AUTOSTREAM MANUAL

INGERSOLL-RAND
FLUID PRODUCTS

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INTRODUCTION:

The Johnstone Dispense System (JDS) Collection of Autostream components include a variety of subsystems and devices which work in concert to produce a specific level of flow control and application performance.

Each Autostream system includes a proportional mastic valve (patented) as a pressure control device. The output pressure of this pneumatically operated valve is adjusted by changing the control air pressure applied to it. The changes can be achieved by manual adjustment of the air pressure, or by changing the strength of the electronic flow rate signal (0 to 10v DC).

In addition to pressure control, temperature conditioning of the mastic may be required to achieve the proper level of application performance. Temperature conditioning may be used to stabilize or control materials viscosity, create a phase change, increase adhesiveness, or optimize total application parameters.

Flow Monitoring	Measures and outputs the volume used each job. Outputs a fault for out of range volume. Measured in cubic centimeters.

SPECIFICATIONS:

Input Power	575v AC, 60 Hz, 13.5 amps or 575v AC, 60 Hz, 10.0 amps (Single zone system) or 575v AC, 60 Hz, 13.8 amps (Dual zone system)
Signal Input (from cell controller)	
Flow rate	- 0 to +10v DC
Digital	- 120v AC, 24v DC or Contact Closure 1 Amp AC or DC
Outputs (to cell controller)	-Contact Closure 1 Amp AC or DC
Maximum System Output Pressure	- 4000 PSI
Air Supply	- 85 to 100 Psi (1/2" id. dia minimum tubing supply)

THEORY OF OPERATION:

The Johnstone Pump Co. Autostream Level 30 consists of three major subsystems:

A. Fluid delivery subsystem.

B. Control subsystem.

C. Temperature Conditioning subsystem.

A. FLUID DELIVERY SUBSYSTEM:

From the supply header, pressurized material is conducted through the following devices:

High Pressure Material Supply (includes pump supply hoses, header system and mastic hoses to cell).

High pressure filter assembly.

Gear monitor.

Proportional Mastic Valve (regulates pressure in direct response to control signal).

High Pressure Whip Hose or a close-coupled transition block.

Dispense Valve, pneumatically controlled (includes mounting of pressure sensors at point of application).

B. CONTROL SUBSYSTEM:

Components found in the Autostream main control panel.

The Autostream Level 30 control subsystem consists of two major components:

A Proportional Valve System (PVS), which is an electronically controlled, pneumatically powered pressure regulation system.

A Flow Control Microcomputer (FCM), which is a microprocessor based data acquisition system.

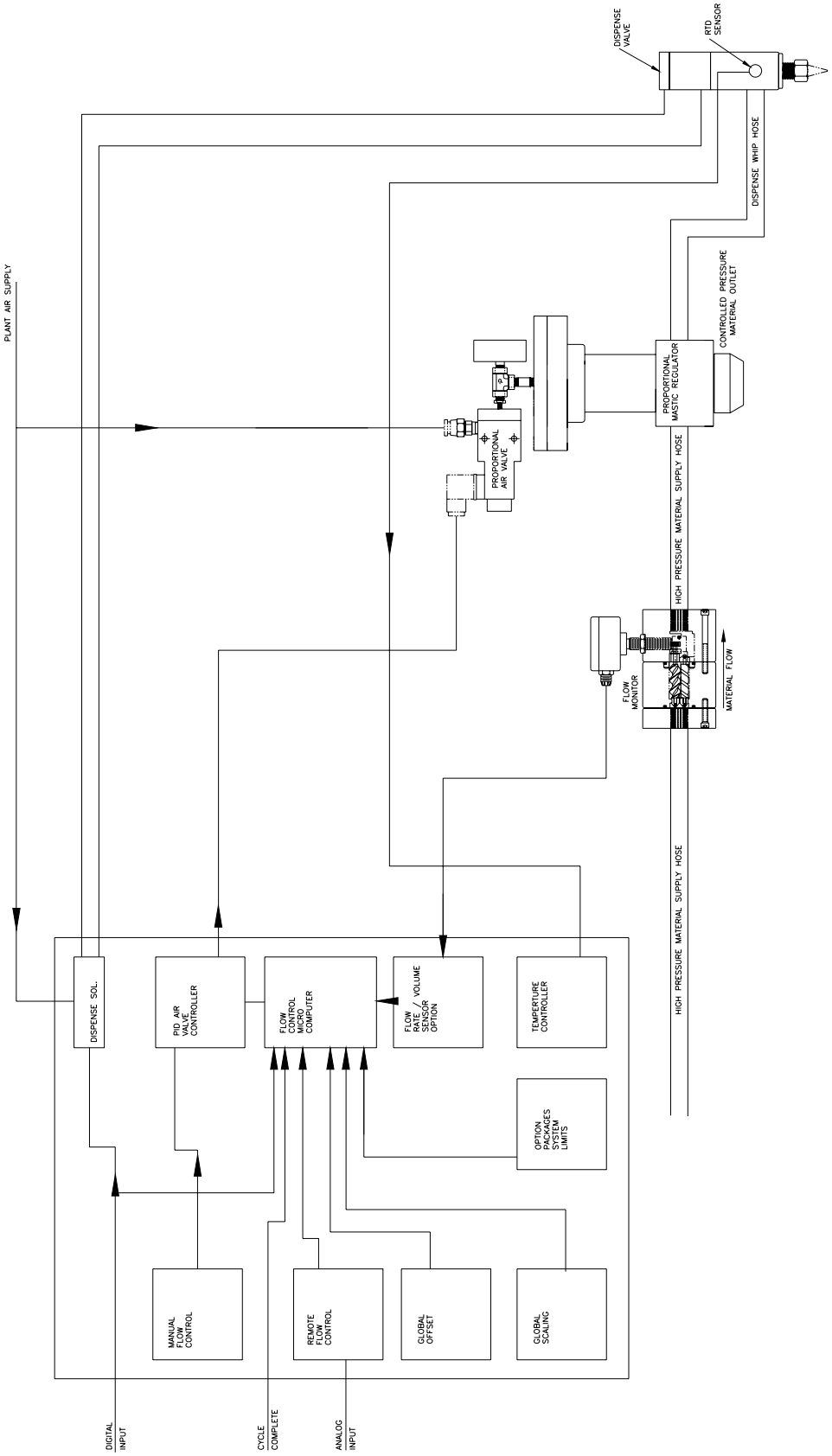
The PVS provides a controllable mastic pressure at the point of application. An analog input (reference signal) representing the desired flow pressure is received from the FCM or the MANUAL FLOW CONTROL (potentiometer). It is compared to the reference signal by the PID air valve controller, which then adjusts the strength of its output signal. The output of this card controls a proportional air valve, which regulates the mastic pressure at the point of application.

The FCM is an interface between the robot (or cell controller) and the PVS. Also, the FCM monitors volume limits and flow rate limits, for diagnostic interface.

C: TEMPERATURE CONDITIONING SUBSYSTEM:

This subsystem provides temperature-controlled water that is used to maintain a conditioned conduit for the mastic material to pass through. Conditioning takes place at all conduit elements: dispense valve, whip hose, proportional mastic valve, supply hose and heat exchangers.

The mastic temperature is measured using a resistive thermal device (RTD) and controlled at the point of application (dispense valve). The RTD is designed to be installed in the material port of the dispense valve. This allows the system to read the temperature of the material at the point of application.


DISPENSE VALVE
RTD SENSOR
DISPENSE WHIP HOSE
PLANT AIR SUPPLY
CONTROLLED PRESSURE MATERIAL OUTLET
PROPORTIONAL MASTIC REGULATOR
PROPORTIONAL AIR VALVE
HIGH PRESSURE MATERIAL SUPPLY HOSE
FLOW MONITOR
MATERIAL FLOW
HIGH PRESSURE MATERIAL SUPPLY HOSE
DISPENSE SOL.
PID AIR VALVE CONTROLLER
FLOW CONTROL MASTER COMPUTER
FLOW RATE / VOLUME SENSOR OPTION
TEMPERTURE CONTROLLER
OPTION PACKAGES SYSTEM LIMITS
MANUAL FLOW CONTROL
REMOTE FLOW CONTROL
GLOBAL OFFSET
GLOBAL SCALING
DIGITAL INPUT
CYCLE COMPLETE
ANALOG INPUT

DESCRIPTION OF PANEL DOOR CONTROLS:

Power On light: When on, indicates that the main disconnect is on.

SYSTEM CONTROL:

Master Start push button:

Push "MASTER START" push button to energize panel. "POWER ON" light will be on.

Master E-Stop: Push "MASTER STOP" push button to de-energize panel. "POWER ON" light will be off.

Automatic / Automatic with Pot / Manual Selector Switch:

Automatic: This position allows the system to operate from the digital and analog inputs from the robot (or PLC).

Automatic With Pot: This position allows the system to operate the dispense valve from the digital inputs and the analog flow control from the Manual flow Pot located on the panel door.

Manual: This position removes all control from the robot. The dispense valve is opened by the "MANUAL DISPENSE" push button on the panel door. The flow rate is a constant, controlled by the potentiometer on the panel door. The manual flow rate is not affected by the scaling features.

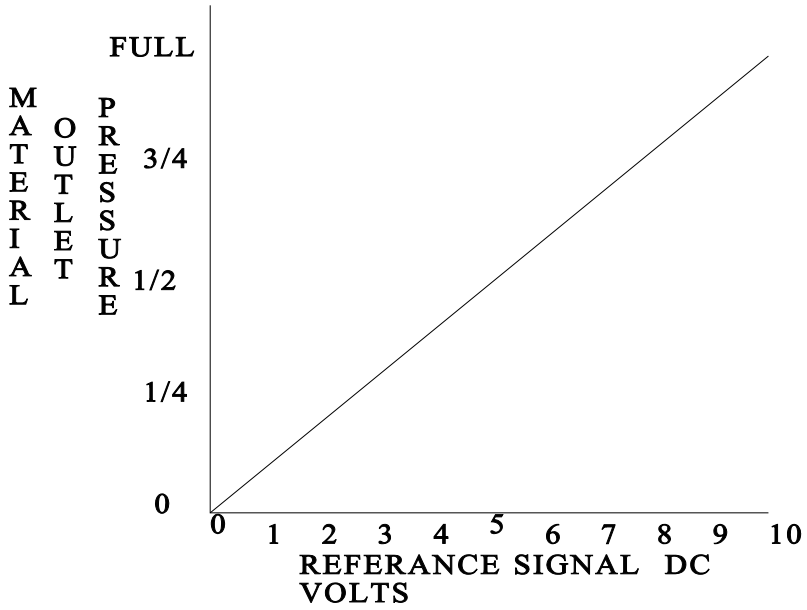
DISPENSE CONTROL:

Automatic Dispense – Automatic with Pot–Manual Dispense:

Automatic Dispense: This position is used for normal production mode. The analog signal from the robot is used to control the desired flow rate of the dispensed fluid.

Automatic With Pot: This position is used when the analog voltage from the robot is not available. The robot will still turn on and off the dispense valve. The “MANUAL FLOW RATE POT” on the front door controls the flow rate. The flow rate will not vary with the robot speed. The flow rate is a constant value for the entire dispense cycle.

Manual Flow Rate: This position is to run the Autostream without input from a robot. To purge or depressurize the system. The Autostream panel is turning on the dispense valve by depressing the Manual Dispense push-button. The Manual Flow Rate Pot controls the dispense flow rate.



Global Scaling Pot:

The Global Scaling pot will modify the remote analog input so that the flow rate can be changed from 50% to 150%. The initial base setting is at potentiometer dial setting of 10.00 = 100%.

This adjustment is used to change the flow rate without reprogramming the source of the remote signal. The global scaling is generally used to adjust higher voltage signals.

Global Offset Pot:

The Global Offset pot will modify the remote analog input so that the zero offset can be adjusted from, -5v to +5v. The initial base setting is at potentiometer dial setting of 10.00 = 0v.

This adjustment is used to change the flow rate without reprogramming the source of the remote signal. The global offset is generally used to adjust lower voltage signals.

Reference Signal DC Voltmeter:

Displays the control signal to the PID AIR VALVE CONTROL CARD, after the scaling factor and the offset signal in the FCM has modified it.

If the system is in MANUAL, this control signal is directly related to the MANUAL FLOW RATE pot on the panel door, it is not affected by the GLOBAL SCALING POT or the GLOBAL OFFSET POT.

Manual Dispense Push Button:

Commands the dispense valve to open, starts the flow of material at the setting on the "MANUAL FLOW POT". Only functions when the AUTOMATIC / MANUAL mode selector switch is in the "MANUAL" position, and the "MANUAL" push button has been depressed. The "MANUAL" pilot light will be on.

Manual Flow Pot:

The "MANUAL FLOW" pot, adjustable from 0v to +10.0v, controls the output pressure of the material through the proportional mastic valve. At any particular setting, the output pressure is maintained even though the input pressure, orifice restriction, hose length, or material viscosity may change.

Dispense Ready Light:

Indicates that the system is ready to dispense. The temperature condition system is on and within temperature range. Having a dispense fault (high or low volume) on will not turn off the dispense ready light.

Scaling Warning Light: (Used on Level 20, 30)

The output to the proportional air valve tried to exceed system limits. This can be caused by the global scaling set too high, and/or remote input is too high, and/or global offset is set too high. Stays on until condition is corrected.

OPTIONS:

ES1 Upgrade Option:

Automatic Push Button & Pilot Light:

After selecting Automatic with the "AUTOMATIC / MANUAL" selector switch, this button must be depressed to engage the system into the automatic mode. The "AUTOMATIC" pilot light will come on.

Manual Push Button & Pilot Light:

After selecting Manual with the "AUTOMATIC / MANUAL" selector switch, this button must be depressed to engage the system in to a manual mode. The "MANUAL" pilot light will come on.

Volume Monitoring Option: (Used on Level 10, 30)

Volume Door Display:

A miniature electronic 8-digit counter/rate indicator, calibrated to display the volume dispensed during one dispense cycle.

The display is calibrated to display the volume in cubic centimeters. The display can be cleared at any time by pressing the reset button.

Low Volume Fault Light:

After cycle complete. Light is on when the FCM records that the volume dispensed is below the LOW VOLUME LIMIT system variable. The fault is reset when a new dispense cycle is started.

High Volume Fault Light:

After cycle complete. Light is on when the FCM records that the volume dispensed is above the HIGH VOLUME LIMIT system variable. The fault is reset when a new dispense cycle is started.

Flow Rate Fault Light:

During the dispense cycle. Light is on when the FCM records that the flow rate is above or below the HIGH & LOW FLOW RATE LIMITS, set in the FCM system variable list. The fault is on for the duration of the fault and is auto reset.

CELL INTERFACE INPUTS AND OUTPUTS:

INPUTS:

Remote Analog Input:

The "REMOTE ANALOG INPUT", adjustable from 0v to +10.0v DC, (0 (zero) volts must be the same as DC ground) controls the output pressure of the material through the proportional mastic valve. At any particular setting the output pressure is maintained even though the input pressure, orifice restriction, hose length, or material viscosity may change.

(Provided that the fluid inlet to the fluid mastic regulator is not starved for flow and or pressure).

Digital input Open Dispense Valve:

Digital input Gun on: The dispense valve opens, and the Proportional Control card follows the remote analog input. This input is held for as long as material flow is required. Can be pulsed on and off during the dispensing cycle as the application dictates.

There are three separate inputs, Input Style #1, Style#2 and Style#3. Each input will open the same dispense valve. Each Style allows the FMC to select a separate volume range for each body style. The volume ranges are set manually in the FMC.

Digital input Cycle Complete:

Digital input on: Indicates that the dispensing sequence is complete and that the volume is to be displayed on the FCM and that the volume on the door display is to be reset after two seconds.

Digital output Automatic Dispense Ready:

Indicates that the system is ready to dispense, in an automatic mode. The following signals must be present, providing that option has been purchased:

1. Temperature conditioning subsystem on.
2. No "HEATER HIGH TEMP FAULT".
3. No" MATERIAL TEMPERATURE FAULT".
4. No "FLOAT SWITCH LOW LEVEL FAULT".
5. "DISPENSE CONTROL" switch in "AUTOMATIC" or "AUTO W/ POT".

Temperature fault cannot be reset they must be corrected.

OUTPUT OPTIONS:

Digital output Scaling Warning: **Red light on panel door**.
(Used on Level 30)

The output to the proportional air valve tried to exceed system limits 10v. This can be caused by the global scaling set too high, and/or remote input too high, and/or compensation correction factor too high. Stays on until condition is corrected. The fault can be reset by the fault-reset button or when a new dispense cycle is started.

Digital output Dispense Fault: **No light on panel door.**

If any dispense fault is on the dispense fault will automatically latch on. A low volume, high volume, flow rate and scaling fault can turn the dispense fault on. The fault can be reset by the fault-reset button or when a new dispense cycle is started.

Volume Monitor Option: (Used with Level 10 and 30)

Digital output Low Volume Fault: **Red light on panel door**

After cycle complete. This output is on when the FCM records that the volume dispensed is below the LOW VOLUME LIMIT system variable. The fault can be reset by the fault-reset button or when a new dispense cycle is started.

Digital output High Volume Fault: Red light on panel door.

After cycle complete. This output is on when the FCM records that the volume dispensed is above the HIGH VOLUME LIMIT system variable. . The fault can be reset by the fault-reset button or when a new dispense cycle is started.

Digital output Flow Rate Fault: **Red light on panel door**.

During the dispense cycle. This output is on when the FCM calculated that the flow rate is above or below the HIGH or LOW FLOW RATE LIMITS, set in the FCM system variable list. The fault can be reset by the fault-reset button or when a new dispense cycle is started.

DESCRIPTION OF INSIDE PANEL INDICATORS AND DISPLAYS:

Johnstone Dispense Systems - Autostream Motherboard:

Circuitboard that contains all of the electronic flow controls and diagnostic interface circuits. Proportional Air Valve Control Card:

Power - Green LED:

Indicated that the power is on the PID Air Valve Control Card.

Shut Down - Red LED:

Not used. Indicates that the unit is shut off.

Flow Control Micro-Computer (FCM):

Red Power on LED: Indicator on when power is on the Microcomputer.

LCD Display:

Power Up Screen:

Johnstone Dispense systems
Autostream XX VerX.X

Between Dispense Cycle Display:

Last Volume XXXX.Xcc or	Total Volume XXXXGal
Global Scaling XXX % or	Global Offset X.X V

During Dispense Cycle Display:

Johnstone Dispense Systems
XXX.X cc/s Flow Rate

TEMPERATURE CONTROL:

Temperature Conditioning Option:

Temperature Conditioner On push button:

Push "TEMPERATURE CONDITIONER ON" push button to energize TEMPERATURE CONDITIONING SUBSYSTEM. "TEMPERATURE CONDITIONING SYSTEM ON" light will be on. The TEMPERATURE CONTROLLER will be powered on, and the temperature subsystem will start to control the temperature of the material.

Temperature Conditioning Off push button:

Push "TEMPERATURE CONDITIONER OFF" push button to De-energize TEMPERATURE CONDITIONING SUBSYSTEM. "TEMPERATURE CONDITIONING SYSTEM ON" light will be off. The TEMPERATURE CONTROLLER will be powered off.

Temperature Conditioning On Light:

Light on indicates that the TEMPERATURE CONDITIONING SUBSYSTEM is on.

Heater High Temp Fault Light:

This light is on when the thermal safety switch is tripped. This will turn off the DISPENSE READY SIGNAL. Sensor is located in the Heater assembly.
The Fault can not be reset. It must be corrected.

Material Temp Fault Light:

This light is on when the material is above or below the temperature limits. This will turn off the DISPENSE READY SIGNAL. The alarm indicator on the temperature controller will be on. The Fault can not be reset. It must be corrected.

Float Switch Low Level Light:

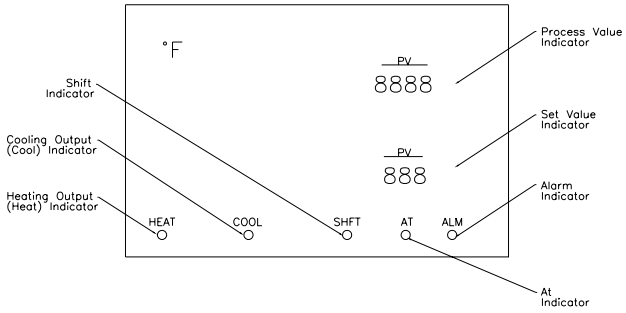
This light is on when the water level in the overflow tank is below a safe operating level. This will turn off the DISPENSE READY SIGNAL. The Fault can not be reset. It must be corrected.

INDICATORS ON THE TEMPERATURE CONTROLLER:

Process Value Indicator:

-RED-

Displays the process temperature value and various messages according to a specified display level.



Temperature Controller

Displays an error code when an error occurs in the temperature controller.

Displays "0000" for about 4 seconds on power application.

Set Value Indicator: Green

Displays various set values, messages, and output value.
Remains non-illuminated for about 4 seconds on power application.

Heating output (HEAT) Indicator:

Lights when the heating control output is turned on.

Cooling output (COOL) Indicator:

Light when the cooling control output is turned on.

Shift Indicator:

Illuminates when shift set input terminals (2 & 3) are short-circuited, not used in Autostream applications.

AT Indicator:

Indicates that auto tuning is in progress by flashing at intervals of 1 second. Flashing stops when Auto Tuning is complete.

Alarm Indicator:

[ALM] Illuminates when alarm output is turned on.

SEQUENCE OF OPERATION:

POWER UP:

1. Turn main disconnect on.

2. Push MASTER START push button. POWER ON light will be on.

3. Push TEMPERATURE CONDITIONER ON push button. TEMPERATURE CONDITIONING SYSTEM ON light will be on. (Level 30)

A. MANUAL MODE (Level 30)

1. AUTOMATIC / MANUAL selector switch in MANUAL.
2. Depress MANUAL push button. MANUAL pilot light on. (ES1 Option upgrade.)

B. PRODUCTION MODE. (Level 30)

1. AUTOMATIC / MANUAL selector switch in AUTOMATIC.
2. Depress AUTOMATIC push button. AUTOMATIC pilot light on. (ES1 Option upgrade.)
3. AUTOMATIC DISPENSE / AUTOMATIC W-MANUAL FLOW POT / MANUAL DISPENSE selector switch in AUTOMATIC DISPENSE. (Level 30)

C. AUTOMATIC WITH MANUAL FLOW RATE MODE. (Level 30)

1. AUTOMATIC / MANUAL selector switch in AUTOMATIC.
2. Depress AUTOMATIC push button. AUTOMATIC pilot light on. (ES1 Option upgrade.)
3. AUTOMATIC DISPENSE / AUTOMATIC W-MANUAL FLOW POT / MANUAL DISPENSE selector switch in AUTOMATIC W-MANUAL FLOW POT . (Level 30)

D. BY-PASS MODE. (Level 30)

1. AUTOMATIC / MANUAL selector switch in AUTOMATIC.
2. Depress AUTOMATIC push button. AUTOMATIC pilot light on. (ES1 Option upgrade)
3. AUTOMATIC DISPENSE / AUTOMATIC W-MANUAL FLOW POT / MANUAL DISPENSE selector switch in AUTOMATIC DISPENSE.
4. ON / OFF selector switch on Mother Board on OFF position. FCM displays Autostreaming BY-PASS mode. (Fault Disabled)

A. MANUAL MODE - SEQUENCE OF OPERATION:

This mode is used when manual purging of the system is required.

1. The robot should be moved to a safe purge position

2. AUTOMATIC / MANUAL selector switch in MANUAL.

3. Depress MANUAL push button. MANUAL pilot light on. (ES1 Option upgrade.)

4. The MANUAL DISPENSE push button is depressed.

5. The dispense flow rate is adjusted with the MANUAL FLOW RATE pot on levels 30; it is controlled by the setting on the manual air regulator on the proportional mastic valve on level 10.

6. Dispense valve opens.

7. The PID AIR VALVE CONTROL CARD: (Level 30)

    a. Receives the REFERENCE SIGNAL from the MANUAL FLOW RATE pot.
    b. Calculates the output value for optimum results.
    c. Outputs a control signal to the PROPORTIONAL AIR VALVE.

8. End of dispense cycle. Release the MANUAL DISPENSE push button.

9. The VOLUME INDICATOR on the door (volume monitor) and the 'LAST DISPENSED VOLUME' on the FCM does not update or display dispensed volume.

10. Ready for new cycle.

B: PRODUCTION MODE - SEQUENCE OF OPERATIONS:

1. At the start of the dispense cycle the robot sends the Control Subsystem two inputs.

    a. OPEN DISPENSE VALVE (start cycle). Can be turned on and off during one dispense cycle.
    b. REMOTE ANALOG INPUT. (Level 30 & Dual 30/30)

2. Dispense valve opens.

3. The FCM: (If present in the system.)

    a. Resets any resettable faults.
    b. Receives the REMOTE ANALOG INPUT.
    c. Applies the global scaling factor.
    d. Sends the composite REFERENCE SIGNAL to the PROPORTIONAL AIR VALVE CONTROL CARD.
    e. During the dispense cycle the FCM monitors, and output faults for:

        1. Counts the pulses from the GEAR MONITOR SENSOR. (Volume Monitoring Option.)
        2. The flow rate, and volume limits. (Volume Monitoring Option)

4. The PROPORTIONAL AIR VALVE CONTROL CARD: (Level 10 and 30)

    a. Receives the composite REFERENCE SIGNAL from the FCM.
    b. Calculates the output value for optimum results.
    c. Outputs a control signal to the PROPORTIONAL AIR VALVE.

5. The dispense valve opens and closes depending on the application, with the OPEN DISPENSE VALVE input.

6. End of dispense cycle. The robot turns off the open valve signal, and at the last dispense position, returns the analog signal to zero volts DC.

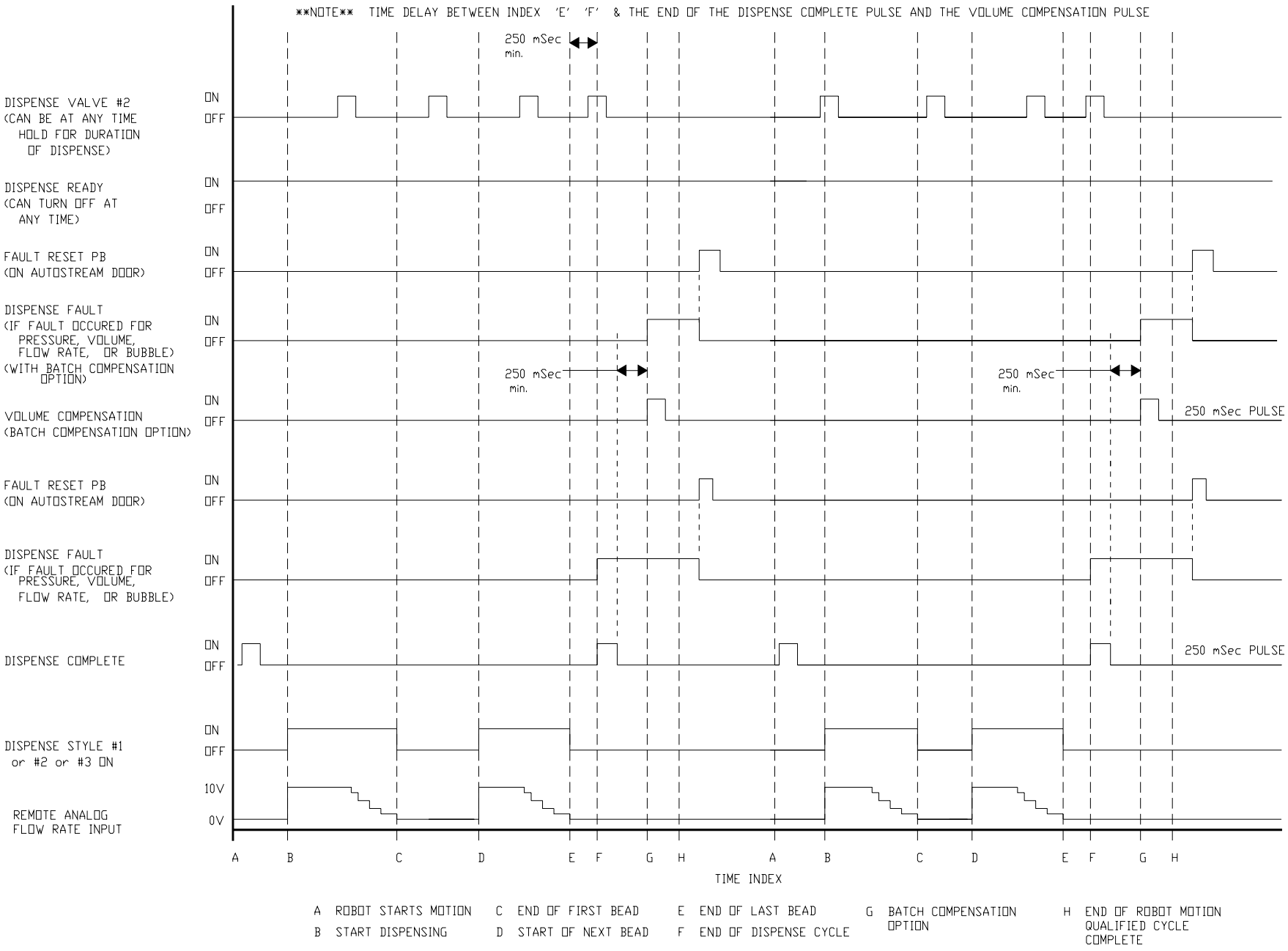
7. The robot turns on the CYCLE COMPLETE signal and then turns the signal off (minimum pulse 250 msec).

8. The VOLUME INDICATOR on the door displays the dispensed volume for the last dispensed job. The volume is also displayed at the FCM LCD, 'LAST DISPENSED VOLUME' and is displayed until a new cycle is started.

9. The FCM: (If present)

    a. Reads the global scaling factor for the next cycle.
    b. Reads the global scaling factor for the next cycle.
    c. Outputs to the robot any fault diagnostics, VOLUME FAULT, FLOW RATE FAULT, LOW PRESSURE, HIGH PRESSURE, SCALING WARNING, DISPENSE FAULT, HIGH VOLUME LIMIT, LOW VOLUME LIMIT. (Outputs depend on the option package in the system.)

10. Ready for new cycle.


NOTE TIME DELAY BETWEEN INDEX 'E' 'F' & THE END OF THE DISPENSE COMPLETE PULSE AND THE VOLUME COMPENSATION PULSE
250 mSec min.
DISPENSE VALVE #2 (CAN BE AT ANY TIME HOLD FOR DURATION OF DISPENSE)
DISPENSE READY (CAN TURN OFF AT ANY TIME)
FAULT RESET PB (ON AUTOSTREAM DOOR)
DISPENSE FAULT (IF FAULT OCCURED FOR PRESSURE, VOLUME, FLOW RATE, OR BUBBLE) (WITH BATCH COMPENSATION OPTION)
250 mSec min.
250 mSec min.
VOLUME COMPENSATION (BATCH COMPENSATION OPTION)
250 mSec PULSE
FAULT RESET PB (ON AUTOSTREAM DOOR)
DISPENSE FAULT (IF FAULT OCCURED FOR PRESSURE, VOLUME, FLOW RATE, OR BUBBLE)
DISPENSE COMPLETE
250 mSec PULSE
DISPENSE STYLE #1 or #2 or #3 ON
REMOTE ANALOG FLOW RATE INPUT
ON
OFF
10V
0V
A B C D E F G H A B C D E F G H
TIME INDEX
A ROBOT STARTS MOTION
B START DISPENSING
C END OF FIRST BEAD
D START OF NEXT BEAD
E END OF LAST BEAD
F END OF DISPENSE CYCLE
G BATCH COMPENSATION OPTION
H END OF ROBOT MOTION QUALIFIED CYCLE COMPLETE

C. AUTOMATIC WITH MANUAL FLOW RATE MODE - SEQUENCE OF OPERATION:

1. At the start of the dispense cycle the robot sends the Control Subsystem two inputs, but only one is used by the Control Subsystem.

   a. OPEN DISPENSE VALVE (start cycle). Can be turned on and off during one dispense cycle.
   b. REMOTE ANALOG INPUT. Signal not used.

2. Dispense valve opens.

3. The FCM:

   a. Resets any resettable faults.

   b. During the dispense cycle the FCM monitors, and outputs faults for:

      1. The dispense valve pressure limits.
      2. The flow rate limits.

4. The PROPORTIONAL AIR VALVE CONTROL CARD:

   a. Receives the REFERENCE SIGNAL from the MANUAL FLOW RATE potentiometer.
   b. Calculates the output value for optimum results.
   c. Outputs a control signal to the PROPORTIONAL AIR VALVE.

5. The dispense valve opens and closes depending on the application, with the OPEN DISPENSE VALVE input.

6. End of dispense cycle. The robot turns off the open valve signal and, at the last dispense position, returns the analog signal to zero volts DC.

7. The robot turns on the CYCLE COMPLETE signal and then turns the signal off (minimum pulse 250 msec).

8. The VOLUME INDICATOR on the door displays the dispensed volume for the last dispensed job. The volume is also displayed at the FCM LCD, 'LAST DISPENSED VOLUME' and is displayed until a new cycle is started.

9. The FCM: (If present)

   a. Outputs to the robot any fault diagnostics, VOLUME FAULT, FLOW RATE FAULT, DISPENSE FAULT, HIGH VOLUME LIMIT, LOW VOLUME LIMIT. (Outputs depend on the option package in the system.)

10. Ready for new cycle.

D. BY-PASS MODE - SEQUENCE OF OPERATION: (Level 10 and 30)

This mode is used when the FCM is diagnosed to have failed and the system no longer responds as expected.
Move the DIP switch (blue) on the Motherboard to the off position.

1. The robot sends the Proportional Valve System two inputs.

   a. OPEN DISPENSE VALVE (start cycle).
   b. REMOTE ANALOG INPUT.

2. Dispense valve opens.

3. The PROPORTIONAL AIR VALVE CONTROL CARD:

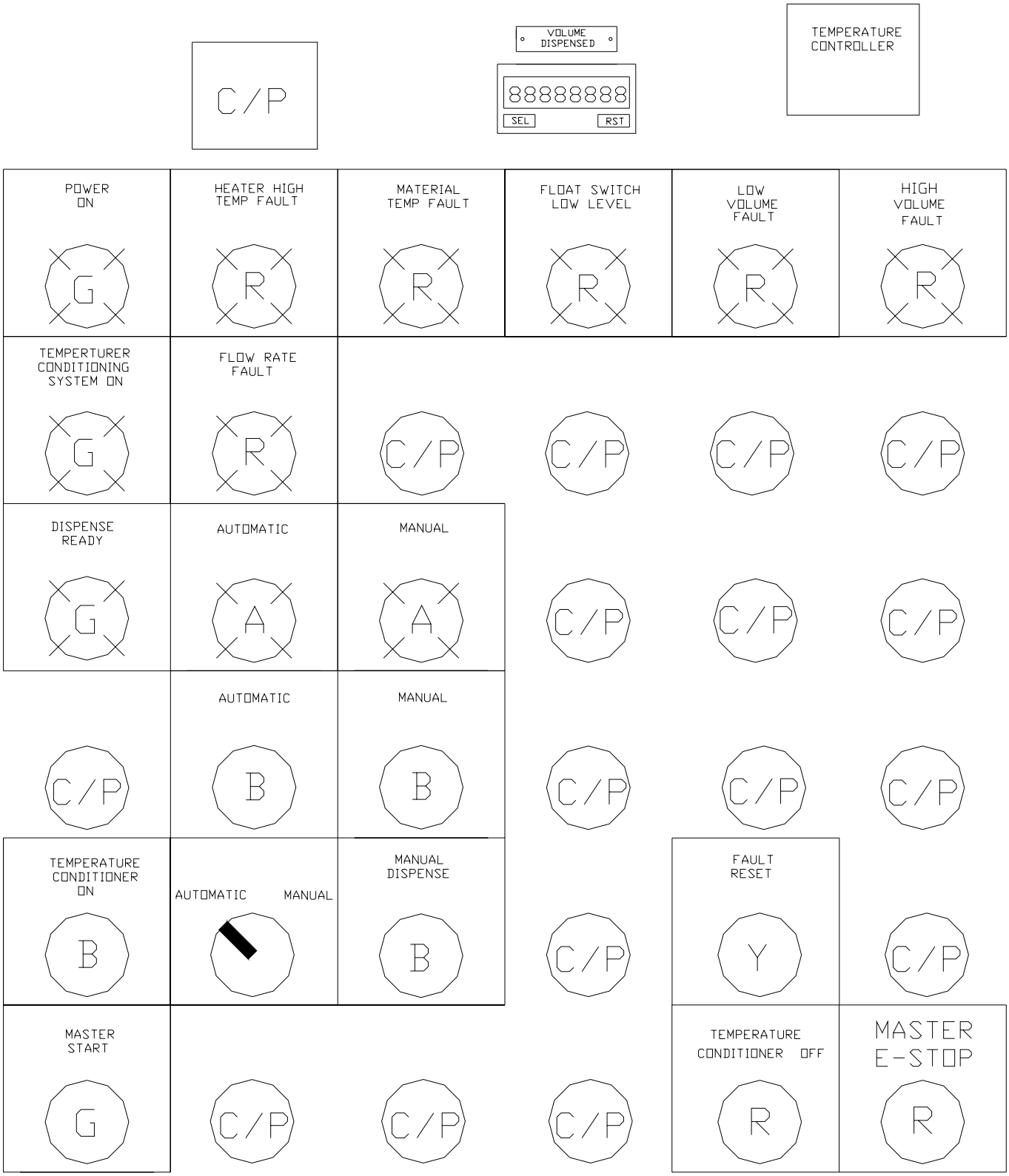
   a. Receives the ANALOG INPUT SIGNAL from the robot.
   b. Calculates the output value for optimum results.
   c. Outputs a control signal to the PROPORTIONAL AIR VALVE.
   d. The Global Scaling and Offset pots do not work.

4. End of dispense cycle. The robot turns off the two inputs.

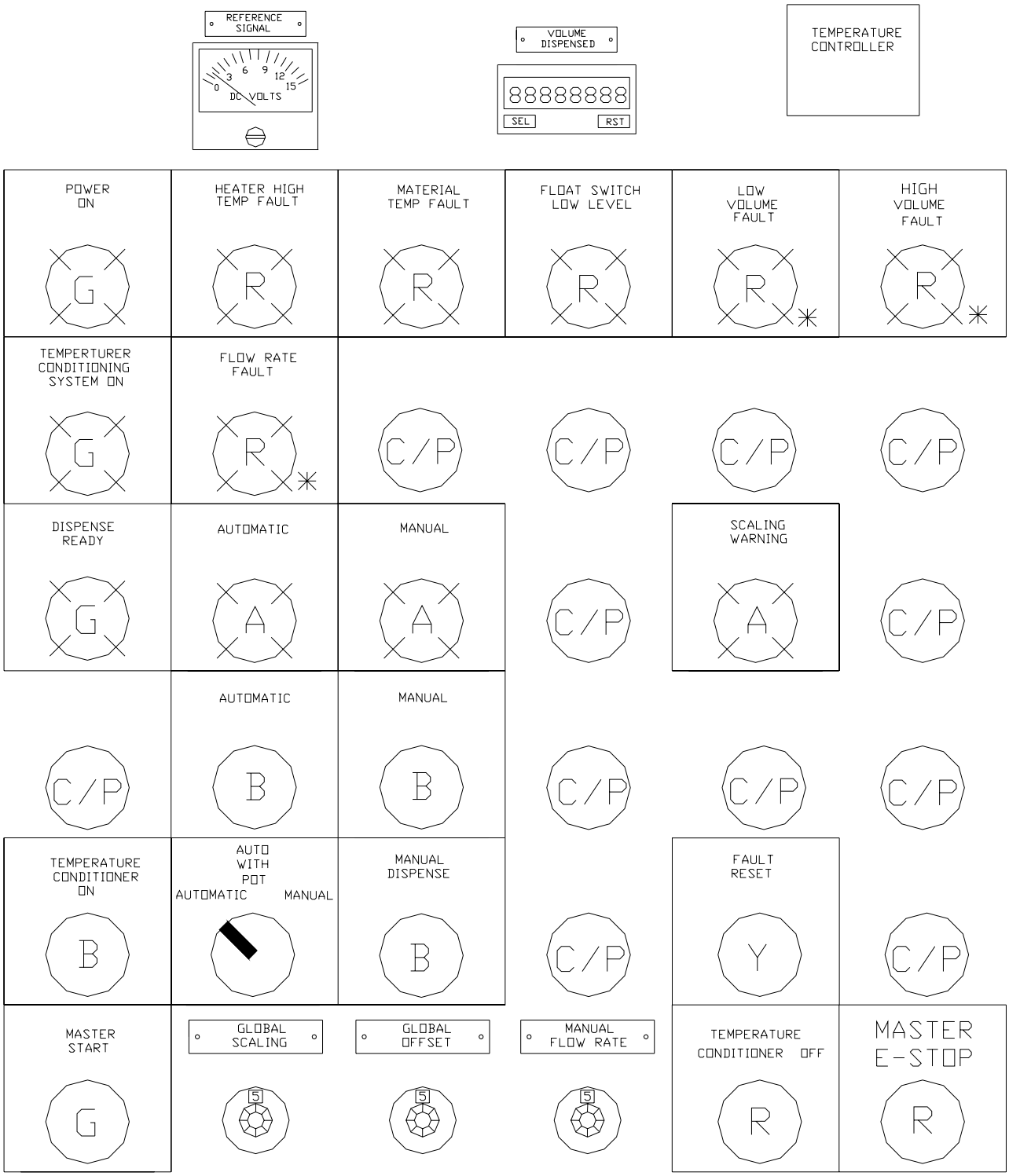
5. At the end of the robot cycle, the robot sends a CYCLE COMPLETE input.
   The FMC is no longer in operation DISPENSE FAULTS do not work in this mode.

6. Ready for new cycle

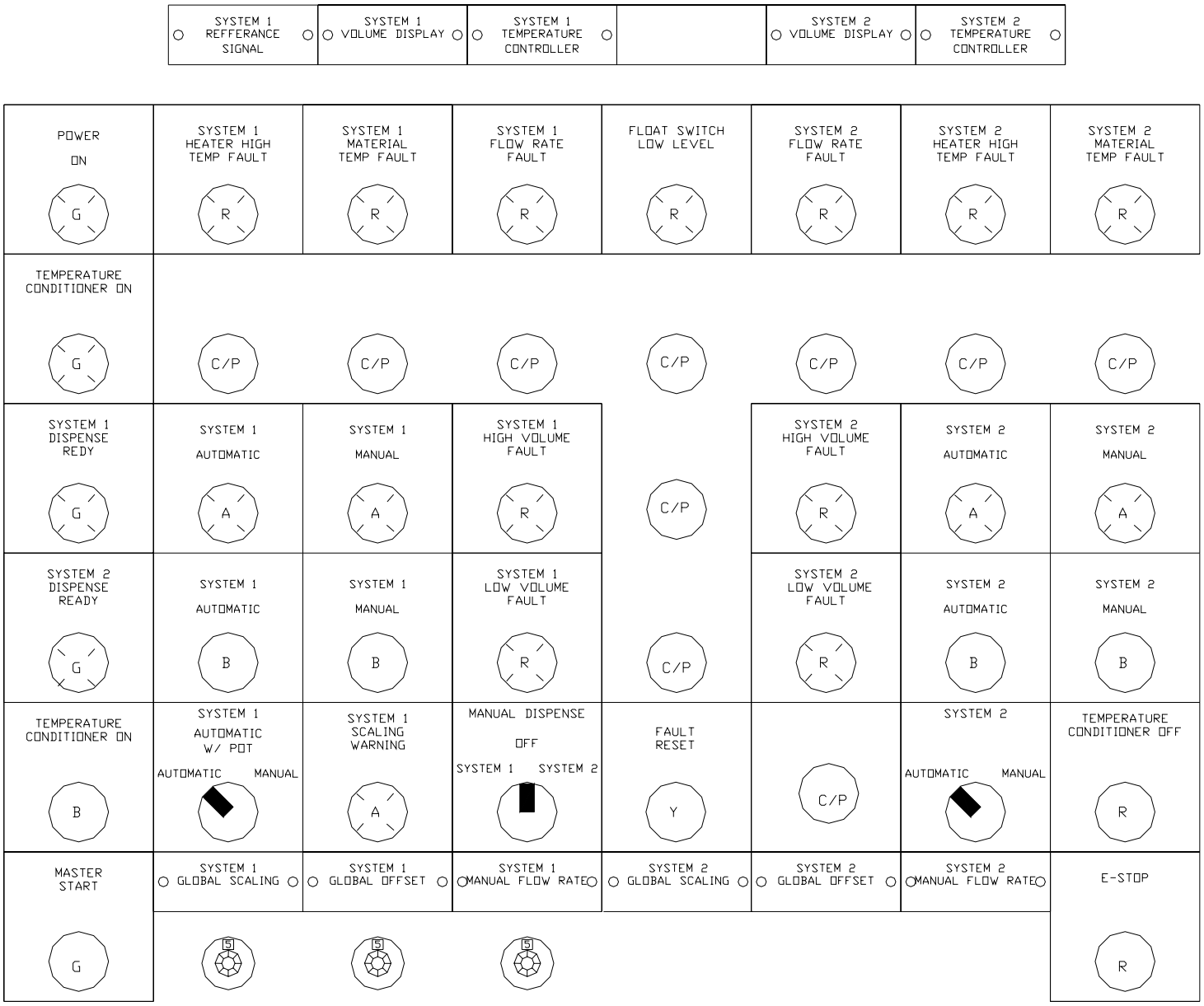
PANEL LAYOUT DRAWINGS:



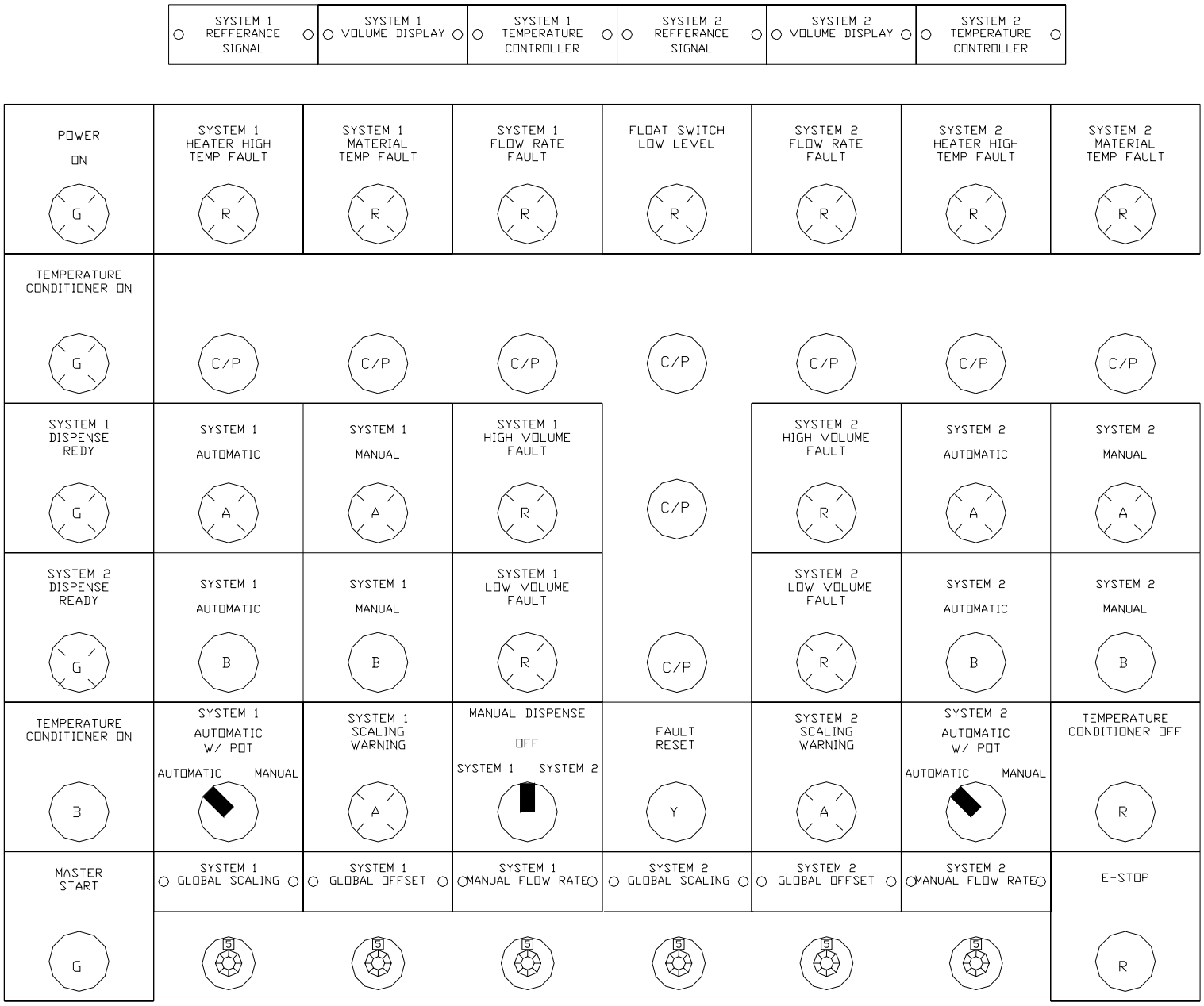
Level 10 Door Layout Drawing



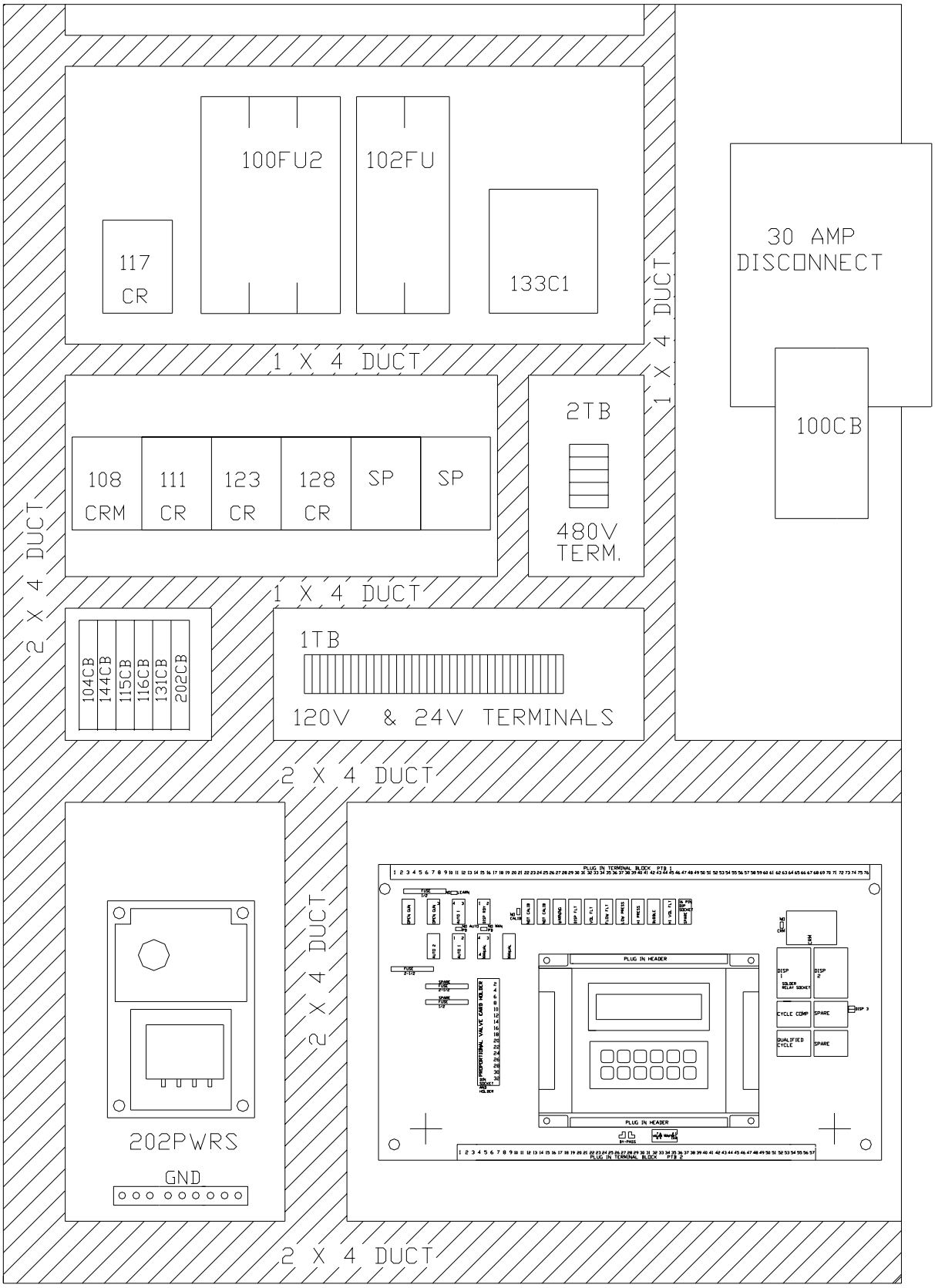
Level 30 Door Layout Drawing



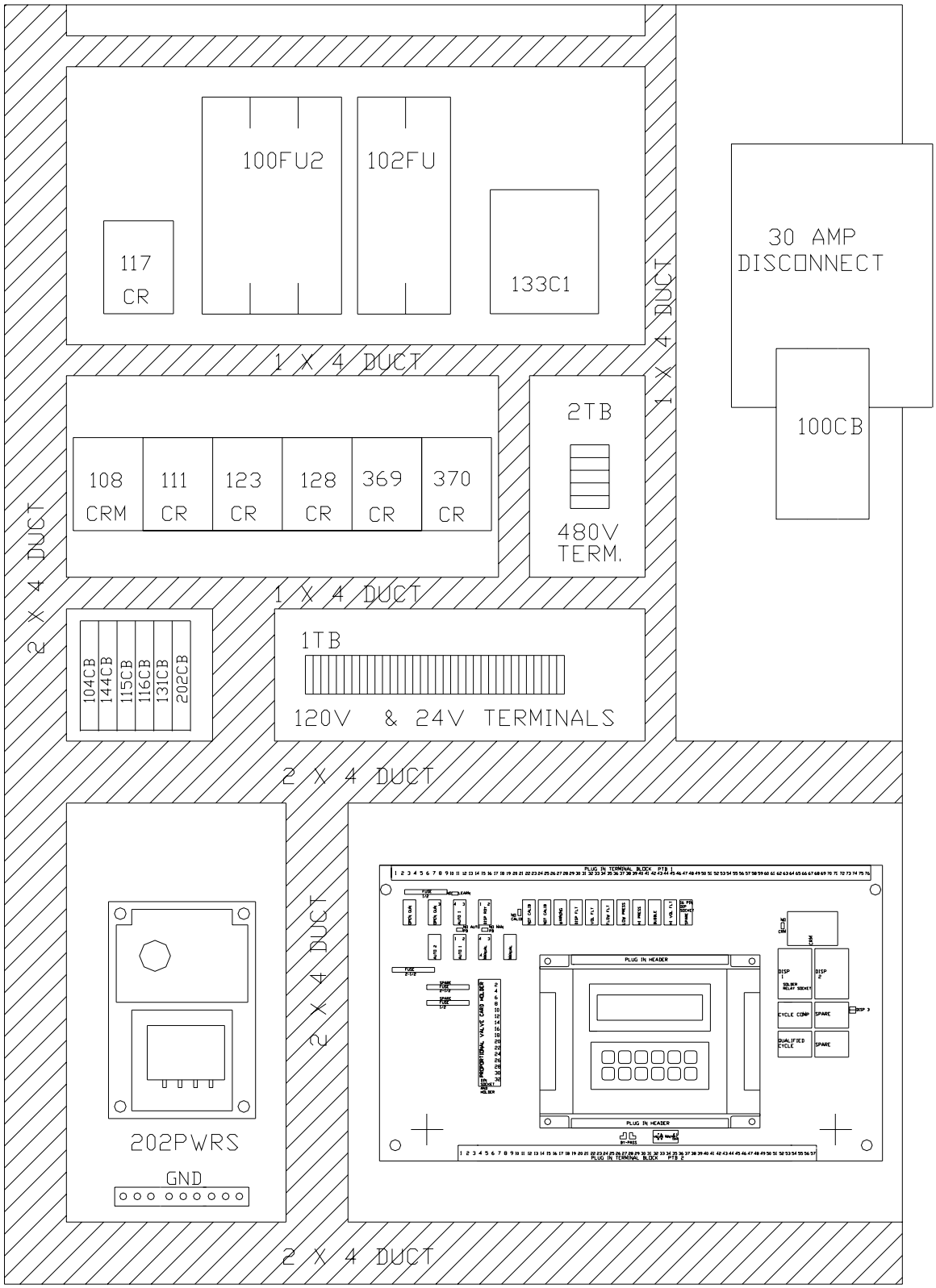
Level 30/10 Door layout drawing



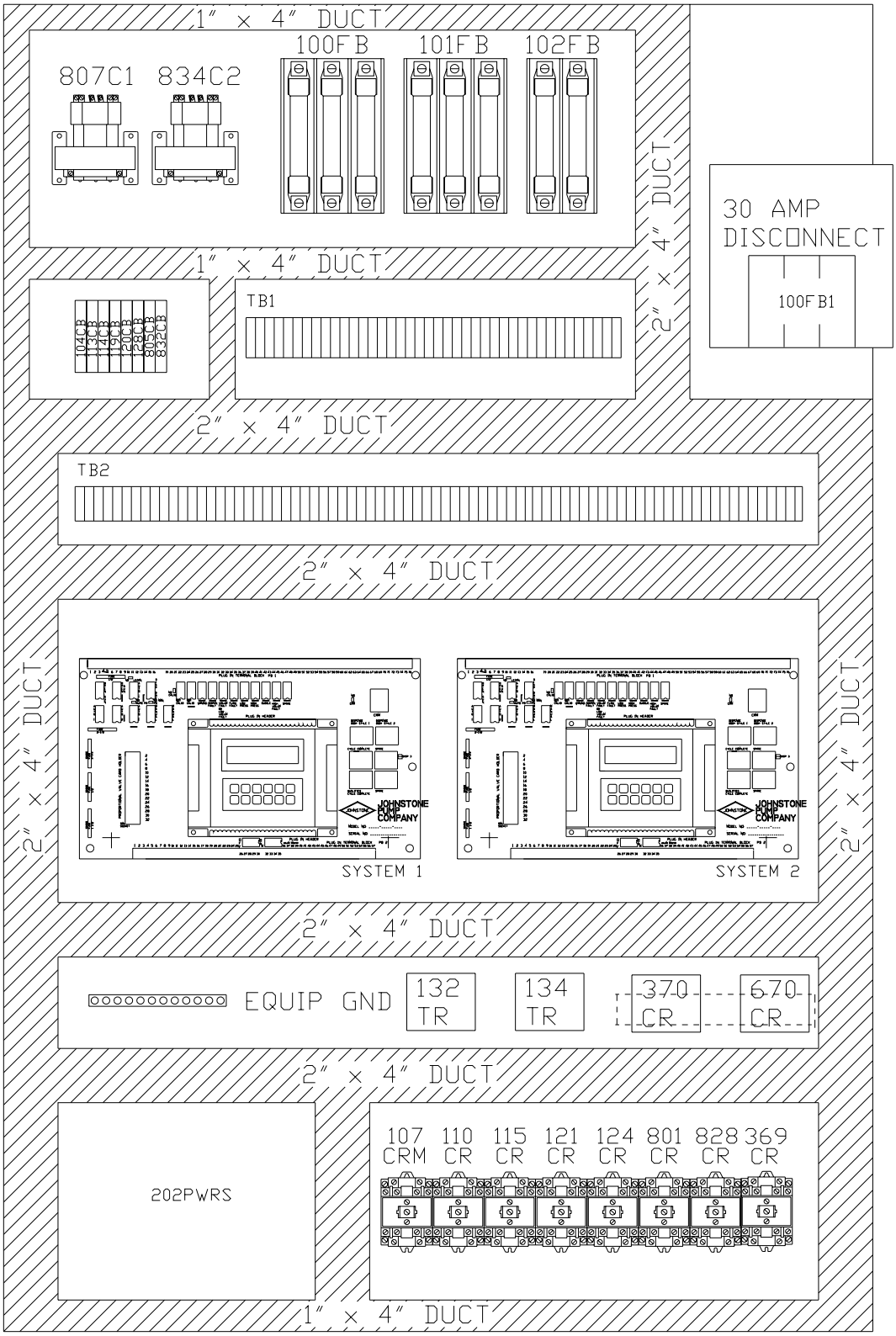
Level 30/30 Door Layout Drawing



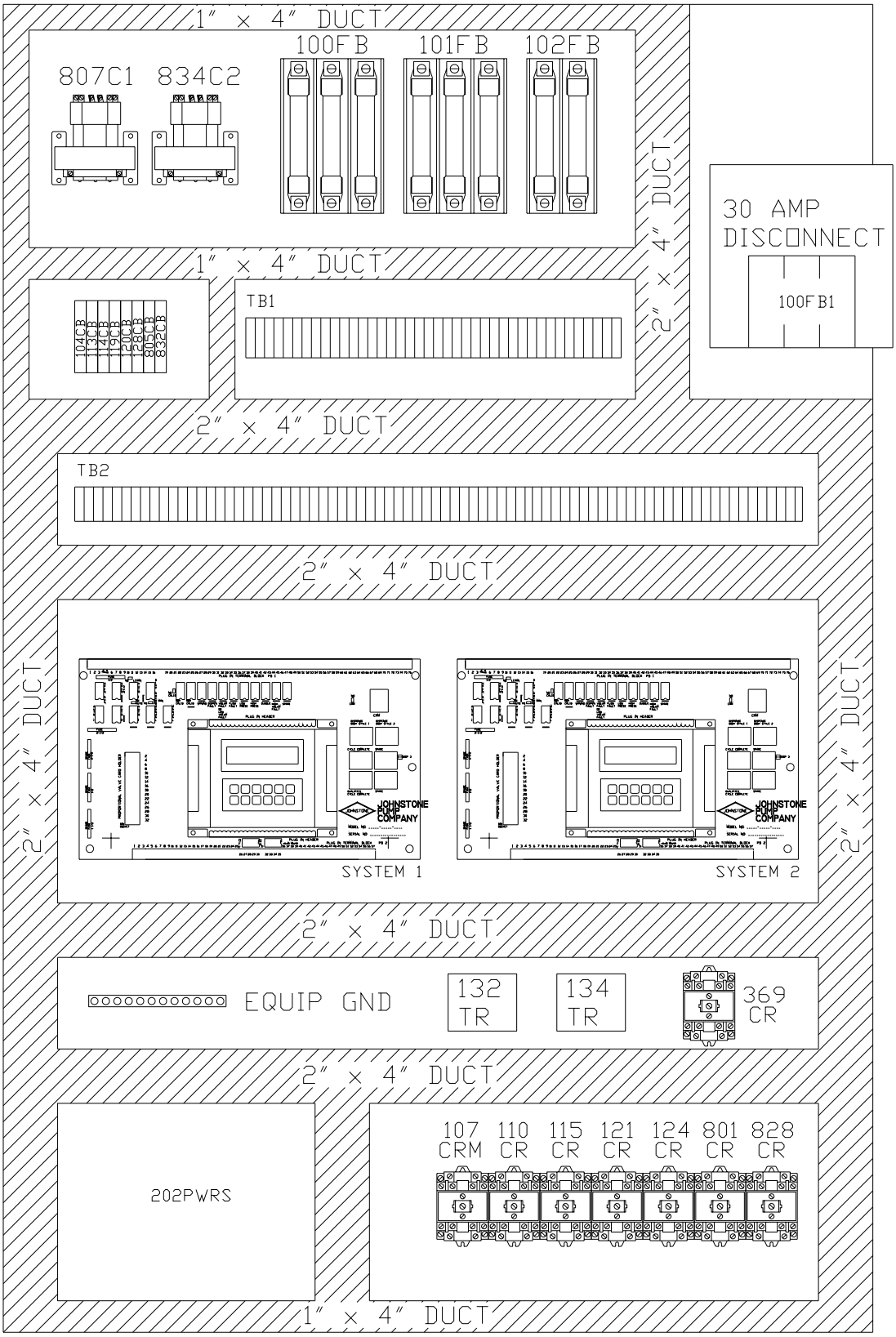
Level 10 Panel Layout Drawing



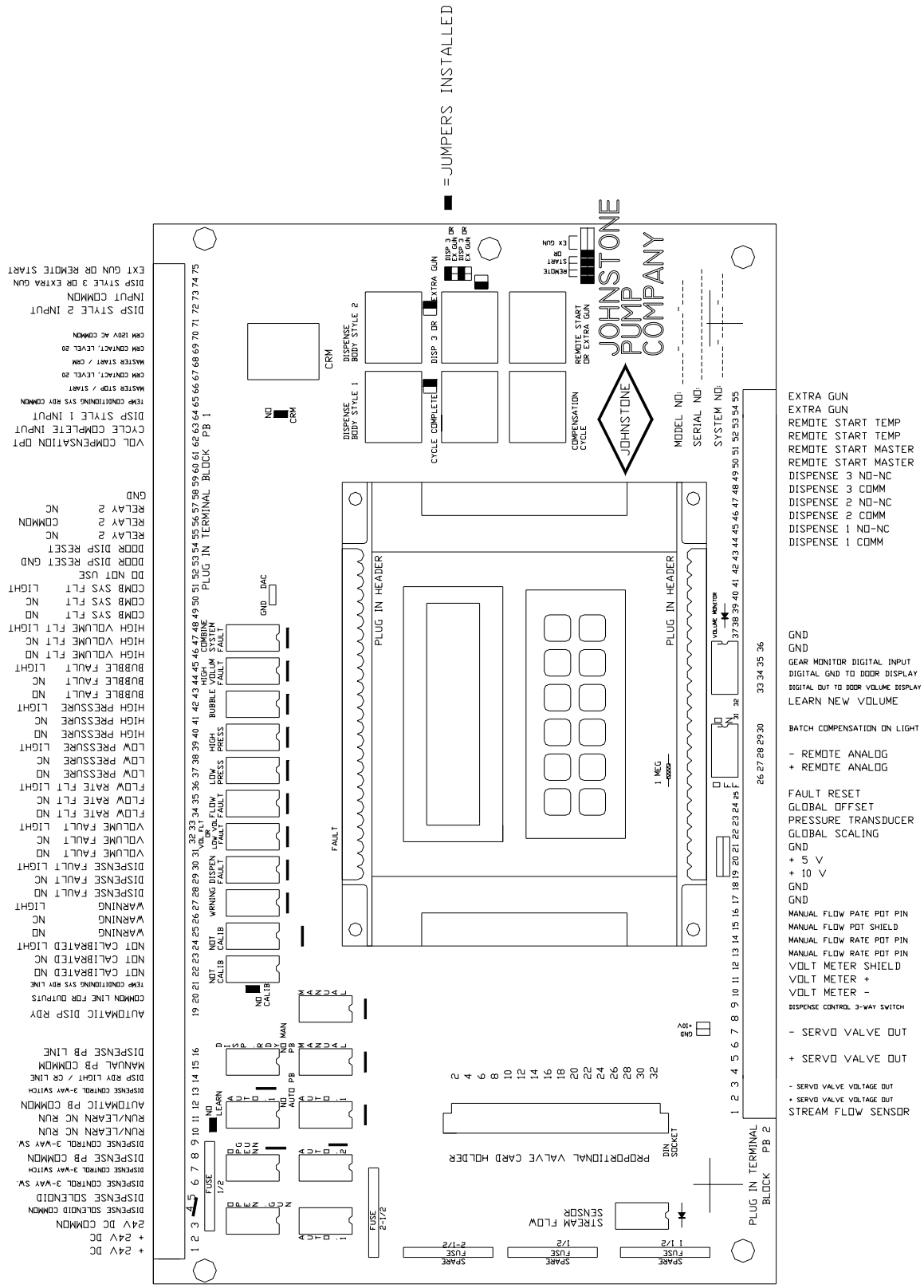
Panel Layout Level 30 Drawing



Dual Panel Layout Level 30/10 Drawing



Dual Panel Layout Level 30/30 Drawing



Motherboard Layout Drawing

SYSTEM SET-UP:

PURGE MATERIAL SYSTEM:

1. Install fluid delivery system components per system layout. Do not connect the material hose to the dispense system now.

2. Install electrical interface between system or robot controller and the Autostream control panel.

3. Connect cables from the J-Box to the proportional valve, dispense solenoid, RTD, flow sensor, and control panel, as required.

4. Install electrical power to the Autostream panel.

5. Install the proportional air valve to the air inlet on the proportional mastic valve.

6. Connect plant air (1/2in min) to the air inlet of the proportional mastic valve and the dispense solenoid.

7. Turn on the supply pumps.

8. Purge material through the Header. Turn off the pumps.

9. Install the material Hose to the dispense system inlet and turn on the pumps.

10. Start the Autostream panel and put into a manual mode. Depress the Manual Dispense Button and turn the manual flow rate pot to 10.0V.

11. Purge five gallons of material from the dispense valve.

12. Release the manual dispense button.

13. Material supply is purged.

14. Start the water system if available. (see page 5-2).

TEMPERATURE CONDITIONING SYSTEM SEQUENCE OF OPERATION

1. **DESCRIPTION:**

   a. The water system is a closed loop system that uses a reservoir to store extra water. The system can be put anywhere in the plant and does not require a separate water line piped to it.
   b. The system is used to maintain the material temperature of a dispense system. Water is constantly flowing thru the system using two circulation pumps. Water flows thru the dispense components, dispense gun, conditioned hoses, mastic regulator and heat exchangers.
   c. The water may be heated using a electrical heating element or chilled using a chiller. The chiller is just a cold storage unit. It maintains a temperature between 52 and 56 F. The water is stored in copper coils. The chiller has its own control thermostat and it does not matter if water is flowing thru it. It just maintains its own temperature.
   d. A system temperature controller is used to maintain the material temperature. A RTD (Resistive Thermal Device) is located in the dispense gun. The RTD is plumbed into a material port located as close to the dispense nozzle as possible. The sensor monitors the material temperature as close to the nozzle as possible.
      i. If the temperature is too hot a solenoid valve is opened allowing water to flow thru the chiller.
      ii. If the temperature is too cold a heater is energized, heating the water as it passes thru its coils.
   e. The water is routed so that it passes thru the dispense gun first then thru the rest of the dispense equipment such as, conditioned hoses, mastic regulator and heat exchangers. The water is plumbed this way so that by the time the material reaches the nozzle it is at a regulated temperature.

2. **WATER REQUIREMENTS:**

   a. The water must be distilled. **DO NOT ADD GLYCOL**.
   b. Nalco 39M Corrosion Inhibitor must be added to the system. The required amount is 2 ounces per gallon. This is just a rust inhibitor it does not prevent algae. An algaecide must be added to the system to prevent algae. Johnstone is not a licensed biocide dealer.

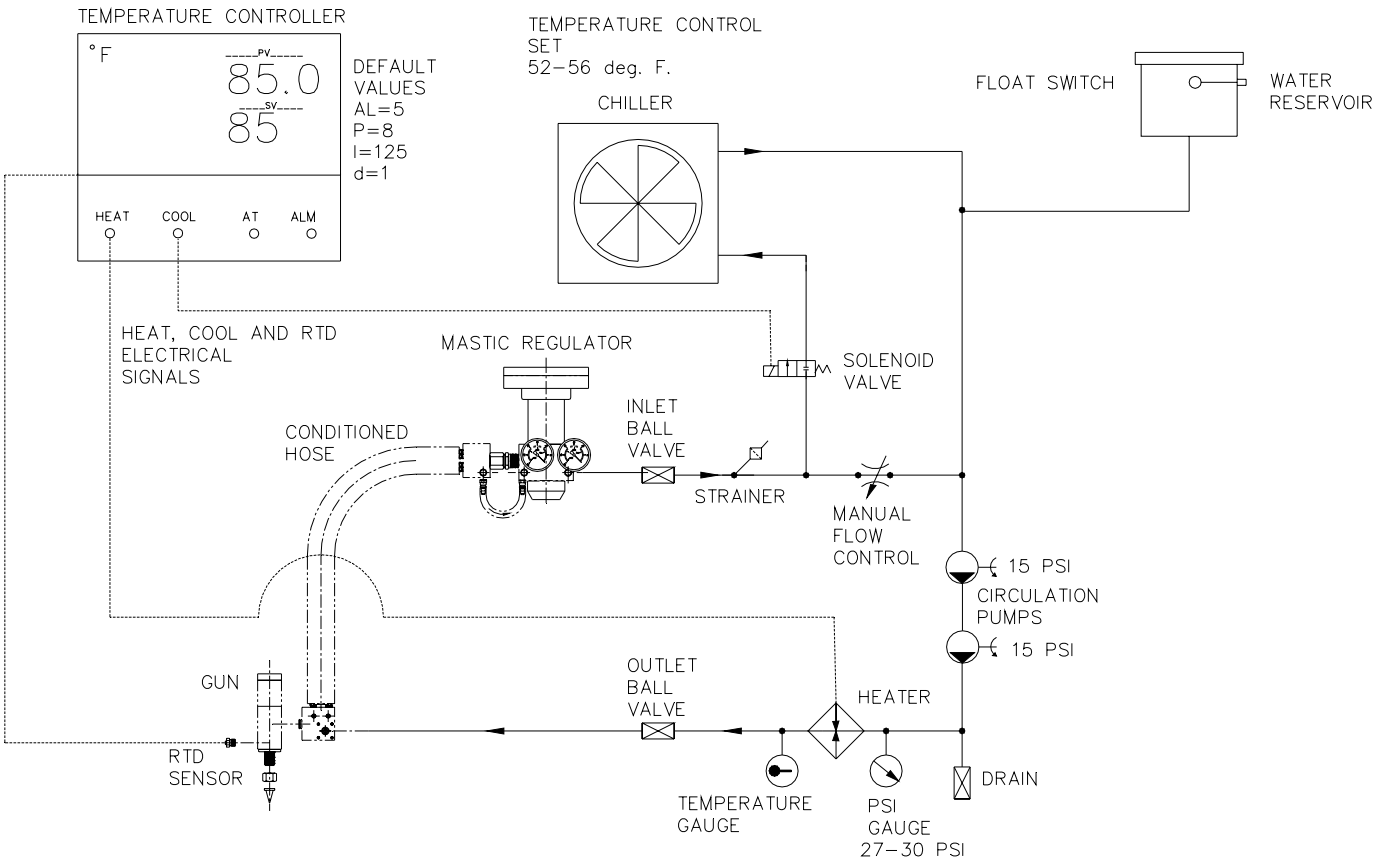
3. **SEQUENCE OF OPERATION:**

   a. The return water passes thru the return ball valve and into the water strainer. The water strainer protects the solenoid valve and circulation pumps from foreign material. After the strainer the water can go in a parallel path.
   b. The normal path is thru the Manual Flow Control to the Circulation pumps. The flow control is adjusted so that there is 1/2 GPM flow restriction across it. The other path is only flowing when the system needs to be chilled. Water passes thru the solenoid valve (energized by the Cool output of the temperature controller) and thru the chiller. After the chiller the water will join with the output side of the Manual Flow Control and the parallel path will be complete. In doing this only 1/2 GPM of water will flow thru the chiller and the rest of the water will still flow thru the flow control. The cold water will mix with the water going thru the flow control. This prevents the system from sending a cold shot of water to the dispense gun.
   c. The water now enters the Circulation Pumps. There are two pumps in the system. Each pump puts out 15 PSI and they are in series. When the system is running the water pressure after the pumps should read between 27 - 30 PSI.
   d. The water will now flow into a vessel. The Heater Elements are located inside of the Vessel. When the Temperature Controller energizes the Heat output the elements will start heating. Water passing across the heater elements will prevent the elements from overheating. Incase a ball valve is closed or there is a restriction in the system a Over Temperature Switch protects the heater. The Over-Temperature Switch is set 10 higher than the normal running material temperature. If the water temperature inside the vessel goes over the temperature setting the switch will open and prevent the heater from operating.

e. After the Heater water goes thru a outlet ball valve and then to the dispense gun, conditioned hose, mastic regulator and any other dispense equipment and finally completes the path to the inlet ball valve.

f. A Water Reservoir is installed in the system between the chiller and the circulation pumps. There is NO check valve in the feed line. If there is a small amount of air in the system, air will automatically purge out of the reservoir. The reservoir is equipped with a Float Switch. If the water level drops the following will occur. The circulation pumps will shut down, the Heater will shut down, the temperature controller will lose power and the dispense ready signal to the robot will go low.

g. If the circulation pumps are cavitated (low or no pressure), stop the circulation pumps by turning the panel on and off. Small amounts of air will automatically purge out of the system.



4. NORMAL AIR BLEEDING PROCEDURE:

a. REMOVE the FUSE or TRIP the CIRCUIT BREAKER that operates the CHILLER. If a small amount of water is inside of the chiller and it is turned on it can freeze the water preventing water flow thru it.

i. Adjust the temperature controller set point to 60 degrees.

b. Fill the water reservoir with clean distilled water.

c. Start the system by depressing the Master Start and Temperature Conditioning On button.

d. Wait 30 seconds for the system to stabilize itself.

i. Push down the float located in the reservoir.

1. The Air that is trapped in the pumps will bubble out of the reservoir feed tubing.

ii. When the Air bubbles have stopped release the Float.

1. The pumps will start and water in the system should start to flow.

iii. This procedure in step "e" normally will be repeated until Air stops bubbling in the Reservoir.

e. All of the air is out of the system when the Water pressure is reading 27 to 30 PSI.

i. The System will bleed small amounts of air automatically.

NOTE: Under certain conditions where the water hose routing is above the temperature-conditioning unit. Air can be trapped making it very difficult to get water flowing in the system. The following procedure should be preformed.

5. CONTAMINATED WATER AND AIR PURGE PROCEDURE:

a. Turn off the temperature conditioning system.

b. Remove the Chiller Fuse or trip the Circuit Breaker.

c. Adjust the temperature controller set point to 60 degrees.

d. Close the Return ball valve located at the Temperature condition unit.

e. Remove the return hose.

i. To Purge Air from the system put the return hose in the reservoir.

ii. To purge contaminated water from the system, put the hose in a 5-gallon pail (example).

f. Turn on the system. The water reservoir will need to be refilled during this step.

i. Continue until the water starts flowing constantly and the air is out of the lines.

ii. Continue until the water starts running clear.

A. If the water system still looks dirty it will need to be chemically cleaned.

B. Finish the Contaminated water and air purge procedure. Then add 1 ounce of TRISODIUM PHOSPHATE to the system. (Nalco brand of Trisodium Phosphate is called NALPREP III).

C. Let the system run for four hour and repeat the Contaminated water and air purge procedure.

g. Turn off the temperature conditioning system.

h. Attach the return hose to the temperature unit (return ball valve).

i. Repeat (section 4) Normal Air Bleeding Procedure until all of the air is out of the system.

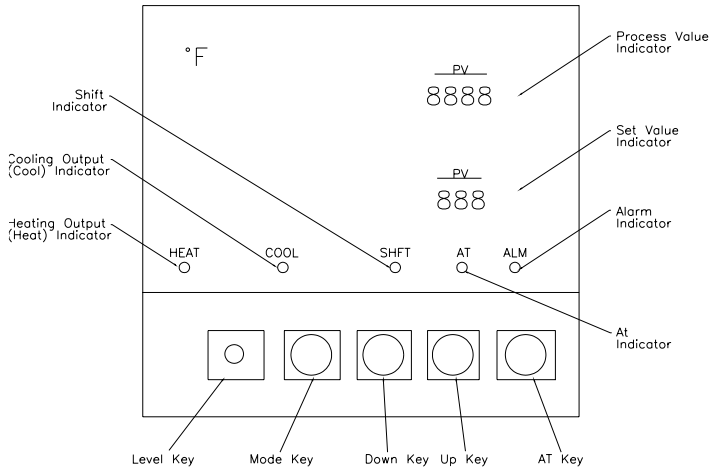
j. Install the chiller fuse or turn on the circuit breaker and reset the temperature controller set point value.
NOTE: The system must be completely flushed of Trisodium Phosphate before adding any water treatment/Conditioner.

k. Add Water Treatment/Conditioner to the system in the proper concentration.

Variables on the Temperature Controller: (Temperature Conditioning Option)

Level Key:

Holding down the level key for 2 sec. or longer can change the indication levels. Indication in each level are as follows.



Mode Key:

Used to change the display mode within display levels 0, 1, or 2.

Down Key: Decrements the set numeric value in display levels 0 an 1. Each time this key is pressed, the set value decreases by 1. When the key is held down for 1 second or more, the set value decreases by 50 units in 1 second. It no longer decreases if the lower limit value has been reached. If an attempt is made to decrement the set value below its lower limit value, the set value indicator flashes.

Up Key: Increments the set numeric value in display levels 0 and 1. Each time this key is pressed, the set value increases by 1. When the key is held down for 1 second or more, the set value increases by 50 units in 1 second. It no longer increased if the upper limit value has been reached. If an attempt is made to increment the set value above its upper limit value, the set value indicator flashes.

Level 0	Level 1	Level 2
Process Value	Limit of temperatures	Output value
Control set temperature	Dead Band	Sensor type
Alarm set value	Cooling coefficient	Alarm mode
PID constants	Control period	
	Hysteresis	
	Shift set value	

The following variables are preset, at Johnstone Pump CO., before system shipment.

Level 0:

Alarm (AL)	(default =5)	Number of degrees +/- deviation allowed before "MATERIAL TEMP FAULT" light comes on.
Proportional band (P)	(default=8)	Automatically adjusted during Auto-Tune.
Reset time (I)	(default=125)	Automatically adjusted during Auto-Tune.
Rate time (d)	(always=1)	Automatically adjusted during Auto-Tune.

Level 1:

Set limit low (SL-L)	(default = 60)	The range for platinum RTD's are -99.9 to 800EF. The temperature range can be narrowed for special applications, i.e. 50 to 100EF. To do this, set the lower limit to 60 and the upper limit to 100.
Set limit high (SL-H)	(default=100)	
Dead Band (C-db)	(0)	Overlap or deadband for the cooling output.
Cooling Coef (C-SC)	(1.0)	Proportional band for the cooling output.
Control period heat (CP)	(20)	Seconds.
Control period cool (C-CP)	(20)	Seconds.
Shift set value (SP-S)	(0)	Shift input, not used.

Level 2:

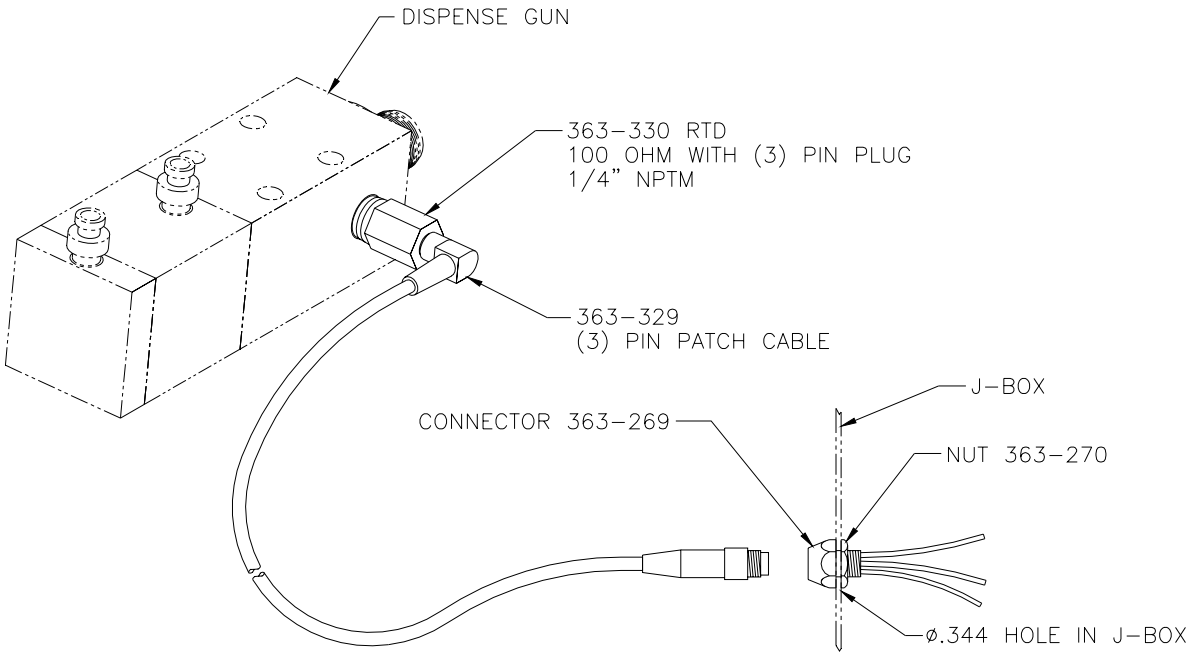
Output monitor	(0.0)	Displays the status of the output 0 to 100 %.
Sensor type(Cn-T)	(Pt)	Displays the sensor type. i.e. Platinum RTD.
Alarm mode(AL)	( ]--[ )	Alarm mode set to upper and lower limits.

SETTING THE KEY LOCK OUT SWITCH:

To protect the controller against unauthorized setting changes, the key lockout switch (SW101) is set to the ON position. The level key, up, down and auto-tune keys cannot be operated. In effect, the temperature controller is write protected and only the set values (i.e. alarm values) can be read.

The lock-out key switch is located inside the temperature controller case on the circuit board.

Resistive Temperature Detector (RTD) 363-330



CABLE COLOR CODE		
NEW COLOR:	REPLACES:	WIRE #:
BROWN	CLEAR	1350
BLUE	RED	1360
BLACK	BLACK	1370

RTD and Cable Assembly # 110-379

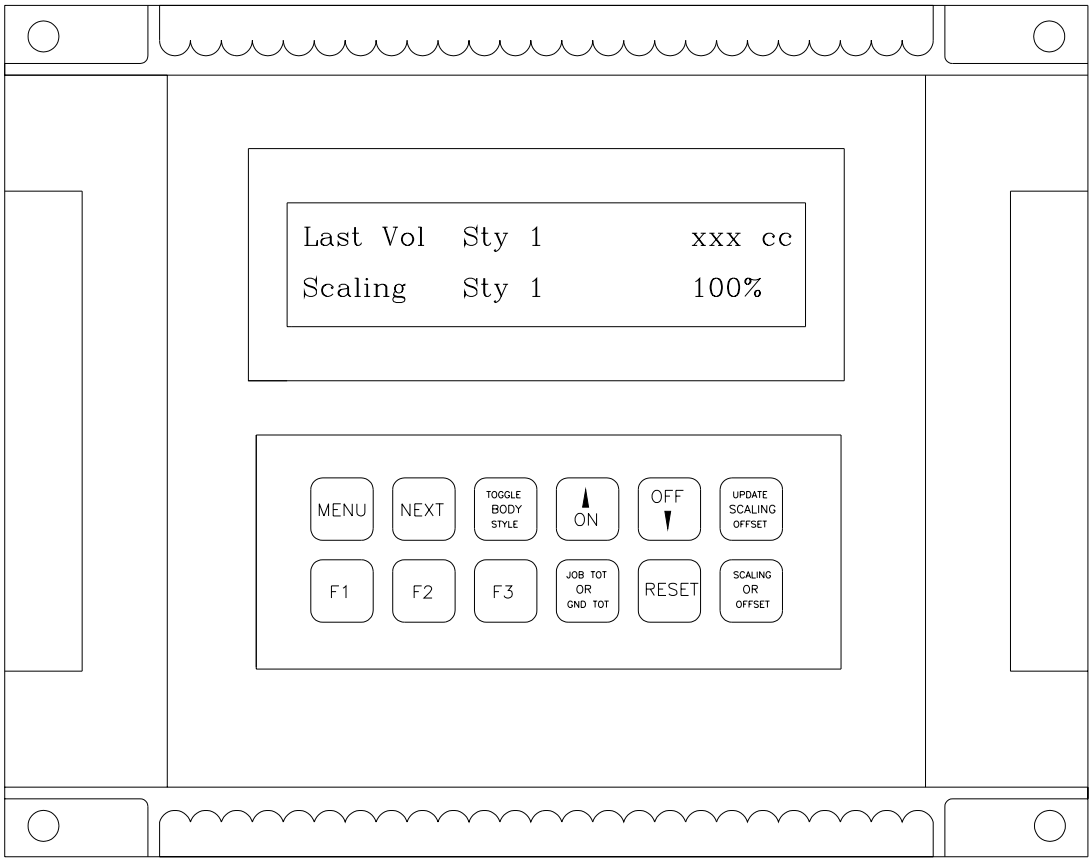
Testing the RTD:

An Ohmmeter (Resistance Meter) from wire 1360 to 1370 should read between 0 and 10 Ohms.

An Ohmmeter from wire 1350 to 1360 should read between 100 and 200 Ohms.

If either of these readings are off, the RTD **must** be replaced.

SETTING THE VARIABLES ON THE FLOW CONTROL MICRO-COMPUTER
VERSION 3.35



1. PROGRAMMABLE OPTIONS AVAILABLE ON THE FCM.

1. Three different body styles available.
2. Global scaling and global offset variables for each body style. (Option)
3. High and low pressure settings. (Option)
4. Adjustable tooth volumes. (Option)
5. High and low volume settings. (Option)
6. High and low flow rate settings. (Option)
7. Adjustable Air bubble size Detection. (Option)
8. Choice of pressure transducer size (Option)

2. **SETTING THE SYSTEM VARIABLES:**

1. The FCM display must be in the cycle complete mode.
    1. Depress the fault-reset button on the door panel.
        (1) This will automatically put the FCM in the cycle complete mode.

2. Depress the MENU button on the FCM keypad.
    1. The FCM will display the options available one at a time by depressing the NEXT button. If the NEXT button is not depressed the FCM will automatically scroll.
        2. Use the appropriate function buttons, up arrow, down arrow, on, off, F1, F2, F3 to obtain the desired value displayed.

3. FLOW CONTROL MICRO-COMPUTER OPTIONS DISPLAYED:

1. "How many body styles do you want?"
    1. Use the up arrow button to increase the body styles up to three.
    2. Use the down arrow button to decrease the body style down to one.
        (1) To utilize the different body styles they need to be wired (see electrical drawings). There are separate inputs for each body style.

2. "x.xxx(value) tooth volume".
    1. Use the up arrow button to increase the value.
    2. Use the down arrow button to decrease the value.
        (1) The F1 button is a .1 multiplier
        (2) The F2 button is a .001 multiplier
        (3) The F3 button is a .0001 multiplier
            (1) 362-104A value=2.0750
            (2) 362-256 value = .2860 default

3. "xxx (value) precharge"
    1. Use the up or down arrow to change the value
        (1) The default value is always .0 (option not being used).

4. "xxxx (value) transducer size".
    1. Use the up or down arrow to change the value.
        (1) The choices are 1000, 2000, 3000, 4000 and 5000 PSI.

5. "Latch pressure fault".
    1. Use the up or down arrow button for yes or no.

6. "xxxx (value) Low Pressure Style #1".
    1. Use the up or down arrow buttons to increase or decrease the value.
        (1) Value can be set from 0 to 9999 PSI.

7. "xxxx (value) High Pressure Style #1".
    1. Use the up or down arrow buttons to increase or decrease the value.
        (1) Value can be set from 0 to 9999 PSI

8. "xxx (value) Bubble Size Style #1".
    1. Use the up or down arrow buttons to increase or decrease the value.
        (1) The FCM will repeat the Low, High and Bubble PSI for style #2 then repeat for Style #3.
        (2) Value can be set from 0 to 400 PSI.

9. "Do you want Flow rate Faults".
    1. Use the up or down arrow buttons for yes or no.

10. "Do you want to Latch flow rate faults".
    1. Use the up or down arrow buttons for yes on no.

11. "xxx (value) cc/s Low flow rate limit".
    1. Use the up or down arrow buttons to increase or decrease the value.

12. "xxx (value) cc/s High flow rate limit".
    1. Use the up or down arrow buttons to increase or decrease the value.
        (1) The FCM will repeat the Low and High flow rates for style #2 then repeat for Style #3.

13. "xxx (value) cc Low volume limit"
    1. Use the up or down arrow buttons to increase or decrease the value.

14. "xxx (value) cc High volume limit"
    1. Use the up or down arrow buttons to increase or decrease the value.
        (1) The FCM will repeat the Low and High volume faults for style #2 then repeat for Style #3

15. "Want to test I/O?"
    1. Use the up arrow for yes and the down arrow for no.

16. Test Analog inputs.
    1. Use the up arrow for yes and the down arrow for no.
    2. Use the arrow buttons to raise or lower the Input numbers.
        (1) Input #1 = Global Scaling
        (2) Input #2 = Pressure transducer
        (3) Input #3 = Global Offset
        (4) Input #4 = Fault Reset (Normally 10 V)
        (5) Input #5 = By-Pass on- off switch (Normally 10 v)
        (6) Input #6 = Remote analog signal from the robot.
    3. Depress the NEXT button to get out of the Analog Input menu.

17. Test Digital Inputs.
    1. Use the up arrow for yes and the down arrow for no.
    2. Use the arrow buttons to raise or lower the Input numbers.
        (1) Input #1 = Dispense Valve ON, Body style #1
        (2) Input #2 = Qualified Cycle complete
        (3) Input #3 = Run/ Learn selector switch
        (4) Input #4 = Cycle Complete
        (5) Input #5 = Dispense Valve ON, Body style #2
        (6) Input #6 = Dispense Valve ON, Body Style #3
        (7) Input #7 = Flow rate sensor input
    3. Depress the NEXT button to get out of the Digital Input Menu.

18. Test Digital Outputs.
    1. Use the F1 button to raise the output channel.
    2. Use the F2 button to lower the output channel.
    3. Use the on button to turn the output on and the off button to turn the output off.
        (1) Output #1 = Not Calibrated light
        (2) Output #2 = Scaling
        (3) Output #3 = Dispense Fault
        (4) Output #4 = Low Volume Fault
        (5) Output #5 = Flow Rate Fault
        (6) Output #6 = Low Pressure Fault
        (7) Output #7 = High pressure Fault
        (8) Output #8 = Bubble Fault
        (9) Output #9 = High Volume Fault
        (10) Output #10 = System Fault
        (11) Output #11 = Door Volume indicator reset
    4. Depress the NEXT button to get out of the Digital Output Menu.

19. Test Analog Output.
    1. Not used.
    2. Depress the NEXT button to get out of the Analog Output Menu.

4. ADJUSTING THE MANUAL FLOW POTENTIOMETER:

1. The manual flow pot only operates in the Auto with Pot or Manual position on the selector switch.

2. The dial setting on the potentiometer range from 0 to 10.
    1. 0 position on the dial = 0v and = 0 Psi on the servo valve.
    2. 10 position on the dial = 10v and = the inlet pressure on the servo valve (100PSI).

5. ADJUSTING THE GLOBAL SCALING and GLOBAL OFFSET POTENTIOMETER:

1. The global scaling and offset potentiometer only operates in the Automatic position on the selector switch.
    1. The dial setting on the Global Scaling potentiometer range from 5 to 15.
        (1) 5 position on the dial = 50% of the Robot analog signal.
        (2) 15 position on the dial = 150% of the Robot analog signal.
    2. The dial setting on the Global Offset potentiometer range from 5 to 15.
        (1) 5 position on the dial = -5v subtracted from the Robot analog signal.
        (2) 15 position on the dial = +5v added to the Robot analog signal.

2. The potentiometer cannot be adjusted by just turning the dial. The values are locked by the FCM.
    1. To adjust the potentiometer the FCM must be in the Cycle Complete mode (Depress the fault reset button).
        (1) Depress the UPDATE SCALING OFFSET button on the FCM.
            (1) The screen will display either UPDATING GLOBAL SCALING STYLE #x or UPDATING GLOBAL OFFSET STYLE #x.
        (2) To toggle between the Global Scaling and Global Offset screen depress the SCALING or OFFSET button.
        (3) Adjust the potentiometer on the control panel door and the value can be read on the FCM display screen.
        (4) Depress the UPDATE SCALING OFFSET button and the FCM will return to the normal mode and lock the scaling and offset values.

6. **DISPLAYING JOB TOTALS OR GRAND TOTALS ON THE FCM**:

1. Depress the JOB TOT or GND TOT button on the FCM.
    1. The FCM display will toggle between the last Job Total in cc or Grand total in Gallons.
        (1) The Grand Total value can be reset to zero by depressing the reset button.

NOTE: If the FCM does not respond as expected the microprocessor might have to be reset. To reset, depress MASTER STOP and then MASTER START.

Calibrating the Door Volume Display:

To enter the programming mode connect the program terminal to the common terminal with a jumper wire.

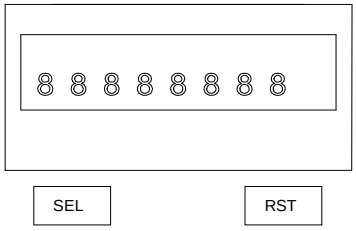
Pressing the select button scrolls through the menus. The display alternately flashes between the menu and the current programmed data selected. Pressing the reset button stops the display from flashing and enters the unit into the data modification mode.

In the data modification mode, a menu has one of two types of parameters to program.

1. In the selection type, the operator pressed the reset button to scroll through the various parameters available for that menu or is pressed to toggle between a yes or no selection. Pressing and holding the select button exits the data modification mode and advances to the next menu.

2. Numerical values use the reset button to increment the flashing digit, and momentarily pressing the select button advances to the next digit. Pressing an holding the select button for more than two seconds exits the data modification mode and advances to the next menu.

All parameter values are saved when exiting the programming mode. To exit the programming mode, remove the connection between the program terminal and the common terminal.



Volume Display

Count Mode:	Set to RTE CNt
Select Enable (dSPSEL):	Set to No
Reset Enable (rSt Enb):	Set to Yes
Counter Decimal Point (tot dP):	Set to 0.0
Count Scale Factor (SCLFAC): For size SRZ40 meter	2.860
Rate Enable (rAtE Enb):	Set to No
User Input (USEr INP):	Set to Stor-rSt

CALIBRATING THE TEMPERATURE CONTROLLER: AUTO TUNING

WARNING:

Auto Tuning should be used as a last resort only. Call your area representative before performing this operation.

The default P.I.D. values that normally work.

P=8 I=125 d (always)=1

Auto Tuning of the temperature control subsystem should be done when the fluid system is filled with material.

TO START AUTO TUNING:

Auto Tuning is started and the AT indicator flashes when the AT key is held down for 1 second or more. The AT indicator extinguishes and the optimum P, I, D constants have been set, when Auto Tuning is finished. The auto tuning procedure will take approximately ½ hour.
NOTE: A normal auto tuning will set the derivative value to approximately 45. Reset the value to 1

TO STOP AUTO TUNING:

To stop Auto Tuning, hold down the AT key for 1 second or more. The At indicator will extinguish. The PID parameters set before start of Auto Tuning are retained.

CALIBRATING THE MANUAL AIR REGULATOR FLOW CONTROL

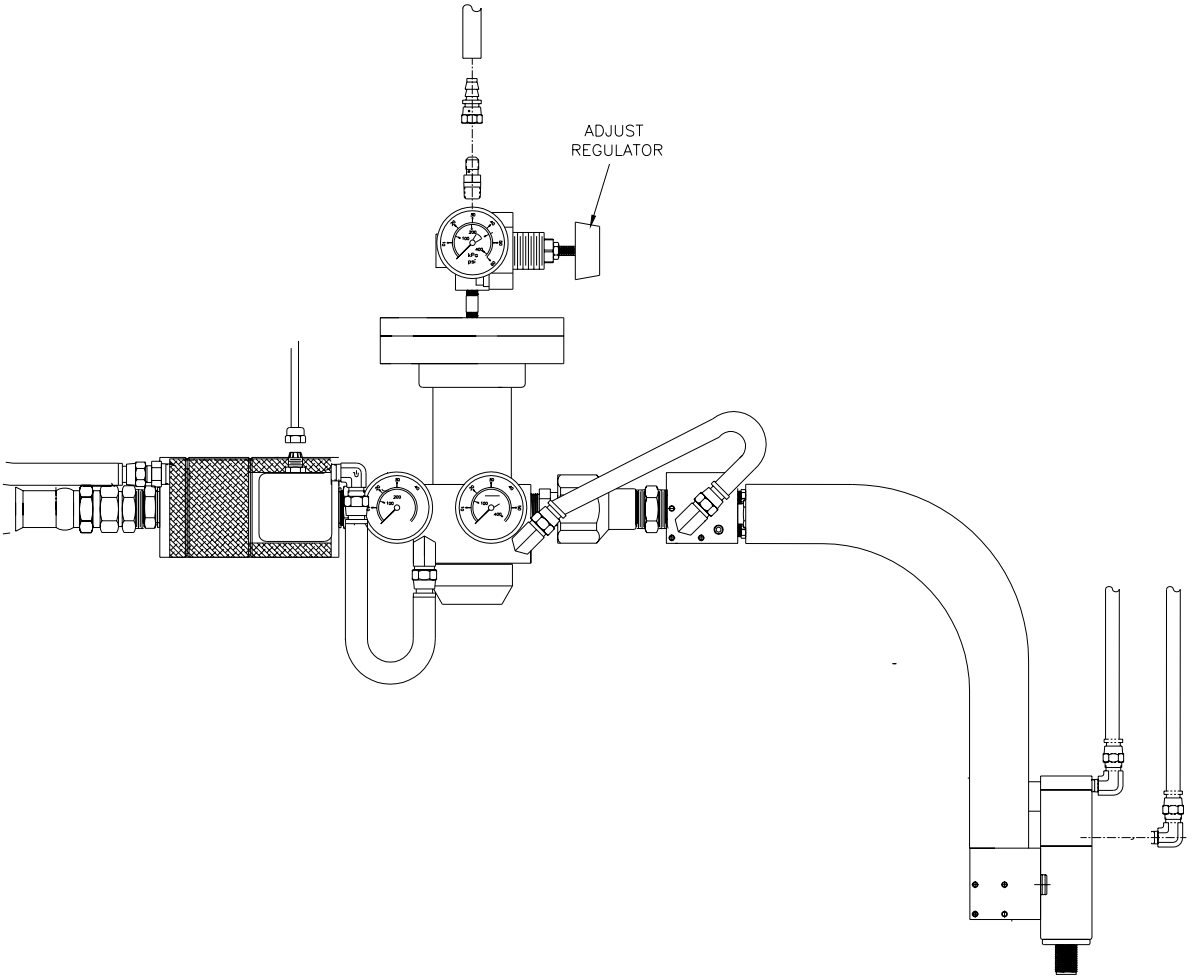
1. Adjust the Pump pressure to desired setting.

2. Adjust Material Temperature to specified range.

3. Open the Dispense Valve.

4. Adjust the Manual Air Regulator (Located on Mastic Regulator) until desired Flow is achieved.

   a. Increase Pressure for more material.
   b. Decrease Pressure for less material.



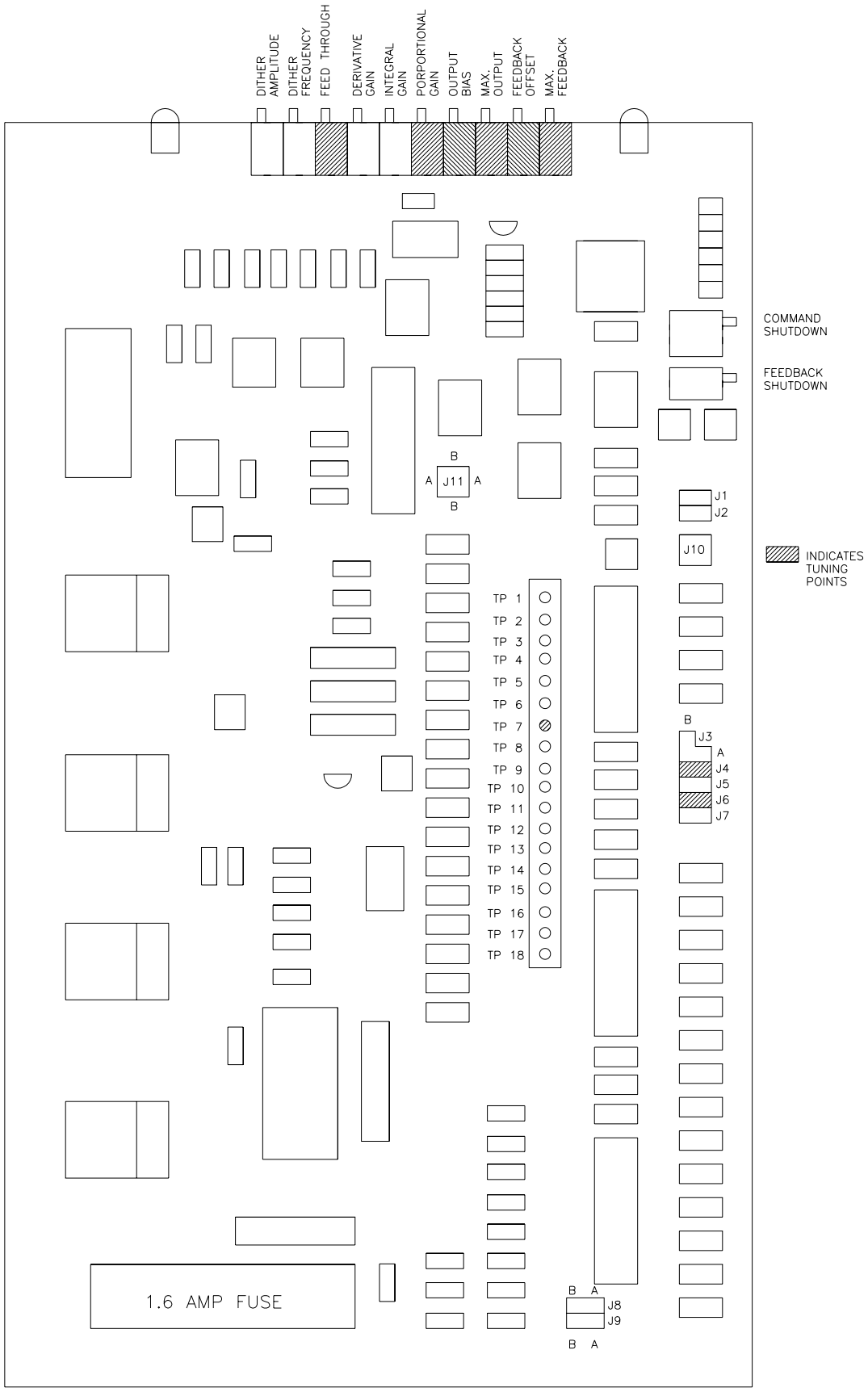
CALIBRATING THE PROPORTIONAL AIR VALVE CONTROL CARD

Initial factory settings:

Jumper settings:

J1	Not installed	Dither disabled.
J2	Not installed	Auto Shutdown disabled.
J3	Not installed	Lag compensation is enabled.
J4	Installed	Feedthrough is enabled.
J5	Not installed	Derivative gain disabled.
J6	Installed	Proportional gain is enabled.
J7	Not installed	Integral gain disabled.
J8	Not installed	4 to 20 ma. feedback disabled.
J9	Not installed	4 to 20 ma. command disabled.
J10	Not installed	Feedback shutdown disabled.
J11	Not installed	Command shutdown disabled.

See Proportional Card Layout Drawing Page 6-9.



PROPORTIONAL AIR VALVE CONTROL CARD LAYOUT

CALIBRATING THE SERVO CARD FOR OPEN LOOP CONTROL

1. Power down system and remove the Servo Card.

2. Remove J4, install J6.

3. Turn **MAX. OUTPUT** pot, and **MAX. FEEDBACK** pot, completely Counter Clock Wise. The pots will click when they reach the end of adjustment – both directions.

4. Install DC **AMP METER** in series with output to Proportional Air Valve. (Remove wire #2631 from proportional valve terminal and connect one meter lead to terminal and the other meter lead to the loose wire. Set the meter scaling to read 1.5 Amp DC.)
   HINT: When installing the AMP meter, connect the red lead closest to the motherboard terminal connection.

5. Turn power on.

6. Put the 3-WAY selector switch in "MANUAL".

7. Depress the "MANUAL" push button. "MANUAL" pilot light on (ES1 option).

8. Turn the "MANUAL FLOW" pot to 0.0 (located on the door).

9. Depress the "MANUAL DISPENSE" button and adjust **OUTPUT BIAS** pot until material starts flowing. Back pot off slightly so that there is no flow. All systems are now tuned to +0.15 A.

10. Disconnect air to the PROPORTIONAL AIR VALVE.

11. **** IMPORTANT **** Turn the **PROPORTIONAL GAIN** pot fully Clock Wise.

12. Press the "MANUAL DISPENSE" button and adjust the "MANUAL FLOW" potentiometer (located on the door) so that the "DC REFERENCE SIGNAL" reads 10.0v(located on the door).

13. Adjust the **MAX. OUTPUT** pot until the AMP meter reads .90 A.

**** If you fail to do this, excessive output could damage the proportional valve. ****

If the polarity of the DC current reverses as you adjust the MAX. OUTPUT pot, redo previous step 8 using the opposite polarity for the output bias.

14. Turn power off.

15. Remove AMP meter.

16. Reconnect air supply to Proportional valve.

17. Remove J6, install J4.

HINT: Verify setting on volt meter. If a AMP meter is installed the card will short.

18. Connect a **VOLTMETE**R between TP7 on the SERVO AIR VALVE CONTROL CARD, and the power supply 24V DC common (wire #2052).

19. Turn main power on.

20. Put the system into "MANUAL".

21. Press the "MANUAL DISPENSE" button and adjust the "MANUAL FLOW" potentiometer (located on the door) so the "DC REFERENCE SIGNAL" reads 10.0V (located on the door).

22. On the SERVO AIR VALVE CONTROL CARD adjust the **FEEDTHROUGH** pot so that the voltage at **TP7** (test point 7) is 10.0V. (see drawing 7-9)

23. Turn power off.

24. Remove Voltmeter.

25. Open loop calibration is complete.

PROPORTIONAL AIR VALVE CARD DEFINITIONS:

MAX. FEEDBACK:

This adjustment allows trimming of the feedback signal to match the command signal. An example might be a feedback transducer whose output is supposed to be 10 volts, but is actually only 9.94 volts. Another example might be a feedback transducer whose output is 0 to 5 volts, but the command signal is 0 to 10 volts.

During the Proportional valve calibration process (steps 12 and 13) the maximum feedback voltage (for maximum flow rate, or maximum air pressure (90 to 100 Psi) at the outlet of the proportional air valve) is calibrated to match the maximum input voltage of 10.0v DC.

FEEDBACK OFFSET:

This adjustment sets the 'zero' point of the feedback loop. When the dispense valve is open and the flow rate is set to zero, there may be some residual pressure. This value must be set equal to zero. A fairly accurate method of making this adjustment is to apply the minimum command and feedback signals, and adjust the Feedback Offset until the voltage at TP14 is 0,0 volts.

MAX. OUTPUT:

The Max. Output adjustment is used to ensure that the proportional air valve coil is protected from excessive current, regardless of what mat be happening in the control loop. It may also be used to limit the maximum dispense pressure.

OUTPUT BIAS:

This is normally used to compensate for any mechanical bias (deadband) that might exist in the proportional air valve, and or, proportional mastic valve. The Output Bias is different from the Feedback Offset in that the Feedback Offset is applied prior to (and included in) the Feedback to Command comparison. The Output Bias is applied after (and not included in) the Feedback to Command comparison.

PROPORTIONAL GAIN:

A closed loop system takes the feedback signal and compares it to the command signal. It generates an error signal by subtracting the feedback signal from the command signal. This error signal is used as part of the signal to drive the valve coil. Gain is a multiplier of this error signal that can be adjusted. A mathematical representation of this relationship is as follows:

Proportional Output = Gain (Command - Feedback)

It can generally be said that the more gain there is, the less error there is. However, the more gain there is, the more unstable (tend to oscillate or "hunt") the loop is. Adjustment of gain will always be a trade-off between minimum error and maximum stability. It should be noted that when the feedback is equal to the command, there will be no proportional output. In applications where the valve must be partially open to control the loop (such as a variable displacement motor's speed), there will of necessity be an error.

INTEGRAL GAIN:

NOTE This function is not used unless the dispense system is still unstable after calibrating the proportional gain and follow through functions.

AS DISCUSSED IN THE PROPORTIONAL GAIN SECTION, ERROR WILL ALWAYS EXIST IN A SIMPLE PROPORTIONAL LOOP WHEN A MAINTAINED OUTPUT IS NECESSARY FOR PROPER OPERATION. A SPEED LOOP USING A PROPORTIONAL VALVE AND HYDRAULIC MOTOR WOULD BE A GOOD EXAMPLE OF HIS. ATTEMPTS TO INCREASE THE PROPORTIONAL GAIN TO MINIMIZE ERROR EVENTUALLY WILL CAUSE LOOP INSTABILITY. THE INTEGRAL FUNCTION CAN BE ADDED TO ELIMINATE THIS PROBLEM. INTEGRAL CONTROL BASICALLY TAKES A PORTION OF THE ERROR SIGNAL, ADDS IT TO AN ACCUMULATOR ON A CONTINUOUS BASIS. THE CONTENTS OF THE ACCUMULATOR ARE THEN ADDED TO THE PRESENT ERROR SIGNAL TO GENERATE THE OUTPUT. THE VALUE IN THE INTEGRATOR'S ACCUMULATOR WILL CONTINUE TO INCREASE AS LONG AS AN ERROR SIGNAL EXISTS. AS THE ERROR SIGNAL DECREASES, THE INTEGRATOR'S ACCUMULATED VALUE INCREASES AT A SLOWER RATE. IF THE ERROR SIGNAL GOES TO THE OPPOSITE POLARITY, THE INTEGRATOR WILL BEGIN HEADING IN THE OPPOSITE DIRECTION. WHEN THE ERROR SIGNAL DECREASED TO ZERO, THE ACCUMULATOR STOPS CHANGING(WHETHER INCREASING OF DECREASING). THE INTEGRATOR CONSTANTLY ATTEMPTS TO BUILD TO A VALUE THAT WILL REDUCE THE ERROR TO ZERO.

DERIVATIVE GAIN:

NOTE This function is not used unless the dispense system is still unstable after calibrating the proportional gain and follow through functions.

Closed loop systems will often have delays somewhere in the loop. Inertial loads greater than static load capability are prime examples. In systems where activity "lags" the output signal, overshoot occurs. Another source of lag is in the feedback signal conditioning with F to V converters being the biggest culprits. Derivative control "looks ahead" and anticipates satisfaction of the loop by reducing the output at a rate greater than normal proportional control, IN a sense, derivative control constantly resists change in the process, and so helps re reduce overshoot. The more sudden the change, the greater the modification to the output signal to resist the change. This is true whether the change is attributable to command change or process change. The proportional controller has a continuously variable Derivative Gain adjustment with a jumper select for "Lead" Or " Lag" compensation. Select the proper jumper configuration and adjust the Derivative Gain to eliminate overshoot.

FEEDTHROUGH: This function is used instead of the integral function.

As mentioned in the Integral Gain section, sometimes a maintained output is required to satisfy the loop. However, an integral function will make a loop slower responding. When a fast responding loop is required and an integral function creates problems, feedthrough may be an acceptable alternative. This adjustment essentially takes a portion of the command signal and feeds it straight through to the output much like an open loop valve driver. This may allow the proportional gain to be lowered to maintain stability without creating unacceptable error. This adjustment can be made by temporarily removing any of the jumpers that may be applied to J5, J6, J7, and installing J4. At this point the proportional controller is operating as an open loop controller. Apply the maximum command signal, and adjust the Feedthrough until the process is close to the desired level. The jumpers previously removed can be replaced and the Proportional Gain readjusted.

This function controls the start of the bead, i.e. blobbing or too little material. If the 'Feedthrough' is too high the bead start will have a blob. Also, when the analog control signal goes from a small value to a large value, there may be some overshoot. By turning down the 'Feedthrough' the overshoot will be eliminated. But, at the same time this effects the response time when the analog control signal goes from a large valve to a small value. This delay in reaction can be overcome in your robot path programming and bead module location. Therefore, the 'Follow Through' should be adjusted to eliminate the blobbing and overshoot.

DITHER AMPLITUDE AND DITHER FREQUENCY:

NOTE This function is <u>not used</u> unless the dispense system is still unstable after calibrating the proportional gain and follow through functions.

SOME ELECTRO-PNEUMATIC VALVES EXHIBIT MECHANICAL HYSTERESIS. THIS PROPERTY CAN BE ELIMINATED BY INTRODUCING "DITHER" INTO THE VALVE COIL DRIVE. DITHER IS A SMALL AMOUNT OF AC CURRENT THAT "RIDES" ON THE DC CURRENT OUTPUT. THIS DITHER SERVES TO KEEP THE VALVE SPOOL IN CONSTANT MOTION AROUND THE STATIC POSITION. PROPER DITHER ADJUSTMENT CAN BE ACCOMPLISHED OVER A RANGE OF FREQUENCIES. IN GENERAL THE LARGER THE VALVE SPOOL, THE LOWER THE DITHER FREQUENCY. DITHER FREQ. MAY BE MEASURED BY CONNECTING AN OSCILLOSCOPE ACROSS THE LOAD (MAKE SURE THERE IS ENOUGH DITHER AMPLITUDE TO GET A READING). USING THE OSCILLOSCOPE, CALCULATE THE DITHER FREQUENCY BY MEASURING THE DITHER CYCLE PERIOD AND FINDING THE RECIPROCAL OF THAT TIME VALUE (FREQUENCY = 1/TIME). ONCE THE DITHER FREQ. HAS BEEN SET, THE DITHER AMPLITUDE MAY BE ADJUSTED CLOCKWISE UNTIL THE PNEUMATIC EFFECT BEGINS TO OSCILLATE NOTICEABLY. THE DITHER AMPLITUDE MAY BE MEASURED BY PLACING AN AC CURRENT METER IN SERIES WITH THE LOAD. THE AC CURRENT METER SHOULD BE A TRUE RMS TYPE SINCE THE DITHER FREQ. MAY BE DIFFERENT THAN 60 HZ. BECAUSE THE SPOOL IS IN CONSTANT MOTION, DITHER MAY ALSO SLIGHTLY ENHANCE VALVE RESPONSE TIMES.

AUTOSTREAM SYSTEMS **MAINTENANCE SCHEDULE**

DAILY:
1. Verify that the Dispense bead or pattern is correct.
2. Verify the Temperature setting is correct

WEEKLY:
1. Check the Dispense Valve to ensure that it is not leaking.
2. Check the Mastic Regulator to ensure that it is not leaking.
3. Check all of the regulator settings, Pump, Mastic Regulator, Dispense Valve and Water system.

MONTHLY:
1. Check Water Level in the Reservoir
2. Check hoses for tightness and damage.
3. Check Air Filters for contamination.
4. Purge the Mastic Regulator.
   (Remove the 1/8 in. pipe plug from body).

SEMI ANNUALLY:
1. Replace Material Filter Element.
   (Subject to the material-may require more maintenance)
2. Clean the Water Strainer.
3. Add Water Treatment.
4. Check the Reservoir Float Switch to ensure it is functioning.
5. Clean the chiller evaporator.

PUMPS

DAILY:
1. Assure that the packing oil cup is filled with D.I.D.P. oil.
2. Clean material from packing cut if necessary.
3. Assure hand valve for elevator is in down position.
4. Lubricate Follower Plate wiper ring every barrel change.
5. Bleed Air from Follower Plate every barrel change.
6. Bleed Air from Foot Valve every barrel change.

WEEKLY:
1. Assure that air line lubricators, above the pump are filled with #10 oil.
2. Check for loose gaskets on air valve and air motor, tighten or replace.

MONTHLY:
1. Check air line filters.
2. Clean or replace filter element as required.
3. Check follower plate wiper ring and replace if damaged.
4. Purge water from elevator.
   (Open valve at base of elevator tube)

AUTOSTREAM FAULT RECOVERY

Float Switch Low Level:	The water Reservoir on the back of the conditioning unit is low on water.
To Reset:	Fill the water Reservoir.
Flow Rate Fault:	The Autostream flow meter was receiving material flow that was either to high or to low on the last job. This fault is usually only critical if a volume fault is received at the same time. It is a good indicator that the system may need servicing in the near future.
To Reset:	Press the yellow fault reset button on the Autostream panel door
Heater High Temperature:	The water conditioning heater element is too hot. If this fault is not cleared the element will burn out.
To Reset:	Immediately shut off power to the Autostream panel and see Temperature control package in the trouble-shooting guide.
High Volume Fault:	The amount of material on the last Job was too high.
To Reset:	Press the yellow fault reset button on the Autostream panel door. See Mastic on Part in the trouble-shooting guide if it occurs again.
Low Volume Fault:	The amount of material on the last Job was too low.
To Reset:	Press the yellow fault reset button on the Autostream panel door. See Mastic on Part in the trouble-shooting guide if it occurs again.
Material Temperature Fault:	The material is too Hot or Cold. This fault is normal when the system is first turned on and stays high until the material temperature reaches within 5 of the set point temperature.
To Reset:	It will reset itself. If the temperature is not climbing or falling at a reasonable rate. See TEMPERATURE CONTROL PACKAGE in the trouble shooting guide.

TROUBLE SHOOTING TABLE OF CONTENTS

AUTOSTREAM TROUBLE SHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
DC POWER SUPPLY	Main Disconnect off	Turn on Main disconnect
No Output	No AC power	Check power fusing
	Defective power supply	Replace power supply
DISPENSE VALVE (Gun)	Plugged tip	Replace tip
No Material output	Plugged Material Filters	Replace Material Filters
	No Air Supply	Turn on Air Supply and set to 80 PSI
	Ball Broken off of Stem	Replace Ball and Stem Assembly
	Air cylinder stuck	Replace Dispense valve (Gun)
	Solenoid Valve not actuating	See SOLENOID VALVE
Material leaking	Material leaking from Vent Hole	Stem seal leaking- Replace Valve
	Material leaking from Tip	Replace Nozzle or Ball Stem or Polyseal
	Water Leaking from Valve	Replace O-Rings on Mounting Block
SOLENOID VALVE		
Not Actuating	No Air supply	Turn on Air Supply and set to 80 PSI
	Foreign Debris in Valve	Replace Valve
	No Electric Signal	Check Main Power
		Check 2.5 A fuse on Motherboard
		Check 1.5 A fuse on Motherboard
		Verify selector switch Position
		Check Connector to Valve
		Verify input from Robot
		Verify Sine connection - Plugged in Open Wire
		Verify Dispense Relay Operation
GEAR MONITOR	Material Not at Temperature	Wait for Material to reach set Temperature
No Material Flow	Mechanical binding	Purge Monitor with outlet not connected to Mastic Valve
	Expired Material	Purge System with Fresh Material
		Replace Monitor
Flow Sensor No Output	No DC Power Supply	Check Power Fusing
	Defective Power Supply	Replace Power Supply
	No Output Signal	Improper adjustment of the Hall Effect Sensor, bottom out then back out 1/8 turn and tighten Jam nut.
		Check Sine connection - Plugged in Open Wire
		Verify DC Power to Hall Effect Sensor
		Defective Sensor Replace
		Defective Motherboard Relay
	Incorrect Jumper location in Sensor	J-3 ON and J-5 ON
	Improper Analog Signal from Robot	Verify Robot analog
	Scaling Pots set Incorrectly	Adjust Scaling Pots for the Correct Bead Size

AUTOSTREAM TROUBLE SHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
DOOR VOLUME DISPLAY		
Not counting	Display not calibrated	Calibrate Display page 59
	No input from Hall Effect Sensor	See GEAR MONITOR
		Check Sine connection - Plugged in
	Input Relay Defective	Replace Input Relay on Motherboard
Not Resetting	Not Receiving Cycle Complete signal	Check Robot I/O for Cycle Complete
	Display not calibrated	Calibrate Display
Incorrect Volume Readings	Scaling in display not calibrated	Calibrate Display
	Gear monitor Mechanical binding	See GEAR MONITOR
NO MATERIAL ON PART	Nozzle Plugged	Clean or Replace Nozzle
	Ball Valves Closed	Open System Ball Valves
	Filters Plugged	Replace Filter Elements
	Air Supply Turned Off	Turn the Air Supply ON
	No Material Pumps Empty	Change Barrels
	Pumps Not Working Correctly	Repair Pumps
	Expired Material	Purge System with Fresh Material
	Plug In the Material System	Locate Plug and Remove it or Replace System Component
	Dispense Valve solenoid not Actuating	See SOLENOID VALVE
	Dispense Valve not Opening	See DISPENSE VALVE
	Mastic Regulator not operating properly	See MASTIC REGULATOR
	Flow Monitor bound	See FLOW MONITOR
	No analog signal from Robot	Verify analog signal from Robot
	Pressure Transducer operating Improperly	See PRESSURE TRANSDUCER
PATTERN IS TO SMALL	Incorrect size or clogged Nozzle	Replace with clean or correct Nozzle
	Nozzle not properly Aligned	Align Nozzle in Slot
	System temperature is too Low	Set temperature to correct Settings
	Material Ball Valve is Closed	Open All Ball Valves
	Material Filter is Clogged	Replace Filter Element
	Mastic Regulator Incorrect Pressure Setting	Set Regulator to the Correct Setting
	Pump Pressure Set to Low	Set Regulator to the Correct Setting
	Mastic Regulator not Operating Properly	See Mastic Regulator
	SCALING pots set to Low	Adjust pot for the correct bead size
	Batch Viscosity Changed	Adjust GLOBAL SCALING pot for the correct bead size
	Expired Material	Purge System with Fresh Material
	Pressure Transducer Operating Improperly	See Pressure Transducer
	Incorrect Robot Bead Values	Correct Bead Values in Robot Program

AUTOSTREAM TROUBLE SHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
PATTERN IS TO BIG	Incorrect size or worn Nozzle	Replace with Correct Nozzle
	Mastic Regulator Air Pressure to High	Verify correct Air Regulator Setting.
	Pump Pressure to High	Set Regulator to the Correct Setting
	System Temperature set to High	Reset Temperature Setting
	Mastic Regulator Not Operating Properly	See Mastic Regulator
	SCALING pots adjusted to high	Adjust pot for the Correct Bead Size
	Batch Viscosity Change	Adjust GLOBAL SCALING pot for the Correct Bead Size
	Pressure Transducer Operating Improperly	See PRESSURE TRANSDUCER
	Incorrect Robot Bead Values	Correct Bead Values in Robot Program
SPRAY PATTERN INCORRECT		
	Part Miss-Loaded	Align Part Properly
	Partial or Plugged Nozzle	Replace or Clean Nozzle
	Nozzle or Mounting Bracket Bent	Replace Nozzle or Bracket
	Material Viscosity Change	Check Material Expiration Date
	Pressure Transducer Operating Improperly	See Pressure Transducer
	Check System Pressure Settings	Adjust System Pressure Settings
	Incorrect Robot Bead Values	Correct Bead Values in Robot Program
	Nodes have been moved in Robot Program	Move Nodes to their correct location
Bead is too Large or Small at the Start or when the Analog Input Changes Value	Air Valve Control Card Out of Adjustment	Calibrate the PID Air Valve Controller Card
	Pressure Transducer Operating Improperly	See Pressure Transducer
MASTIC REGULATOR 300-911		
No Material Output	Air Supply Turned Off	Turn the Air Supply on the system
	Material Ball Valves Closed	Open Ball Valves
	Insufficient Material Supply Pressure	Check the Supply Pumps for Correct Operation and Pressure
	Filter Plugged	Replace Filter Element
	Temperature Setting Incorrect	Set Temperature to the Correct Setting
	Mastic Regulator or Supply Hose Plugged	Replace Mastic Regulator or Supply Hose
	Air Diaphragm in Mastic Regulator Damaged	Replace Diaphragms
	Cured Material inside of the Mastic Regulator	Remove and Rebuild the Mastic Regulator
	Mechanical Bind in the Mastic Regulator	Remove and Rebuild the Mastic Regulator

AUTOSTREAM TROUBLE SHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
MASTIC REGULATOR 300-911 Continued		
Unable to Regulate Flow	Insufficient Air Supply to Mastic Regulator	Verify Air Supply for a Closed Ball Valve and Correct Hose Size
	Cured Material inside of the Mastic Regulator	Remove and Rebuild the Mastic Regulator
	Valve or Poppet Inside Mastic Regulator Damaged	Replace Valve and Poppet
	Mechanical Bind in the Mastic Regulator	Remove and Rebuild the Mastic Regulator
	Proportional Air Valve Operating Improperly	See Proportional Air valve or See Air Valve Controller Card
Material Leaking	From Vent Hole	Remove and Rebuild the Mastic Regulator
	From body to housing	Defective O-Ring Rebuild the Mastic Regulator
PRESSURE TRANSDUCER		
No Signal Output	Interface Cables	Check Connection at Pressure Transducer Check Sine Cable Open or Shorted Wire
Improper Output Signal	Plugged Transducer Port	Remove Transducer and Clean Material from Port
	Improper Zero Calibration	Recalibrate the Air Valve Controller Card
	Failed Transducer	Remove and Replace
SERVO AIR REGULATOR		
Not Regulating	Selector Switch not in proper setting	Select proper mode of operation AUTO/ MANUAL
	Interface Cabling	Verify Sine Cable is Plugged in Check for Open wire (inside plug in connector)
	Insufficient Air Supply	Open all Air Ball Valves Check Air Supply for Damaged Hoses
	Burned out Coil	Solenoid Resistance = 6.5Ω @ 68°F If incorrect Replace Valve
	PID Air Regulator Control Card Not Plugged in	Plug In the Control Card
	Loose Card on Mother-Board or Card Missing	Push Card Securely into Slot or Install Card

AUTOSTREAM TROUBLE SHOOTING GUIDE

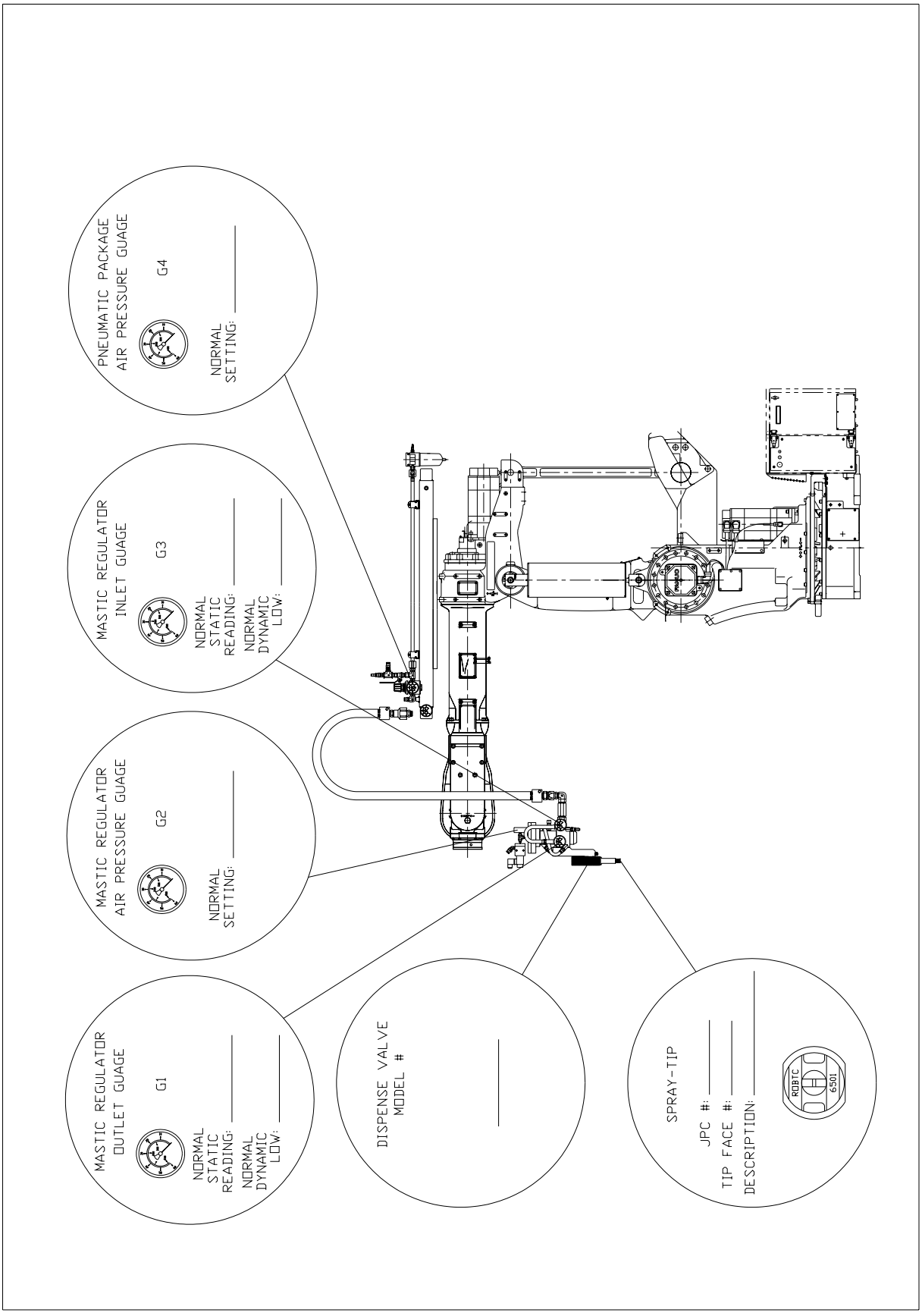
PROBLEM	CAUSE	SOLUTION
PID AIR REGULATOR CONTROL CARD		
No Output to servo Valve	No DC Supply Power to Card	Verify DC Power Supply Operation
	Blown Fuse on Control Card	Replace 1.5A Fuse
	Control Card Failed	Replace Control Card
Servo Regulator too much pressure or Not enough pressure	Pressure Transducer signal Improper	See PRESSURE TRANSDUCER
	SCALING pots set to High	
	Control Card Failed	Replace Control Card
	Improper Analog signal from Robot	Check Analog Signal from Robot
Output Pressure Oscillating	Control Card Out of Calibration	Recalibrate Card
Output not Following the Analog Input	Selector Switch not in proper setting	Put the Selector Switch in Automatic.
	SCALING pots not set correctly	Adjust Scaling pots for the correct bead size
	Control Card Out of Calibration	Recalibrate Card
TEMPERATURE CONDITIONING SYSTEM		
System Will not Power Up		
	Temperature Conditioner not Started	Depress Temperature ON button
	Water Reservoir Low	Fill Water Reservoir
	Float Switch not Working	Verify operation of the Float Switch
	Blown Fuse	Check Fusing
	Timer Turned Off	Turn Panel ON or Blown Fuse
	Timer Unit defective	Replace Timer
RTD Temperature Control unit Flashes SeRv	No input Signal from RTD	Check Sine Connector Check RTD Connector Open wire in RTD- Replace
	Wrong Polarity	Check Wiring at Temperature Controller
Temperature Out of Range	Set Point Changed	Reset Setpoint
	Defective RTD	Replace RTD
	Not enough Water in System	Check and Fill Reservoir
	Air in the Water System	Purge Air from Water System
	Circulation Pumps not Working	
	Pressure should be 27 - 30 PSI	Purge Air from Water System Check Fusing Check Electrical Connections Check the pump for Foreign Material Replace Pump
	Restricted Water Lines	Check for Kinked Water Lines Open All Water Ball Valves Clean Water Strainer Set Flow Restrictor to 1.5 - 2 GPM

AUTOSTREAM TROUBLE SHOOTING GUIDE

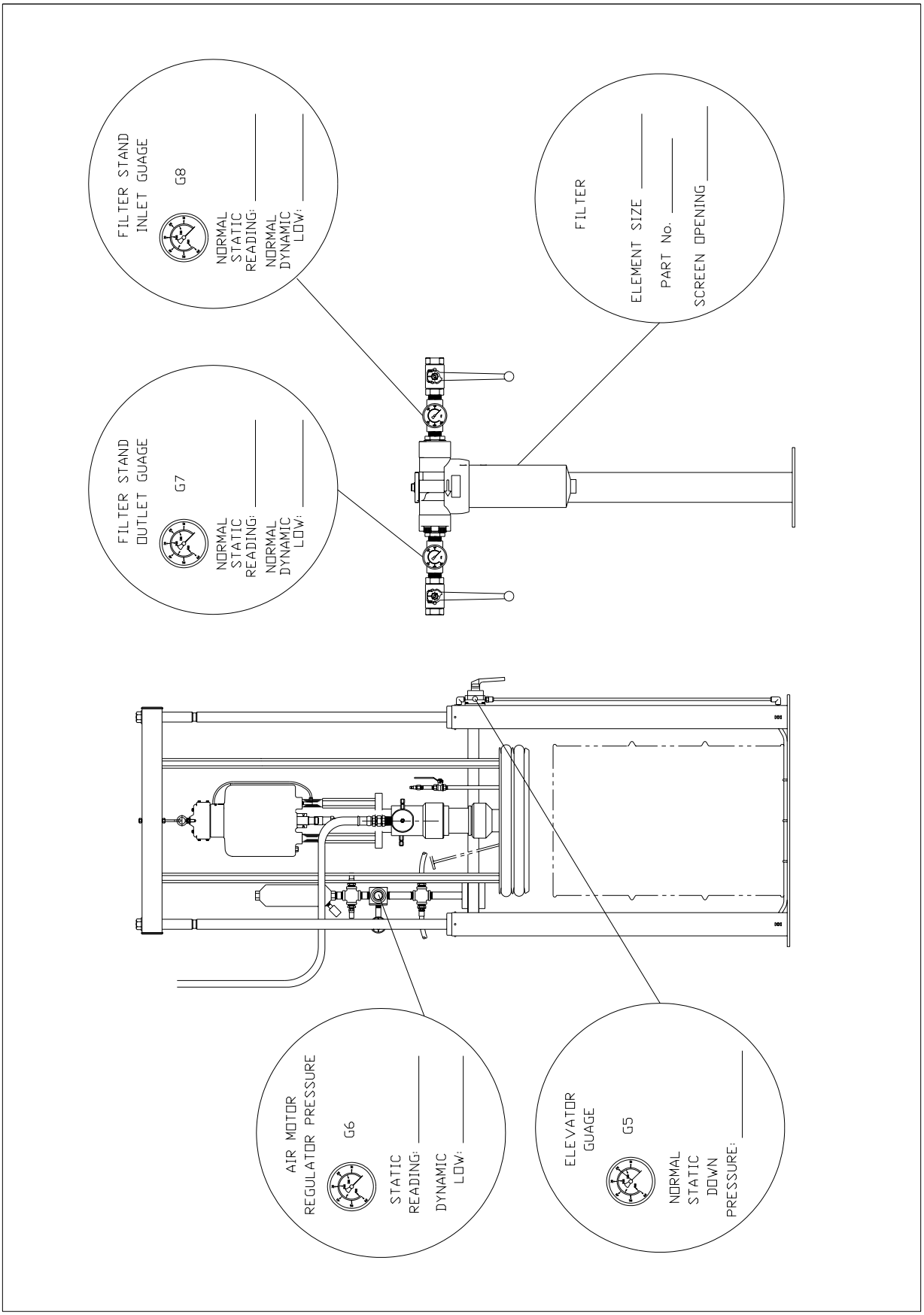
PROBLEM	CAUSE	SOLUTION
RTD Continued Temperature out of Range	Material In Water Lines	Check Sight Gauge for Color Change Replace Conditioned Hose Check O-Ring on Dispense Valve Mounting Block
	PID values in Temperature Controller set incorrectly	Reset the PID values in the Controller P = 8 I = 125 D = 1
	Alarm set point set to Low	Reset Alarm (AL) in Temperature Controller to 5 5 = + or - 5° of set value.
System Not Heating	Fuses For Heater Open	Check Heater Fuses
	Heater Over-Temperature Switch Failed or Set Incorrectly	Check Operation of Over-Temperature Switch and Set High Temperature
	Cooling Solenoid Valve Stuck Open	Check the Solenoid Valve for Foreign material or Replace
	Heater Elements Burned Up	Check Elements Amperage - Replace
	Water Ball Valves Closed	Open Water Ball Valves
	Temperature Controller not Working	Replace Temperature Controller
System Not Cooling		
	Not enough Water Flow	Check for Kinked Hoses Open Water Ball Valves Clean Water Strainer Set Flow Restrictor to 1.5 to 2 GPM Check Circulation Pump Fuses Check Circulation Pump Pressure Should be 27 - 30 PSI
	Controller Stuck in the Heat Mode	Replace Controller
No Cooling Water	Water Solenoid Valve not Opening	Check Solenoid Fuse Check Wiring for Open Circuit Replace Solenoid
	Water Chiller Not Cooling	Check Fusing Verify Temperature Conditioning is turned ON Check Thermostat Setting Replace Chiller

SYSTEM SETTINGS AND SPECIFICATIONS:

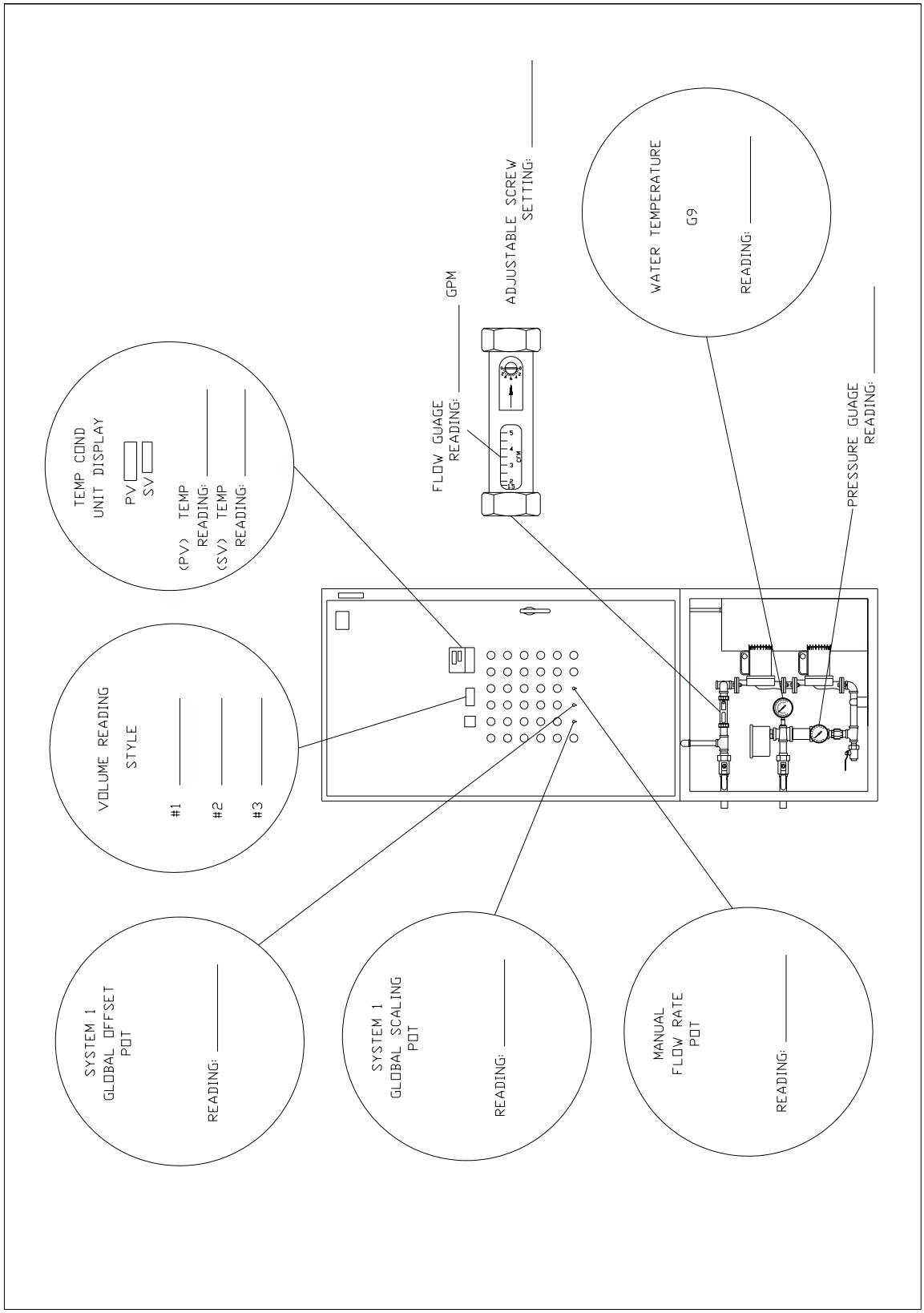
Wetted path settings:



Pump and filter settings:



Control panel settings:



INGERSOLL-RAND
FLUID PRODUCTS

AUTOSTREAM
SYSTEM SPECIFICATIONS

PUMP PRESSURES		**TEMPERATURE CONTROLLER**	
Elevator Down Pressure		Heater size	
Air Motor Pressure		Water Flow Rate/PSI	
Mastic Regulator Air Pressure		Set Point Value [SV]	
Dispense Gun Air Pressure		Alarm [AL]	
		LEVEL (0)	
MATERIAL INFORMATION		Set Point Value [SV]	
Pump Pressure Static		Proportional band [P]	
Pump Pressure Dynamic		Intergerital time [I]	
Filter Inlet Static		Derivitive time [d]	
Filter Inlet Dynamic		LEVEL (1)	
Filter Outlet Static		Set limit low [SL-L]	
Filter Outlet Dynamic		Set limit High [SL-H]	
Mastic Regulator Inlet Static		***These value must not be changed***	
Mastic Regulator Inlet Dynamic		Dead Band [C-db]	0
Mastic Regulator Outlet Static		Cooling Coef [C-SC]	1
Mastic Regulator Outlet Dynamic		Control Period Heat [CP]	20 sec.
Volume dispensed Style #1		Control Period Cool [C-CP	20 sec.
Flow Rate Style #1		Shift set value [SP-S]	0
Volume dispensed Style #2		LEVEL (2)	
Flow Rate Style #2		Output Monitor	xxx%
Volume dispensed Style #3		Sensor Type [Ln-t	Pt(=RTD)
Flow Rate Style #3		Alarm [AL}	]--[
MICROPROCESSOR		**ROBOT SETUP**	Setup -Johnstone
Autostream level		Material Factor	
Autostream Version		Flow Rate BIAS (V)	
How many Body Styles		TCPP BW Scale Factor	
Set PreCharge at ? Volts	Always set to .0	Min Flow Command (V)	
Tooth Volume	Always set to 0.2860	Max. analog out	
Do You Want Flow Rate Faults	Always answer NO	Max Voltage	10
Low Volume Limit Style #1		Voltage Step	0.1
High Volume Limit Style #1		Flow Rate Control	
Low Volume Limit Style #2		Calibration Status	Complete
High Volume Limit Style #2		SCHED in MOV_SEAM	30
Low Volume Limit Style #3		Flow Rate Type	TCPP Bead Width
High Volume Limit Style #3		Desired Flow Rate	
Manual Flow Rate Potentiometer		Purge Program	
Global Scaling Potentiometer Style #1		Path Program	
Global Offset Potentiometer Style #1		Sample program	
Global Scaling Potentiometer Style #2		Home Program	MOV_HOME
Global Offset Potentiometer Style #2		Bead Size	
Global Scaling Potentiometer Style #3		Program speed	
Global Offset Potentiometer Style #3		Cycle time	
Want to test I/O	Always answer NO		

Johnstone Hardware			
Filter Size		Tip-Nozzle	
Mastic Regulator Part Number		Supply hose Part No.	
Dispense Gun		Coax-Traced Hose No.	

Oshawa specs.xls August 1998

AUTOSTREAM SYSTEM SPECIFICATIONS 4-

DATE:

LOCATION:

COMPONENTS	AIR PRESSURES
ELEVATOR DOWN PRESSURE	PSI
AIR MOTOR PRESSURE	PSI
MASTIC REGULATOR DISPENSING AIR PRESSURE	PSI
AIR PRESSURE TO AIR SERVO REGULATOR	PSI

SYSTEM MATERIAL PRESSURES

LOCATION OF GAUGE	*STATIC PRESSURE*	*DYNAMIC PRESSURE*
PUMP PRESSURE (FILTER INLET)	PSI	PSI
AFTER FILTER (OUTLET)	PSI	PSI
INLET MASTIC REGULATOR	PSI	PSI
OUTLET MASTIC REGULATOR	PSI	PSI

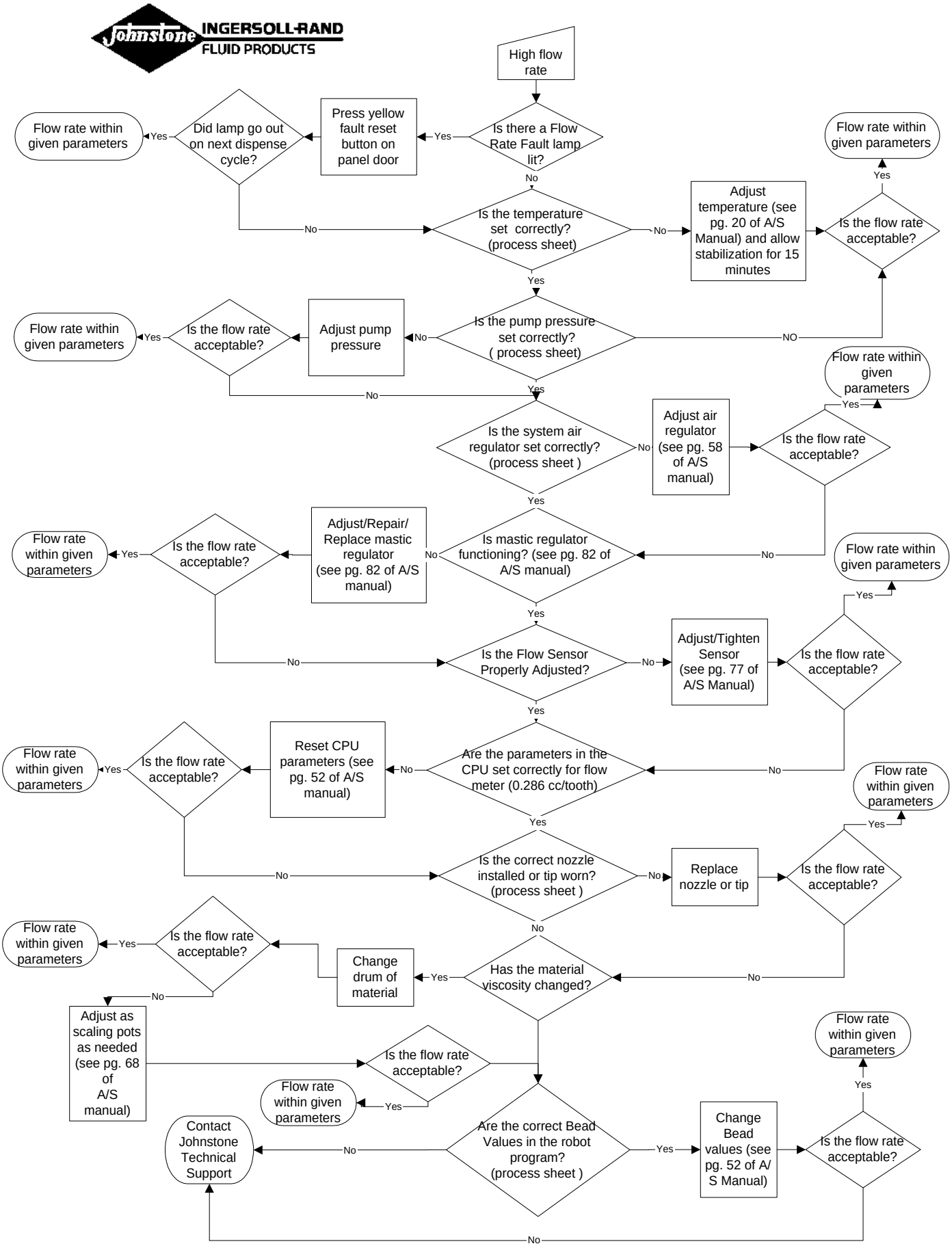
VOLUME DISPENSED	TOTAL	CC	FLOW RATE	CC/S

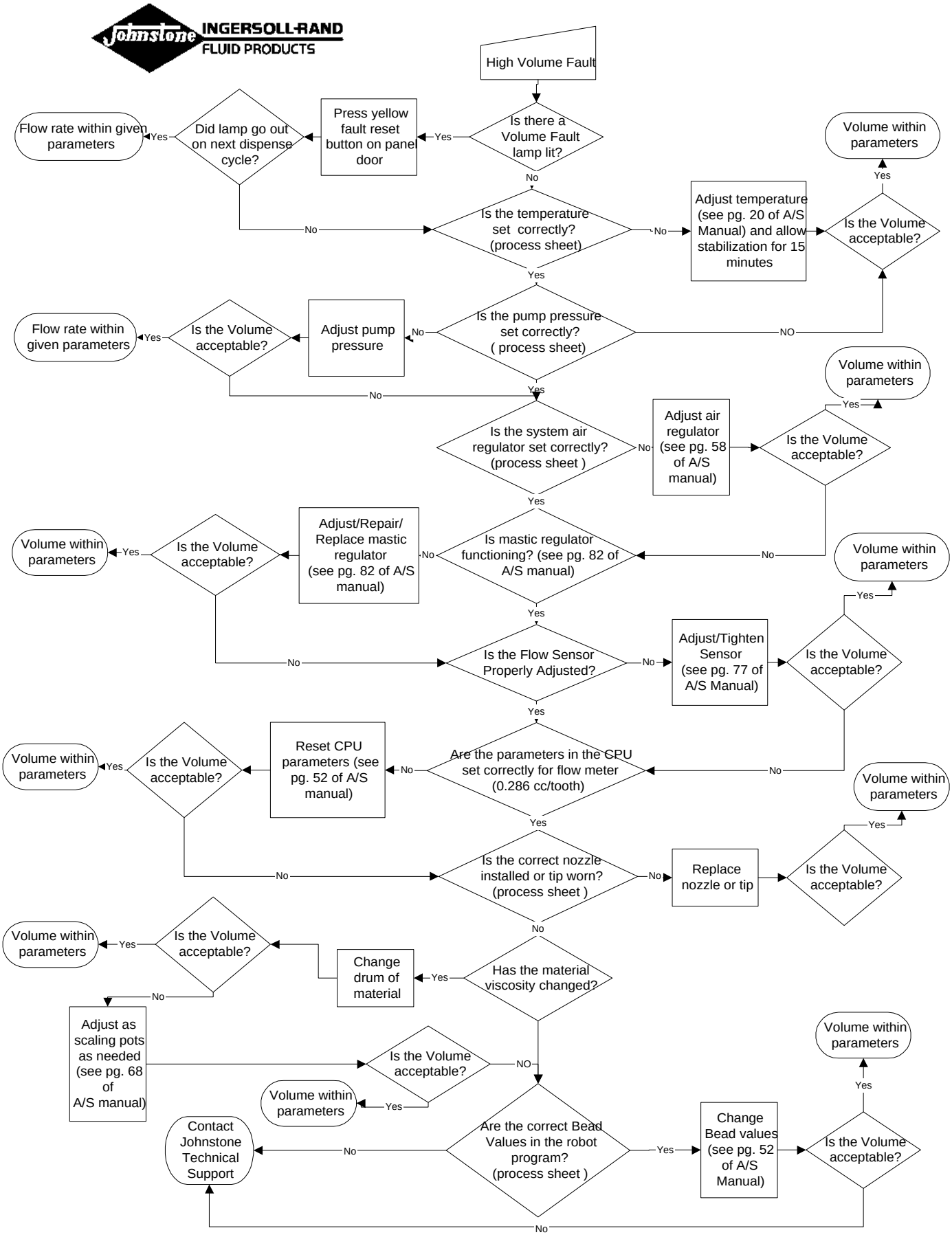
WATER SETTINGS

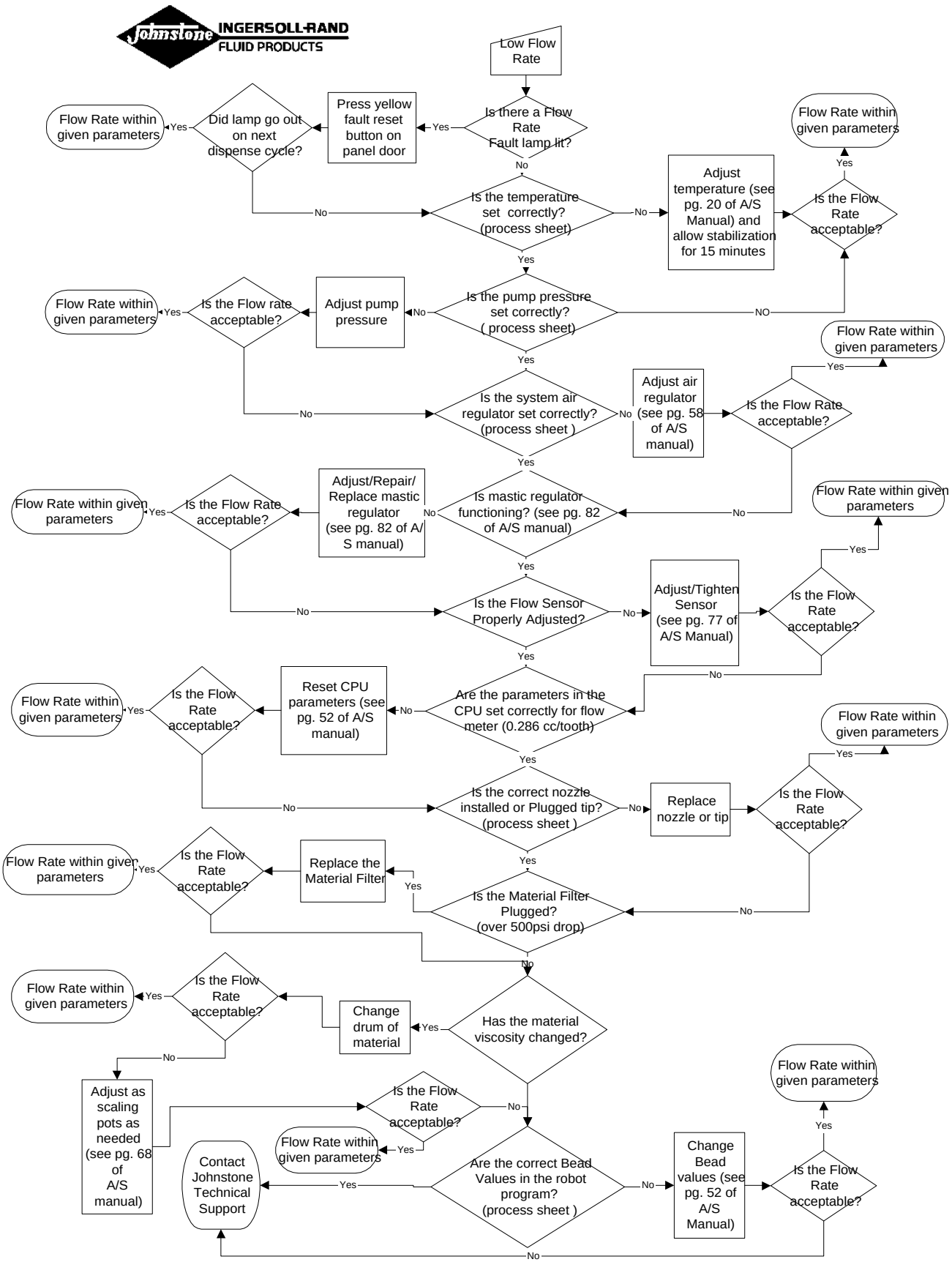
TEMPERATURE		Deg. F	PROPORTIONAL	
HEATER SIZE		KW	INTEGRAL	
WATER FLOW RATE		GPM	DERIVATIVE	
HIGH TEMP FAULT SETTING		Deg. F	ALARM	5deg.

COMPUTER MENU

AUTOSTREAM LEVEL NO. & VERSION		LEVEL NO.	VERSION
TOOTH VOLUME	0.286	GLOBAL SCALING POT	
TRANSDUCER SIZE		GLOBAL OFFSET POT	
DO YOU WANT FLOW FAULTS		MANUAL FLOW RATE POT	
PRECHARGE PRESSURE		REFERENCE VOLTAGE AVG	
LOW LIMIT PRESSURE		OPEN LOOP CONTROL	
HIGH LIMIT PRESSURE		DISPENSE VALVE	
LOW VOLUME LIMIT		MASTIC REGULATOR SIZE	
HIGH VOLUME LIMIT		SPRAY TIP SIZE	


Johnstone
INGERSOLL-RAND
FLUID PRODUCTS
High flow rate
Is there a Flow Rate Fault lamp lit?
Yes
Press yellow fault reset button on panel door
Did lamp go out on next dispense cycle?
Yes
Flow rate within given parameters
No
Is the temperature set correctly? (process sheet)
No
Adjust temperature (see pg. 20 of A/S Manual) and allow stabilization for 15 minutes
Is the flow rate acceptable?
Yes
Flow rate within given parameters
Yes
No
Is the pump pressure set correctly? (process sheet)
NO
Adjust pump pressure
No
Is the flow rate acceptable?
Yes
Flow rate within given parameters
Yes
No
Is the system air regulator set correctly? (process sheet)
No
Adjust air regulator (see pg. 58 of A/S manual)
Is the flow rate acceptable?
Yes
Flow rate within given parameters
Yes
No
Is mastic regulator functioning? (see pg. 82 of A/S manual)
No
Adjust/Repair/ Replace mastic regulator (see pg. 82 of A/S manual)
Is the flow rate acceptable?
Yes
Flow rate within given parameters
Yes
No
Is the Flow Sensor Properly Adjusted?
No
Adjust/Tighten Sensor (see pg. 77 of A/S Manual)
Is the flow rate acceptable?
Yes
Flow rate within given parameters
Yes
No
Are the parameters in the CPU set correctly for flow meter (0.286 cc/tooth)
No
Reset CPU parameters (see pg. 52 of A/S manual)
Is the flow rate acceptable?
Yes
Flow rate within given parameters
Yes
No
Is the correct nozzle installed or tip worn? (process sheet)
No
Replace nozzle or tip
Is the flow rate acceptable?
Yes
Flow rate within given parameters
Yes
No
Has the material viscosity changed?
No
Change drum of material
Is the flow rate acceptable?
Yes
Flow rate within given parameters
No
Adjust as scaling pots as needed (see pg. 68 of A/S manual)
Is the flow rate acceptable?
Yes
Flow rate within given parameters
Yes
Flow rate within given parameters
Are the correct Bead Values in the robot program? (process sheet)
No
Contact Johnstone Technical Support
Yes
Change Bead values (see pg. 52 of A/S Manual)
Is the flow rate acceptable?
Yes
Flow rate within given parameters
No


Johnstone
INGERSOLL-RAND
FLUID PRODUCTS
High Volume Fault
Is there a Volume Fault lamp lit?
Yes
Press yellow fault reset button on panel door
Did lamp go out on next dispense cycle?
Yes
Flow rate within given parameters
No
Is the temperature set correctly? (process sheet)
No
Adjust temperature (see pg. 20 of A/S Manual) and allow stabilization for 15 minutes
Is the Volume acceptable?
Yes
Volume within parameters
Yes
No
Is the pump pressure set correctly? (process sheet)
NO
Adjust pump pressure
No
Is the Volume acceptable?
Yes
Flow rate within given parameters
No
Is the system air regulator set correctly? (process sheet)
No
Adjust air regulator (see pg. 58 of A/S manual)
Is the Volume acceptable?
Yes
Volume within parameters
Yes
No
Is mastic regulator functioning? (see pg. 82 of A/S manual)
No
Adjust/Repair/ Replace mastic regulator (see pg. 82 of A/S manual)
Is the Volume acceptable?
Yes
Volume within parameters
Yes
No
Is the Flow Sensor Properly Adjusted?
No
Adjust/Tighten Sensor (see pg. 77 of A/S Manual)
Is the Volume acceptable?
Yes
Volume within parameters
Yes
No
Are the parameters in the CPU set correctly for flow meter (0.286 cc/tooth)
No
Reset CPU parameters (see pg. 52 of A/S manual)
Is the Volume acceptable?
Yes
Volume within parameters
Yes
No
Is the correct nozzle installed or tip worn? (process sheet)
No
Replace nozzle or tip
Is the Volume acceptable?
Yes
Volume within parameters
Yes
No
Has the material viscosity changed?
Yes
Change drum of material
Is the Volume acceptable?
Yes
Volume within parameters
No
Adjust as scaling pots as needed (see pg. 68 of A/S manual)
Is the Volume acceptable?
NO
Volume within parameters
Yes
Are the correct Bead Values in the robot program? (process sheet)
No
Contact Johnstone Technical Support
Yes
Change Bead values (see pg. 52 of A/S Manual)
Is the Volume acceptable?
Yes
Volume within parameters
No


Johnstone
INGERSOLL-RAND
FLUID PRODUCTS
Low Flow Rate
Is there a Flow Rate Fault lamp lit?
Yes
Press yellow fault reset button on panel door
Did lamp go out on next dispense cycle?
Flow Rate within given parameters
No
Is the temperature set correctly? (process sheet)
Adjust temperature (see pg. 20 of A/S Manual) and allow stabilization for 15 minutes
Is the Flow Rate acceptable?
Flow Rate within given parameters
Is the pump pressure set correctly? (process sheet)
Adjust pump pressure
Is the Flow rate acceptable?
Is the system air regulator set correctly? (process sheet)
Adjust air regulator (see pg. 58 of A/S manual)
Is mastic regulator functioning? (see pg. 82 of A/S manual)
Adjust/Repair/ Replace mastic regulator (see pg. 82 of A/S manual)
Is the Flow Rate acceptable?
Is the Flow Sensor Properly Adjusted?
Adjust/Tighten Sensor (see pg. 77 of A/S Manual)
Are the parameters in the CPU set correctly for flow meter (0.286 cc/tooth)
Reset CPU parameters (see pg. 52 of A/S manual)
Is the correct nozzle installed or Plugged tip? (process sheet)
Replace nozzle or tip
Is the Material Filter Plugged? (over 500psi drop)
Replace the Material Filter
Has the material viscosity changed?
Change drum of material
Adjust as scaling pots as needed (see pg. 68 of A/S manual)
Are the correct Bead Values in the robot program? (process sheet)
Change Bead values (see pg. 52 of A/S Manual)
Contact Johnstone Technical Support


Johnstone
INGERSOLL-RAND
FLUID PRODUCTS
Low Volume
Is there a Volume Fault lamp lit?
Yes
Press yellow fault reset button on panel door
Did lamp go out on next dispense cycle?
Yes
Volume within given parameters
No
Is the temperature set correctly? (process sheet)
No
Adjust temperature (see pg. 20 of A/S Manual) and allow stabilization for 15 minutes
Is the Volume acceptable?
Yes
Volume within given parameters
Yes
No
Is the pump pressure set correctly? (process sheet)
No
Adjust pump pressure
Is the Volume acceptable?
Yes
Volume within given parameters
NO
Yes
Is the system air regulator set correctly? (process sheet)
No
Adjust air regulator (see pg. 58 of A/S manual)
Is the Volume acceptable?
Yes
Volume within given parameters
Yes
No
Is mastic regulator functioning? (see pg. 82 of A/S manual)
No
Adjust/Repair/ Replace mastic regulator (see pg. 82 of A/ S manual)
Is the Volume acceptable?
Yes
Volume within given parameters
Yes
No
Is the Flow Sensor Properly Adjusted?
No
Adjust/Tighten Sensor (see pg. 77 of A/S Manual)
Is the Volume acceptable?
Yes
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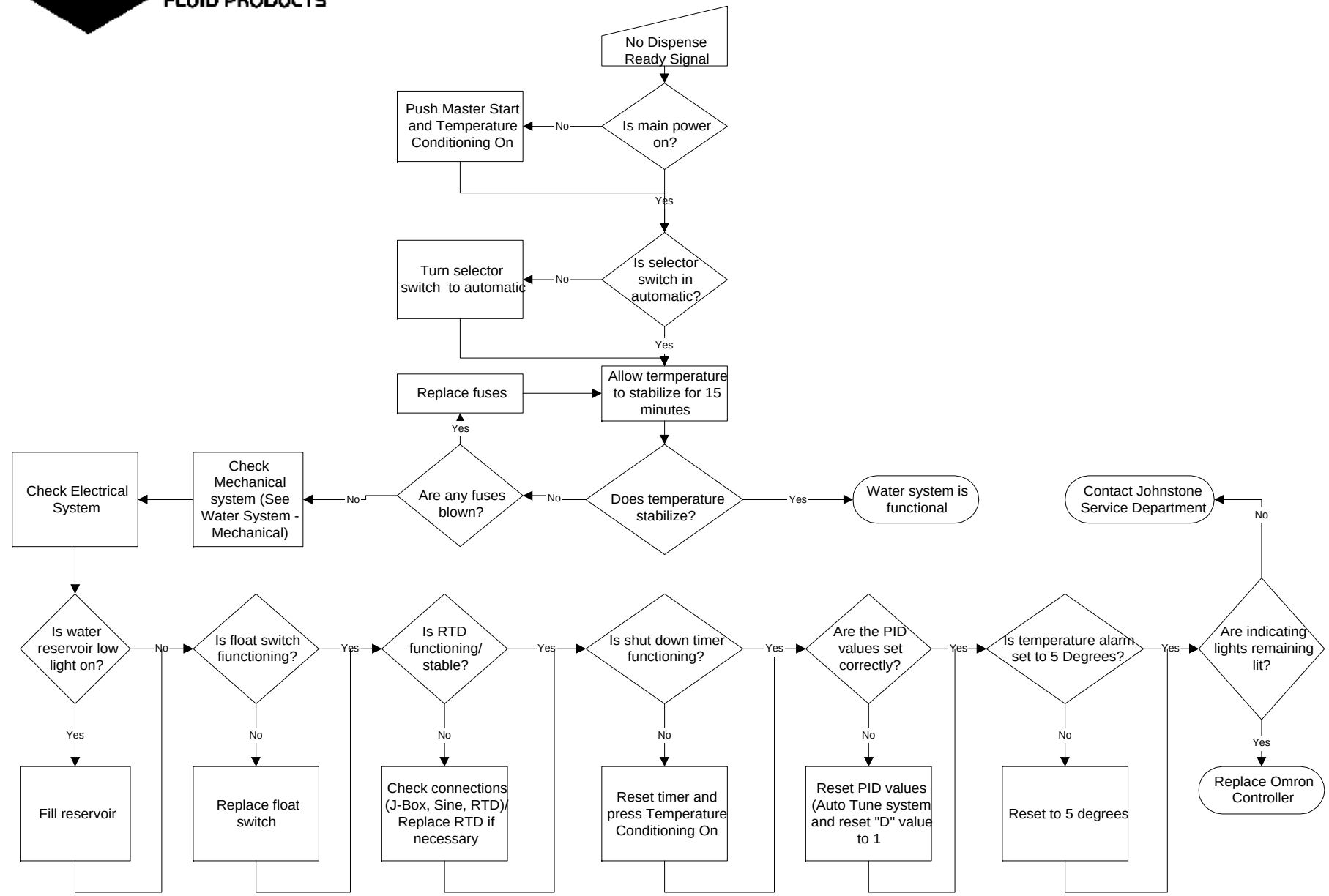
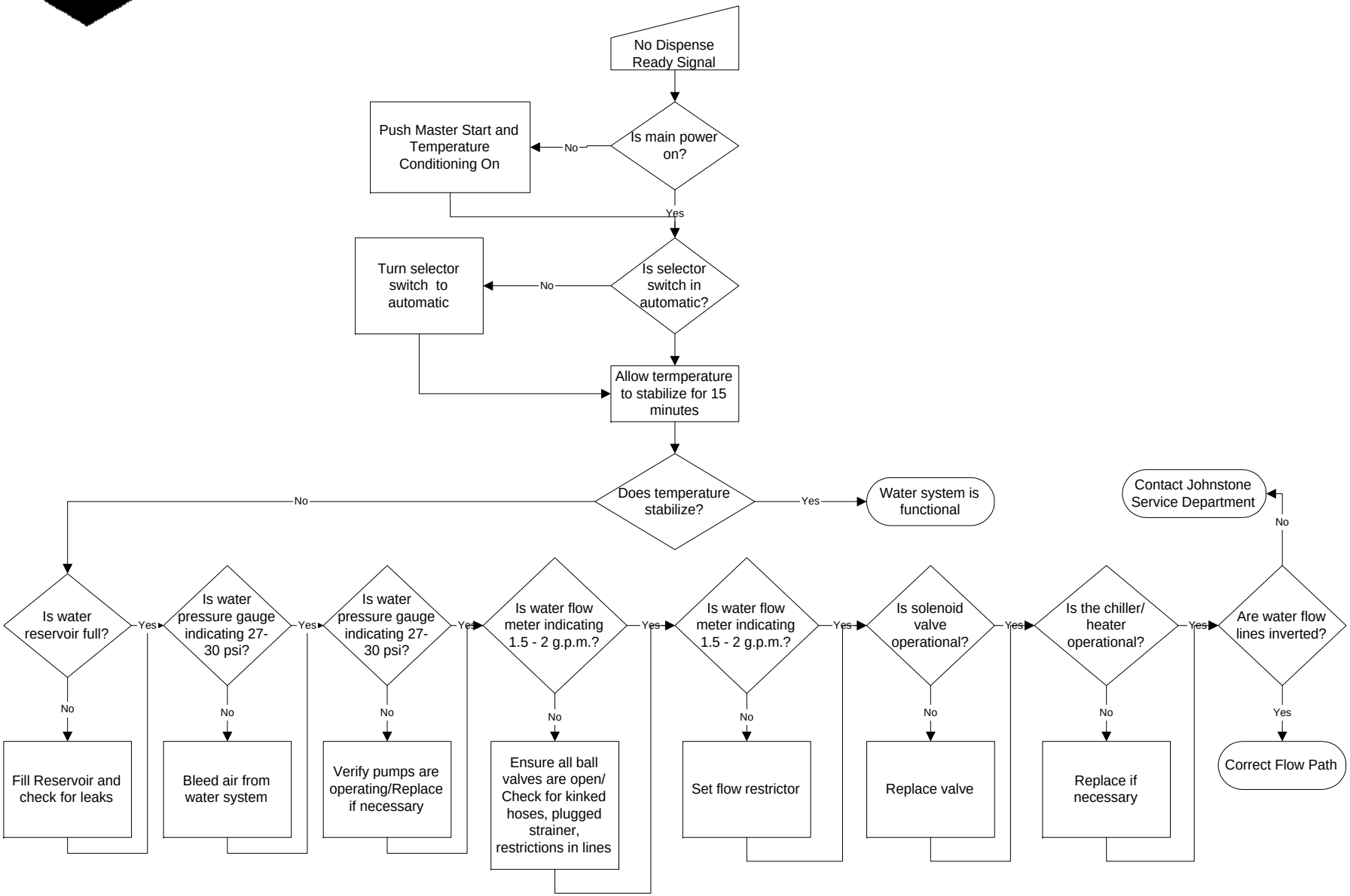
No
Are the parameters in the CPU set correctly for flow meter (0.286 cc/tooth)
No
Reset CPU parameters (see pg. 52 of A/S manual)
Is the Volume acceptable?
Yes
Volume within given parameters
Yes
No
Is the correct nozzle installed or Plugged tip? (process sheet)
No
Replace nozzle or tip
Is the Volume acceptable?
Yes
Volume within given parameters
Yes
Yes
Is the Material Filter Plugged? (over 500psi drop)
No
Replace the Material Filter
Is the Volume acceptable?
Yes
Volume within given parameters
No
Has the material viscosity changed?
Yes
Change drum of material
Is the Volume acceptable?
Yes
Volume within given parameters
No
Adjust as scaling pots as needed (see pg. 68 of A/S manual)
Is the Volume acceptable?
No
Volume within given parameters
Yes
Are the correct Bead Values in the robot program? (process sheet)
Yes
Contact Johnstone Technical Support
No
Change Bead values (see pg. 52 of A/S Manual)
Is the Volume acceptable?
Yes
Volume within given parameters
No

Dispense Troubleshooting
Water System - Electrical



Johnstone INGERSOLL-RAND FLUID PRODUCTS

Dispense Troubleshooting
Water System - Mechanical



Johnstone

ZIPPER COVERED CONDITIONED DISPENSE HOSE ASSEMBLIES

DESCRIPTIVE NUMBERING SYSTEM

3 0 1 Z D _ 5 _ _ _

STANDARD COMPONENTS
- (1) 403-027 H_2O COND. BLK. GUN END
- (1) 403-038 H_2O COND. BLK. REG. END
- (1) 080 HOSE
- (1) HOSE COVER

HOSE SIZE
- 1/4 = 4
- 3/8 = 6
- 1/2 = 8
- 3/4 = 7

PRESSURE RATING
- 5,000 = 5

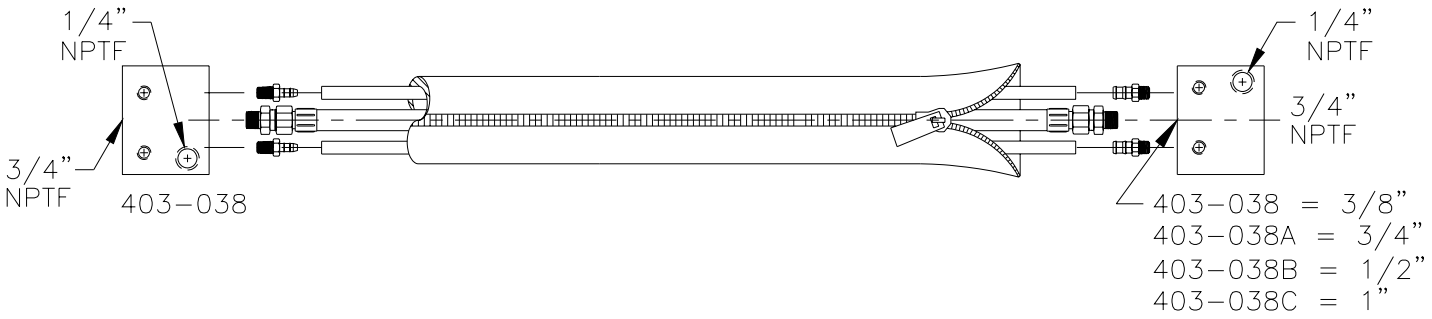
HOSE MATERIAL
- RUBBER = R
- TEFLON = T

FOOT LENGTH
- 5' = 05
- 7' = 07
- 10' = 10
- 15' = 15

Johnstone

ZIPPER COVERED CONDITIONED SUPPLY HOSE ASSEMBLIES

DESCRIPTIVE NUMBERING SYSTEM



3 0 1 Z S _ 5 _ _ _ _

STANDARD COMPONENTS
- (2) 403-038
  - H_2O COND. BLK. REG. END
- (1) 080 HOSE
- (1) HOSE COVER

HOSE SIZE
- 1/4" = 4
- 3/8" = 6
- 1/2" = 8
- 3/4" = 7
- 1" = 1

PRESSURE RATING
- 5,000 = 5

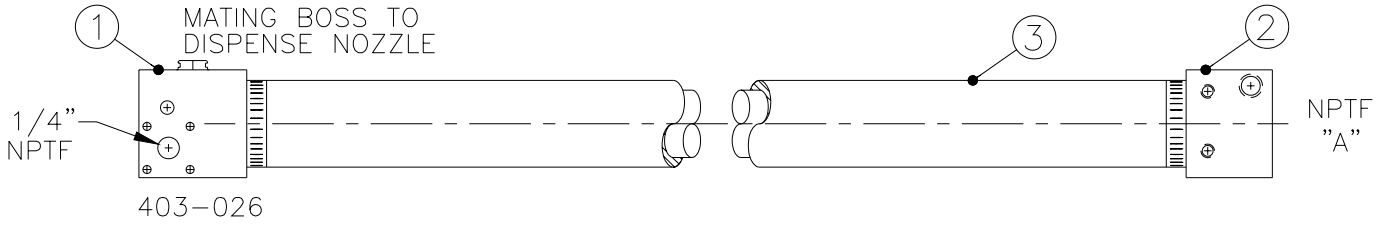
HOSE MATERIAL
- RUBBER = R
- TEFLON = T

FOOT LENGTH
- 5' = 05
- 7' = 07
- 10' = 10
- 15' = 15

Johnstone

COAXIAL CONDITIONED DISPENSE HOSE ASSEMBLIES

DESCRIPTIVE NUMBERING SYSTEM



3 6 2 C D _ 5 _ _ _

STANDARD COMPONENTS
1. (1) ALUMINUM HOSE BLOCK (JPC)
2. (1) ALUMINUM HOSE BLOCK (ST CLAIR)
3. (1) BELLOWSFLEX COVER (ST CLAIR)

HOSE SIZE

	NPTF CONNECTION "A"
1/2 = 8	1/2" NPTF
3/4 = 7	3/4" NPTF
1 = 1	1" NPTF

PRESSURE RATING
5,000 = 5

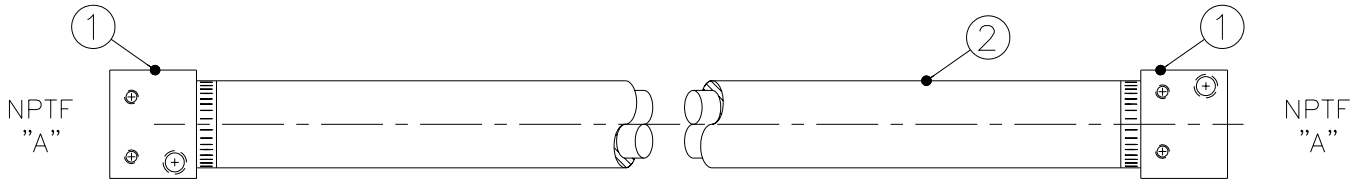
INNER HOSE MATERIAL
RUBBER = R (neoprene)
TEFLON = T

FOOT LENGTH
5' = 05
7' = 07
10' = 10
15' = 15

Johnstone

COAXIAL CONDITIONED SUPPLY HOSE ASSEMBLIES

DESCRIPTIVE NUMBERING SYSTEM



3 6 2 C S _ 5 _ _ _

STANDARD COMPONENTS
(1) (2) ALUMINUM HOSE BLOCK (ST CLAIR)
(2) (1) BELLOWSFLEX COVER (ST CLAIR)

HOSE SIZE

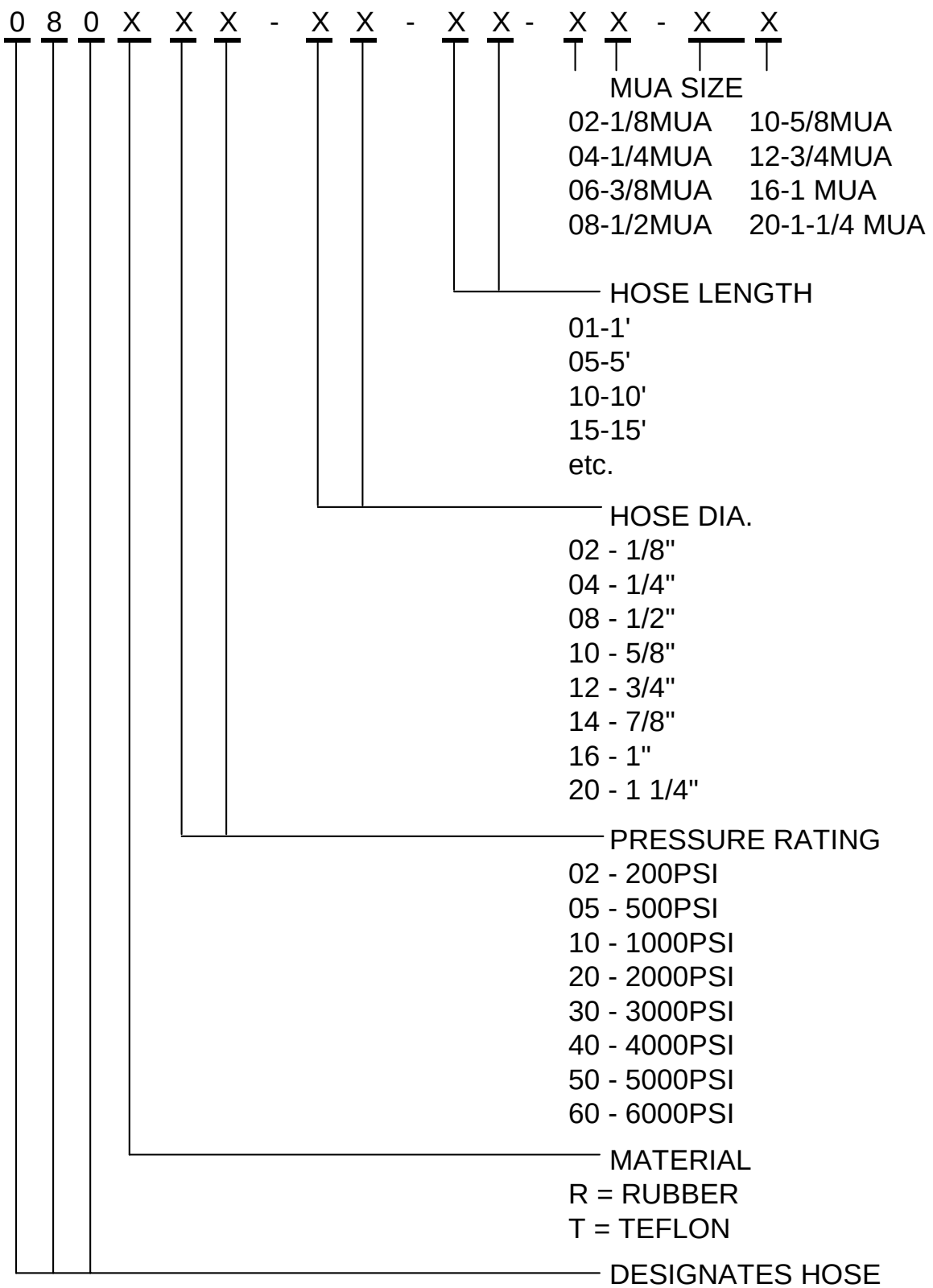
	NPTF CONNECTION "A"
1/2 = 8	1/2" NPTF
3/4 = 7	3/4" NPTF
1 = 1	1" NPTF

PRESSURE RATING
5,000 = 5

INNER HOSE MATERIAL
RUBBER = R (neoprene)
TEFLON = T

FOOT LENGTH
7' = 07
10' = 10
15' = 15
20' = 20

HOSE NUMBER CHART

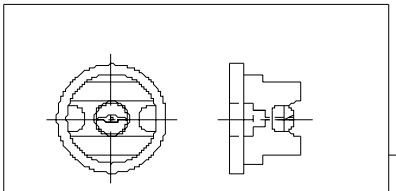


STREAMING AND SPRAY TIPS

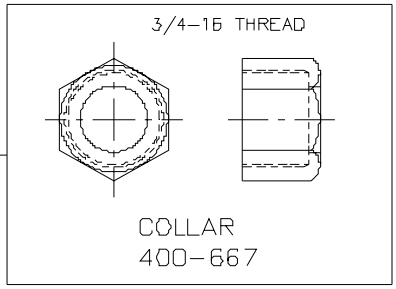
RECOMMENDED FOR BODY SHOP AND STAMPING PLANT APPLICATION

(A) HEM–FLANGE ADHESIVE 1,5 TO 3,0 BEAD
(B) OVER–HEM 1,5 HIGH X 6,0/8,0 WIDE BEAD
(C) ANTI–FLUTTER – STITCH BEAD 6,0 TO 12,0 BEAD
(D) WARM MELT 2,0 TO 6,0 BEAD (FORD 6QB3, CHRYSLER MSCD473B)
(E) WELD THRU SEALER 3,0 TO 10,0 BEAD
(F) BPR (BODY PANEL REINFORCEMENT) SPRAY PATTERN

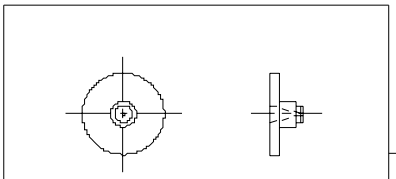
GENERAL PURPOSE STREAMING TIPS



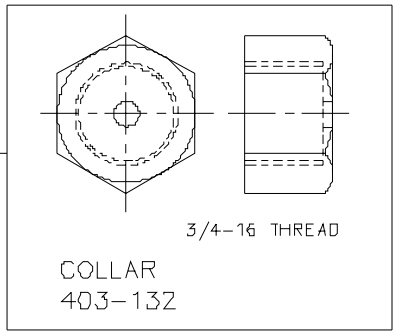
PART No.	ORIFICE	APPLICATIONS
362–192C	5° .016	A
362–192B	5° .018	A
362–192A	5° .021	A
362–192F	5° .026	A D E
362–192G	5° .031	D E
362–192E	5° .036	E
362–196C	65° .026	F
362–196A	65° .031	F
362–196B	65° .036	F
362–457	110° .021	F



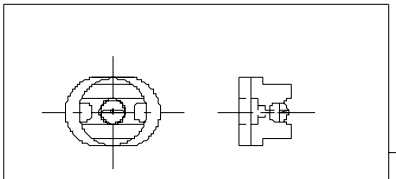
PREFERRED STREAMING TIPS



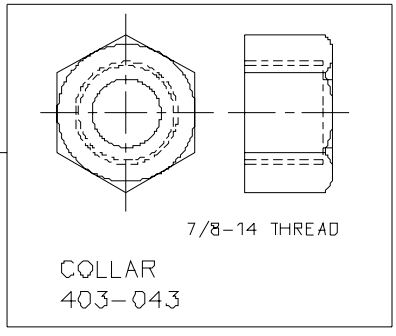
PART No.	ORIFICE	APPLICATIONS
362–470	.016	A
362–471	.018	A
362–472	.021	A
362–473	.026	A



ORIENTED SPRAY TIPS



PART No.	ORIFICE	APPLICATIONS
362–457Q	110° .021	F
362–051	95° .023	F
362–051A	110° .023	F



EXTRUSION NOZZLES

RECOMMENDED FOR BODY SHOP AND STAMPING PLANT APPLICATIONS:
WHEN MOTION IS LESS THAN 300 MM/SECOND

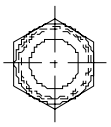
(A) HEM-FLANGE ADHESIVE
1,5 TO 3,0 BEAD

(B) OVER-HEM
1,5 HIGH X 5,0/8,0 WIDE BEAD

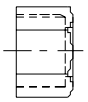
(C) ANTI-FLUTTER - STITCH BEAD
6,0 TO 12,0 BEAD

(D) WARM MELT
8,0 TO 15,0 BEAD

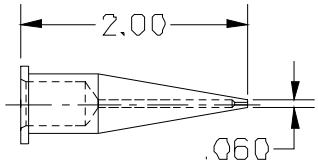
COLLAR
400-667



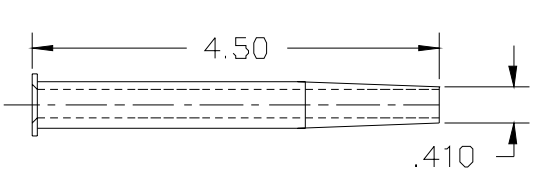
3/4-16 THREAD



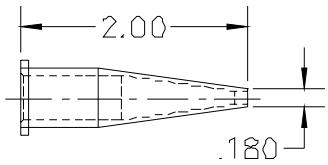
USED WITH ALL NOZZLES SHOWN ON THIS PAGE



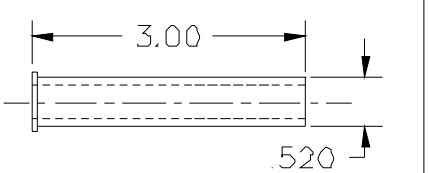
PART No.	ORIFICE	APPLICATIONS
400-705	.026	B
400-712	.046	A



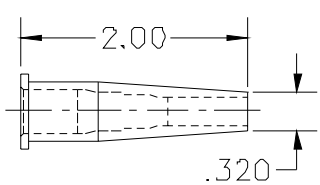
PART No.	ORIFICE	APPLICATIONS	
403-023	.310	C D	



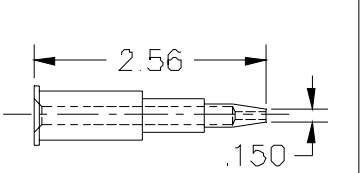
PART No.	ORIFICE	APPLICATIONS
400-723	.093	A C
400-589-B	.106	C
400-724	.125	C



PART No.	ORIFICE	APPLICATIONS	
403-025	.390	C D	



PART No.	ORIFICE	APPLICATIONS
400-725	.187	C
400-726	.250	C D
ALSO USED W/ 102-006DC		

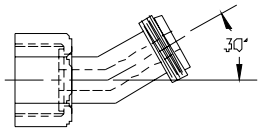


PART No.	ORIFICE	APPLICATIONS
402-745	.090	C
HONDA PREFERRED		

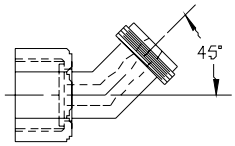
ANGLED NOZZLE ADAPTERS

SUITABLE FOR ALL STREAMING, SPRAY AND EXTRUSION APPLICATIONS

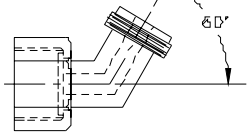
403-114-30



403-114-45



403-114-60



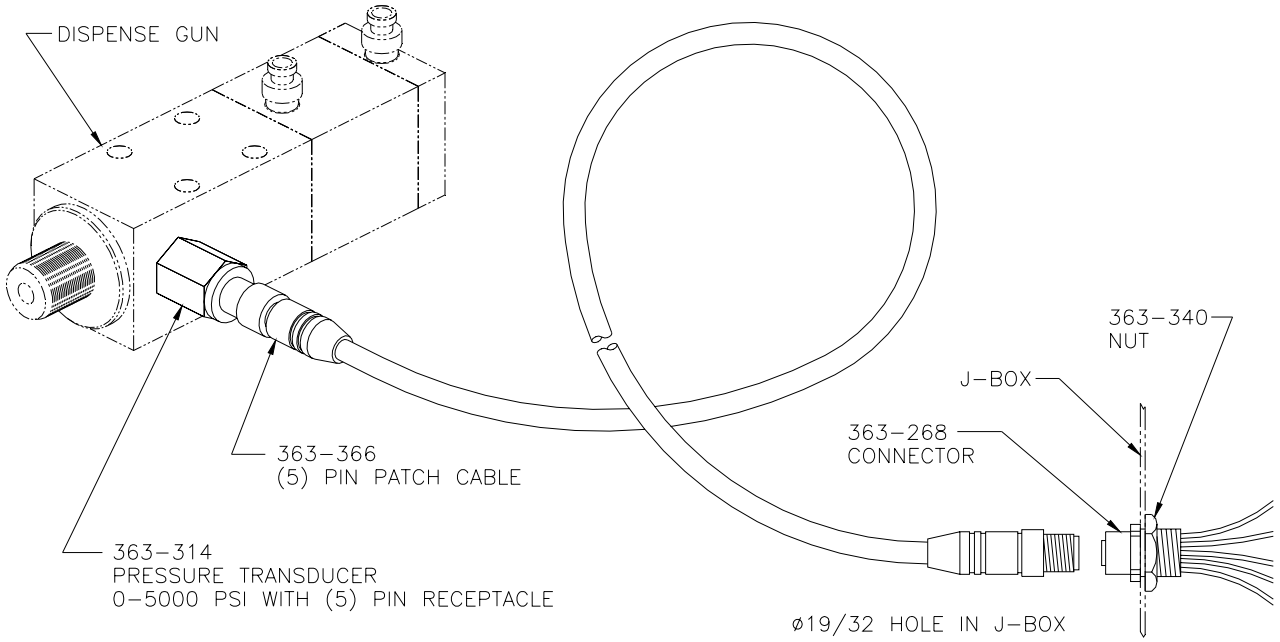
3/4-16 THREAD
MALE & FEMALE

Pressure Transducer New 363-314

Range 0-5000 PSI

The Pressure Transducers send the material pressure back to the FCM so that it can increase or decrease is if necessary. They also assure that the chambers have refilled correctly.

110-380 Transducer and cable assembly.



WIRE COLOR CODE				
NEW COLOR:				
CORD GRIP	CONNECTOR	REPLACES	WIRE #	FUNCTION
RED	WHITE	RED	2051	+ POWER
BLACK	BLUE	BLACK	2052	- POWER
SHIELD (BARE)	BROWN	SHIELD (BARE)	2362	SHIELD
WHITE	BLACK	WHITE	2361	+ SIGNAL
BLUE	GREY	GREEN	2351	- SIGNAL

To Test the Sensors output:

1.) Inspect cord grips on the receptacles to insure tightness.

2.) Connect male and female sensor cable receptacles together.

3.) Apply 24vdc power supply to black (common) and red (+) wires at the end of the cable.

4.) Connect digital voltmeter leads to white (+) and blue (-) wires at cable end.

5.) Voltage reading from digital voltmeter should be near 1vdc with no pressure applied.

6.) Apply pressure. Replace the sensor if:

* The sensor outputs a constant voltage regardless of pressure.

- Voltage = [(Pressure x 0.0018) + 1]

The New Pressure Transducer Cable Part No. is 363-366
Install the Air Regulator.

362-256 FLOW MONITOR / LESS SENSOR

IMPORTANT: READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING, OR SERVICING THIS EQUIPMENT

362-256	Flow Monitor / Sensor not included
362-449	Flow Monitor Sensor

SERVICE KITS

Use only Johnstone replacement parts to insure compatibility and longest life.

- Flow Monitor Repair Kit: 362-256RK
- Flow Monitor Seal Kit: 362-256SK

WARNING:
DO NOT OPERATE REGULATOR AT PRESSURES ABOVE RECOMMENDED MAXIMUM OF 5000PSI (340 BAR)

SPECIFICATIONS

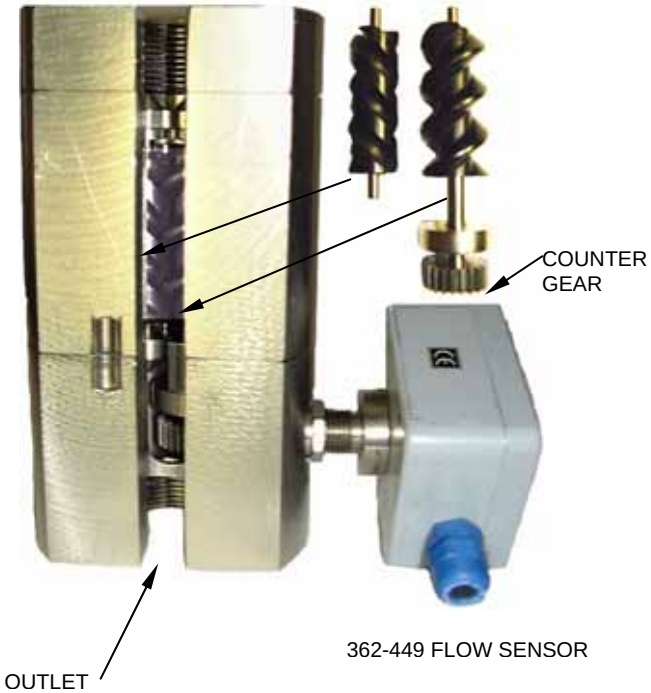
Fluid Inlet Port Size	3/4" BSPM
Fluid Outlet Port Size	3/4" BSPM
Resolution	.2860 cc

MAINTENANCE SCHEDULE

MONTHLY:
Bleed Material at a high flow rate.
(Manual purge with the dispense nozzle off)
EVERY SHUTDOWN:
Depressurize the Flow Monitor.

OPERATION

When material flows through the Monitor the two screw gears turn. A counter gear is press on one of the screw gears. A Hall effect sensor outputs a 24V square wave pulse every time a tooth from the counter gear passes by. The Autostream system counts the pulses and will record a total dispense volume.



CUT-AWAY VIEW

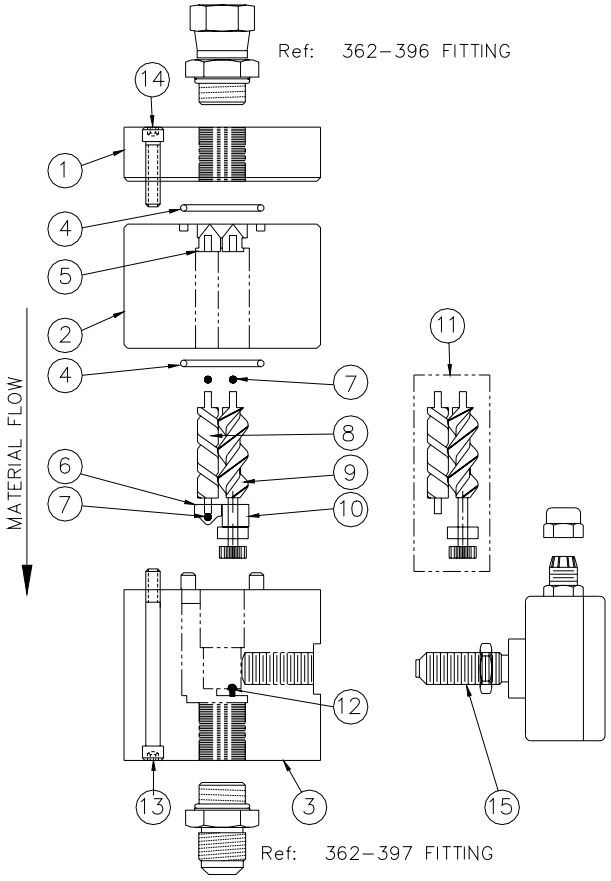
REPLACEMENT PROCEDURE

DEPRESSURIZE THE MATERIAL, AIR AND WATER SYSTEMS AND POWER DOWN THE ELECTRICAL SYSTEM.

Remove the cover of the Flow Sensor and remove the wire connection. Loosen the Jam nut and unscrew the Flow Sensor.
Loosen the Four SHCS on the temperature cover if installed. Unscrew both #12 JIC connectors on the flow monitor and slide it out of the temperature cover.
Reverse this process to install the Flow Monitor.
NOTE: Thread the Flow Sensor until it bottoms out, unscrew 1/8 turn and tighten the jam nut.
Bleed the air from the water system.
Supply material air pressure to the System.
Operate the System to bleed the air from the material. (Purge 1 to 2 gallons of material)

* INCLUDED IN REPAIR KIT 362-256RK ∇ INCLUDED IN SEAL KIT 362-256SK				
	DET#	QTY	PART#	DESCRIPTION
	1	1	N/A	Body Part Inlet
	2	1	N/A	Body Part Center
	3	1	N/A	Body Part Exit
*∇	4	2	362-958	O-ring Teflon
*	5	2	363-522	Inlet Sleeve Bearings
*	6	1	362-966	Radial Bearing (exit side)
*	7	3	362-959	Axial Bearing
	8	1	362-962	Gear Short
	9	1	362-963	Gear Long
*	10	1	362-965	Spacer
*	11	1	361-961	Helical Gear Assembly
*	12	1	362-964	Axial Bearing Button
	13	6	N/A	M8 X 65 mm SHCS
	14	6	N/A	M8 X 25 mm SHCS
	15	1	362-449	Flow Sensor

NOTE: The Flow Sensor and JIC fittings must be ordered Separately.



Flow Monitor No. 362-

repair kit 256RK

MAINTENANCE FOR THE GEAR MONITOR #362-256 (SRZ)

DISASSEMBLY PROCEDURE:

NOTE: Never pry any body component apart with a chisel or screwdriver.

1. Remove the sensor by releasing the lock nut and remove the sensor from the flow meter body.
2. Relax the six SHCS (13) at the outlet end (3) with a 6mm Allen hex key.
3. Remove four of the six bolts but keep two opposing bolts engaged by a few threads
4. Hold the flow meter about 1in. above a table and grasp the upper housing at the sensor end, tap on the two bolts with a soft hammer until body parts (2) and (3) separate.
5. Remove the last two bolts (13) and pull the flow meter straight apart.

NOTE: The gears can break if the monitor is pulled apart at an angle.

6. The helical gears (8,9) with the sleeve bearings and sleeve (10) can now be pulled out of the body.
7. The Inlet Body can be removed by removing the six SHCS (14)
8. Remove the O-rings (4), clean the monitor, and inspect for damage.

REASSEMBLY PROCEDURE:

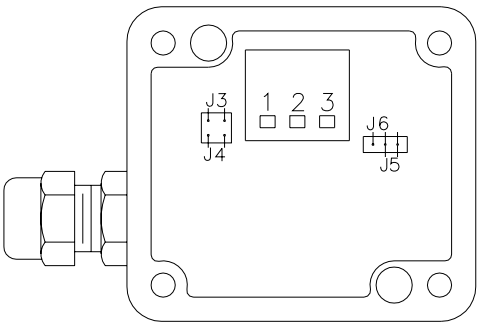
1. Set body part (3) down on a table with the locating pins pointing up. Verify that all three of the Axial Bearing (7) and Radial Bearing (12) are correctly installed.
2. Install the O-Ring (4) into the Body Exit (3).
3. Insert Helical Gear (9) with Counter Gear facing down.
4. Push on the Sleeve Bearing so that it is inserted just inside the body (3).
4. Install the Slotted Sleeve (10) above the sleeve bearing (8).
5. Insert the Radial Bearing (7) into the Body Exit counterbore and push the Slotted Sleeve fully into it bore.
6. Insert the Short gear (8) into the Radial Bearing (7).
7. Slide the body (2) over the helical hears and push down as far as it can go.
7. Insert the six bolts (13) and alternately tighten each down until the two body parts (2 & 3) are together. Torque to 20 Ft. Lbs.
8. Install the O-Ring (4) on the Body Center, screw the Body Inlet (1) to the Body Center and torque the SHCS (14) to 20 Ft. Lbs.

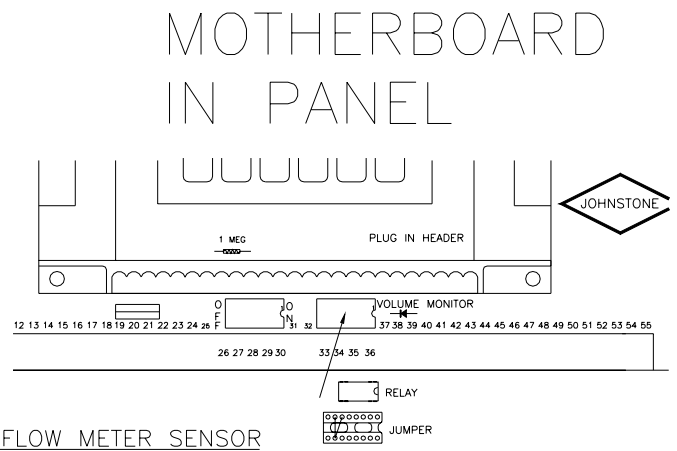
NOTE: If the parts are reassembled correctly, a torque of 20 foot lbs. will provide a sufficient seal. Reassemble should not require use of a vise.

9. To replace the sensor (14) screw the pickup in by hand until it bottoms out. Turn counter clock wise 1/8 turn and lock into position with the Jam nut .

FLOW SENSOR JUMPER SETTINGS.

The jumper setting on the Flow Sensor can be set to two different configurations. With a relay or a Jumper socket installed in the motherboard socket (see Drawing)



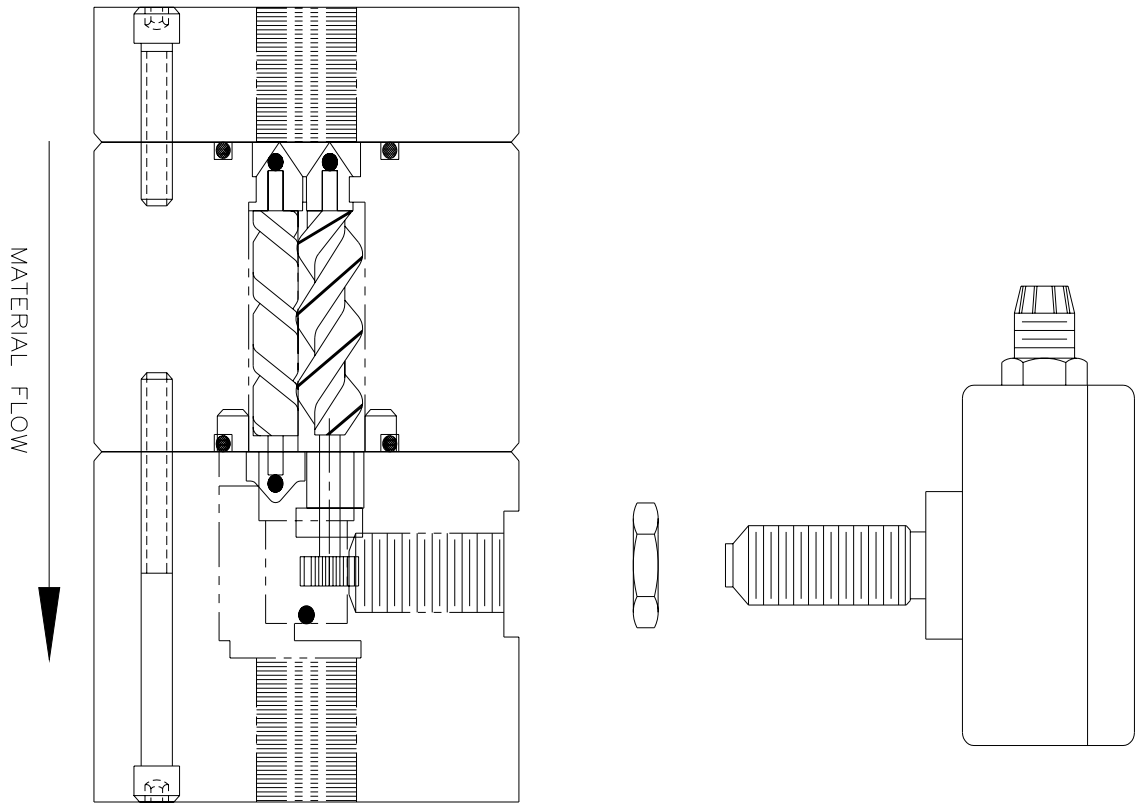


FLOW METER SENSOR
JUMPER SETTINGS & TERMINALS

VERSION	J3	J4	J5	J6
WITH RELAY or PC CONTROLLER (NPN)	ON	OFF	ON	OFF
MOTHERBOARD WITH JUMPER (PNP)	ON	OFF	OFF	ON

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
GEAR MONITOR	Material Not at Temperature	Wait for Material to reach set Temperature
No Material Flow	Mechanical binding	Purge Monitor with outlet not connected to Mastic Valve
	Expired Material	Purge System with Fresh Material Replace Monitor
Flow Sensor No Output	No DC Power Supply	Check Power Fusing
	Defective Power Supply	Replace Power Supply
	No Output Signal	Improper adjustment of the Hall Effect Sensor, bottom out then back out 1/8 turn and tighten Jam nut. Check Sine connection - Plugged in Open Wire Verify DC Power to Hall Effect Sensor Defective Sensor Replace Defective Motherboard Relay
	Incorrect Jumper location in Sensor	Check jumper settings
	Improper Analog Signal from Robot	Verify Robot analog
	Scaling Pots set Incorrectly	Adjust Scaling Pots for the Correct Bead Size



300x911xxx MATERIAL REGULATOR

IMPORTANT: READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING, OR SERVICING THIS EQUIPMENT

300-911Axx	Low Flow Regulator 9/32” orifice
300-911Bxx	Medium Flow Regulator 5/16” orifice
300A911Bxx	Abrasive Med. Flow Reg. 5/16 orifice
300-911Cxx	High Flow Regulator 3/8” orifice

SERVICE KITS

Use only Johnstone replacement parts to insure compatibility and longest life.

- Low Flow Repair Kit: 300-911ARK
- Medium Flow Repair Kit: 300-911BRK
- Medium Abrasive Rep. Kit 300A911BRK
- High Flow Repair Kit: 300-911CRK

WARNING:
DO NOT OPERATE REGULATOR AT PRESSURES ABOVE RECOMMENDED MAXIMUM OF 5000PSI (340 BAR) MATERIAL AND 100PSI (6.8 BAR) AIR.

SPECIFICATIONS

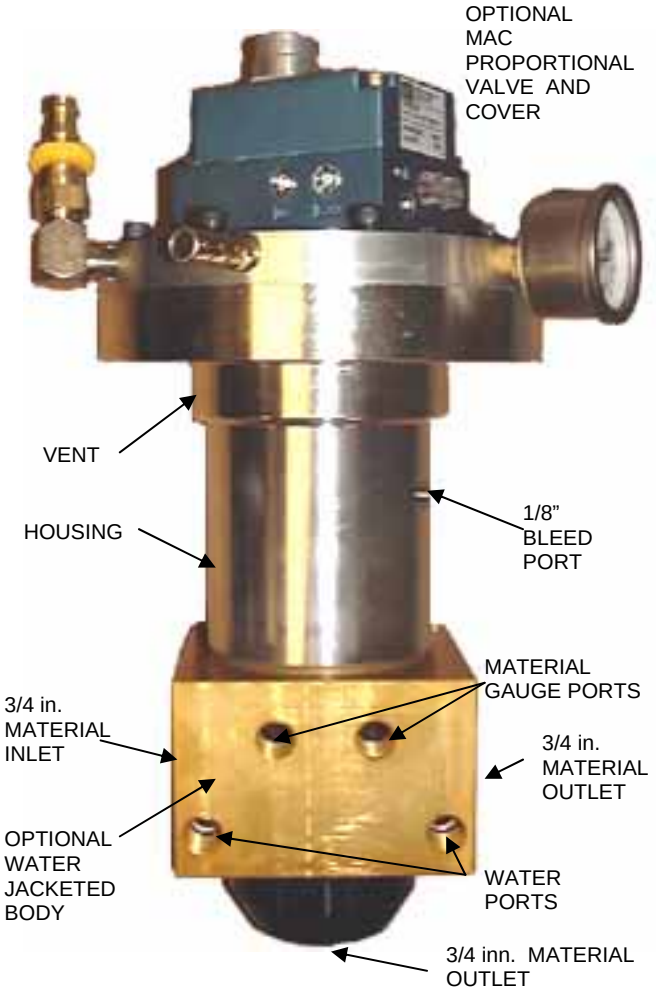
Air Inlet Port Size	1/4" NPT
Fluid Inlet Port Size	3/4" NPT
(2) Fluid Outlet Port Size	3/4” NPT
Static Pressure Ratio	37:1

MAINTENANCE SCHEDULE

MONTHLY:
Bleed Material from the housing.
Check for material leakage in the housing vent hole.
EVERY SHUTDOWN:
Depressurize the regulator.

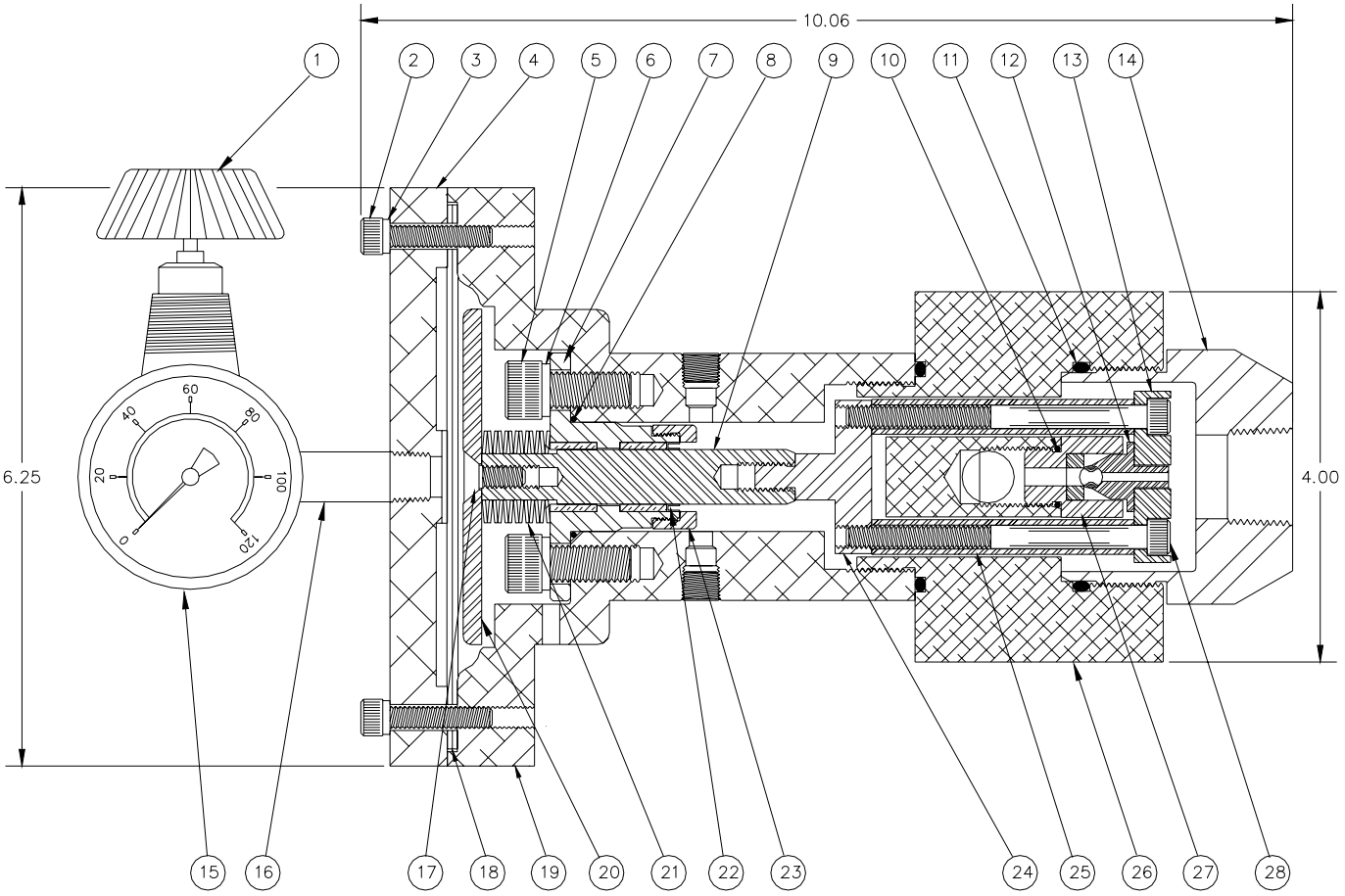
OPERATION

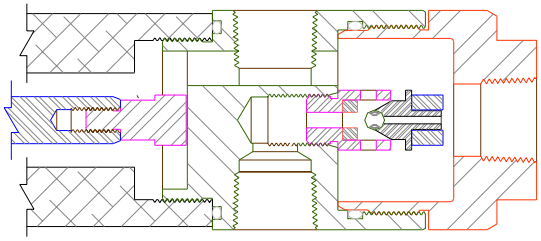
Supply material and air pressure to the regulator. Adjust the Air Regulator to change the material pressure. Increase the air pressure for more PSI and decrease the air pressure for less PSI.



REPLACEMENT PROCEDURE

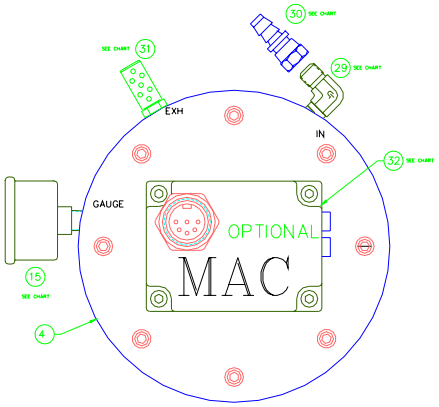
DEPRESSURIZE THE REGULATOR – MATERIAL, AIR AND WATER PRESSURE.
Remove Fluid and Pneumatic connections.
Install new Fluid and Pneumatic Connections and tighten.
Bleed the air from the water system.
Supply material air pressure to the regulator.
Operate the regulator to bleed the air.
(Purge 1 to 2 gallons of material)





MAT. IN PORT

VIEW ROTATED 90°, FULL OPEN POSITION



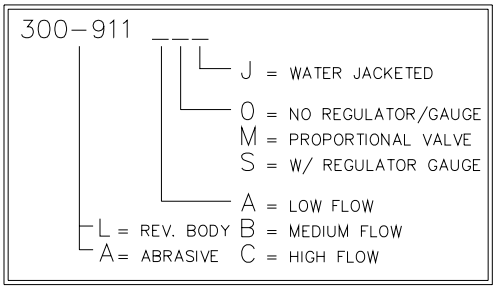
∗ = INLUDED IN REPAIR KIT SEE CHART

	DET.	QTY.	PART No.	DESCRIPTION
	32	1	363-124	PROPORTIONAL VALVE (OPTIONAL)
	31	1	360-249	MUFFLER w/PROP. VALVE.
	30	1	363-000B03	3/8" BARB X #6 JIC w/PROP. VALVE
	29	1	363-048	ELBOW #6 X 1/8" NPT 90 w/PROP. VALVE
	28	2	402-518	1/4 - 20 X 3 1/4 SHCS
∗	27	1	SEE CHART	SEAT
	26	1	SEE CHART	BODY
	25	2	402-517	SPACER
	24	1	402-514	LOWER PLATE
	23	1	402-522	COLLAR
∗	22	1	360-650	SEAL
∗	21	13	361-974	BELLEVILLE WASHER
	20	1	402-519	DIAPHRAGM PLATE
	19	1	402-525	HOUSING
∗	18	2	402-290V	DIAPHRAGM VITON
	17	1	350-400	1/4 - 20 X 3/4 FLAT SOCKET CAP
	16	1	350-949	1/4 X 1 1/2 NIPPLE
	15	1	SEE CHART	350-053 w/REG. 361-708 w/ PROP.
	14	1	402-520	END CAP
	13	1	402-516	UPPER PLATE
∗	12	1	SEE CHART	POPPET
∗	11	2	350-129V	O-RING VITON
∗	10	1	350-336	O-RING BUNA
	9	1	402-521	SHAFT
∗	8	1	362-088	O-RING VITON
	7	1	402-523	RETAINER
	6	4	361-916	LOCK WASHER 7/16"
	5	4	360-581	10 MM X 25 MM SHCS
	4	1	SEE CHART	402-330 STD. / 402-330A PROP. VALVE
	3	8	361-233	LOCK WASHER 1/4"
	2	8	360-583	6 MM X 30 MM SHCS
	1	1	SEE CHART	361-821 REGULATOR (OPTIONAL)

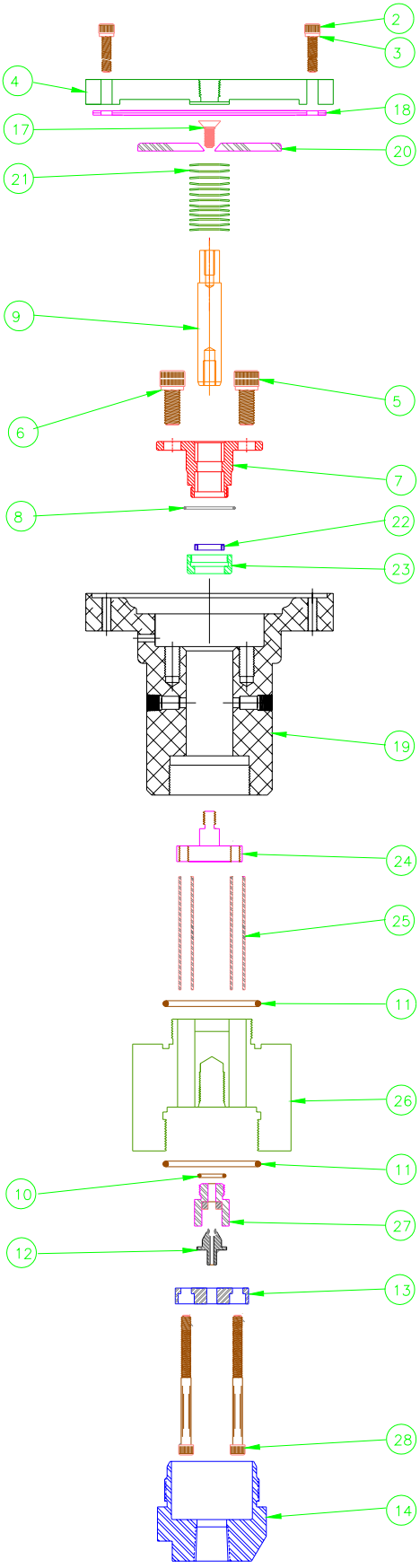
There are several different types of Material regulators.

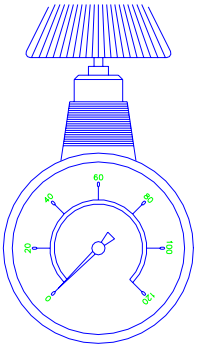
1. Non Temperature Conditioning
2. Temperature Conditioning the body is water jacketed
3. Standard flow and reverse porting regulators used to mirror dispense paths on robots.
4. Low Flow 9/32 orifice: Medium Flow 5/16 orifice: High Flow 3/8 orifice.
5. The Medium flow regular is offered in a abrasive resistant version.
6. A manual Air regulator can be added to control the material flow
7. A Proportional regulator can be added to control the flow.

Use the chart to find the correct style regulator.

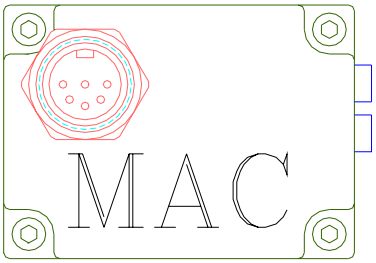


LOW FLOW MASTIC REG. No.	15 GAUGE 0-160 PSI	1 REGULATOR 0-160 PSI	12 POPPET 9/32	27 SEAT	26 BODY	32 PROP. VALVE	4 COVER PLATE	27 SEAT
300-911A0	–	–	402-515	402-513	402-524	–	402-330	
300-911AOJ	–	–	402-515	402-513	402-990 WATER JACKETED	–	402-330	
300L911AOJ	–	–	402-515	402-513	402-990-OP WATER JACKETED	–	402-330	
300-911AS	350-053	361-821	402-515	402-513	402-524	–	402-330	300-911ARK
300-911ASJ	350-053	361-821	402-515	402-513	402-990 WATER JACKETED	–	402-330	
300L911ASJ	350-053	361-821	402-515	402-513	402-990-OP WATER JACKETED	–	402-330	
300-911AMJ	361-708	–	402-515	402-513	402-990 WATER JACKETED	363-124	402-330A	
300L911AMJ	361-708	–	402-515	402-513	402-990-OP WATER JACKETED	363-124	402-330A	
MED. FLOW MASTIC REG. No.			POPPET 5/16					
300-911B0	–	–	402-991	402-992	402-524	–	402-330	
300-911BOJ	–	–	402-991	402-992	402-990 WATER JACKETED	–	402-330	
300L911BOJ	–	–	402-991	402-992	402-990-OP WATER JACKETED	–	402-330	
300-911BS	350-053	361-821	402-991	402-992	402-524	–	402-330	300-911BRK
300-911BSJ	350-053	361-821	402-991	402-992	402-990 WATER JACKETED	–	402-330	
300L911BSJ	350-053	361-821	402-991	402-992	402-990-OP WATER JACKETED	–	402-330	
300-911BMJ	361-708	–	402-991	402-992	402-990 WATER JACKETED	363-124	402-330A	
300L911BMJ	361-708	–	402-991	402-992	402-990-OP WATER JACKETED	363-124	402-330A	
300A911BO	–	–	403-071	402-992	402-524	–	402-330	300A911BRK
300A911BSJ	350-053	361-821	402-991	402-992	402-524	–	402-330	
HIGH FLOW MASTIC REG. No.			POPPET 3/8					
300-911C0	–	–	402-993	402-994	402-524	–	402-330	
300-911COJ	–	–	402-993	402-994	402-990 WATER JACKETED	–	402-330	
300L911COJ	–	–	402-993	402-994	402-990-OP WATER JACKETED	–	402-330	
300-911CS	350-053	361-821	402-993	402-994	402-524	–	402-330	300-911CRK
300-911CSJ	350-053	361-821	402-993	402-994	402-990 WATER JACKETED	–	402-330	
300L911CSJ	350-053	361-821	402-993	402-994	402-990-OP WATER JACKETED	–	402-330	
300-911CMJ	361-708	–	402-993	402-994	402-990 WATER JACKETED	363-124	402-330A	
300-911CMJ	361-708	–	402-993	402-994	402-990-OP WATER JACKETED	363-124	402-330A	

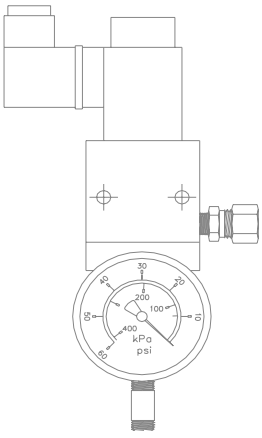




MANUAL
REGULATOR
361-821
GAUGE NO. 350-053



MAC PROPORTIONAL
VALVE OPTION
363-124
GAUGE NO. 361-821



HERION PROPORTIONAL
VALVE (OLD STYLE)
361-983

DISASSEMBLING THE MATERIAL REGULATOR

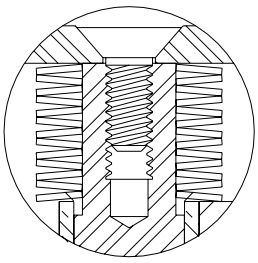
WARNING:
REMOVE MATERIAL PRESSURE FROM SYSTEM AND TURN OFF AIR BEFORE CONTINUING

1) Unscrew the Air Regulator.
2) Unscrew the eight Socket Screws (2) and Lock Washers (3) that hold the diaphragm cover (4).
3) Remove the Diaphragm Cover (4) and the two Diaphragms (18).
4) Unscrew the Flat Socket Screw (17) that holds on the Diaphragm Plate (20).
5) Remove the Diaphragm Plate (20) and the thirteen Belleville Washers (21).
6) Unscrew the four Socket Screws (5) and Lock Washers (6) that hold the Retainer (7).
7) Remove the Retainer (7) and the Housing (19) can be unscrewed from the Jacketed body (26).
8) Unscrew the Shaft (9) from the Lower Plate (24).
9) Unscrew the End Cap (14) from the Jacketed Body (26).
10) Unscrew the two Socket Screws (28) that hold the Upper Plate (13).
    a) Remove the Upper Plate (13), the Poppet Valve (12) and both Spacers (25).
11) The Valve Seat (27) can be removed with a ¾" socket
    a) The "C" size valve seat requires a 7/8 six-point socket.
12) Remove the Seal and O-rings from the body and discard.

ASSEMBLING THE MATERIAL REGULATOR

ASSEMBLING THE MATERIAL SECTION – INSPECT AND CLEAN ALL PARTS CAREFULLY AND REPLACE IF NECESSARY – LUBRICATE ALL SEALS AND O-RINGS

1) Install the O-ring (10) on the Valve Seat (27) and thread it into the Body (26) and tighten (20 Ft/Lbs.).
2) Install the two Socket Screws (28) into the Upper Plate (13).
    a) Slide the Spacers (25) over the Socket Screws (28).
    b) Install the Poppet Valve (12) ¼" guide into the Upper Plate (13).
    c) Push the above assembly into the Body (26) until the Poppet Valve and Seat are mated.
    d) Hold the Lower Plate (24) against the Socket Screws (28) and tighten to 10 Ft/Lbs.
3) Install the O-ring (12) into both ends of the Body (26).
4) Thread the End Cap (14) into the Body (26) and tighten to 30 Ft/Lbs.
5) Thread the Housing (19) onto the Body (26) and tighten to 40 Ft/Lbs.
6) Install the Seal (22) into the Retainer (7) Lip Facing Material.
    a) Thread the Collar (23) onto the Retainer (7) and tighten to 10 Ft/Lbs.
    b) Install the O-ring (8) on the Retainer (7) and lubricate.
7) Install the Retainer (7) into the Housing (19) and tighten the Socket Screws (5) and Lock Washers (6) to 30 Ft/Lbs.
8) Hold the Shaft (9) in the up position.
   Install the Thirteen Belleville Washers (21) onto the shaft.



    a) The Washers go in opposite directions. Start the first washer large diameter facing the Retainer (7).
9) Place the Diaphragm Plate (20) on the Shaft (9) and tighten the Flat Socket Screw (17).
10) Install the Piston Assembly (step 9) and push the Shaft (9) into the Retainer (7) and thread the Shaft (9) onto the Upper Plate (24) and tighten the Flat Socket Screw (17) to 12 Ft/Lbs.
11) Install the two Diaphragms (18) in the Housing (19) and align the holes.
12) Install the Cover (4) and thread the eight Socket Screws (2) and Lock Washers (3) to 10 Ft/Lbs.
13) Install the Air Regulator.

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
No Material Output	Air Supply Turned Off	Turn the Air Supply on the system
	Material Ball Valves Closed	Open Ball Valves
	Insufficient Material Supply Pressure	Check the Supply Pumps for Correct Operation and Pressure
	Filter Plugged	Replace Filter Element
	Temperature Setting Incorrect	Set Temperature to the Correct Setting
	Mastic Regulator or Supply Hose Plugged	Replace Mastic Regulator or Supply Hose
	Air Diaphragm in Mastic Regulator Damaged	Replace Diaphragms
	Cured Material inside of the Mastic Regulator	Remove and Rebuild the Mastic Regulator
	Mechanical Bind in the Mastic Regulator	Remove and Rebuild the Mastic Regulator
Unable to Regulate Flow	Insufficient Air Supply to Mastic Regulator	Verify Air Supply for a Closed Ball Valve and Correct Hose Size
	Cured Material inside of the Mastic Regulator	Remove and Rebuild the Mastic Regulator
	Valve or Poppet Inside Mastic Regulator Damaged	Replace Valve and Poppet
	Mechanical Bind in the Mastic Regulator	Remove and Rebuild the Mastic Regulator
	Proportional Air Valve Operating Improperly	See Proportional Air valve or See Air Valve Controller Card
Material Leaking	From Vent Hole	Remove and Rebuild the Mastic Regulator
	From body to housing	Defective O-Ring Rebuild the Mastic Regulator

105B038x DISPENSE VALVE

IMPORTANT: READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING, OR SERVICING THIS EQUIPMENT

105B038A 3/4-16 Nozzle #403-003
105B038C 7/8-14 Nozzle #403-005
105B038D 7/8-14 Tip Alignment Nozzle #403-005A
105B038E 3/4-16 End Cap Mounting Nozzle #403-003

SERVICE KITS

Use only Johnstone replacement parts to insure compatibility and longest life.

- Dispense Valve Repair Kit 105B038RK

WARNING:
DO NOT OPERATE THE VALVE AT PRESSURES ABOVE RECOMMENDED MAXIMUM OF 4000PSI (272 BAR) MATERIAL AND 100PSI (6.8 BAR) AIR.

SPECIFICATIONS

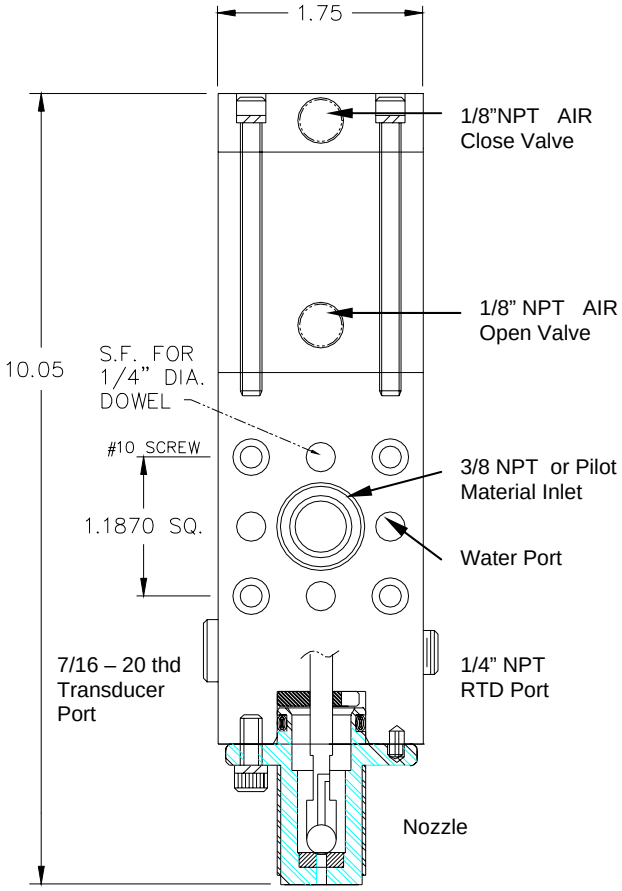
Air Inlet Port Size	1/8" NPT
Fluid Inlet Port Size	3/8" NPT or Pilot Port
Fluid Outlet Port Size	3/4-16 or 7/8-14 Thread

MAINTENANCE SCHEDULE

MONTHLY:
Check for material leakage in the housing vent hole.
EVERY SHUTDOWN:
Depressurize the Dispense Valve.

OPERATION

Supply material, water and air pressure (80 PSI Recommended) to the Dispense Valve. A 2-position pneumatic valve controls the open and closing of the valve.
To Close the valve air pressure is directed to the blind side of the piston. Pushing the piston and stem w/ball against a carbide seat.
To Open air pressure is directed to the rod side of the piston. Pushing the piston and stem w/ball away from the seat. Material starts flowing.

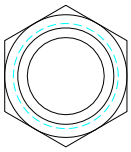


REPLACEMENT PROCEDURE

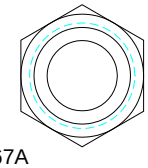
DEPRESSURIZE THE DISPENSE VALVE MATERIAL, AIR AND WATER PRESSURE.
Remove the transducer or RTD from the valve
Remove the 4 SHCS that hold the valve to the mounting block. The Valve can be removed.
To Install replace the mounting block O'rings and lubricate them and tighten the 4 SHCS.
Bleed the air from the water system.
Supply material air pressure to the regulator.
Open the Valve to bleed the air.
(Purge 1 to 2 gallons of material)

105B038x DISPENSE VALVE

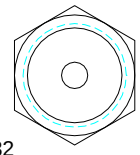
COLLARS



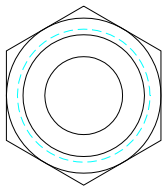
400-667
3/4 in. x 16 thd. .550 opening
Used with Extrusion Nozzles



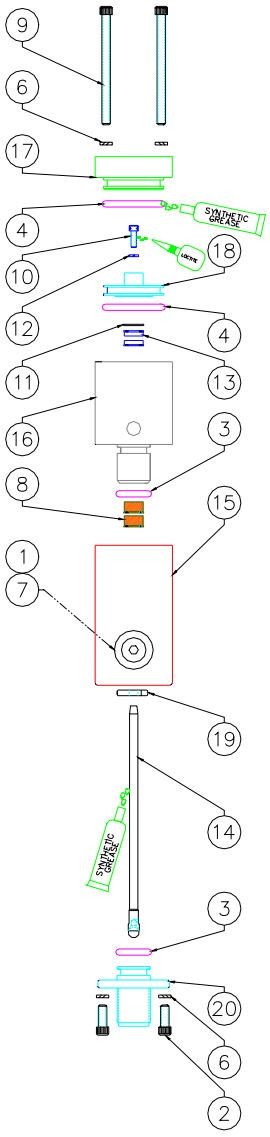
400-667A
3/4 in. x 16 thd. .494 opening
Used with Standard Spray Tips

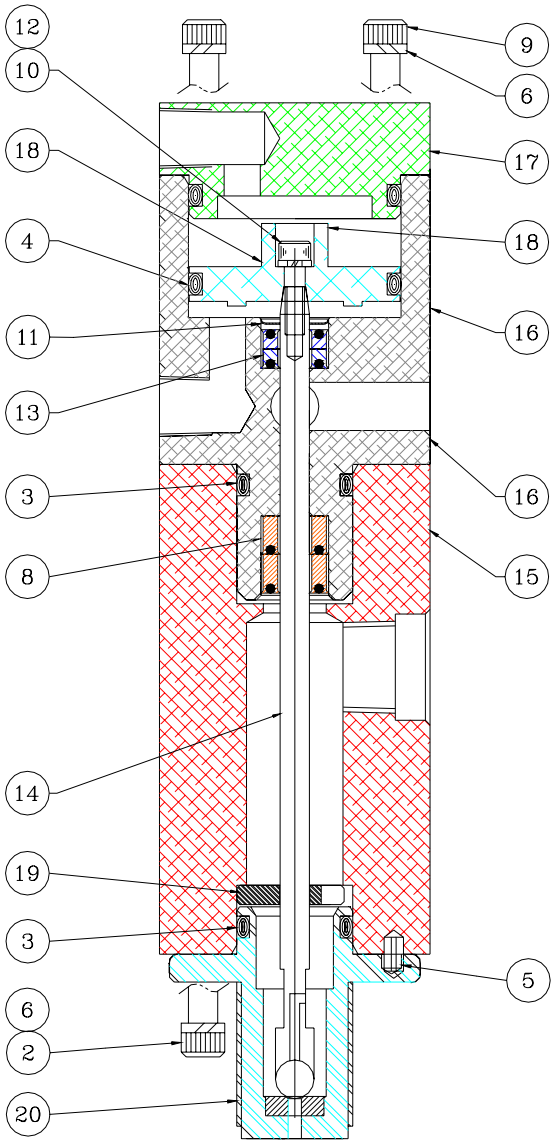


403-132
3/4 in. x 16 thd. .191 opening
Used with HV Type Spray Tips



403-043
7/8 in. x 14 thd. .500 opening
Used with Orientated Spray Tips.





* INCLUDED IN REPAIR KIT 105B038RK				20D	1	403-005A	7/8-14 NOZZLE W/ORIENTATION
*11	1	362-046	SELF RETAINING LOCK WASHER	20C	1	403-005	7/8-14 NOZZLE
*10	1	362-045	#5-40 X 3/8 SHCS	20A	1	403-003	3/4-16 STANDARD NOZZLE
9	4	362-036SS	#10-24 X 2-1/2 SHCS	*19	1	403-002	STEM GUIDE
*8	2	362-002	UPPER STEM SEAL	*18	1	403-001	PISTON
7	1	362-000	7/16-20 PLUG W/O-RING	17E	1	403-000-A	CYLINDER CAP W/END MOUNTING
6	8	361-904	#10 HC LOCK WASHER	17	1	403-000	CYLINDER CAP
5	1	361-376	1/8 DIA. X 1/4 ROLL PIN	16	1	402B999	CYLINDER HOUSING
*4	2	360-208	1-3/8 X 1-3/16 X 3/32 VITON ORING	15	1	402-998	BODY
*3	2	360-012	3/4 X 9/16 X 3/32 VITON ORING	*14	1	402B997	STEM W/ BALL
2	4	362-045SS	#10-24 X 1/2 SHCS	*13	2	362-035	AIR CYL. SEAL
1	1	350-341	1/4 NPT PIPE PLUG	*12	1	362-717	#6 LOCK WASHER
DET.	QTY.	PART #	DESCRIPTION	DET.	QTY.	PART #	DESCRIPTION

105B038x DISPENSE VALVE REPAIR INSTRUCTIONS

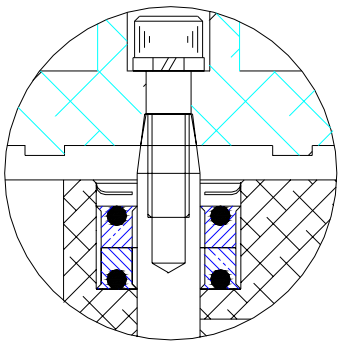
Maximum, operating pressure 4000 PSI.

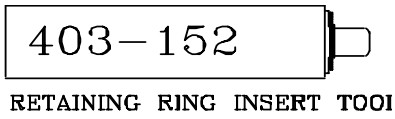
TOOLS REQUIRED

1. 5/32” Allen Wrench
2. 3/32” Allen Wrench
3. Small Adjustable Wrench 4 in.
4. Small Hammer.
5. Synthetic Grease

ASSEMBLY INSTRUCTIONS.

1. Inspect all Parts for Damage. Do not reuse any scored, elongated or pitted parts.
2. Lubricate polyseal and piston bores of the Cylinder Housing #16 with Synthetic Grease.
3. Install both (Orange) Stem polyseals #8 with the seal lips facing towards the nozzle.
4. Install the Air cylinder polyseals. The polyseals should be installed one at a time. (See figure below)
   A. Install the first seal by pushing it into the bore at a 45° with the seal lips facing down until it is squarely seated in the bore.
   B. The second polyseal lips face up and can be pushed squarely into the bore.
5. To Install the Retaining Ring a special tool was designed to install it. (See figure below)

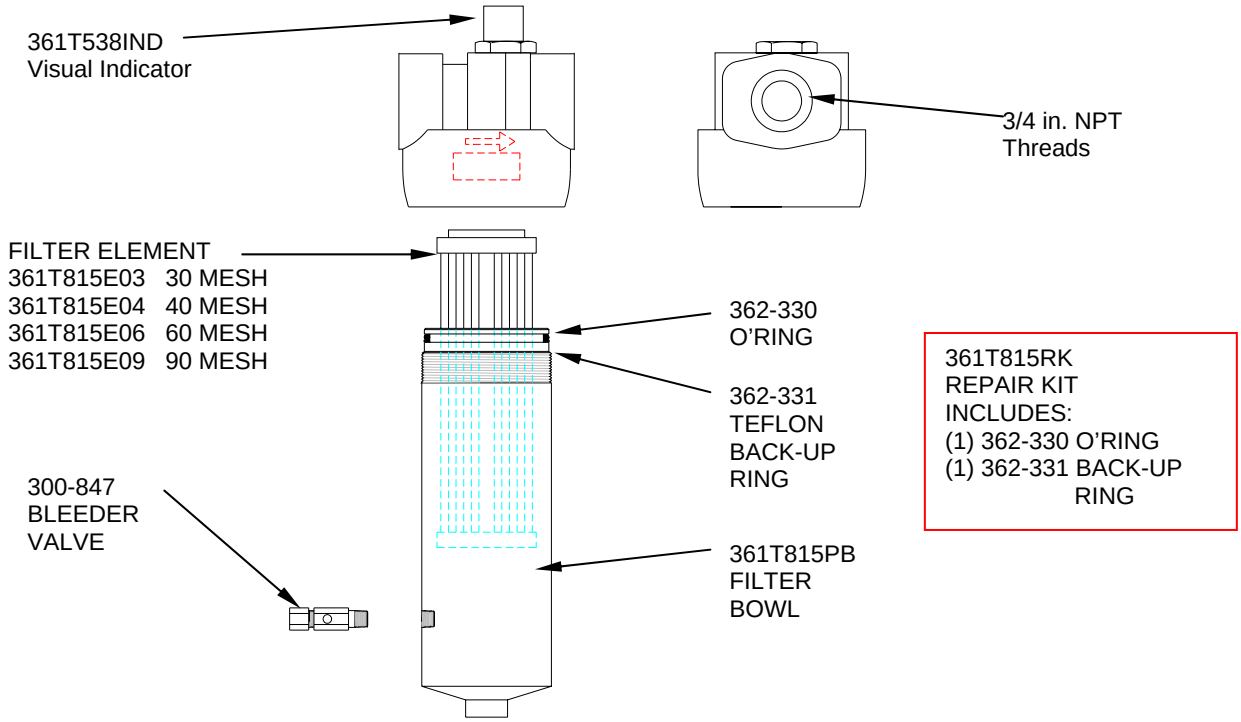




   A. Put a small amount of synthetic grease on the face of the tool to hold the retaining ring.
   B. Place the Retaining ring on the tool and insert it into the seal bore and tap the end of the tool with a hammer. This will seat the retaining ring squarely.
6. Install the Cylinder Housing O-ring #3 into its groove and Lubricate.
7. Insert the Cylinder Housing #16 pilot boss into the Body #15. It will only go into one bore.
8. Place the Stem Guide #19 over the Stem W/Ball #14 and lubricate the threaded end of the Stem.
9. Push the Stem Guide #19 Through the Body #15 and Cylinder Housing #16 Seals. *Note: Be careful to push the Stem SQUARELY this will prevent seal damage.*
10. Clean off the threaded end of the Stem #14 and put a drop of removable locktite in the thread.
11. Install the O-ring #4 over the Piston #18 and lubricate.
12. Push the piston inside the Cylinder Housing #16 until the Stem is in contact with piston.
13. Put the lock washer #12 on the 5-40 SHCS #10 and thread it into the piston and stem. Tighten 5-Foot Lbs. (Hand tight).
14. Install the O-ring over the Cylinder Cap #17 and lubricate.
15. Align the 1/8” air cylinder ports to the desired position (shipped with ports facing opposite the material inlet port).
16. Put the lock washer #6 on the four 10-24 SHCS #9 and insert them through the End Cap and Cylinder Housing. Tighten to 5-Foot Lbs. (Hand tight).
17. Install the Roll Pin #5 into the nozzle-mounting surface of the Body #15.
18. Install the O-ring #3 on to the Nozzle #20 and lubricate.
19. Align the roll pin hole of the Nozzle #20 and push the nozzle onto the Body #15
20. Put the Lock-washers #6 on the 10-24 x ½ SHCS and thread it into the Nozzle and Body. Tighten 5 Ft. Lbs. Install the ¼” Pipe Plug #1 and 7/16- 20 Plug in to the Body. Not shown in Diagram.

361T815Fxx 3/4in. FILTER ASSEMBLY

IMPORTANT: READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING, OR SERVICING THIS EQUIPMENT



FILTER ASSEMBLY PART NUMBERS		
361T815F03	30 Mesh Element	.022 in. orifice
361T815F04	40 Mesh Element	.015 in. orifice
361T815F06	60 Mesh Element	.010 in. orifice
361T538F09	90 Mesh Element	.0065 in. orifice

WHEN REPAIRING THE FILTER TURN OFF THE PUMP SUPPLY PRESSURE AND BLEED THE MATERIAL PRESSURE FROM THE PUMPING SYSTEM AND FILTER BOWL.

MAINTENANCE

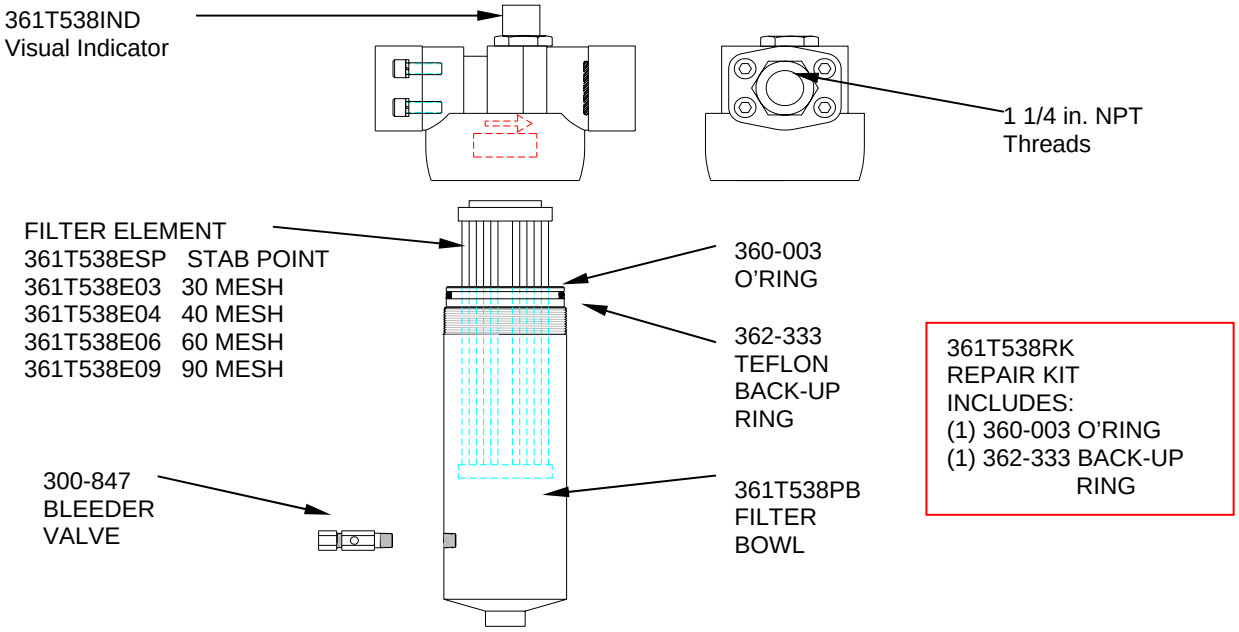
Replace the Filter element when there is a 500-pound pressure drop across it.
Note: Material must be flowing to check the pressure drop.

REBUILDING INSTRUCTIONS

1) Close the ball valves and depressurize the filter by opening the bleeder valve.
2) Unscrew the Filter Bowl and remove the Element.
3) Clean the Filter Bowl and Housing.
4) Replace the O'ring and Back-up Ring and lubricate.
5) Install new Element in the Filter Housing.
6) Thread on the Bowl and tighten to 50 Ft. Lbs.

361T538Fxx 1 1/4in. FILTER ASSEMBLY

IMPORTANT: READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING, OR SERVICING THIS EQUIPMENT



FILTER ASSEMBLY PART NUMBERS		
361T538FSP	STAB POINT	Large orifice
361T538F03	30 Mesh Element	.022 in. orifice
361T538F04	40 Mesh Element	.015 in. orifice
361T538F06	60 Mesh Element	.010 in. orifice
361T538F09	90 Mesh Element	.0065 in. orifice

WHEN REPAIRING THE FILTER TURN OFF THE PUMP SUPPLY PRESSURE AND BLEED THE MATERIAL PRESSURE FROM THE PUMPING SYSTEM AND FILTER BOWL.

MAINTENANCE

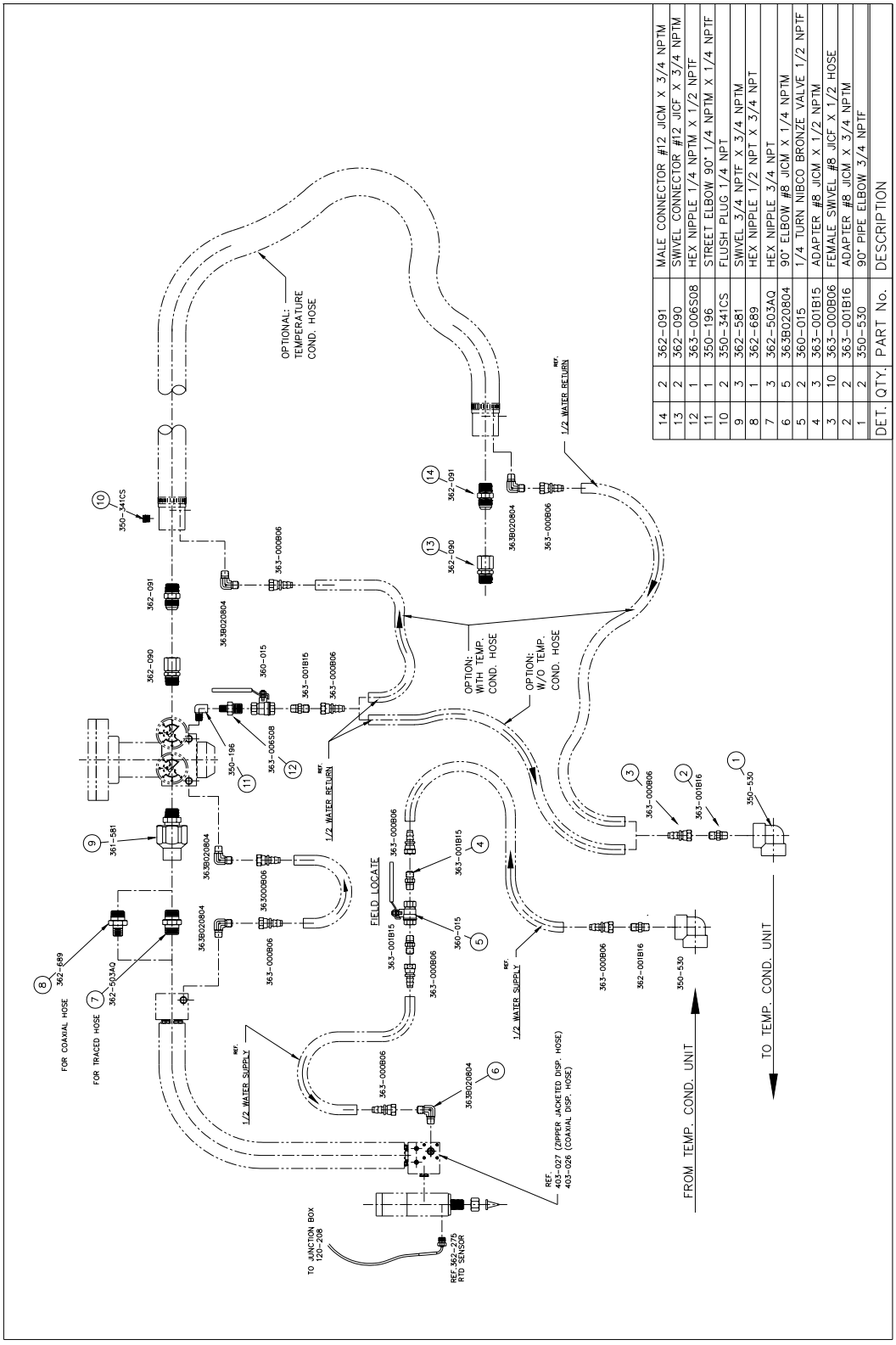
Replace the Filter element when there is a 500-pound pressure drop across it.
Note: Material must be flowing to check the pressure drop.

REBUILDING INSTRUCTIONS

7) Close the ball valves and depressurize the filter by opening the bleeder valve.
8) Unscrew the Filter Bowl and remove the Element.
9) Clean the Filter Bowl and Housing.
10) Replace the O'ring and Back-up Ring and lubricate.
11) Install new Element in the Filter Housing.
12) Thread on the Bowl and tighten to 50 Ft. Lbs.

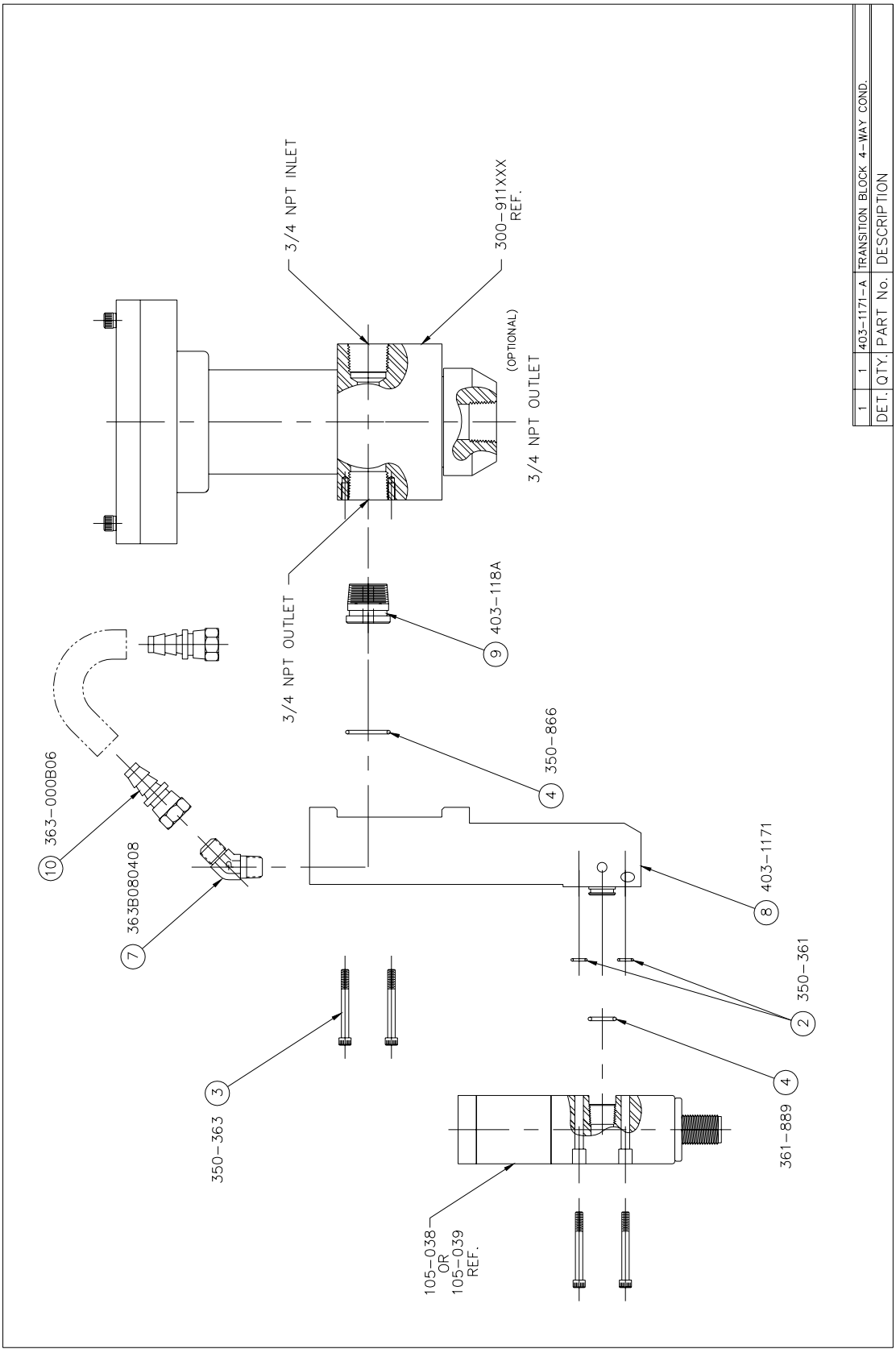
MISCELLANEOUS DRAWINGS:

Water path:

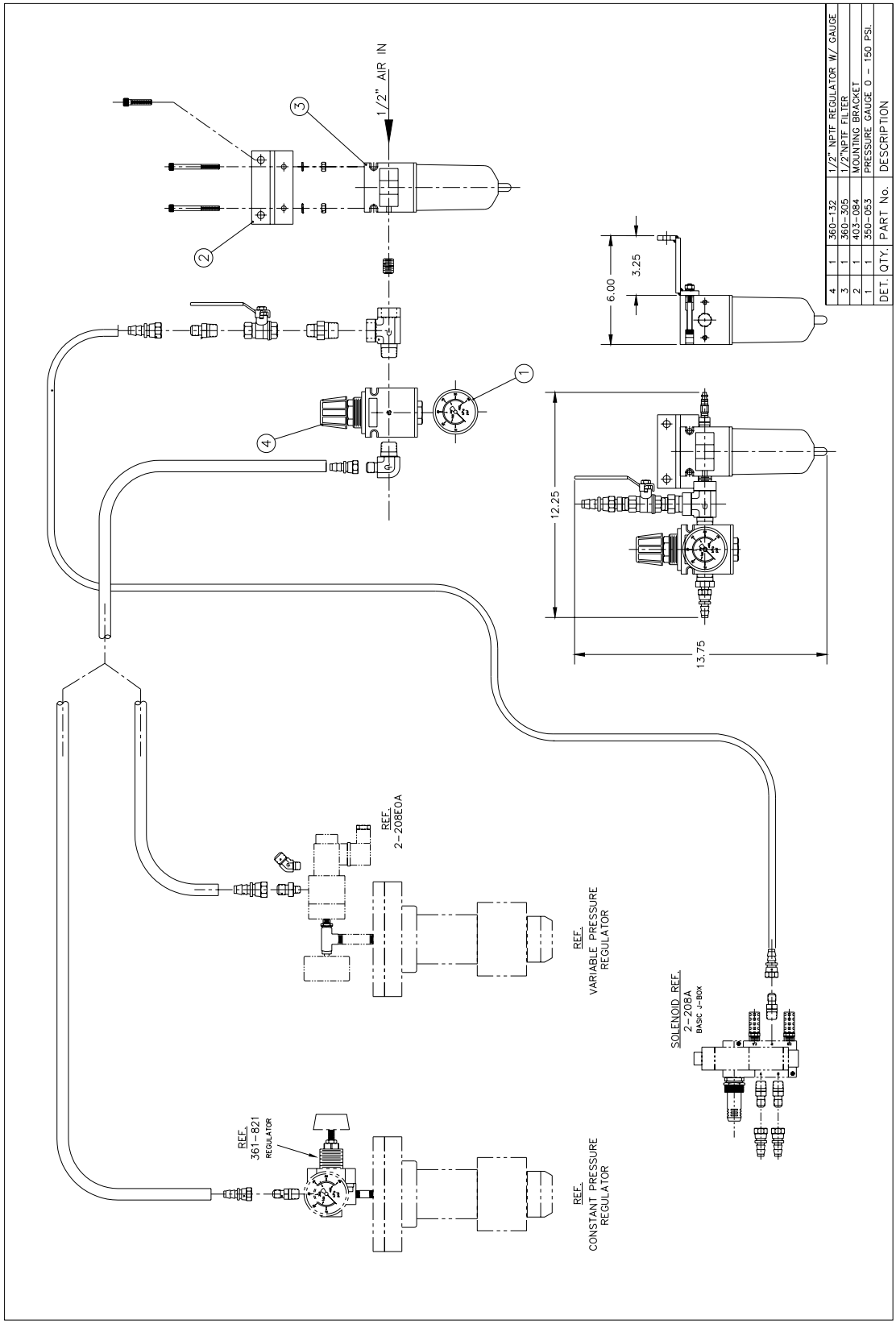


DET.	QTY.	PART No.	DESCRIPTION
14	2	362-091	MALE CONNECTOR #12 JICM X 3/4 NPTM
13	2	362-090	SWIVEL CONNECTOR #12 JICF X 3/4 NPTM
12	1	363-006S08	HEX NIPPLE 1/4 NPTM X 1/2 NPTF
11	1	350-196	STREET ELBOW 90° 1/4 NPTM X 1/4 NPTF
10	2	350-341CS	FLUSH PLUG 1/4 NPT
9	3	362-581	SWIVEL 3/4 NPTF X 3/4 NPTM
8	1	362-689	HEX NIPPLE 1/2 NPT X 3/4 NPT
7	3	362-503AQ	HEX NIPPLE 3/4 NPT
6	5	363B020804	90° ELBOW #8 JICM X 1/4 NPTM
5	2	360-015	1/4 TURN NIBCO BRONZE VALVE 1/2 NPTF
4	3	363-001B15	ADAPTER #8 JICM X 1/2 NPTM
3	10	363-000B06	FEMALE SWIVEL #8 JICF X 1/2 HOSE
2	2	363-001B16	ADAPTER #8 JICM X 3/4 NPTM
1	2	350-530	90° PIPE ELBOW 3/4 NPTF

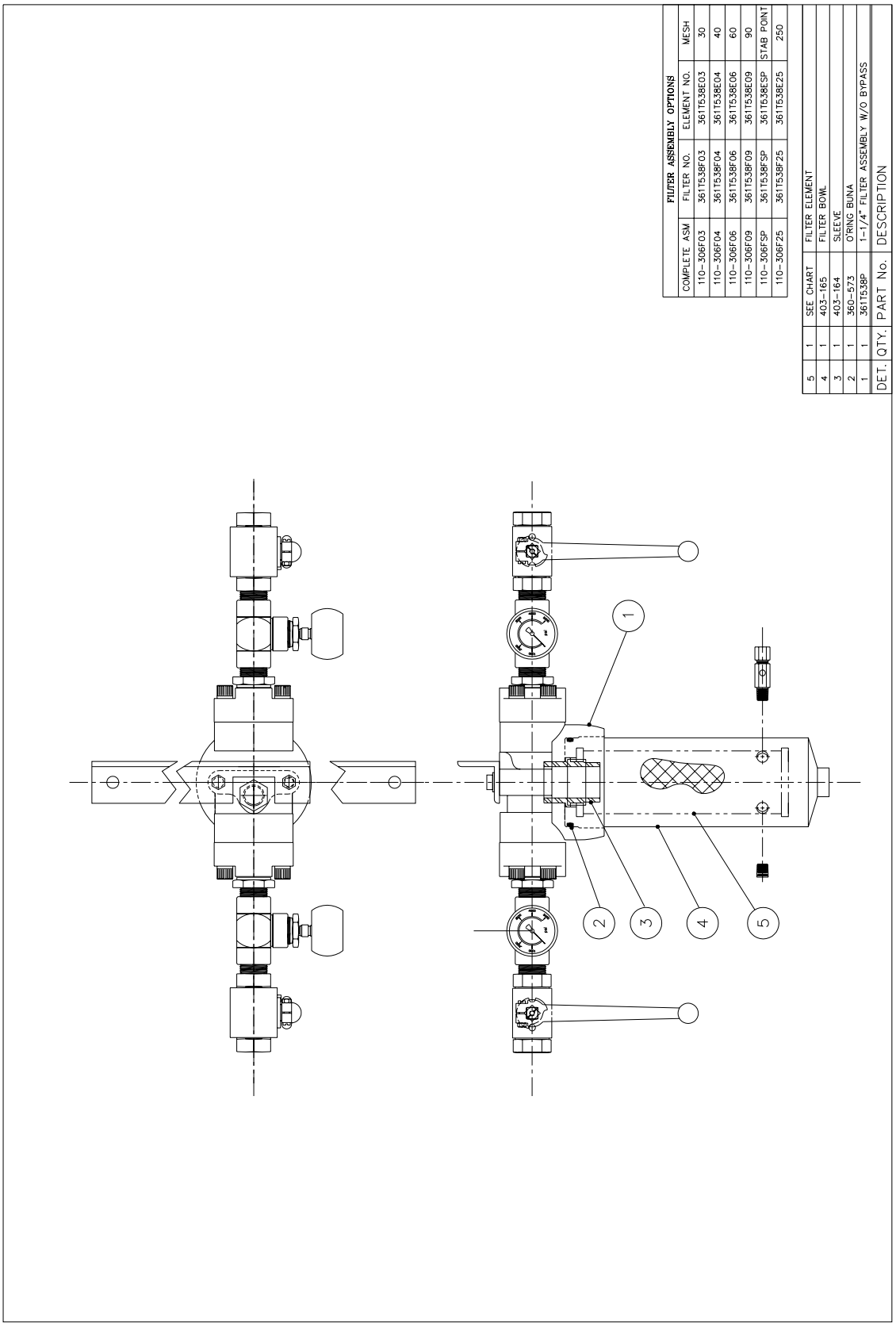
Close-Coupled Assembly:



Pneumatic Package:



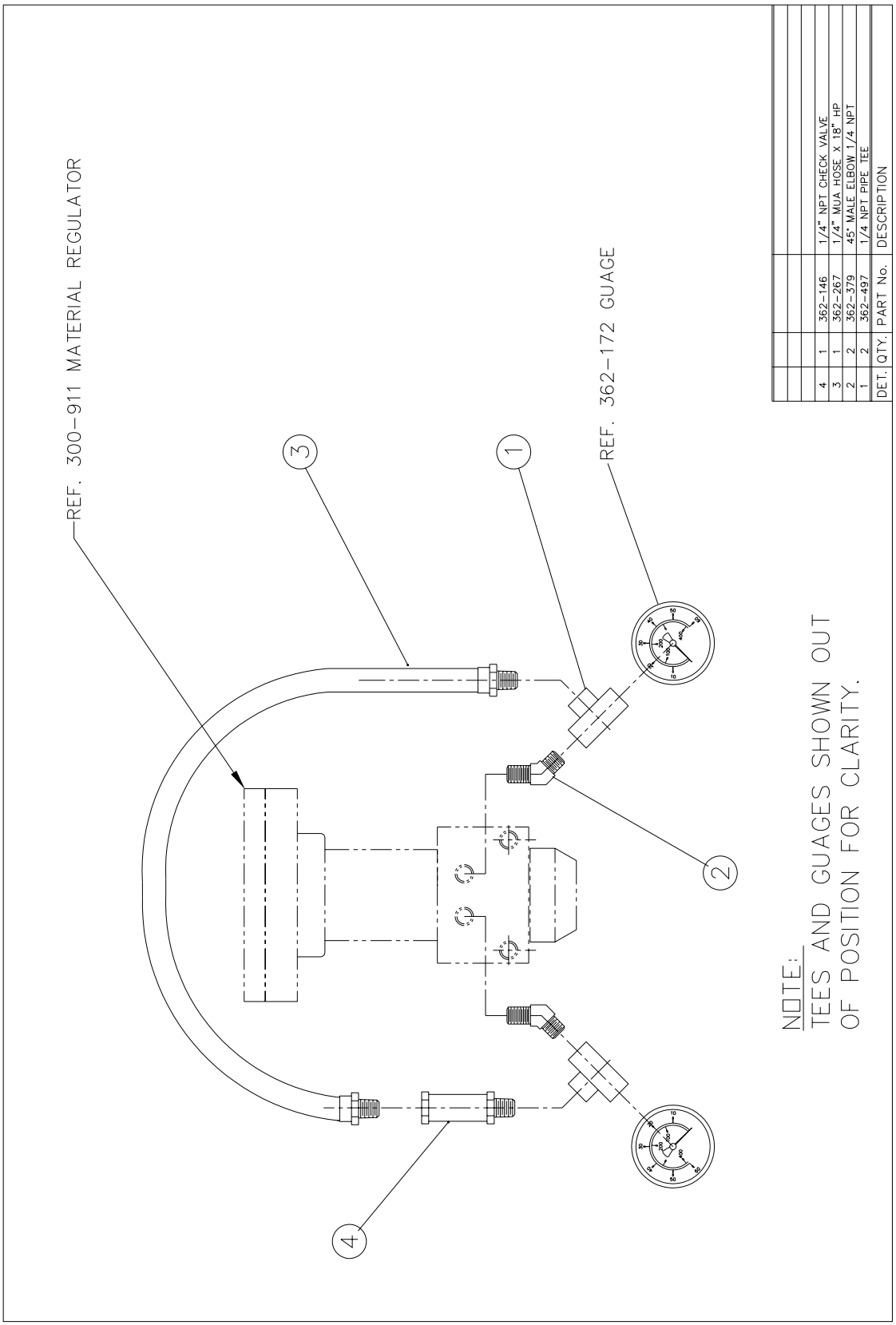
Filter Assembly Drawing:



FILTER ASSEMBLY OPTIONS			
COMPLETE ASM	FILTER NO.	ELEMENT NO.	MESH
110-306F03	3611538F03	3611538E03	30
110-306F04	3611538F04	3611538E04	40
110-306F06	3611538F06	3611538E06	60
110-306F09	3611538F09	3611538E09	90
110-306FSP	3611538FSP	3611538ESP	STAB POINT
110-306F25	3611538F25	3611538E25	250

DET.	QTY.	PART No.	DESCRIPTION
5	1	SEE CHART	FILTER ELEMENT
4	1	403-165	FILTER BOWL
3	1	403-164	SLEEVE
2	1	360-573	O'RING BUNA
1	1	3611538P	1-1/4" FILTER ASSEMBLY W/O BYPASS

Over Pressure Relief Kit:



DET.	QTY.	PART No.	DESCRIPTION
4	1	362-146	1/4" NPT CHECK VALVE
3	1	362-267	1/4" MUA HOSE X 18" HP
2	2	362-379	45° MALE ELBOW 1/4 NPT
1	2	362-497	1/4 NPT PIPE TEE