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AMCO Water Metering Systems For Potable Cold Water Meters *Installation/Start-up Instructions*

INTRODUCTION

All AMCO water meters have been manufactured with current technology in accordance with applicable AWWA standards. Water passes through a measuring chamber driving an oscillating piston or rotor, the movements of which are transferred by appropriate gearing and magnetic drive to a standard direct reading sealed register. If the meter has been ordered with visual remote (RMR), electronic remote (EMR) or InsideR™ transmitter, refer to the following documents for additional instructions:

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| 1. Remote Meter Read (RMR) | RMR-INS-022 |
| 2. Encoder Electronic Meter Read (EMR) | EMR-INS-026 |
| 3. InsideR™ | INS-INSIDE-RF |

TESTING FOR METER ACCURACY

All AMCO water meters have been flow tested before shipment. Should further accuracy tests be necessary, the requirements of Table 5-3 of the AWWA Manual M-6 should be followed. Before testing, thoroughly flush the meter to eliminate all air from the test bench system. In the case of turbine and compound meters, water should pass through as much straight pipe as possible before entering the meter, or install a turbulence canceling strainer ahead of the meter. Turbines and compound meters tested in series must have straight pipe between meters for absolute accuracy testing.

GENERAL INSTALLATION INSTRUCTIONS FOR ALL AMCO WATER METERS

- (1) Install meters in a service line which has been flushed free of foreign material.
- (2) Install meters in horizontal or inclined pipe work.
- (3) Install meters with the flow direction arrow pointing downstream, i.e. towards the utility customer's facility being served by the meter.
- (4) Thoroughly tighten all meter couplings or companion flange bolts.

POSITIVE DISPLACEMENT AND TURBINE METER START-UP

A meter's measuring device can be damaged if subjected to full flow conditions prior to expelling all the air from the pipeline.

- (5) With all valves closed, open a downstream faucet or other fixture that will demand water from the water main.
- (6) Gradually open the upstream valve to allow water to pass through the meter.
- (7) Observe that the register's sweep hand is turning clockwise in response to the water throughput.
- (8) Observe that the lowest value totalizer wheel advances one (1) number for each complete turn of the sweep hand.

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- (9) When all the air has been expelled from the pipeline, close the downstream faucet or fixture.
 - (10) Check all connections to detect leaks.
 - (11) Observe the low flow detector to identify downstream piping leaks.

COMPOUND METER START-UP

At start-up, the changeover valve is closed, diverting water through the bypass meter. When 6.5 psi differential exists across the valve, with at least 13 psi pressure downstream, the valve will open allowing water flow through the main line turbine meter; however, water will continue to be measured by the bypass meter.

- (12) With all valves closed, open slightly a downstream faucet or other fixture that will demand water from the water main.
- (13) Gradually open the upstream valve causing water to flow through the bypass meter, and allowing the downstream piping to build up to at least 13 psi.
- (14) Increase the rate of flow until the turbine meter register begins to measure water.
- (15) Observe that both meters are now measuring water.
- (16) Reduce the rate of flow until the turbine meter register stops measuring water.
- (17) Observe that the bypass meter will continue to measure water.
- (18) Close the downstream valve or faucet, and check all connections to detect leaks.
- (19) Observe the low flow detector to identify downstream piping leaks.

FIRE HYDRANT METER START-UP

It is recommended that a gate valve or fire hydrant valve be installed downstream to control flows from AMCO's hydrant meter. After coupling the meter to the hydrant outlet,

- (20) Open slightly the downstream valve.
- (21) Slowly pressurize the meter by opening the fire hydrant's main valve.
- (22) After all the air has been expelled from the hydrant meter, close the downstream gate valve.
- (23) Open the fire hydrant's main valve as needed.
- (24) Control flows from the downstream valve, always opening it slowly to avoid overspeeding on start-ups.

MAXIMIZING TURBINE AND COMPOUND METER ACCURACY AND REVENUE

Unlike positive displacement meters, horizontal turbines of all types can be adversely affected by upstream turbulence. Good metering practices suggest that you consider a length of straight pipe upstream, or the installation of AMCO's Z-Plate turbulence-canceling strainer to maximize accuracy and revenue, as well as to protect the meter from foreign matter and debris.

COMPOUND AND TURBINE METER UPSTREAM/DOWNSTREAM PIPE LENGTHS

Straight pipe lengths upstream and downstream of the C3000, T3000 and T4000 meter can be reduced from ten to five and five to three, respectively, with the addition of a Z-plate/angle strainer.

Types of Fittings	Distance Upstream in Pipe Diameters	Distance Downstream in Pipe Diameters
Tees and crosses	10	5
Elbows and reducers	10	5
Tees and crosses with strainer or straighteners upstream	5	5
Elbows and reducers with strainer or straighteners upstream	5	5
Angle strainer	5	3
Basket strainer	5	3
Gate valve	1 to 3	1 to 3
Butterfly valve	5	5
Plug valve	5	5
Check valve	*	5
Pressure regulator	*	5
Test tee and plug	*	3
Saddle	*	3

* These fittings are not recommended for use upstream of a water meter. Under extreme high pressures, when it is necessary to protect the meter, pressure regulators may be considered upstream use only after consulting with AMCO Water.

WARNINGS AND CAUTIONS

POSITIVE DISPLACEMENT METERS

At your request, these meters may have a non-return valve installed in the inlet port. This valve will not allow pressures caused by thermal expansion to pass to the water system's side of the meter. Take particular care that the meter is installed with the direction of flow as indicated by the arrow cast in the meter case. Check your local codes for pressure relief requirements. AMCO Water Metering Systems Inc. assumes no responsibility for damages.

At your request, these meters may have a plastic main case. Plastic meter cases will not conduct electricity. Check your local codes for grounding requirements. AMCO Water Metering Systems assumes no responsibility for the electrical grounding of its water meters.

At your request, these meters may have a frost protection device. Take particular care to install these meters in a location where water damage will not occur if the frost device releases or functions. AMCO Water Metering Systems assumes no responsibility for damages.

FIRE HYDRANT METERS

This meter has a restrictor plate installed in the outlet port. A restrictor plate will suppress the flow capacity of the meter and protect it from overspeeding when water throughput flows to atmosphere. Take particular care to install and start-up the meter as recommended above. AMCO Water Metering Systems assumes no responsibility for damages.

At your request, this meter may have a check valve installed in place of the restrictor plate. This valve will not allow pressures caused by reverse flow conditions to pass to the water system's side of the meter. Take particular care that the meter is installed with

the direction of flow indicated by the arrow cast in the meter case. Check your local codes for pressure relief requirements. AMCO Water Metering Systems assumes no responsibility for damages.

APPLICATION. These meters are for use in the measurement of potable cold water up to 120 degrees F and working pressures up to 150 psi.

PERFORMANCE DATA				DIMENSIONS			
Model	Size	Flow Range	Recommended Continuous Flow	Length (in.)	Width (in.)	Height (Lid Closed) (in.)	Weight (lbs)
C700	5/8" x 1/2"	1/8 – 20	15	7 1/2	4	5 1/2	3 1/2
	5/8" x 3/4"	1/8 – 20	15	7 1/2	4	5 1/2	3 1/2
	3/4" x 3/4"S	1/4 – 30	15	7 1/2	3 7/8	6 3/16	4 3/5
	3/4"x3/4"	1/4 – 30	15	9	3 7/8	6 3/16	4 4/5
	3/4"x1"	1/4 – 30	15	9	3 7/8	6 3/16	4 4/5
	1"	1/2 – 50	25	10 3/4	6 15/16	6 5/8	10 1/5
	1 1/2"	1 1/2 – 100	50	12 5/8 or 13	7 1/2 or 8 1/2	8 7/8	21 7/10 or 23
	2"	2 – 160	80	15 1/4 or 17	8 3/4	8 1/8	36 7/10 or 38
T3000	1 1/2"	3 – 200	160	10	7 3/8	7 3/4	19 1/2 or 20
	2"	3 – 200	160	10	7 3/8	7 3/4	21 1/2 or 22
	3"	4 – 750	600	11 7/8	7 3/8	11 7/8	33 3/8
	4"	7 – 1250	1000	14	9	10 3/4	51 1/2
	6"	15 – 2500	2000	18	11	13 3/8	90
	8"	25 – 3500	2800	20	13 7/16	16 1/16	168
	10"	55 – 5500	3200	17 3/4	16 1/8	18 15/16	246
	12"	95 – 7000	4300	19 3/4	19 1/16	20 3/8	278
T4000	1 1/2"	1 1/2 – 400	220	10	5 5/8	8 3/16	22 1/2
	2"	1 1/2 – 400	220	10	6 1/16	8 1/8	24
	3"	2.2 – 900	600	12	7 1/2	9 3/8	37 1/2
	4"	2.6 – 1500	1200	14	9 1/16	9 3/4	51
	6"	8 – 3100	2500	18	11	13	101 1/2
	8"	16 – 5000	4000	20	13 9/16	15 1/8	136 1/2
	10"	20 – 8000	6500	17 3/4	16 1/10	17 1/4	180 3/4
	12"	40 – 10000	8000	19 3/4	18 1/10	18 1/3	229 1/4
TS4000	1 1/2"	1 1/2 – 400	220	13	5 7/8	8 1/4	32
	2"	1 1/2 – 400	220	17	6	8 9/16	39
	3"	2.2 – 900	600	19	7 9/16	9 3/16	54 1/2
	4"	2.6 – 1500	1200	23	9 1/16	10 3/16	73
	6"	8 – 3100	2500	27	11	13 3/8	141
C3000	2"	1/4 – 650	100	17	12 9/16	8	34
	3"	1/4 – 650	325	17	13 1/4	9 7/16	55 1/4
	4"	1/4 – 1150	575	20	14 1/8	10 7/8	67 1/8
	6"	3/4 – 2500	1560	24	17 9/16	8 1/8	145
	8"	1 1/2 – 3000	1875	34 or 34 1/2	20 1/2	16	227 or 285
H3200	3"	5 – 400	300	14 3/8	7 3/8	8 13/16	17 1/4