



INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

Valves: MTP Series

MASTER-TROL® PLUS WATER MANAGEMENT SYSTEM



TABLE OF CONTENTS

Important	2
Dimensional Data	3
Hardware Specifications	4
Stand-Alone Installation (No Computer Interface)	5
Monitored Single/Multiple Versa-Link Wiring	6
Sub Module Setup	7
Modular Controller	8
Controller Station Numbering & Labeling	9
Controller Addressing	10
Versa-Link Wiring Installation - Wiring Diagrams	11
Multiple Versa-Link Wiring Installation	12
Pneumatic Pushbutton Valve Installation	13
Piezo Button Valve Installation	14
IR Sensor Installation	15
Flush Valve Installation	16
Piezo Button Flush Valve Installation	17
(-PFB) Power Fail Bypass Valve Installation	18
(-PFB) Power Fail Bypass Valve Setup	19
Electronic Flood-Trol Installation	20
Vacuum Transducer Installation	21-22
Permissive Switch/Button Installation	23
Main Module Wiring Diagram	24
Sub Module Wiring Diagram	25
Branch Box Wiring Diagram	26
Repair Parts	27-33
Warranty Information	34



ACORN ENGINEERING COMPANY
P.O. BOX 3527 • CITY OF INDUSTRY, CA 91744 U.S.A.
TOLL FREE 800-488-8999 :: LOCAL 626-336-4561
FAX 626-961-2200 :: www.acorneng.com



Important: Some options may slightly alter installation. To ensure proper installation, read this Manual thoroughly and verify Rough-Ins before beginning any work. File this Manual with the owner or maintenance personnel upon completion of installation.

For a communicating Master-Trol® PLUS system, Wiring Diagrams for Controller placement and addressing are available from Acorn Engineering Company. To acquire Wiring Diagrams you must submit building plans that detail fixture type (tags) and cell/location designations. You must also submit the quantities of each fixture type that will be connected to the Master-Trol® PLUS System. Wiring diagrams may take up to 3 weeks to complete.

Optional site visits for commissioning, training and troubleshooting are available. Site visit must be scheduled a minimum 4 weeks in advance.

Provide 110-120VAC Primary Electrical Supply for factory-supplied 120VAC/24VAC/50VA Class 2 Plate Mounted Transformer.

NOTE: Transformer(s) must be wired to a GFCI Protected Circuit. Fixture must be earth grounded per N.E.C. (National Electrical Code).

Prior to installation, Supply Lines must be flushed of all foreign material such as pipe dope, chips, or solder. Debris or foreign material in water supply may damage Valve.

Single Temp Valve Assembly: Recommended working water pressure is 30 PSI (2.07 bars) minimum to 100 PSI (6.89 bars) maximum. Maximum temperature is 130°F (54.4°C). Maximum recommended outlet temperature is 105°F (40.6°C). Valve Assembly must be drained prior to being subjected to freezing temperatures. A Checkstop is provided with this Valve Assembly.

Do not use pipe dope or other petroleum based products on plastic components. Teflon tape is recommended on all brass NPT connections.

ANSI, UFAS, NEC or ADA compliance is subject to the interpretation and requirements of the Local Code Authority and is the responsibility of the Installer for verification.

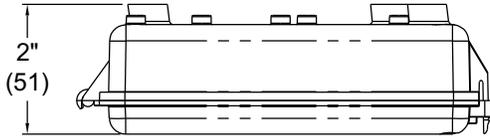


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

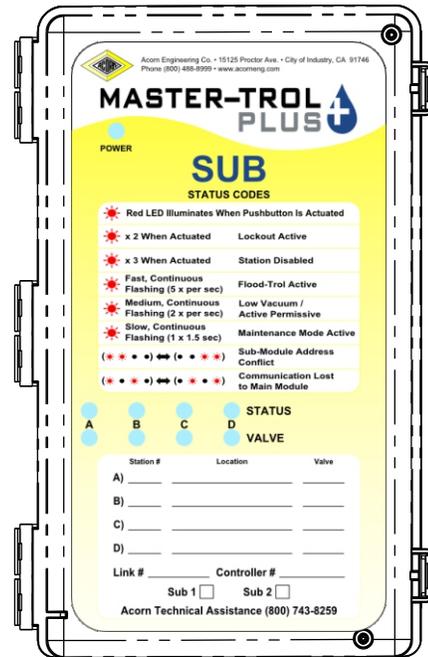
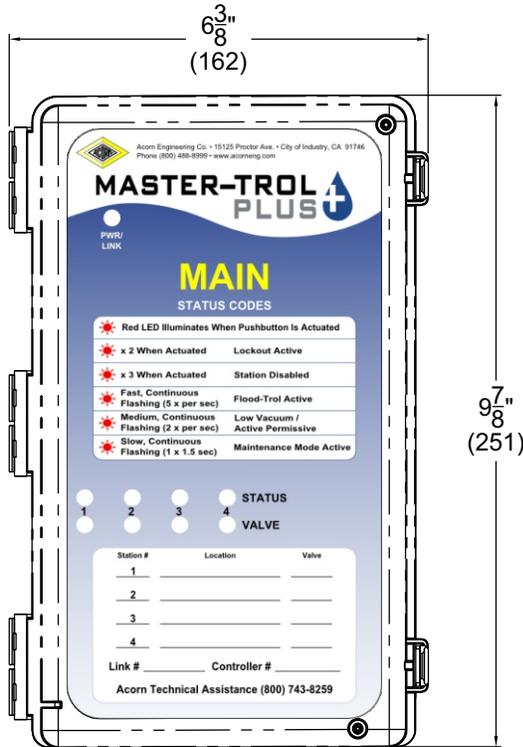
Please visit www.acorneng.com for most current specifications.

MASTER-TROL® PLUS

DIMENSIONAL DATA: MAIN & SUB MODULES

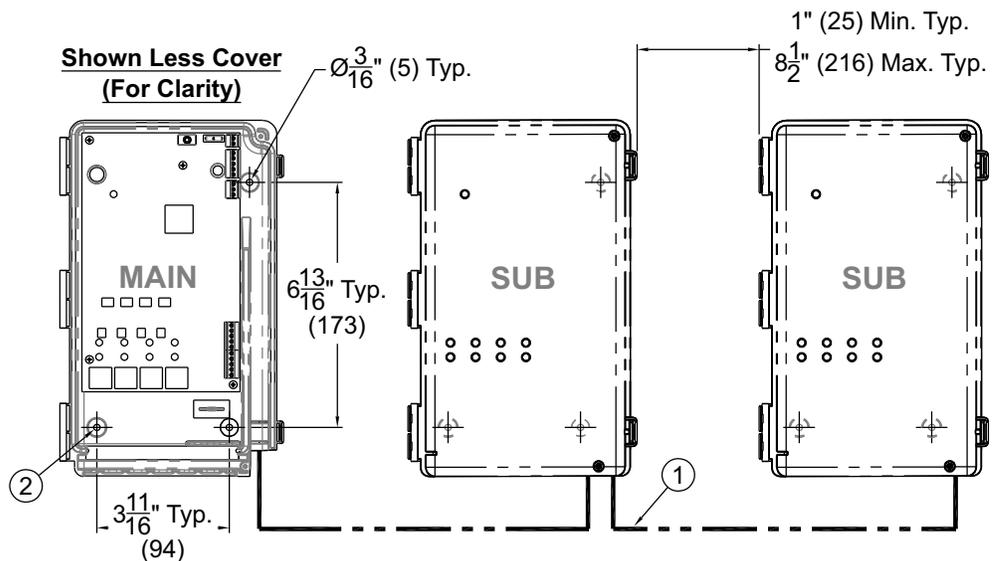


Note:
Main and Sub Modules have the same dimensional data



Notes:

1. Main/Sub Module 42" Extension Cable, West Penn Wire P/N 77350 or Equal is provided with each Sub Module. For lengths longer than supplied, contact Factory.
2. (3) Ø3/16" Holes provided for Anchoring Hardware (provided by installer).





INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

HARDWARE SPECIFICATIONS

Manufacturer's names and model numbers are provided for reference only.

HARDWARE (COMPUTER ONLY)

A- Option -CLT Laptop Computer (1) is provided with a Windows 10 Operating System for Single-Link systems only. USB to RS-485 Converter (2), COM1 to Versa-Link (via RJ-12 Socket) provided.

B- Option -CDT Desktop Computer (3) is provided with a Windows 10 Operating System for Single-Link or Multiple-Link (up to 8 Links) systems.

MISCELLANEOUS HARDWARE

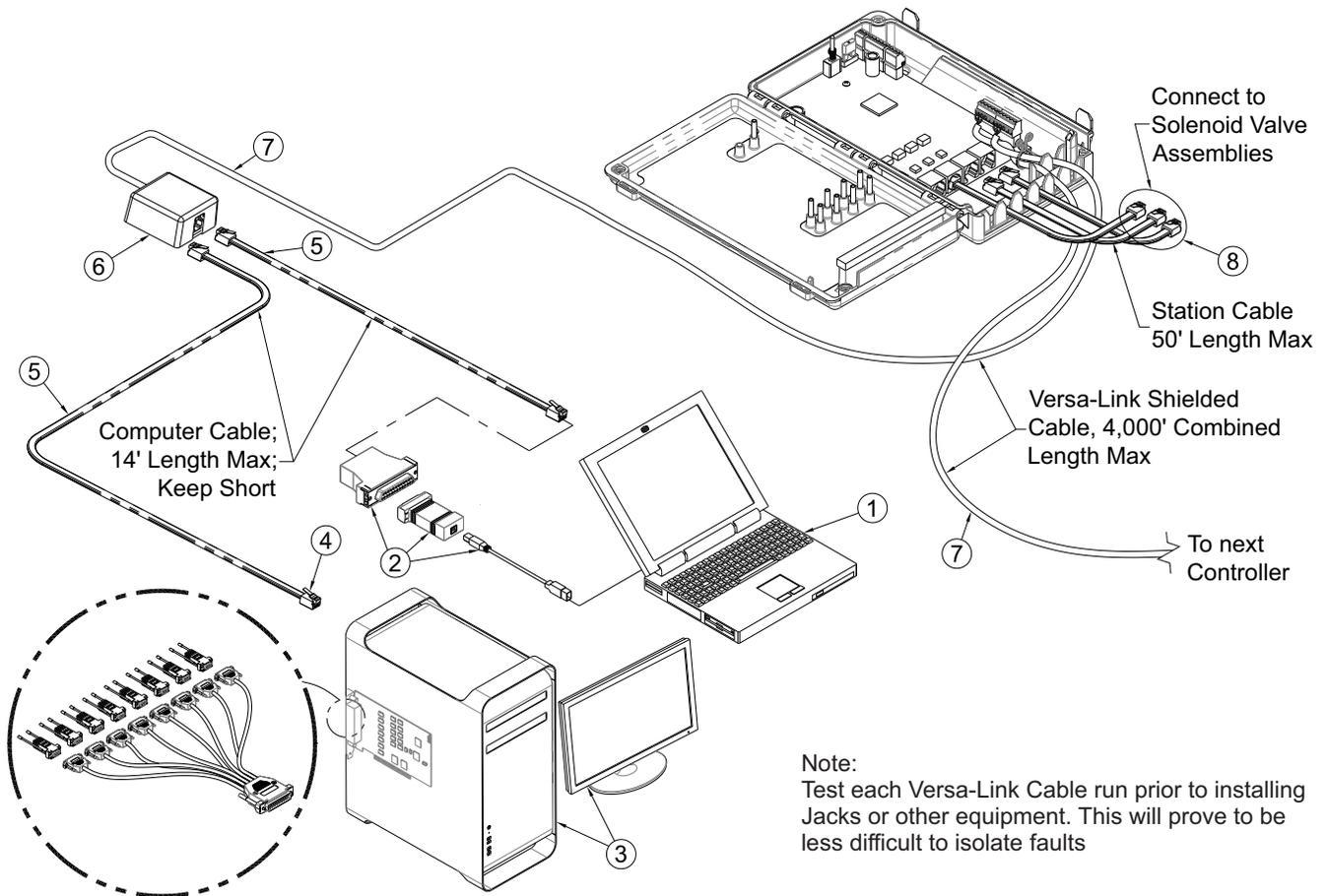
C- 6-Pin, 6-Conductor, RJ-12 Phone Plug (4) AMP INC. P/N #5-555042-3 or Equal, by others.

D- RJ-12, 26 AWG, 6P6C, Straight Modular Cable (5) with Connectors on both ends. I/O interconnect, P/N 120-610-000 or Equal. Telephone Flat Cable; used for Versa-Link Extension Cable, by others.

E- RJ12 Surface Mounted Modular Jack (6) - to be located near -CDT Desktop Computer. (See page 12 for wiring detail, by others.)

F- Versa-Link Cable (7), 24 AWG Shielded Twisted Pair Cable. Belden, P/N #9501 or Equal. 4,000' combined max per Link, by others. Up to 8 Links.

G- Station Cable P/N 0715-665-000: Standard Ethernet Cable (8) connects Master-Trol® PLUS Electronic Valve Controller Station to Fixture Solenoid Valve Assembly Branch Box. One Cable, 15 feet long per Solenoid Station provided.



REQUIRED ITEMS FOR COMMUNICATING INSTALLATION - NOT SUPPLIED

- ✂ Versa-Link 24 AWG Shielded Twisted Pair Cable
- ✂ RJ-12 6P6C Modular Surface Mounted Jack

- ✂ Link Wire 6-Conductor Phone Cable w/ RJ-12 Plugs at Each End



INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

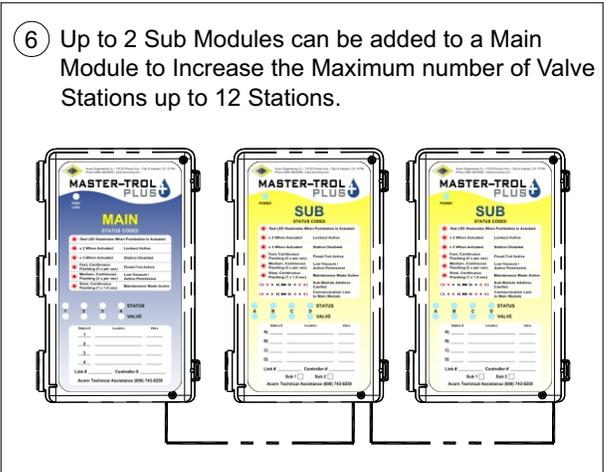
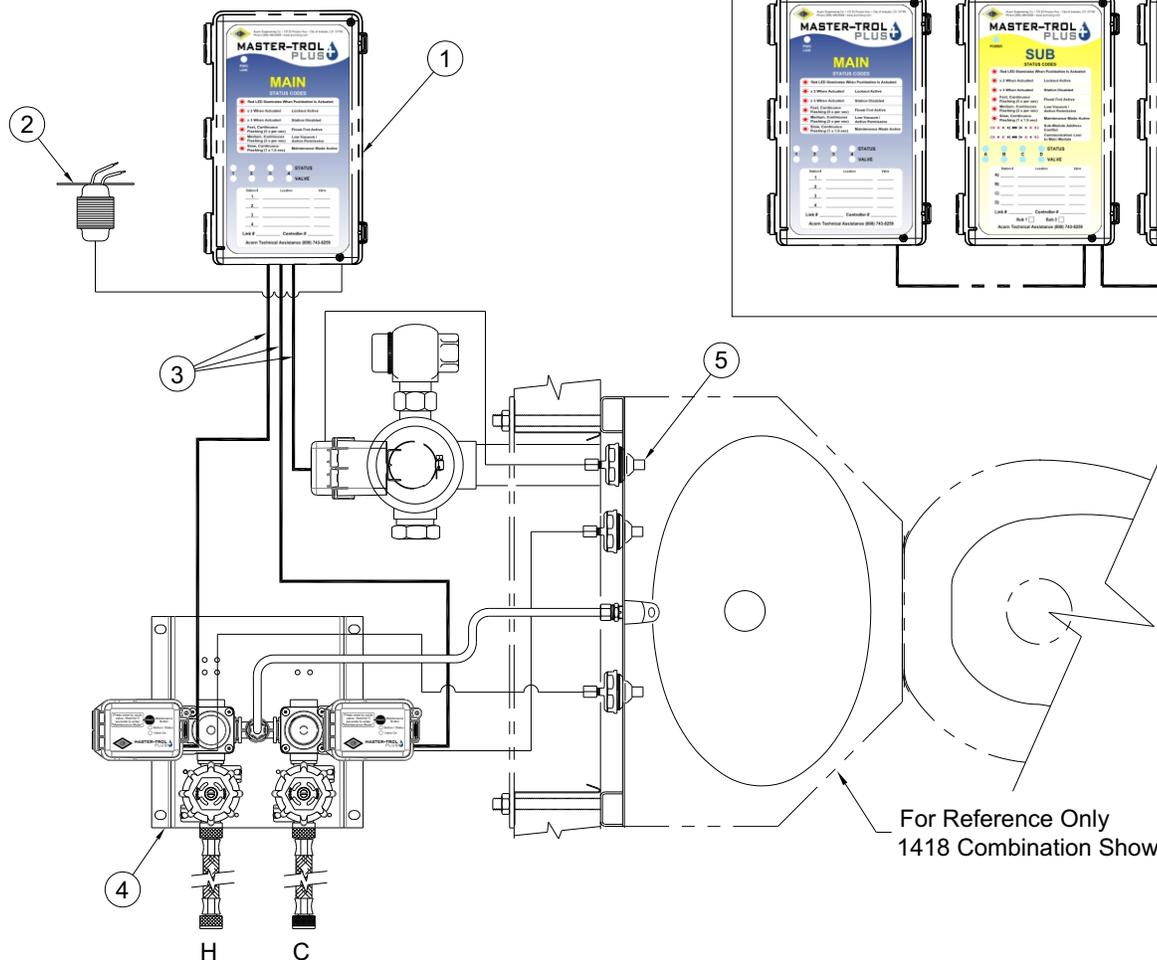
MASTER-TROL® PLUS

STAND-ALONE INSTALLATION (NO COMPUTER INTERFACE)

- 1 Locate Master-Trol® PLUS Controller in desired location. It is recommended that the Controller be located in a dry place within 50 feet of the Solenoid Valve/Branch Boxes.
- 2 120V Primary Electrical Supply for 24VAC 50VA Class 2 Transformer with 36" Leads (provided). Recommended location is at/or near Master-Trol® PLUS Controller.
NOTE: Connect only one Controller (1 Controller = 1 Main Module and up to 2 Sub Modules) per 50VA Transformer. Transformer must be wired to a G.F.I. Protected Circuit.
- 3 Station Wires (between Master-Trol® PLUS Controller Station & Branch Box) Cat5 or 6 Ethernet Cables (15 ft. supplied). If Controller is pre-programmed, then connect the Station Wires per the factory-supplied wiring diagrams or per the specified designations printed on the Controller label.
- 4 Solenoid Valve Assembly with Branch Box. Recommended distance is within 10 feet of fixture.
- 5 For Pneumatic Pushbuttons, see page 26 (#5) for Tubing Diagram. For Piezo Buttons / Infrared Sensor, see page 26 (#4) for Electrical Wiring Diagram.
- 6 If required, connect Sub Module(s) to the Main Module as shown on Page 7. Each Sub Module will add an additional 4 Stations to the Controller. A maximum of 2 Sub Modules can be added to a Main Module giving you a maximum total of 12 Stations per Controller.

ELECTRICAL WIRING LINE KEY

- Transformer Electrical Supply
- Expansion Cable (Sub Module to Main Module or Sub Module)
- Station Cable



For Reference Only
1418 Combination Shown



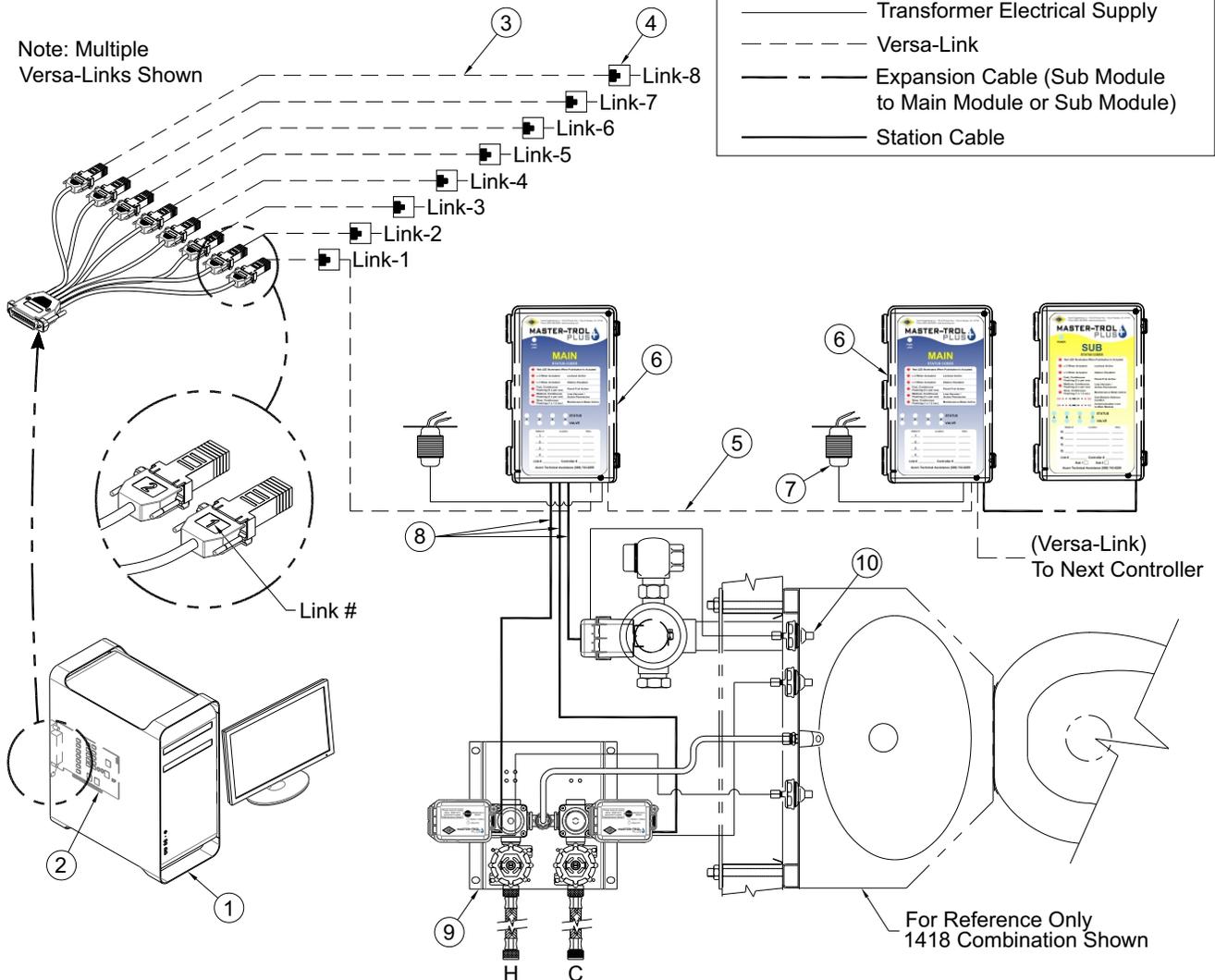
INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

MONITORED SINGLE/MULTIPLE VERSA-LINK WIRING

- ① Master-Trol® PLUS suffix -MTPC Desktop IBM Compatible Computer. Recommended installation is within control room or maintenance office. Max distance from -MTPC to last Valve Controller on a Versa-Link is 4,000 ft.
- ② The RS-485 Interface Card installed in the Computer will accommodate up to 8 Versa-Links. Versa-Links are connected to an Octopus Cable that has each Link numbered.
- ③ Computer Wire 6-Conductor Modular Phone Cable with RJ-12 Connecters at both ends (by others).
- ④ RJ-12 6P6C Surface Mounted Modular Jack (by others). For detail Connections, see page 12 for Versa-Link Wiring Installation. Recommended location at/or near Computer.
- ⑤ Versa-Link 24 AWG Shielded Twisted Pair Cable (by others). Not to exceed 4,000 total feet. Up to 32 Master-Trol® PLUS Controllers can be connected to a single Versa-Link (see page 12 for Versa-Link Wiring).
- ⑥ Locate Master-Trol® PLUS Controller in a dry place within 50 feet of Solenoid Valve/Branch Box.
- ⑦ 120V Primary Electrical Supply for 24VAC 50VA Class 2 Transformer with 36" Leads (provided) recommended location is at/or near Master-Trol Plus Controller. Note: Transformer must be wired to a G.F.I. Protected
- ⑧ Circuit Station Wires (between Master-Trol® PLUS Controller Station & Branch Box) Cat5 or 6 Ethernet Cables (15 ft.).
- ⑨ Solenoid Valve Assembly with Branch Box. Recommended distance is within 10 feet of fixture.
- ⑩ For Pneumatic Pushbuttons, See Page 26 (#5) for Tubing Diagram. For Piezo Buttons / Infrared, See Page 26 (#4) for Electrical Wiring Diagram.





INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

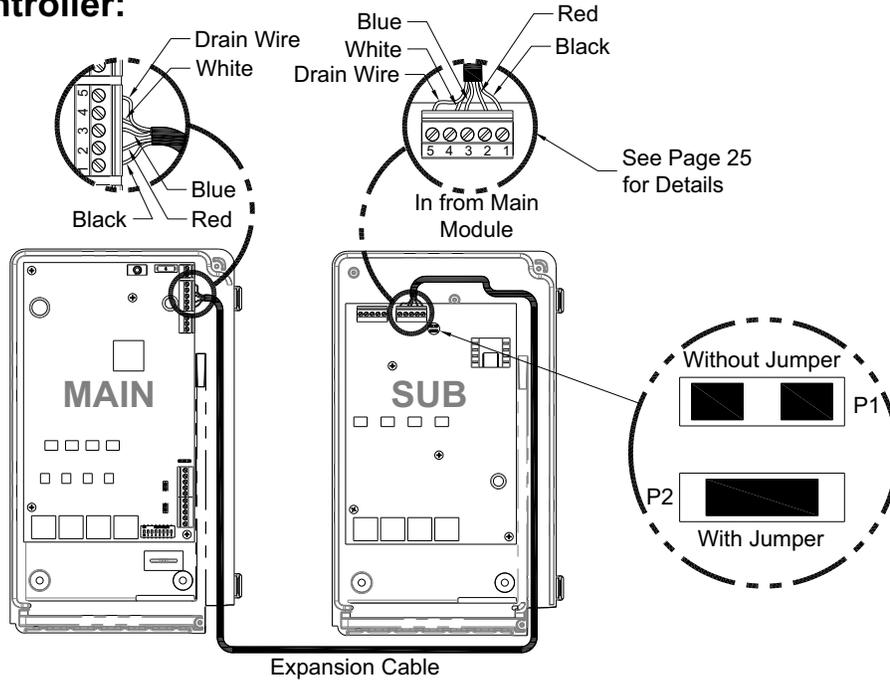
Please visit www.acorneng.com for most current specifications.

MASTER-TROL® PLUS

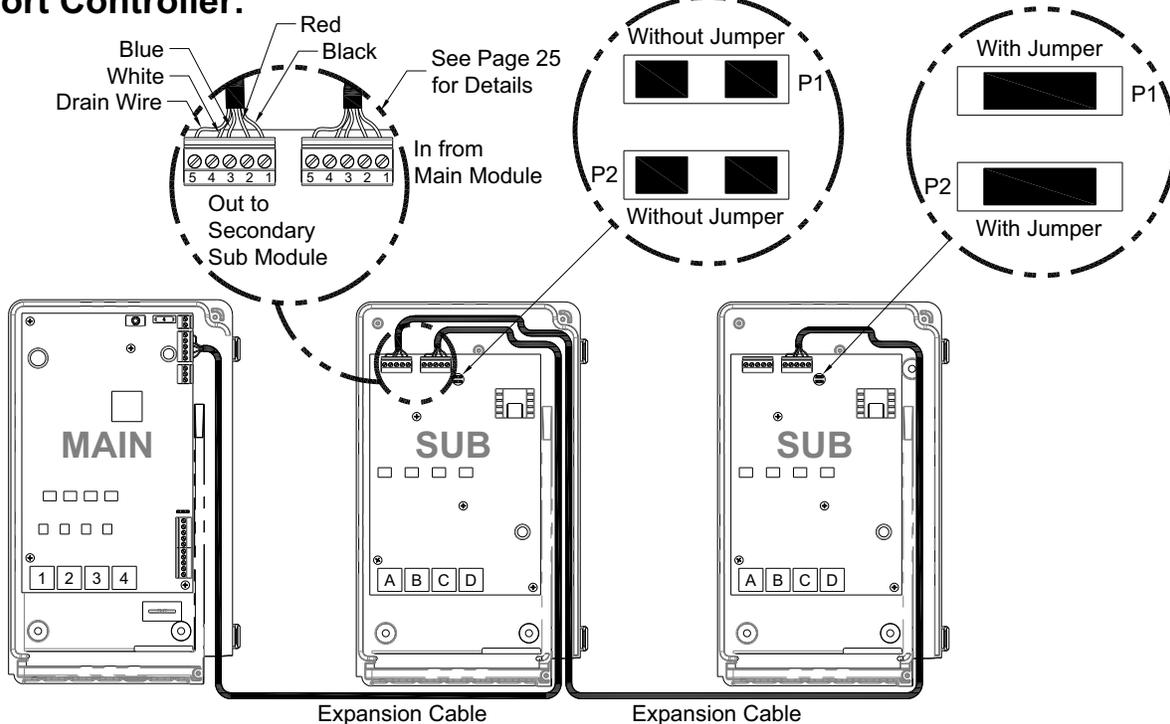
SUB MODULE SETUP

Sub Modules can be added to Main Modules using provided Expansion Cables to increase the number of Valve Ports on the Controller. Adding one Sub Module will give you an 8-Port Controller and adding two will give you a 12-Port Controller. Use the diagrams below to properly connect the Sub Modules to the Main Module using provided Expansion Cables and to properly configure the Jumpers for the desired Controller configuration. **NOTE: Be sure to turn off power to the Controller before making any connections or changes.**

8-Port Controller:



12-Port Controller:





INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

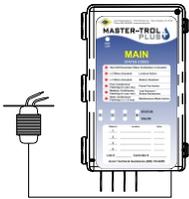
MASTER-TROL® PLUS

MODULAR CONTROLLER

The Master-Trol PLUS Controller's modular design allows you to combine Main Module and Sub Module to create 4, 8 & 12 Port Controllers (See below for reference).

4-Port Controller

1 Main Module



= 1 Controller Address

8-Port Controller

1 Main Module + 1 Sub Module



= 1 Controller Address

12-Port Controller

1 Main Module + 1 Sub Module + 1 Sub Module



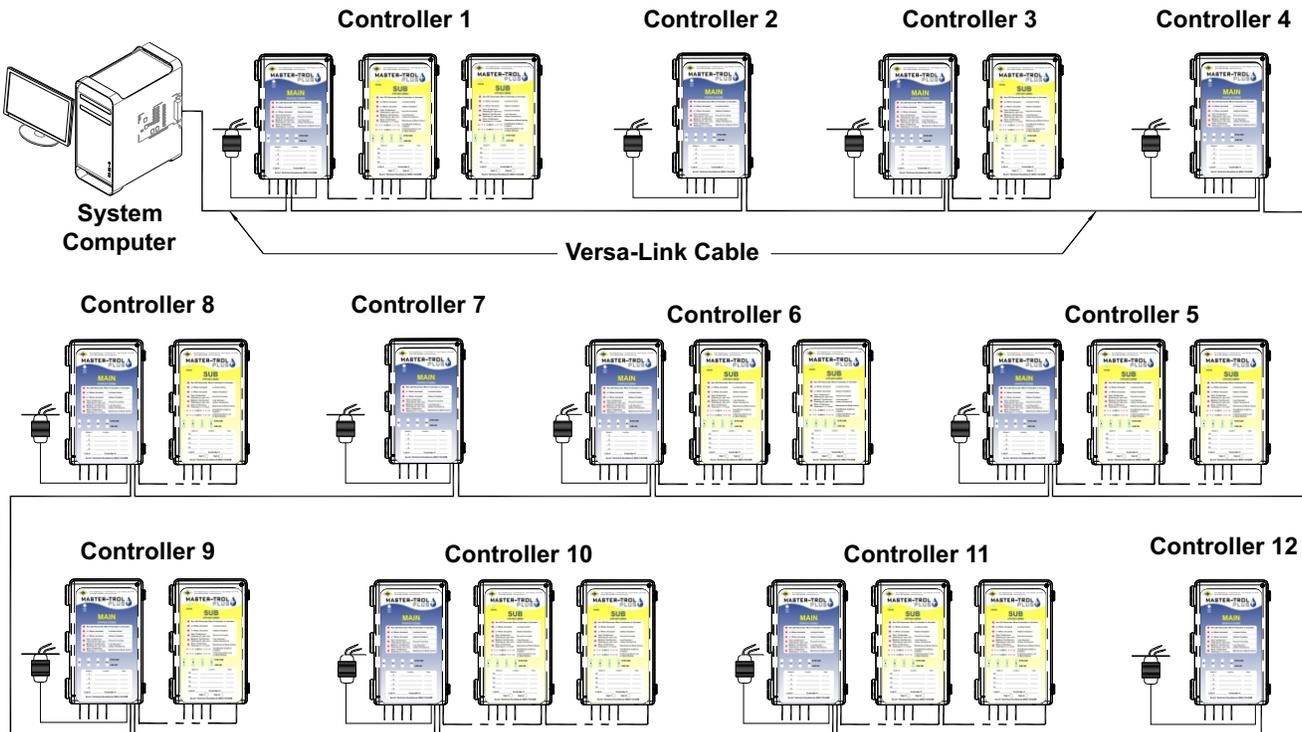
= 1 Controller Address

On a communicating system, you can combine these configurations in any order on a Versa-Link to accommodate all the Valve clusters in a location.

Versa-Link: A Single Communication Cable that connects a group of Controllers to the Master-Trol PLUS System Computer. One Versa-Link can accommodate up to 32 Controllers and can be a maximum combined distance of 4,000 feet (See page 6 for Versa-Link Wiring).

NOTE: Versa-Link Setup **does not** have to be in numerical sequence.

Example: Versa-Link Setup:





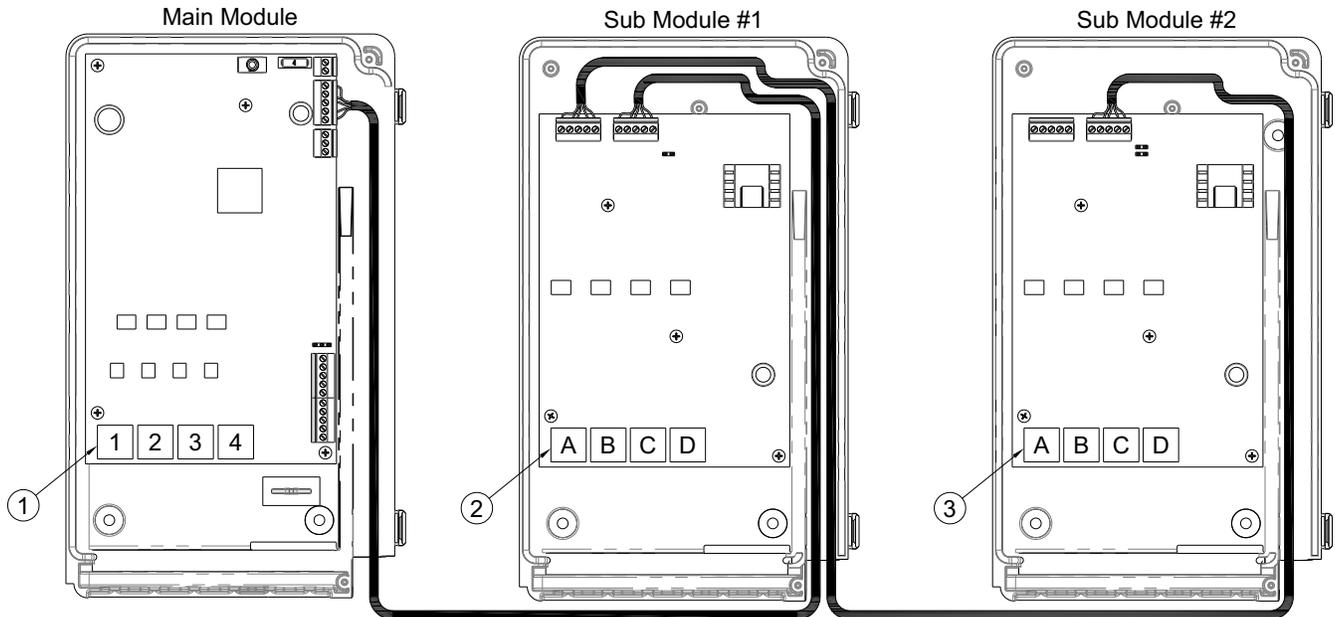
INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

CONTROLLER STATION NUMBERING & LABELING

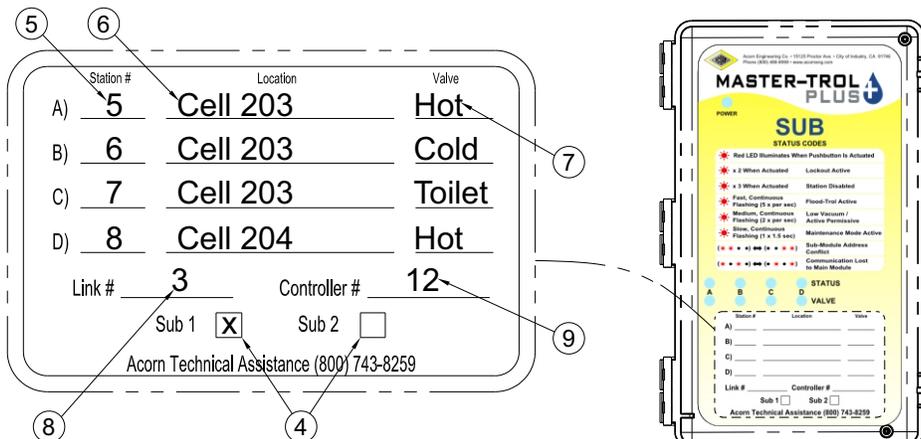
It is important to properly label the Controllers and Cables for easy identification. Use a permanent marker to label Controllers.



① The Stations on the Main Module will always be numbered 1 thru 4 from left to right in ascending order.

② Station numbers on Sub Module #1 will be numbered as follows:
A = 5 B = 6 C = 7 D = 8

③ Station numbers on Sub Module #2 will be numbered as follows:
A = 9 B = 10 C = 11 D = 12



Since the Stations for the Main Module are automatically numbered 1 thru 4, the example above is in reference to labeling the Sub Modules. The Main Module will be labeled the same less the Station numbers and Sub Module ID selections.

④ Mark the Sub Module Address Number. If there is only one Sub Module connected to the Main Module, then mark "Sub 1". (Not required for Main Module) See page 7 for Sub Module Jumper settings.

⑤ Fill in the Station numbers for the Sub Module. Sub Module #1 will be 5 thru 8 and Sub Module #2 will be 9 thru 12. (Not required for Main Module)

⑥ Write the location of the Valve
⑦ Write the Valve Type
⑧ Write the Link Number that the Controller is connected to
⑨ Write the Controller's address number

NOTE: Refer to the manufacturer supplied Wiring Diagrams for Controller locations and all other information called out above. See page 11 for Wiring Diagram Information.



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

CONTROLLER ADDRESSING

On a communicating system, each Controller on a Versa-Link must have its own unique address number. The address number only has to be unique per Versa-Link (up to 8) so the same address number range can be used on each Versa-Link connected to the system. The numbering range is from 1 to 32 and is set using the DIP Switch Array mounted on the Circuit Board of the Main Module. The Controllers addresses must be set prior to communication with an interface device such as a Desktop Computer or Laptop. If you have factory provided Wiring Diagrams, then the Controllers should be addressed according to those diagrams. Any deviations from the factory-supplied Wiring Diagrams should be reported to the manufacturer for the purpose of revising the Wiring Diagrams.

- The DIP Switch Array consists of 8 Switches. Only Switches 1 through 5 are used for addressing the Controller. Each Switch has a different value.

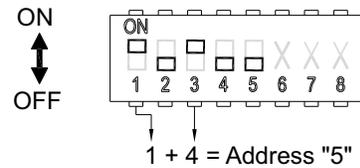
Switch:	1	2	3	4	5	6	7	8
Value:	1	2	4	8	16	X	X	X

Note: Switches 6-8 are not used.

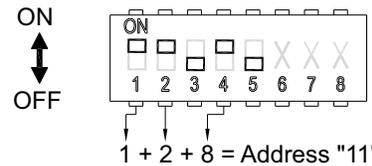
- To set the address, flip the Switches to "ON" (upward) whose values add up to the desired address (See examples to the right).

Note: For example 4, All Switches are "OFF" (downward) for Address "32".

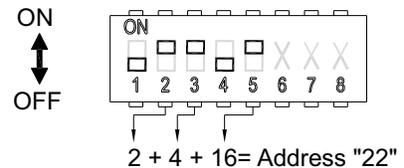
Example 1 - Set Controller address to "5"



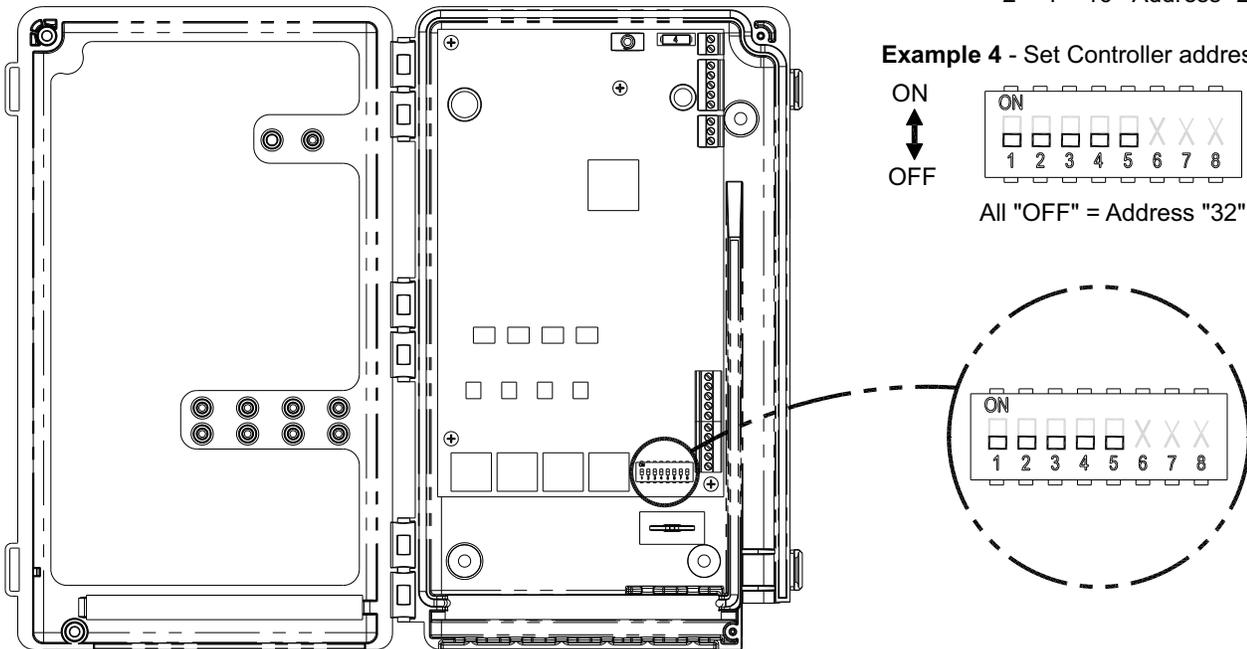
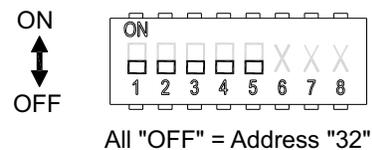
Example 2 - Set Controller address to "11"



Example 3 - Set Controller address to "22"



Example 4 - Set Controller address to "32"

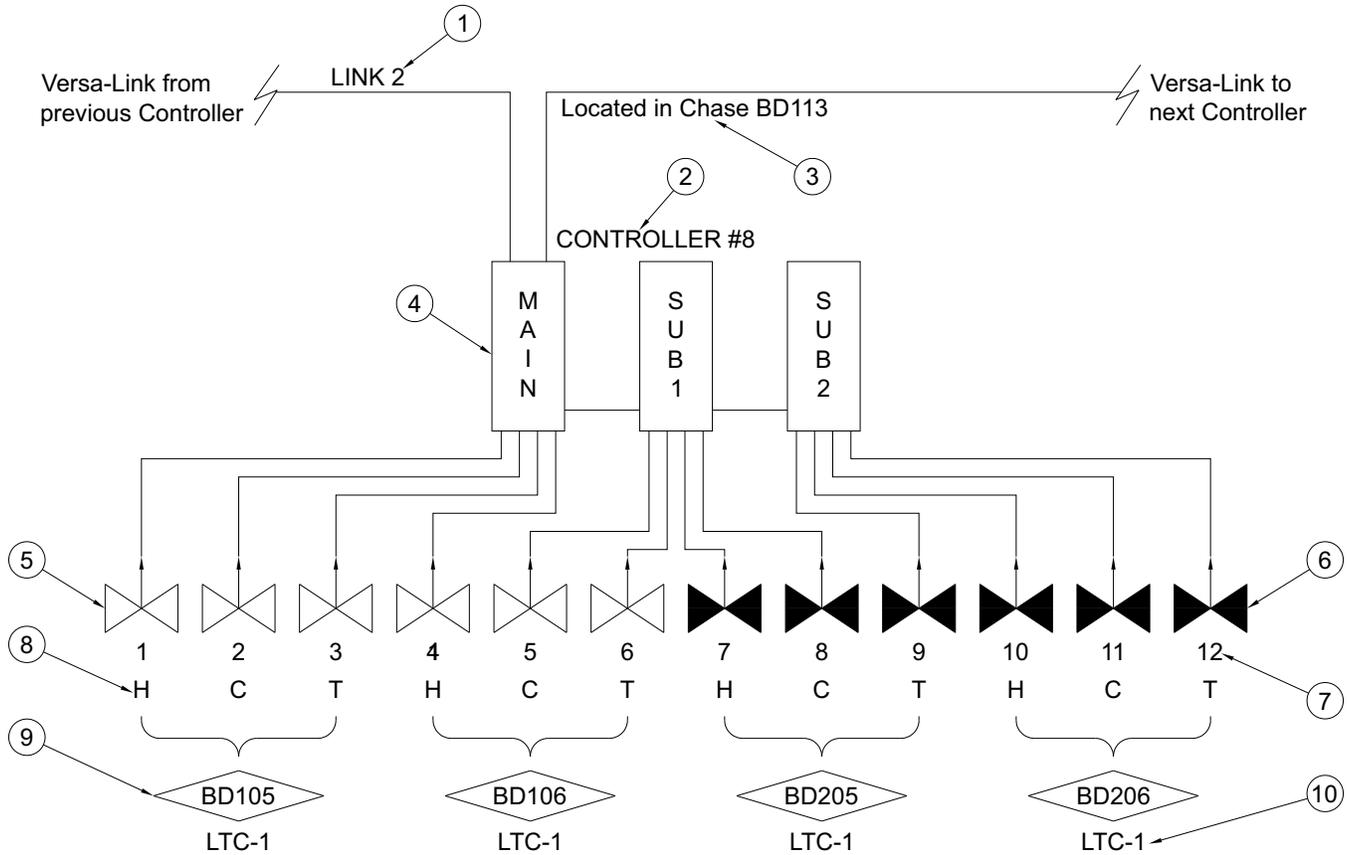




VERSA-LINK WIRING INSTALLATION - WIRING DIAGRAMS

Use the manufacturer supplied Wiring Diagrams for Controller locations and Valve connections. Below is an example of a Controller setup that would be seen on the factory supplied Wiring Diagrams.

NOTE: In some cases, you may need to deviate from the supplied Wiring Diagrams due to site conditions. Be sure to make detailed notes of all the deviations and provide them to the manufacturer for revisions to the Wiring Diagram.



- ① Link Number (Versa-Link)
- ② Controller Address Number
- ③ Controller Location
- ④ Controller Main and Sub Module Configuration
- ⑤ White Symbol = Valve on Ground Level

- ⑥ Black Symbol = Valve on Mezzanine Level
- ⑦ Controller Station Number
- ⑧ Valve Designation for Station Number Above
- ⑨ Cell / Room / Location Designation
- ⑩ Fixture Designation

- Valve Designations
 H = Hot Valve
 C = Cold Valve
 T = Toilet Valve
 S = Shower Valve
 E = Extraction Valve
 R = Refill Valve
 A = Accumulator Valve

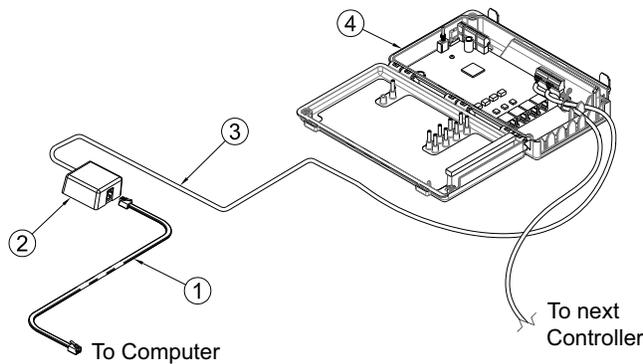


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

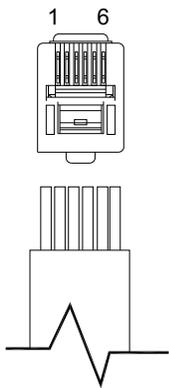
MULTIPLE VERSA-LINK WIRING INSTALLATION



- ① RJ-12 Versa-Link Interface Cable. Not to exceed 14 feet in length.
- ② RJ-12 (6P6C) Surface Mounted Modular Phone Jack. To be mounted at the Computer location.
- ③ Versa-Link Communication Cable. 24 AWG Shielded Twisted Single Pair Wire with Drain Wire. Cable not to exceed a combined length of 4,000 feet.
- ④ Master-Trol® PLUS Controller (Main Module). One Versa-Link Cable can connect up to a maximum of 32 Controllers.

Note: See page 4 for component specifications.

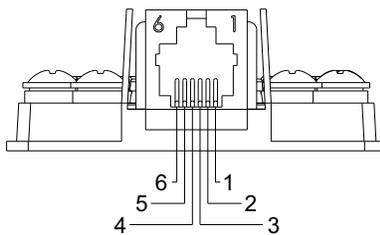
① RJ-12 Versa-Link Interface Cable



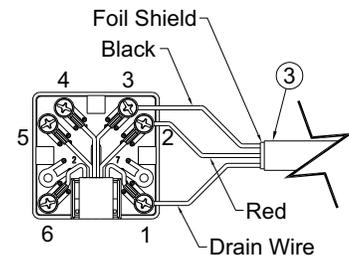
Pin	Wire Color
1	Blue
2	Yellow
3	Green
4	Red
5	Black
6	White

② RJ-12 Surface Mounted Modular Phone Jack

③ Versa-Link Communication Cable

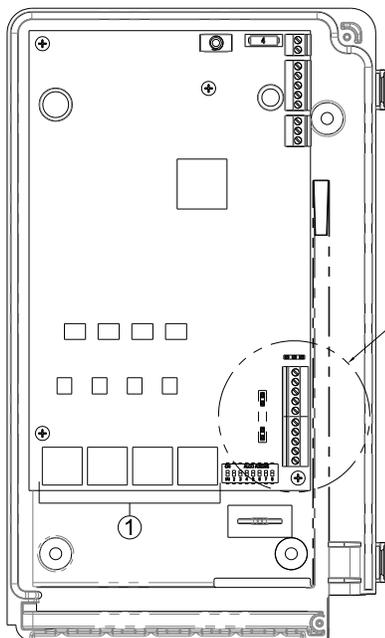


Note: Check all cabling for open circuits and shorts before connecting Controllers.



Caution: ③ Drain Wire and Foil Shield can cause communication errors if they come in contact with other components. Trim all extra Wire and Foil to limit exposure and insulate as needed.

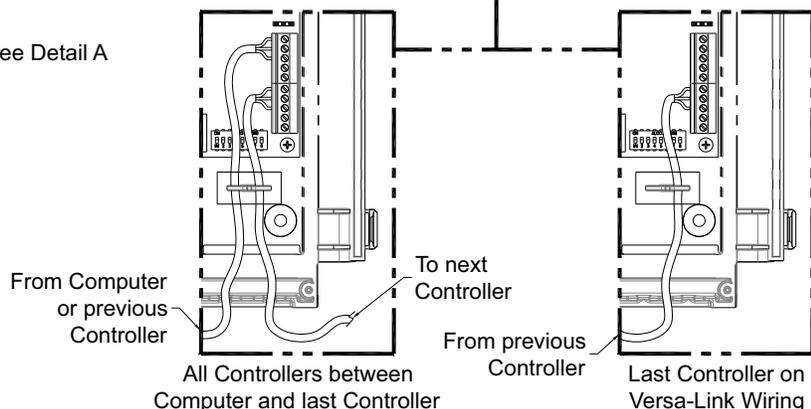
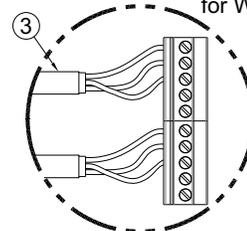
④ Master-Trol® PLUS Controller (Main Module)



Notes:

1. See Page 11 for Wiring Diagram Information
2. See Page 10 for Controller Addressing
3. See Page 9 for Controller Station Numbering & Labeling
4. See Page 7 for Sub Module Setup

Detail A
See Page 24 (#3)
for Wiring Detail





INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

PNEUMATIC PUSHBUTTON VALVE INSTALLATION

A- Rough-in and install fixture per manufacturer instructions.

B- Mount Solenoid Valve Assembly (1) within the Chase or Fixture Frame / Cabinet as required, a maximum of 10 feet from 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 Branch Box Pressure Switch 3/16" OD Tube. Air Tubing (2) fits inside the Pressure Switch 3/16" OD Tube. See page 26 (#5).

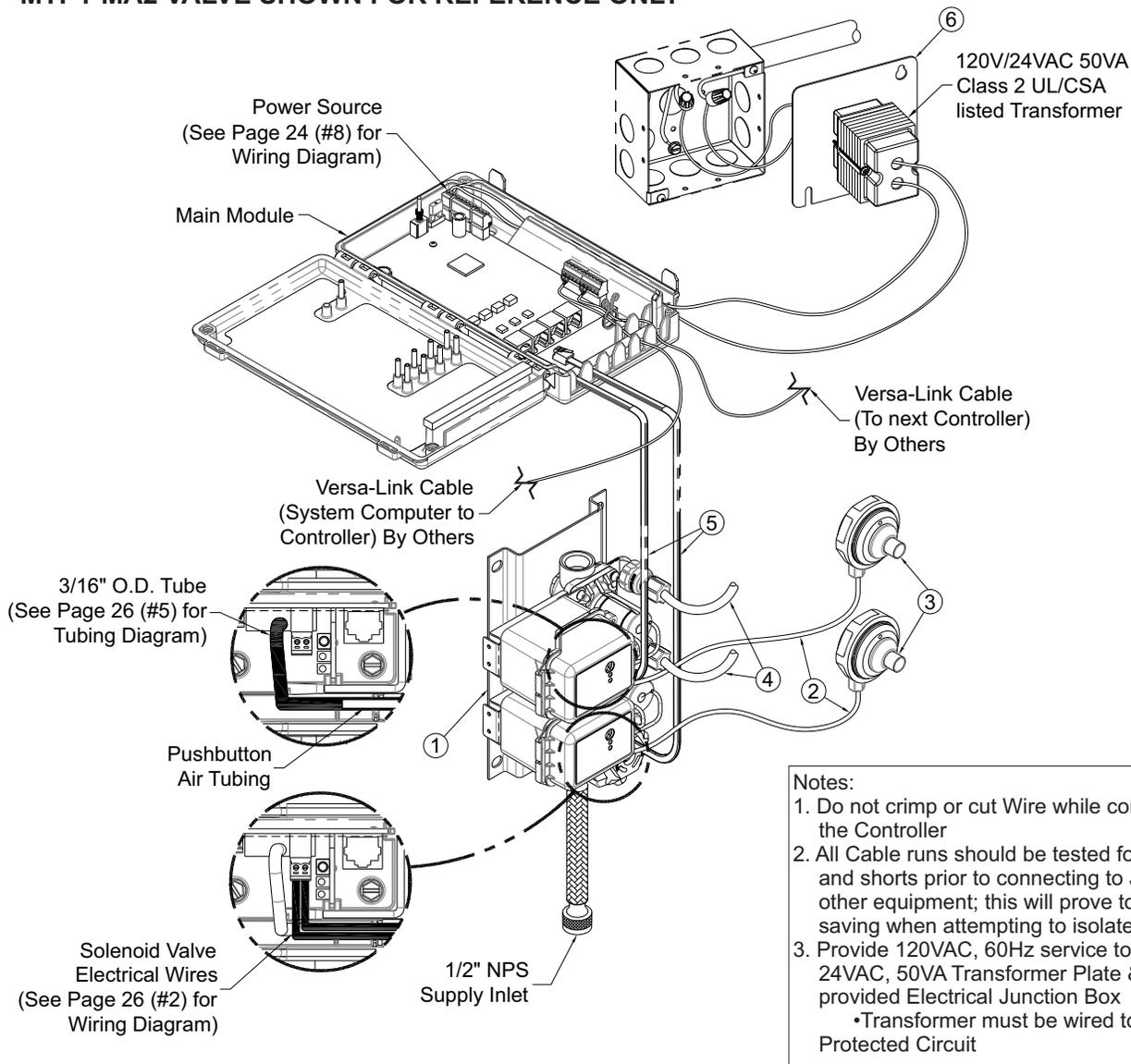
D- Connect Riser Tubing (4) to Valve Assembly and Fixture Discharge Connector. Hand-tighten using Ferrule Nuts provided.

E- Connect Station Wire (5) to Branch Box and appropriate location on Controller as shown. See page 26 (#1).

F- Make up connections from Transformer (6) to Controller as shown. See page 24 (#8).

G- After thoroughly flushing supply lines, make up supply connections.

-MTP1-MA2 VALVE SHOWN FOR REFERENCE ONLY





INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

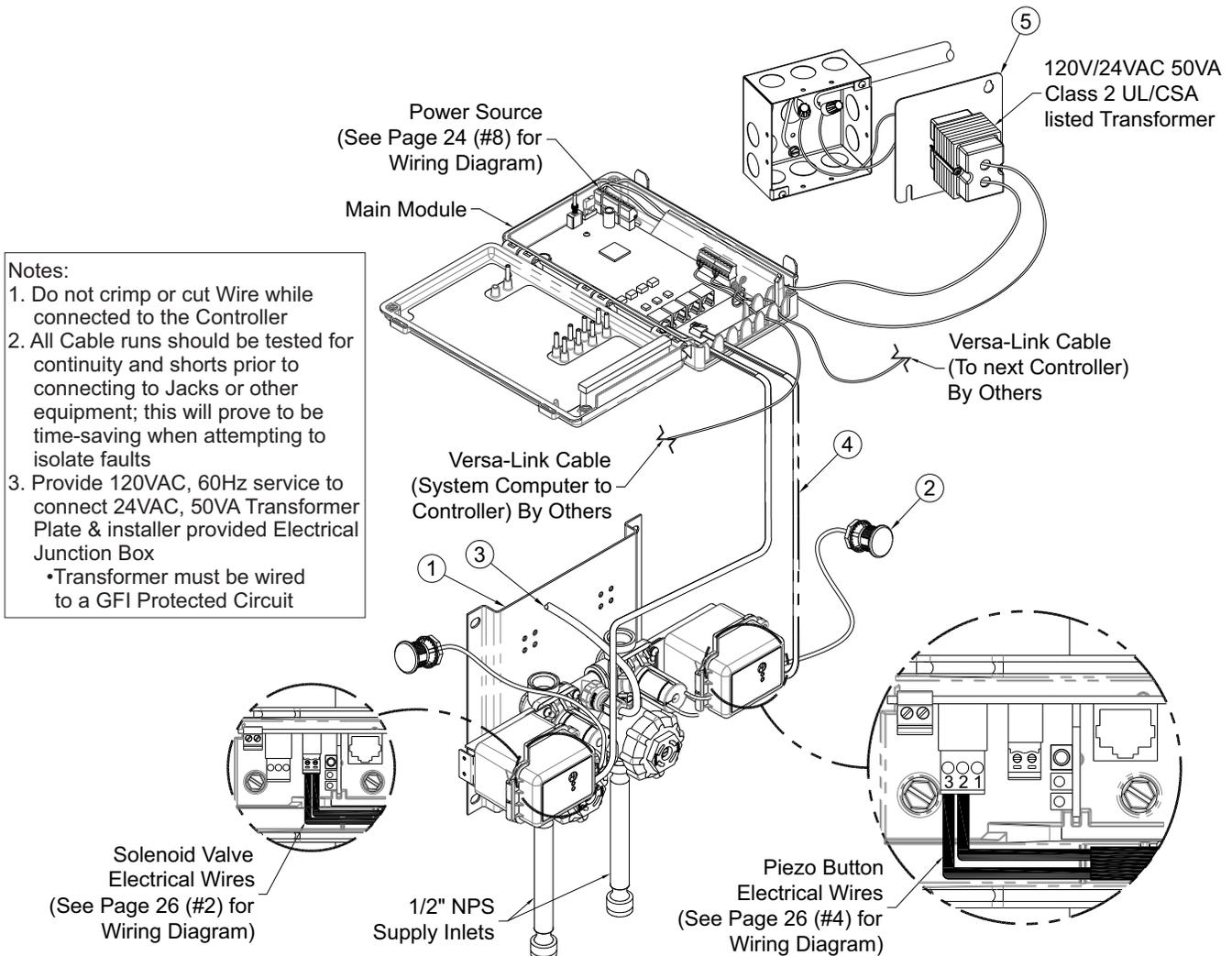
Please visit www.acorneng.com for most current specifications.

MASTER-TROL® PLUS

PIEZO BUTTON VALVE INSTALLATION

- A- Rough-in and install fixture per manufacturer instructions.
- B- Mount Solenoid Valve Assembly ① within the Chase or Fixture Frame / Cabinet as required, a maximum of 10 feet from fixture.
- C- Connect mounted Piezo Switch ② Wire Leads to Branch Box. See page 26 (#4).
- D- Connect Riser Tubing ③ to Valve Assembly and fixture discharge connector. Hand-tighten using Ferrule Nuts provided.
- E- Connect Station Wire ④ to Branch Box and appropriate location on Controller as shown. See page 26 (#1).
- F- Make up connections from Transformer ⑤ to Controller as shown. See page 24 (#8).
- G- After thoroughly flushing supply lines, make up supply connections.

-MTPP2 VALVE SHOWN FOR REFERENCE ONLY





INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

IR SENSOR VALVE INSTALLATION

A- Rough-in and install fixture per manufacturer instructions.

B- Mount Solenoid Valve Assembly ① within the Chase or Fixture Frame / Cabinet as required, a maximum of 10 feet from fixture.

C- Connect the IR Sensor ② to the Branch Box Input Connector using the diagram ③ below.

D- If required, the sensor range can be adjusted using the Range Adjustment Screw ④ on the back of the sensor. Turn the screw clockwise to increase the range and counterclockwise to decrease. Max range is 24". Max range can change slightly depending on environmental conditions.

E- Connect the Riser Tubing ⑤ to the Valve Assembly and fixture discharge connector. Hand-tighten using provided Ferrule nuts.

F- Connect the Station Wire ⑥ to the Branch Box and the appropriate location on the Controller as specified in the Wiring Diagrams. See pages 24 (#1) and 26 (#1).

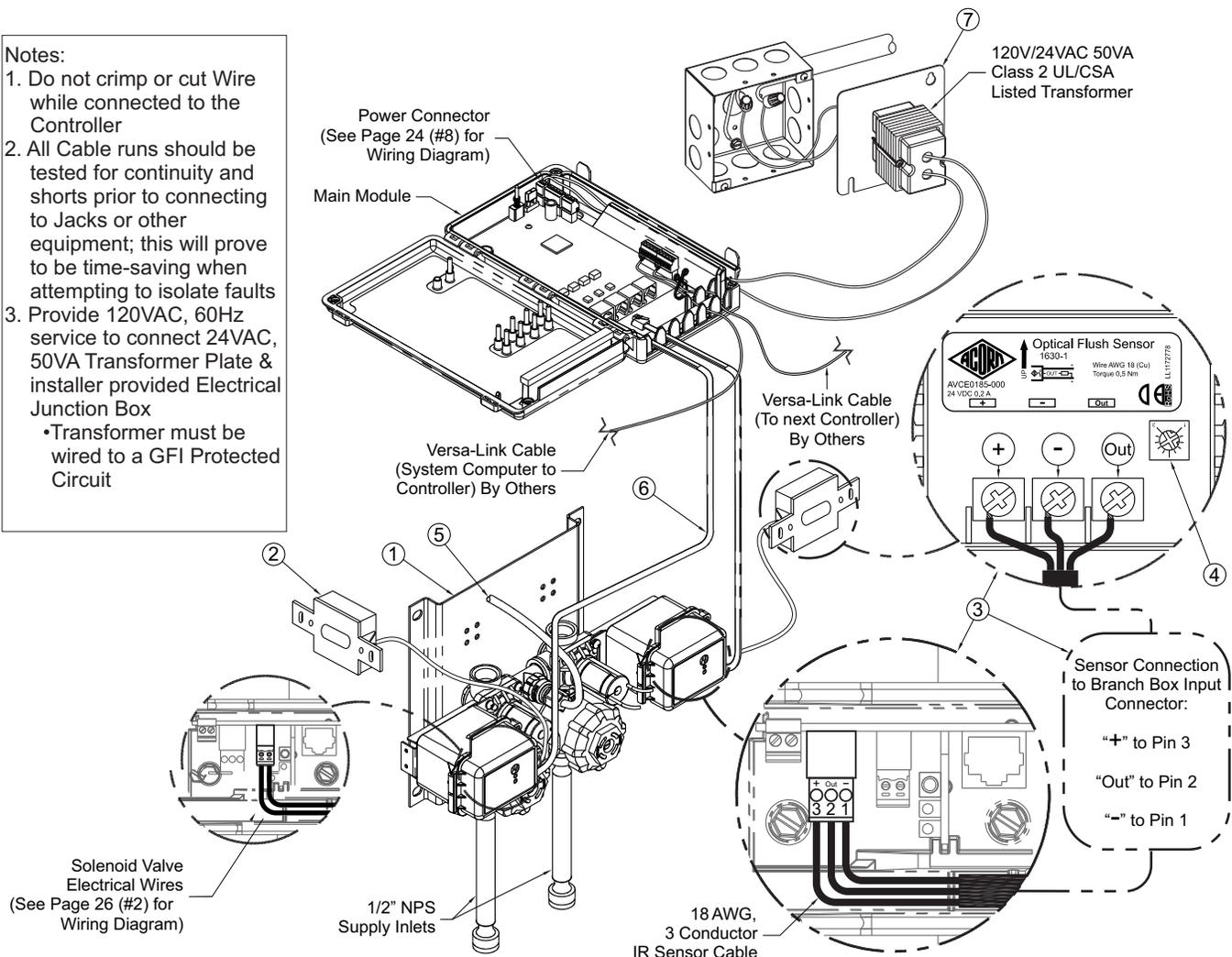
G- Make up connections from the Transformer ⑦ to the Controller as shown. See page 24 (#8).

H- Thoroughly flush supply lines before connecting to the Valve Assembly.

-MTPP2 VALVE SHOWN FOR REFERENCE ONLY

Notes:

1. Do not crimp or cut Wire while connected to the Controller
2. All Cable runs should be tested for continuity and shorts prior to connecting to Jacks or other equipment; this will prove to be time-saving when attempting to isolate faults
3. Provide 120VAC, 60Hz service to connect 24VAC, 50VA Transformer Plate & installer provided Electrical Junction Box
 - Transformer must be wired to a GFI Protected Circuit





INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

FLUSH VALVE INSTALLATION

A- Rough-in & install fixture and Flush Valve per manufacturer's instructions.

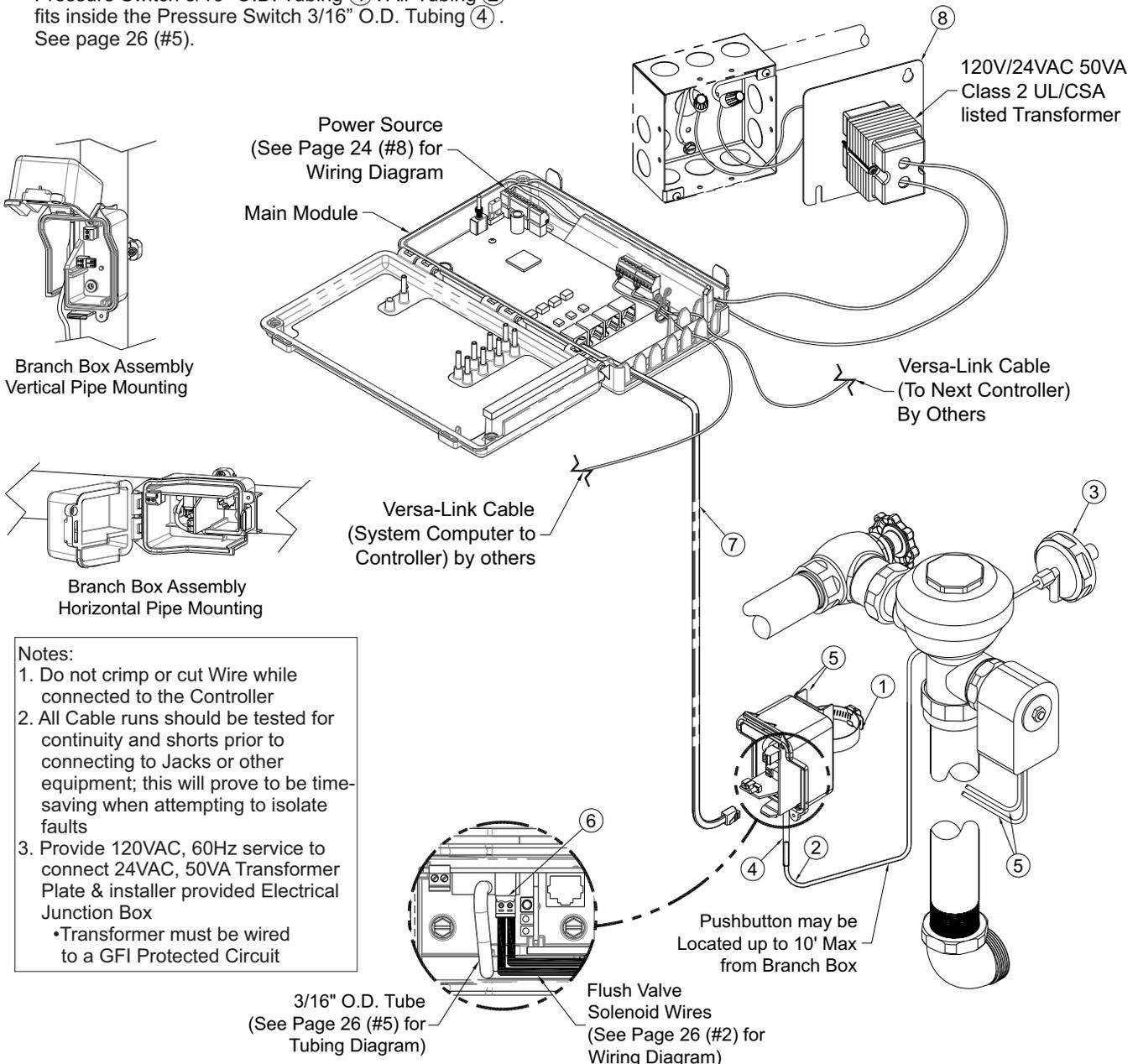
B- Use Hose Clamp to attach Branch Box Assembly (1) to a horizontal or vertical pipe. The Wire opening must be looped towards the floor, so that water will not drain into the Branch Box opening.

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 Branch Box Pressure Switch 3/16" O.D. Tubing (4). Air Tubing (2) fits inside the Pressure Switch 3/16" O.D. Tubing (4). See page 26 (#5).

D- Connect Solenoid Valve Wires (5) to MTP Branch Box Terminals (6) as shown. See page 26 (#2).

E- Connect Station Wire (7) to Branch Box and appropriate location on Controller. See page 11.

F- Make up connections from Transformer (8) to Controller as shown. See page 24 (#8).





INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

FLUSH VALVE INSTALLATION w/ PIEZO

A- Rough-in & install fixture and Flush Valve per manufacturer instructions.

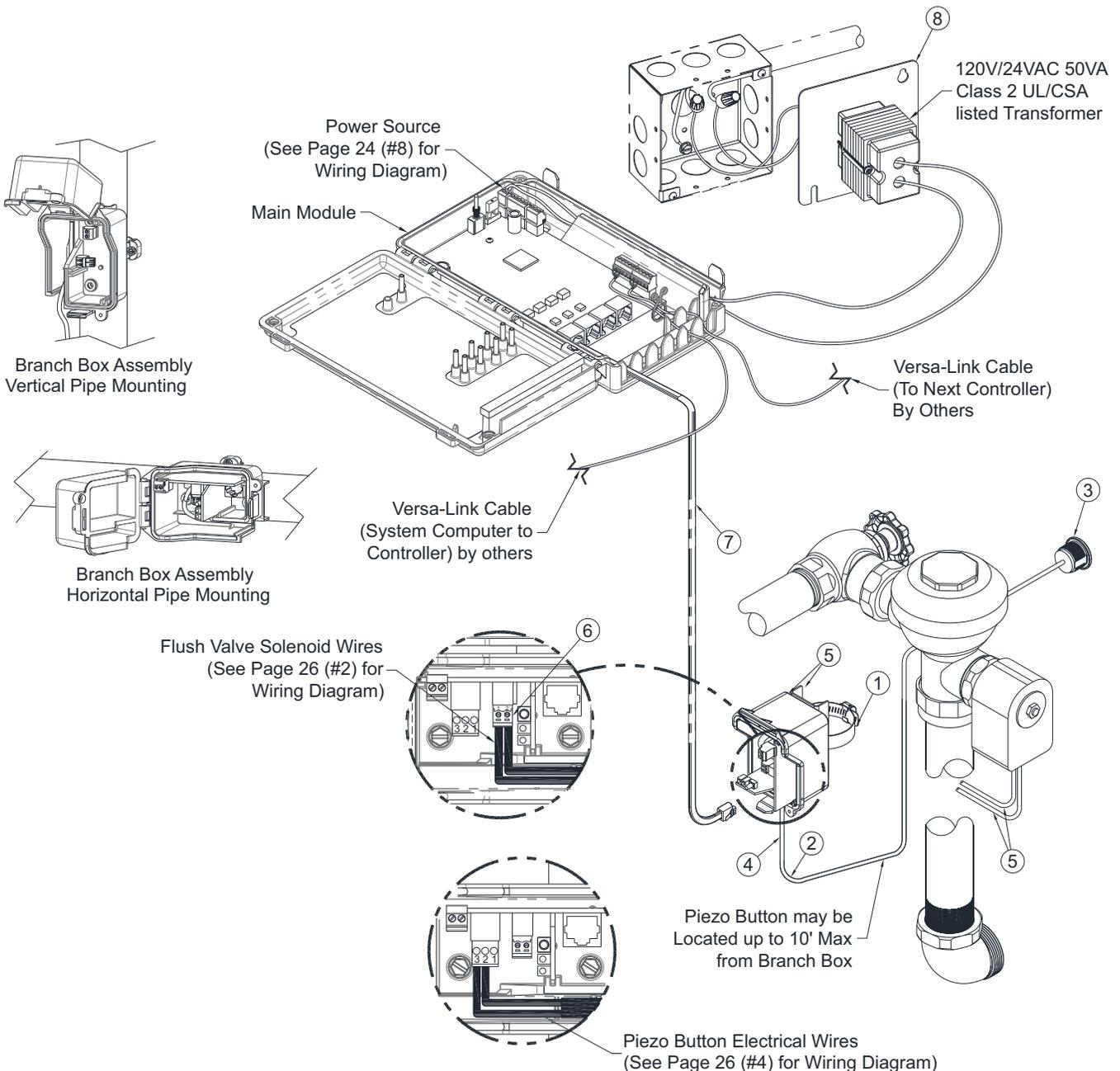
B- Mount Solenoid Valve Assembly ① within the Chase or Fixture Frame / Cabinet as required, a maximum of 10 feet from fixture.

C- Connect mounted Piezo Switch Wire Leads ② to Branch Box. See page 26 (#4).

D- Connect Solenoid Valve Wires ⑤ to MTP Branch Box Terminals ⑥ as shown. See page 26 (#2).

E- Connect Station Wire ⑦ to Branch Box and appropriate location on Controller. See page 11.

F- Make up connections from Transformer ⑧ to Controller as shown. See page 24 (#8).



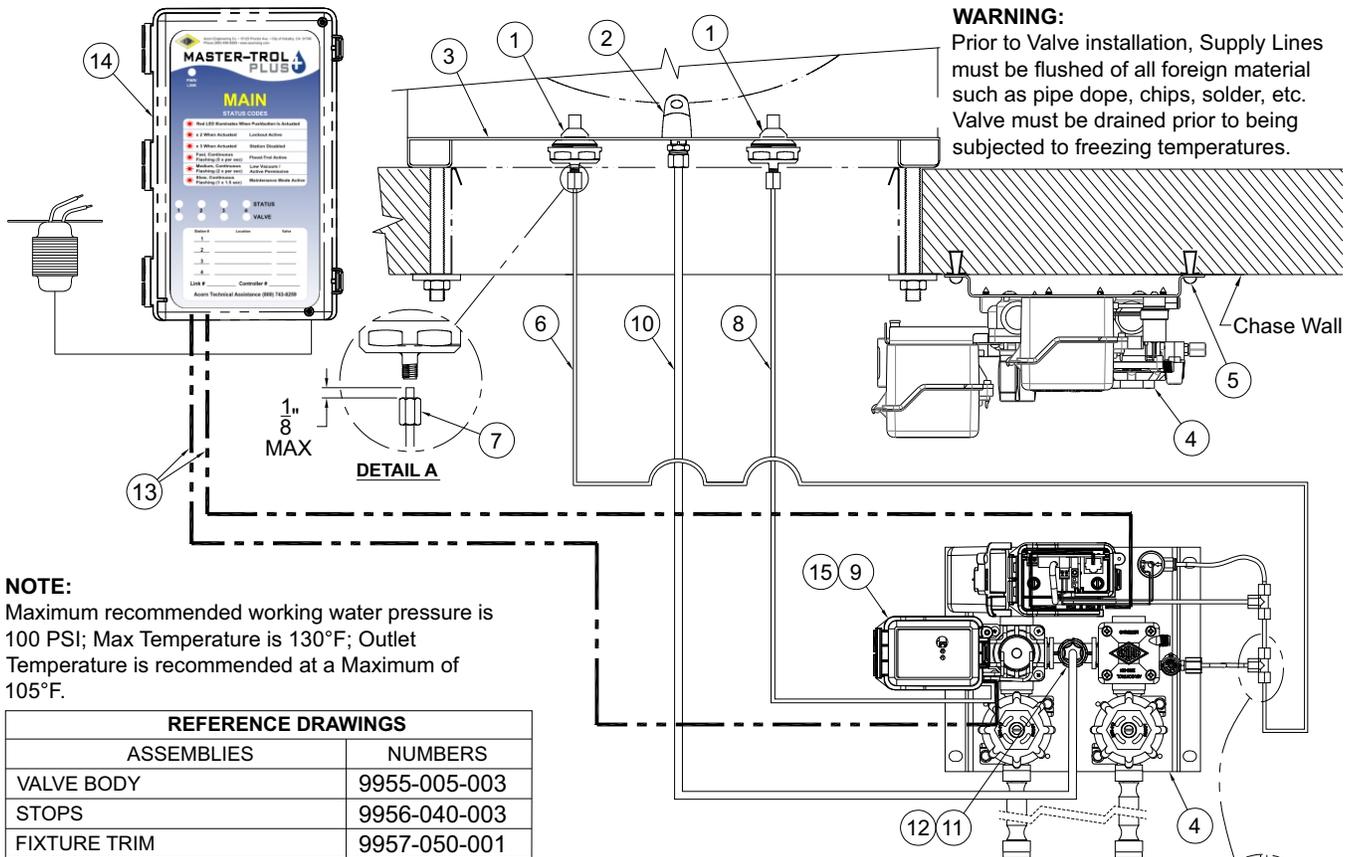


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

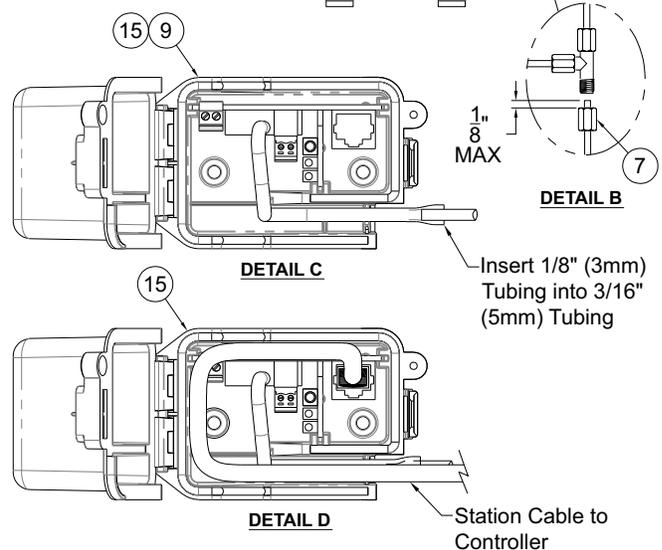
MASTER-TROL® PLUS

(-PFB) POWER FAIL BYPASS VALVE INSTALLATION



INSTALLATION INSTRUCTIONS:

- A- Prior to installation of the fixture, mount Pushbuttons (1) and Bubbler (2) to the Backsplash (3).
- B- Install the Plumbing Fixture to the wall including upper Support Plate (Not Shown).
- C- Locate as required and mount the Valve Assembly (4). Maximum allowable distance between Pushbutton (1) and Valve Assembly (4) is 10 feet (3m). Wall Anchoring Hardware (5) is supplied by others.
- D- Connect Blue 1/8" O.D. Polyethylene Air Tubing (6) to Cold Pushbutton (1) and Cold Supply on the Valve Assembly (4) using Ferrule Nut (7) provided (See Detail "A" and "B").
- E- Connect Red 1/8" (3mm) O.D. Polyethylene Air Tubing (8) to Hot Pushbutton (1) using Ferrule Nut (7) provided and Hot Supply Branch Box (9) on the Valve Assembly (4) (See Detail "A" and "C").
- F- Connect 1/4" O.D. Polyethylene Water Line (10) to Fixture Bubbler (2) and Valve Supply Tee (11) using the provided 1/4" Compression Nuts (12). Hand-tighten only.
- G- Connect Station Cables (13) from Controller (14) to Branch Boxes (15) (See Detail "D"). The Station Cable Port locations and Fixture Valve locations are detailed on the supplied Wiring Diagrams. More information on Wiring Diagrams can be located on page 11.



NOTE:

The default timing for the Secondary Timer is 40 seconds (+/- 5 Sec). If the Primary Timing (Electronic Run Time Programmed into the Master-Trol® PLUS Controller) for the Cold Valve is going to exceed 35 seconds, then you must adjust the Secondary Timing using the instructions on page 19.



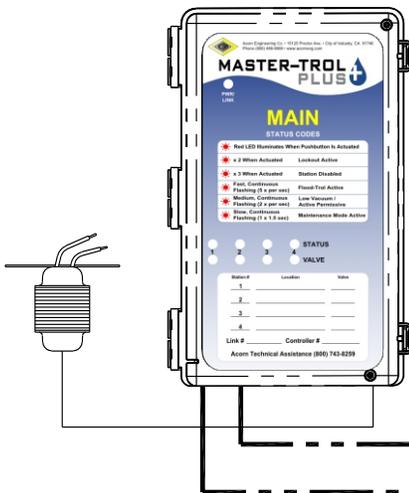
INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

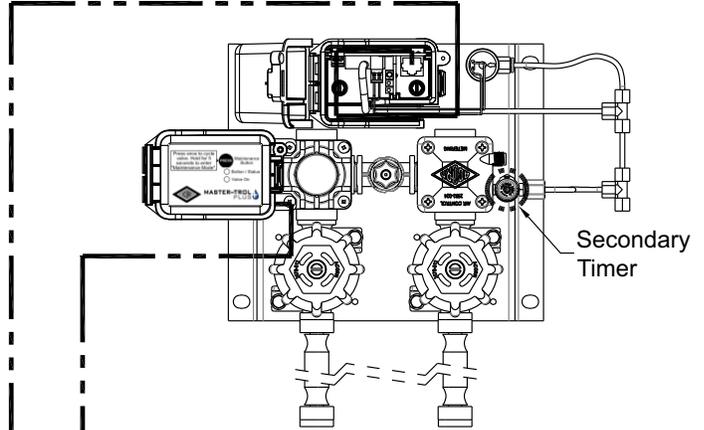
MASTER-TROL® PLUS

(-PFB) POWER FAIL BYPASS VALVE SETUP

Master-Trol® PLUS Controller
(Primary Timing)



Hot & Cold Power Fail
Bypass Valve



Secondary
Timer

The (-PFB) Power Fail Bypass Valve is an Electronically Timed Valve that is controlled by a Master-Trol® PLUS Controller. In the event of a power loss, the Valve will continue to provide Drinking Water to the Fixture.

The Valve is controlled by a Primary Timer and a Secondary Timer. The Primary Timing is programmed into the Master-Trol® PLUS Controller. The Secondary Timer is located on the Valve. In the event of a power loss, the Primary Timing will cease to function and the Secondary Timer will take over functional control.

NOTE:

- The following setup procedure is not required if the Primary Timing that is programmed into the Master-Trol® PLUS Controller is less than 35 seconds on the Cold Water Supply.
- Only the Cold Supply will continue to operate in the event of a power loss. The Hot Water Supply will cease to operate.

WHAT YOU WILL NEED:

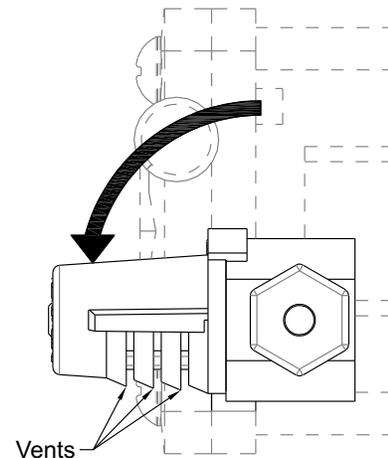
- One Flat Head Screwdriver with a Blade width of 1/8" (3mm) or less.
- A Stopwatch to measure Valve Timing.
- You will also need to know the Runtime of the Cold Water Supply that will be programmed into the Master-Trol® PLUS Controller.

POWER FAIL BYPASS SETUP

- Make sure the Water Supply to the Valve is turned on.
- Turn "OFF" the Master-Trol PLUS® Controller using the Power Switch inside the Controller.
- Position the Secondary Timer as shown in the images to the right.
- Use the "Timing Adjustment Screw" to adjust the Secondary Runtime of the Valve. Turn the Screw clockwise to increase timing and counter-clockwise to decrease timing. Check the timing by actuating the Pushbutton and measure how long the water runs with a Stopwatch. You want the Secondary Runtime to be 5 to 10 seconds longer than the Primary Runtime that is programmed on the Master-Trol® PLUS Controller.
- When you are done adjusting the Secondary Runtime, turn the Controller power back "ON" and the setup is complete.

Secondary Timer Adjustment

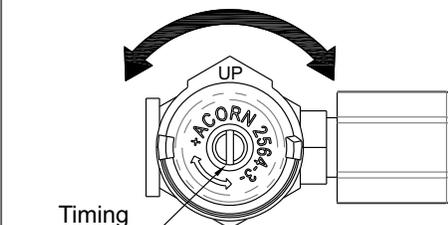
Turn the Secondary Timer Assembly until it is horizontal with the floor.



Vents

(Side View)

Twist the Black Vent Cover until the arrow is pointed towards the ceiling and the Vents are facing towards the floor.



Timing
Adjustment
Screw

(Front View)



INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

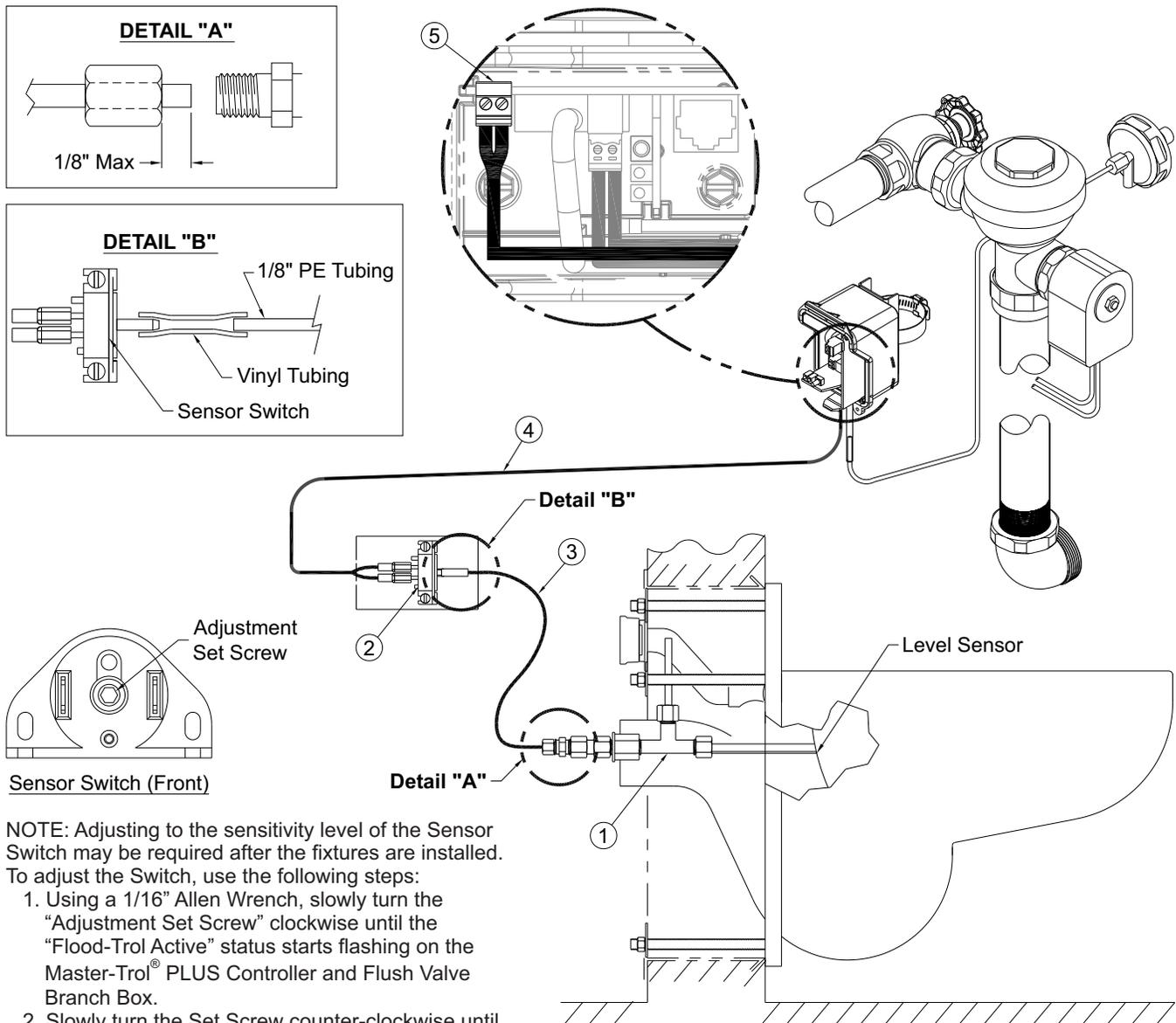
ELECTRONIC FLOOD-TROL INSTALLATION

A- Install the Vent Tube Assembly (1) onto the Level Sensor Port on the back of the Toilet Bowl.

B- The Sensor Switch (2) may come pre-mounted on the fixture. But if the Sensor Switch is shipped loose, then it must be mounted in a location near the fixture at a minimum of 3" above the Toilet Rim height.

C- Connect the 1/8" PE Tubing (3) to the Vent Tube Assembly and the Sensor Switch. Install Tubing in an upward slope without any low points to prevent water from collecting in the Tubing.

D- Connect the Switch Cable (4) to the Sensor Switch using the end of the Cable equipped with Insulated Spade Connectors. Connect the other end of the Switch Cable (4) to the 2-Pin Terminal Block Connector (5) located in the Branch Box Assembly. See page 25 (#3) for Connector location and connection details.



NOTE: Adjusting to the sensitivity level of the Sensor Switch may be required after the fixtures are installed. To adjust the Switch, use the following steps:

1. Using a 1/16" Allen Wrench, slowly turn the "Adjustment Set Screw" clockwise until the "Flood-Trol Active" status starts flashing on the Master-Trol® PLUS Controller and Flush Valve Branch Box.
2. Slowly turn the Set Screw counter-clockwise until the status stops flashing on the Controller.
3. Turn the Set Screw an additional 1/4 turn counter-clockwise for the proper sensitivity setting.

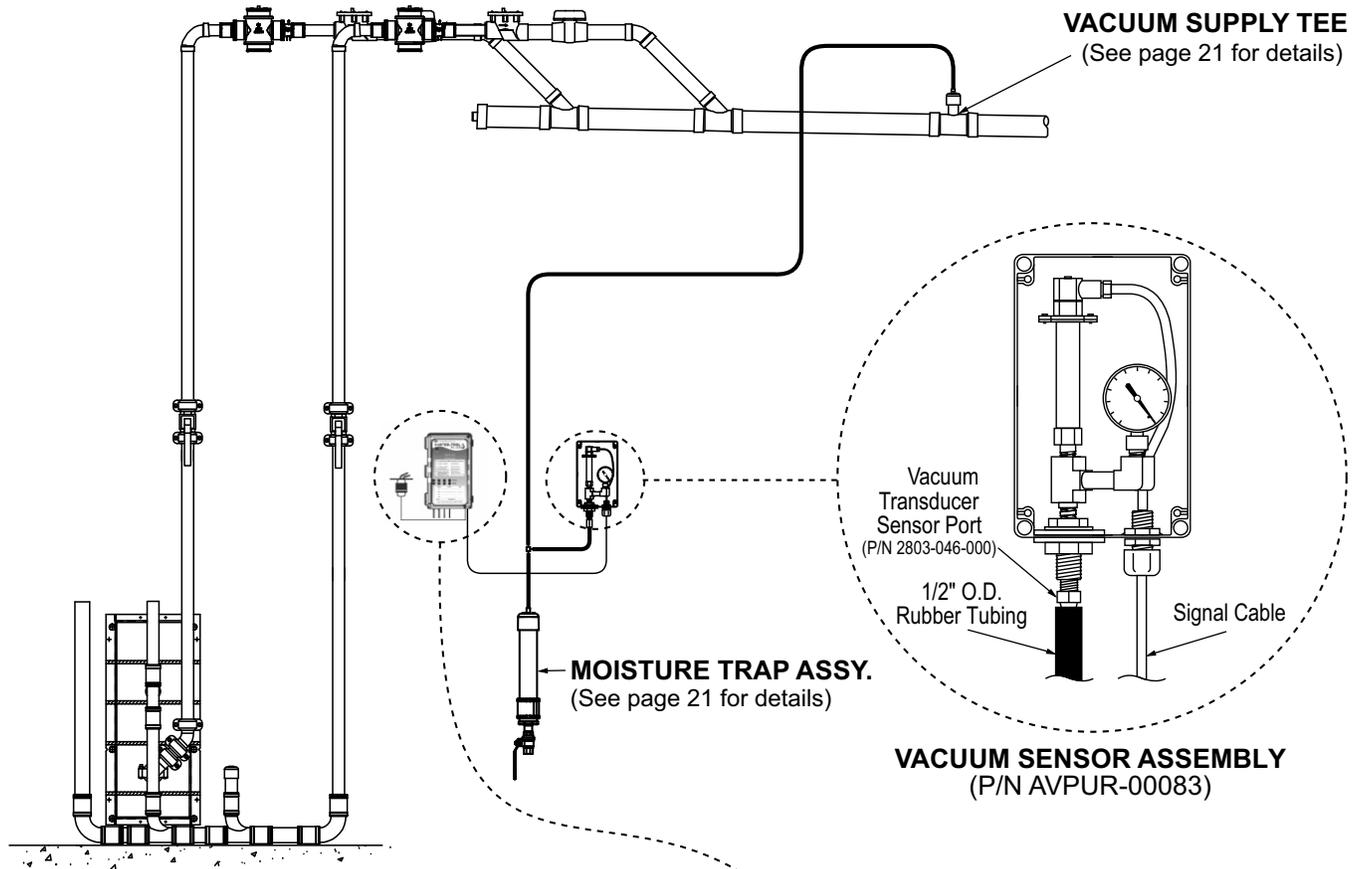


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

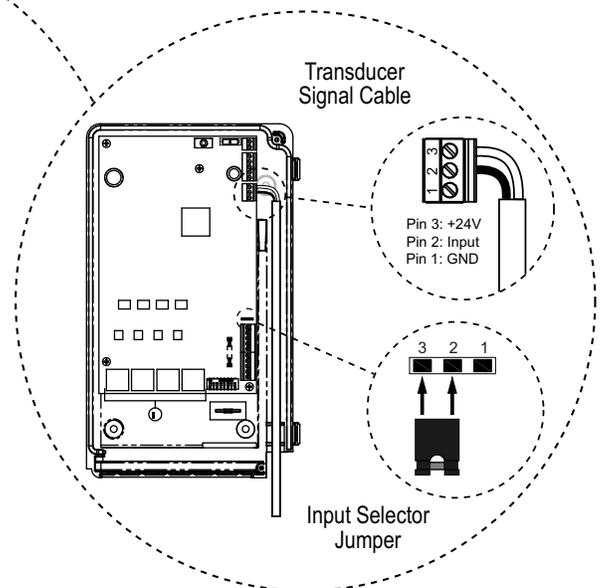
MASTER-TROL® PLUS

MASTER-TROL PLUS VACUUM TRANSDUCER INSTALLATION



NOTE: These instructions are only applicable to the installation of the "Kele Model PTX1 Stainless Steel Pressure Transmitter". Other brands of pressure transmitters must first be reviewed and authorized by AcornVac before use with the Master-Trol PLUS and AcornVac systems.

- A - Mount the Vacuum Sensor Assembly within 150 feet of the Master-Trol PLUS controller using the proper mounting hardware (mounting hardware by others). Distances further than 5 feet will require an extension to the transducer signal cable which is supplied by others.
- B - Connect the Vacuum Transducer Sensor Port to the Vacuum Supply Tee on the overhead horizontal vacuum piping with 1/2" O.D. rubber tubing. The maximum tubing length can be up to 25 feet. Remove all dips in the tubing where water might collect.
- C - Connect the Moisture Trap Assembly to the vacuum supply tubing as shown on page 21.
- D - Route the Transducer Signal Cable through the enclosure by creating a knockout and attaching a chord grip or conduit connector, depending on the local building code (knockout and connectors by others).
- E - Connect the Transducer Signal Cable to the Master-Trol PLUS controller and adjust the Input Selector Jumper as shown in the diagram to the right.



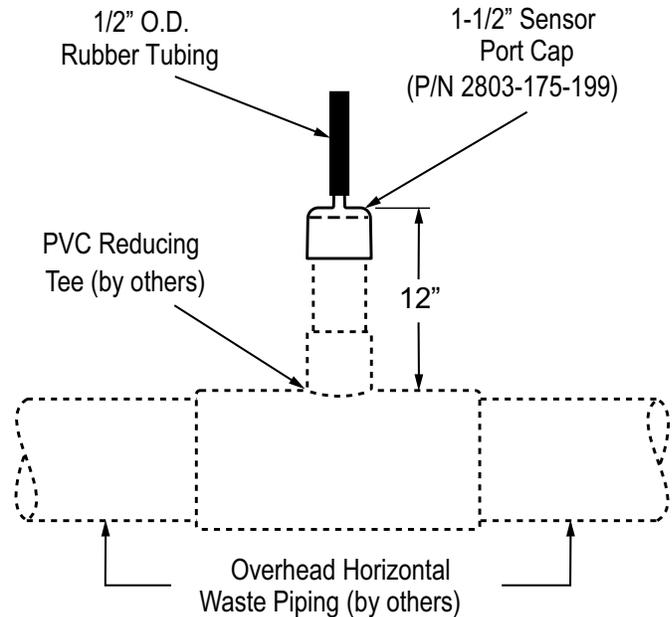


Please visit www.acorneng.com for most current specifications.

MASTER-TROL PLUS VACUUM TRANSDUCER INSTALLATION (CONT.)

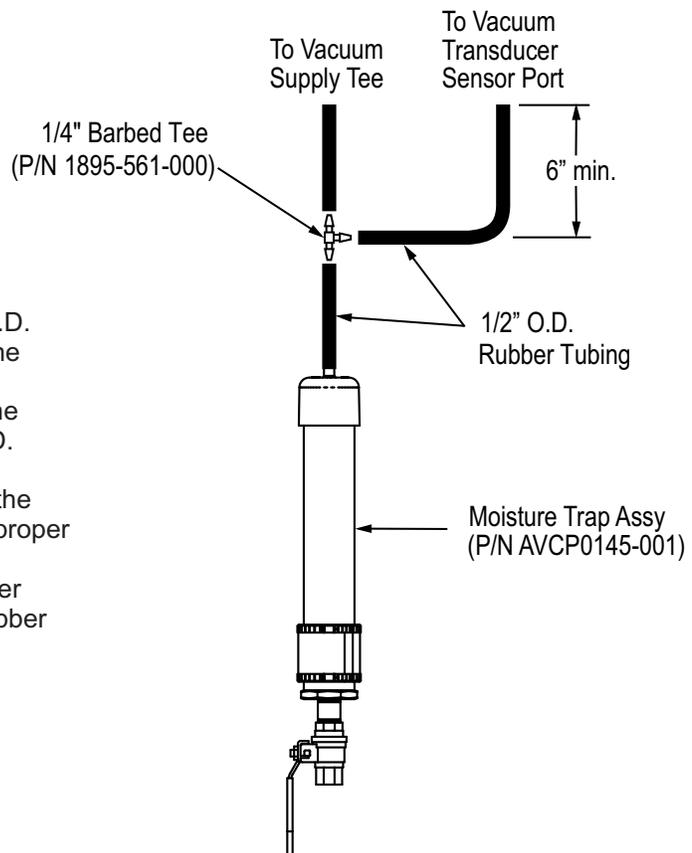
VACUUM SUPPLY TEE:

- A - Add a PVC Reducing Tee (by others) to the overhead horizontal waste piping for the 1-1/2" O.D. vacuum sensor port.
- B - Extend sensor port 12" vertically and cap it with 1-1/2" Sensor Port Cap (P/N 2803-175-199).
- C - Connect the 1/2" O.D. Rubber Tubing from the Vacuum Transducer Sensor Port to the Sensor Port Cap.



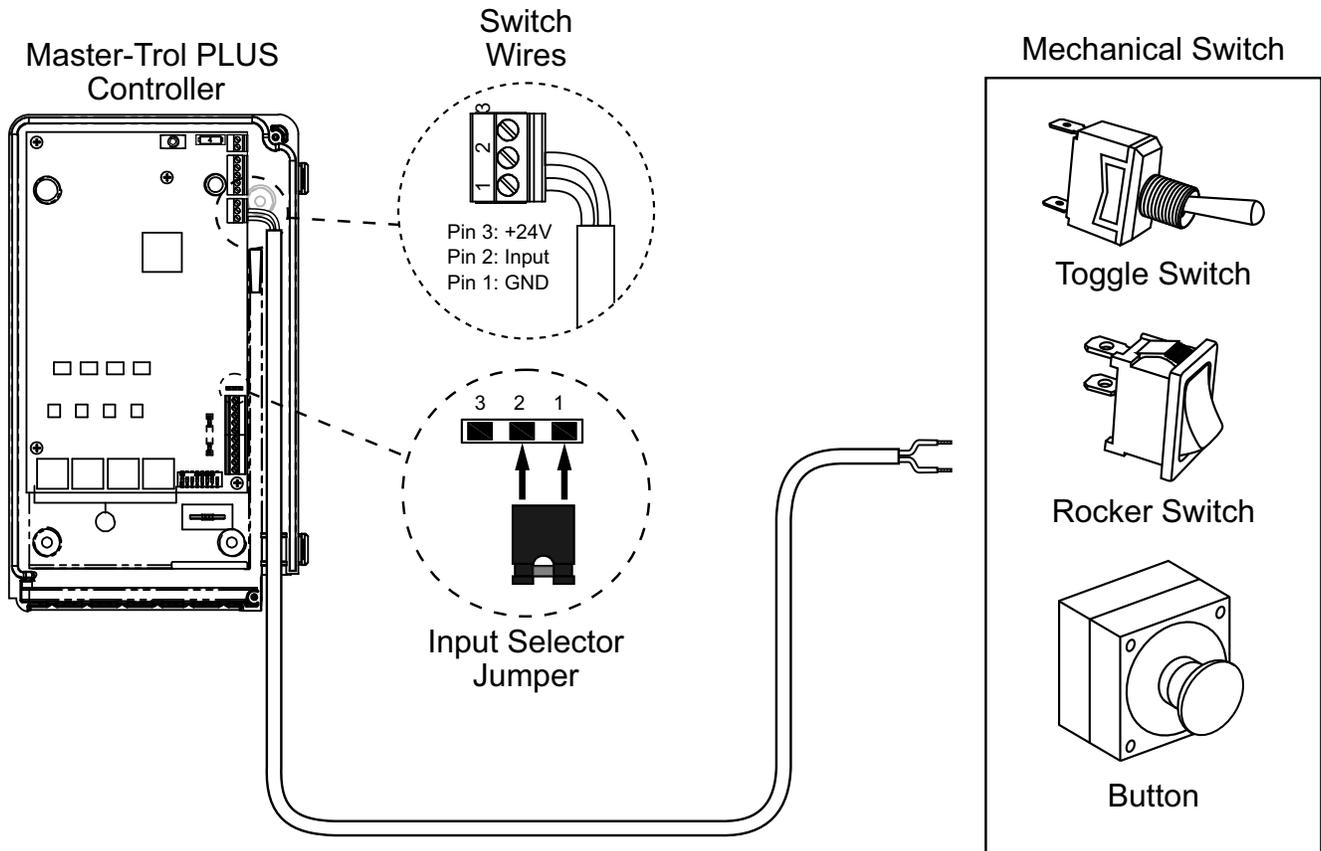
MOISTURE TRAP ASSEMBLY:

- A - Install the 1/4" Barbed Tee fitting into the 1/2" O.D. vacuum supply tubing a minimum of 6" below the Vacuum Transducer Sensor Port.
- B - Connect the horizontal barb of the 1/4" Tee to the Vacuum Transducer Sensor Port using 1/2" O.D. Rubber Tubing.
- C - Mount the Moisture Trap Assembly securely to the wall in a vertical position as shown to allow for proper drainage when the valve is opened.
- D - Connect the Moisture Trap Assembly to the lower vertical barb of the 1/4" Tee using 1/2" O.D. Rubber Tubing.





PERMISSIVE SWITCH/BUTTON INSTALLATION



The Master-Trol PLUS controller is capable of using a mechanical switch as a permissive device to disable valves. The mechanical switch is used to open and close a circuit which is detected by the controller. When the circuit is open the valves are enabled. When the circuit is closed the valves that are programmed to be controlled by the permissive switch will be disabled.

- A- Mount the mechanical switch within 50 feet of the Master-Trol PLUS controller.
- B- Connect the switch to the controller using a pair of 18 AWG insulated wire (max length is 50 feet). Connect one end of the wire pair to the removable connector plug in the controller as shown above. Connect the opposite end of the wire pair to the switch as specified by the manufacturer.
- C- Move the "Input Selector Jumper" to pins 1 & 2 on the header inside the controller as shown above.

NOTE:

- Mechanical switches and switch wiring are supplied by others.
- Mechanical switches should be single pole.
- The connection for the mechanical switch does not supply power for LED switches.
- Use a "Normally Open" switch when installing a button.
- The switch will only affect the valves that are connected to the same controller (Main and Sub Modules) as the switch.

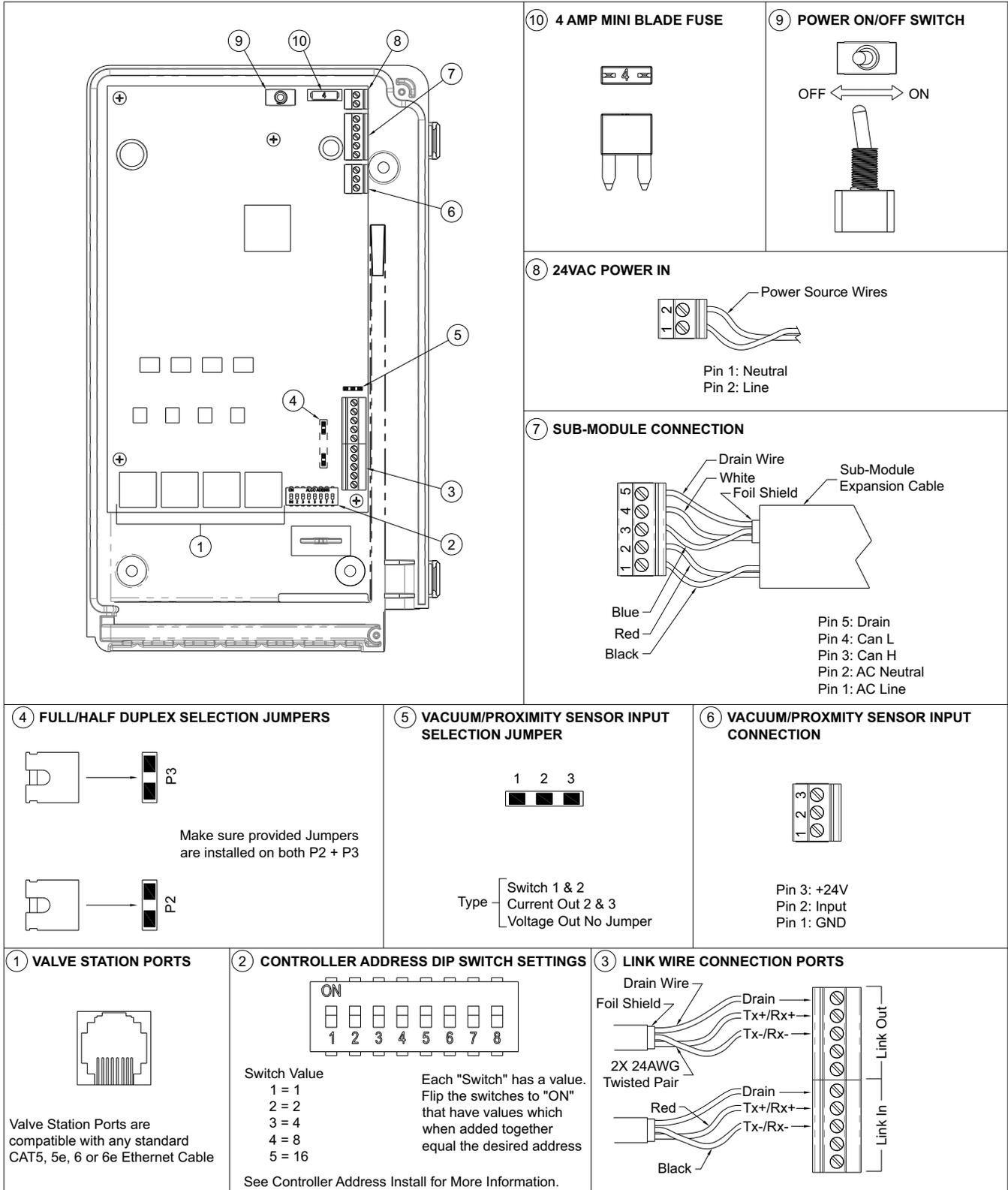


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

MAIN MODULE WIRING DIAGRAM



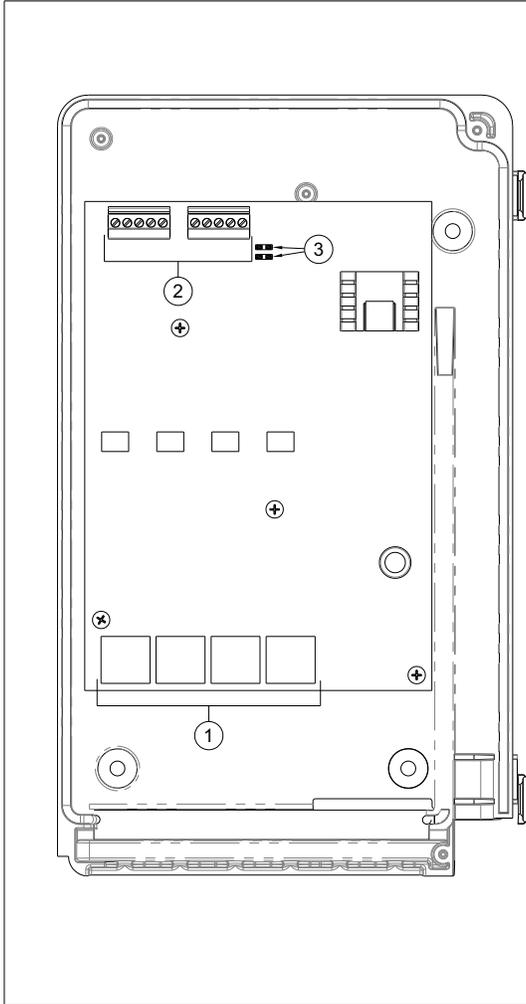


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

SUB MODULE WIRING DIAGRAM



3 P1 & P2 - SUB MODULE SELECTION JUMPERS (JUMPERS INCLUDED)

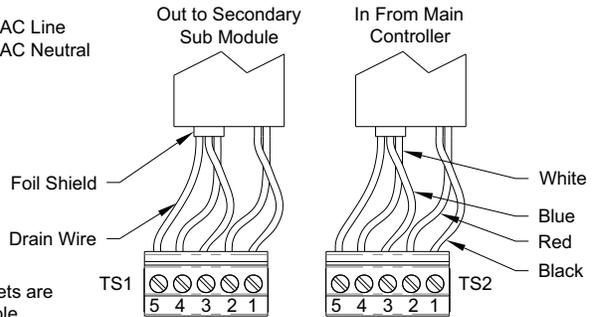


# Of Ports per Controller	Sub Module 1 Settings		Sub Module 2 Settings	
	P1	P2	P1	P2
8-Port Controller	NO	YES	N/A	N/A
12-Port Controller	NO	NO	YES	YES

- **8-PORT CONTROLLER:** Add a Jumper to the P2 Connector of Sub-Module 1 if you are adding one Sub-Module to make an 8-Port Controller.
- **12-PORT CONTROLLER:** Remove Jumpers from both Connectors on Sub-Module 1 and add Jumpers to both Connectors on Sub Module 2 to make a 12-Port Controller.

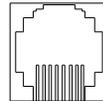
2 SUB-MODULE EXPANSION CABLE CONNECTION

Pin 1: 24VAC AC Line
 Pin 2: 24VAC AC Neutral
 Pin 3: Can H
 Pin 4: Can L
 Pin 5: Drain



Note:
 Canbus Sockets are interchangeable.

1 VALVE STATION PORTS



Valve Station Ports are compatible with any standard CAT5, 5e, 6 or 6e Ethernet Cable



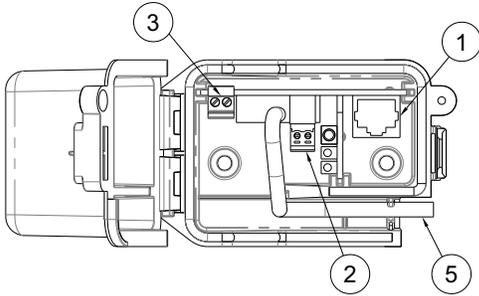
INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

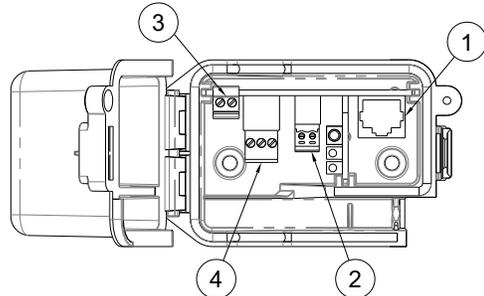
MASTER-TROL® PLUS

BRANCH BOX WIRING DIAGRAM

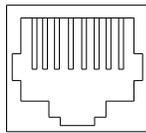
BRANCH BOX FOR PNEUMATIC PUSHBUTTONS



BRANCH BOX FOR PIEZO BUTTONS / INFRARED



1 VALVE STATION PORT



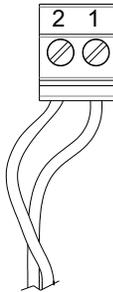
Valve Station Ports are compatible with any standard CAT5, 5e, 6 or 6e Ethernet cable

2 TS3 - SOLENOID VALVE WIRE DIAGRAM



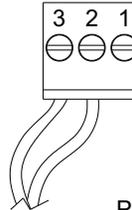
Pin 1: 24VAC Valve AC
Pin 2: AC Neutral

3 TS1 - FLOOD-TROL WIRE DIAGRAM



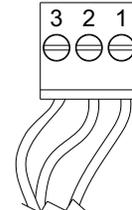
Pin 1: +24V
Pin 2: Flood Actuator Input

4 TS2 - PIEZO BUTTON DIAGRAM

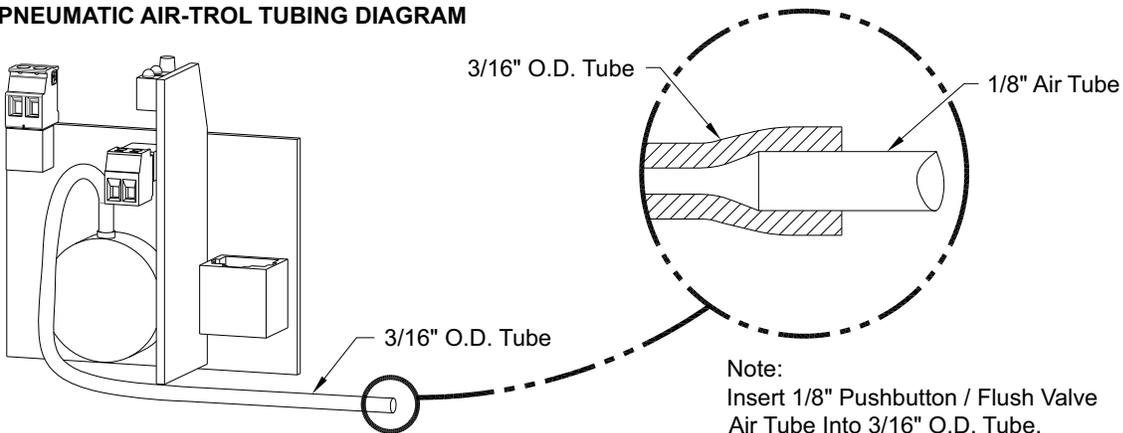


Pin 1: GND
Pin 2: Inmate Actuator Input
Pin 3: +24V

TS2 - INFRARED WIRE DIAGRAM



5 PNEUMATIC AIR-TROL TUBING DIAGRAM



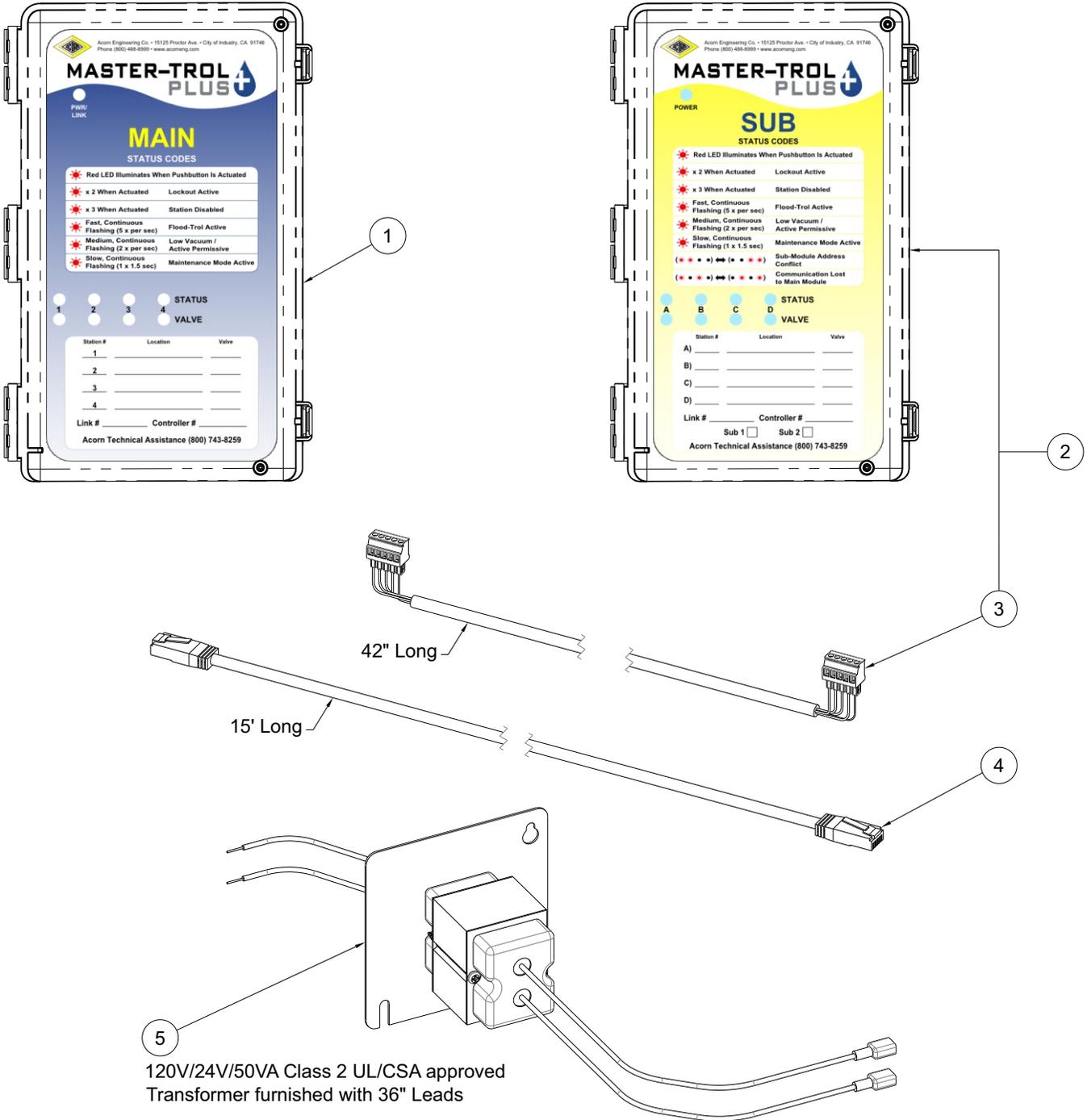


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

REPAIR PARTS: -MTP CONTROLLER AND TRANSFORMER ASSEMBLY



1	0715-600-001	(-MTP) Main Module Assembly	4	0715-665-000	(-MTP) 15' Station Cable
2	0715-620-001	(-MTP) Sub-Module Assembly	5	0710-700-000	Transformer with 4" x 4" Mounting Plate
3	0715-666-299	(-MTP) Sub-Module Connection Cable			
Item	Part Number	Description	Item	Part Number	Description

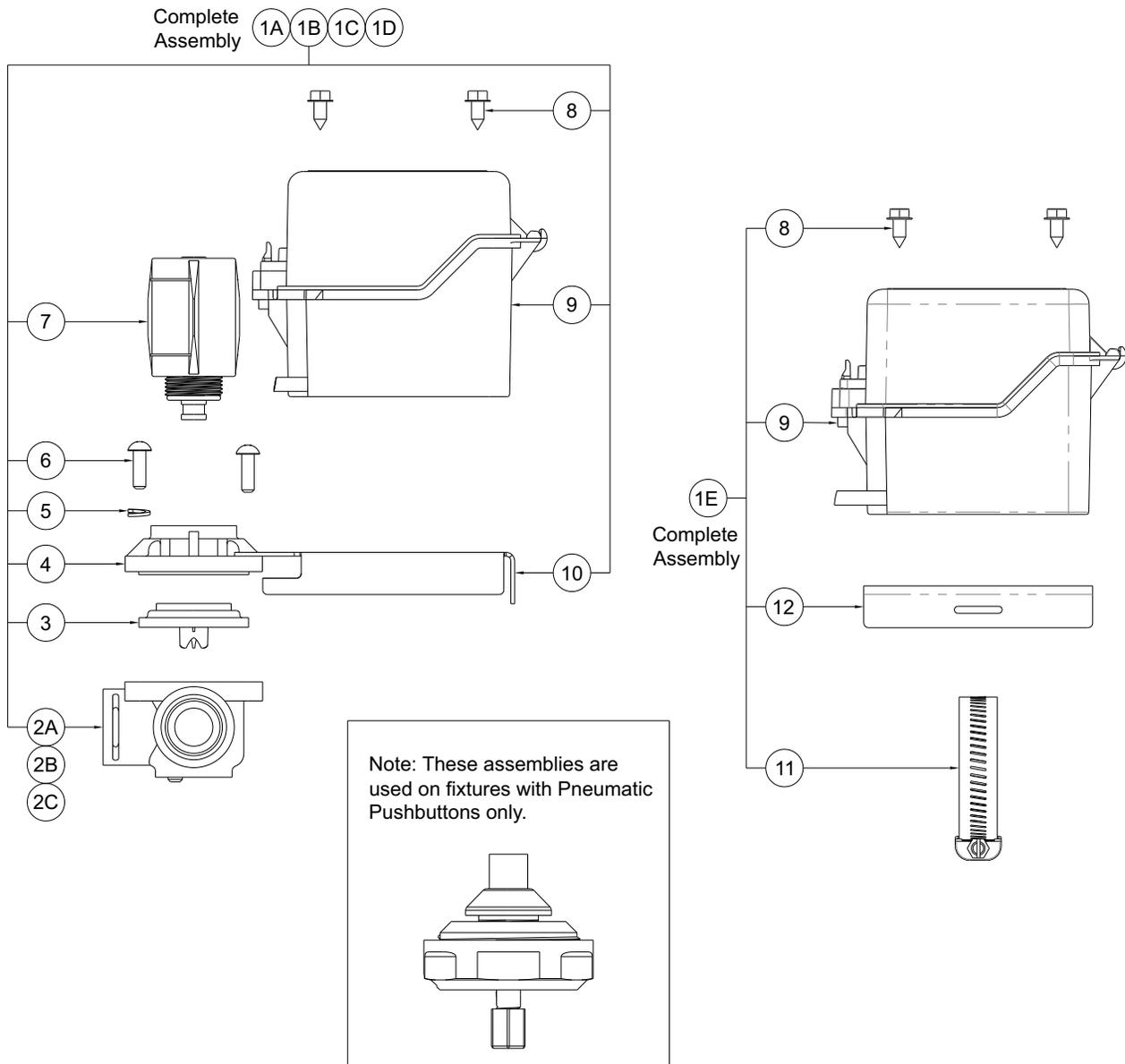


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

REPAIR PARTS: -MTP SOLENOID VALVE / BRANCH BOX ASSEMBLY (PNEUMATIC)



1A	2570-148-001	(-MTP) R Output Solenoid Valve Assy (Pneumatic)	4	2570-061-000	Air-Trol Solenoid Bonnet
1B	2570-149-001	(-MTP) L Output Solenoid Valve Assy (Pneumatic)	5	0331-003-000	#8 Stainless Steel Helical Spring Lock Washer
1C	2570-150-001	(-MTP) R Output Solenoid Valve Assy (Pneumatic)	6	6502-043-000	#8-32 UNC x 1/2" Stainless Steel Phillips Screw
1D	2570-151-001	(-MTP) L Output Solenoid Valve Assy (Pneumatic)	7	2563-305-199	24VAC Solenoid for Mater-Trol Plus
1E	2570-155-001	(-MTP) Flush Valve Branch Box (Pneumatic)	8	0124-031-000	#8 x 3/8" Hex Washer Head, Slotted Screw
2A	2570-027-000	Valve Body	9	0715-631-001	(-MTP) Acorn Branch Box Assy (Pneumatic)
2B	2570-026-000	Valve Body	10	2563-371-199	(-MTP-BRS) Branch Box Bracket
2C	2570-025-000	Valve Body, Lower	11	0358-009-000	1-1/16" - 2" ID Stainless Steel Hose Clamp
3	2563-010-001	Water Diaphragm Assembly	12	2563-374-199	(-MPT) Branch Box Mtg Bracket, Flush Valve
Item	Part Number	Description	Item	Part Number	Description

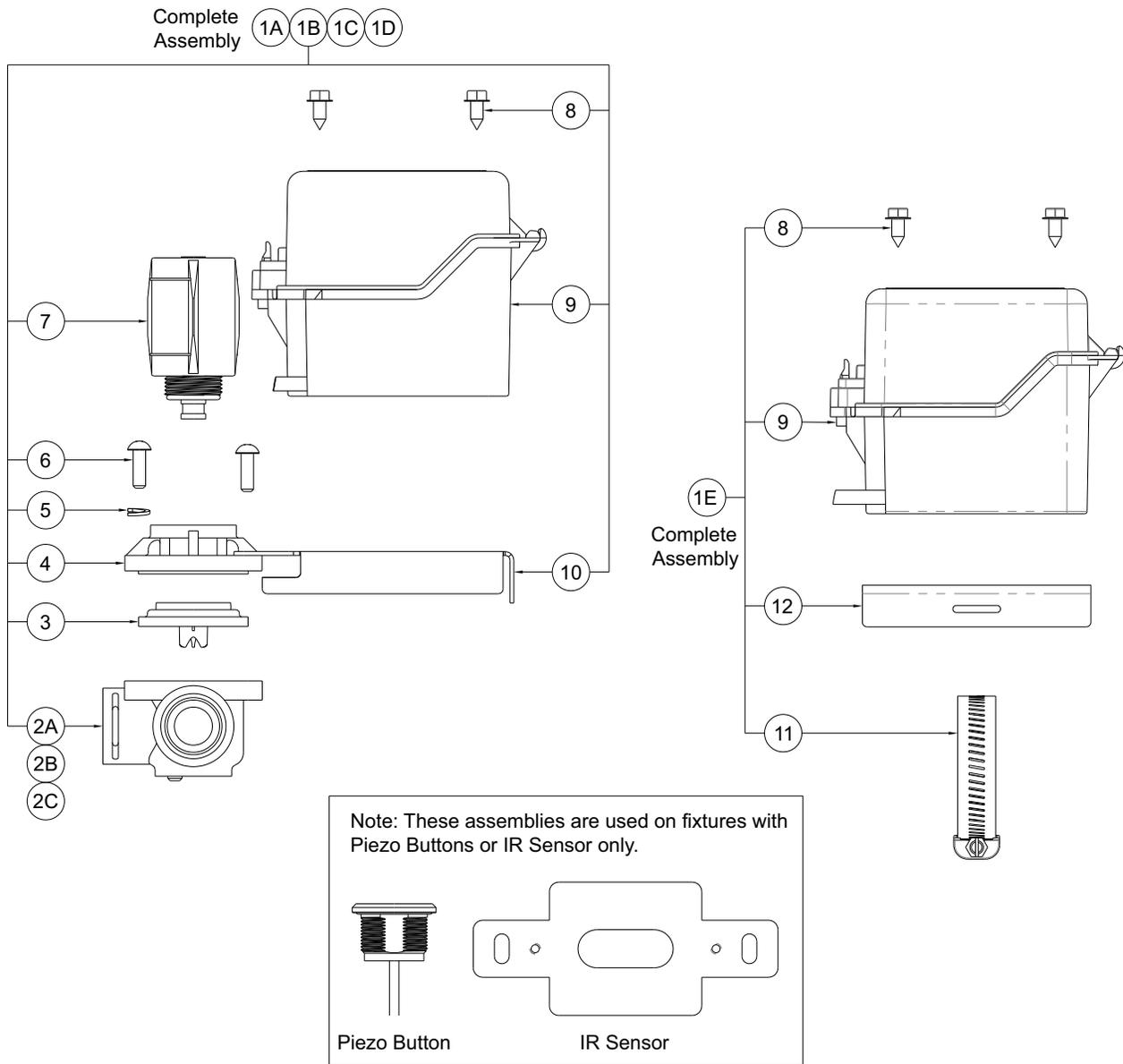


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

REPAIR PARTS: -MTP SOLENOID VALVE / BRANCH BOX ASSEMBLY (PIEZO/IR)



1A	2570-147-001	(-MTP) R Output Solenoid Valve Assy (Piezo/IR)	4	2570-061-000	Air-Trol Solenoid Bonnet
1B	2570-146-001	(-MTP) L Output Solenoid Valve Assy (Piezo/IR)	5	0331-003-000	#8 Stainless Steel Helical Spring Lock Washer
1C	2570-152-001	(-MTP) R Output Solenoid Valve Assy (Piezo/IR)	6	6502-043-000	#8-32 UNC x 1/2" Stainless Steel Phillips Screw
1D	2570-153-001	(-MTP) L Output Solenoid Valve Assy (Piezo/IR)	7	2563-305-199	24VAC Solenoid for Mater-Trol Plus
1E	2570-154-001	(-MTP) Flush Valve Branch Box (Piezo/IR)	8	0124-031-000	#8 x 3/8" Hex Washer Head, Slotted Screw
2A	2570-027-000	Valve Body	9	0715-630-001	(-MTP) Acorn Branch Box Assy (Piezo/IR)
2B	2570-026-000	Valve Body	10	2563-371-199	(-MTP-BRS) Branch Box Bracket
2C	2570-025-000	Valve Body, Lower	11	0358-009-000	1-1/16" - 2" ID Stainless Steel Hose Clamp
3	2563-010-001	Water Diaphragm Assembly	12	2563-374-199	(-MPT) Branch Box Mtg Bracket, Flush Valve
Item	Part Number	Description	Item	Part Number	Description

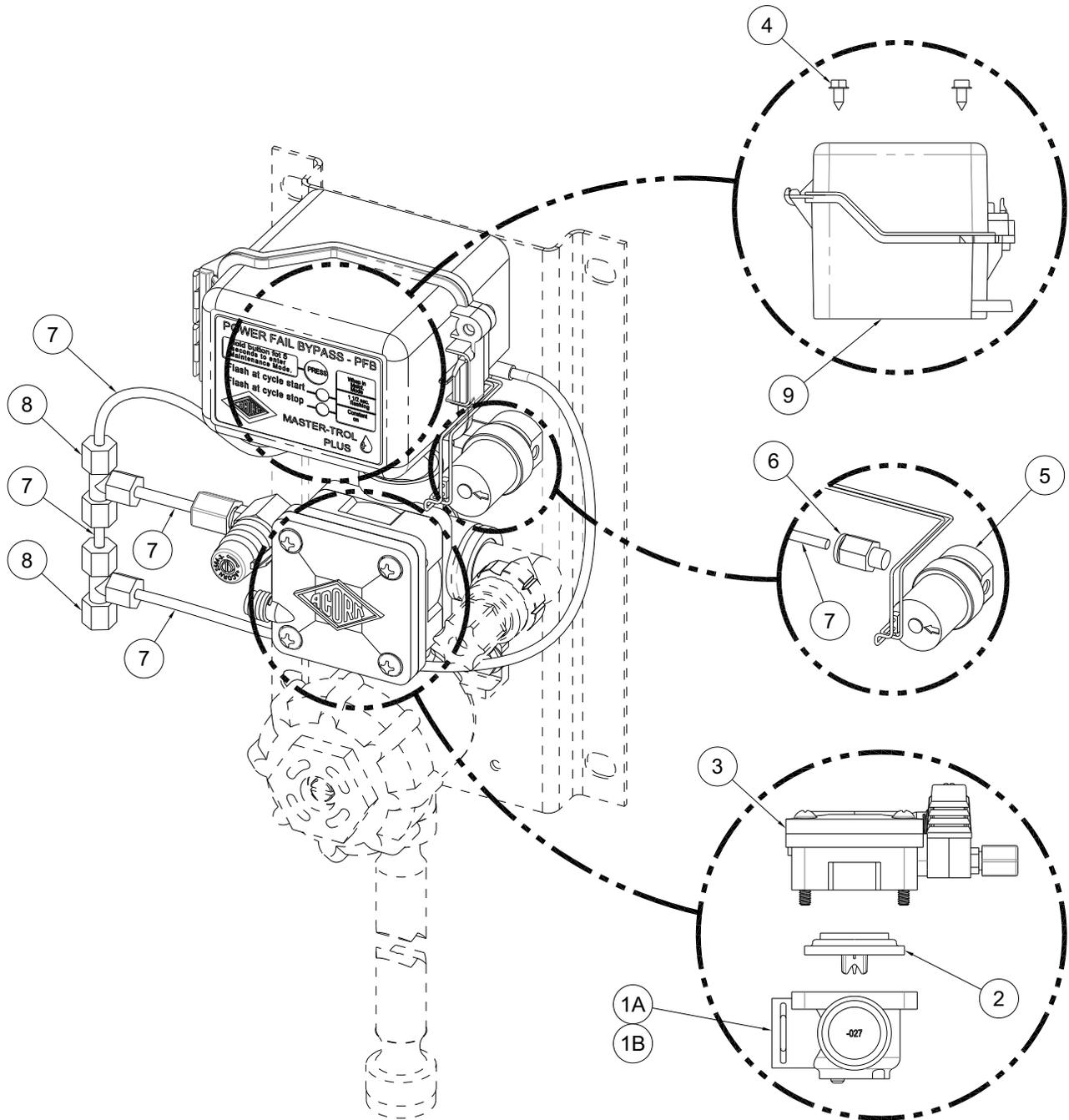


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

REPAIR PARTS: -MTP1-PFB POWER FAIL BYPASS VALVE ASSEMBLY



1A	2570-026-000	Valve Body	5	0715-667-000	2-Way Electronic Valve, 24 VDC w/ Top Leads
1B	2570-025-000	Valve Body, Lower	6	7000-125-000	#10-32 x 1/8" OD Push-In Fitting
2	2563-010-001	Water Diaphragm Assembly	7	2155-000-000	1/8" OD Low Density Polyethylene (Blue)
3	2563-020-003	Metering Assembly	8	1895-400-000	1/8" OD Nylon Tube Union Tee
4	0124-031-000	#8 x 3/8" Hex Washer Head, Slotted Screw	9	0715-632-001	-MTP-PFB Branch Box Assembly (Pneumatic)
Item	Part Number	Description	Item	Part Number	Description

ACORN ENGINEERING COMPANY

ACORN ENGINEERING FIELD SERVICE
TOLL FREE 800-743-8259 • LOCAL 626-855-4866 • FAX 626-855-4863

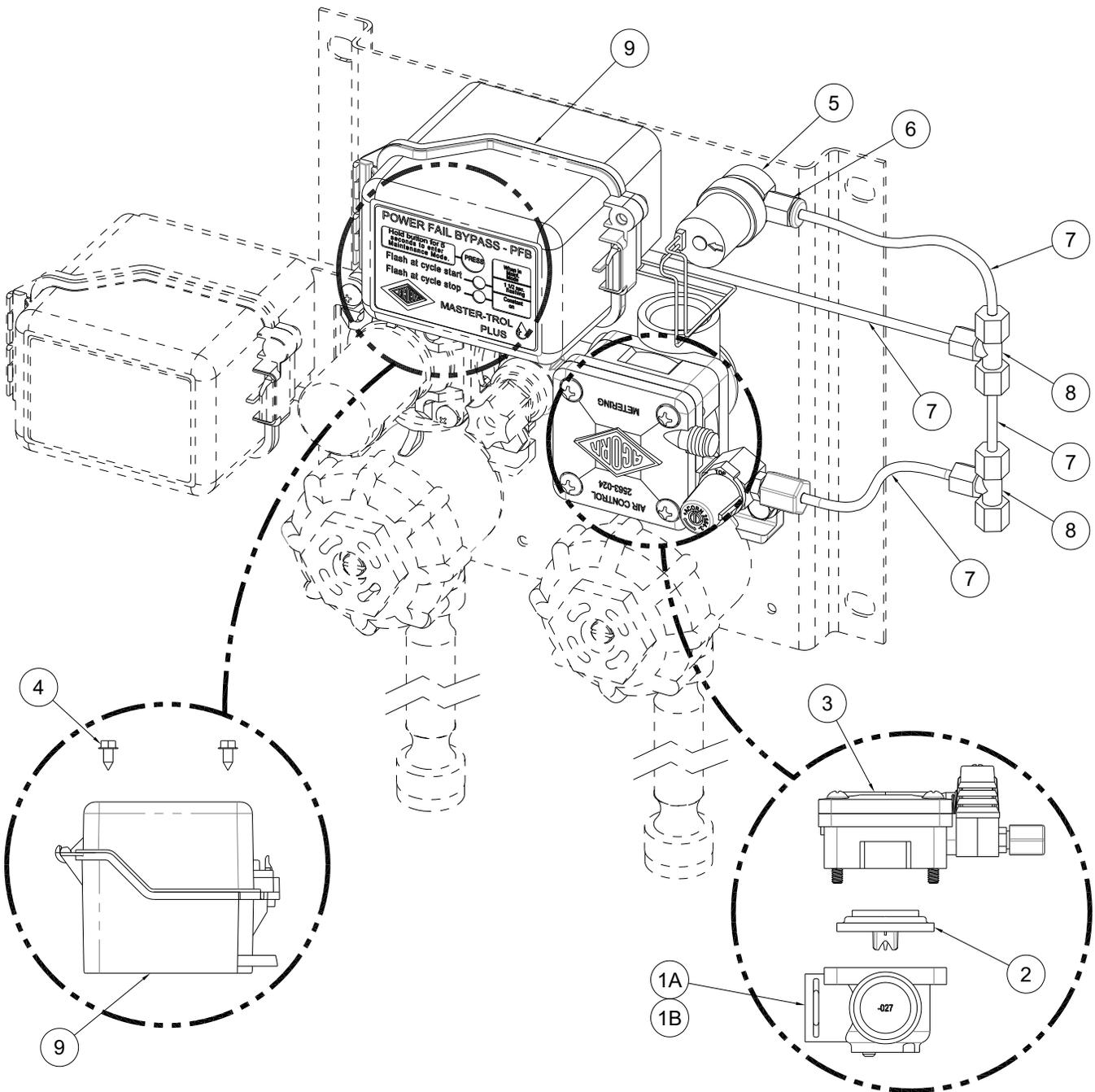


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

REPAIR PARTS: -MTP2-PFB H&C POWER FAIL BYPASS VALVE ASSEMBLY



1A	2570-026-000	Valve Body	5	0715-667-000	2-Way Electronic Valve, 24 VDC w/ Top Leads
1B	2570-025-000	Valve Body, Lower	6	7000-125-000	#10-32 x 1/8" OD Push-In Fitting
2	2563-010-001	Water Diaphragm Assembly	7	2155-000-000	1/8" OD Low Density Polyethylene (Blue)
3	2563-020-003	Metering Assembly	8	1895-400-000	1/8" OD Nylon Tube Union Tee
4	0124-031-000	#8 x 3/8" Hex Washer Head, Slotted Screw	9	0715-632-001	-MTP-PFB Branch Box Assembly (Pneumatic)
Item	Part Number	Description	Item	Part Number	Description

ACORN ENGINEERING COMPANY

ACORN ENGINEERING FIELD SERVICE
TOLL FREE 800-743-8259 • LOCAL 626-855-4866 • FAX 626-855-4863

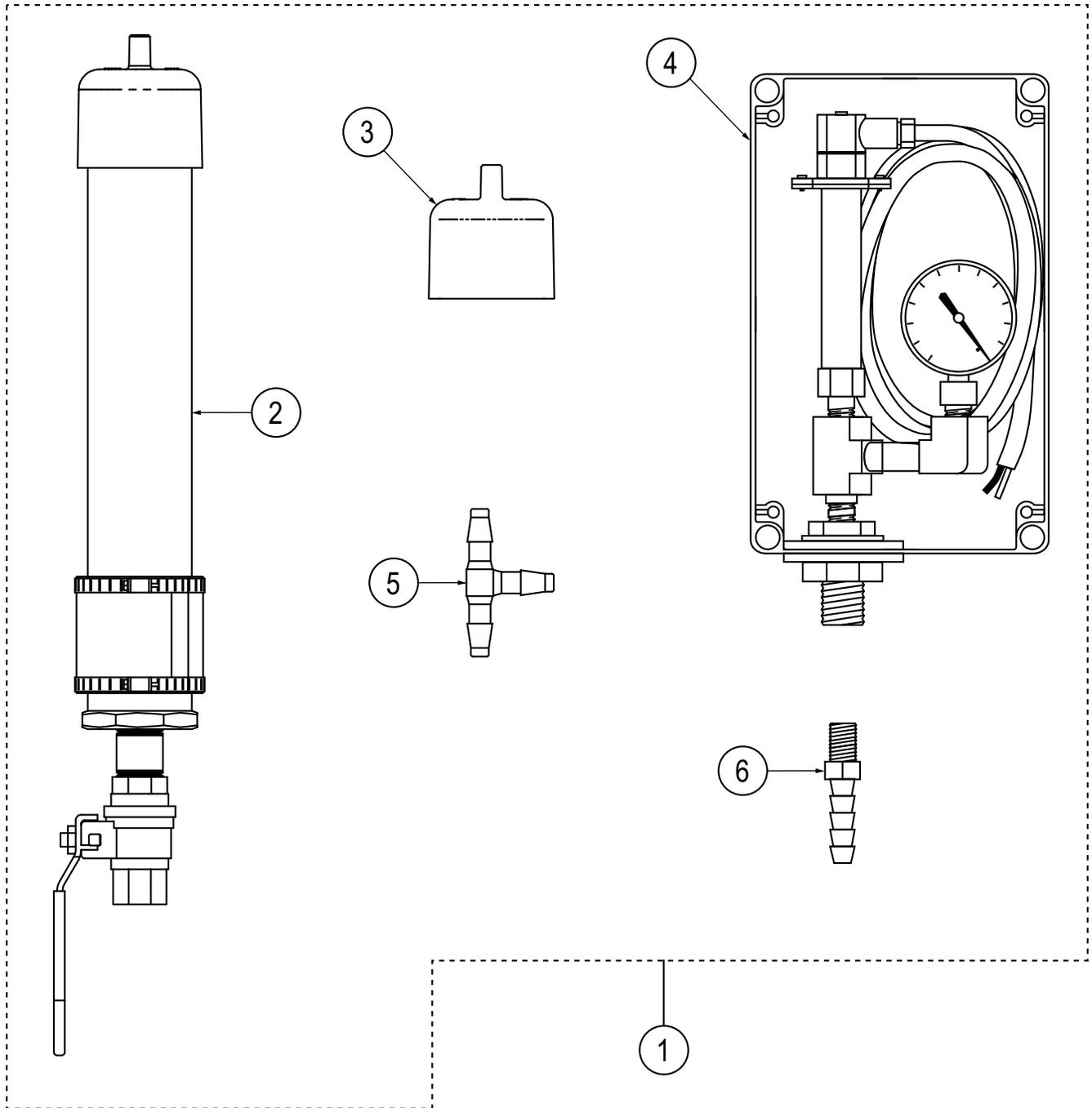


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

MASTER-TROL PLUS VACUUM TRANSDUCER KIT



1	AVLC0066-001	MTP VACUUM TRANSDUCER KIT	4	AVPUR-00083	VACUUM SENSOR ASSEMBLY
2	AVCP0145-001	MOISTURE TRAP ASSEMBLY	5	1895-561-000	1/4" x 1/4" x 1/4" BARBED TEE
3	2803-175-199	SENSOR PORT CAP, 1-1/2, PVC SOCKET	6	2803-046-000	1/8" NPTM x 1/4" I.D. BRASS BARBED FTG
ITEM	PART NUMBER	DESCRIPTION	ITEM	PART NUMBER	DESCRIPTION

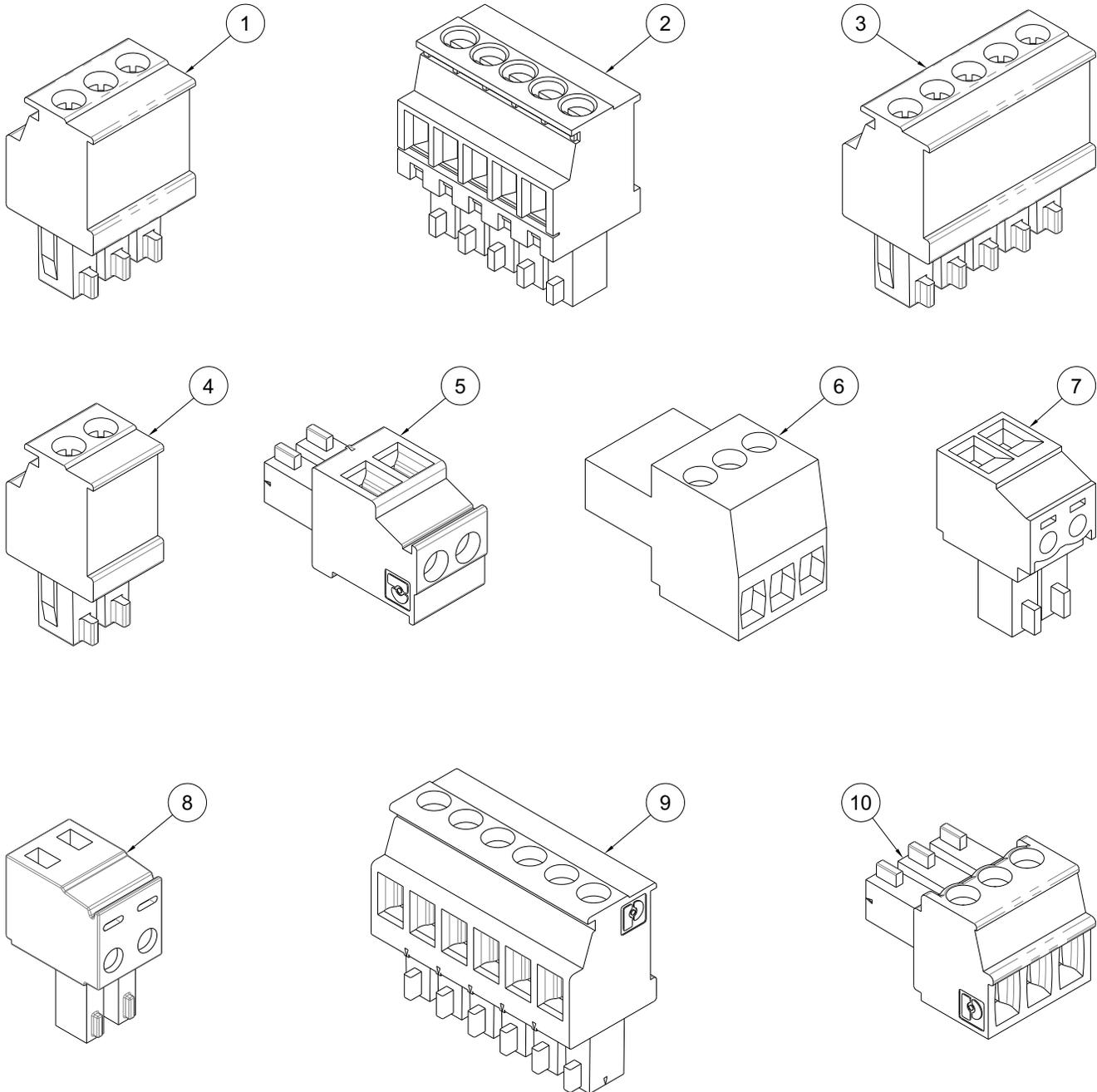


INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS

REPAIR PARTS: -MTP CONTROLLER AND BRANCH BOX CONNECTOR PLUGS



1	0715-670-000	A/D St Male Conn Grn Main PCB (TS2)	6	0715-675-000	Branch Box A&B (TS2) PB 3 Pos Male Con (Blk)
2	0715-671-000	Main PCB (TS1A&B) Comm 5 Male Conn (Blk)	7	0715-676-000	Branch Box A&B (TS3) Valve 2 Poss Conn (Blk)
3	0715-672-000	Main PCB (TS6) Sub 5 Pos Male Conn (Grn)	8	0715-677-000	Branch Box (TS4) 2nd Valve 2 Pos Conn (Grn)
4	0715-673-000	Main PCB (TS4) Pwr 2 Pos Male Conn (Grn)	9	0715-678-000	Mezz. (TS5-7) Keypad 6 Pos Male Conn (Grn)
5	0715-674-000	Branch Box A&B (TS1) F/T 2 Pos Conn (Grn)	10	0715-679-000	Mezz. (TS3) A/D 3 Pos Male Conn (Grn)
Item	Part Number	Description	Item	Part Number	Description

ACORN ENGINEERING COMPANY

ACORN ENGINEERING FIELD SERVICE
TOLL FREE 800-743-8259 • LOCAL 626-855-4866 • FAX 626-855-4863



INSTALLATION, OPERATIONS & MAINTENANCE MANUAL

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

MASTER-TROL® PLUS



ACORN ENGINEERING COMPANY

Manufacturers of Engineered Plumbing Products

MAIL ADDRESS

P.O. BOX 3527
CITY OF INDUSTRY, CA 91744 U.S.A.

PHYSICAL ADDRESS

15125 PROCTOR AVENUE
CITY OF INDUSTRY, CA 91746 U.S.A.

TOLL FREE 800-488-8999 • **LOCAL** 626-336-4561
FAX 626-961-2200 • **WEB** www.acorneng.com

WARRANTY INFORMATION

Acorn warrants that all of its products are guaranteed against defective material or poor workmanship for a period of one year from date of shipment. Acorn's liability under this warranty shall be discharged by replacing without charge F.O.B. City of Industry, California, any goods, or part thereof, which appears to the company upon inspection to be of defective material or not of first class workmanship, provided that claim is made in writing to the company within reasonable period after receipt of the product. Where claims for defects are made, the defective part or parts shall be delivered to the company, prepaid, at City of Industry, California for inspection. Acorn will not be liable for the cost of repairs, alterations or replacement, or for any expense connected therewith made by the owner or his agents, except upon written authority from the Acorn City of Industry office. Acorn will not be liable for any damages caused by defective materials or poor workmanship, except for replacements, as above provided. Contact local Acorn Representative for complete terms and conditions.