TOUCHSCREEN PAGE FUNCTIONS:

MAIN PAGE DISPLAYS:

Manual/automatic mode
Fluid Pressure (psi) A-B & C
Pump Selection A-B-C.
Flow rate setting 1-100%
Operating Pressure set point (psi)
Pump On set point
Max pressure set point
Ratio Settings
Combined A-B and C cc/min flow rate real time display
Recipe title display

FLOW PAGE FUNCTIONS:

Flow rate set point
Flow rate (real time) display cc/min
Operating pressure set point
Material totals A-B-C cc and liters

RATIO PAGE FUNCTIONS:

Ratio check control
Ratio check valve open/close control
Ratio check flow rate control
Run ratio check control

SELECT PAGE FUNCTIONS:

Pump selection control
Jog pumps control

FLUSH PAGE FUNCTIONS:

A-B-C line flush control
Flush valve delay timer
Run time timer
Start flush control
Pulse cycle timer

FACTORY PAGE FUNCTIONS:

Max pressure set point control
Rev counter
Pump on set point control
A-B-C ratio control
Calibration control
Manual/automatic modes control

ALARM HISTORY PAGE FUNCTIONS:

Displays all of the alarm/fault conditions over time

TREND PAGE FUNCTIONS:

Graphs the A-B-C ratios over time

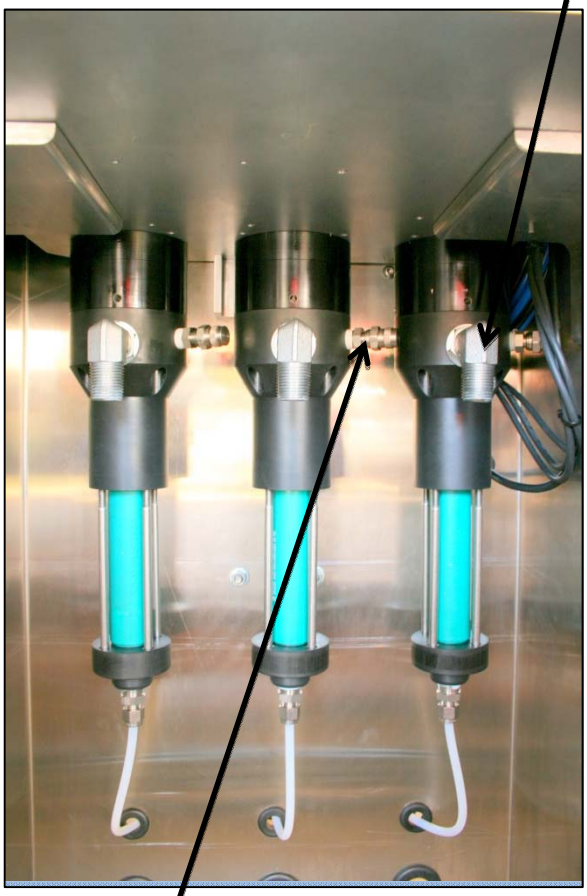
RECIPE PAGE DISPLAYS:

Titles
Pump selections
Ratios
Flow rates
Operating pressures
6 total recipe locations

INITIAL SETUP:

1. Connect fluid feed lines to the A-B and C pumps 1/2 mnpt inlet ports.

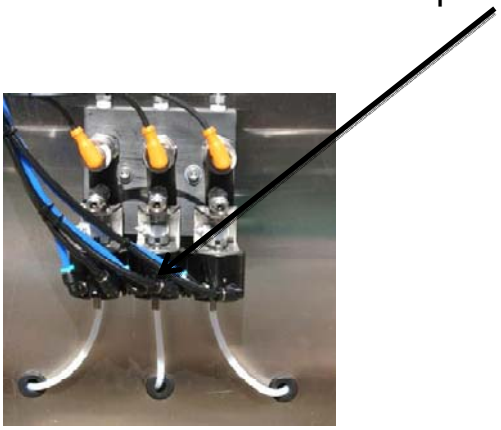
2. Using pressure pots or transfer pumps, apply enough pressure to feed material into the A-B and C metering pumps.



3. Hold a waste cup under the purge valves and using a 5/8 open end wrench, crack open each valve until some material is flowing.

NOTE: IF MATERIAL DOES NOT FLOW THROUGH THE PURGE VALVES INCREASE THE AIR PRESSURE TO THE FEED SUPPLY.
WARNING: NEVER RUN THE PUMPS DRY!

4. Connect solvent flush lines to the1/4 mnpt fittings on the A-B and C flush valves.



5. Connect the system to 110-120vac power.

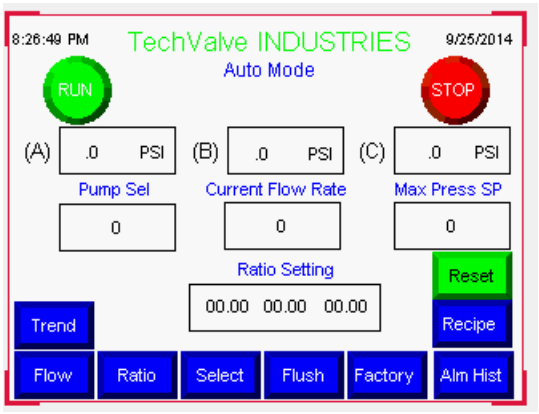
6. Connect spray gun/valve material hose to the 1/4 mnpt fitting on the static mixer.

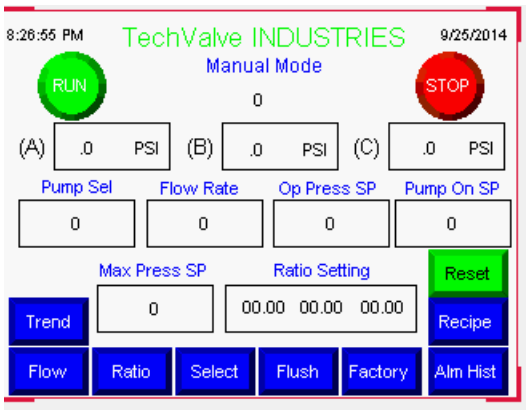
PRIMING THE PUMPS:

1. Press the select keypad and the *pump/jog* page will appear.
2. Select the “A” pump.
3. Place waste cups under the ratio check nozzles.
4. Press the *ratio* keypad and the ratio *set/check* page appears.
5. Set the ratio flow rate *(ratio fr)* to 100.
6. Press the *open* keypad to open the *ratio check valves*.
7. Press the *run ratio ck* keypad to start the “A” pump.
8. Run the “A” pump until an air free stream of “A” material is observed.
9. Press the *run ratio ck* keypad several times to start and stop the “A” pump to make sure all air is out of the “A” fluid circuit.
10. Press the *close* keypad to close the ratio check valves.
11. Repeat the process for the “B” and “C” pumps.

PC 3K HMI

MAIN/START PAGE DISPLAY:





The main page display shows all of the setup information of the current system setup/recipe.

1. Manual/automatic mode: Displays which mode the system is currently set to operate in.
2. Fluid Pressure (psi) A-B & C: Displays (in real time) the current fluid pressure in psi at the output of each of the 3 pumps.
3. Pump Selection A-B-C: Displays which pump/pumps are selected to run.
4. Flow rate setting 1-100%: Displays the current flow rate setting.
5. Operating Pressure set point (psi): Displays the current pump “OFF” pressure set point.
6. Pump On set point: Displays the amount of pressure drop (psi) the fluid must reach to start the pumps.
7. Max pressure set point: Displays the maximum pressure that the system can be set to using the Operating Pressure set point control.
8. Ratio Settings: Displays the current A/B-A/B/C ratio set points.

9. Combined A-B and C cc/min flow rate real time display: Displays the amount of material the system is dispensing (in cc/min.)
10. Recipe title display: Displays which of the 6 recipes the system is currently running. The recipe must have a title for it to appear on the main page.
11. Reset: press the reset keypad on any page to reset/cancel any faults.

NOTE: THE RESESET KEYPAD CAN BE FOUND ON MOST PAGES.
NOTE: THESE ARE DISPLAYS ONLY, NO CONTROL FUNCTIONS.
NOTE: WHEN POWER IS CYCLED THE SYSTEM WILL START IN THE *AUTO MAIN PAGE*.

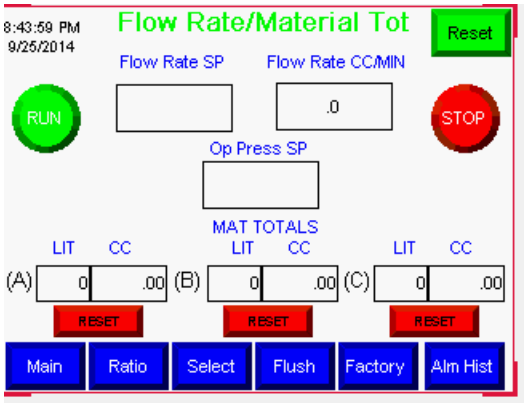
PC 3K HMI CONTROL FUNCTIONS:

RUN/STOP KEYPAD:

Run keypad: Press once to start/enable the system.
Stop keypad: Press once to stop/disable the system.

NOTE: THE SYSTEM WILL NOT START IF THE FLUID PRESSURE IN THE SYSTEM IS UP TO THE "OPERATING PRESSURE SET POINT". THE SYSTEM WILL RUN WHEN THE PRESSURE DROPS TO THE "PUMP ON SET POINT".

FLOW PAGE:



FLOWRATE CONTROL:

The Flow Rate Control is used to set the speed that the pumps run. As the speed increases (in rpm) the fluid output of the pumps increase.

TO SET THE FLOW RATE:

1. Press the *flow* keypad and the flow/material totalization page appears.
2. Press the keypad below the *flow rate sp* text and a numeric keypad will appear.
3. Enter the flow rate (1-100) and press enter.

FLOW RATE (REAL TIME) DISPLAY:

The display to the right of the *flow rate sp* control shows the actual rate of flow in cc/min that the number entered (*in the flow rate sp*) will produce.

NOTE: THE CC/MIN RATE WILL CHANGE IF THE RAITOS ARE CHANGED.
NOTE: 1 = MIN FLOW RATE, 100 = MAX FLOW RATE.

OPERATING PRESSURE SET POINT:

WARNING! THIS IS A *PLASTIC* *LOW PRESSURE* SYSTEM. DO NOT SET THE OPERATING PRESSURE HIGHER THAN 100 PSI.

The Operating Pressure Set Point control is used to control the pumps *off* pressure point. If the operating pressure (*off*) set point is set at 100 psi the pumps will run (as soon as the *run* keypad is pressed) until any of the A-B or C fluid pressures reach 100 psi then *all* pumps will stop. The pump (A, B or C) that reaches the set point first is the winner and takes control. This is settable from 1-300 psi.

NOTE: FLUID PRESSURE IS CONTROLLED VIA THE PRESSURE TRANSDUCERS.

SETTING THE OPERATING PRESSURE SET POINT A-B & C:

1. Press the *flow* keypad and the flow/material totalization page appears
2. Press the keypad below the *op press sp* display and a numeric keypad will appear.
3. Set the desired operating pressure psi and press enter.

NOTE: THE OPERATING PRESSURE CANNOT BE SET TO A VALUE HIGHER THAN THE MAX SYSTEM PRESSURE.

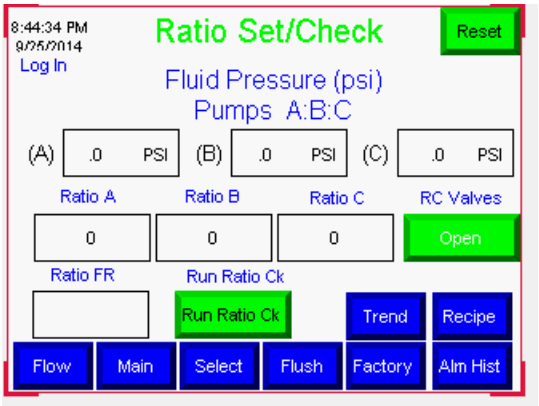
MATERIAL TOTALS:

These displays show the total amount of material dispensed through the A-B and C pumps.

EXPLANATION OF DISPLAYS:

1. Each pump has its own display and reset keypad.
2. Each display is split in half.
3. The left half displays liters the right half displays cc's.
4. When the cc display reaches 1000 a "1" will appear in the liter display and the cc display will restart at "0".
5. There is a reset keypad below each display.
6. Press and hold the reset keypad for 1 sec. to reset the display to "0".

RATIO PAGE:



NOTE: RATIOS ARE CONTROLLED AND MEASURED BY VOLUME NOT WEIGHT.

RUN RATIO CHECK:

8dAllows the operator to take fluid samples to verify that the system is producing the ratios that are set. Press the *run ratio check* keypad to start the A-B-C pumps. Press again to *stop.*

RATIO CHECK FLOW RATE:

Ratio check has its own Flow Rate control that is only active in Ratio Check mode and does not affect the production flow rate settings.
This control is used to set the material flow rate in Ratio Check Mode only.

SETTING RATIO CHECK FLOW RATE:

1. Press the *ratio* keypad and the ratio set/check page will appear.
2. Press the display below the *ratio fr* text and a numeric keypad will appear.
3. Enter the desired flow rate (1-100) and press enter.

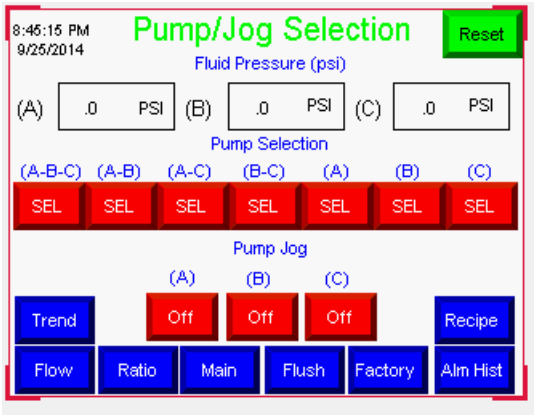
NOTE: RATIO CHECK FLOW RATE DOES NOT AFFECT PRODUCTION FLOW RATE.

PREFORMING A RATIO CHECK:

1. Place waste cups under the ratio check nozzles.
2. Press the *ratio* keypad and the ratio set/check page will appear.
3. Press the *rc valves* (valve control) keypad once to open the ratio check valves.
4. Press the *run ratio check* keypad to start the pumps. Let the pumps run for several seconds to purge any air out of the nozzles. Press the *run ratio check* keypad again to stop the pumps.
5. Place new graduated cups under the nozzles.
6. Press the *run ratio check* keypad to start the pumps. Let the pumps run until a sufficient sample is achieved.
7. Press the *rc valves* keypad again to close the ratio check valves.

NOTE: IN RATIO CHECK MODE, THE PUMPS WILL RUN ONLY IF THE RATIO CHECK VALVES ARE OPEN.

SELECTION PAGE:



PUMP SELECTION CONTROL A-B & C:

Pump Selection Control A-B & C: Allows the operator to select any combination of A-B & C pump/pumps to run and to jog any of the 3 pumps.
A-B & C
A only
B only
C only
A-B
A-C
B-C

TO SELECT PUMPS:

1. Press the *select* keypad and the pump/jog selection page will appear.
2. Press any one of the red *sel* keypads to select the pump or pumps to be run.
   NOTE: WHEN NOT SELECTED THE KEYPADS WILL BE RED. WHEN SELECTED THE KEYPAD WILL TURN GREEN.
   NOTE: THE SYSTEM MUST ALWAYS RUN ALL PUMPS SELECTED. IF FOR ANY REASON ANY OF THE SELECTED PUMPS CANNOT RUN, NO PUMPS WILL RUN AND THE SYSTEM WILL FAULT.

JOG CONTROL:

Jog Control A-B & C: Can run any pump by itself or any combination. Pumps run at the production flow rate.

TO JOG THE PUMPS:

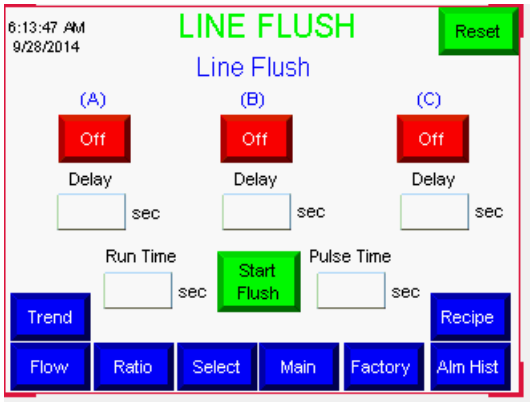
WARNING! : BEFORE JOGGING ANY PUMP MAKE SURE THAT THE FLUID PATH FOR THAT PUMP OR PUMPS IS OPEN, CLEAR AND FREE OF ANY OBSTRUCTIONS OR A FLUID HOSE COULD BURST!

1. Press the *select* keypad and the pump/jog selection page will appear.
2. The A-B-C pump jog control keypads are located below the *pump jog* text.
3. Press the A-B or C keypad once to jog the pump/pumps press again to stop.

NOTE: JOG MODE IS THE ONLY MODE WHERE THE PRESSURE TRANSDUCERS ARE NOT ACTIVE.

NOTE: IN JOG MODE THE PUMPS RUN AT THE PRODUCTION FLOW RATE.

FLUSH PAGE:



LINE FLUSH CONTROL:

Line Flush Control: This control is used to switch the *line flush* system *on* and *off*. There are 3 keypads, *line flush* (A), (B) & (C). They can be switched on one at a time or all can be switched on together.

Line Flush: Line flush cleans the fluid hoses from the Transducer/Flush manifold to the spray valve/gun.

PREFORMING A LINE FLUSH:

1. Press the *flush* keypad and the line flush page will appear.

2. If needed, set the *delay time* (in sec.) for each valve.
   NOTE: THE DELAY TIMER ALLOWS SOME VALVES TO OPEN WHILE DELAYING THE OPENING OF OTHER VALVES.

3. Set the *pulse* timer from 1 sec. on and off up to 30 sec. on and off.
   NOTE: THE PULSE TIMER CYCLES THE VALVES OPEN AND CLOSED (in sec.) FOR THE DURATION OF THE FLUSH ROUTINE.
   NOTE: 1 SEC. ON AND OFF IS A GOOD PLACE TO START.

4. Set the *run time* (in sec.) for the flush process.

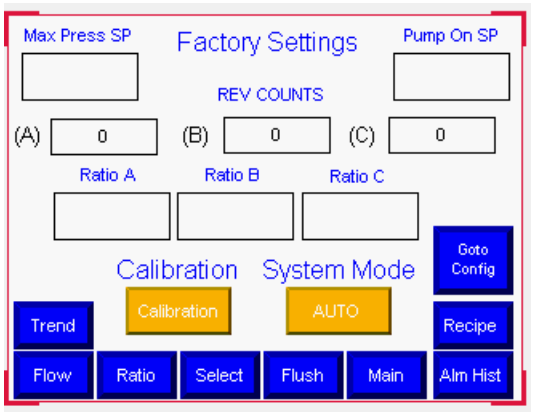
5. Press the *start flush* keypad.

NOTE: THE RUN TIME IS THE TOTAL AMOUNT OF TIME THAT THE FLUSH WILL RUN FROM THE TIME THE FIRST VALVE OPENS.

NOTE: THE METERING PUMPS AND LINE FLUSH SYSTEM CAN NEVER BE "ON" AT THE SAME TIME.

NOTE: IF THE LINE FLUSH SYSTEM IS "ON" THE PUMPS WILL BE DISABLED. THE ONLY WAY TO ENABLE THE PUMPS IS TO FIRST TURN THE (A), (B) & (C) LINE FLUSH OFF.

FACTORY PAGE:



The factory page is where certain critical controls are located.

These controls are:

Max pressure set point control
Rev counter
Pump on set point control
A-B-C ratio control
Calibration control
Manual/automatic modes control

TO ACCESS THE FACTORY PAGE:

1. Press the *factory* keypad.
2. Enter your username and password.
3. Press enter.

MAX SYSTEM PRESSURE:

Max System Pressure: This control is used to set/limit the maximum fluid pressure that the system can reach. This is settable from 1-300 psi.

NOTE: FLUID PRESSURE IS CONTROLLED VIA THE PRESSURE TRANSDUCERS.

SETTING MAX SYSTEM PRESSURE:

WARNING! NEVER SET THE MAX SYSTEM PRESSURE TO A LEVEL HIGHER THAN IS SAFE FOR THE COMPONENTS (HOSES, VALVES, SPRAY GUNS ETC.) THAT ARE ATTACHED TO THE OUTLET OF THE PUMP SYSTEM.

1. Enter the factory page.
2. Press the keypad below the *max press sp* text and a numeric keypad will appear.
3. Enter the desired pressure and press enter.

REV. COUNTER:

There are 3 *rev counter* displays on the touchscreen.
One for the (A) pump.
One for the (B) pump.
One for the (C) pump.
These displays show the total revolution counts for each pump every time the pumps run.
Each time the pumps stop and restart the displays will reset to zero.

PUMP ON SETTING CONTROL:

This is used to set the pumps *on* pressure point. If the pressure *on* set point is set at 5 psi *all* pumps will start when (for any reason) *all* of the pumps fluid pressures drop 5 psi below the *operating pressure set point* (see *Operating Pressure Set Point* located on the *flow* page)**.**

EXAMPLE:
The Operating Pressure Set Point is set at 100 psi.
The Pump on Setting is set at 5 psi.
When a spray gun trigger is squeezed a valve is opened or for whatever reason the fluid pressure in all of the pumps drop by 5 psi (the current set point) all of the pumps will start and run at the current flow rate and ratio set points.
This is settable from 5-50 psi.

NOTE: FLUID PRESSURE IS CONTROLLED VIA THE PRESSURE TRANSDUCERS.

Setting the Pump On PressureA-B & C:

1. Enter the factory page.
2. Press the keypad below the *pump on sp* text and a numeric keypad will appear.
3. Set the desired operating pressure psi and press enter.

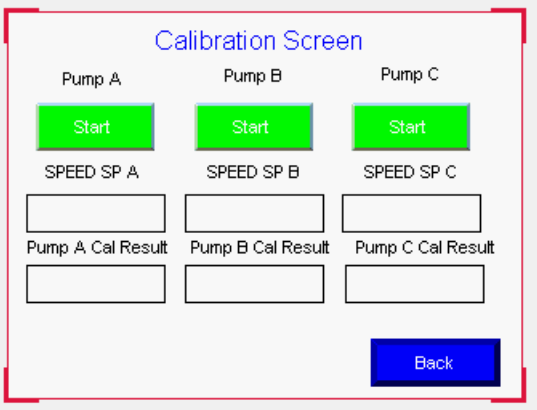
RATIO CONTROL:

The Ratio Control is used to set the fluid ratios of the A-B & C pumps**.** The ratios can be set from 1:1:1 to 25:1:1

SETTING RATIOS:

1. Enter the factory page.
2. Press the display below the *ratio* (A), (B) or (C) text and a numeric keypad will appear.
3. Enter the ratio for the (A) pump and press enter. Repeat for the (B) and (C) pumps.

CALIBRATION:



Calibration A-B &C: Calibration is a system that will adjust the metering system to compensate for wear in any of the metering pumps.

PREFORMING A CALIBRATION:

1. Place cups under the ratio check nozzles.
2. Open the ratio check valves.
3. Enter the *factory* page.
4. Press the *calibration keypad* and the calibration page will appear.
5. Press the *pump A start* keypad. The pump will run for a default amount of rotations then stop.
6. Weigh the sample on a grams scale.
7. Press the keypad below the *pump A cal reset* and a numeric keypad will appear.
8. Enter the weight of the “A” sample and press enter.
9. Repeat for the “B” and “C” pumps.
   NOTE: DISPLAYS AT THE BOTTOM OF THE PAGE INDICATE WHEN THE PUMPS HAVE STOPPED.

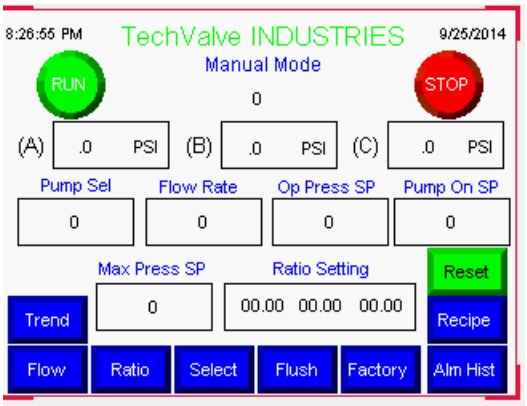
OPERATING MODES:

There are two methods of operating the system:

1. Manual operation.
2. Robot/Automation operation.

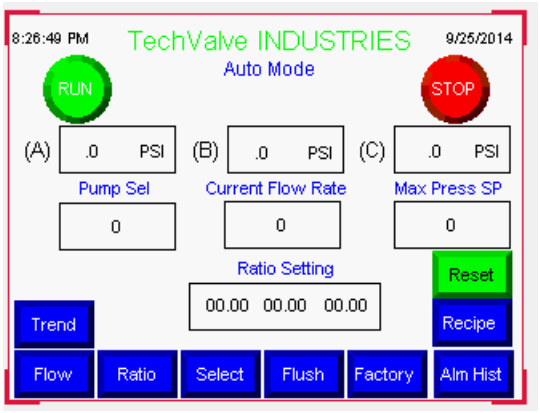
MANUAL OPERATION:

In manual operation the system is cycled ON/OFF by pressure feedback from the pressure transducers. That pressure limit is set using the *operating pressure set point control* which is set in the *flow* page. The *operating pressure set point control* cannot be set higher than the *max system pressure* set point which is set in the *factory page*.



ROBOT/AUTOMATION OPERATION:

In robot/automation operation the system is cycled ON/OFF by input from the robot/automation controller. There is no *operating pressure set point*. The *max pressure set point* is used as a *fault* switch. If the fluid pressure ever reaches the *max system pressure* it will be considered a *fault* and the system will shut down.

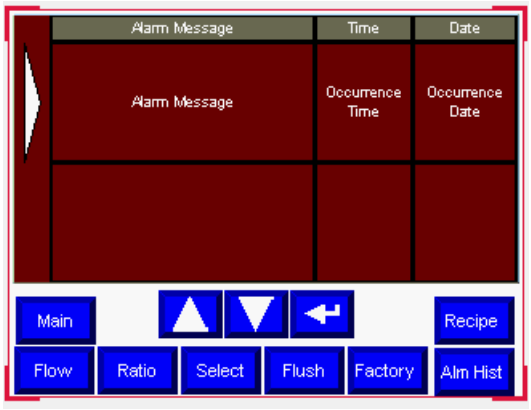


SELECTING OPERATING MODES:

The operator can select which mode to run the system in on the touchscreen.

1. Enter the factory page.
2. Under the *system mode* text, press the *manual/auto* keypad to switch between manual and automatic modes.
3. Make a selection.
4. Press the *main keypad* when done to exit the factory page.
   NOTE: THE FACTORY PAGE WILL TIMEOUT.

ALARM HISTORY PAGE:

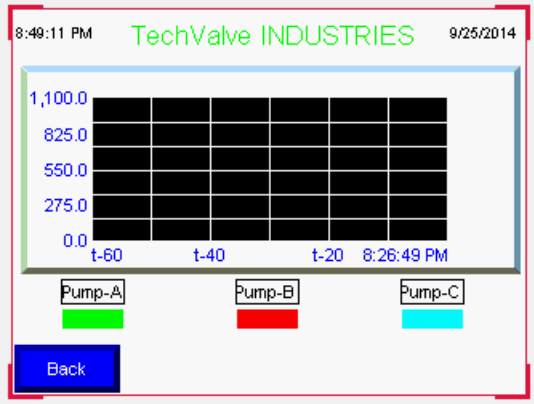


Displays all of the alarm/fault conditions over time.

TO VIEW ALARMS:

1. Press the *alm hist* keypad.
2. Press the *up* and *down* keypads to scroll through the history of alarms.

TRENDS PAGE:

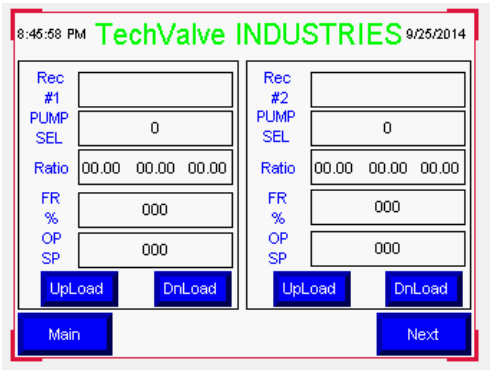


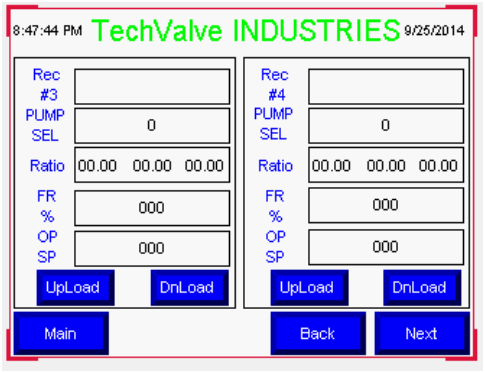
The trends page displays the average ratios over time.
A over B over C.

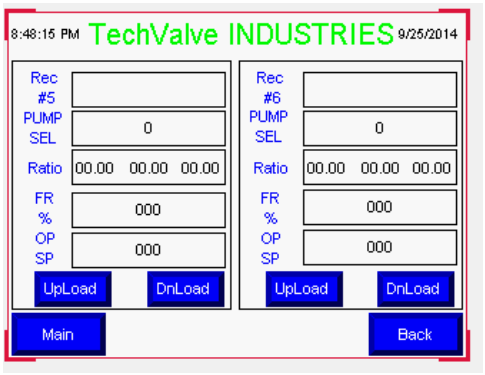
TO VIEW THE TRENDS DISPLAY:

1. Press the *trend* keypad.

RECIPE PAGE:







The recipe page allows an operator to pre-set and store system operation parameters in dedicated storage locations which can be selected for use by a human operator or an automated/robotic system.

SETTING RECIPES:

1. Set your *pump selections*, *ratios*, *pressures and flow rates*.
2. Press the *recipe* keypad and the recipe page will appear.
3. Using the *back* and *next* keypads scroll until you reach the recipe location desired 1-6.
4. Once you have selected a location press the upload keypad and that recipe location will populate with all of settings set in step 1.

USING RECIPES:

1. Press the *recipe* keypad and the recipe page will appear.
2. Using the *back* and *next* select the recipe desired.
3. Press the *download* keypad and all of the presets of that recipe will load into the HMI.

Shut down procedures:
LINE FLUSH:

1. Press the *stop* keypad.
2. Press the *flush* keypad.
3. Set any timers values necessary.
4. Disconnect/turn off the air supply to the spray gun/valve.
5. Point the spray gun/valve into a waste container.
6. Press the *start flush* to start the flush process. Allow solvent to flow until clear.

RATIO CHECK NOZZLE FLUSH:

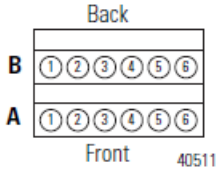
1. Place waste cups under the ratio *check nozzles*.
2. Press the *ratio* keypad.
3. Press the *open* keypad to open the *ratio check valves*.
4. Press the *flush* keypad.
5. Press the red *off* keypad under the “A” text to start flushing the “A” *ratio check nozzle*.
6. Allow solvent to flow until clear.
7. Press the green *on* keypad under the “A” text to turn off the “A” *ratio check nozzle* flush.
8. Repeat for the “B” and “C” nozzles.

NOTE: TO AVOID SPLASHING, IT MAY BE NECESSARY TO LOWER THE SOLVENT PRESSURE WHEN FLUSHING THE RATIO CHECK NOZZLES.

AUTOMATION/ROBOTIC CONTROL:

For automatic/robotic control the PC 3K system needs a 24 vdc signal to input I:0/0 on the plc. When this signal is high the system will start. When low the system will stop.
For the automatic speed control the system needs a 4 - 20 ma signal to the analog input card 2080-IF4 in slot 2. AI point 3 of the card. This is scaled 1-100% flow rate.

We land on pins A4 common and A6 signal.



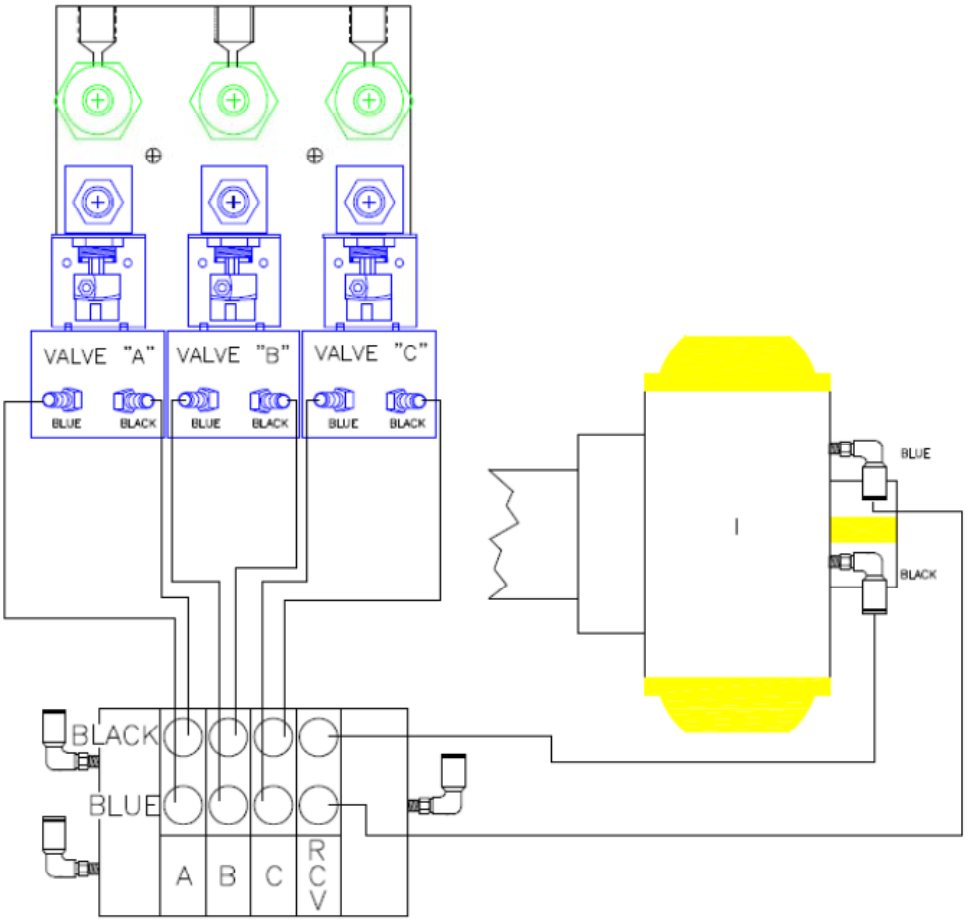
2080-IF2
(View into terminal block)

Pin A1	COM	Pin A5	Not used	Pin B3	COM
Pin A2	Not used	Pin A6	Not used	Pin B4	VI-1
Pin A3	Not used	Pin B1	VI-0	Pin B5	CI-1
Pin A4	COM	Pin B2	CI-0	Pin B6	COM

2080-IF4
(View into terminal block)

Pin A1	COM	Pin A5	VI-3	Pin B3	COM
Pin A2	VI-2	Pin A6	CI-3	Pin B4	VI-1
Pin A3	CI-2	Pin B1	VI-0	Pin B5	CI-1
Pin A4	COM	Pin B2	CI-0	Pin B6	COM

PNEUMATIC SCHEMATIC:



TECHVALVE INDUSTRIES 2014

Assembly and disassembly of Progressive Cavity Pump

DISASSEMBLE AND BREAKDOWN

1. Remove (4) 5.5" screws securing pump stator to stator flange and pump body.

2. Carefully pull and unwind (counter clock wise) pump stator from rotor.

3. Remove (2) 1/4-20 X 2.5" flat head screws from back of upper bearing plate.

4. Carefully remove upper bearing plate.

5. Carefully pull lower bearing plate apart from plastic pump body. Dislodge white plastic seal, and rubber o ring from plastic pump body, and pull entire input shaft and pump rod assembly through the plastic pump body. (Keep white plastic seal secured to input shaft.)

NOTE: Must allow white plastic seal to dislodge from pump body, keeping white plastic seal secured to input shaft. DO NOT attempt to pull input shaft/pump rod assembly through white plastic seal.

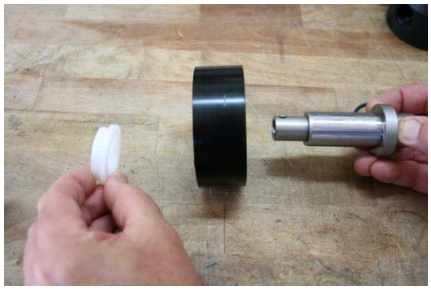
6. See (2) black rubber boots on connecting rod. Slide back metal collar on rubber boot to reveal (2) metal pins connecting pump rod/shaft assembly.

7. Remove (2) metal pins and detach connecting rod from pump rod and input shaft.

8. Carefully remove (2) metal retaining rings securing rubber boots to connecting rod

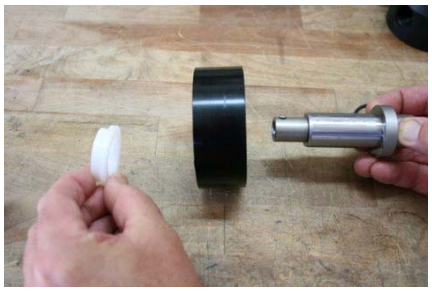
9. Remove (2) rubber boots from connecting rod.

10. Remove white plastic seal from input shaft, and carefully remove input shaft from the lower bearing plate.



REASSEMBLY

1. Insert input shaft through lower bearing plate, and insert input shaft through white plastic seal.



3. Insert connecting rod into pump rod, and secure with (1) metal pin through both holes in the input shaft.

4. Slide (1) rubber boot onto connecting rod. Slide and secure rubber boot collar in place over metal pin.

5. Use (1) metal retaining ring to secure rubber boot to connecting rod.

6. Slide (1) metal retaining ring over the other end of connecting rod.

7. Slide (1) rubber boot over the other end of connecting rod with metal collar facing out, and secure in place using retaining ring.

8. Insert end of connecting rod into input shaft, secure with (1) metal pin through both holes in the input shaft.

9. Make sure both rubber boots are securely in place covering metal pins in through holes.

NOTE: White plastic seal must be in place around input shaft before connecting rod is connected to input shaft.

10. Install rubber o’ring into grove on plastic pump body.

11. Very carefully insert pump shaft assembly through the pump body.

12. Press lower bearing plate firmly to pump body, making sure white plastic seal is seated into pump body.

NOTE: Ensure white plastic seal and rubber o’ring are securely seated in place inside pump body.

13. Carefully slide upper bearing plate over end of input shaft, securing upper bearing plate to the lower bearing plate.

14. Secure top bearing plate, middle bearing plate, and pump body together using (2) 1/4-20 X 2.5" flat head screws.

15. Apply approximately 1/4 oz. of light oil (ISO) to the inside rubber cavity of the pump stator.

16. With the main pump assembly resting on its top bearing plate, with rotor pump facing up; carefully slide while screwing clockwise the stator onto the pump rotor. Ensure the stator fits securely into the counter-bore on the plastic pump body.

17. Place the plastic stator flange on the end of the pump stator and ensure the stator fits securely into the counter-bore on the stator flange, then Insert (4) 1/4-20 X 5.5" screws through stator flange and thread screws into the pump body.

19. Torque (4) 1/4-20 X 5.5" screws to 20 - 25in/lbs.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