpoint as shown in *Figure 29*.

Installation is complete.

NOTE: ORION radio endpoints perform best with a clear line of sight. Performance varies with installation.



C-Clamp



C-Clamp around endpoint

Figure 29: C-Clamp and placement

64394-003 PIPE INSTALL KIT

Pipe Install Kit (64394-003) with mounting support bracket (*Figure 30*) is designed for pipe installations on a 3/8, 5/8 and 1/2 inch rebar or 1/2 inch schedule 40 PVC pipe.

For use with: All ORION endpoints. For ORION Cellular endpoints, the kit can be used for indoor and remote installations, but should NOT be used under a pit lid.

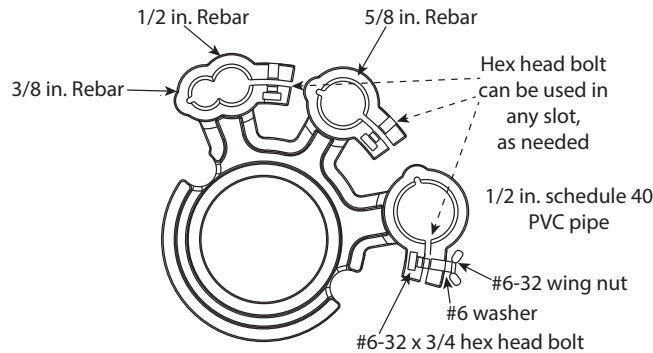


Figure 30: Support bracket (knuckles)

To install an ORION endpoint using the mounting support bracket, follow these steps.

1. Drive rebar or stake into the ground, or use a free-standing pipe or rebar.

CAUTION

DRIVE REBAR OR STAKE INTO THE GROUND PRIOR TO ATTACHING THE ENDPOINT TO AVOID DAMAGE.

2. Slide the mounting support bracket on the rebar/stake/pipe and secure using the enclosed washer, wing nut and hex head bolt provided with the bracket. The hex head bolt fits in any slot.

NOTE: The bracket can be installed with either side up, but installing with the smooth side up is recommended if installed outdoors to avoid potential rainwater build up.

3. Insert the threaded end of the endpoint up through the bottom of the bracket opening. Then thread the lock nut onto the endpoint and tighten the lock nut to secure the bracket (*Figure 31*). For pit installations, mount the endpoint a maximum of 1...2 inches (25...51 mm) below the pit lid. (NOT for ORION Cellular endpoints!)
4. Install the bracket anywhere along the length of the endpoint threaded end, as long as it is at least 0.5 in. (13 mm) below the top where the antenna is located. Installation is complete.

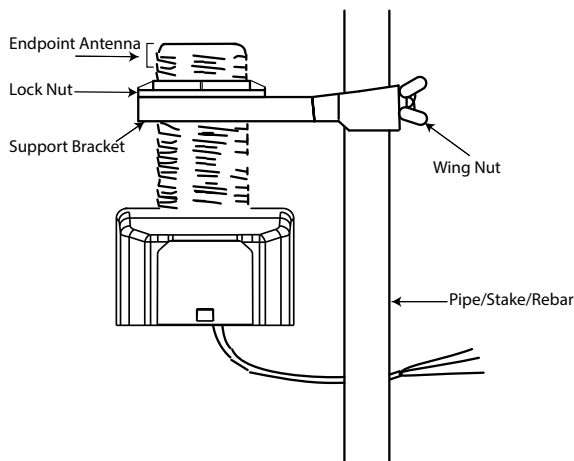


Figure 31: Pipe installation kit with ORION Cellular LTE-M, LTE-MS, LTE endpoints

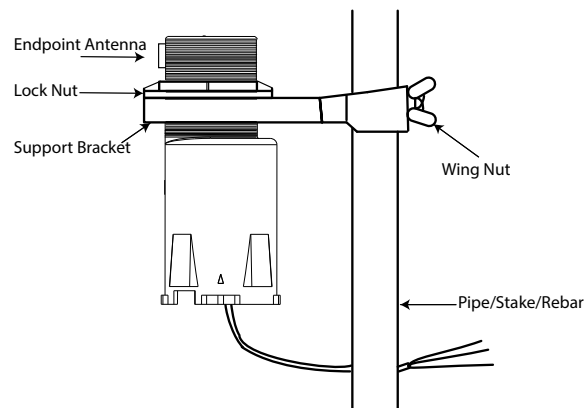


Figure 32: Pipe installation kit with ORION SE, ME, CE endpoints

64394-023 COMMERCIAL METER MOUNTING BRACKET INSTALL KIT

Commercial Meter Mounting Bracket Install Kit (64394-023) is designed for use with most Badger Meter Turbo, Compound Series and Fire Service Disc bypass meter lines. Use the kit to securely mount an ORION endpoint to a meter.

For use with: All ORION endpoints

You will need a torque wrench set for installation. The kit components are:

- Stainless steel mounting bracket 66360-001
- Lock nut 62825-001

To install the bracket, follow these steps:



Figure 33: Stainless steel mounting bracket



Figure 34: Lock nut with gussets

1. Verify that the water is turned off.
2. Slip the mounting bracket over the top of the ORION endpoint, as shown.
3. Screw the lock nut from the kit onto the threaded section of the endpoint. Hand tighten the lock nut to secure the bracket.
4. At the meter, unscrew the head assembly bolt at the location where you plan to mount the endpoint.
5. Position the bracket, reinsert the bolt and hand tighten it.

NOTE: For visual clarity, the photo in [Figure 37](#) shows the bracket without the endpoint attached.



Figure 35: Mounting bracket over endpoint



Figure 36: Tighten lock nut



Figure 37: Bracket attached with bolt

6. Position the bracket so the endpoint is as far from the meter as possible to provide adequate space for the endpoint signal to propagate ([Figure 38](#)).

IMPORTANT

If two ORION endpoints are required for a fire series assembly or a compound meter application, mount the endpoints on OPPOSITE sides of the meter head assembly.

7. With the torque wrench, tighten the bolt as indicated in the chart that follows.



Figure 38: Endpoint connected to meter with bracket

Meter	Ft-lb	Meter	Ft-lb
2-inch Turbo Series Meter	10.9	2-inch Compound Series Meter	16.7
3-inch Turbo Series Meter	37.5	3-inch Compound Series Meter	33.3
4-inch Turbo Series Meter	37.5	4-inch Compound Series Meter	33.3
6-inch Turbo Series Meter	37.5	6-inch Compound Series Meter	33.3
		Heavy Duty Bypass M70	21.0
		Heavy Duty Bypass M170	50.0

Installation is complete. Turn the water back on.

64394-030 THRU-THE-LID INSTALL KIT

The ADA-compliant **Thru-the-Lid Install Kit (64394-030)** is designed for use with a NON-METAL PIT LID, 2 inches (51 mm) maximum thickness, with a standard hole diameter of 1-7/8 inches (48 mm).

For use with: All ORION endpoints

To install an endpoint through a non-metal pit lid, follow these steps and refer to [Figure 39](#).

1. Screw the lock nut (large diameter side up) onto the endpoint tube threads.
2. Insert the endpoint tube through the bottom of the pit lid.
3. Screw the top nut onto the endpoint tube threads.
4. Tighten the lock nut and top nut to make sure the endpoint is secure.

Installation is complete.

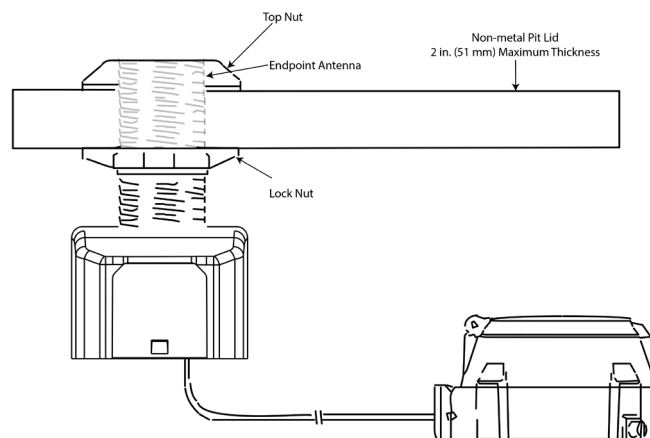


Figure 39: ORION endpoint thru non-metal pit lid

NOTE: When installing an endpoint through a thick lid, you can use a **Pit Tube Extender (67025-001)**. The Extender requires a 2 inch (51 mm) diameter hole. It screws onto the threaded portion of the endpoint. Radio frequency (RF) performance may be reduced when using the Pit Tube Extender.

Do not use Pit Tube Extender with ORION Cellular endpoints.



Figure 40: Endpoint pit tube extender – NOT for ORION Cellular endpoints

64394-009 INTEGRATED PIT LID HANGER INSTALL KIT

Integrated Pit Lid Hanger Install Kit (64394-009) is designed for ORION endpoints installed below composite and plastic lids that have an integrated AMR/AMI endpoint hanger.

For use with: ORION Fixed Network, Migratable, and Classic endpoints

To install an ORION endpoint with this kit, follow these steps and refer to [Figure 41](#).

1. Thread the lock nut onto the top of the ORION endpoint as shown.
2. Slide the endpoint into the lid bracket.
3. Tighten the lock nut so that the endpoint is held firmly in place.

Installation is complete.

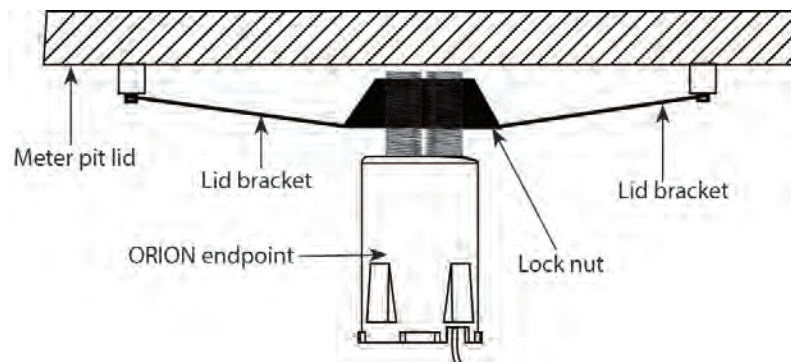


Figure 41: Integrated pit lid hanger installation

INTEGRAL ENDPOINT INSTALLATION

ORION SE, ME and CE endpoints are available in an integral configuration in which the endpoint and encoder are connected in one assembly. There are two types of integral configurations. This section includes instructions for mounting an integral endpoint on a meter and also provides instructions for disassembling both types of integrals.

Mounting an Integral Endpoint on the Meter

An integral endpoint can be installed on any Badger Meter Disc, Turbo, or Compound Series meter. Both integral configuration styles mount to the meter the same way, by placing the assembly onto the bayonet of the meter and rotating it into its locking position. See [Figure 42](#).

1. Loosen the security screw on the endpoint encoder assembly.
2. Mount the assembly housing on the meter bayonet.
3. Turn the assembly clockwise 1/4 turn to lock the assembly into place on the meter.
4. After the assembly is mounted on the meter, tighten the security screw to secure the assembly to the register.

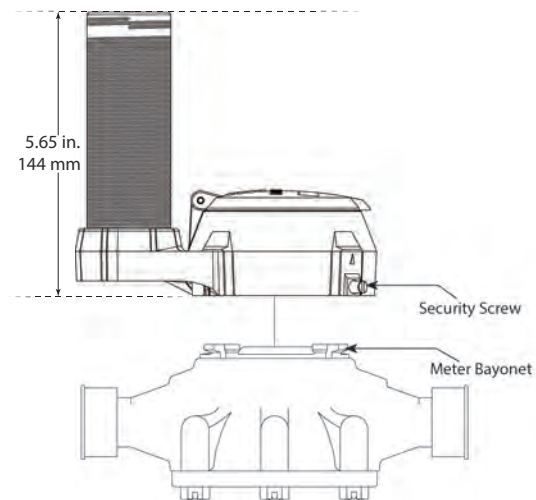


Figure 42: Integral assembly on meter

HR-E LCD Encoder Integral Configuration



Figure 43: HR-E LCD Integral

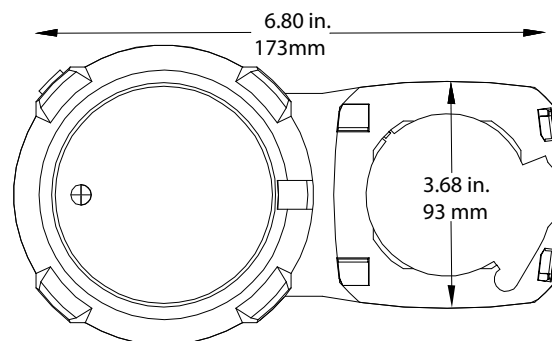


Figure 44: HR-E LCD Integral base dimensions

Configuration

The ORION HR-E LCD Integral Assembly is shown in [Figure 43](#). In an HR-E LCD integral assembly, the endpoint is factory-wired to the encoder and both are mounted to the shroud bracket. Endpoints are available with a 3-foot or 10-foot wire that is wrapped around the body of the endpoint. The endpoint wire is contained under a removable cover. With this option, the endpoint can be removed from the housing, if necessary, and mounted away from the encoder. The endpoint can also be returned to the housing assembly without damage.

Removing the Endpoint from the Assembly Housing

NOTE: The endpoint cover connects to the base with three tabs: one in the back and two in the front (closest to the encoder.)

1. Remove the integral assembly from the meter.
 - Remove the security screw at the base of the assembly. Keep the screw for remounting the encoder assembly.
 - Turn the assembly (as one piece) 1/4 turn, counter-clockwise and lift the assembly off the meter.
2. With the endpoint side of the assembly facing toward you, grasp the bottom of the cover with one hand on either side of the endpoint cover base.
3. With your thumbs, push the cover at the center of the base to release the back tab (*Figure 45*). Then lift up to release the front tabs and remove the cover from the base.



Figure 45: Push at center of endpoint base to release the cover



Figure 46: Cover tabs released, endpoint wire exposed

4. Twist the endpoint to release it from the housing and uncoil the wire.
5. Mount the endpoint according to recommended installation guidelines within the limits of the endpoint wire.

NOTE: The encoder cannot be removed from the assembly housing.

6. Remount the encoder (in the assembly housing) onto the meter bayonet.
 - Turn the assembly clockwise 1/4 turn so it locks in place.
 - Replace and tighten the security screw.

Reattaching the Endpoint

To reattach the endpoint to the assembly housing, follow these steps.

1. Wrap the wire around the endpoint. Make sure the wire is wrapped tightly and neatly around the endpoint or the cover will not fit.
2. Insert the endpoint base into the shroud bracket. Adjust the endpoint so the tabs on the endpoint base align with the openings on the bracket, and the wire at the endpoint base fits into the opening at the back of the bracket. See *Figure 47*.
3. When the endpoint is correctly inserted into the bracket opening, turn the endpoint clockwise to make sure it is secure.
4. Place the cover over the endpoint, with the single tab at the back.
5. When the cover is almost completely on, align the two front tabs with the openings on the shroud bracket (closest to the encoder) and then push down until all three tabs click into place.



Figure 47: Integral bracket without endpoint

HR-E Encoder Integral Configuration



Figure 48: HR-E Integral assembly with additional wire

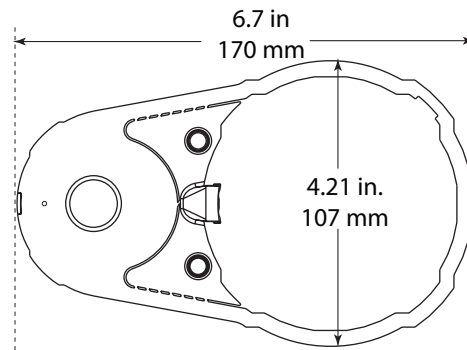


Figure 49: HR-E Integral base dimensions

Configuration

The ORION HR-E Integral Assembly is shown in [Figure 48](#). The endpoint has a 3-foot length of wire stored inside the bottom of the assembly housing. The endpoint can be removed from the housing, if necessary, and mounted away from the encoder.

NOTE: Once removed, the endpoint CANNOT be reassembled into an integral configuration.

Removing the Endpoint from the Assembly Housing

IMPORTANT

Removing the endpoint from the assembly housing can only be done once with this integral configuration.

CAUTION

PRIOR TO DISASSEMBLING AN INTEGRAL ENDPOINT, VERIFY THAT THE ENDPOINT HAS THREE FEET OF WIRE PACKAGED WITH THE ASSEMBLY. CHECK THE SERIAL NUMBER LABEL ON THE SIDE OF THE INTEGRAL BRACKET TO MAKE SURE IT INDICATES "3 FT WIRE." DO NOT CONTINUE WITH THE STEPS LISTED BELOW IF YOUR INTEGRAL ENDPOINT DOES NOT HAVE THIS DESCRIPTION ON THE SERIAL NUMBER LABEL, AS ENDPOINT DAMAGE WILL OCCUR.

1. Remove the assembly from the meter.
 - Remove the security screw at the base of the assembly. Keep the screw for remounting the encoder assembly.
 - Turn the assembly (as one piece) 1/4 turn, counter-clockwise.
 - Lift the assembly off the meter.



Figure 50: Remove assembly from meter

2. Remove the endpoint wire under the breakaway plate.
 - Turn the endpoint/encoder assembly over.
 - Grasp the pull tab located to the right of the encoder seal screw with pliers (*Figure 51*). Then pull and remove the bottom breakaway plate from the housing to expose the wire. The plate is scored to facilitate removal.
 - With your fingers, remove the three feet of endpoint wire from the housing.

NOTE: The wire is attached to the endpoint.



Figure 51: Pull tab to remove the breakaway plate

3. Rotate the endpoint counter-clockwise 1/4 turn and pull the endpoint and endpoint wire out from the assembly base.



Figure 52: Rotate endpoint clockwise



Figure 53: Pull endpoint away from base

4. Mount the endpoint according to recommended installation guidelines within the limits of the endpoint wire.

NOTE: The encoder cannot be removed from the assembly housing.
5. Remount the encoder (in the assembly housing) onto the meter bayonet.
 - Turn the assembly clockwise 1/4 turn so it locks in place.
 - Replace and tighten the security screw.

ENDPOINT STATUS TOOL FOR ORION CELLULAR ENDPOINTS

BEACON® AMA users can check the activation status of ORION Cellular endpoints with the ORION Endpoint Status tool. Several minutes after installation, the tool displays ORION Cellular endpoints assigned to you. Endpoints do not need to be provisioned in BEACON AMA to display.

The browser-based tool can be viewed on a computer or mobile device. An Internet connection is required. Follow these steps to use the ORION Endpoint Status tool.

1. Go to <https://orionstatus.beaconama.net>.
2. Sign in with your BEACON email address and password (Figure 54).

Result: The ORION Endpoint Status screen (Figure 55) opens showing the list of activated Cellular endpoints.

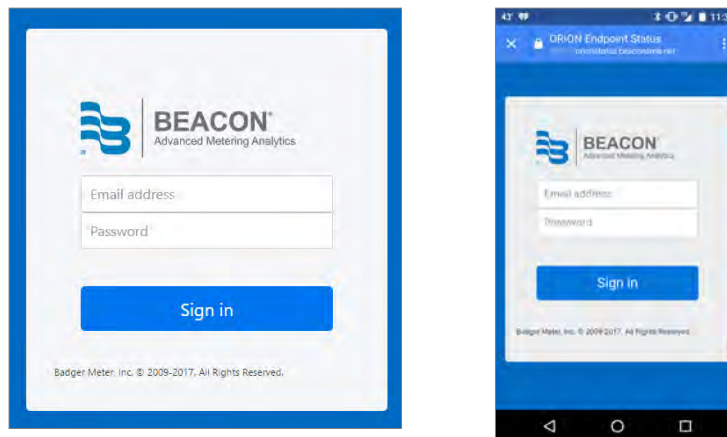


Figure 54: Tool sign in screen - computer and mobile

NOTE: It can take several minutes for a newly installed endpoint to communicate with the cellular network and display on the ORION Endpoint Status screen.

3. View the endpoint list.
The list displays endpoint serial number, activation time, and activation signal strength. The current endpoint and meter status are also shown. Endpoints are listed according to their activation time, with the most recent endpoint activation times listed first (top of list).

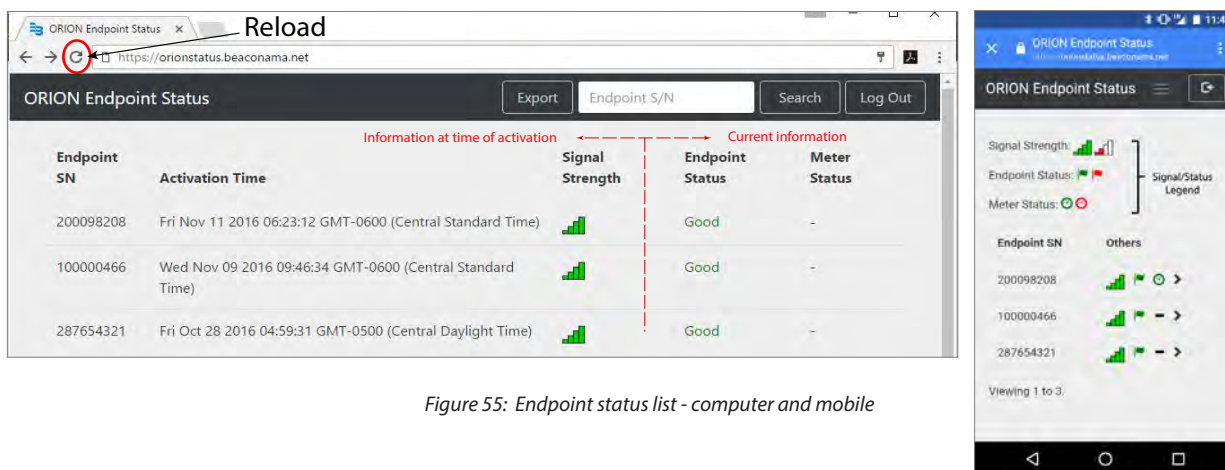



Figure 55: Endpoint status list - computer and mobile

You can also **Export** endpoints into a program such as Excel®, or **Search** to find a specific endpoint.

4. To see any new endpoints that have been added since logging in, reload/refresh the browser window. On a computer, use the reload button  at the top left of the screen. On a mobile device, swipe down the screen to refresh.

5. Select an endpoint in the list to see the endpoint raw read. A window opens, like the examples shown in [Figure 56](#).

NOTE: Information in the first three fields is captured at the time of activation. Information in the next three fields is current information.

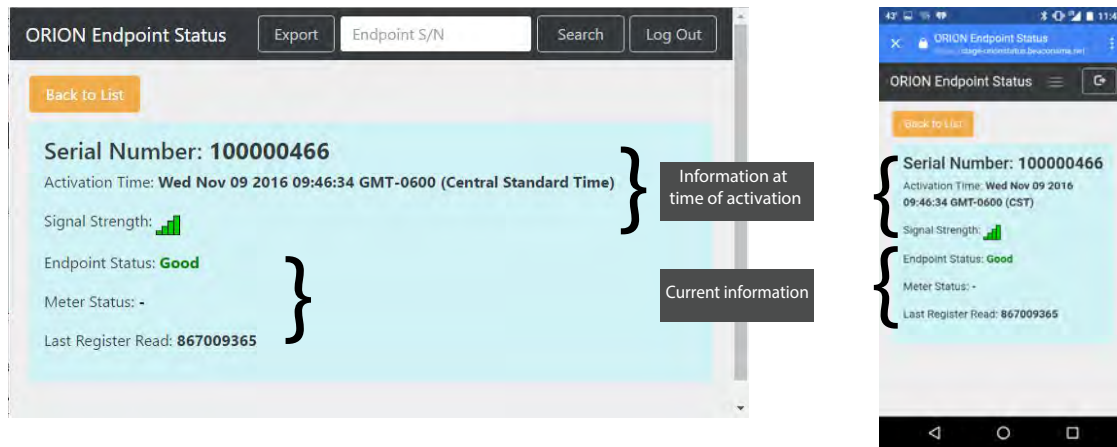


Figure 56: Status detail screen - computer and mobile

The *Endpoint Status* field displays one of the following:

Endpoint Status	Response
Good	No response required.
Endpoint Tamper or Encoder Error	Incomplete information. This message updates at the next scheduled communication.
Endpoint Tamper	Endpoint* requires attention.
Encoder Error	Encoder* requires attention.


*For additional endpoint information, see the ORION Endpoint Utility User Manual for handheld or laptop. For additional encoder information, see the appropriate encoder user manual. All documents are available in the Resource Library at www.badgermeter.com.

The *Meter Status* field displays one of the following:

NOTE: *Meter Status* only displays for E-Series Ultrasonic meters. For other meters, the field will have a dash mark (-).

Meter Status	Response
Good	No response required.
Sensor Error	Meter* requires attention.

*For additional information, see the appropriate E-Series Ultrasonic Meter User Manual, available in the Resource Library at www.badgermeter.com.

6. Tap/click **Back to List** to return to the previous screen.
7. When finished using the tool, tap the **Log Out** button or  on a mobile device.

IN-LINE CONNECTORS

In-line connectors are used to allow AMA/AMR/AMI device connectivity without the need for a field splice kit. There are three available in-line connector types: Twist Tight, 308, Nicor.

When ordered separately, the endpoint and encoder (or electronic meter) in-line connectors come with removable caps, which can be removed in the field before joining the connector ends. With the proper orientation, the connector ends go together easily. No tools are necessary.

NOTE: Additional removable caps are available for order. Part numbers are listed in [Figure 58](#), [Figure 60](#), and [Figure 62](#).

⚠ CAUTION

BEFORE JOINING, MAKE SURE ALL SURFACES OF THE CONNECTOR ENDS ARE CLEAN, DRY, AND FREE OF ANY DEBRIS OR DIRT. THIS STEP IS ESSENTIAL TO MAKE SURE THE CONNECTOR REMAINS WATER TIGHT AND SUBMERSIBLE.

Twist Tight Connector

To use the Twist Tight connector, follow these steps and refer to [Figure 58](#).

1. Remove the protective caps. Twist the rotating collar on each connector counter clockwise (left) to loosen and remove the cap.
2. Align the notches inside each connector and push the ends together until the endpoint-side is fully seated in the encoder-side connector.



Figure 57: Twist Tight in-line connector



Figure 58: Twist Tight connector ends and caps - close up view

3. On the endpoint-side connector, twist the rotating collar clockwise (right) until the ends are tightly connected. When tightly connected, the tabs at the top of the connectors should be aligned and the red O ring on the encoder-side connector should NOT be visible.

IMPORTANT

Do NOT use tools to tighten the connector ends. Hand tighten only.

Twist Tight Extension Harness

An extension harness connects in-line between the meter- and endpoint-side connectors. Extension harnesses are available in the lengths shown, with and without a cable shield. The cable shield offers extra protection for harsh environments such as pit installations.

Part Number Harness only	Extension Harness Length	Part Number Harness with Cable Shield
68307-009	5 ft extension	68883-002
68307-010	10 ft extension	68883-004

NOTE: For more information about the Twist Tight connector, refer to the *Twist Tight In-line Connector Assembly Application Data Sheet*, available in the Resource Library at www.badgermeter.com.

308 Connector

To use the 308 connector, follow these steps and refer to [Figure 60](#).

1. Squeeze the notched area and pull to remove the cap(s).
2. Align the notches inside each connector and push the ends together. You will hear a “click” when the connector ends are firmly seated and secure.



Figure 59: 308 in-line connector



Figure 60: 308 connector ends and caps - close up view

NOTE: For additional information, refer to the *308 In-line Connector Assembly Application Data Sheet*, available in the Resource Library at www.badgermeter.com.

Nicor Connector

To use the Nicor connector, follow these steps and refer to [Figure 62](#).

1. Pull the cap(s) straight off to remove.
2. Locate the arrow on each connector.
With the arrows pointed toward each other, push the ends together until the encoder-side connector is fully seated into the endpoint-side connector. There should be no visible gap.



Figure 61: Nicor in-line connector



Figure 62: Nicor connector ends and caps - close up view

Nicor Extension Harness

An extension harness connects in-line between the meter- and endpoint-side connectors. An extension harness in this lead length is available with the Nicor connector.

Part Number	Extension Harness Length
66488-024	10 ft extension

USING GEL CAPS TO CONNECT AN ENCODER

For those connections that are not factory wired or equipped with in-line connectors, follow these guidelines for using gel caps when splicing is required, either for installation or to fix a connection after a tamper. Refer to the wiring charts for each ORION endpoint, starting on [page 6](#).

NOTE:

- For pit environments, splice connections require a field splice kit (**62084-001**), which can be ordered separately. Refer to *Field Splice Kit for Badger Meter AMR/AMI Products*, available in the Resource Library at www.badgermeter.com.
- For all installations, excess wire should be coiled and cable tied to avoid any damage.

Required Tools

Splicing Tools (Customer Supplied)	Badger Meter Part Number
• Parallel Pliers	59983-001
• Coax Wire Stripper	59989-001
• Diagonal Cutting Pliers	n/a

Connecting an Encoder Using Gel Caps

Follow these steps when using Badger Meter supplied gel caps.

1. To connect an encoder with existing wires to an ORION endpoint, strip approximately 1-1/2 inches (38 mm) of outer insulation sheath from the encoder and endpoint cables using a coax wire stripping tool. We recommend using the Badger Meter Coax Wire Stripper (**59989-001**).

CAUTION

USE CAUTION WHEN REMOVING THE OUTER SHEATH SO THAT THE INNER SIGNAL WIRE INSULATION IS NOT NICKED OR DAMAGED.

2. Unwind the outer foil shield from the endpoint cable and cut it off even with the outer sheath using diagonal cutting pliers.
3. Connect the ORION endpoint to an approved encoder. Verify the endpoint serial number prior to completing the wiring setup.
 - Connect the encoder cable wires to the ORION endpoint wires using the insulation gel caps provided in the installation kit. Refer to the wiring charts for the endpoint type starting on [page 6](#) and determine which wires need to be connected to complete an installation.

NOTE: The terminal posts and wire colors may not match.

CAUTION

DO NOT STRIP ANY INSULATION FROM THE ENDS OF THE WIRES BEFORE YOU PUSH THEM INTO THE GEL CAP.

- Insert the wires from each cable end as far as possible into the gel cap. See [Figure 63: Wires in gel cap](#).



Figure 63: Wires in gel cap

- Using a crimping tool such as the Badger Meter Parallel Pliers (**59983-001**), place the gel cap with the wires into the jaws of the crimping tool.

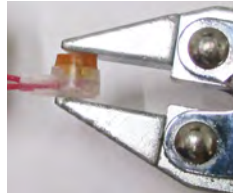


Figure 64: Gel cap in crimping tool

- Crimp the gel cap by squeezing the crimping tool handles until the gel cap is completely compressed. The Badger Meter Parallel Pliers is designed to apply just enough pressure to crimp the gel cap. Apply pressure for three seconds.



Figure 65: Compress the gel cap

- Repeat the crimping procedure for the remaining gel caps and wires.
4. Attach the two plastic cable ties and tighten securely for strain relief. Snip off the excess cable tie with the wire cutter.
 5. For remote installations, the connection is complete.

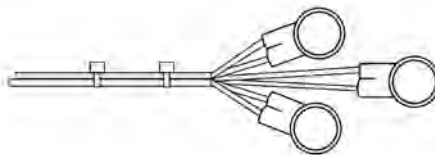


Figure 66: Cable tie attachment locations

NOTE: For pit installations, an appropriate field splice kit should be used. If using the Badger Meter Field Splice Kit, refer to the *Field Splice Kit Application Data Sheet* provided with the kit.

Testing Wire Connections

Test all wiring connections to confirm connectivity, and to verify the ORION endpoint reading and the encoder reading are the same. The connections can be tested using the Quick Read function with either an ORION handheld or mobile data collector. See the appropriate software manual, available in the Resource Library at www.badgermeter.com, for more information.

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TRAINING MANUALS

The type of Documentation provided as part of the implementation will be; Product Installation and Operation Manuals, Product Training Manuals or Training Guides, Product User “Quick Start” Guides and Product User “Help” Webpages. As Badger Meter, Inc. is a green company we strive to utilize electronic media as much as possible. Hard Copies of the electronic documents are available on request. In some instances, hard copies of the documents are needed and will be provided by Badger Meter, Inc.

APPENDIX A – COMPLIANCE TO PCU'S RFP SECTION A – D



No. 1

Section B. 11. Contract Security

Performance and Payment bonds are limited to the supply of product. The BEACON AMA agreement covers the on-going performance of the system over life of the ten (10) year contract. Badger Meter's Surety shall guarantee that the work will be free from defects in material and workmanship for a period of twelve (12) months following completion of the contract. Any additional warranty or guarantee whether expressed or implied is extended by the Principal or Manufacturer only, and the Surety assumes no liability for such a guarantee.]