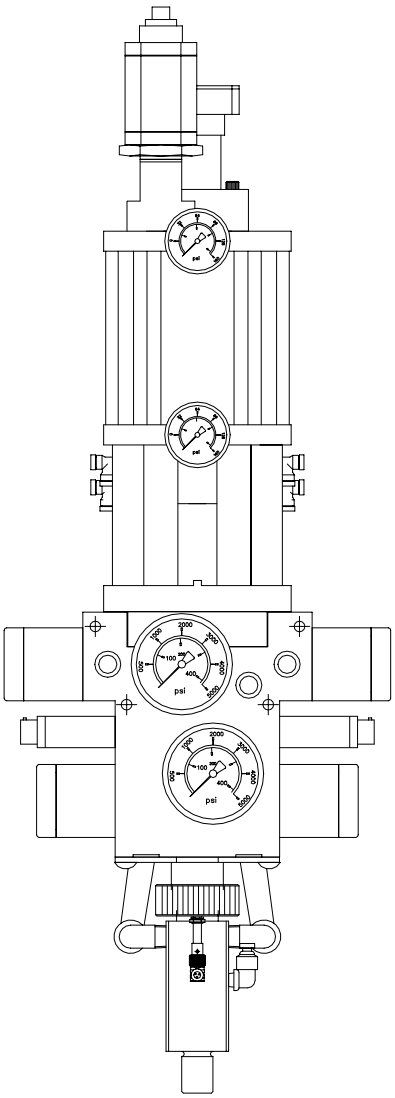
INGERSOLL-RAND
FLUID PRODUCTS

2-PART SERVICE MANUAL



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INDEX:

INTRODUCTION:

The Johnstone Dispense System (JDS) Collection of 2Part components include a variety of subsystems and devices which work together to produce a specific level of flow control and application performance.

Each 2Part system includes a Robot mounted dispense head as a pressure control device (Patent Pending). The dispense heads are offered in 1:1, 2:1 and 4:1 ratios with 40cc volume capacity. 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 changing the strength of the electronic flow rate signal (0 to 10v DC).

In addition to pressure control, temperature conditioning of the material 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.

Streaming — The material can be streamed using a small orifice nozzle.

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

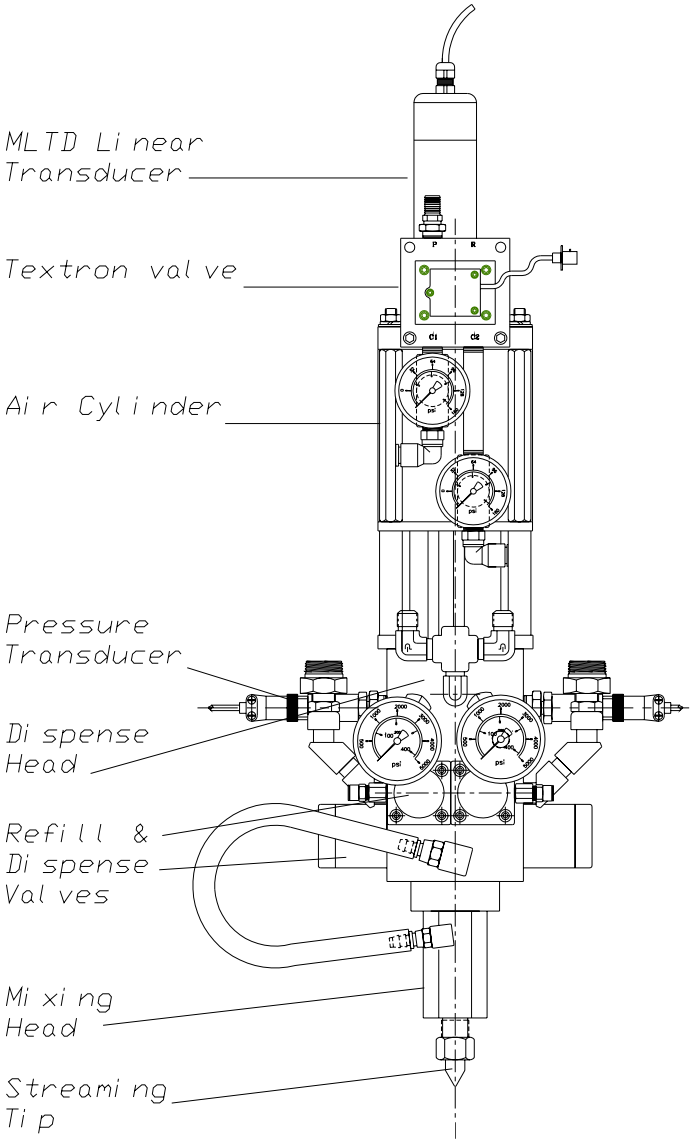


Figure 1 Dispense Head

THEORY OF OPERATION:

FLUID DELIVERY SUBSYSTEM:

The Material pumps are normally set to run at 1000 PSI. This lower material pressure helps prevent the material from packing out. The pump systems include automatic crossover and automatic depressurization. When the temperature control panel is running and within the temperature window it will send a signal to the pumps allowing them to pressurize. The material then runs through hoses, ball valves, filters and finally to the 2-part head.

The 2-part head consists of an Air cylinder that has two dispense rods attached to a signal piston and a dispense head that allows material to be pressurized by the dispense rods (see Figure 1). The rods are sized to match the correct material mix ratio. When the air cylinder retracts two-refill valves open (side A and B) and allow material to flow into separate dispense chambers. The refill valve close. During dispense both dispense valves open and the Textron valve puts a pressure on the air cylinder forcing it down. The material is pressurized in the dispense chambers and starts to flow into the mixing head. The mixing head has a replaceable cartridge that thoroughly mixes the material. The material then flows through the dispense nozzle onto the part.

TEMPERATURE SUBSYSTEM:

This subsystem provides temperature-conditioned water that is used to maintain a constant material temperature. The heat exchange with the water takes place at all conduit elements; the Dispense Head, the Conditioned Hose and the Heat Exchanger Header, etc..

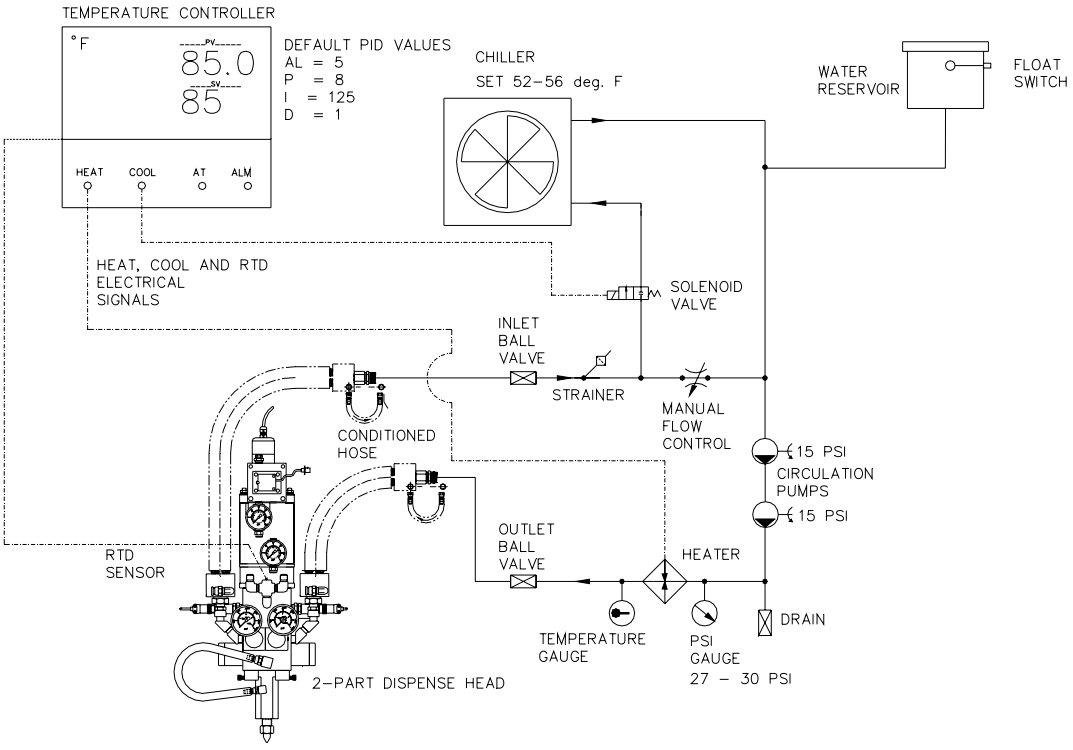


Figure 2 Temperature Control Schematic

The mastic temperature is measured and controlled at the point of application (the Dispense Head) as shown in **Figure 2**. The RTD senses the Present Value of the material temperature and feeds it back to the Temperature Controller.
If it is LESS than the Set Value, it turns on the Heater to warm the material up.

If it is MORE than the Set Value, it turns on the Solenoid Valve, allowing water to flow through the Chiller to cool the material down. The Manual Flow Control creates the pressure differential that forces water through the Chiller, so it must be set properly.

CONTROL SUBSYSTEM:

The Flow Control Microcomputer (FMC) is a microprocessor based data acquisition system that controls the I/O and all functions of the two part head. The two part head has two pressure transducers each located in a dispense chamber. The FMC and pressure transducers allow the system to refill the dispense chambers at a determined pressure, detect low and high refill pressure faults and control the amount of dispense pressure being delivered. The FMC uses the major pressure in a feedback loop with the Textron valve and control signal (0-10v command signal from the robot).

PRESSURE FEEDBACK LOOP:

The Pressure Feedback Loop changes pressure in response to changes in the robot tip speed (velocity).

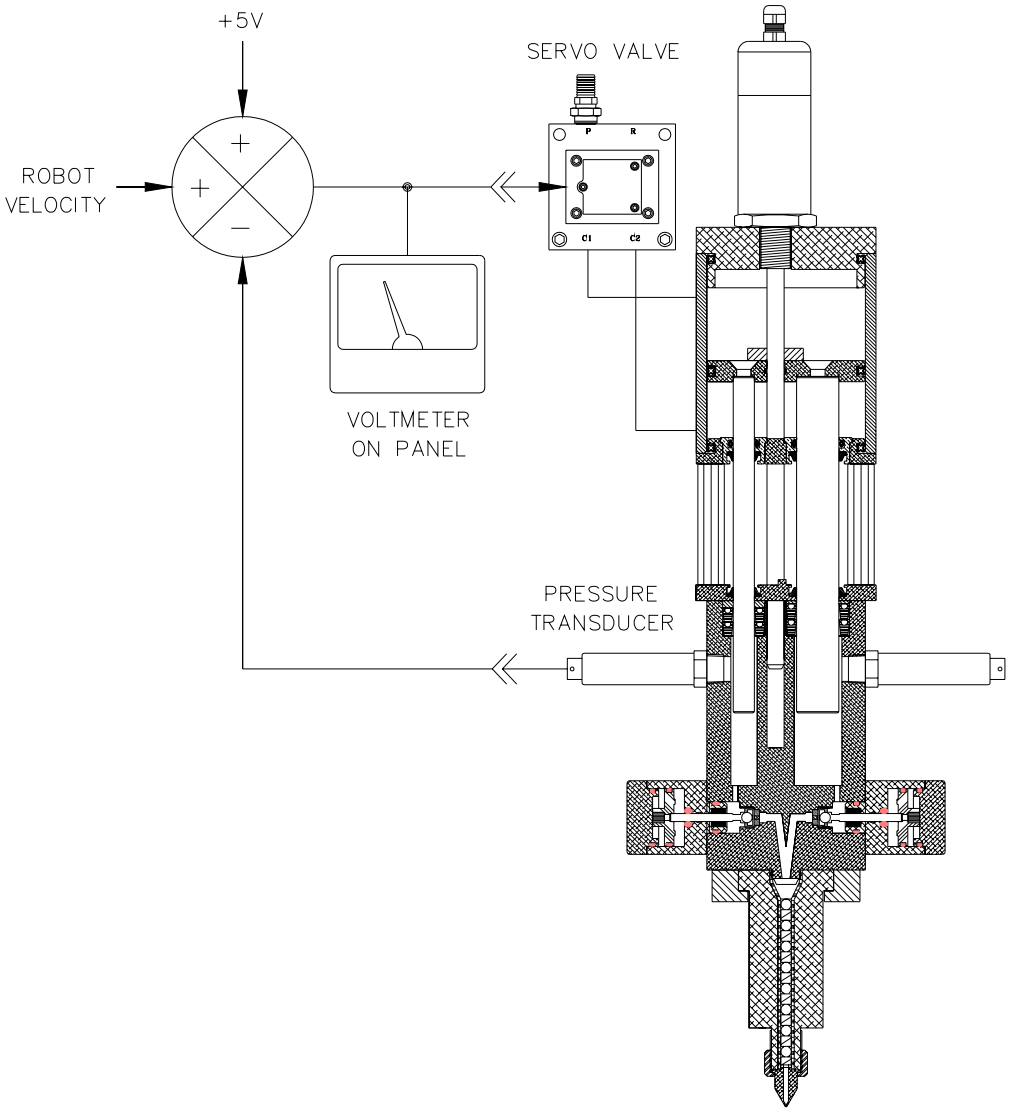


Figure 3 Control Subsystem

- At 5V, the Servo Valve is idle and the same pressure should appear on both sides of the Air Cylinder.
- At above 5V, it increases material pressure.
- At below 5V, it decreases material pressure or refills.

If the robot velocity increases, the output is above 5V when the pressure feedback is subtracted from it. A signal higher than 5V causes the Servo Valve to increase the amount of air in the top of the Air Cylinder, and material pressure increases.

When the material pressure increases to where it is the same as the robot velocity, the output to the Servo Valve is 5V and it is idle.

If the robot velocity decreases, the output is below 5V when the pressure feedback is subtracted from it. A signal lower than 5V causes the Servo Valve to increase the amount of air in the bottom of the Air Cylinder, and material pressure decreases.

When the material pressure decreases to where it is the same as the robot velocity, the output to the Servo Valve is 5V and again it is idle.

SPECIFICATIONS:

INPUT POWER	USA	480vAC, 60HZ, 13.5 amps or 480vAC, 60HZ, 10 amps	Dual Zone System Single Zone System
	CANADA	575vAC, 60HZ, 13.5 amps Or 575vAC, 60HZ, 10 amps	Dual Zone System Single Zone System
Signal Inputs from Robot or PLC			
Flow Rate		0v to 10vDC (0v must = Ground)	
Digital		24vDC / 120vAC or Contact Closure (1 amp AC or DC)	
Signal Outputs from Robot or PLC		Contact Closure (1 amp AC or DC)	
Maximum System Output Pressure		2000 PSI	
Air Supply		85 to 100 PSI (1/2 in I.D. diameter minimum supply)	
Air Intensifier Output		Reservoir Tank 160 PSI After Regulator 120 PSI	
Pressure Traducers			
Input		24v DC	
Output		0-10v DC	
MLTD			
Input		24v DC	
Output		0-10v DC	

DESCRIPTION OF PANEL DOOR CONTROLS AND INDICATOR LIGHTS:

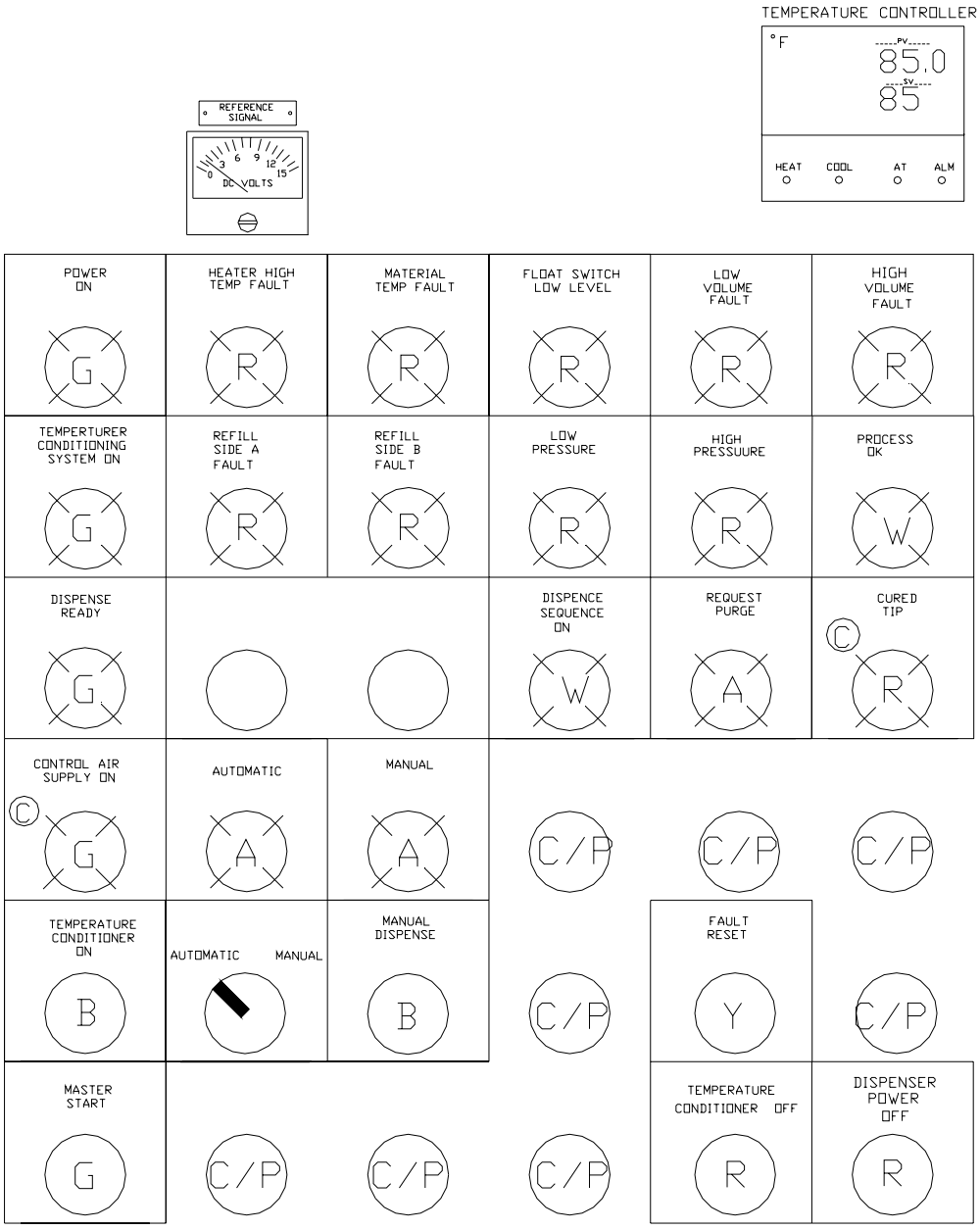


Figure 4 Door Display

SYSTEM CONTROLS;

Master Start push-button	Green	Depress the push-button to energize the panel. The “Power On” light will turn on
Dispenser Power Off	Red	Depress the push-button to De-energize the panel The “Power On” light will turn off

Temperature Conditioner On	Black	Depress the push-button to start the temperature conditioning system. The “Temperature Conditioning On” light will turn on.
Temperature Conditioner Off	Black	Depress the push-button to shut down the temperature conditioning system. The Temperature Conditioning light will turn off.
Fault Reset	Yellow	Resets and refills the dispense head on power up. Resets a dispense fault.(low volume –high volume-low pressure) DOES NOT RESET: Temperature faults / Refill faults / cured tip or blinking low volume fault.

SELECTOR SWITCH AUTOMATIC / MANUAL:

Automatic	Left Position	This position allows the system to run remotely by the robot or PLC. Allows operation of Digital and Analog inputs.
Automatic Light	Amber	Will light when the selector switch is in the Automatic position.
Manual	Right Position	This Position Removes all control from the Robot or PLC. The System is flow rate is a constant set in the FMC and the “Manual Dispense” push-button will start dispensing material. The “Fault Reset” push-button will refill the dispense head.
Manual Light	Amber	Will light when the selector switch is in the Manual position.

FAULT LIGHT INDICATORS:

Low Volume	Red	After the Dispense Complete signal the light indicates that the recorded dispensed volume was less then the low volume limit set in the FMC. The fault is reset by depressing the Fault Reset button.
Low Volume Blinking Light	Red	The light will only blink when less than 3cc of material is dispensed. . To reset the mixing head must be removed, then the fault reset will recover the fault.
High Volume	Red	After the Dispense Complete signal the light indicates that the recorded dispensed volume was more then the high volume limit set in the FMC. The fault is reset by depressing the Fault Reset button.
Low Pressure	Red	The light will only light with a refill fault. It indicates that the system did not refill to the value recorded in the FMC. To reset the mixing head must be removed, then the fault reset will recover the fault.
Refill Side A	Red	The light will indicate when the system did not refill correctly. To reset the mixing head must be removed, then the fault reset will recover the fault.
Refill Side B	Red	The light will indicate when the system did not refill correctly. To reset the mixing head must be removed, then the fault reset will recover the fault

Cured Tip	Red	The light will indicate when the cured tip timer has timed out. To reset the mixing head must be removed, then the fault reset will recover the fault.
Request Purge	Amber	The light will indicate that the timer set in the FMC for a remote purge has timed out. To reset either remote or manual dispense the dispense head before the cured tip timer can timed out.
Control Air Supply On	Green	This light that the air pressure switch is engaged. This ensures that there is air pressure to the system. Not resetable the air must be turn on or the pressure on the switch must be reset.
Dispense Sequence On	White	Indicates that the system is in a dispense mode. To turn off indicator depress the Fault reset button or engerize the dispense complete input.
Process OK	White	During the dispense sequence the light will go off and after the dispense complete signal the light will go on if there is NO dispense fault. If there is a dispense fault the light will stay off.
Dispense Ready	Green	The light indicates that the system is ready to dispense and the selector switch is in the Automatic position. The following signals must be true: Temperature conditioning system ON No Heater High Temperature Fault. No Temperature Out of Range Fault No Water Low Float Level Switch Dispense Head refilled properly and ready to dispense FMC has power and is working properly. Air pressure switch is activated. The mixing head is installed. There is a mixing tube installed. No refill faults
Blinking dispense Ready	Green	The Selector switch is in the Manual position and can be run in the manual mode. The dispense ready signal will be off.

TEMPERATURE CONDITIONING FAULTS:

Heater High Temperature	Red	The light indicates that the water system is too hot. There is a Temperature switch located inside of the heater control box and it is set 10 degrees higher than the normal system running temperature. This is a safety switch to prevent the heater elements if there is no water flow. The dispense ready light will go off
Material Temperature	Red	The light indicates that the water system is out of range. Normally set to 5 degrees. The ALM light on the Omron display will be light and the dispense ready light will go off
Float Level Switch	Red	The light indicates that the water in the reservoir is low. The Water pumps will stop, heating and cooling is disabled and the dispense ready light will go off.

INPUTS AND OUTPUTS:

FROM ROBOT-PLC TO 2-PART CONTROLLER.

Input-Required signals:

BODY ID BCD 1 BODY ID BCD 2 BODY ID BCD 4	Binary coded, body identification. 0 code is reserved for purge routine. Seven body styles are available for the customer. Customer can set volume limits, pressure limits and Global Scaling for each body id. When the EXTRA GUN option is purchased along with the REMOTE START option the maximum body id's available are 3 (the first two bits). Also, if refill on the fly is required, BCD 4 becomes the refill on the fly input to the 2-part controller, and only one other option can be selected. Remote start or extra gun.
GUN ON	Turns on the 2-Part dispenser and begin dispensing, must also have an Analog signal.
REFILL OR DISPENSE COMPLETE	The current dispense cycle is complete. Refill the 2-Part dispenser for the next dispense job. This signal also tells the 2-Part controller to test the finished job against the volume limits set in the variable list. After approx. 1/4 second the dispense fault would come on if there were any faults with the previously finished dispense sequence.
REFILL ON THE	If the dispense job is larger then the volume of the dispense head the refill on the fly signal cam be used the refill the dispense head in the middle of the job and still add the total volume of material being dispensed. BODU ID BCD 4 is used as the input and there are only 3 body styles available. Refill on the fly must be enabled in the FMC.
ROBOT IN PRODUCTION	When this signal is high the 2-Part system will request a purge sequence from the robot, when the purge or timer times out, but will not automatically purge. If signal is SYSTEM NOT low, the 2-Part system might initiate its own purge
SAFE TO AUTO PURGE	sequence and purge the 2-Part dispenser without the robots consent.
ANALOG FLOW	An analog signal proportional to the flow rate desired for dispensing (0 –10v). This signal is in a separate analog cable.
Optional signals:	If purchased.
DISPENSE GUN #2	Second dispense valve on the robot or tooling. Not 2-Part material. Can control a standard dispense valve or an ejection valve.
REMOTE START	Pulsed input (250ms), will turn on the 2-Part panel and turn on the Temperature Conditioning subsystem.

FROM THE 2-PART CONTROLLER TO THE ROBOT-PLC CONTROLLER.

Output Required signals:

DISPENSE READY — Indicates that the system is ready to dispense, in an automatic mode. The following signals must be present:

Temperature conditioning subsystem on.
No heater high temp fault.
No material out of range fault.
No float switch low level fault.
Control panel in automatic mode.
2-Part dispense refilled properly and ready to dispense.
No refill fault side A, or refill fault side B.
Control computer on, and program working OK.
Air Pressure switch engaged
Mixing head installed
Mixing tube installed

DISPENSE FAULT — Comes on when any dispense fault occurred for the previous dispense cycle. i.e. low volume fault, high volume fault, low pressure fault, high pressure fault. The fault is reset with the next cycle, or when the manual fault reset push button is pressed.

Or

PROCESS OK — The 'system fault' output is changed to 'process ok'. At the end of the job, after 'cycle complete/refill', the 'process ok' light comes on, if there are no faults. If there are faults the 'process ok' light does not come on. The fault lights come on, for the fault that happened. The robot program must be modified to accept this change. No input to the robot means there is a 'dispenser fault'.

PURGE REQUEST — Comes on when the 2-Part internal purge timer expires. The robot can either set the body ID to 000 and start a purge dispense sequence, or start a new dispense job. The signal is reset in either case. If the Auto-Purge sequence is turned on, the 2-Part controller will automatically purge if the 'system no safe to auto purge' signal is off.

Optional signals:

LOW VOLUME — The previous job was low in volume.

HIGH VOLUME — The previous job was high in volume.

LOW PRESSURE — The previous job was low in pressure.

HIGH PRESSURE — The previous job was high in pressure.

REFILL FAULT A — The refill sequence failed on side A.

REFILL FAULT B — The refill sequence failed on side B.

TEMPERATURE RANGE FAULT
The system temperature is out of range.

TEMPERATURE CONDITIONER NOT ON
The temperature conditioning subsystem is not turned on.

FLOAT SWITCH — The water fill tank is low on water

SEQUENCE OF OPERATIONS

POWER UP:

Turn Main disconnect on

1) Depress Master Start push button: Power On light will indicate.
   a) 24v power will be supplied to the dispense control system.

2) Depress Temperature Conditioning On pushbutton: Temperature Conditioning system On light will indicate.
   a) The Chiller, Water Pumps and heating Start.

3) Wait for Temperature conditioning system to get within 5° of the set value.
   a) A signal will start the pumps.
   b) Material pressure will be available to the dispense head.

4) Depress the Fault Reset button to refill the dispense head.
   a) The system will send a 1v signal to the Textron valve returning the air cylinder.
   b) The refill valves will open and close when the pressure is satisfied in the dispense chambers. This value is set in the FMC.
   c) The FMC will calculate the amount of material dispensed using the voltage differential on the MLDT position.
      i) When the air cylinder has returned
         (1) The refill valve close when both pressures have satisfied the pressure value set in the FMC.
            (a) If the pressure is not achieved a high or low pressure fault will occur.
         (2) The voltage to the Textron valve will return to 5v (equal pressure on both sides).

   d) The Dispense Sequence On light will go off.

MANUAL MODE:

5) Turn the Selector switch to the Manual position
   a) The Dispense ready light will Start Blinking and the Output will go low

6) Depress the Manual Dispense pushbutton.
   a) The dispense valve will open
   b) A voltage reading is taken at the home position on the MLDT and temporarily stored in the FMC.
   c) The Textron valve will receive a command voltage. (Value set in the FMC).
   d) The air piston will be driven down and material will exit the dispense head until the pushbutton is released or the air cylinder has completed its travel.

7) Depress the Fault Reset button to refill the dispense head.
   a) The system will send a 1v signal to the Textron valve returning the air cylinder.
   b) The refill valves will open and close when the pressure is satisfied in the dispense chambers. This value is set in the FMC and reported by the pressure transducers
   c) The FMC will calculate the amount of material dispensed using the voltage difference by the MLDT position.
      i) When the air cylinder has returned:
         (1) The refill valve close when both pressures have satisfied the pressure value set in the FMC.
            (a) If the pressure is not achieved a high or low pressure fault will occur.
         (2) The voltage to the Textron valve will return to 5v (equal pressure on both sides).

   d) The Dispense Sequence On light will go off.

8) If there are NO Refill Faults the system is ready to dispense again.

AUTOMATIC MODE:

1) The Power up Sequence is complete.
   a) The Selector switch is in the Automatic position.
   b) The Dispense ready signal is On

2) The Auto purge sequence must be disabled.
   a) If the robot is controlling the Autopurge through the I/O (pedestal mount)
      i) The robot sends the signal to stop Autopurge.
      ii) Then the robot waits for the Dispensing Sequence output to go off.
   b) If a Limit switch is being used.
      i) The robot moves off the limit switch (still over the purge bucket).
      ii) Then the robot waits for the Dispensing Sequence output to go off

3) The Robot or PLC send a Dispense Complete pulse (250ms).
   a) This will start the precharge sequence. The Precharge value is set in the FMC.

4) The Robot or PLC send a BCD style.
   a) This allows volume fault detection to operate. Values are set in the FMC
   b) The signal must be on when the Gun On signal is started and can be turned off during the dispense path.
   c) The style bit cannot be changed during a dispense cycle.

5) The robot or PLC is required to send two signals to dispense.
   a) GUN ON – This signal can be turned on and off during the dispense cycle.
   b) Analog Input – This signal 0-10v determines how much material is being dispensed.
      i) A 0v signal will have no material flow. A 10v signal will have maximum flow.
      ii) This value can be changed during the dispense cycle.

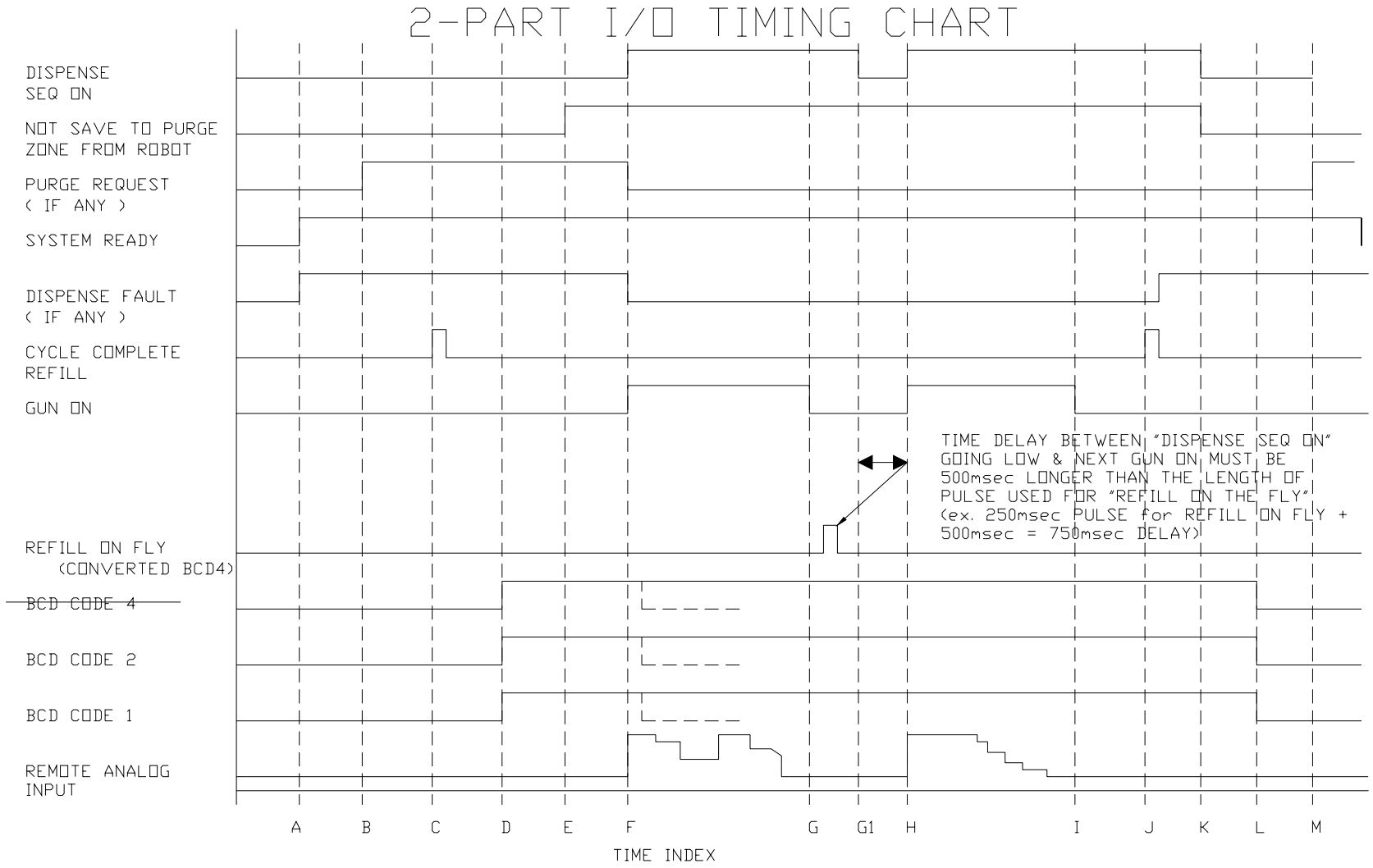
6) When the Gun On and Analog are present:
   a) The dispense valve will open.
   b) A voltage reading is taken at the home position on the MLDT and temporarily stored in the FMC.
   c) The FMC applies the Global Scaling factor to the Analog Input signal.
   d) The Textron valve will receive a reference voltage.
      i) The value is determined by the robot analog voltage, pressure transducer reading and Global Scaling Factor.
   e) The air piston will be driven down and material will exit the dispense head until the Gun On signal is off or the air cylinder has completed its travel.
   f) The Process OK signal will go OFF.

7) If Required – Refill on the Fly
   a) The Gun on input is OFF (dispense valves closed)
   b) Input BCD 4 is pulsed for 250ms to start refilling the dispense head.
      i) The FMC must be set to allow refill on the fly to operate.
   c) A MLDT voltage reading is taken and temporally stored in the FMC.
      i) This voltage or material will be added to display total dispense volume.
   d) The dispense head refills.
   e) When the Dispense Sequence On output is low the robot dispense path can be completed.

8) End of Dispense Cycle.
   a) The Robot turns OFF the Gun On signal and dispensing stops.
   b) The Analog signal returns to zero volts.

9) The Dispense Complete signal is pulsed for 250ms.
    a) The FMC will calculate the amount of material dispensed using the voltage difference by the MLDT position. sensor
    b) The FMC will Check for Volume Faults.
        i) If the value dispensed are within the parameters set in the FMC. No fault will be indicated or the Process OK signal will go ON.
        ii) If the value is outside the parameters set in the FMC. A low or high volume dispense fault will be displayed and the Process OK signal will go OFF.
    c) The dispense head will refill.
        i) The system will send a 1v signal to the Textron valve returning the air cylinder.
        ii) The refill valves will open and close when the pressure is satisfied in the dispense chambers. This value is set in the FMC (refill pressure) and reported by the pressure transducers.
            (1) If the pressure is not achieved a refill fault will occur. Stating Side A or B.
                (a) A low pressure fault will occur.
        iii) The voltage to the Textron valve will return to 5v (equal pressure on both sides)
    d) The Dispense Sequence On light will go off.

10) The system is ready for the next dispense cycle.



I/O Timing chart Figure 5

A ROBOT POWER UP FOR PRODUCTION
JPC POWER UP / REFILL & READY

B ROBOT CHECK FOR DISPENSE READY AND FOR 'DISP SEQ ON' TO BE OFF

C ROBOT PULSE CYCLE COMPLETE / REFILL (250 mSEC)

D ROBOT IDENTIFY PART

E ROBOT START MOTION

F FOBOT TURN GUN ON

G ROBOT TURN GUN OFF FOR MULTI PATH

G1 END OF REFILL CYCLE FOR REFILL ON FLY

H ROBOT TURN GUN ON

I ROBOT TURN GUN OFF FOR LAST DISPENSE

NOTE: C, D, E CAN CHANGE ORDER

J ROBOT PULSE CYCLE COMPLETE / REFILL (250mSEC)
START PURGE TIMER

K WAIT FOR REFILL TIMER / VALIDATION

L END OF DISPENSE CYCLE

M PURGE TIME OUT

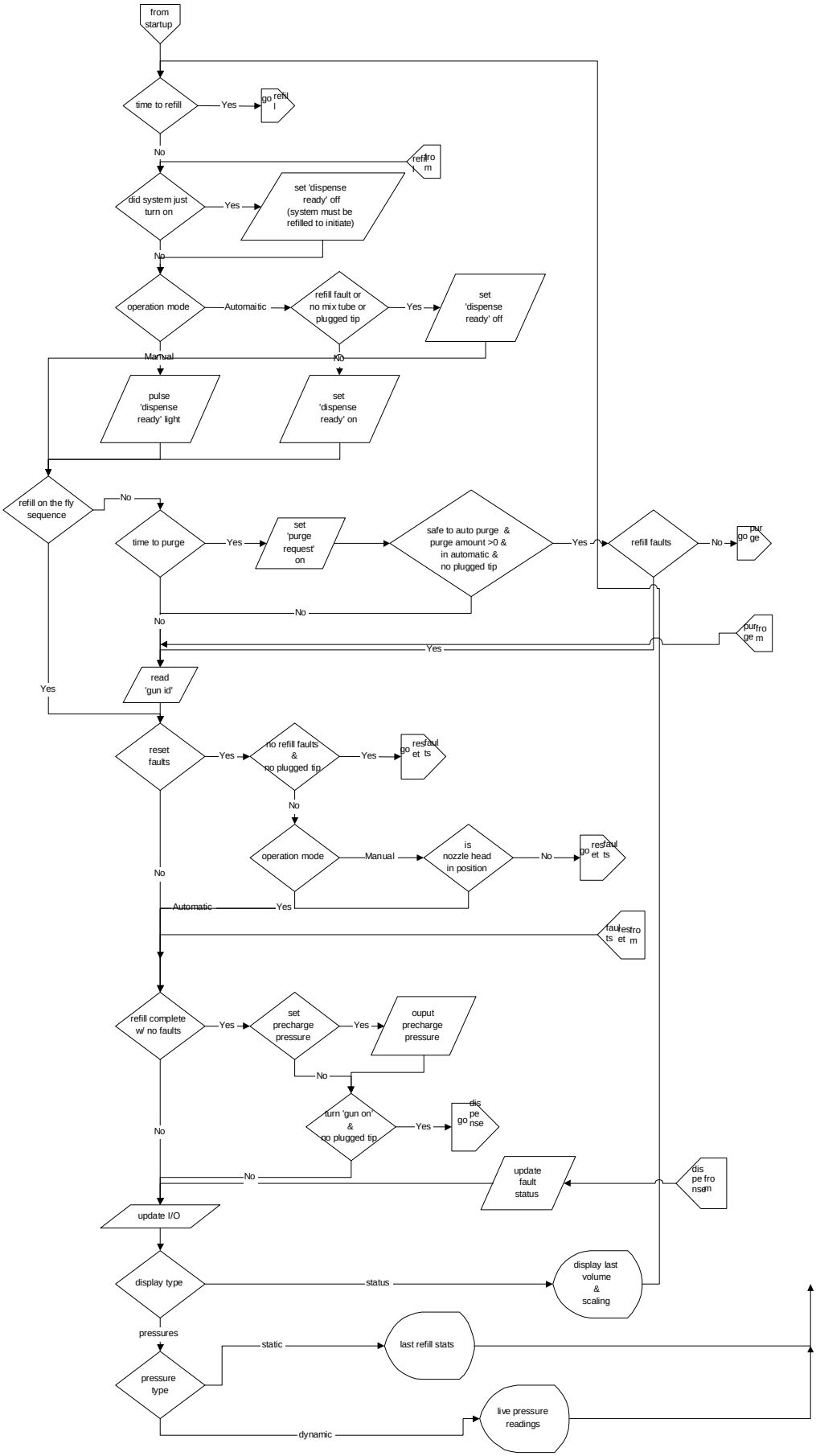

from startup
time to refill
Yes
go refil l
No
refil l from
did system just turn on
Yes
set 'dispense ready' off (system must be refilled to initiate)
No
operation mode
Automaitic
refill fault or no mix tube or plugged tip
Yes
set 'dispense ready' off
Manual
No
pulse 'dispense ready' light
set 'dispense ready' on
refill on the fly sequence
No
time to purge
Yes
set 'purge request' on
safe to auto purge & purge amount >0 & in automatic & no plugged tip
Yes
refill faults
No
go purge
No
purge from
Yes
read 'gun id'
Yes
reset faults
Yes
no refill faults & no plugged tip
Yes
go reset faults
No
operation mode
Manual
is nozzle head in position
No
go reset faults
No
Automatic
Yes
faults reset from
refill complete w/ no faults
Yes
set precharge pressure
Yes
ouput precharge pressure
No
turn 'gun on' & no plugged tip
Yes
go dispense
No
No
update fault status
dispense from
update I/O
display type
status
display last volume & scaling
pressures
static
last refill stats
pressure type
dynamic
live pressure readings

Figure 6

STARTING UP THE SYSTEM.

BEFORE STARTING THE SYTEM ENSURE THAT THE MIXING HEAD IS **NOT** INSTALLED.

1) Depress the Master Start pushbutton
2) Depress the Temperature Conditioning On Pushbutton
3) Wait for the Temperature to reach the set value.
   a) The pumps will start allowing material pressure to the dispense head.
4) Put the selector switch in the Manual position.
5) Depress the Fault Reset pushbutton and the system will refill.
6) Depress the Manual Dispense pushbutton and the system will start to dispense the material in the dispense head.
7) Depress the Fault Reset pushbutton to refill the dispense head.
   a) If there are no faults (refill, low volume, high volume and low pressure) The mixing head can be installed.

NOTE: If required a Ratio Check can be done at this time.

TIP PART NO.	ORIFICE	MATERIAL	USE TIP COLLAR NO.
362-867	∅ 0.032"	CELCON (BLUE)	400-667
363-171	∅ 0.032"	CELCON W/ GLASS BEAD (GREEN)	400-667
363-315A	∅ 0.032"	316 STAINLESS STEEL	403-132B
363-315B	∅ 0.040"	316 STAINLESS STEEL	403-132B

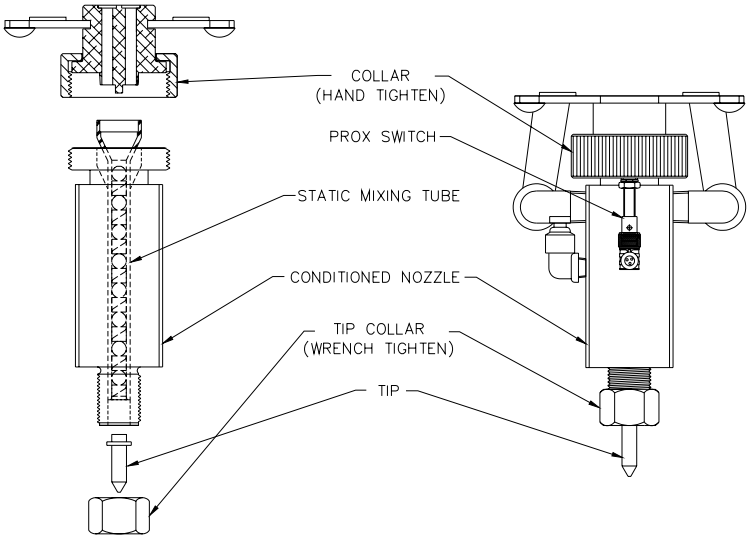


Figure 7

NOTE: STATIC MIXING TUBE SHOULD BE REPLACED EVERY TIME A TIP IS REPLACED TO INSURE CORRECT OPERATION

8) TIP AND STATIC MIXING TUBE REPLACEMENT
   a) Using a wrench, remove the Tip Collar and Tip.
   b) Unscrew the Collar by hand and remove the Static Mixing Tube.
   c) Wipe off excess material from the Head and Nozzle.
   d) Install a new Static Mixing Tube.
   e) Install the Nozzle to the Body by tightening the Collar by hand (the Light on the Prox Switch should turn ON).
   f) Press a new Tip into the Static mixing Tube and Nozzle.
   g) Using a wrench, tighten the Tip Collar.
8) Depress the Manual Dispense button to purge fresh material throughout the mixing tube and tip.
   a) Verify that a straight strong stream exits from the tip. If not replace the tip.
9) Verify that the Home limit Switch is in place and engaged.
10) Depress the Fault Reset to refill the system.
   a) If not faults exist turn the selector switch to the Automatic position
11) The system is ready for Automatic dispensing.

SHUT DOWN PROCEDURE:

1) Turn the selector switch to the Manual position.

2) Depress the Panel Dispenser Power Off button.
   a) This will shut down the temperature controller and depressurize the pumps.

3) Remove the Collar from the Mixing Head.

4) Remove the Streaming Tip.

5) Using a T-Handle allen Wrench, loosen the mixing head mounting screws
   a) turn the mixing head 90°
   b) The mixing can now be pulled away from the dispense head.

6) Remove the mixing tube from the mixing head.

7) Clean any excess material from the outlet ports and the mating surface of the mixing head.

The system is now in a safe shut down mode.
The system can be left for long periods without causing any damage to it.

WATER SYSTEM:

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 through the system using two circulation pumps. Water flows through the dispense components, dispense head, conditioned hoses, mixing head and heat exchangers.
c. The water may be heated using an 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 through the chiller.
    ii. If the temperature is too cold a heater is energized, heating the water as it passes three its coils.
e. The water is routed so that it passes through the dispense head first then through the rest of the dispense equipment such as, conditioned hoses, mixing head 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 is added to the system. 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 algaecide dealer and cannot supply it.

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 an 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 through 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.

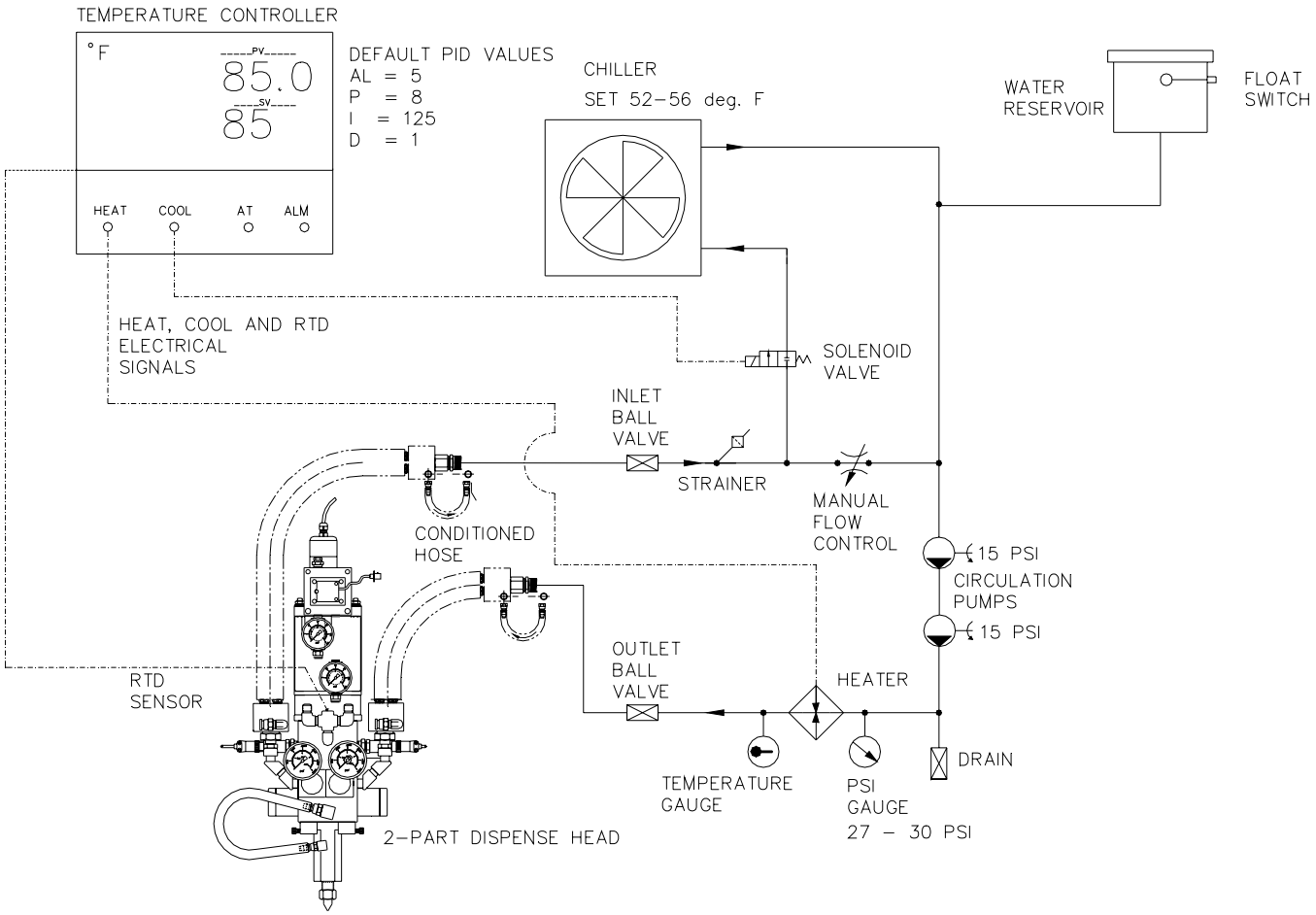


Figure 8

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.

INDICATORS ON THE TEMPERATURE CONTROLLER:

Process Value Indicator:

-RED-

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

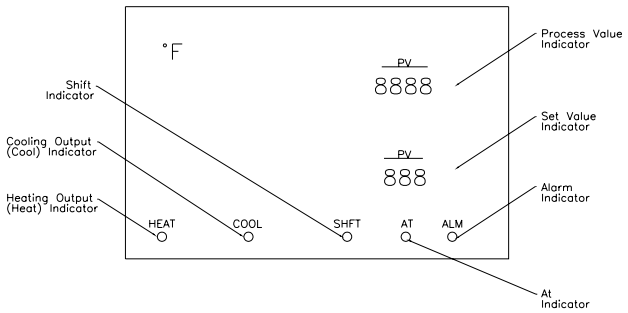


Figure 9

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.

VARIABLES ON THE TEMPERATURE CONTROLLER:

Level Key:

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

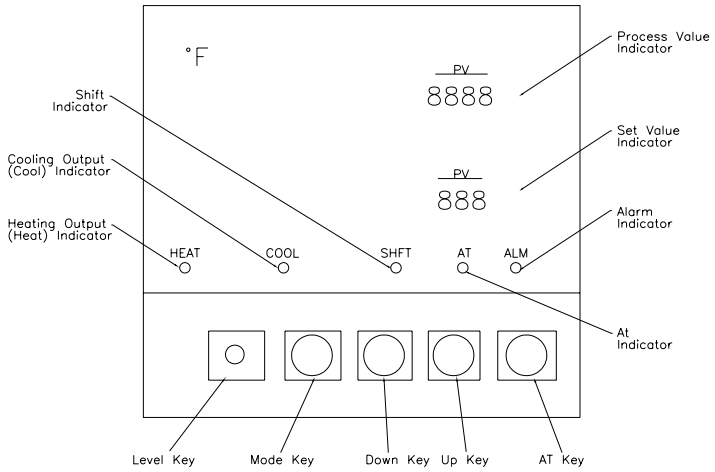


Figure 10

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, 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:

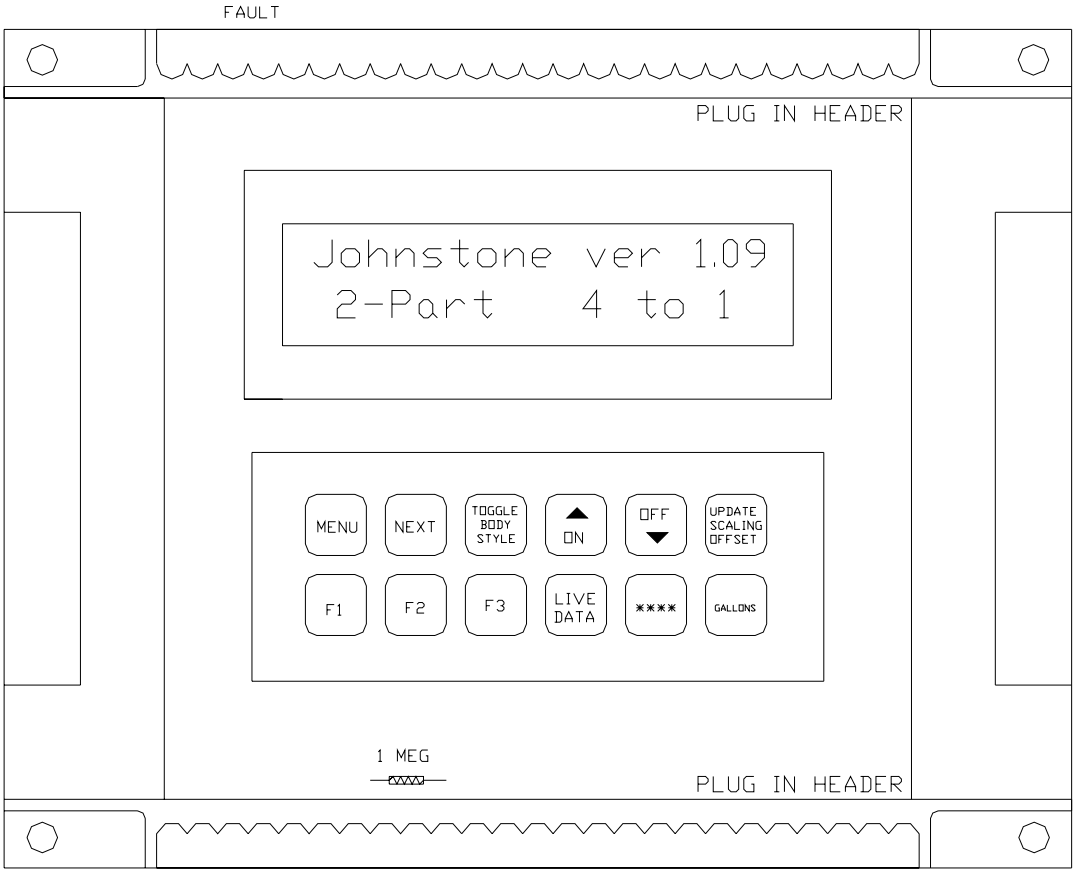
Output monitor	(0.0)	Displays the status of the output 0 to 100 %.
Sensor type(Cn-T)	(Pt)	Displays the sensor type. i.e. Platinum RTD.
Alarm mode(AL)	( ]--[ )	Alarm mode set to upper and lower limits.

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.

SETTING THE VARIABLES ON THE FLOW MICRO COMPUTER (FMC)



PROGRAMMING OPTIONS AVAILABLE ON THE FMC:

1) Select Ratio 1:1, 2:1 and 4:1.
2) Maximum refill time.
3) Auto purge interval.
4) Manual flow rate.
5) Volume to Autopurge.
6) How many Body Styles 1-7.
7) Refill Pressure.
8) Precharge Pressure.
9) Low Volume limits (0-7 body styles)
10) High Volume limits (0-7 body styles)
11) I/O calibration and testing.
12) Refill on the Fly
13) Process OK Faults
14) Automatic Calibration.

SETTING THE VARIBALES.

1) **Global Scaling**
   a) This will increase or decrease the bead size without changing the command voltage from the robot.
   b) To Adjust:
      i) Press the [Toggle Body Style] button until the body style that you wish to change appears on the screen.

         (1) Body style 0 = purge
         (2) Body style 1 = Dispense path part 1… up to style 7

      ii) Press the [Update Scaling Offset] button and the display will state "Update Global Scaling". Default value is 100%.
         (1) Press the up or down arrow keys to increase the scaling. Range is 50% to 150%

      iii) Press the [Update Scaling Offset] button to lock in the scaling variable and return to the home screen.

2) **Display Major and Minor side Pressures.**
   a) To Display pressures

      i) Press the [LIVE DATA] button and the display will show the Major and Minor pressures
      ii) Press the [LIVE DATA] button to return to the home screen.

3) Displaying Gallons
   a) To Display the gallon dispensed feature.

      i) Press the [LIVE DATA] button and the display will show total gallons the system has dispensed.
      ii) Press the [LIVE DATA] button to return to the home screen

SETTING THE PROCESS VARIABLES.

4) INSIDE THE FLOW MICRO COMPUTER
   a) The FMC must be in the cycle complete mode
      i) Depress the Fault Reset button on the door panel
         (1) This will automatically put the FMC in the cycle complete mode.
   b) Depress the [MENU] button and the FMC will enter into the Process Variables.
   c) The FMC will display the options one at a time by depressing the [NEXT] button. If the next button is not pressed the screen will automatically scroll.

DISPLAYED OPTIONS IN THE FMC

5) How many seconds ___ for refill ? Default = 6 sec.
   a) This sets the maximum time that the refill valve can stay open.
      i) If the timer times out there will be a refill fault.
   b) Press the Up or Down arrow keys to adjust the time.

6) How many minute wait ___ for purging?
   a) This sets the time lapse between auto purges.
   b) Press the Up or Down arrow keys to adjust the time

7) Manual flow rate? 0.0 v DC to 5 Default =3.5
   a) This is the Manual Flow Rate when the manual dispense pushbutton is depresses or when there is an automatic purge.
   b) Press the Up or Down arrow keys to adjust the voltage.

8) ___ cc's Automatic Purge Amount Default = 10cc.

a) This is the Amount of material that will be purged during the Automatic purge.
b) Press the Up or Down arrow keys to adjust the amount in cc.

9) How many body styles ___ Do you want?

a) This sets the amount of different body styles that will be used. The purge is always style 0 and is not included in this screen.
b) Press the Up or Down Arrow keys to adjust the amount of body styles. Range is 1 to 7.

10) 0.1574 cc per volt Auto Calibrate Var

a) This screen shows the MLTD automatic calibration factor. It cannot be adjusted.

11) Min Scale Offset Maj 2.25 x 64 2.17 x 78

a) This screen shows the automatic calibration factor and voltage offset for both the Minor and Major pressure transducer. These variables can only be adjust during the Automatic Calibration
b) Depress the Arrow up button to show the current pressure transducer readings.

12) 400 Psi Refill Pressure Minor

a) The sets the minimum pressures that the Major and Minor dispense chambers must reach to close the refill valves.
b) Press the Up or Down Arrow keys to adjust the refill pressure.

13) 400 Precharge Pressure F1=1 F2=10 F3=250

a) When the dispense complete is pulsed before the Gun on Signal the system will go into a precharge mode. The precharge value should never be lower than the refill pressure.
b) Press the Up or Down Arrow keys to adjust the refill pressure.
c) Use the F1, F2 or F3 buttons for quick scaling.

14) XX ccLoVol Lim StyX F1=.1 F2=1.0 F3=10.0

a) This sets the low volume limit for the body style shown
   i) Body style 0 is purge.
b) Press the Up or Down Arrow keys to adjust the volume limit. Zero= no fault.
c) Use the F1, F2 or F3 buttons for quick scaling.

15) XX ccHIVol Lim StyX F1=.1 F2=1.0 F3=10.0

a) This sets the low volume limit for the body style shown.
b) Press the Up or Down Arrow keys to adjust the volume limit.
c) Use the F1, F2 or F3 buttons for quick scaling.

TESTING INPUT/ OUTPUTS & CALIBRATION FEATURES.

16) Do You Want to test I/O?
On=yes Off=No

a) Depress the on button and the FMC will go into the testing and calibration mode.
b) Depress the off button and the FMC will return to the home menu.

17) Test Analog Inputs?
On=yes Off=No

a) On enters the Test analog input menu. Off exits to the next screen.
b) Use the arrow button to raise or lower the input channels.
   i) Input 1 is the Major side pressure transducer voltage.
   ii) Input 2 is the Minor side pressure transducer voltage.
   iii) Input 3 is the Remote manual refill pushbutton located by the dispense head. Normally = 10v.
   iv) Input 4 is the fault reset button. Normally = 10v.
   v) Input 5 is the position sensor MLDT voltage.
   vi) Input 6 is the Robot Analog signal.
   vii) Input 7 is the Air Pressure switch On and Nozzle in Place. Normally =10v.
c) Depress the NEXT button to continue to the next screen.

18) Test Digital Inputs?
On=yes Off=No

a) On enters the Test digital input menu. Off exits to the next screen.
b) Use the arrow button to raise or lower the input channels
   i) Input 1 is Body Style BCD 1 from Robot
   ii) Input 2 is Gun On from Robot
   iii) Input 3 is an internal input for Automatic Mode.
   iv) Input 4 is the Dispense Complete from Robot.
   v) Input 5 is Body Style BCD 2 from Robot.
   vi) Input 6 is Body Style BCD 3 from Robot.
   vii) Input 7 is Robot NOT safe to Purge
c) Depress the NEXT button to continue to the next screen

19) Test Digital Outputs?
On=yes Off=No

a) On enters the Test digital output menu. Off exits to the next screen.
b) Use the ON and OFF buttons to turn the outputs On and Off.
c) Use the F1 button to raise the channels.
d) Use the F2 button to lower the channels.
   i) Output 1 is an internal Dispense Ready signal.
   ii) Output 2 is Minor Refill Fault.
   iii) Output 3 is Major Refill Fault.
   iv) Output 4 is Low Volume Fault.
   v) Output 5 is Dispense Sequence On.
   vi) Output 6 is Low Pressure Fault.
   vii) Output 7 is High Pressure Fault.
   viii) Output 8 is Purge Request.
   ix) Output 9 is High Volume Fault.
   x) Output10 is Process OK.
   xi) Output 11 is Dispense Gun ON.
   xii) Output 12 is Refill Gun ON.
e) Depress the NEXT button to continue to the next screen

20) Test Analog Outputs?
On=yes Off=No

a) On enters the Test Analog output menu. Off exits to the next screen.
b) This output sends the reference signal to the Textron valve.
c) Use the ON and OFF buttons to raise or lower the signal voltage.
d) Depress the NEXT button to continue to the next screen

21) Set Refill on the Fly?
On=yes Off=No

a) On enters the Refill on the Fly menu. Off exits to the next screen.
b) This allows the processor to refill the dispense head and add the total volume of the entire bead for fault detection. When this is enabled only three Body Style BCD are available.

c) Do you want to refill / During the dispense cycle
On=yes Off=No
d) Press the ON button for yes and the off button exits to the next screen.

22) On=yes Off=No
Do you require more / Than 3 body styles

a) If ON is pressed a message will appear "You can not have refill during dispense.
b) If Off is pressed a message appears "
c) How many body styles
___ Do you want?
   i) This sets the amount of different body styles that will be used. The purge is always style 0 and is not included in this screen.
   ii) Press the Up or Down Arrow keys to adjust the amount of body styles. Range is 1 to 3.
   iii) Press the Next button and the next screen will appear.

23) Change to Process OK?
On=yes Off=No

a) Press The On button to set the processor for Process OK fault detection.
b) Press the Off button to continue to the next screen.

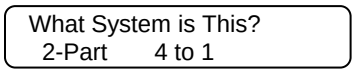
c) Update Fault to Process OK?
On=yes Off=No
   i) Press On button to set the process for Process OK fault detection.
   ii) Press the off button to continue to the next screen.

d) Is the Robot program Fixed?
On=yes Off=No
   i) Press On button to set the process for Process OK fault detection.
   ii) Press the off button to continue to the next screen.

24) Do You Want to Calibrate?
On=yes Off=No

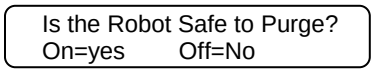
a) Press On button to Calibrate the Pressure Transducer and the MLDT.
b) The conditions for Automatic calibrations are.
   i) The Air intensifier must be set at 120 Psi regulated output air. The Mixing Head Must be Removed. The material temperature must be at it set point. The Material pumps must be on and have equal pressure.
c) Press OFF and return to the home menu.

d)



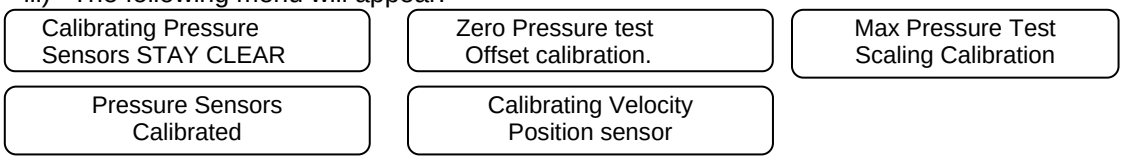
i) Use the Arrow keys to select the type of system.
   (1) Choices are 2-part 4 to1: 2-part 2 to1: 2-Part 1 to 1: 1-Part Short :1-Part Long.
      (a) Select the correct style of dispense head and press the NEXT button.

e)

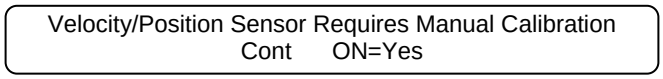


i) Press the ON button and the FMC starts the Automatic calibration procedure.
ii) Press the OFF button and the FMC returns to the Main Menu

iii) The following menu will appear.



iv) The display will automatically return to the home menu if there are NO problems with the transducers or MLDT.
v) If there is a voltage problem with a device the screen will display the condition.



vi) Depress the On button to Continue.

f) The Automatic Calibration is complete and the screen is at its Home menu.
g) Power the System Down Before Running.

TROUBLE SHOOTING:

Dispense Fault and Low Volume Fault.

This condition indicates that too little adhesive has been supplied to the part, normally because mixed material has hardened inside the streaming tip and static mixing tube, causing a flow restriction and too little material (or none) to be dispensed.

During “Low Volume Fault” conditions, the volume indicated on the FMC display should be lower than the “Low Volume Limit” setting for that “Style”. The production part that experienced the “Low volume Fault” will exhibit either a full perimeter of adhesive of too small a bead diameter or the correct bead diameter with an interruption at some point. In either case please proceed as follows to correct this fault condition:

1) Turn the selector switch on the Control Panel to “Manual”.

2) Enter the cell, remove the Nozzle Body, and discard the old static mixing tube and tip.

3) Go back to the Control Panel and press the yellow “Reset “button to reset the fault. Then press the “Manual Dispense” button, to purge a full shot of material from out of the two outlet nostrils on the bottom of the metering block.

4) Push the yellow “Reset” button to refill.

5) Re-install the Nozzle Body, with new static mixing tube and tip.

6) Then press the “Manual Dispense” button to purge the mixing tube and tip with fresh material. Verify that a straight, strong stream issues from the tip.

7) Press the yellow “Reset” button to refill.

8) Turn the selector switch to “Automatic” and resume production.

IF THE FAULT CONTINUES TO OCCUR:

1) Check the Scaling in the FMC.

2) Verify that the Air Pressure after the air intensifier is 120 PSI.

3) Verify that the Dispense and Refill valve are operating correctly.

4) Check the voltage output of the Linear Transducer MLTD. (0-10v DC)

5) Check the robot output voltage.

TROUBLE SHOOTING:

Dispense Fault and High Volume Fault

This condition indicates that too much material has been dispensed onto the part, normally because the streaming orifice of the tip has enlarged from excessive wear which allows a greater flow of mixed material from the outlet.

It is a normal occurrence after several hundred cycles for the adhesive volume-per-part to increase because of normal tip wear. During “High Volume Fault” conditions, the volume indicated on the FMC display should be higher than the “High Volume Limit” setting for that “Style”. The production part that experienced a “High volume Fault” will have a full perimeter bead of glue applied, but that bead diameter should appear too large. To correct the fault, proceed as follows:

1) Turn the selector switch on the Control Panel to “Manual”. Then press the yellow “Reset” button to clear the fault.

2) Enter the cell, and remove the blue streaming tip only (it is not necessary to remove the nozzle body and static mixing tube to correct a “High Volume Fault”.

3) Install a new streaming tip into the bottom of the existing static mixing tube, and replace and re-tighten the tip-collar.

4) Go back to the Control Panel and press the “Manual Dispense” button to purge the mixing tube and new tip with fresh material. Verify that a straight, strong stream issues from the tip.

5) Press the yellow “Reset” button to refill.

6) Turn the selector switch to “Automatic” and resume production.

IF THE FAULT DOES NOT CLEAR CHECK THE FOLLOWING:

1) Verify that there is 120 PSI of air pressure Textron valve. (after the intensifier) .

2) Check the voltage output of the Pressure Transducers. (0-10v DC).

3) Verify that the robot analog voltage is correct.

TROUBLE SHOOTING

Refill Fault Side A or a **Refill Fault Side B**

A “Re-Fill Fault” will occur to warn you that material supply pressure from either of the pumps was too low to guarantee a complete re-load of major-side or minor-side material into the displacement chambers of the dispense head.

The red “Re-fill Fault (side A or B)” light will be accompanied by another red light signifying a “Low Pressure Fault”. This means that the adhesive pump pressure supplied to the dispense head during re-fill was lower than the “Refill Pressure” setting you assigned in the FMC Set-Up Menu. Normally, it means that the pump(s) are probably shut-off, or the air-motor regulator is set too low. If this happens:

1) Turn the selector switch to “Manual”. **The Refill-Fault Reset button will be disabled.**

   a) **NOTE: Do not attempt a “Manual Dispense” after a “Refill Fault” with the Nozzle Body installed. It could cause the major and minor materials to inter-mix in the dispense head and cure-out.**

2) Remove the Tip, Nozzle Body and Mixing Tube from the dispense head, leave uninstalled.

3) Verify that material supply pressures at the header outlets feeding material to the robot boom are at least 600 Psi, if not, correct the material supply problem. The air supply to the pumps may be turned off or adjusted way too low.

   a) If you are unclear about what the correct Air-motor pressure settings for the pumps should be, consult the System Data portion of this manual and adjust them as recorded in this manual.

   b) You should also scroll through the FMC Set-Up Menu to verify that verify that “Seconds for Refill” and “Refill” are at the same values originally recorded in the System Data portion of this manual. If not, re-adjust them accordingly.

4) Push the yellow “Re-set” button to clear the faults.

5) Push the “Manual Dispense” button to purge material from the outlet nostrils of the metering block.

6) Push the yellow “Reset” button to re-fill. If there are no further faults, replace the Nozzle-Body with a new Mixing Tube and Tip.

7) Do another “Manual Dispense” and “Reset” to refill with new tube and tip installed, and if there is still no “Refill Fault”, then turn the selector switch to “Automatic” and resume production.

IF THE FAULT DOES NOT CLEAR CHECK THE FOLLOWING:

1) Verify that there is 120 PSI of air pressure Textron valve. (after the intensifier)

2) Verify that the Dispense and Refill valve are operating correctly.

3) Check the voltage output of the Pressure Transducers. (0-10v DC).

4) Check the voltage output of the Linear Transducer MLTD. (0-10v DC)

5) Check the operation of the Dispense Head. Are the Piston Rods moving?

6) Open both dispense and refill solenoid valves manually. Does the material flow from the Dispense head.

   a) If not look for a Plugged Filter or a plugged port in the dispense head.

TROUBLE SHOOTING:

NO DISPENSE READY SIGNAL.

This is the output to the robot that let it know that the system is work correctly and is ready to run. The following conditions must be made for the system to run.

1) There is NO Refill Fault.

2) The Linear Transducer MLDT voltage must be below 2v at the air cylinder returned position.

3) The Air Pressure Switch must be engaged.

4) The Mixing Head in place Proximity switch must be engaged.

5) The Mixing tube in place Pressure switch must be engaged.

6) The Panel is turned on.

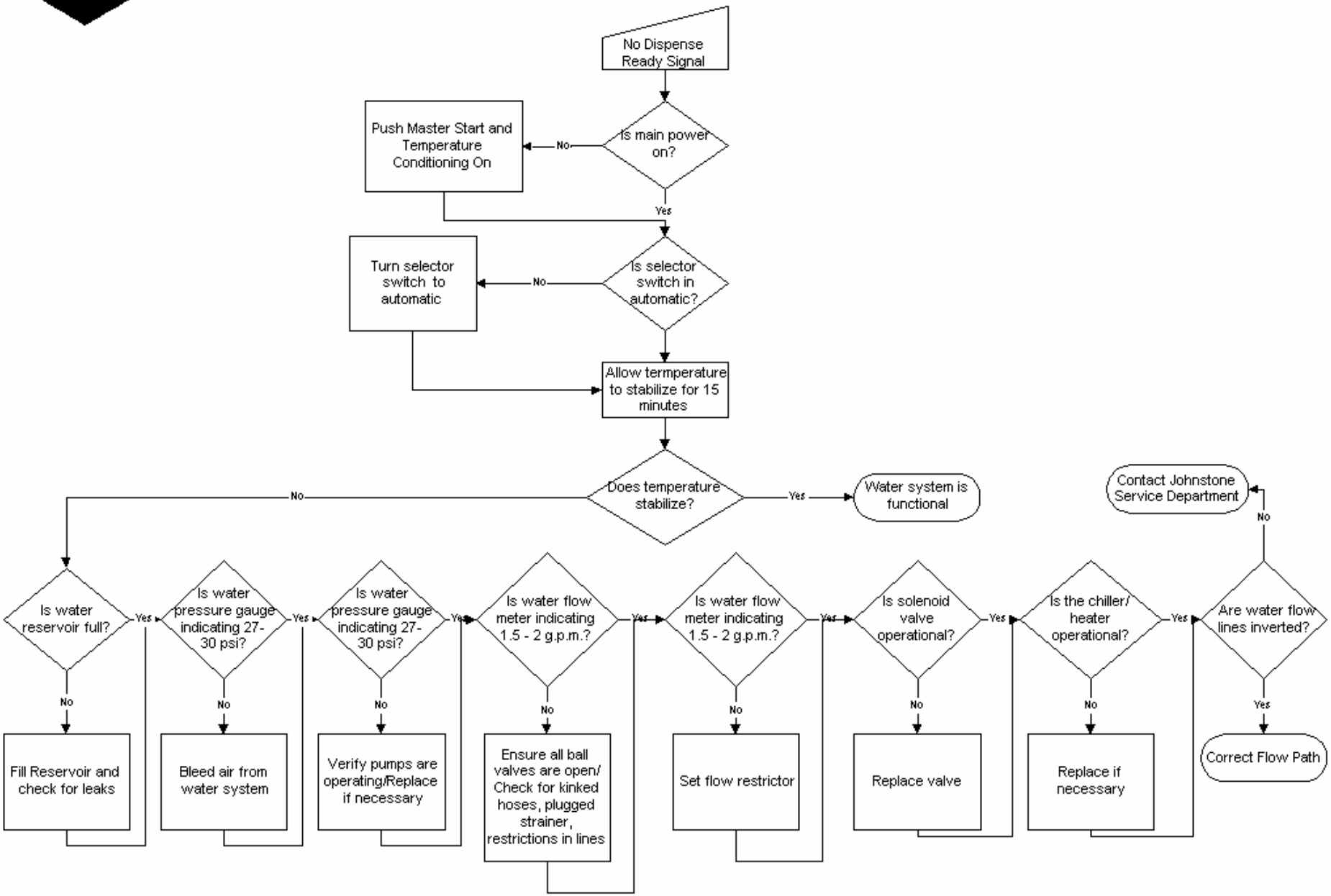
7) The temperature conditioning system is turned on and within 5 deg. of the set value temperature.

8) There is no Temperature Conditioning Faults (Float Switch, Heater High Temperature, Material Range)

9) The Selector Switch is the AUTOMATIC Position.

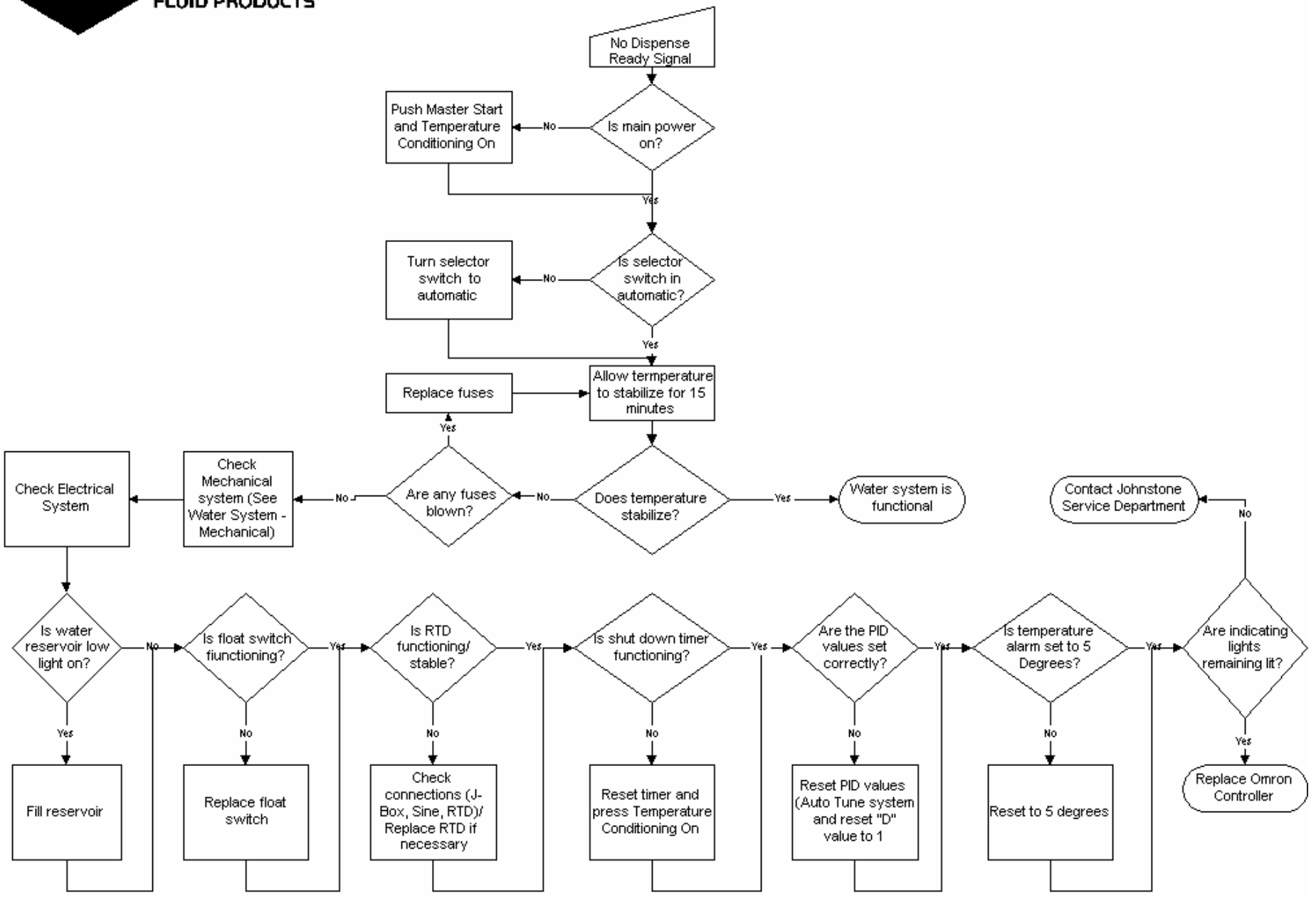
Johnstone INGERSOLL-RAND FLUID PRODUCTS

Dispense Troubleshooting Water System - Mechanical

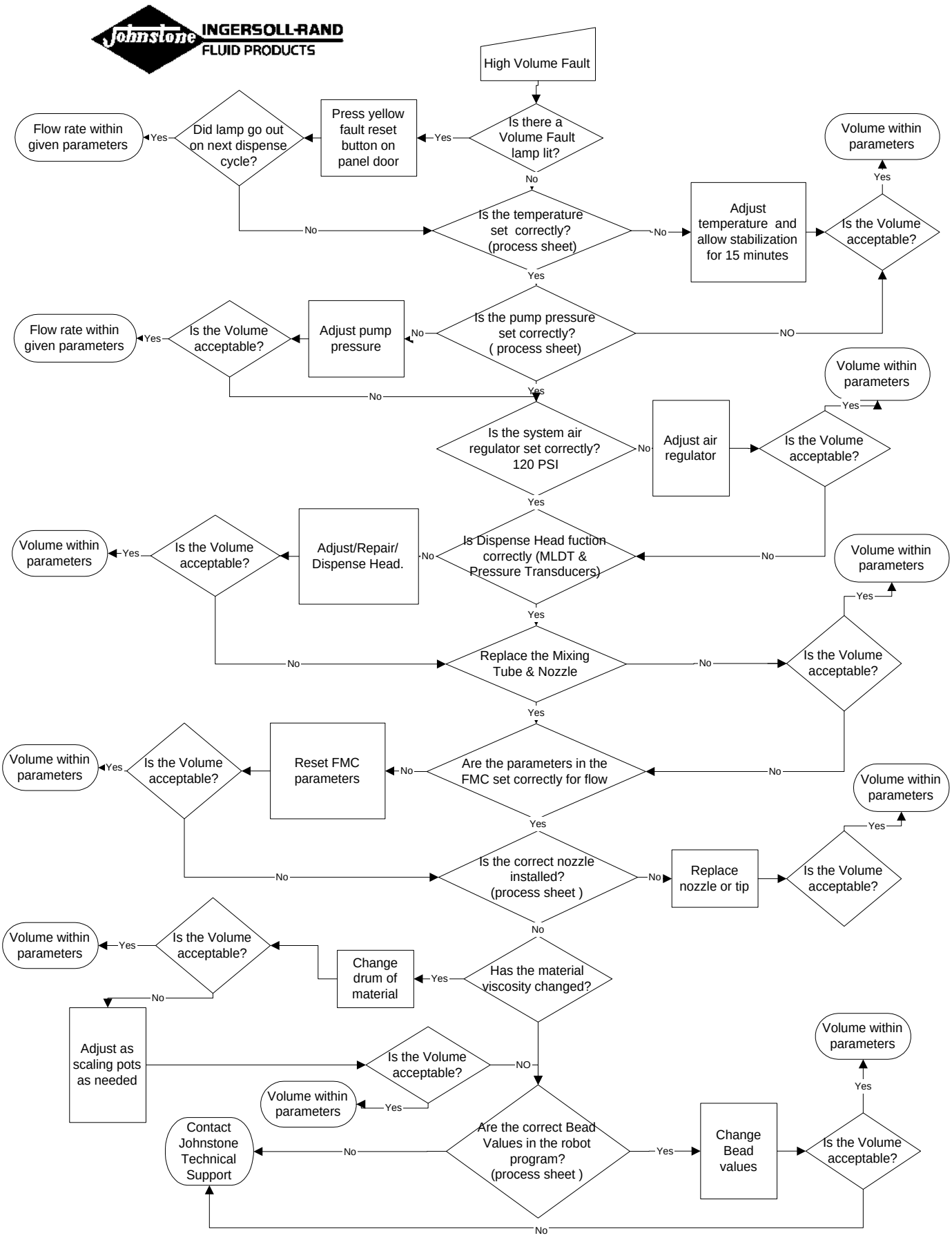


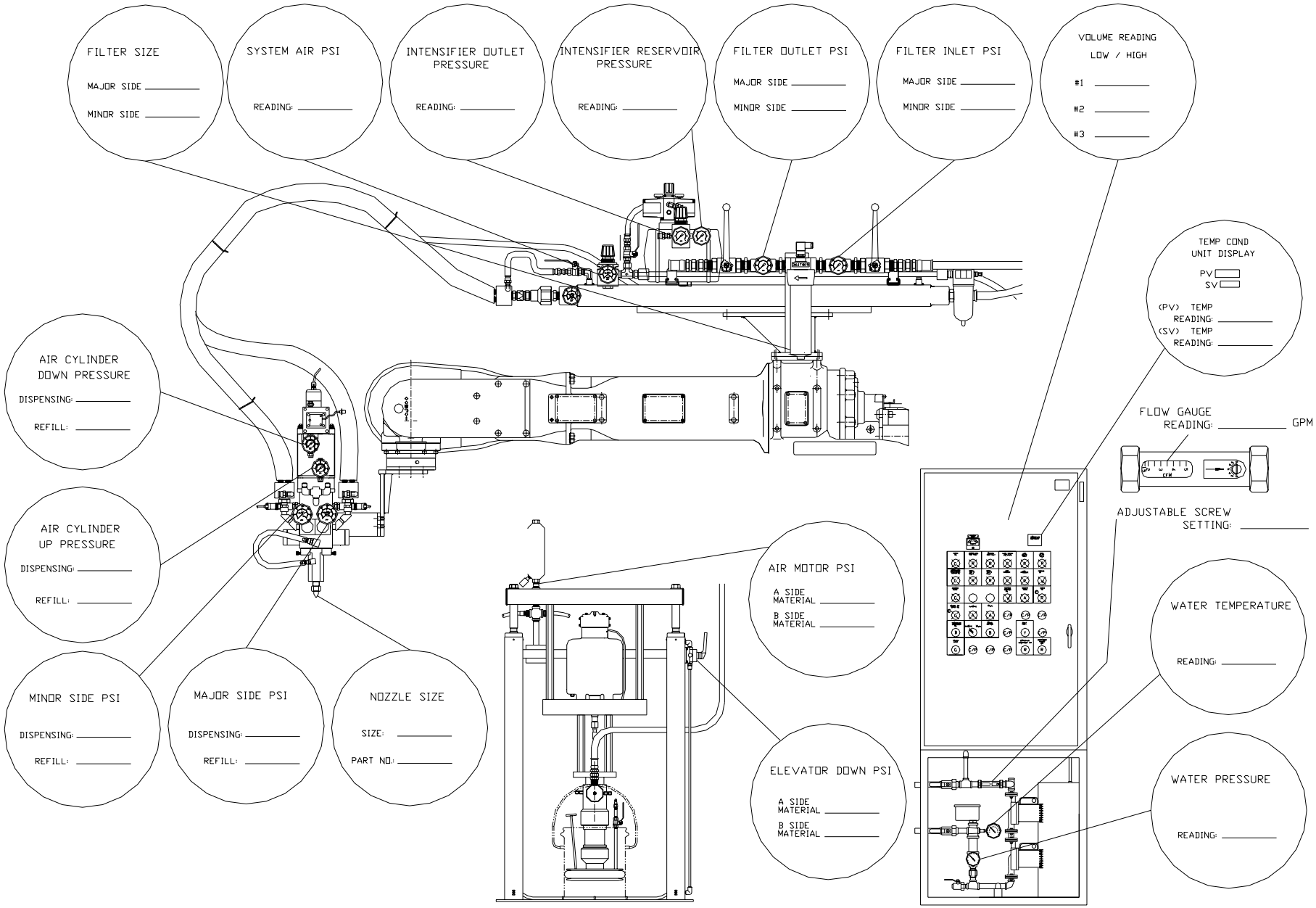
Johnstone INGERSOLL-RAND FLUID PRODUCTS

Dispense Troubleshooting Water System - Electrical




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 process sheet) 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
Yes
No
Is the system air regulator set correctly? (120PSI)
No
Adjust air regulator
Is the Volume acceptable?
Yes
Volume within given parameters
Yes
No
Is Dispense head fuctioning properly. (MLTD & Pressure transducer voltage)
No
Adjust/Repair/ Dispense Head
Is the Volume acceptable?
Yes
Volume within given parameters
Yes
No
Replace the Mixing Tube & Nozzle
No
Is the Volume acceptable?
Yes
Volume within given parameters
Yes
No
Are the parameters in the FMC set correctly (scaling feature)
No
Reset FMC parameters
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
No
Are the dispense and refill valves opening correctly
Yes
Replace the dispense and refill valves
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
Is the Volume acceptable?
No
Yes
Volume within given parameters
Are the correct Bead Values in the robot program? (process sheet)
Yes
Contact Johnstone Technical Support
No
Change Bead values
Is the Volume acceptable?
Yes
Volume 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
Yes
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 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
Yes
No
Is the system air regulator set correctly? 120 PSI
No
Adjust air regulator
Is the Volume acceptable?
Yes
Volume within parameters
Yes
Yes
No
Is Dispense Head fuction correctly (MLDT & Pressure Transducers)
No
Adjust/Repair/ Dispense Head.
No
Is the Volume acceptable?
Yes
Volume within parameters
Yes
Yes
No
Replace the Mixing Tube & Nozzle
No
Is the Volume acceptable?
Yes
Volume within parameters
Yes
Yes
No
Are the parameters in the FMC set correctly for flow
No
Reset FMC parameters
No
Is the Volume acceptable?
Yes
Volume within parameters
Yes
Yes
No
Is the correct nozzle installed? (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
No
Is the Volume acceptable?
Yes
Volume within parameters
Yes
Adjust as scaling pots as needed
Is the Volume acceptable?
NO
Volume within parameters
Yes
Yes
Are the correct Bead Values in the robot program? (process sheet)
No
Contact Johnstone Technical Support
Yes
Change Bead values
Is the Volume acceptable?
Yes
Volume within parameters
No



DATE: _____ PROGRAM: _____

SYSTEM: _____ COMPLETED BY: _____

2-PART SYSTEM PRESSURES

Johnstone INGERSOLL-RAND FLUID PRODUCTS

2-PART SYSTEM
PRESSURES & VARIABLES

SYSTEM # 6-

LOCATION:

DATE:

AIR PRESSURES		
ELEVATOR DOWN PRESSURE	MAJOR SIDE	MINOR SIDE
AIR MOTOR PRESSURE	MAJOR SIDE	MINOR SIDE
MAIN AIR PRESSURE REGULATOR	80 PSI	
INTENSIFIER TANK AIR PRESSURE	140 PSI	
REGULATOR AFTER AIR INTENSIFIER	120 PSI	
AIR CYLINDER DOWN PRESSURE-GAUGE	AT REFILL	DISPENSING
AIR CYLINDER UP PRESSURE GAUGE	AT REFILL	DISPENSING

MATERIAL PRESSURES		
	MAJOR SIDE	MINOR SIDE
FILTER INLET (PUMP PRESSURE)	PSI	PSI
FILTER OUTLET	PSI	PSI
DISPENSE HEAD-REFILL	PSI	PSI
DISPENSE HEAD-WHILE DISPENSING	PSI	PSI

TEMPERATURE CONDITIONING			
TEMPERATURE SP	Deg. F	PROPORTIONAL VALUE	
HEATER SIZE	KW	INTEGRAL VALUE	
WATER FLOW RATE	GPM	DERIVATIVE VALUE	
ALARM SETTING	Deg. F	WATER PRESSURE	PSI

COMPUTER VALUES			
GLOBAL SCALING	%	Precharge Pressure	PSI
Sec for Refill	Sec.	Low Volume Limit Style 0 (purge)	Cc
Wait for Purging	Min.	Low Volume Limit Style 1	Cc
Manual Flow Rate	V	Low Volume Limit Style 2	Cc
Auto Purge Amount	Cc	Low Volume Limit Style 3	Cc
How many body Styles		High Volume Limit Style 0 (purge)	Cc
MLTD calibration factor		High Volume Limit Style 1	Cc
Minor Psi Transducer cal. factor		High Volume Limit Style 2	Cc
Major Psi Transducer cal. Factor		High Volume Limit Style 3	cc
Refill Pressure	PSI	Mixing tube and Nozzle part No.	
Robot Speed	mm/s	Robot analog Voltage	V

2-PART- SYSTEMS MAINTENANCE SCHEDULE

DAILY:

1. Verify that the Dispense bead or pattern is correct.
2. Verify the Temperature setting is correct
3. Lubricate the Dispense Head with Synthetic Grease.
4. Install a new Mixing Tube and Nozzle.

WEEKLY:

1. Check the Dispense & Refill Valves to ensure that it is not leaking.
2. Check the Dispense Head to ensure that it is not leaking.
3. Check all of the regulator settings, Pump, Air Intensifier Dispense Head and Water system.

MONTHLY:

1. Check Water Level in the Reservoir
2. Check hoses for tightness and damage.
3. Check Air Filters for contamination.

SEMI ANNUALLY:

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

PUMPS

DAILY:

1. Assure that the packing oil cup is filled with Synthetic 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.

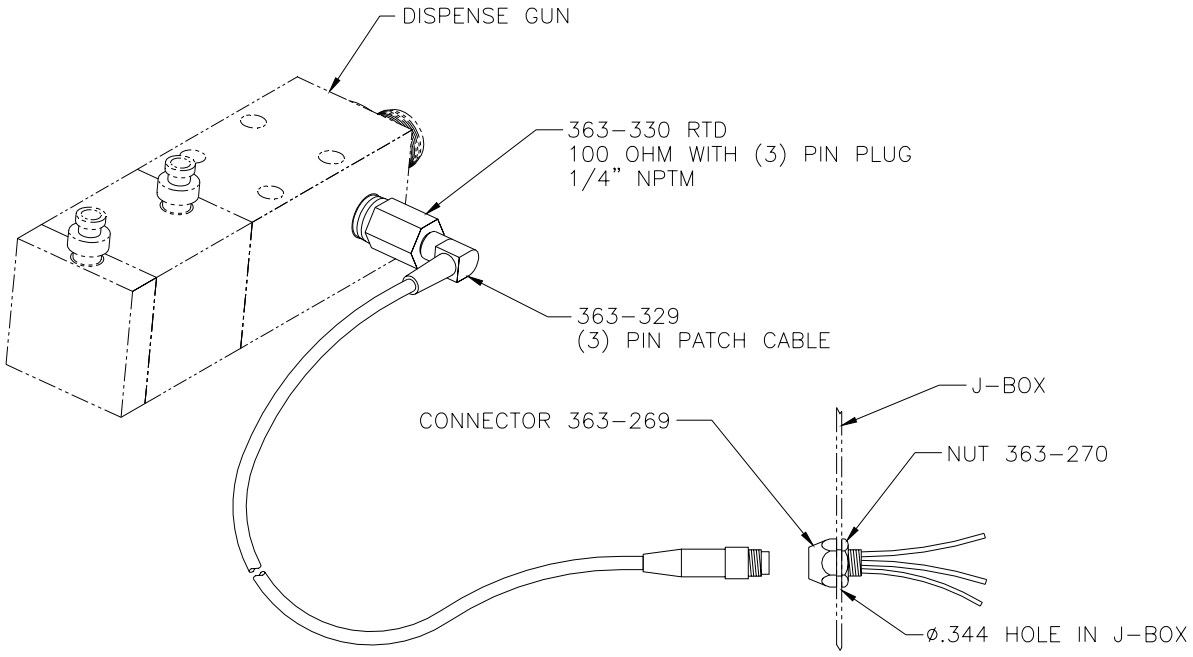
WEEKLY:

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

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:

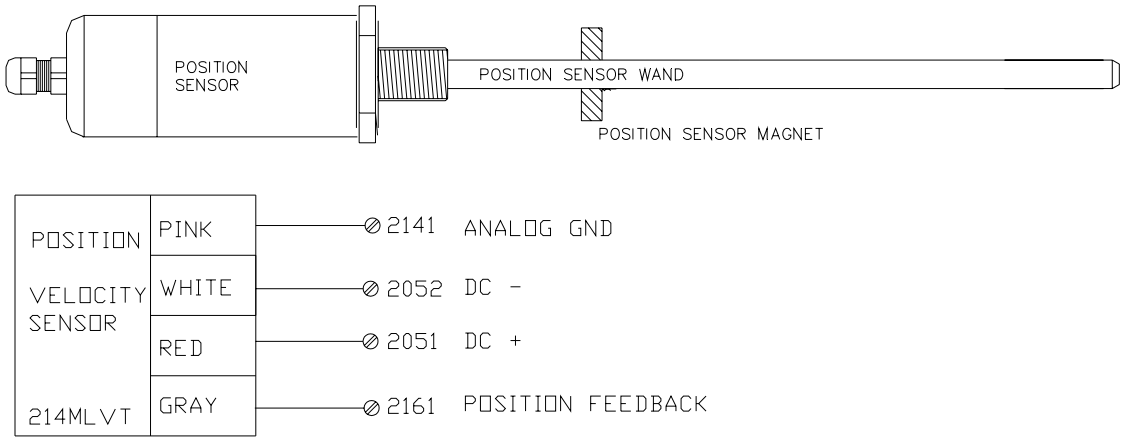
An Ohmmeter (Resistance Meter) from wire 1360 to 1370 should read between 0 and 10 Ohms.

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.

Linear Transducer (MLDT) 363-139

The MLDT is used to measure the dispensed volume and to assure that the chambers have fully re-filled.



PART NO.	DESCRIPTION
363-141	MAGNET
363-139	POSITION TRANSDUCER
363-142	CABLE 7-PIN FEMALE

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 White (common) and red (+) wires at the end of the cable.

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

5.) Voltage reading from digital voltmeter should be between 12.3 to 12.7vdc.

6.) Apply the 363-141magnet ring to the end of the rod, and slowly slide it downward to the base of the wand, while observing the voltage output from the meter. Voltage should descend evenly and gradually to zero at the base, without abrupt voltage jumps, interruptions, or ascensions. Replace the sensor if:

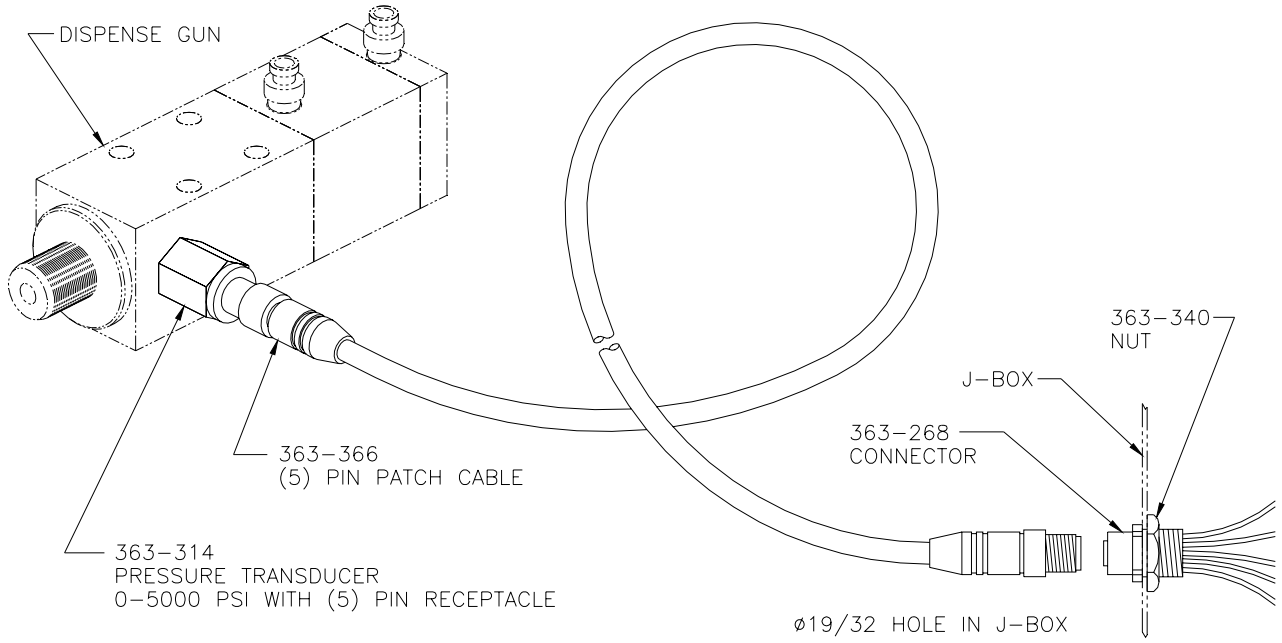
* The sensor outputs a constant voltage regardless of magnet position.
* The voltage ever ascends with the magnet traveling toward the base.
* The voltage without the magnet applied exceeds 12.7vdc, or is less than 12.3vdc.

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.

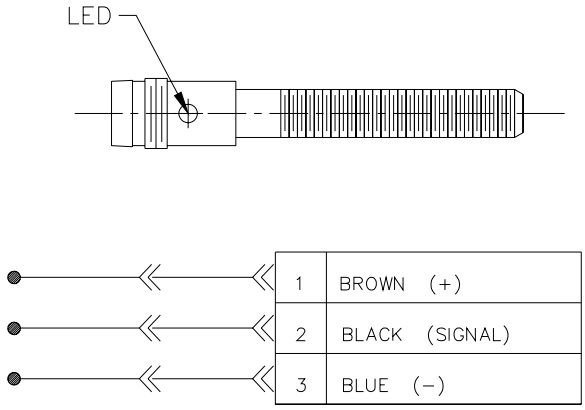
- Voltage = [(Pressure x 0.0018) + 1]

The New Pressure Transducer Cable Part No. is 363-366

Proximity Switch

362-977

The Prox Switch tells the FMC that the Nozzle is properly installed.



To Test the Sensors output:

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

2.) Connect cable to sensor.

3.) Apply 24vdc power supply to blue (-) and brown (+) wires at the end of the cable.

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

5.) Voltage reading from digital voltmeter should be near 0vdc with no metal in front of the sensor and the LED should be OFF.

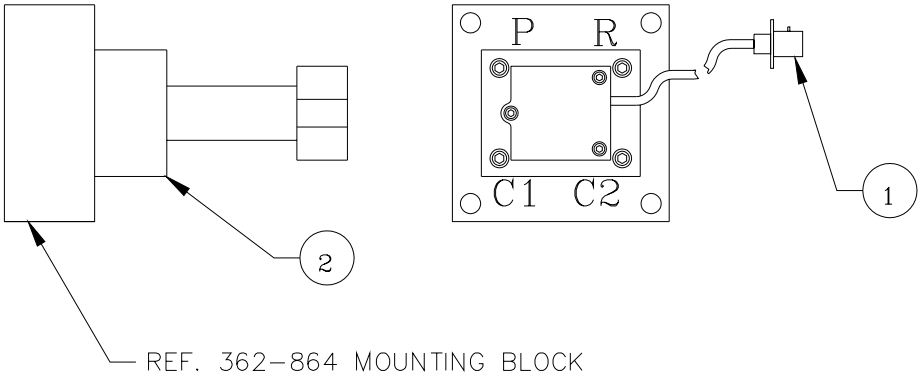
6.) Place metal close to the sensor front. Replace the sensor if:

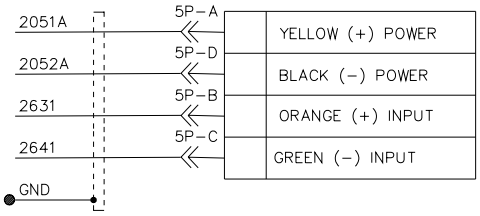
* The sensor output does not become 24vdc.
* The LED does not come ON.

Servo Valve

362-860

The Servo Valve controls the supply of air to the top and bottom of the Dispenser Air Cylinder in order to control material pressure.





DET	QTY	PART NO.	DESCRIPTION
1	1	362-861	RECEPTACLE 4-PIN MALE
2	1	362-860P	SERVO VALVE 24VDC 0-10V

- At 5V, the Servo Valve is idle and the same pressure should appear on both sides of the Air Cylinder.
- At above 5V, it increases material pressure.
- At below 5V, it decreases material pressure or refills.

To Test the Valve Output:

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

2.) Connect cable to Valve.

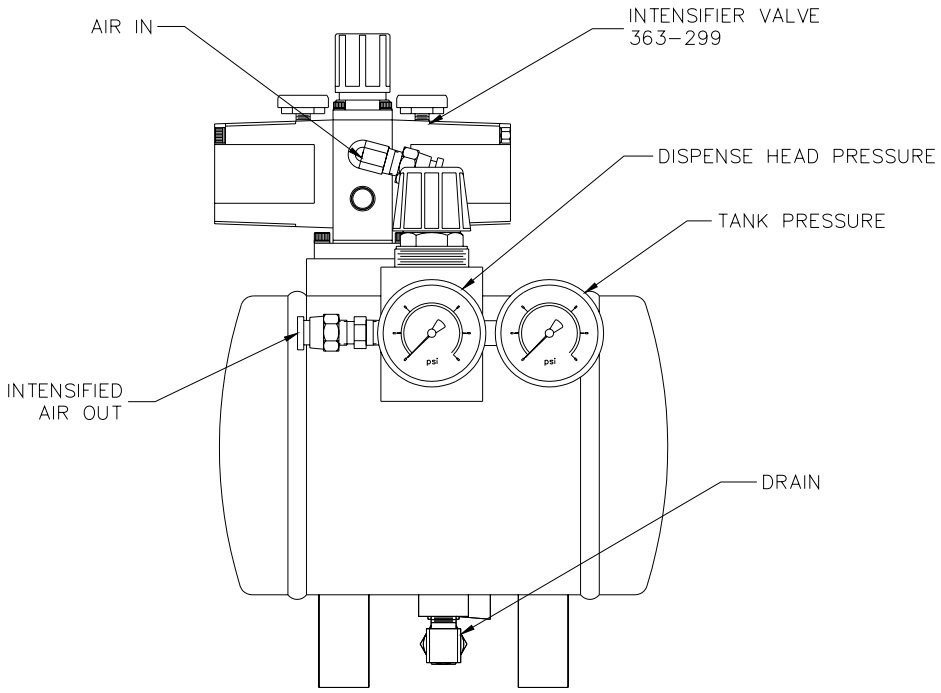
3.) Apply 24vdc power supply to black (-) and yellow (+) wires at the end of the cable.

4.) Apply 5vdc to orange (Input+) and green (Input-) wires at cable end. Replace the Servo Valve if the pressures on both sides of the Air Cylinder are not within 15psi of one another.

Pressure Intensifier Package

362-285

The Pressure Intensifier raises the air pressure to the Dispense Head to 120psi from an air supply above 65psi.

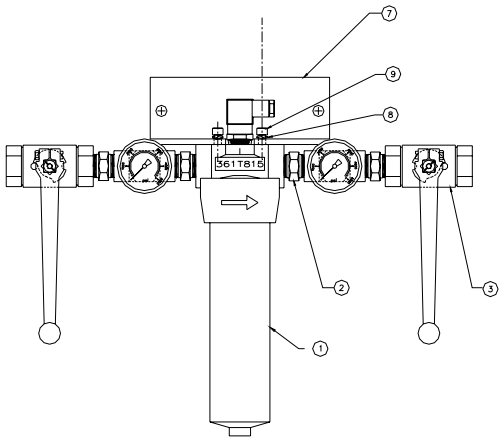


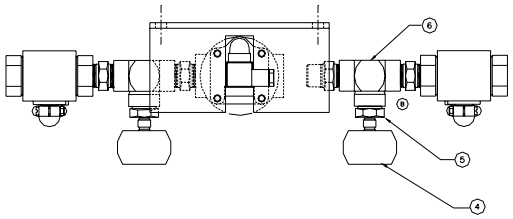
- Adjust the tank pressure using the regulator knob on the Intensifier Valve (363-299)
- Adjust the Dispense Head Pressure to 120psi using the Regulator on the outlet
- Air to the Intensifier should be run through a 5 micron filter (coalescing-type filter preferred)
- Monthly open Drain to expel water or contaminants

3/4 INCH FILTER ASSEMBLY

110-330Fxx

The Filter prevents large particles of material from plugging the streaming nozzle.





9	4	350-177	5/16-18 x 5/8" LONG S.H.C.S.
8	4	350-036	5/16 LOCK WASHER
7	1	403-141	MOUNTING BRACKET
6	2	350-977AQ	3/4" NPTF x 3 TEE
5	2	360-535	3/4" NPTM x 1/4" NPTF REDUCING BUSHING
4	2	362-172	0-5000 PSI., 2 1/2" DIAL PRESSURE GAUGE
3	2	360-628	3/4" NPTF BALL VALVE, HIGH PRESSURE
2	4	362-503AQ	3/4" x CLOSE HEX NIPPLE
1	1	361T815P	FILTER ASSY. W/O ELEMENT
DET.	QTY.	PART No.	DESCRIPTION

FILTER ASSEMBLY OPTIONS			
COMPLETE ASS'Y No. W/ FILTER	FILTER No.	ELEMENT No.	MESH
110-330F03	361T815F03	361T815E03	30
110-330F04	361T815F04	361T815E04	40
110-330F06	361T815F06	361T815E06	60
110-330F09	361T815F09	361T815E09	90

361T815RK REPAIR KIT		
1	362-331	BACK-UP RING
1	362-330	"O" RING, VITON
QTY.	PART No.	DESCRIPTION

The filter is considered plugged when there is a 300 PSI pressure drop across it.

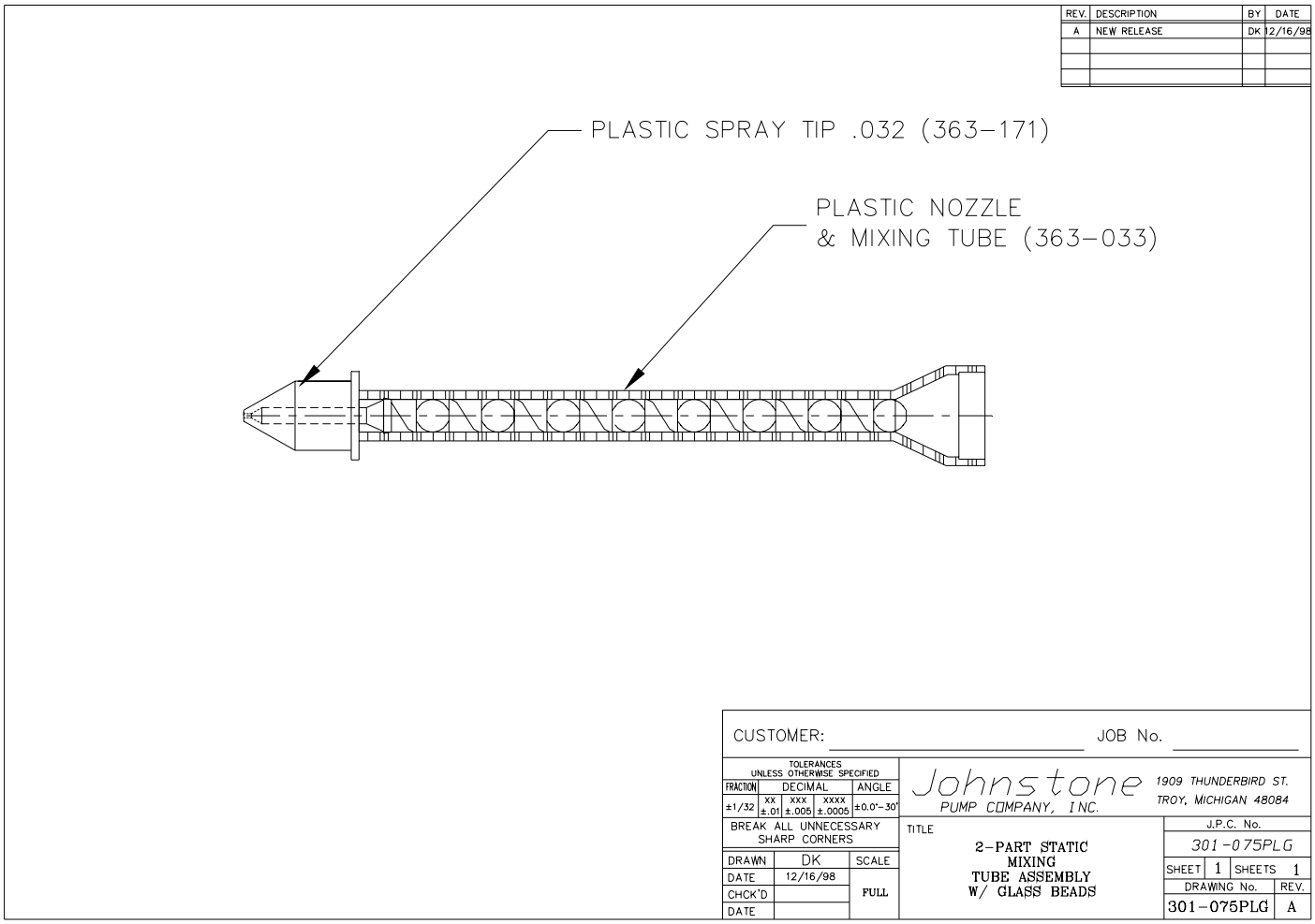
To Replace the element:

Depressurize the material supply, the pressure gauges should drop to 0 PSI: close both ball valves: Remove the filter bowl: Pull out the old element and clean the bowl: Install new filter element and lubricate the o-ring on the filter bowl and reassemble.

MIXING TUBE AND NOZZLE ASSEMBLY

ASSEMBLY NUMBER 301-075PLG

1.



PUMP AUTOMATIC DEPRESSURIZE SYSTEM

SYSTEM OVERVIEW:

The automatic depressurization system was designed to prevent material from being cured by temperature and packing out (being under pressure for extended periods of time). The system works by interfacing the pump pneumatics to the Autostream control panel. When the control panel is turned off the pumps will loose the air motor pressure and open a dispense valve. The pumps will stop running (no air) and the material pressure in the header system is relieved by opening a dispense valve installed between the header system and the pump follower plate. When the valve is opened material will flow from the header system to under the pumps follower plate. There is no loss of material since it is dispensed under the follower plate and recovered when the pumps start up again. The pump controls are energized by a solenoid valve located in a junction box located on the pumps. The Autostream panel controls this signal. In order for the pumps to run the Autostream panel must be turned on and the temperature conditioning system must be within the temperature range. If the temperature is out of range (Material temperature Fault) or the panel is turned off, the pumps will depressurize. Another feature was added to the system. A automatic shutdown timer. If the dispense gun has not been energized within the timers set period of time, the temperature conditioning system will be turned off and the pumps will depressurize. The timer is adjusted by opening the Autostream panel and turning the dial on the front face of the timer. Different materials will require different timer settings. The setting can be adjusted from 1 minute to 60 hours. If the timer times out the system may be restarted by depressing the Temperature Conditioner On button located on the Autostream control panel. The Temperature conditioning system will start and the pumps will pressurize when the temperature is within the temperature range. The system is ready to run.

SEQUENCE OF OPERATIONS:

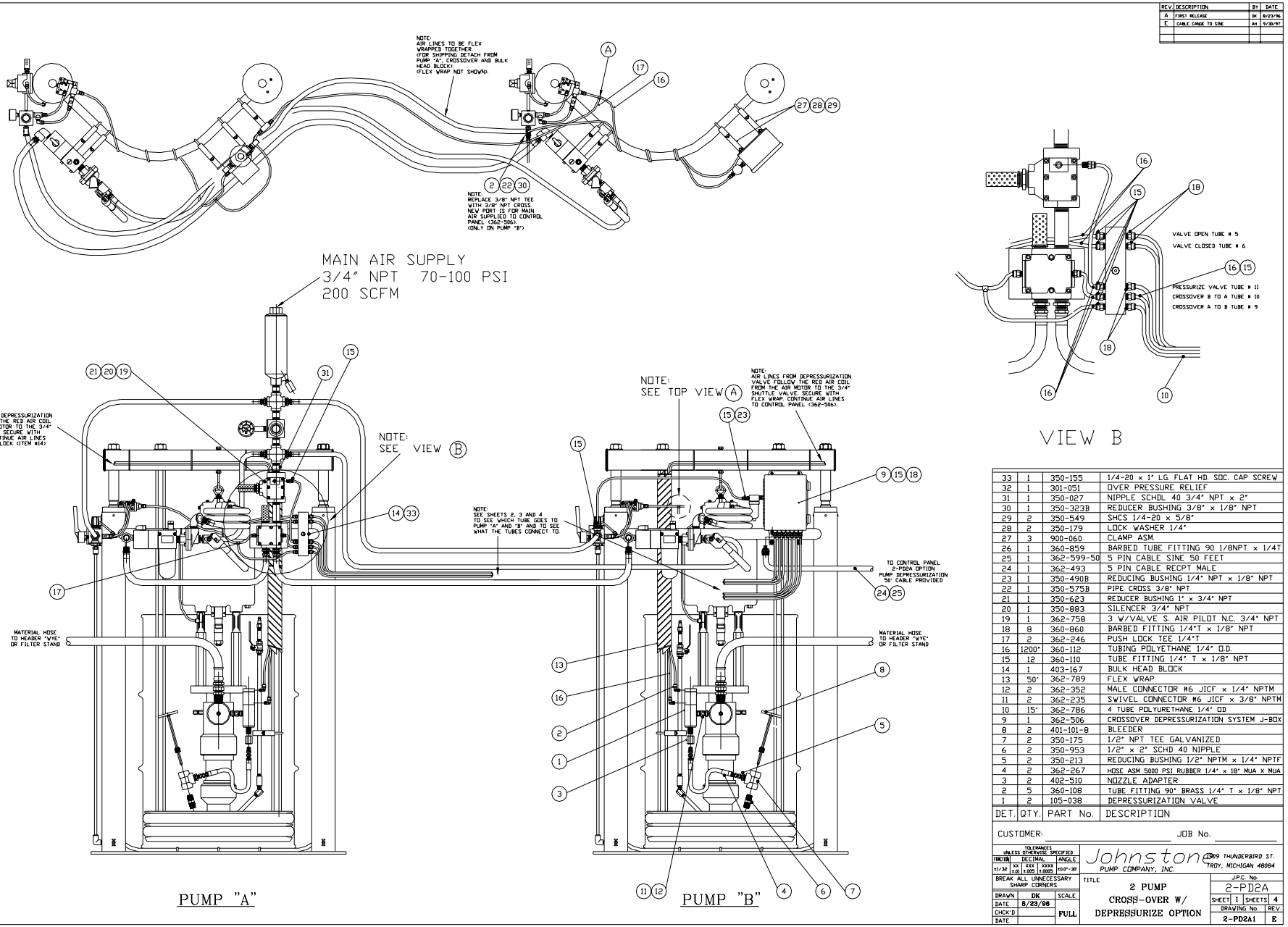
PRESSURIZING THE PUMPS:

1. Turn on the Autostream Panel.
2. Depress the Temperature Conditioner On button.
    1. The Temperature Conditioning system will start.
    2. If the temperature is over 5 degrees of the set value no action.
    3. If the temperature is within 5 degrees of the set value the pump solenoid valve will be activated (ERV1).
3. The pump solenoid valve is energized (ERV1).
    1. RV3 or RV4 pneumatic valve will be de-energized.
        1. This will cause both dispense valve to close (pressurize).
    2. The air pilot signal to the pump air motor shutoff valve is sent.
        1. This will turn on the supply air to the air motors.
4. The pumps are turned on and running.

DEPRESSURIZING THE PUMPS:

5. The Autostream Control stops sending the solenoid valve signal.
    1. The temperature conditioner set value is 5 degrees out of range.
    2. The temperature conditioner controls are turned off.
    3. The timer has timed out.

6. The pump solenoid valve is de-energized.
    1. ERV1 is de-energized and it pressurizes valve RV3 or RV4.
        1. The dispense valve on pump A or pump B will open.
            (1) Only the pump that is on line will open.
            (2) RV2A is a detented relay valve that tells either RV3 or RV4 to energize.
                (1) RV2A is switched by the empty drum signals from the pumps.
                    (1) If drum A was the last pump that was emptied RV4 will energize. Open drum B dispense valve.
                    (2) If drum B was the last pump that was emptied RV3 will energize. Open drum A dispense valve.
        2. Material will flow thru the dispense valve into the follower plate depressurizing the system.
    2. The air pilot signal sent to the air motor shutoff valve is stopped.
        1. This will stop the air motors from running.
7. The system is depressurized.



REV.	DESCRIPTION	BY	DATE
A	FIRST RELEASE	DK	8/23/96
E	CABLE CANGE TO SINE	AH	9/30/97

DET.	QTY.	PART No.	DESCRIPTION
33	1	350-155	1/4-20 x 1" LG. FLAT HD. SOC. CAP SCREW
32	1	301-051	OVER PRESSURE RELIEF
31	1	350-027	NIPPLE SCHDL 40 3/4" NPT x 2"
30	1	350-323B	REDUCER BUSHING 3/8" x 1/8" NPT
29	2	350-549	SHCS 1/4-20 x 5/8"
28	2	350-179	LOCK WASHER 1/4"
27	3	900-060	CLAMP ASM
26	1	360-859	BARBED TUBE FITTING 90 1/8NPT x 1/4T
25	1	362-599-50	5 PIN CABLE SINE 50 FEET
24	1	362-493	5 PIN CABLE RECPT MALE
23	1	350-490B	REDUCING BUSHING 1/4" NPT x 1/8" NPT
22	1	350-575B	PIPE CROSS 3/8" NPT
21	1	350-623	REDUCER BUSHING 1" x 3/4" NPT
20	1	350-883	SILENCER 3/4" NPT
19	1	362-758	3 W/VALVE S. AIR PILOT N.C. 3/4" NPT
18	8	360-860	BARBED FITTING 1/4"T x 1/8" NPT
17	2	362-246	PUSH LOCK TEE 1/4"T
16	1200"	360-112	TUBING POLYETHANE 1/4" O.D.
15	12	360-110	TUBE FITTING 1/4" T x 1/8" NPT
14	1	403-167	BULK HEAD BLOCK
13	50'	362-789	FLEX WRAP
12	2	362-352	MALE CONNECTOR #6 JICF x 1/4" NPTM
11	2	362-235	SWIVEL CONNECTOR #6 JICF x 3/8" NPTM
10	15'	362-786	4 TUBE POLYURETHANE 1/4" OD
9	1	362-506	CROSSOVER DEPRESSURIZATION SYSTEM J-BOX
8	2	401-101-B	BLEEDER
7	2	350-175	1/2" NPT TEE GALVANIZED
6	2	350-953	1/2" x 2" SCHD 40 NIPPLE
5	2	350-213	REDUCING BUSHING 1/2" NPTM x 1/4" NPTF
4	2	362-267	HOSE ASM 5000 PSI RUBBER 1/4" x 18" MUA X MUA
3	2	402-510	NOZZLE ADAPTER
2	5	360-108	TUBE FITTING 90° BRASS 1/4" T x 1/8" NPT
1	2	105-038	DEPRESSURIZATION VALVE

CUSTOMER: _____ JOB No. _____

TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTION ±1/32 | DECIMAL XX ±.01, XXX ±.005, XXXX ±.0005 | ANGLE ±0.0°-30'

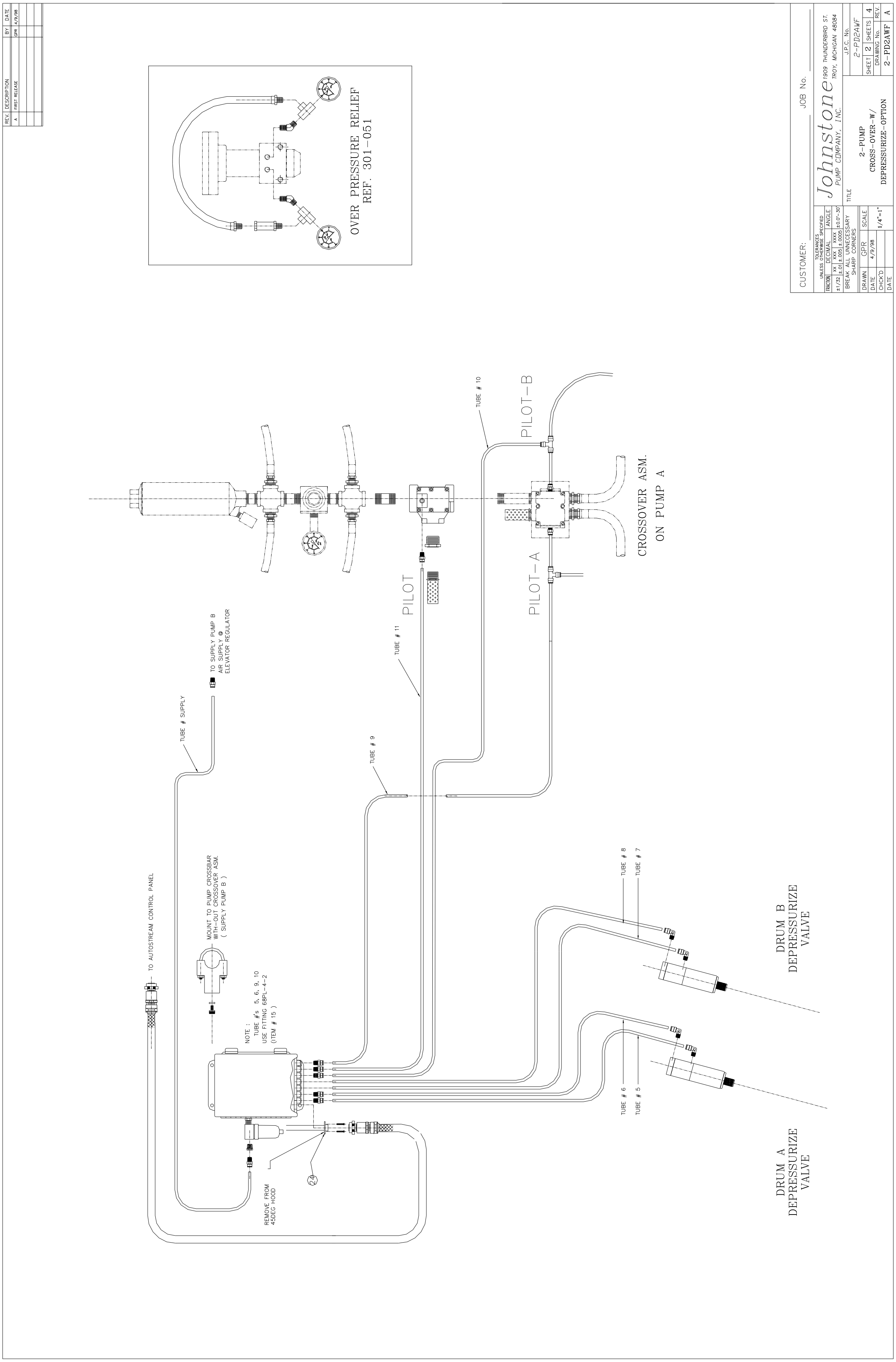
BREAK ALL UNNECESSARY SHARP CORNERS

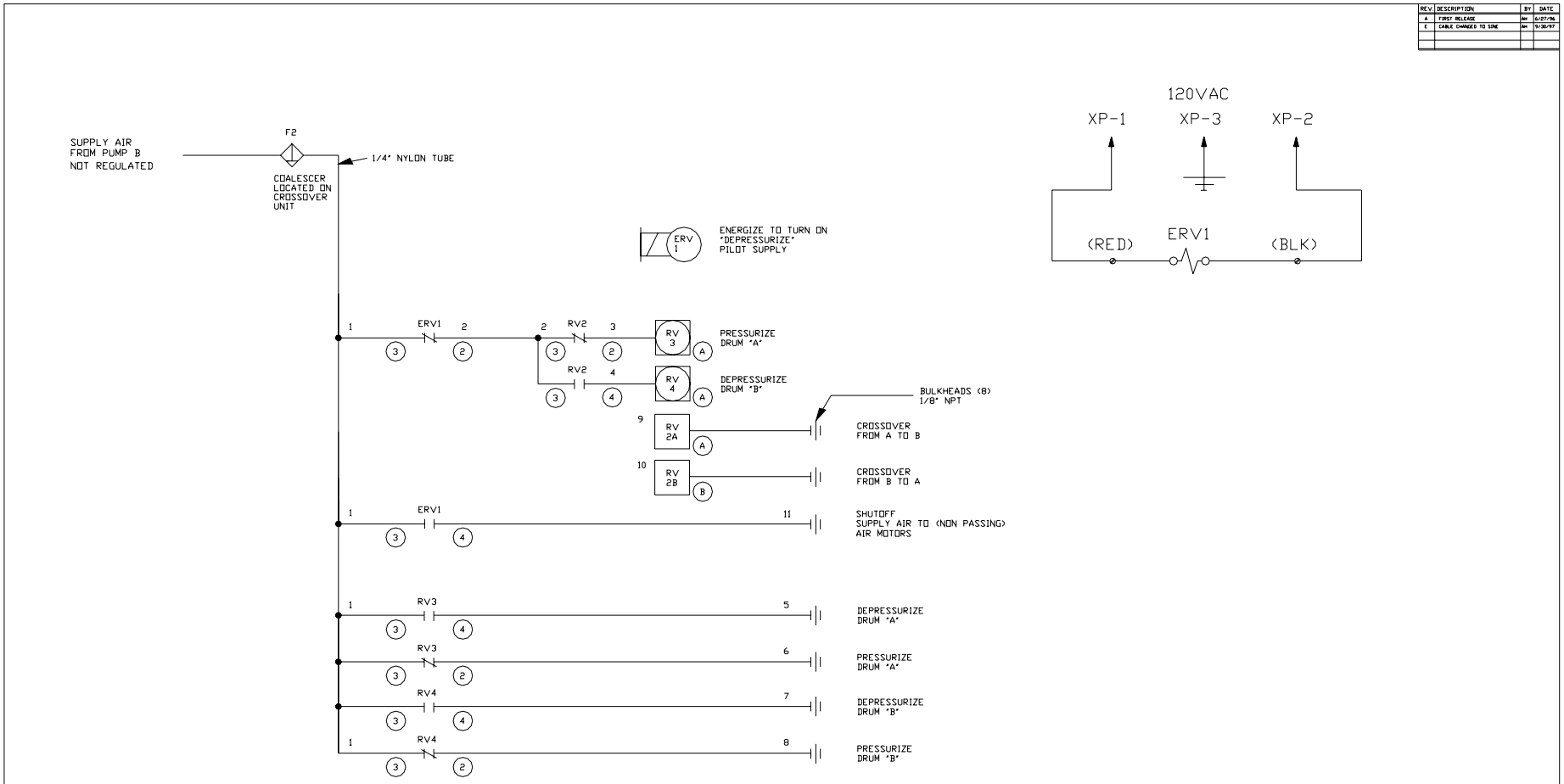
Johnston PUMP COMPANY, INC. 1909 THUNDERBIRD ST. TROY, MICHIGAN 48084

DRAWN	DK	SCALE
DATE	5/23/96	FULL
CHECK'D		
DATE		

TITLE: 2 PUMP CROSS-OVER W/ DEPRESSURIZE OPTION

J.P.C. No. 2-PD2A | SHEET 1 | SHEETS 4 | DRAWING No. 2-PD2A1 | REV. E


REV. DESCRIPTION BY DATE
A FIRST RELEASE GPR 4/9/98
OVER PRESSURE RELIEF
REF. 301-051
CROSSOVER ASM.
ON PUMP A
PILOT-B
PILOT-A
PILOT
TUBE # 10
TUBE # 11
TUBE # 9
TUBE # SUPPLY
TO SUPPLY PUMP B
AIR SUPPLY @
ELEVATOR REGULATOR
TO AUTOSTREAM CONTROL PANEL
MOUNT TO PUMP CROSSBAR
WITH-OUT CROSSOVER ASM.
(SUPPLY PUMP B)
NOTE :
TUBE #'s 5, 6, 9, 10
USE FITTING 68PL-4-2
(ITEM # 15)
REMOVE FROM
45DEG HOOD
24
TUBE # 8
TUBE # 7
TUBE # 6
TUBE # 5
DRUM B
DEPRESSURIZE
VALVE
DRUM A
DEPRESSURIZE
VALVE
CUSTOMER:
JOB No.
Johnstone
PUMP COMPANY, INC.
1909 THUNDERBIRD ST.
TROY, MICHIGAN 48084
J.P.C. No.
2-PD2AWF
TITLE
2-PUMP
CROSS-OVER-W/
DEPRESSURIZE-OPTION
BREAK ALL UNNECESSARY
SHARP CORNERS
DRAWN GPR
DATE 4/9/98
CHCK'D
DATE
SCALE
1/4"=1"
SHEET 2 SHEETS 4
DRAWING No. 2-PD2AWF
REV. A


REV. DESCRIPTION BY DATE
A FIRST RELEASE AH 6/27/96
C CABLE CHANGED TO SINE AH 9/30/97
120VAC
XP-1
XP-3
XP-2
(RED)
ERV1
(BLK)
SUPPLY AIR
FROM PUMP B
NOT REGULATED
F2
1/4" NYLON TUBE
COALESCER
LOCATED ON
CROSSOVER
UNIT
ERV 1
ENERGIZE TO TURN ON
"DEPRESSURIZE"
PILOT SUPPLY
ERV1
RV2
RV 3
PRESSURIZE
DRUM "A"
RV 4
DEPRESSURIZE
DRUM "B"
BULKHEADS (8)
1/8" NPT
RV 2A
CROSSOVER
FROM A TO B
RV 2B
CROSSOVER
FROM B TO A
SHUTOFF
SUPPLY AIR TO (NON PASSING)
AIR MOTORS
RV3
DEPRESSURIZE
DRUM "A"
PRESSURIZE
DRUM "A"
RV4
DEPRESSURIZE
DRUM "B"
PRESSURIZE
DRUM "B"
CUSTOMER:
JOB No.
TOLERANCES
UNLESS OTHERWISE SPECIFIED
FRACTION DECIMAL ANGLE
±1/32 XX ±.01 XXX ±.005 XXXX ±.0005 MED-30
BREAK ALL UNNECESSARY SHARP CORNERS
DRAWN P.L. SCALE
DATE 8/3/95 N/A
CHK'D
DATE
Johnstone PUMP COMPANY, INC.
1369 THUNDERBIRD ST.
TROY, MICHIGAN 48084
TITLE
2-PUMP
CROSS-OVER-W/
DEPRESSURIZE-OPTION
J.P.C. No.
2-PD2A
SHEET 3 SHEETS 4
DRAWING No. REV.
2-PD2A3 E
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