Model AM2 M40 Panel

Installation, Operation, and Maintenance Manual

RECEIVING AND INSPECTION

Upon receiving unit, check for any interior and exterior damage, and if found, report it immediately to the carrier. Also check that all accessory items are accounted for and are damage free.

WARNING!!

Installation of this control should only be performed by a qualified professional who has read and understands these instructions and is familiar with proper safety precautions. Improper installation poses serious risk of injury due to electric shock, and other potential hazards. Read this manual thoroughly before installing or servicing this equipment. ALWAYS disconnect power prior to working on module.

Save these instructions. This document is the property of the owner of this equipment and is required for future maintenance. Leave this document with the owner when installation or service is complete.

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WARRANTY

This equipment is warranted to be free from defects in materials and workmanship, under normal use and service, for a period of 12 months from date of shipment. This warranty shall not apply if:

1. The equipment is not installed by a qualified installer per the MANUFACTURER'S installation instructions shipped with the product,
2. The equipment is not installed in accordance with federal, state and local codes and regulations,
3. The equipment is misused or neglected,
4. The equipment is not operated within its published capacity,
5. The invoice is not paid within the terms of the sales agreement.

The MANUFACTURER shall not be liable for incidental and consequential losses and damages potentially attributable to malfunctioning equipment. Should any part of the equipment prove to be defective in material or workmanship within the 12-month warranty period, upon examination by the MANUFACTURER, such part will be repaired or replaced by MANUFACTURER at no charge. The BUYER shall pay all labor costs incurred in connection with such repair or replacement. Equipment shall not be returned without MANUFACTURER'S prior authorization and all returned equipment shall be shipped by the BUYER, freight prepaid to a destination determined by the MANUFACTURER.

PIPING SIZE SELECTION

To ensure proper operation of the Self Cleaning System, a minimum of 30 PSI water operating pressure during spraying must be achieved at the hood nozzles. For this to occur, proper sizing of the water line is required. Use the following steps to calculate the piping minimum size.

1. Use the Minimum Pressure Requirements for Lengths of Hood chart and find the minimum PSI required at the hood inlet. Subtract this value from the available PSI at the panel pressure gauge. Maximum panel operating pressure is 50 PSI. This will be your maximum allowable pressure drop for field installed pipes between the panel and the hood.
2. Most fittings add an equivalent pipe length to the total run. Use the chart below to calculate the equivalent pipe length for installed fittings. If you have multiple fittings of one type, simply multiply the number below by the total number of the fitting and add to the total run length.

Equivalent Pipe Length For Various Pipe Fittings

Pipe Size Inches	45° Elbow	90° Elbow	Tee Thru Run	Tee Thru Branch
3/4"	1.03	2.21	1.23	4.41
1"	1.31	2.81	1.56	5.62
1 ½"	2.15	4.31	2.4	8.63

3. To calculate the total flowing pressure drop between the panel and the hood, take the total equivalent length found in step 2 and add the total linear field installed pipe length. Multiply this number by the value found in the table below, Pressure Drop (PSI) per Equivalent Foot of Waterline. (Gallons per minute is calculated by multiplying the length of the hood by 0.7 GPM) This will be the friction pressure drop between the hood and the panel.

Pressure Drop (PSI) per Equivalent Foot of Waterline - Pipe Size

Gallons per Minute	Waterline Pipe Size (PSI per foot of pipe)		
	3/4"	1"	1 1/2"
10	0.102	0.029	0.004
20	0.368	0.105	0.014
30	0.779	0.222	0.030
40	1.327	0.379	0.052
50	2.005	0.573	0.078
60	2.809	0.803	0.109
70	3.735	1.068	0.146
80	4.782	1.367	0.186
90	5.947	1.700	0.232
100	7.223	2.066	0.282

4. Add in the pressure drop due to gravity. This must be evaluated to overcome any rise in pipe elevation between the panel and the hood. There is .43 PSI/ft of vertical rise of pressure drop..
5. Now, compare the maximum allowable pressure drop from step 1 to the calculated pressure drop from step 3. If the calculated pressure drop exceeds the maximum allowable pressure drop, increase the pipe size and recalculate steps 2 and 3. Continue this step until the calculated pressure drop is below the maximum allowable.

Field Pipe Pressure Drop Calculation Example

Wall mount panel installed with 30 feet of ¾" linear pipe between panel and hood. (2) 90 degree elbows are installed in the pipe run and the pipe run has a vertical rise of 5 feet. Length of end-to-end hood system is 32 feet.

Hood System = 32 feet. Flow rate = 32 feet * 0.7 GPM = 23 GPM
Pressure required at hood = 37 PSI.
Pressure at panel gauge = 50 PSI.
Allowable pressure drop between panel and hoods: 50 PSI – 37 PSI = 13 PSI

Equivalent length of pipe = 30 + 2 * 2.21 = 34.42 feet
Friction Pressure Drop through pipe = 34.42 * 0.779= 26.81 PSI
Gravitational Pressure = 0.43 PSI/ft * 5 feet = 2.15 PSI
Total Pressure Drop in Field Pipe between panel and hood = 26.81 PSI + 2.15 PSI = **28.96 PSI**
Allowable pressure drop = 13 PSI

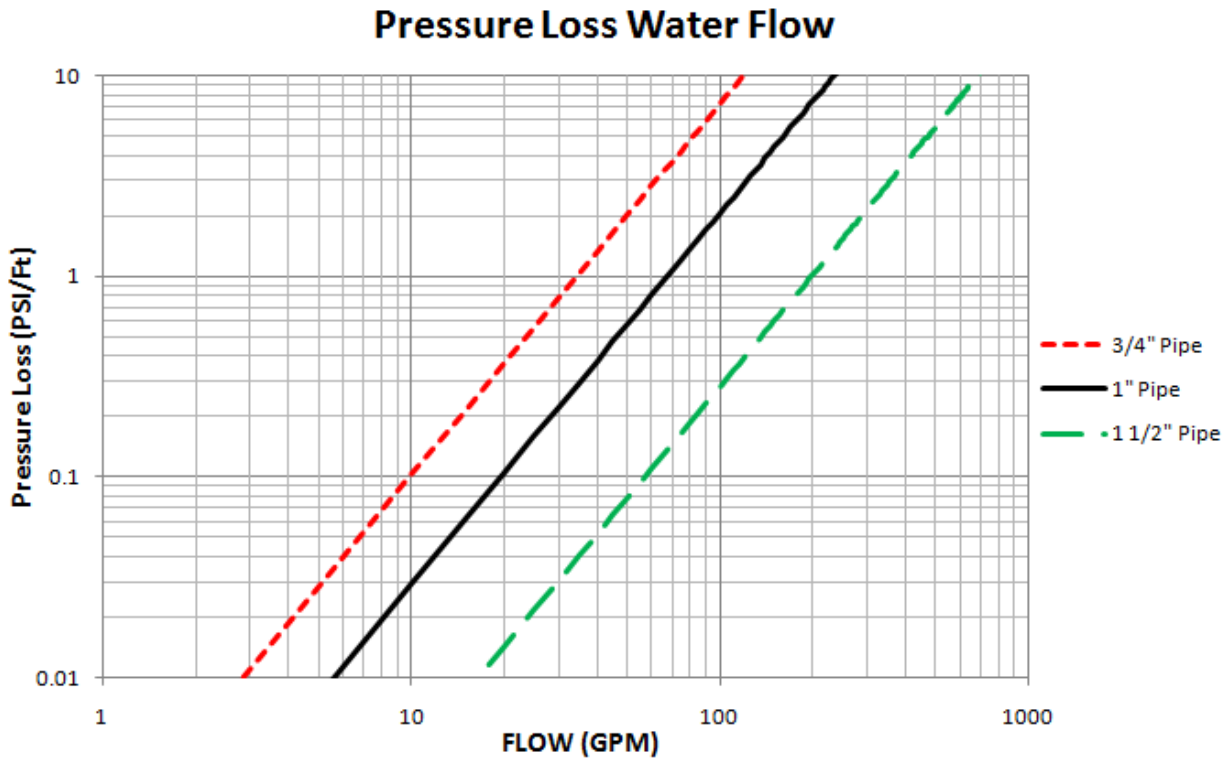
*This system will **not work** correctly because calculated pressure drop is greater then allowable pressure drop. Pipe size will need to be change to 1 inch diameter.*

Re-calculate with 1 inch pipe instead of ¾" pipe:

Equivalent length of pipe = 30 + 2 * 2.81 = 35.62 feet
Friction Pressure Drop through pipe = 35.62 * 0.222 = 7.91 PSI
Gravitational Pressure = 0.43 PSI/ft * 5 feet = 2.15 PSI
Total Pressure Drop in Field Pipe between panel and hood = 7.91 PSI + 2.15 PSI = 10.07 **PSI**
Allowable pressure drop = 13 PSI

This system will work correctly because calculated pressure drop is less then allowable pressure drop.

Pressure Loss Through Typical Water Pipe Chart



Minimum Operating Pressure Requirements for Lengths of Hood

Length of Hood (Ft)	Minimum Inlet Water Pressure for Cold Mist (PSI)	Minimum Inlet Water Pressure for Self Cleaning (PSI)
0	10	30
4	10	30
8	10	30
12	10	30
16	15	30
20	15	31
24	15	32
28	15	34
32	20	37
36	20	39
40	20	42
44	20	46
48	20	50

NOTE: Water pressure may not drop below 30 PSI while the hood hot water is operating. Pressure may not rise above 50 PSI when the hood is spraying. If the pressure is greater than 50 PSI, a water regulator must be connected. The chart above is for continuous hood installations. If you exceed the lengths above, water line must be branched for adequate water supply.

INSTALLATION

Refer to the project blueprints for proper plumbing and electrical hookup, located on the inside of the plumbing door. **CAUTION:** Do not apply power before plumbing and electrical installation is complete on the panel. Please see drawings for the panel on the following pages.

Plumbing

Site Preparation

1. Provide clearance around installation site to safely install equipment into its final position.
2. Consider general service and installation space when locating unit.

Assembly

1. Mount the panel on the wall, or recessed in the wall with an optional trim ring if ordered, approximately 42" from the finished floor to the bottom of the cabinet.
2. Open the cabinet and verify proper pipe size for the hot water connection. Route and connect the hot water supply piping to the manifold connection located at the bottom of the cabinet.
3. Connect piping from the top connection of the manifold and route to the ceiling. Connect a vacuum breaker at the highest point of the run to the hood connections.
4. Connect a tee fitting after the vacuum breaker and connect the ¼" NPT soap injection check valve.
5. Continue the pipe to the hood, and then connect to the wash manifold connection on the hood.
6. Connect the tubing to the check valve and route tubing to the cabinet. At the cabinet, connect tubing to the top connection on the clear block mounted on the detergent pump.

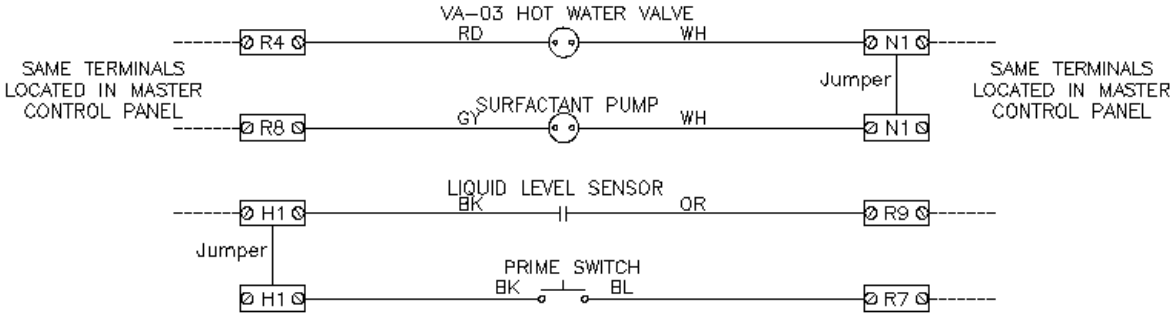
Electrical

Electrical termination points are located on the right hand side compartment of the panel. One side of these terminal blocks is internally wired. Field wiring is expected on the other side, directions shown below.

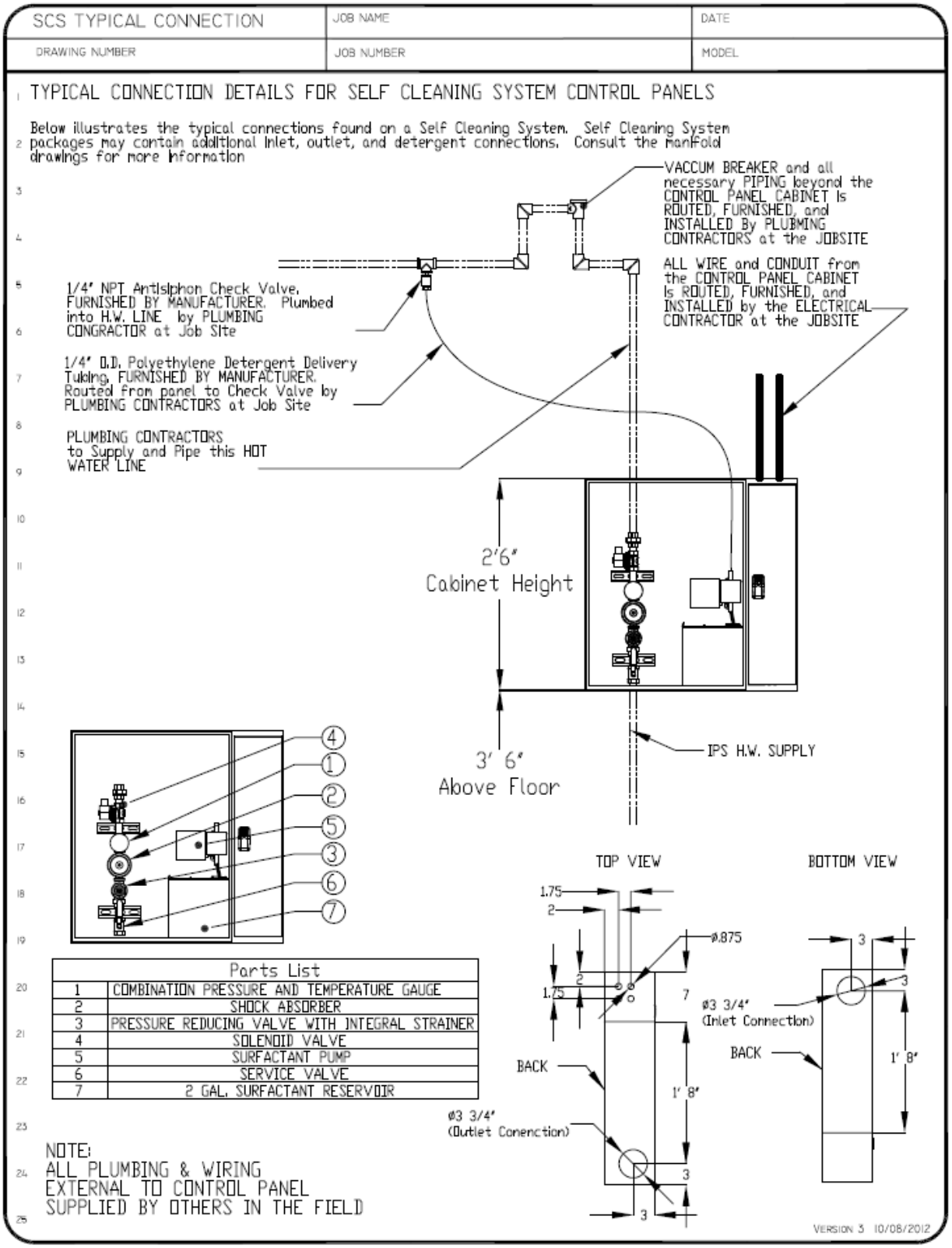
Field Wiring

1. 120 VAC signal to power the hot water solenoid valve should be connected to R4 (HOT) and N1 (Neutral).
2. 120 VAC signal to power the surfactant pump should be connected to R8 (HOT) and N1 (Neutral).
3. A liquid level sensor is provided with a dry contact between H1 and R9 to be used as an input signal. Contact closes when surfactant level is low.
4. A prime switch is provided with a dry contact between H1 and R7 to be used as an input signal. The prime switch should turn the surfactant pump on if the surfactant level is sufficiently high (liquid level sensor contacts opened).
5. If an electrical pre-wire package controlling the fans or an Energy Management System (EMS) is also provided by the same manufacturer in conjunction with the Self Cleaning panel, the pre-wire and EMS package will contain terminal blocks identically labeled H1, N1, R4, R7, R8 and R9. Connect the terminal blocks together from the Self Cleaning panel to the electrical control panel.

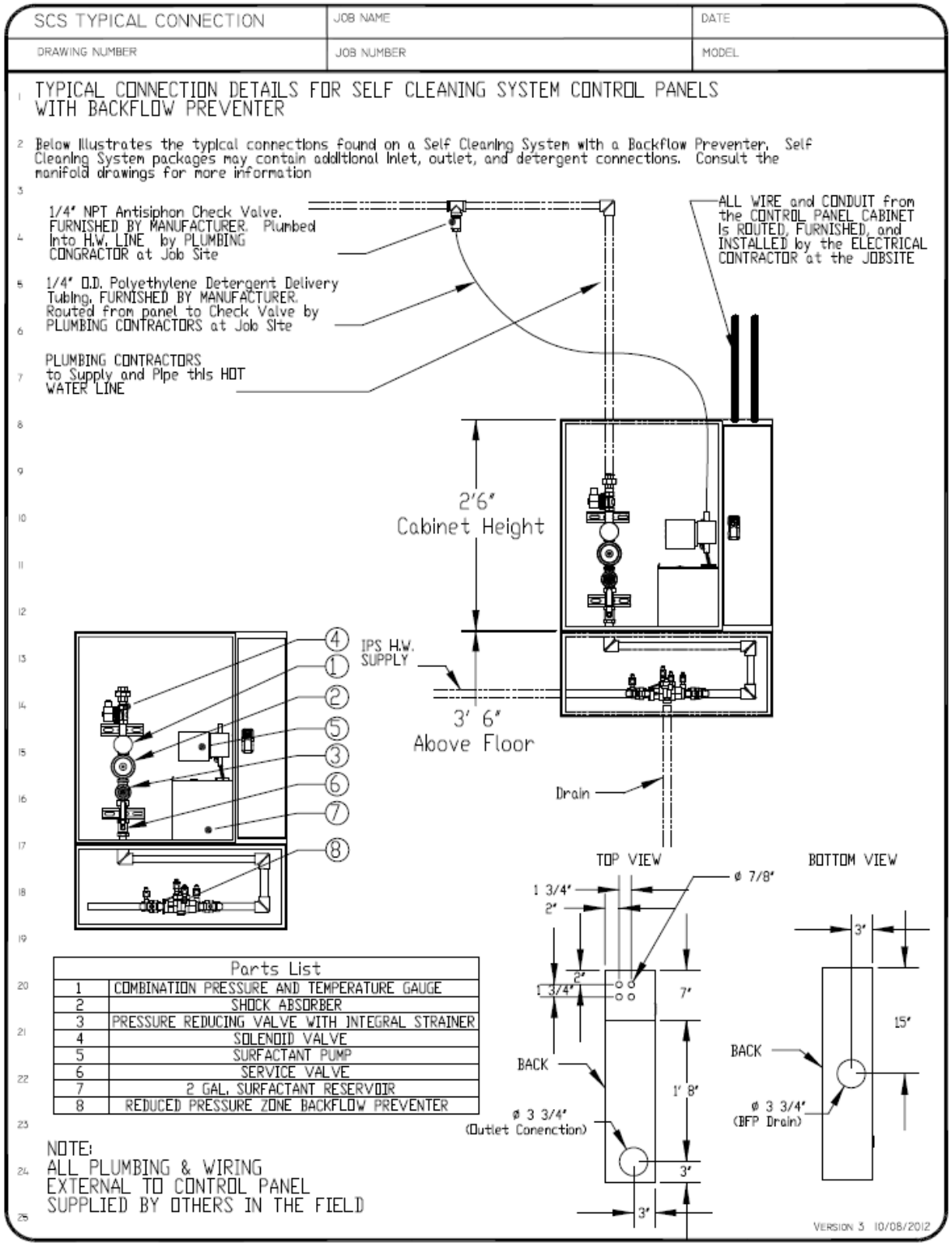
AM2 M40 Electrical Diagram



AM2 M40 Control Panel Diagram



AM2 M40 Control Panel Diagram with Backflow Preventer



MAINTENANCE

To guarantee trouble free operation of this control, the manufacturer suggests following these guidelines. Most problems associated with unit failures are directly related to poor service and maintenance.

Please record any maintenance or service performed on this equipment in the documentation section located at the end of this manual.

First Week of Operation

1. Remove and clean the line strainer screen, located in the pressure reducing valve assembly within the plumbing enclosure of the control panel, after the first week of operation. Clogging from line debris, caused by new construction, will happen more frequently until lines are flushed by repeated usage.

Weekly

1. The surfactant level should be checked to keep the detergent pump from losing its prime. If low, then add surfactant until full. Please see directions for priming the detergent pump if needed.
2. Monitor the hot water temperature (140 to 170 degrees F) and pressure (30 to 50 PSI) while ventilators are washing. Readings can be accomplished by checking the combination temperature/pressure gauge located within the plumbing enclosure of the control panel.

Every 3 Months

1. Visually inspect the components of the control panels to ensure proper operation.
2. Check all nozzles for proper and evenly distributed water flow. If nozzles are clogged, clean or replace.

Every 6 Months

1. The line strainer, located in the pressure reducing valve assembly, should be removed and cleaned. Remove the bottom plug and O-ring; the strainer will be attached to the bottom plug and will be extracted when the bottom plug is removed. Remove and clean strainer as required. If the screen is damaged, then a replacement of 80-mesh screen is required.
2. Check all nozzles for proper and evenly distributed water flow. If nozzles are clogged, clean or replace.

Prime the Detergent Pump

1. Loosen the wing nut on the knurled adjustment cam nut, located behind the clear pump block.
2. Turn the pointer index to the setting number 6 (maximum flow) and then retighten the index.
3. Ensure that the strainer is below the surface of the surfactant level.
4. Loosen the tubing connection on top of the clear block. WARNING: Do not let surfactant spray from the loose fittings. Wrap a rag around loosened fittings to prevent the surfactant from spraying.
5. Press the pump prime switch or rotate the knurled nut by hand until the detergent is drawn out of the loosed fitting with no air bubbles in the clear block.
6. Tighten the top fitting and press the pump prime switch or rotate the knurled nut by hand to verify that the surfactant will be pumped beyond the cleat block into the top tubing.
7. Loosen the wing nut and adjust the pointer to the 1.5 or 2 setting, and then retighten the wing nut. The pump is primed and now ready for use.

Start-Up and Maintenance Documentation

Job Information

Job Name	
Address	
City	
State	
Zip	
Phone Number	
Fax Number	
Contact	
Purchase Date	

Service Company	
Address	
City	
State	
Zip	
Phone Number	
Fax Number	
Contact	
Start-Up Date	

Maintenance Record

Date	Service Performed

Factory Service Department

Phone: 1-866-784-6900
Fax: 1-919-554-9374