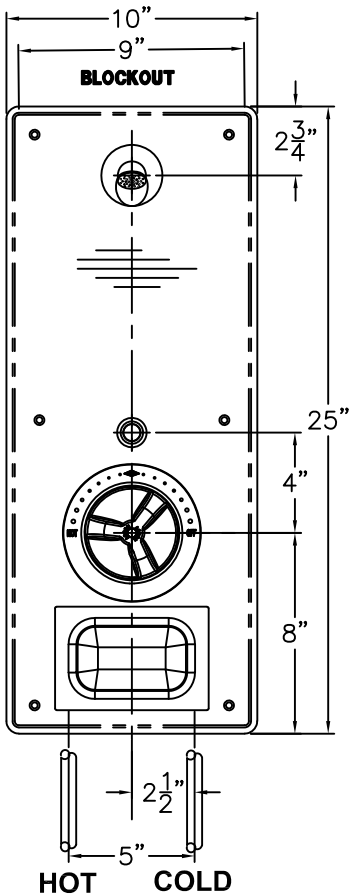
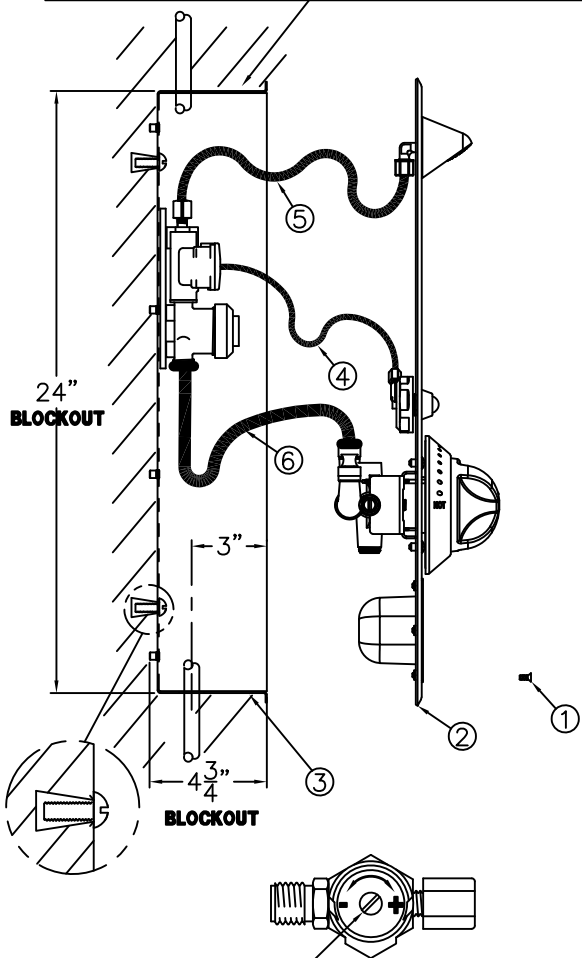




NOTE: HEIGHT FROM FLOOR TO TOP OF MOUNTING FRAME SHOULD BE SHOWER HEAD DISCHARGE HEIGHT PLUS 2-1/4".



REFERENCE DRAWINGS	
ASSEMBLIES	NUMBERS
MIXING VALVE	9975-005-002
MIXING VALVE ADJUSTMENT	9900-007-001
-M METERING SERVOMOTOR	9955-000-002
-3 VALVE BODY S/T	9955-006-003
STOP	9956-040-003
SHOWER HEAD	9970-000-003
PUSHBUTTON	9957-060-001
MOUNTING NUTS	9951-007-001
SECURITY SCREWS	9951-005-001

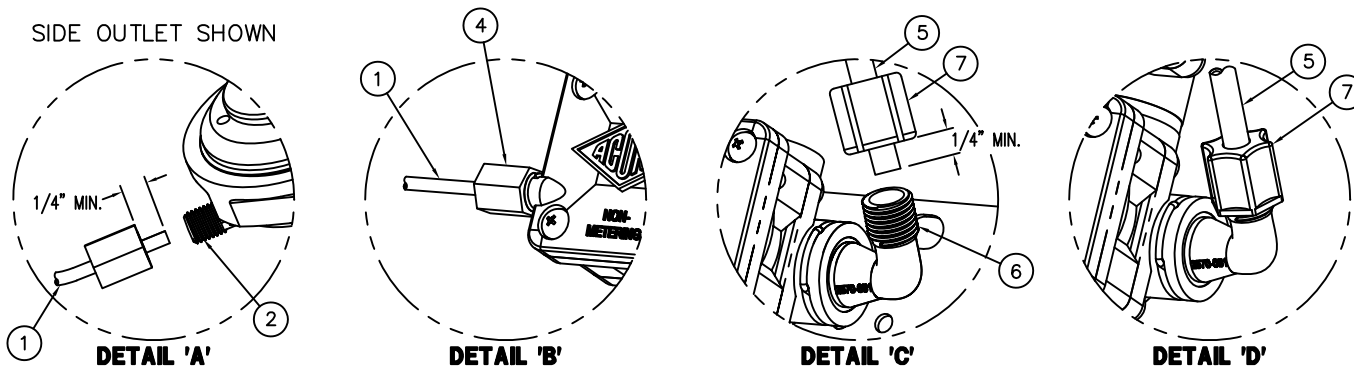
TIMING SCREW
TURN CLOCKWISE TO INCREASE TIMING
TURN COUNTERCLOCKWISE TO DECREASE TIMING

NOTE: MAXIMUM RECOMMENDED WORKING PRESSURE IS 100 PSI. TEMPERATURE IS 130°F; OUTLET TEMPERATURE IS RECOMMENDED AT MAXIMUM OF 105°F.
WARNING: PRIOR TO MAKING INSTALLATION SUPPLY LINES MUST BE FLUSHED OF ALL FOREIGN MATERIAL SUCH AS PIPE DOPE, CHIPS, ETC. VALVE MUST BE DRAINED PRIOR TO BEING SUBJECT TO FREEZING TEMPERATURES. MAXIMUM RECOMMENDED OUTLET WATER TEMPERATURE OS 105°F.

INSTALLATION INSTRUCTIONS:

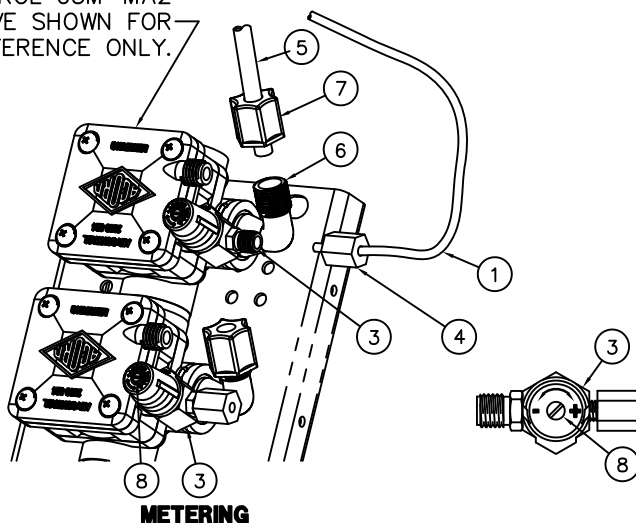
- A. REMOVE SIX MOUNTING SCREWS (1) HOLDING SHOWER PANEL (2) TO FRAME (3). CAREFULLY REMOVE SHOWER PANEL (2); DISCONNECT AIR LINE (4) AND WATER LINE (5) FROM AIR CONTROL VALVE.
- B. BLOCK OUT EXISTING WALL FOR MOUNTING FRAME (3) 24" X 9" X 4-3/4" DEEP.
- C. INSTALL MOUNTING FRAME WITH SUITABLE FASTENERS; DRILL THRU HOUSING TO WALL AND INSTALL WALL ANCHORS. FASTENERS BY OTHERS.
- D. ROUGH-IN SUPPLIES; MOUNTING FRAME MAY BE POSITIONED FOR SUPPLIES THROUGH TOP OR FROM BOTTOM. (NOTE: SUPPLY INLET CONNECTION WILL ACCOMMODATE 1/2" NPT MALE ADAPTER). THREAD FLEX CONNECTOR HOSE (6) TO VALVE INLET AND TO SUPPLY STUBOUTS.
- E. AFTER THOROUGHLY FLUSHING THE SUPPLY LINES, MAKE-UP SUPPLY CONNECTIONS (1/2" NPS FEMALE).
- F. CONNECT AIR LINE (4) AND WATER LINE (5). SET VALVE TIMING AS SHOWN IN DETAIL.
- G. REATTACH (6) MOUNTING SCREWS (1).

	ACORN ENGINEERING COMPANY P.O. BOX 3527 Industry, CA 91744 15125 Proctor Ave Industry, CA 91746 (626) 336-4561 FAX (626) 961-2200		TITLE PENAL PAK WALL SHOWER-CAT. #LR1748FA	
	MANUFACTURE DATE MAY 2017 TO PRESENT	DATE ISSUED 06/29/22	DRAWING NUMBER 9925-147-001	
		DATE REVISED A 02/24/23		



NOTE: PENAL-WARE & ECO-RAIN SHOWER FIXTURES USE 1/4" O.D. RISER TUBING WHILE OTHER SHOWER-WARE FIXTURES USE 3/8" O.D. TUBING.

AIR-CONTROL 03M-MA2 VALVE SHOWN FOR REFERENCE ONLY.



METERING

TIMING IS ADJUSTABLE FROM 5 TO 60 SECONDS AND IS ACCOMPLISHED BY ROTATING TIMING SCREW (8). TURNING THE TIMING SCREW CLOCKWISE INCREASES METERING TIME WHILE TURNING THE SCREW COUNTERCLOCKWISE DECREASES METERING TIME.

REFERENCE DRAWINGS

REPAIR PARTS	DRAWING
VALVE BODY	9955-006-003
CHECKSTOP	9956-040-003
PUSHBUTTON/ESCUTCHEON	9957-300-001
METERING SERVOMOTOR	9955-000-003

NOTE:

1. ALL TUBING SHOULD BE CUT SQUARE AND BE FREE OF BURRS OR DEFORMITIES TO ENSURE A WATER TIGHT CONNECTION.
2. EXTEND TUBING AT LEAST 1/4" BEYOND FERRULE NUT AND INSERT TUBING INTO CONNECTION OPENING BEFORE TIGHTENING.
3. TUBING SHOULD BE FREE OF KINKS TO ENSURE PROPER OPERATION.
4. MAXIMUM RECOMMENDED WORKING WATER PRESSURE IS 100 PSI; TEMPERATURE IS 130° F; OUTLET TEMPERATURE IS RECOMMENDED AT A MAXIMUM OF 105° F.

WARNING:

PRIOR TO MAKING INSTALLATION, SUPPLY LINES MUST BE FLUSHED OF ALL FOREIGN MATERIAL SUCH AS PIPE DOPE, CHIPS, SOLDER, ETC. VALVE MUST BE DRAINED PRIOR TO BEING SUBJECTED TO FREEZING TEMPERATURES. MAXIMUM RECOMMENDED OUTLET WATER TEMPERATURE IS 105° F.

INSTALLATION INSTRUCTIONS:

A- MOUNT FIXTURE IN ACCORDANCE TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.

B- ASSEMBLE PUSHBUTTONS AND OR SHOWER NOZZLES TO FIXTURE IF REQUIRED.

C- CONNECT 1/8" O.D. POLYETHYLENE AIR LINE (1) TO PUSHBUTTON (2) AND VALVE TIMER ASSEMBLY (3). SEE DETAILS 'A' & 'B'. HAND TIGHTEN FERRULE NUT (4) PROVIDED.

D- CONNECT SHOWER RISER (5) TO VALVE ASSEMBLY ELBOW (6). SEE DETAIL 'C' AND 'D'. HAND TIGHTEN FERRULE NUT (7) PROVIDED.

E- AFTER THOROUGHLY FLUSHING SUPPLY LINES, MAKE UP CONNECTIONS TO VALVE ASSEMBLY INLET(S) 1/2" NPT OR 1/2" NPS FLEX HOSE AS REQUIRED.



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TITLE

HAND OPERATED, AIR-CONTROL VALVE SHOWER CONNECTIONS

MANUFACTURE DATE

**OCTOBER 2010
TO PRESENT**

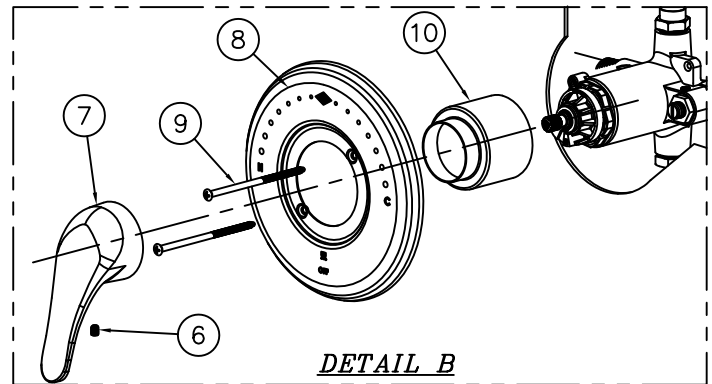
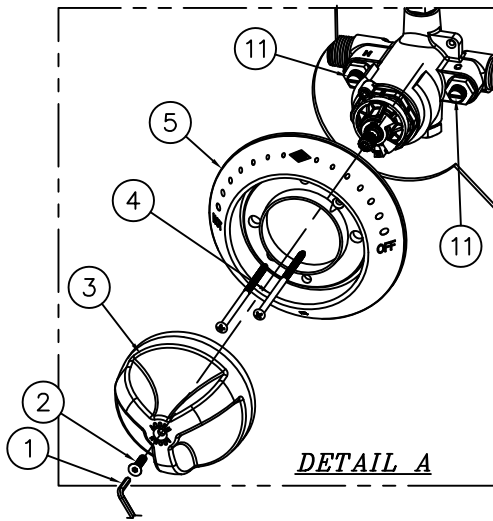
DATE ISSUED

10/28/10

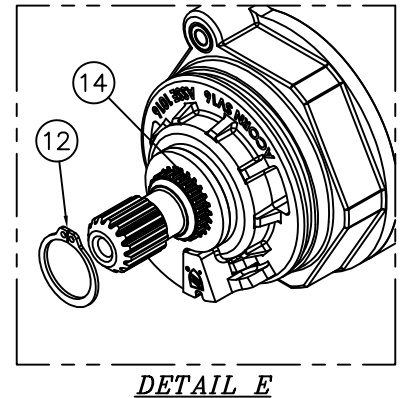
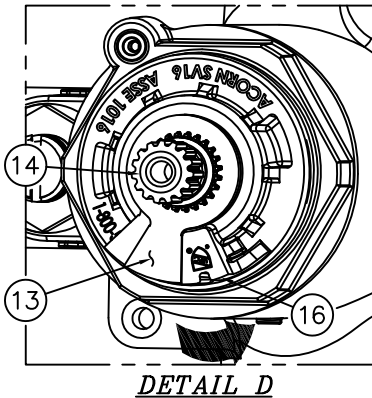
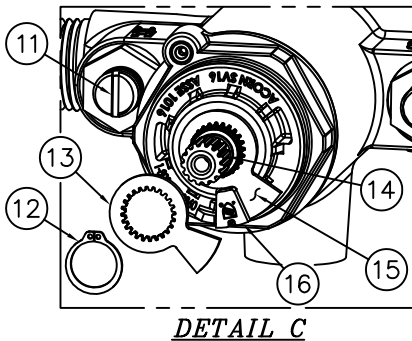
DATE REVISED

DRAWING NUMBER

9900-006-003

**REFERENCE DRAWINGS**

ASSEMBLIES	NUMBER
T/P VALVE	9975-005-002

**INSTRUCTIONS:**

A-REMOVE TRI-LEVER HANDLE TRIM: SEE DETAIL A

a- USING CENTER REJECT ALLEN WRENCH ① REMOVE HANDLE SCREW ② AND REMOVE HANDLE ③.

b- REMOVE ESCUTCHEON ④ BY REMOVING SCREWS ⑤.

FOR OPTIONAL -LVR LEVER HANDLE TRIM: SEE DETAIL B

a- REMOVE SET SCREW ⑥ AND HANDLE ⑦.

b- REMOVE ESCUTCHEON ⑧ BY REMOVING SCREWS ⑨.

c- PULL OFF VALVE SLEEVE ⑩.

TEMPERATURE ADJUSTMENT:

B-ENSURE MAIN WATER SUPPLY IS ON.

C-ENSURE CHECK STOPS ⑪ ARE OPEN.

D-ENSURE VALVE IS IN THE OFF POSITION.

E-USING SNAP RING PLIERS REMOVE RETAINING RING ⑫ AND THE FIRST TEMPERATURE LIMIT WASHER ⑬ ONLY FROM VALVE STEM ⑭. SEE DETAIL C.

NOTE: IF SECOND TEMPERATURE LIMIT WASHER ⑮ COMES OFF, RESETTING OF THE OFF STOP MAY BE REQUIRED, KEY AS CLOSE AS POSSIBLE ON THE COUNTER-CLOCKWISE SIDE OF BONNET STOP ⑯. USING HANDLE ③ OR ⑦ SLIGHTLY OPEN AND CLOSE VALVE TO ENSURE WATER WILL SHUT OFF. DETAIL C.

TEMPERATURE ADJUSTMENT: CONTINUED:

F-USING HANDLE ③ OR ⑦ TURN VALVE STEM ⑭ COUNTER-CLOCKWISE TO INCREASE HOT, CHECKING OUTLET TEMPERATURE UNTIL DESIRED TEMPERATURE IS REACHED (RECOMMENDED 105° TO 110°). SLIDE FIRST TEMPERATURE LIMIT WASHER ⑨ OVER VALVE STEM ⑬ AND ENSURE SIDE OF WASHER RESTS AS CLOSE AS POSSIBLE TO COUNTER-CLOCKWISE SIDE OF BONNET LIMIT STOP ⑯. DETAIL D.

G-WITH VALVE IN THE "ON" POSITION AND WATER RUNNING, USING SNAP RING PLIERS INSTALL RETAINING RING ⑫. ENSURE RETAINING RING ⑫ IS INSERTED PROPERLY INTO GROOVE ON VALVE STEM ⑭. DETAIL E.

H-REINSTALL TRIM IN REVERSE ORDER.



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TITLE

-8 T/P TEMP/PRESS BALANCING MIXING VALVE - TEMPERATURE ADJUSTMENT

MANUFACTURE DATE

APRIL 2014

PRESENT

DATE ISSUED

05/01/14

DATE REVISED

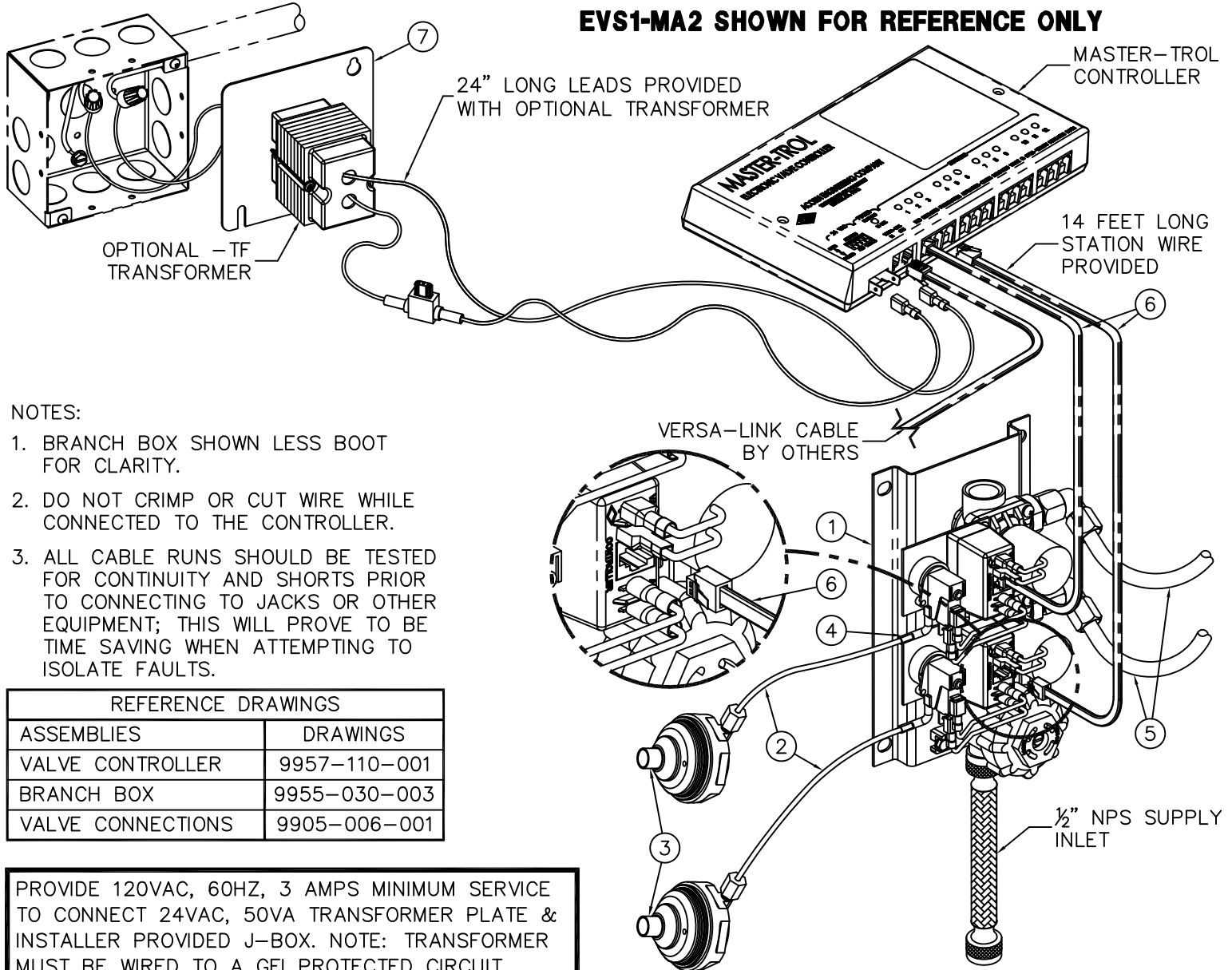
09/01/16 B

DRAWING NUMBER

9900-007-001



EVS1-MA2 SHOWN FOR REFERENCE ONLY



INSTALLATION INSTRUCTIONS:

- ROUGH-IN & INSTALL FIXTURE PER MANUFACTURER'S INSTRUCTIONS.
- MOUNT SOLENOID VALVE ASSEMBLY ① WITHIN THE CHASE OR FIXTURE FRAME / CABINET AS REQUIRED A MAXIMUM OF 10 FEET FROM THE FIXTURE.
- CONNECT AIR TUBING ② TO MOUNTED PUSHBUTTON ASSEMBLY ③ AND HAND TIGHTEN FERRULE NUT. CONNECT THE TAG END OF THE AIR TUBING ② TO THE BRANCH BOX PRESSURE SWITCH 3/16" OD TUBE ④. AIR TUBING ② FITS INSIDE THE PRESSURE SWITCH 3/16" OD TUBE ④.
- CONNECT RISER TUBING ⑤ TO VALVE ASSEMBLY AND FIXTURE DISCHARGE CONNECTOR. HAND TIGHTEN USING FERRULE NUTS PROVIDED.
- CONNECT STATION WIRE ⑥ TO BRANCH BOX AND APPROPRIATE LOCATION ON CONTROLLER.
- MAKE UP CONNECTIONS FROM TRANSFORMER ⑦ TO CONTROLLER AS SHOWN.
- AFTER THOROUGHLY FLUSHING SUPPLY LINES MAKE UP SUPPLY CONNECTIONS.



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TITLE

EVS1 MASTER-TROL SINGLE TEMP VALVE INSTALLATION

MANUFACTURE DATE

MAY 1998

TO PRESENT

DATE ISSUED

12/09/10

DATE REVISED

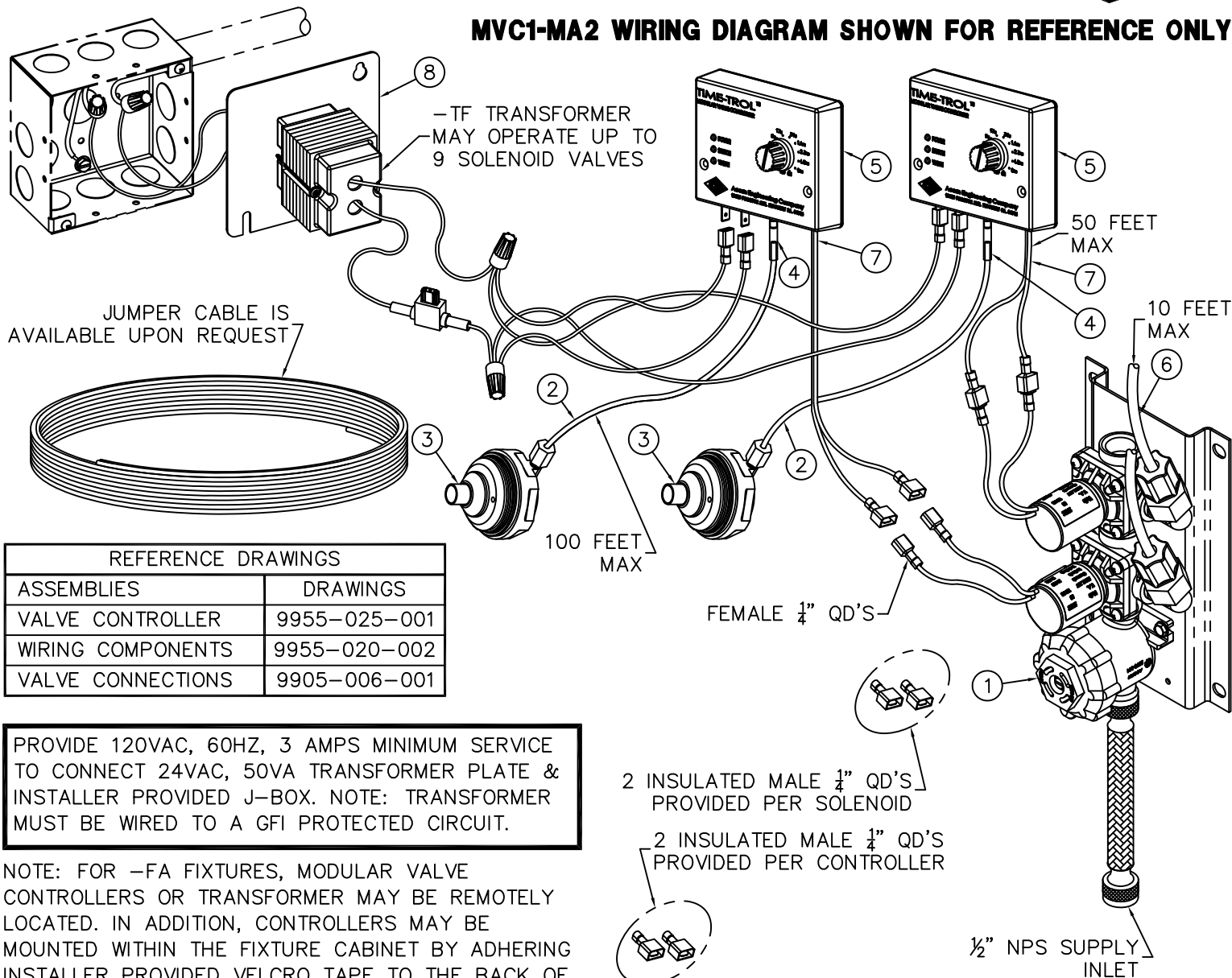
05/14/13

DRAWING NUMBER

9905-330-004



MVC1-MA2 WIRING DIAGRAM SHOWN FOR REFERENCE ONLY



REFERENCE DRAWINGS

ASSEMBLIES	DRAWINGS
VALVE CONTROLLER	9955-025-001
WIRING COMPONENTS	9955-020-002
VALVE CONNECTIONS	9905-006-001

PROVIDE 120VAC, 60HZ, 3 AMPS MINIMUM SERVICE TO CONNECT 24VAC, 50VA TRANSFORMER PLATE & INSTALLER PROVIDED J-BOX. NOTE: TRANSFORMER MUST BE WIRED TO A GFI PROTECTED CIRCUIT.

NOTE: FOR -FA FIXTURES, MODULAR VALVE CONTROLLERS OR TRANSFORMER MAY BE REMOTELY LOCATED. IN ADDITION, CONTROLLERS MAY BE MOUNTED WITHIN THE FIXTURE CABINET BY ADHERING INSTALLER PROVIDED VELCRO TAPE TO THE BACK OF THE CONTROLLER AND ONTO FIXTURE CABINET.

INSTALLATION INSTRUCTIONS:

- A- ROUGH-IN & INSTALL FIXTURE PER MANUFACTURER'S INSTRUCTIONS.
- B- MOUNT SOLENOID VALVE ASSEMBLY (1) WITHIN THE CHASE OR FIXTURE FRAME / CABINET AS REQUIRED A MAXIMUM OF 10 FEET FROM THE FIXTURE.
- C- CONNECT AIR TUBING (2) TO MOUNTED PUSHBUTTON ASSEMBLY (3) AND HAND TIGHTEN FERRULE NUT. CONNECT THE TAG END OF THE AIR TUBING (2) TO THE VALVE CONTROLLER TUBE (4) AT THE POSITION MARKED "ACTUATOR" ON THE CONTROLLER (5). AIR TUBING FITS INSIDE THE CONTROLLER TUBE (4).

- D- CONNECT RISER TUBING (6) TO VALVE ASSEMBLY AND FIXTURE DISCHARGE CONNECTOR. HAND TIGHTEN USING FERRULE NUTS PROVIDED.
- E- CONNECT CONTROLLER WIRES (7) (INDICATED AS "VALVE" ON THE CONTROLLER) FROM VALVE CONTROLLER (2) TO SOLENOID VALVE (1).
- F- MAKE UP CONNECTIONS FROM TRANSFORMER (8) TO CONTROLLERS IN PARALLEL AS SHOWN.
- G- AFTER THOROUGHLY FLUSHING SUPPLY LINES MAKE UP SUPPLY CONNECTIONS.
- H- SET TIMING ON VALVE CONTROLLER (5) TO DESIRED FLOW DURATION.



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TITLE

MVC1-MA2 TIME-TROL SINGLE TEMP VALVE INSTALLATION

MANUFACTURE DATE

MAY 1990**TO PRESENT**

DATE ISSUED

08/05/10

DATE REVISED

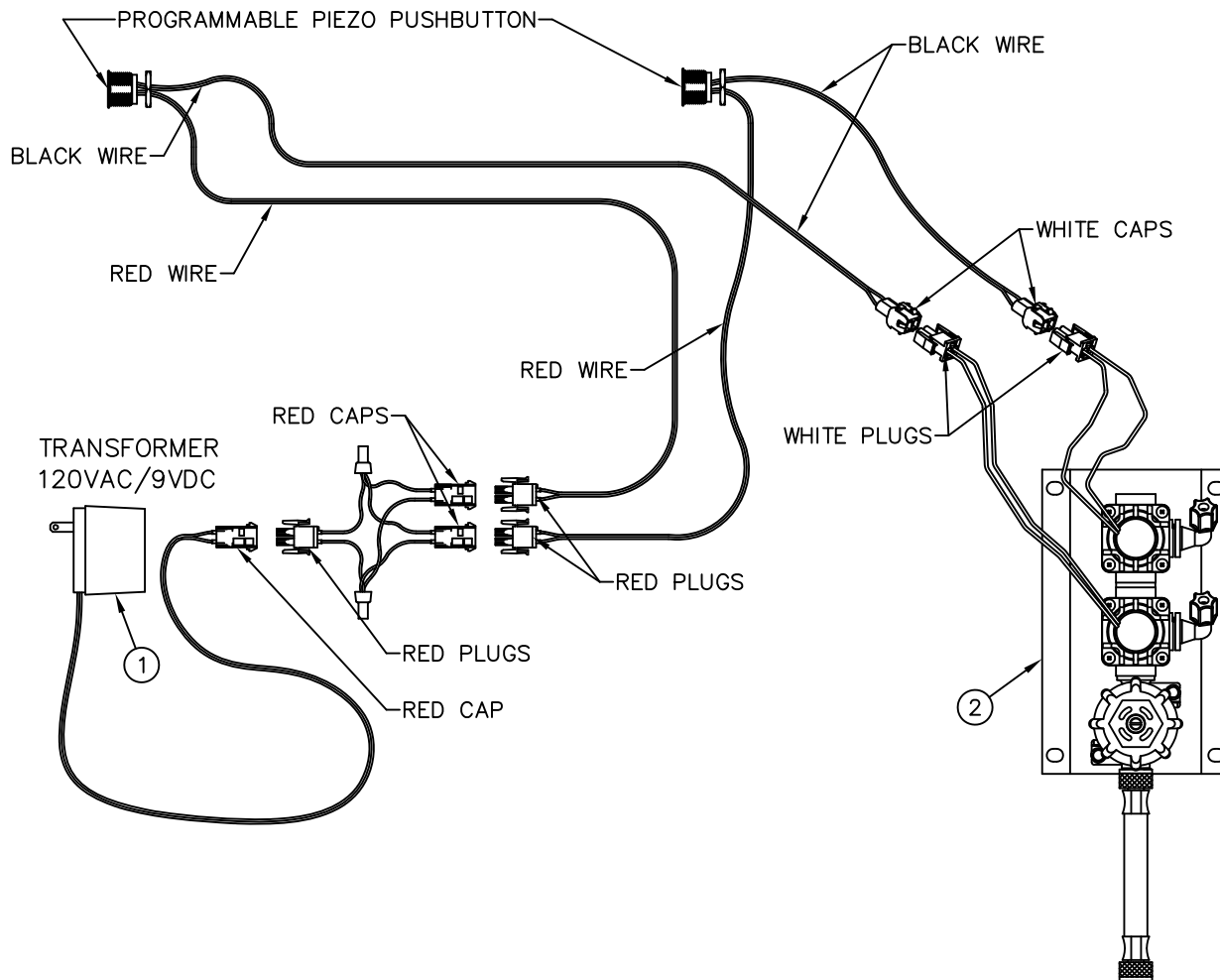
01/11/13

DRAWING NUMBER

9900-001-004



TWO STATION AND ADA WIRING DIAGRAM SHOWN



REFERENCE DRAWINGS

9VDC SENSOR & PARTS	9955-019-002
PIEZO PB PROGRAMMING	9940-009-001

INSTALLATION INSTRUCTIONS:

A- USING APPROPRIATE INSTALLATION INSTRUCTIONS, MOUNT FIXTURE TO WALL AND MAKE-UP SUPPLY CONNECTIONS. ELECTRONIC PUSHBUTTON ARE FACTORY INSTALLED. POWER SUPPLY ① AND VALVE ② SHIPPED LOOSE.

B- INSTALL SOLENOID VALVE ASSEMBLY ② ON THE WALL (FASTENERS AND WALL ANCHORS BY OTHERS), MAKING SURE THAT THE VALVE WILL BE WITHIN HOUSING OR BLOCKOUT AREA.

C- CONNECT WATER SUPPLY (AFTER FLUSHING LINES) TO VALVE, AND VALVE RISER TO SHOWERHEAD AS PER UNIT INSTALLATION INSTRUCTIONS.

D- CONNECT SOLENOID VALVE, POWER SUPPLY AND SENSOR WIRING AS SHOWN ON DETAIL.

E- COMPLETE THE INSTALLATION OF THE UNIT ACCORDING TO THE UNITS INSTALLATION INSTRUCTIONS.

NOTE:

1- PLUG-IN TRANSFORMER INCLUDES BUILT-IN SECONDARY FUSE. IN THE EVENT OF POWER SURGE TRANSFORMER MAY REQUIRE REPLACEMENT.

2- ELECTRICAL RECEPTACLE MUST BE WIRED TO A GFI PROTECTED CIRCUIT. FIXTURE MUST BE EARTH GROUNDED PER N.E.C. (NATIONAL ELECTRICAL CODE).



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TITLE

-PPZ PIEZO ELECTRONIC PUSHBUTTON INSTALLATION

MANUFACTURE DATE

**OCTOBER 2013
TO PRESENT**

DATE ISSUED

10/11/13

DATE REVISED

DRAWING NUMBER

9927-223-001



Programable Piezo Pushbutton Programming Instructions (Flow Time Adjustment)

The Button is factory set an 8 sec. timing cycle, if an 8 sec. cycle is adequate, then **no** programming adjustment is required. This will provide less than 1/4 gallon (1 liter) per run cycle. If is noted that the valves are running longer than this maximum recommended cycle time please follow these instructions to correct the cycle time. When properly set the faucet should not produce more than 1/4 gallon (1 liter) per cycle. Pushing button during the timing cycle will stop the cycle (Cycle Interrupt).



NOTE: Read the entire document before trying to program the piezo pushbutton.*

THE TIME SETTINGS PROGRAM USES 3 DIFFERENT TIMING MODES:

- **1 second timing mode:** Each push of the button adds 1 second to the total timing cycle.
- **5 second timing mode:** Each push of the button adds 5 seconds to the total timing cycle.
- **20 second timing mode:** Each push of the button adds 20 seconds to the total timing cycle.

To program the piezo pushbutton, you will need to be able to see the back of the piezo pushbutton.

Prevision must be made to access the back of the piezo pushbutton. There is an LED on the back of the piezo pushbutton under a layer of transparent epoxy, used as a programming indicator light (see page 3).



NOTE: This programming procedure moves along rapidly, there is only about 2 or 3 seconds between programming operations.

In order to start the programming the piezo pushbutton, the button must be powered down. Disconnect the red power cable and wait 20 seconds, then reconnect the red power cable.

As soon as the cable is reconnected the LED will start flashing, it will flash 4 times, then stays on for 3 seconds. During the 3 second period, push the piezo button once, the LED will go out, now you are in the **1 sec timing mode** and each time the button is pushed the LED will flash, adding 1 sec to the total timing cycle.

To move on to the **5 sec timing mode**, pause and wait for the LED to flash 2 times, now you are in the 5 sec timing mode. Each time the button is pushed the LED will flash, adding 5 sec to the total timing cycle.

To move on to the **20 sec timing mode**, pause and wait for the LED to flash 3 times, now you are in the 20 sec timing mode and each time the button is pushed the LED will flash, adding 20 sec to the total timing cycle. After programing is complete, pause and wait for the LED to flash 4 times and then 5 times, which completes the programming.

GENERAL NOTES:

- When a **timing mode is not required** then **do not** push the button and wait for the next timing mode.
- Each timing mode (1 sec, 5 sec or 20 sec timing mode) can be sequenced up to 100 times, that is the number of times, the button can be pushed, to increase the total timing cycle in each timing mode.

*See work sheet on page 2 which will simplify the programming procedure.



Programmable Piezo Pushbutton Programming Instructions (Flow Time Adjustment)

WORKSHEET

(FILL IN ALL BOXES, WHICH WILL SIMPLIFY THE PROGRAMMING PROCEDURE)

Fill in all the
Boxes below



Determine the
number of seconds
per timing cycle

PROGRAMING STEPS:

- Power down piezo button for 20 seconds.
- Reconnect power.
- LED flashes, then stays on.
- While the LED is steady on, push button.
- LED turns off.

1 Push = 1 Second

x 1 = sec



- You are in the 1 sec timing mode, immediately push the button, 1 push equals 1 sec added to the total timing cycle.
- Pause and wait for the LED to flash 2 times.

ADD

1 Push = 5 Seconds

x 5 = sec



- You are in the 5 sec timing mode, immediately push the button, 1 push equals 5 sec added to the total timing cycle.
- Pause and wait for the LED to flash 3 times.

ADD

1 Push = 20 Seconds

x 20 = sec



- You are in the 20 sec timing mode, immediately push the button, 1 push equals 20 sec added to the total timing cycle.

EQUALS

Total timing cycle equals

seconds

NOTE: if you miss a step in the programming procedure, just power down the button and start again from the first step.



INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

Please visit www.acorneng.com
for most current specifications.

