

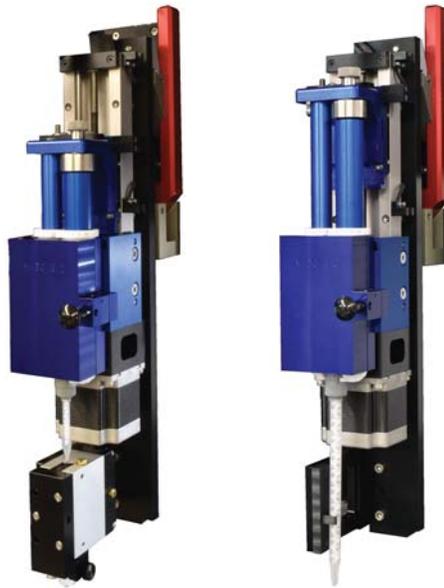
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# *MV50 Cartridge Valve User Guide*

Version 1.0  
May 12, 2017  
Part No. 22110222M

*for use with:*

PN 22110222-0001 - MV50 Cartridge Valve  
with and without Pinch Tube Valve



prepared by GPD Global<sup>®</sup> Documentation Dept.



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## Safety Notices

**CAUTION:**

Before connecting/disconnecting the MV50 Pump power cable to/from the system interconnect panel, **ALWAYS** activate the system Motion Stop or else damage to the system circuit will occur.

This notice assumes the MV50 Pump is being installed on or removed from a GPD Global DS Series or MAX Series dispensing system.

## Overview

### Valve Description & Function

The MV50 Cartridge Valve is a dispense mechanism with a precision stepper motor and an integrated, software-controlled dispense rate.

The valve is designed for dual material cartridge systems with a total volume of 50 ml and operates at slow speeds to accommodate a wide range of material viscosities. Real-time material mixing replaces the need for premixed and frozen material, thereby dramatically increasing material pot life and typically lowering material costs.

The MV50 valve is compatible with both the GPD Global MAX Series and DS Series Dispense Systems.

The pinch tube portion of the valve is a dual piston, pneumatically operated, normally-closed pinch valve. For details specific to the pinch tube, refer to [Pinch Tube Details](#) (pg 9).

### General Theory of Operation

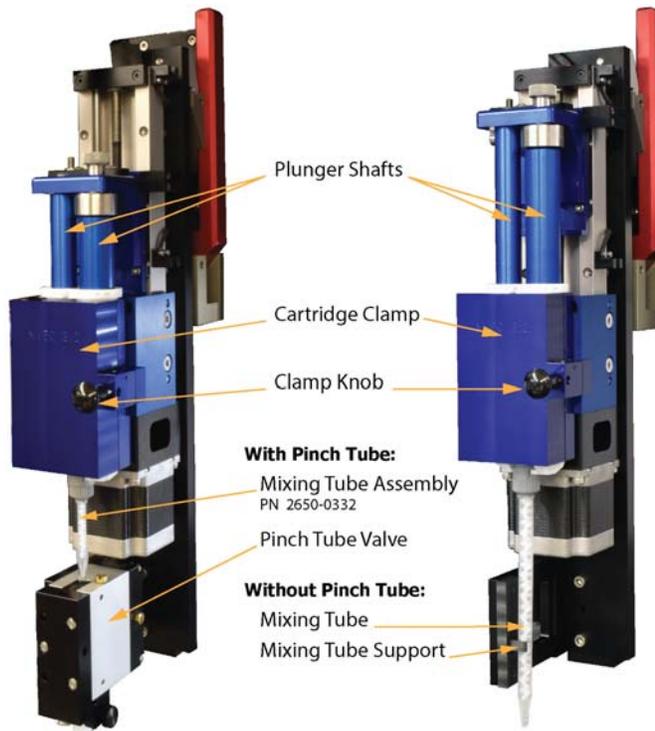
After loading the MV50 Cartridge Valve with a dual material cartridge – a quick and easy process requiring no tools, the valve is loaded onto the dispenser – also quick and simple and requiring no tools.

When the operator starts a program run or offline purge, the valve plunger shafts descend into the material cartridge at the “dispense pressure” value preset in the control software. When the program run or offline purge is complete, the plunger shafts rise out of the material cartridge and the valve returns to the “idle pressure” value preset in the control software.

### Special Features

- Integrated material level detection
- Quick material cartridge changeover
- Interchangeable ratio pistons
- No tools are needed for tool assembly and installation
- Disposable wetted parts
- No drip

## Parts Identification



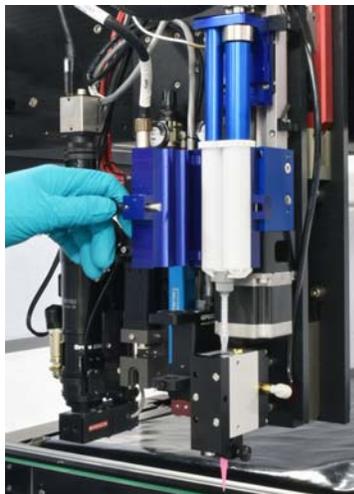
## Valve Set Up

Valve set up typically consists of installing a material cartridge in the valve, installing the valve on the dispenser, and verifying the correct settings in the control software.

## Replacing Material Cartridge

To replace the material cartridge mounted in the cartridge hardware:

1. Home the valve so the Plunger Shafts exit the Material Cartridge.
2. Open the Cartridge Clamp with Clamp Knob and remove the used Material Cartridge.



3. Install a Mixing Tube on a new material cartridge. Refer to [Installing Mixing Tube](#) (pg 3) for details.
4. Insert the new material cartridge in the cartridge clamp and close the cartridge clamp.

## Installing Mixing Tube

It is generally easier to install the Mixing Tube on the Material Cartridge before installing the Material Cartridge in the valve.

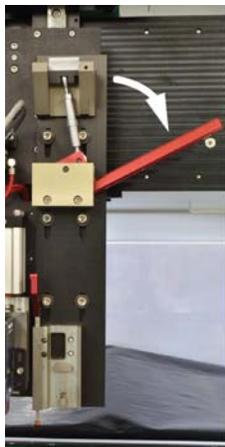
1. Screw a needle onto the Mixing Tube until snug.
2. Install the Mixing Tube on the Material Cartridge.
3. When installing the Material Cartridge in the valve Cartridge Clamp, be sure to press the Mixing Tube into the Mixing Tube Support.

## Installing Valve

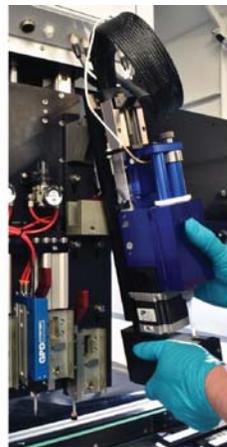
To install the valve on the dispenser:

1. Press the system Motion Stop button.
2. Release the red Lock Handle to its down-most position (Figure 1, step 1).
3. Rest the protuberance located at the rear of the upper valve hardware in the valve Support Groove (Figure 1, step 2).
4. Secure the lower section of the valve hardware onto the dispenser by pressing down on the Taper Lock Lever, seating the valve with a slight lift-and-push motion, and then releasing the taper lock lever (Figure 1, step 3).
5. Tighten the Taper Lock screw (Figure 1, step 4).
6. Raise the red Lock Handle to its most upright position (Figure 1, step 5). This locks the valve in place.

**Figure 1:** Valve Installation



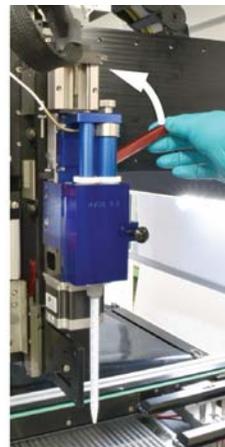
1 - Open lock handle



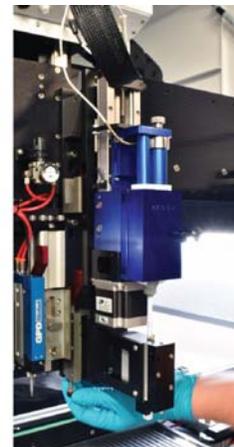
2 - Rest valve extension in support groove.



3 - Press Taper Lock lever down while seating valve.



4 - Lock valve in place with lock handle.



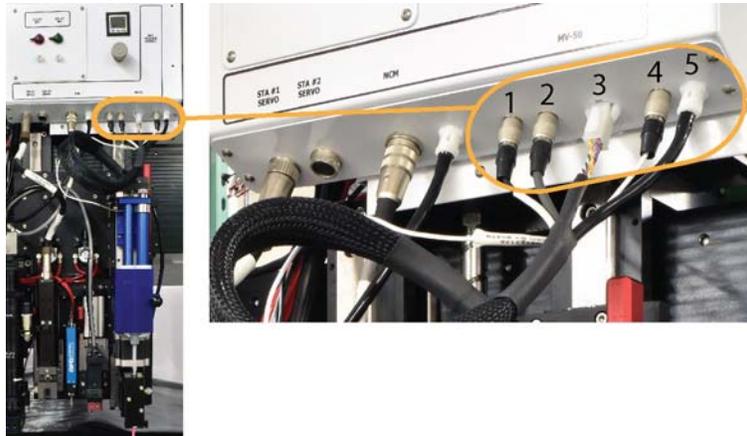
5 - Tighten mount lock screw.

- Before connecting valve lines and cables, verify the system Motion Stop button is pressed/activated.

**CAUTION:**

Before connecting/disconnecting the MV50 Pump power cable to/from the system interconnect panel, **ALWAYS** activate the system Motion Stop or else damage to the system circuit will occur.

- Hook up valve air, power, and sensor lines to proper receptacles on dispenser receptacle panel.

**Figure 2:** Valve Connections

1	Level Detect Sensor power and signal
2	Home/- and + limit switches
3	Stepper motor power
4	Pressure Transducer power and signal
5	Pinch Tube air

- Release the system Motion Stop button.

## Removing Valve

To remove the valve from the dispenser:

- Press the system Motion Stop button.

**CAUTION:**

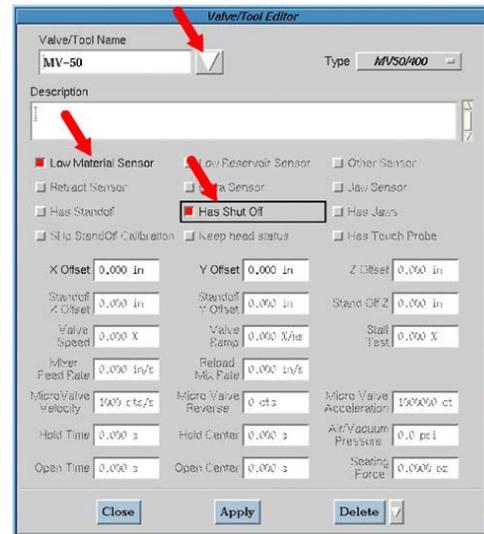
Before connecting/disconnecting the MV50 Pump power cable to/from the system interconnect panel, **ALWAYS** activate the system Motion Stop or else damage to the system circuit will occur.

- Disconnect each valve air and power line from its connection on the dispenser receptacle panel.
- Loosen the Taper Lock screw.
- Release the upper section of the valve hardware by pulling the red lock handle out and down to the right.
- Grasp the valve while releasing the lower section of the valve hardware by pushing down on the red taper lock thumb lever located behind the valve.
- Lift the valve hardware up and out of the valve mount.

## Verifying Software Settings

To set up or modify valve characteristics:

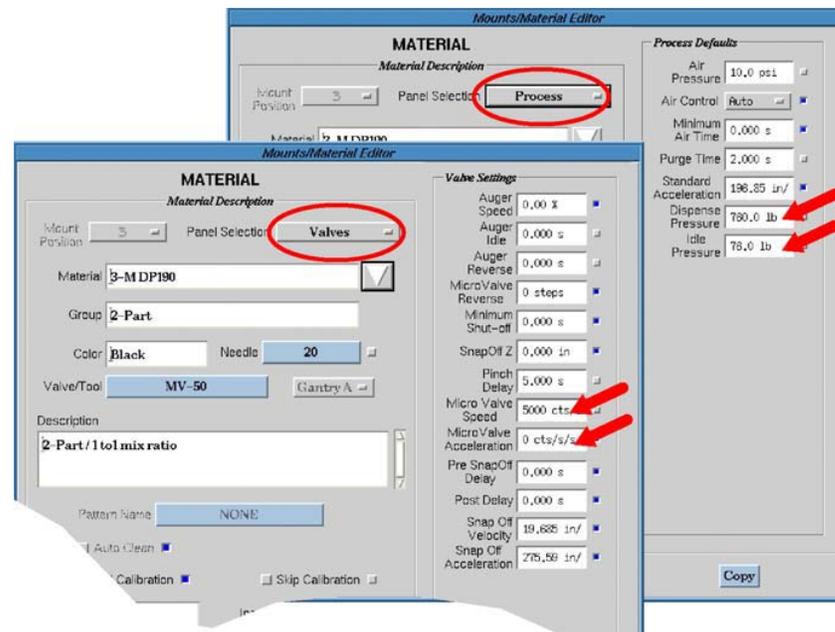
1. Open the Program Editor and click on Libraries > Head. The Valve/Tool Editor displays.
2. Click on the select button next to the Valve/Tool Name field, select MV50 valve, and then click ACCEPT.
3. Verify that the Low Material Sensor is turned on (red).
4. For the pinch tube portion of the valve, verify that Has Shut Off is turned on.
5. Click APPLY to save any changes made, and then click CLOSE to exit the window.



## Controlling Valve

Control valve pressure, speed, and acceleration.

Several valve characteristics, such as air pressure and valve speed and acceleration, can be modified with the control software. The values for these characteristics are material dependent; therefore, the characteristic fields are located on the Material version of the Mounts/Material Editor window.



1. From the Program Editor menu bar, click on Libraries > Material. The Material version of the Mounts/Material Editor window displays.

- Click on the Panel Selection button and select either Valves or Process, depending on which characteristic values you wish to add or modify.

*Characteristics by Type of Panel Selection*

Panel Selection	Air Pressure Fields	Definition
Process	Dispense Pressure	When this pressure is attained, the valve is activated and material dispense begins.
	Idle Pressure	The valve is set to this pressure at the end of a dispense before any other action (snap off, snap off delay, etc.) occurs.
Valves	Micro Valve Speed	Speed at which the valve moves (jogs) up and down. A suggested starting value is 12000 cts.
	Micro Valve Speed	Valve acceleration (steps/sec/sec). A suggested starting value is 12000 cts/s/s.

- Click APPLY to save any changes made, and then either select another Panel Selection choice or click CLOSE to exit.

## Valve Operations

### Moving the Valve

To manipulate the valve inputs and outputs directly, use the following Custom Control features in the FLOWare® software.

**NOTE:** The features listed below apply only to a single MV50 valve mounted in station 3.

- From the main menu bar of the Main Control Panel, click Machine Controls > MV50 Controls.
- Click on the valve feature you wish to activate.

**NOTE:** When you click on a feature, the corresponding device will activate immediately.

To:	click on:	Results:
HOME valve in station 3	MV50/400 Home3	Homes MV50/400 valve in station 3. Raises valve plunger shafts out of the material cartridge. Used when replacing material cartridge.
JOG valve plunger shafts DOWN	MV50/400 Reverse3	Jogs valve plunger shafts downward. NOTE: Jog motion continues for as long as selector key is depressed.
JOG valve plunger shafts UP	MV50/400 Jog3	Jogs valve plunger shafts upward. NOTE: Jog motion continues for as long as selector key is depressed.

## Adjustments

### Low Level Detect

The distance to which the plunger shafts travel into the material cartridge before triggering the low level detect sensor can be adjusted.

To increase plunger shaft depth into the material cartridge:

1. Back out the set screw (Item 18, Drawing 22110321-0001) located on the back of the adjustment screw (Item 19, Drawing 22110321-0001).
2. Adjust the adjustment screw up or down as needed.
3. Tighten the set screw to maintain the new adjustment screw position.

# Housekeeping

## Routine Maintenance

### Daily or Weekly

- Wipe all easily accessible surfaces with a clean, dry, soft cloth.
- Inspect pinch tubing and replace as needed per [Tubing Installation](#) (pg 12).

### Monthly

Lubricate ball screw and linear bearings with 1 drop light machine oil.

## Spare Parts

Description	Part No.	Qty
Opto switch	3700-0050	1
Bellows coupler	10/3600	1
Mixing tube (MV50 to Pinch Tube)	2650-0332	30

## Specifications

Needles . . . . . uses standard Luer-Lok™ needles  
 Material cartridge ratio . . . . . 3:2; requires cartridge hardware PN 22110321-0001  
 Repeatability . . . . . ±1% at 10 mg shots  
 Viscosity range . . . . . 0-500 Kcps

## References

- [Pinch Tube Details](#) (pg 9)
- [Mechanical Drawings](#) (pg 13)

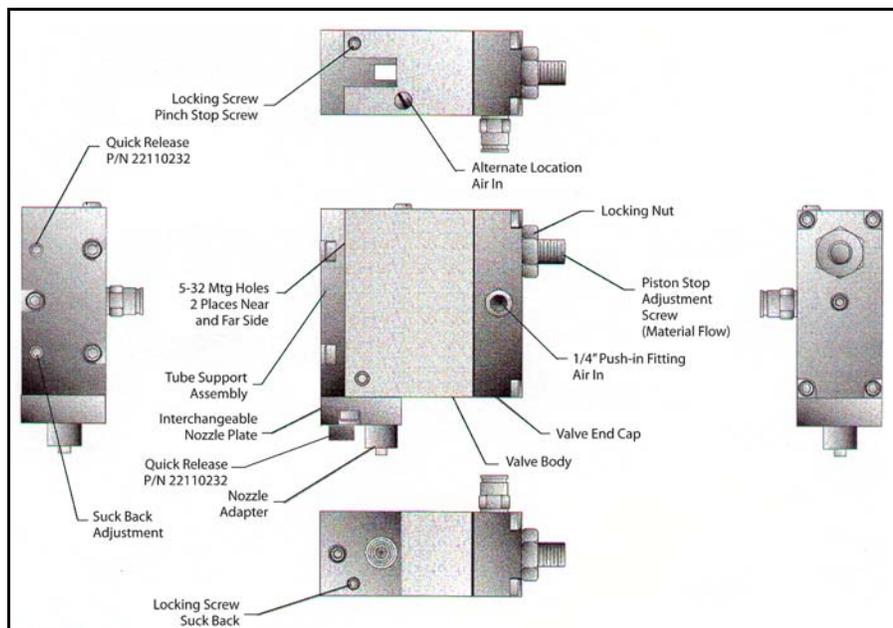
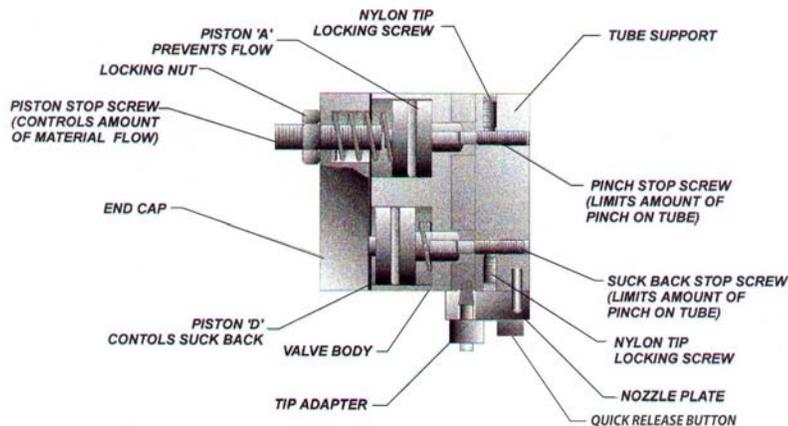
## Pinch Tube Details

- [Pinch Tube Description & Function](#) (pg 9)
- [Pinch Tube Theory of Operation](#) (pg 10)
- [Pinch Tube Set Up](#) (pg 11)
- [Pinch Tube Mounting & Installation](#) (pg 12)

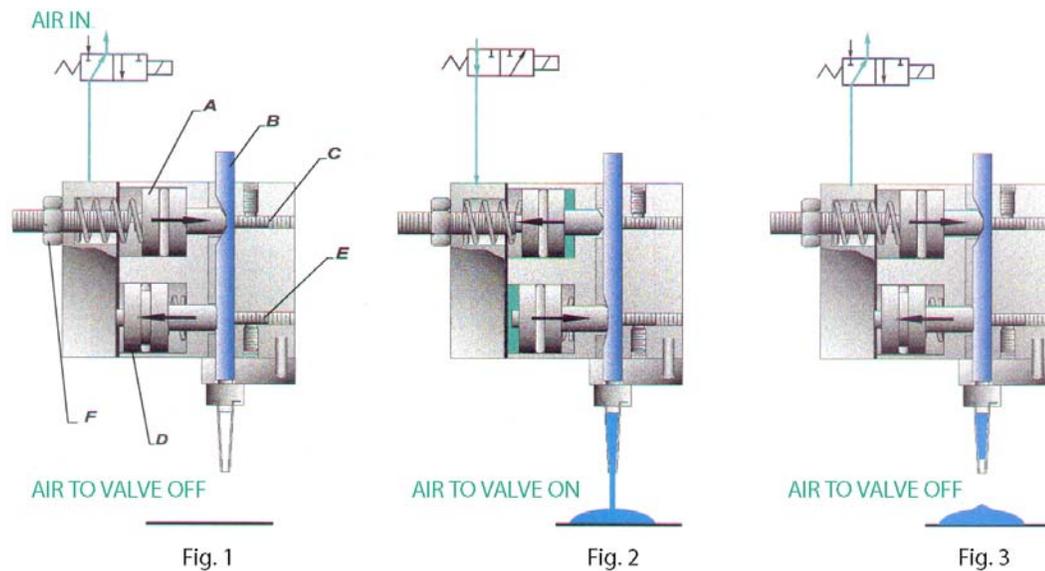
## Pinch Tube Description & Function

The pinch tube portion of the valve is a dual piston, pneumatically operated, normally-closed pinch valve. The pinch tube features precise, lockable controls to facilitate the adjustment of these critical parameters:

- Flow rate through the valve (i.e, amount the tube opens).
- Amount of tube closure (which insures the accuracy and repeatability of operation and greatly extends tube life).



## Pinch Tube Theory of Operation



### Pinch Tube Start Up

When an external 3-way, spring returned, normally-closed valve is off (unactuated), the pinching surface of the upper spring-closed piston (**A**) prevents flow by collapsing the tube (**B**). The patented pinch stop adjusting screw (**C**) limits the amount of pinch which limits the stress on the tube (this greatly extends tubing life and insures shot repeatability). The blunt lower piston (**D**) is held in its open position by a spring. The adjusting screw (**E**), which determines the amount that this piston will close the tubing when actuated, is set to a position that will allow approximately a 50% tube closure.

### Pinch Tube Dispense

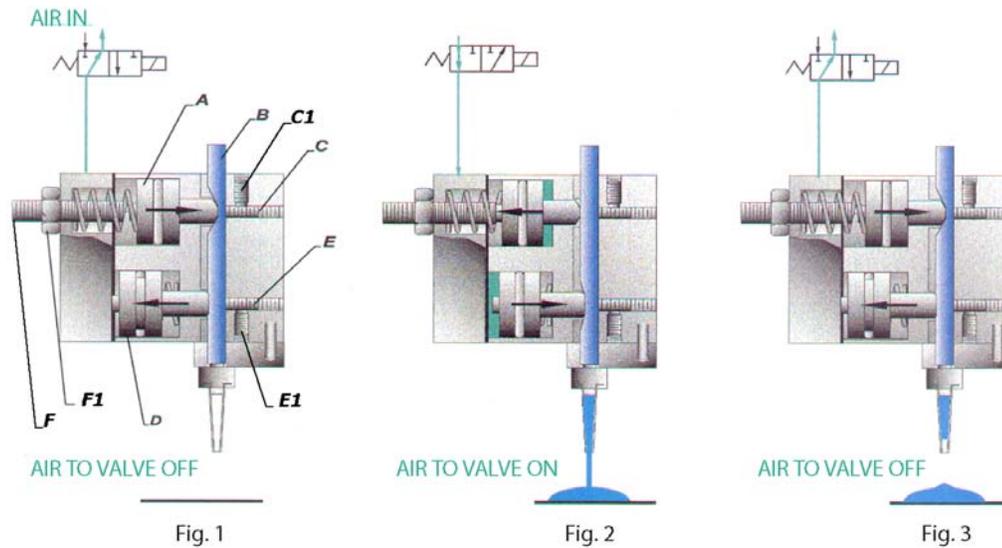
When the external valve is on, the air moves the upper piston back to the adjustable stop (**F**). This stop controls the amount the tube opens, which in turn controls the rate of flow through the tube. These actions, combined with nozzle size (if a nozzle is used), fluid pressure, and amount of time the valve is open, govern the amount of fluid dispensed. Simultaneous with the action of the upper piston (**A**), the lower, blunt piston (**D**) moves forward until it stops against the adjusting screw (**E**). This causes the piston to partially occlude the tubing (**B**).

### Pinch Tube Shut Off

When the external valve is turned off (end of dispense cycle), the actuating air exhausts. This allows the upper piston spring to move the piston (**A**) forward where it once again pinches the tubing (**B**). At precisely the same moment the lower blunt piston (**D**) is also released so that its spring can also return to its original position. This action allows this portion of tube (**B**) to return to its normal (open) shape. It is this return to shape from its partially closed position (which is adjustable) that creates a precise suck back. The valve is now ready to repeat the cycle. Fine adjustments can be made to both flow rate and suck back to obtain the required results.

## Pinch Tube Set Up

### Adjusting Material Flow & Suck Back



To set the piston for the proper pinch of the tube (amount of closing):

1. Verify that the tube support is flush against the valve body. It is very important that the tube support be firmly in place to enable the valve to function properly.
2. With the tube (B) connected to the material reservoir, gradually pressurize the reservoir and adjust the valve-piston pinch using the following steps:
  - a. Set the reservoir pressure to 5 psi. If the pinch stop screw (C) prevents the valve piston from closing the tubing, flow will begin as soon as the reservoir is pressurized.
  - b. Using a hex wrench, loosen the locking screw (C1), then turn the pinch stop screw (C) counterclockwise [piston (A) moves toward the tube] until the tube is sufficiently closed to stop the flow of material.
  - c. Using a hex wrench, first turn the Pinch Stop Screw (C) clockwise [piston moves away from the tube] until drops of liquid form at the nozzle tip. Note the locations shown in Fig. 1. This screw pushes the piston and the pinch off the tube. Turn the screw counterclockwise [piston moves toward the tube until the tube is sufficiently closed to stop the flow but is not over-pinched]. Usually, an additional 15 degrees more than the zero-flow will provide a correct setting. Tighten the locking screw (C1).
  - d. After adjusting the Pinch Stop Screw (C), loosen the locking nut (F1) and turn the Piston Adjustment Screw (F) clockwise just until you feel resistance or you may cut the tubing [by pushing the piston (A) into the tubing]. The resistance you feel is the Piston Adjustment Screw (F) pressing against the piston. To set proper Piston Stop with the Piston Adjustment Screw (F) (amount of opening), back it off from the closed position, as described above, based on the following guideline: one full turn of the Piston Adjustment Screw equals .042 inches of travel. Tighten the locking nut (F1).
  - e. To adjust the suck back feature Piston (D), loosen the locking screw (E1), then tighten the Suck Back Stop screw clockwise until the screw is bottomed out. Then back off the screw approximately ½ turn. Greater suck back is achieved by turning counterclockwise. Tighten the locking screw (E1).

## Pinch Tube Mounting & Installation

### Mount Rules

- If the valve is to be mounted in an area that limits access to the valve, we recommend performing the setup operation prior to mounting the valve.
- There are two 6-32 x 0.25 dp tapped holes on both sides of the valve for mounting purposes.
- Access to various surfaces of the valve will be necessary for periodic adjustment.

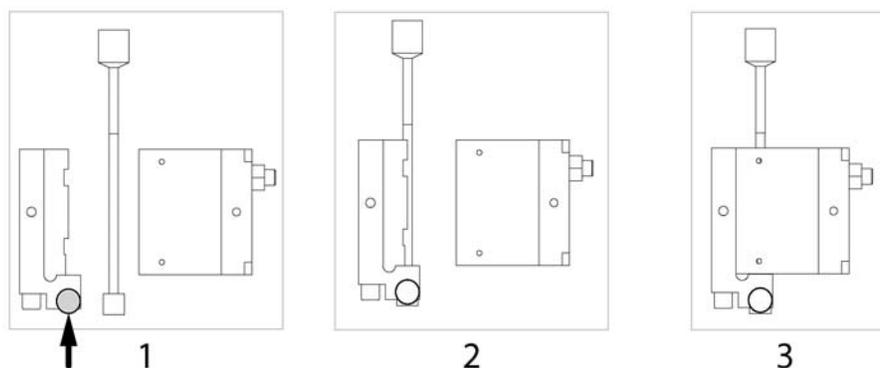
### Install Hardware

To install the valve:

1. Secure the valve to its mounting surface.
2. Connect the air line to the port provided.
3. Use a 3-way normally closed valve to operate the valve (CV of 0.01 or greater).
4. Connect your air supply to the 3-way valve.
5. To complete valve installation, enter offset values in the GPD dispenser FLOWare™ software so the valve needle will be properly positioned over the calibration station and dispense locations during operations.

Since the pinch valve is mounted in a valve bracket dedicated to the pinch valve, modify the X Offset and Y Offset in Base Locations (refer to the *Base Locations Reference Guide* PN 22100025).

### Tubing Installation



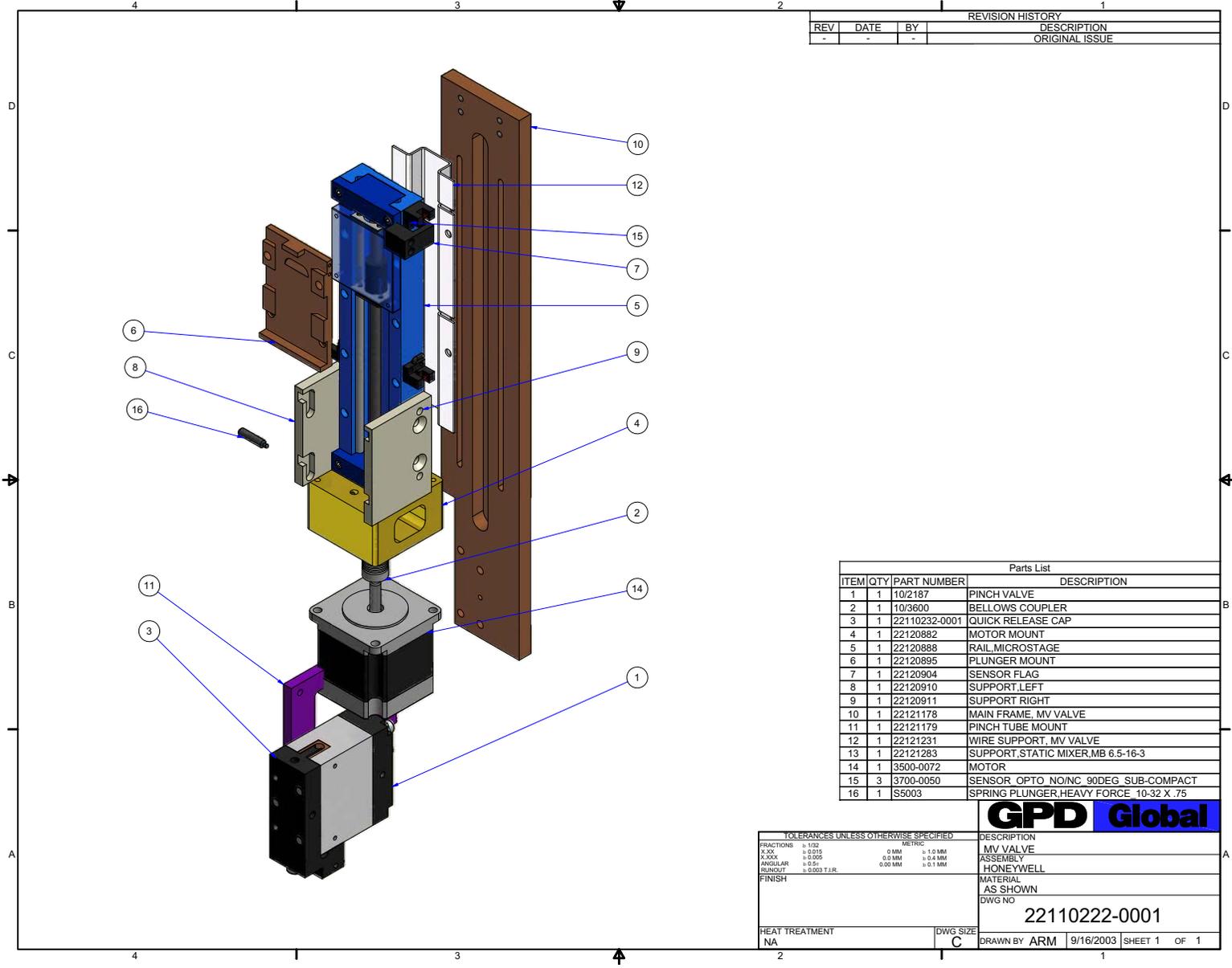
To install Reservoir tube (MV50 to Pinch Tube) in valve body:

1. Loosen the thumb screw and then remove the tube support assembly.
2. Install tubing over barb fitting on nozzle plate or insert through hole provided.
3. Replace tube support assembly on valve body and tighten thumb screw. Refer to [Spare Parts](#) (pg 8) for part number detail.

## Mechanical Drawings

- [MV50 Cartridge Valve - 22110222-0001](#) (pg 14)
- [Cartridge Hardware 3:2 Ratio - 22110321-0001](#) (pg 15)
- [MV Valve Hardware for Station 3 - 22110319](#) (pg 16)

### MV50 Cartridge Valve - 22110222-0001



REVISION HISTORY			
REV	DATE	BY	DESCRIPTION
-	-	-	ORIGINAL ISSUE

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	10/2187	PINCH VALVE
2	1	10/3600	BELLOWS COUPLER
3	1	22110232-0001	QUICK RELEASE CAP
4	1	22120882	MOTOR MOUNT
5	1	22120888	RAIL, MICROSTAGE
6	1	22120895	PLUNGER MOUNT
7	1	22120904	SENSOR FLAG
8	1	22120910	SUPPORT, LEFT
9	1	22120911	SUPPORT, RIGHT
10	1	22121178	MAIN FRAME, MV VALVE
11	1	22121179	PINCH TUBE MOUNT
12	1	22121231	WIRE SUPPORT, MV VALVE
13	1	22121283	SUPPORT, STATIC MIXER, MB 6.5-16-3
14	1	3500-0072	MOTOR
15	3	3700-0050	SENSOR, OPTO, NO/NC, 90DEG, SUB-COMPACT
16	1	S5003	SPRING PLUNGER, HEAVY FORCE, 10-32 X .75

TOLERANCES UNLESS OTHERWISE SPECIFIED		
FRACTIONS	± 0.02	METRIC
XXX	± 0.015	0.001
XXX	± 0.005	± 0.001
ANGULAR	± 0.01	± 0.04
FINISH	± 0.01	± 0.1
FINISH	± 0.003 T.R.	

**GPD Global**

DESCRIPTION  
**MV VALVE ASSEMBLY**  
**HONEYWELL**

MATERIAL  
 AS SHOWN

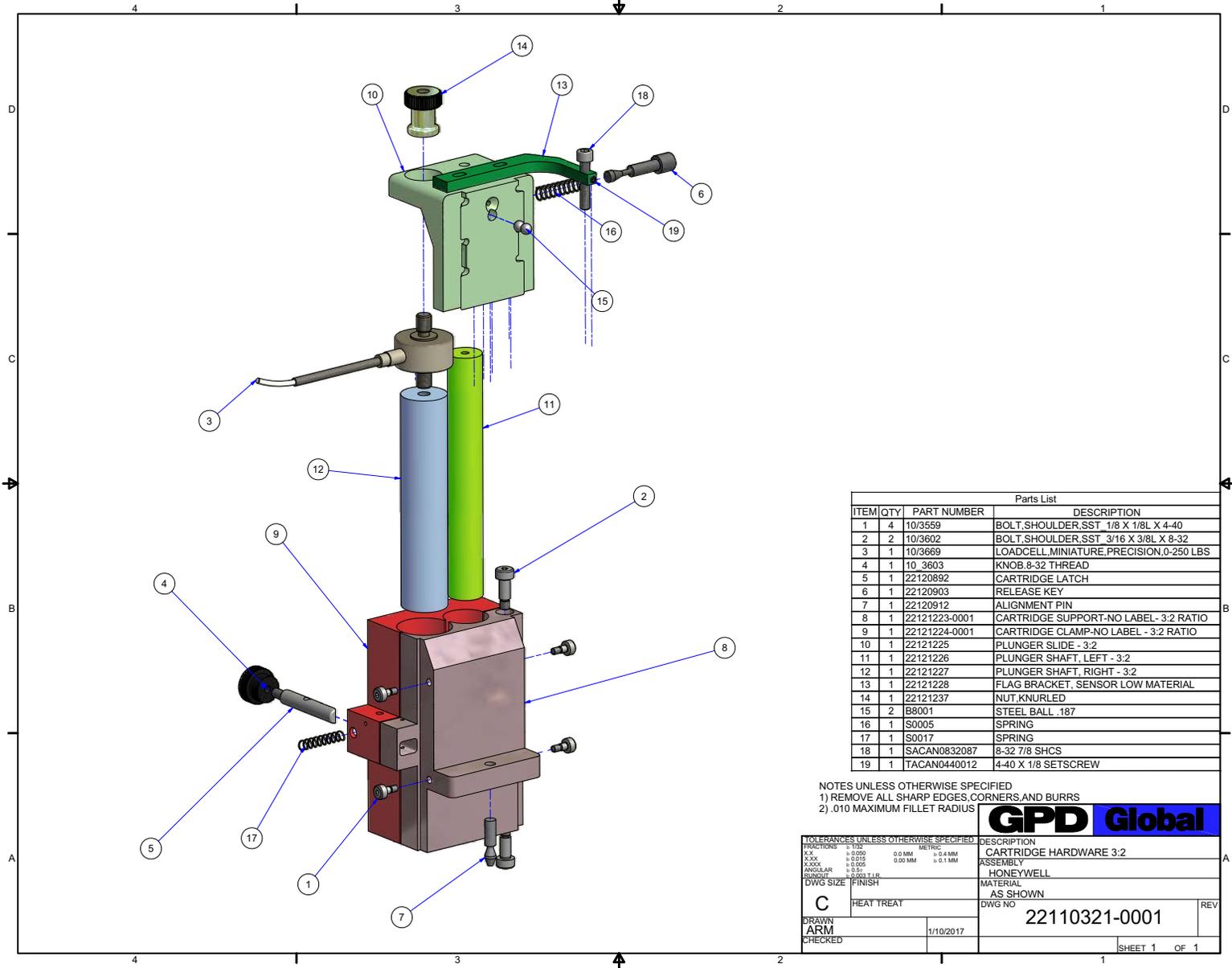
DWG NO  
**22110222-0001**

HEAT TREATMENT  
 NA

DWG SIZE  
**C**

DRAWN BY **ARM** 9/16/2003 SHEET 1 OF 1

### Cartridge Hardware 3:2 Ratio - 22110321-0001



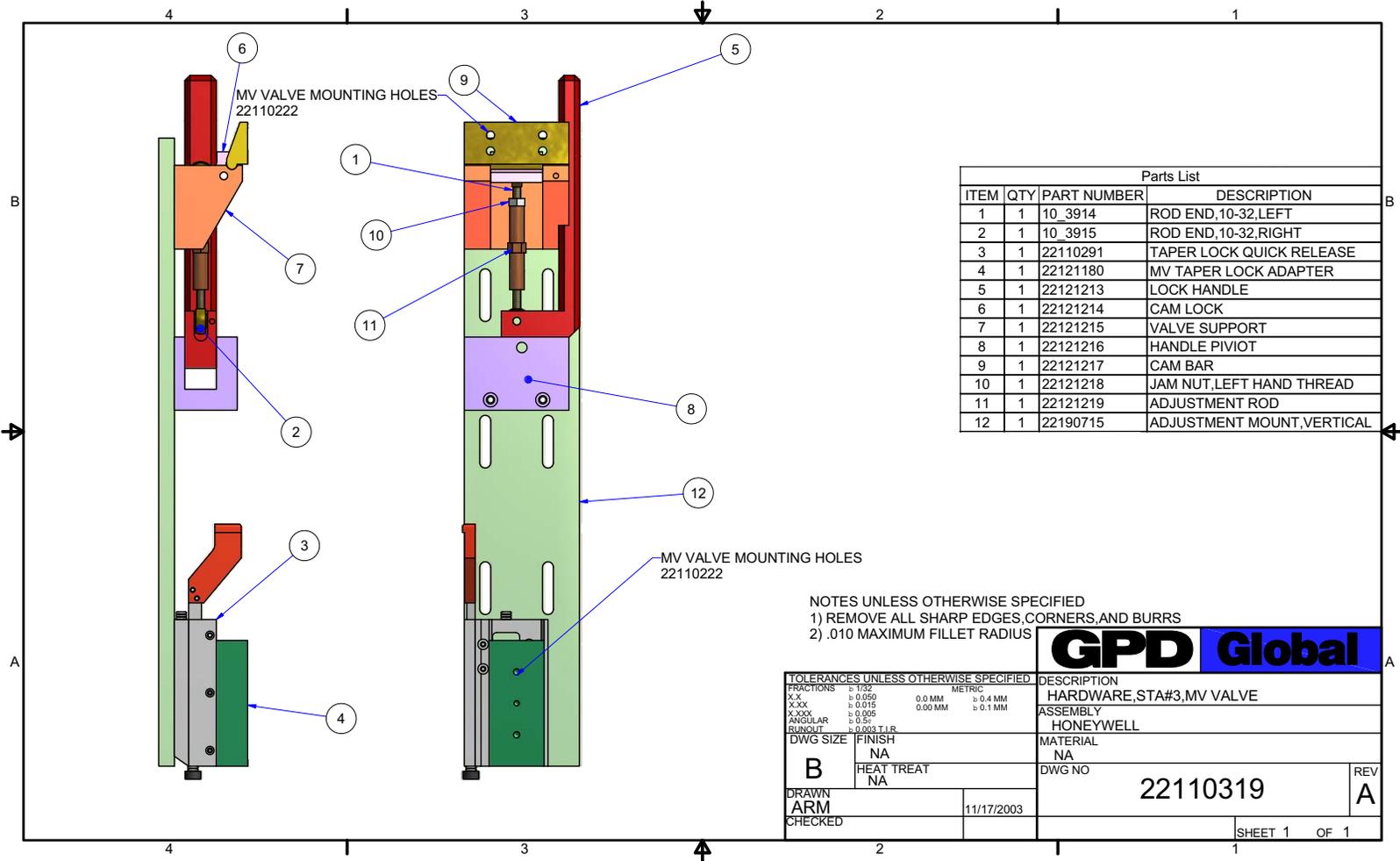
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	10/3559	BOLT, SHOULDER, SST 1/8 X 1/8L X 4-40
2	2	10/3602	BOLT, SHOULDER, SST 3/16 X 3/8L X 8-32
3	1	10/3669	LOADCELL, MINIATURE, PRECISION, 0-250 LBS
4	1	10_3603	KNOB, 8-32 THREAD
5	1	22120892	CARTRIDGE LATCH
6	1	22120903	RELEASE KEY
7	1	22120912	ALIGNMENT PIN
8	1	22121223-0001	CARTRIDGE SUPPORT-NO LABEL- 3:2 RATIO
9	1	22121224-0001	CARTRIDGE CLAMP-NO LABEL - 3:2 RATIO
10	1	22121225	PLUNGER SLIDE - 3:2
11	1	22121226	PLUNGER SHAFT, LEFT - 3:2
12	1	22121227	PLUNGER SHAFT, RIGHT - 3:2
13	1	22121228	FLAG BRACKET, SENSOR LOW MATERIAL
14	1	22121237	NUT, KNURLED
15	2	B8001	STEEL BALL, .187
16	1	S0005	SPRING
17	1	S0017	SPRING
18	1	SACAN0832087	8-32 7/8 SHCS
19	1	TACAN0440012	4-40 X 1/8 SETSCREW

NOTES UNLESS OTHERWISE SPECIFIED  
 1) REMOVE ALL SHARP EDGES, CORNERS, AND BURRS  
 2) .010 MAXIMUM FILLET RADIUS



TOLERANCES UNLESS OTHERWISE SPECIFIED:		DESCRIPTION	
FRACTIONS	± 0.02	METRIC	CARTRIDGE HARDWARE 3:2
K x .x	± 0.050	0.0 MM	ASSEMBLY
X .xx	± 0.015	0.00 MM	HONEYWELL
X .xxx	± 0.005	0.00 MM	MATERIAL
ANGULAR	± 0.5°		AS SHOWN
DWG SIZE	FINISH	DWG NO	22110321-0001
C	HEAT TREAT	REV	
DRAWN	1/10/2017	SHEET 1 OF 1	
CHECKED			

MV Valve Hardware for Station 3 - 22110319



## Warranty

**General Warranty.** Subject to the remedy limitation and procedures set forth in the Section “Warranty Procedures and Remedy Limitations,” GPD Global warrants that the system will conform to the written description and specifications furnished to Buyer in GPD Global’s proposal and specified in the Buyer’s purchase order, and that it will be free from defects in materials and workmanship for a period of one (1) year. GPD Global will repair, or, at its option, replace any part which proves defective in the sole judgment of GPD Global within one (1) year of date of shipment/invoice. Separate manufacturers’ warranties may apply to components or subassemblies purchased from others and incorporated into the system. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

**Limitations.** GPD Global reserves the right to refuse warranty replacement, where, in the sole opinion of GPD Global the defect is due to the use of incompatible materials or other damages from the result of improper use or neglect.

This warranty does not apply if the GPD Global product has been damaged by accident, abuse, or has been modified without the written permission of GPD Global.

Items considered replaceable or rendered unusable under normal wear and tear are not covered under the terms of this warranty. Such items include fuses, lights, filters, belts, etc.

**Warranty Procedures and Remedy Limitations.** The sole and exclusive remedy of the buyer in the event that the system or any components of the system do not conform to the express warranties stated in the Section “Warranties” shall be the replacement of the component or part. If on-site labor of GPD Global personnel is required to replace the non-warranted defective component, GPD Global reserves the right to invoice the Buyer for component cost, personnel compensation, travel expenses and all subsistence costs. GPD Global’s liability for a software error will be limited to the cost of correcting the software error and the replacement of any system components damaged as a result of the software error. In no event and under no circumstances shall GPD Global be liable for any incidental or consequential damages; its liability is limited to the cost of the defective part or parts, regardless of the legal theory of any such claim. As to any part claimed to be defective within one (1) year of date of shipment/invoice, Buyer will order a replacement part which will be invoiced in ordinary fashion. If the replaced part is returned to GPD Global by Buyer and found by GPD Global in its sole judgment to be defective, GPD Global will issue to Buyer a credit in the amount of the price of the replacement part. GPD Global’s acceptance of any parts so shipped to it shall not be deemed an admission that such parts are defective.

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Specifications, descriptions, and all information contained in this manual are subject to change and/or correction without notice.

Although reasonable care has been exercised in the preparation of this manual to make it complete and accurate, this manual does not purport to cover all conceivable problems or applications pertaining to this machine.