INSTALLATION, OPERATION, & MAINTENANCE MANUAL

V Series

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MP SYSTEMS is committed to delivering quality products and providing maximum productivity and uptime. Our engineering team is diligent in eliminating high maintenance issues associated with machine tool accessories, to allow better performing equipment for your business.

Thanks to our quality components, dedicated engineers, sales team and manufacturing personnel, MP SYSTEMS high pressure coolant systems & accessories are low maintenance and longer lasting. MP SYSTEMS prides itself on building and supporting a dependable product.

Our team works closely with CNC machine tool manufactures, distributors and customers to provide excellent customer service. These relationships facilitate superior application experiences. Our goal is to help make you more productive with less downtime, decreased cycle times, improved tool life and more parts out the door.

V2 SERIES INSTALLATION, OPERATION, MAINTENANCE MANUAL				
DOCUMENT PART #: B V-2 OPERATOR				
Revision	**Description**		**Date Issued**	**Proofed By:**
00	Original		06/05/2014	S. Devlin
01	▪ Updated all control signal electrical drawings ▪ Updated KVA	▪ Added Aeration explanation	12/24/2014	S. Devlin
02	▪ Filter bag replacement images	▪ Formatting ▪ Updated mpteam@mp-systems.net	05/19/2015	S. Devlin
03	▪	▪ Added introduction and Symbology ▪ Updated safety measures ▪ Formatting		

Contents

1. Introduction

This manual contains instructions for installation, operation, and maintenance of MP System's auxiliary coolant and chip control systems, as well as indicating the residual risk associated with them. This manual has been specifically compiled and produced to enable easy and safe use by appropriate personnel.

MP SYSTEMS does not accept responsibility for any inaccuracies contained in this manual, whether due to errors in printing or transcription.
It furthermore reserves the right to carry out such modifications to its products as it considers necessary and/or useful, without compromising their essential characteristics.

	*MP SYSTEMS* does not accept responsibility for improper use of the equipment, unauthorized modifications to the same non-observance of the instructions contained in the manual. The manual must be kept in a safe place and made available to personnel qualified to use and maintain R Series auxiliary coolant and chip control systems.

1.1. Symbology

Symbology contained in this manual.

	**DANGER:** Indicates possible danger. Failure to heed this warning carries a risk of accident or injury.
	**DANGEROUS VOLTAGE:** Indicates dangerous voltage. Failure to heed this warning carries a risk of injury or death.
	**WARNING:** Indicates a possible danger situation. Failure to heed this warning carries a risk of injury.
	**INFORMATION:** Indicates important information or advice on the use of the machine.
	**FLAMMABLE:** Indicates possible flammable material.
	**LOCK-OUT/TAG-OUT:** Lock-Out/Tag-Out R Series before service can be done.

2. Safety Measures

MP SYSTEMS disclaims all responsibility for non-observance of the instructions and advice contained in this manual. It furthermore disclaims all responsibility for damage caused by improper or inappropriate use of the machine or by modifications made without authorization.

These safety instructions contain all the general rules that must be observed during commissioning, operations and all periods of attendance to the machine.

It is essential that these instructions are supplied and always available to the installer, competent operators, and authorized maintenance personnel.

The following basic instructions must be observed when using any MP System product;

- Operation and maintenance must be carried out only by qualified personnel following the instructions contained in this manual.
- Always keep a copy of this manual near the machine.
- Carry out routine maintenance operations with great care; have worn or damaged parts replaced by qualified personnel and use original parts or those recommended by *MP SYSTEMS*.
- To function correctly and for operator security, the MP unit must be operated with all panels in place and secured.
- Dangerous voltage contained within this unit; before carrying out any operations, ensure that the electrical supply has been switched off.
- Operating this unit with safety protection removed is strictly forbidden.
- Before installing this unit, ensure operating conditions are suitable for intended use.

	*MP SYSTEMS* disclaims all responsibility for damage to person(s) or things resulting from non-standard assembly of the machine or from re-use of its individual components. Unauthorized replacement or removal of one or more parts of the machine is forbidden.

2.1. General Rules

MP System's products have been designed and constructed in such a way to minimize any possible cause of danger to the operator and their surroundings. However, residual risk still remains and can arise through improper use of the machine and can be of various types;

- Risk due to escaped coolant/cutting fluid.
- Risk due to excessive noise caused by operating outside permitted limits.
- Risk of accidents caused by scraping against edged sheet metal profiles.

2.2. Prevention of Mechanical Risks

In operation, MP System's products contain some moving parts. These parts constitute a possible source of danger to the operator, therefore in order to avoid any possible danger it is necessary to observe the following operational rules;

- Before removing any panels/guards, ensure electricity supply to the machine has been switched off.
- Never start the unit with any panel/guards removed.
- The additives present in coolant/cutting fluid may have a corrosive action that can irritate the skin and eyes.
    - Always wear gloves & eye protection when handling coolant/cutting fluid.

2.3. Prevention of Electrical Risks

When power to the machine is switched on, the machine is a source of danger, especially if the basic safety rules are not followed. In order to avoid any possible danger it is necessary to observe the following basic operation rules;

- When making electrical connections to MP System's products, observe state and federal electrical codes or those otherwise in force. Observe the technical supply conditions imposed by the power supply companies.
- Before carrying out any work on the unit, switch off the electrical supply at the main isolator.
- Work on the unit must only be carried out by authorized personnel.
- Always replace worn out or defective components.
- Before working on electrical equipment always read the manual that contains the machines circuit diagram.
- Always make sure there is no electric power to the equipment.
- Check to ensure the machine is earthed before powering on the unit.
- Check all electrical connections and connecting cables are well insulated and replace any cables that are evidently worn or damaged.
- Be sure to use power cables supplied by *MP SYSTEMS* or that have been approved by *MP SYSTEMS*.

3. Intended Uses

- The V-2 Series was constructed for use on sliding headstock and like machines that have existing low pressure pumps (flood), tanks, complete machining environment enclosures and CNC controls with interlocks.

- The V-2 Series is intended as an auxiliary coolant and chip control system working alongside the standard low pressure pump. The high pressures developed, 1000-2000 PSI depending on model, can dramatically improve many machining processes (cycle time), but should only be used where process improvements warrant its use.

- The V-2 Series includes a large capacity filter, which is there primarily to protect the high pressure pump system and cutting tools. However, its presence in the system tends to keep the machine tool and its coolant much cleaner.

- The V-2 Series has CNC controlled outlet ports that are to be turned on as needed, so the high pressure is used only on the tool in the cut. This allows maximum pressure to be used when needed, but limits detrimental effects of high pressure coolant.

- The V-2 Series is intended for use with coolants with viscosities between 90 and 140 SUS @ 100 F. It can work outside this range, but the results are not consistent.

- The V-2 Series is intended for use with coolants blended for high pressure service, uncontrolled properties of some coolants will cause air entrainment, this will airlock the flood pump, reducing its pumping ability. This in turn will cause changing lock line point of impact, short filter life, and high pressure pump starving. Special flood pumps, auxiliary tanks, and air separators can reduce these symptoms, but the problem is best solved with help from the oil blender.

3.1. Features & Benefits

- High pressure coolant when properly applied can save considerable time per cycle, dramatically improve tool life, and remove many of the requirements for operator intervention.
- Cutting operations that suffer from chip evacuation problems can see improved speed, accuracy, surface finish and reliability when using the R Series high pressure system.
- In problem holes, high pressure can allow for higher speeds and higher feed rates, with little to no pecking. This allows for 5-20% faster drilling.
- Coolant fed reamers & boring tools, either through tool or close nozzle, can greatly improve finish, tool life and accuracy.
- In severe milling applications, the improvements will be easily recognized through the lack of re-cutting of chips.
- Heavy cuts can be made far more reliably with high pressure coolant. Tools that smoke or burn will see tool life greatly improved. This allows for much ‘heavier’ cuts with tools that can be pushed much harder, greatly improving cycle times.
- Jobs already being run with ‘flood’ coolant will see dramatic increase in productivity with high pressure coolant.
- Often, time consuming programing methods such as rough/finish cuts, interrupted feed, non-optimum tool and feed speeds can be eliminated with the use of high pressure coolant. High pressure coolant gives the ability to break and/or control the chips that typically cause slow speeds.
- Rings of material left on drills and boring bars can be blown off with high pressure coolant.
- Coolant through sub spindle can stop miss chucking and reduce parts being marked by chips left in the collet.

4. Specifications

MP SYSTEMS equipment ships with an identification label. The label is located by the main disconnect on the front of the machine.

Information listed on Identification Label;

- **Pump Type**
- **Serial Number**
- **Build Date**
- **Operating Voltage (208-230VAC/460VAC)**
- **FLA (Full load Amps). Largest load, for determining power service requirements.**

	The operating voltage may be changed in the field if necessary. Changing the operating voltage can only be done by specialized personnel. Not available on all systems.

*All specifications are subject to change.

4.1. Electrical Specifications

All power for motor and hydraulics is derived from the high pressure pump input source.

Main Power: 3 Phase @ 60Hz

Model	208-230 VAC	460 VAC	kVA
V-2 SO2	25	12	10
V-2 SO8	25	12	10
V-2 SW2	25	12	10
V-2 SW8	25	12	10
V-2 HO2	26	13	10.5
V-2 HO8	26	13	10.5
V-2 HW2	26	13	10.5
V-2 HW8	26	13	10.5

Motor	HP	RPM	208-230 VAC FLA	460 VAC FLA
High Pressure Main	7.5	1750	21-20	10.5
Feed Pump	1.0	3450	3.5-3.4	1.7
Heat Exchanger	0.33	3425	1.1	0.55

Control Power - Isolated	Control Signals	Alarm Circuit
150VA Transformer	24vdc	NC
110VAC Secondary		NO
Primary Fused		

*Optional 4 port variants

4.2. Mechanical Specifications

Model	V-2 Series
Length	43 ½”
Width	24”
Height	36”
Capacity	5 GAL
Weight*	580 lbs

V-2 – 1000 PSI @ 8 GPM	V-2 – 2000 PSI @ 5 GPM

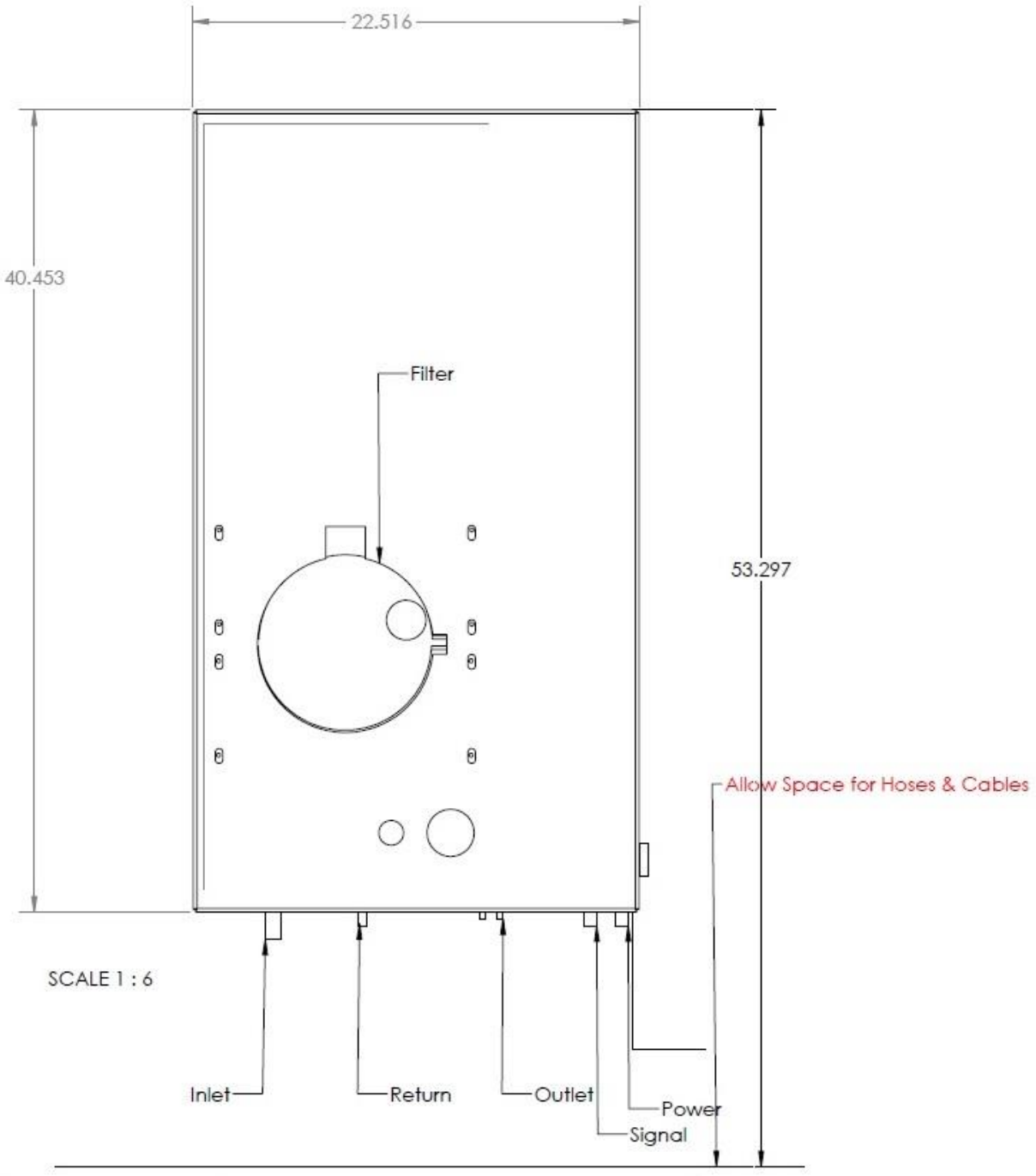
Filter	Area	Dimensions	Rating
HB BAG ORING #2 5MC 7 x 32	4.4 ft²	7” x 32”	5 Micron

Environments:

Temperature range: 41º-104º F
Relative humidity: 20-95 % noncondensing
Voltage range: 85-115 %

The V-2 Series should be placed on the floor to avoid damaging vibrations.
The V-2 Series should be moved on its own castors or by lifting from underneath.
All covers should be on during operation.

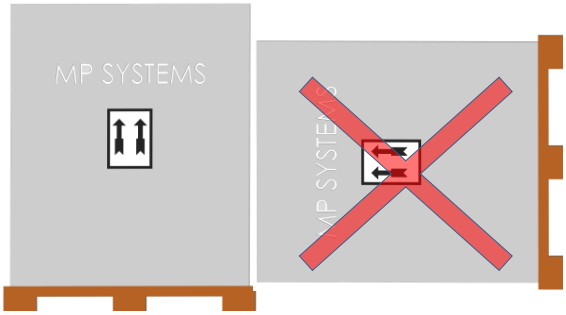
5. Floor Layout



6. Moving & Storage

6.1. Delivery Checks

When taking delivery of machine, carefully check the physical condition of the packaging. Having removed the packaging, check that the machine has not suffered any knocks or damage. Check that the machine has been transported in the correct position. In case of damage, do not accept the goods and immediately inform *MP SYSTEMS.*



DO NOT accept the machine in the event of irregularities during transit. The hauler will bear the full responsibility for any damage suffered.

6.2. Transport & Carriage

The machine must be transported in a vertical position (casters/wheels down). Machine tank **MUST BE EMPTY** before moving. MP System's products have been constructed so, as to be moved by fork truck or rolled around on casters on base of unit.

The machine must be moved in such a way as to avoid the risk of damage.

Do not attempt to lift the machine with equipment that is inadequate or unsuitable, especially with equipment that is too small for overall weight of machine. Refer to the **Mechanical Specifications** section for unit weight.

Before moving machine, take care to ensure that all removable panels are firmly attached to the unit to prevent them from falling.

		**WARNING:** Do not transport machine with fluid in tank.

6.3. Moving with a Fork Truck

To move the machine with a fork truck, the two blades must be inserted under the long side of the machine. The base is designed for transportation by fork truck. Insert blades symmetrically with respect to the center of gravity of the machine, and push them in through the whole depth of the machine. Lifting than can be carried out. Carry out the moving operation at a very slow speed.

Ensure the tank is completely empty of coolant when moving.

6.4. Storage

MP System's products must be stored in a cool and dry environment, avoiding all extreme conditions. Avoid freezing conditions. All coolant must be drained from machine before being stored. If utilizing water based coolants, the system must be flushed before storage, please refer to coolant manufacture for correct flushing agent. Removing all coolant from the system will ensure coolant does not become contaminated while in the system. Contaminated coolant may lead to malfunctions.

	Not properly draining/flushing the unit before storage can lead to jammed solenoids, diaphragms that become stuck and bacterial growth. Bacterial growth will contaminate any coolant it comes in contact with. Contaminated coolants effectiveness is also greatly reduced.

7. Installation

All MP System's products are shipped on wooden pallets designed for the safe transport of the auxiliary coolant and chip control system. A large *MP SYSTEMS* container protects the unit from any unnecessary damage during transportation.

7.1. Installation Kit Components

COMPONENT	QUANTITY/LENGTH
Power Harness	1
Control Signal Harness	1
Spare 5 Micron Filter Bag	1
Operation & Installation Manual	1
Inlet Dip Tube	1
Return Dip Tube	1
1 1/4" Diameter Inlet Hose	15'
1 1/4" Diameter Return Hose	15'
2" Hose Clamp	2
½" Hose Clamp	2
Weld Clamp (Mounting Dip Tubes)	1
Self-Taping Hex Screws (Mounting Weld Clamps)	2

7.2. Recommended Tools for Installation

- Philips (Cross) Head Screwdriver
- Flat Blade Screwdriver
- Electric Drill
- 7/8" UniBit (Step Drill)
- 1 1/4" Conduit Punch or equivalent size hole saw
- 12" Pipe Wrench (Minimum)
- Metric Hex Keys
- Teflon Pipe Tape / Liquid Pipe Sealant

7.3. Electrical Installation

The MP V-Series is designed to be a versatile pump that can be used on swiss style lathes, machining and turning centers. The information outlined in this section is generic installation guide. See insert for manufacture specific instructions.

There are two electrical harnesses to be installed in the electrical cabinet for the V-2 Series high pressure coolant system. One 3 phase power cable and one control signal cable.

		LOCK OUT/TAG OUT any and all power disconnect switches before performing any work on equipment.

	Be sure to observe local and federal electrical codes in effect. Observe the technical supply conditions imposed by the power supply company.

7.3.1. Power / Signal Installation

- Verify on the service tag of machine that the 3 phase power is adequate for the FLA of V-2 Series. V-2 Series FLA is located on identification label and in the **Electrical Specifications** Section of this manual.
- Confirm correct voltage from supply power with voltage on V-2 Series identification label.
- If available power is too great, a circuit breaker will need to be installed. (Normally shipped with V-2 Series if needed)

7.3.2. 3 Phase Power Cable Installation

1. Mount supplied power / signal cable with hardware provided in V-2 Series installation kit * If ¾" conduit plug is not available, knock out hole and install supplied cord grip. Make sure V-2 Series power cable reaches desired mounting point.

2. Run supplied power cable through supplied ¾" cord grip.

3. Run supplied cable inside cabinet, wire cable into appropriate 3 phase power and ground. (Ground is usually away from 3 phase, leave enough slack to reach grounding point.)

7.3.3. Control Signal Cable Installation

1. Mount supplied control signal harness with hardware provided in V-2 Series Kit and route cable.
    - Make sure the V-2 Series plug is able to reach mounted harness.
    - If ½" conduit plug is not available, knock out hole and use cord grip supplied in kit.
    - Use zip tie to attach supplied dummy plug to control signal (19 Pin Only).

*IF THE V-2 SERIES HIGH PRESSURE COOLANT PUMP NEEDS TO BE UNPLUGGED FROM MACHINE, REPLACE V-2 SERIES CONTROL SIGNAL CONNECTION WITH SUPPLIED DUMMY PLUG (19 Pin Only).

2. Wire signals needed to perform desired pump function.
    - All MP signals are 24vdc. Relays may need to be installed for 110VAC signals.
    - Signals and M codes may vary between machines. Confirm with machine tool electrical drawing before wiring.
    - Some external M codes may require latching functions.
    - MP Alarm contains both NC and NO connections through 1 common.
    - NC alarms are typically wired in series with machine low pressure pump.
    - NO alarms are typically wired in parallel with machine low pressure pump.
    - Refer to V-2 Series signal schematic located in rear of this manual, please verify proper schematic.

	Please call MP Systems with any questions or concerns before wiring at 877-689-1860.

7.3.3.1. Wire Diagram

Wire #	V-2 16 Pin	Function
1	PORT 1	Turns on Port 1
2	PORT 2	Turns on Port 2
3	PORT 3	Turns on Port 3
4	PORT 4	Turns on Port 4
5	0v	0 volt Common
6	DUMP	Opens Dump Valve
7	ALARM COM 24v	24 Vdc Alarm Common
8	NC ALARM OUT	Opens on MP Fault
9	+24 Vdc	+24 Vdc from MP Pump
10	PORT 5	Turns on Port 5
11	PORT 6	Turns on Port 6
12	PORT 7	Turns on Port 7
13	PORT 8	Turns on Port 8
14	N/A	N/A
15	N/A	N/A
16	NO ALARM OUT	Closes on MP Fault
GRN	PE	Ground

Wire #	V-2 19 Pin (1-4 Port)	Function
1	PORT 1	Turns on Port 1
2	PORT 2	Turns on Port 2
3	PORT 3*	Turns on Port 3*
4	PORT 4*	Turns on Port 4*
5	0v	0v Common
6	Dump Valve On*	Opens Dump Valve*
7	ALARM COM 24v	24 Vdc
8	NC ALARM OUT	Opens on MP Fault
9	+24 Vdc	+24 Vdc from MP Pump
10	NO ALARM OUT	Closes on MP Fault
11	N/A	N/A
12	N/A	N/A
13	N/A	N/A
14	N/A	N/A
15	N/A	N/A
16	N/A	N/A
17	N/A	N/A
18	N/A	N/A
19	N/A	N/A
GRN	PE	Ground

*Normally Closed Alarm Circuit Recommended.

Wire #	V-2 19 Pin (8 Port)	Function
1	PORT 1	Turns on Port 1
2	PORT 2	Turns on Port 2
3	PORT 3	Turns on Port 3*
4	PORT 4	Turns on Port 4*
5	0v	0v Common
6	Dump Valve On*	Opens Dump Valve*
7	ALARM COM 24v	24 Vdc
8	NC ALARM OUT	Opens on MP Fault
9	+24 Vdc	+24 Vdc from MP Pump
10	PORT 5	Turns on Port 5
11	PORT 6	Turns on Port6
12	PORT 7	Turns on Port 7
13	PORT 8	Turns on Port 8
14	N/A	N/A
15	N/A	N/A
16	NO ALARM	Closes on MP Fault
17	N/A	N/A
18	N/A	N/A
19	N/A	N/A
GRN	PE	Ground

7.3.3.2. Mill Applications

- Typical Mill installations require one port and one alarm signal.
- Locate ‘Through Spindle’ contactor in machine cabinet. (Please refer to machine tool electrical drawing booklet.)
- Wire #1 and #5 are to be used when using machine tool voltage.
- Wire #1 and #9 are used when put across dry contact. (Terminals 13 and 14 NO)
- Remove 3 phase power from bottom of low pressure TSP contactor.
- Some TSP setups require a second supply pump to be disconnected as well.
- Wire NC connections in series with TSP overload circuit.
- Wire NO connections in parallel with TSP overload circuit.
- Additional machine alarms may need to be jumped out.

7.3.3.3. Lathe Applications

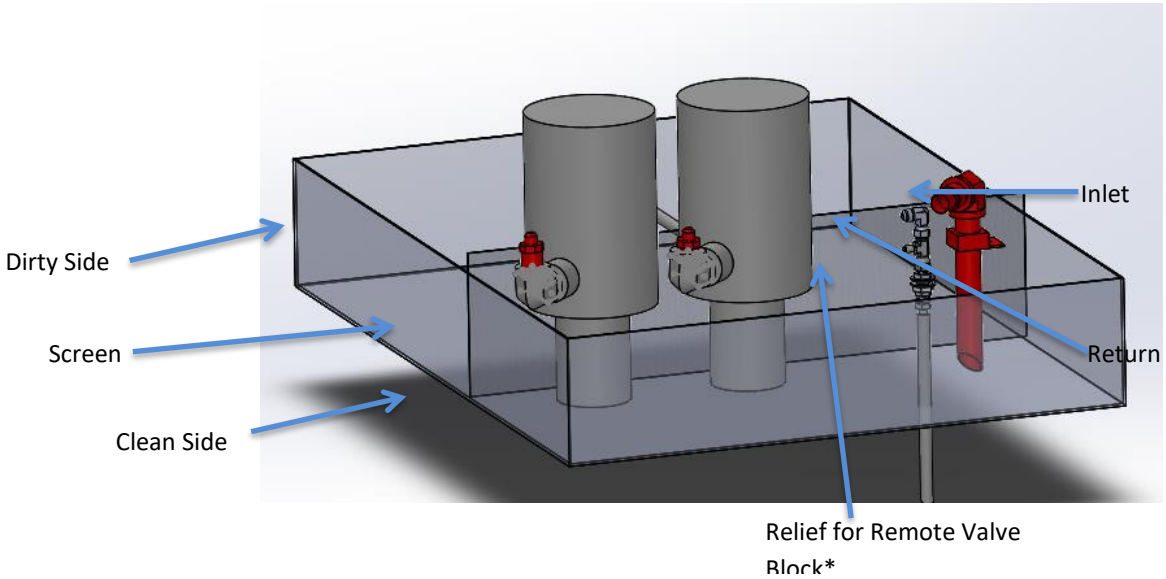
- Typical lathe configurations consist of wiring in series with the existing low pressure contactor along with an external M Code. This allows for both low and high pressure pumps to be utilized.
- Wiring through low pressure contactor before external M Codes ensures the MP V Series Pump will shut down whenever machine is in hard alarm.
- Typical lathe applications use wire #9 to supply +24vdc from V Series through a series of dry contacts.
- Wire NC connections in series with low pressure coolant overload circuit.
- Wire NO connections in parallel with low pressure coolant overload circuit.
- Additional machine alarms may need to be jumped out.
- Parameters may need to be set in order to latch external M Code functions

Subject to change please refer to schematics in rear of manual .See Insert for Machine-Specific Signals and Keep Relay instructions

7.4. Low Pressure Hose Installation

1. Mount supplied weld clamp on clean side of reservoir tank, after the screens, usually near the low pressure pumps already on reservoir tank.
    - Use an already open area on the tank. If no opening, use 1 ¼" Conduit Punch or equivalent size drills for 1 ¼" dip tube.
    - Return dip tube is ½" bulk head should be installed in ¾" hole drilled by user.
    - Make sure hole for inlet dip tube is away from low pressure pumps and always touching bottom of the tank to ensure proper suction of coolant.
2. Run the Inlet and Return hose to their respected connections. The V-2 Series return and inlet are clearly marked so there is no confusion of where to place them.
    - Connect the inlet hose with the 2 - 2" hose clamps supplied in V-2 Series Instillation Kit.
    - Inlet & Return hoses should be no longer than 15'.
    - Hoses must be placed on floor near V-2 Series. To ensure proper priming of the V-2 Series.

	Do not place hoses on top of unit or stand vertically. This will cause the V-2 series to not prime properly.



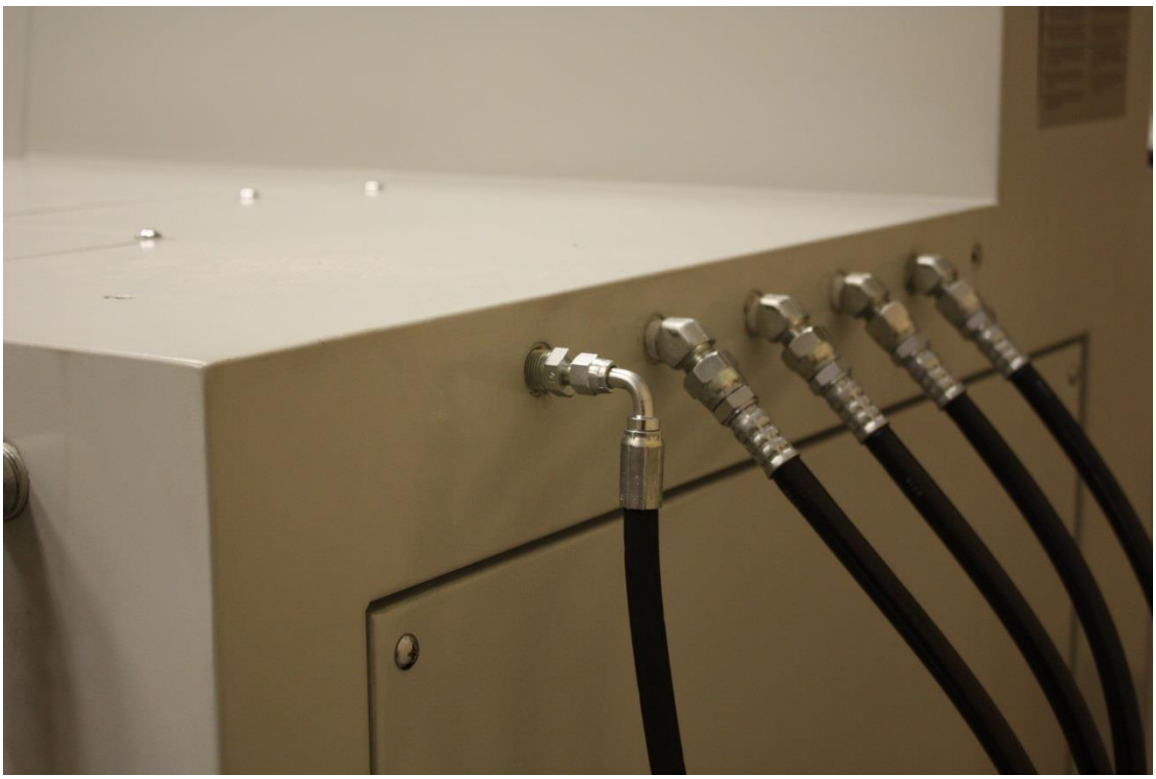
7.5. High Pressure Installation

The V-2 Series has a few installation options to choose from. Seeing the wide array of machine types and variations of each type, MP Systems has an installation kit and installation guide suited for every customer's needs. This section will cover the basic 4 ports and remote manifold installation on machine tool. Please refer to machine specific install manuals for proper hose routing inside machining cabinet.

7.5.1. Generic 4 Port Installation

Depending on the options installed on machine tool, holes may need to be drilled and ¼" JIC Bulkheads will need to be installed.

- Locate suitable location for 4, ½" holes to be drilled. (Use caution to make sure there is clearance for hoses to be routed on the inside of the machine tool cabinet.)
- Install 4, ¼" JIC Bulkheads included in installation kit.
- Run 4 high pressure hoses from installation kit from JIC Bulkhead to corresponding ports on V-2 Series high pressure coolant system.

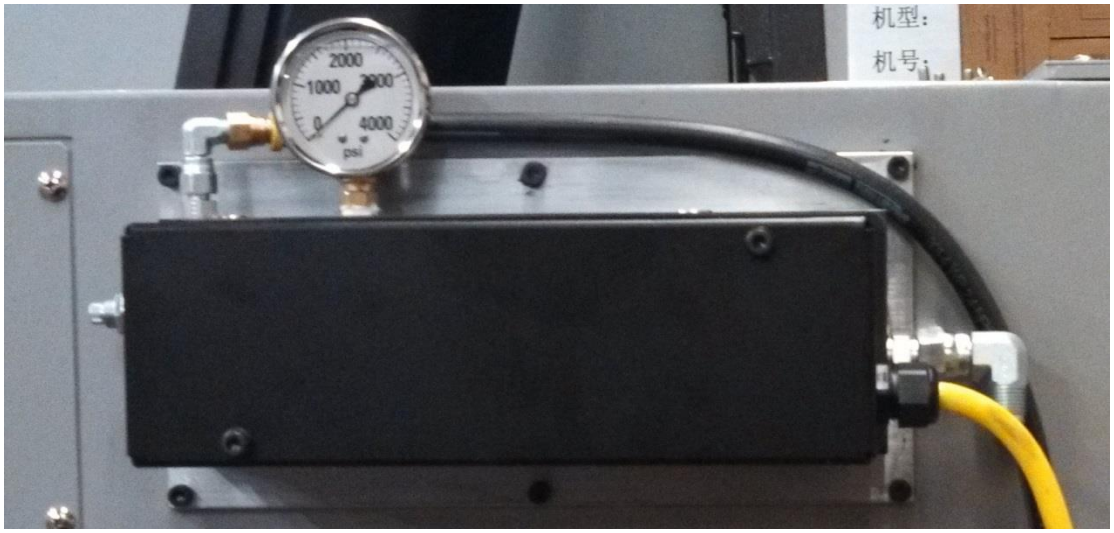


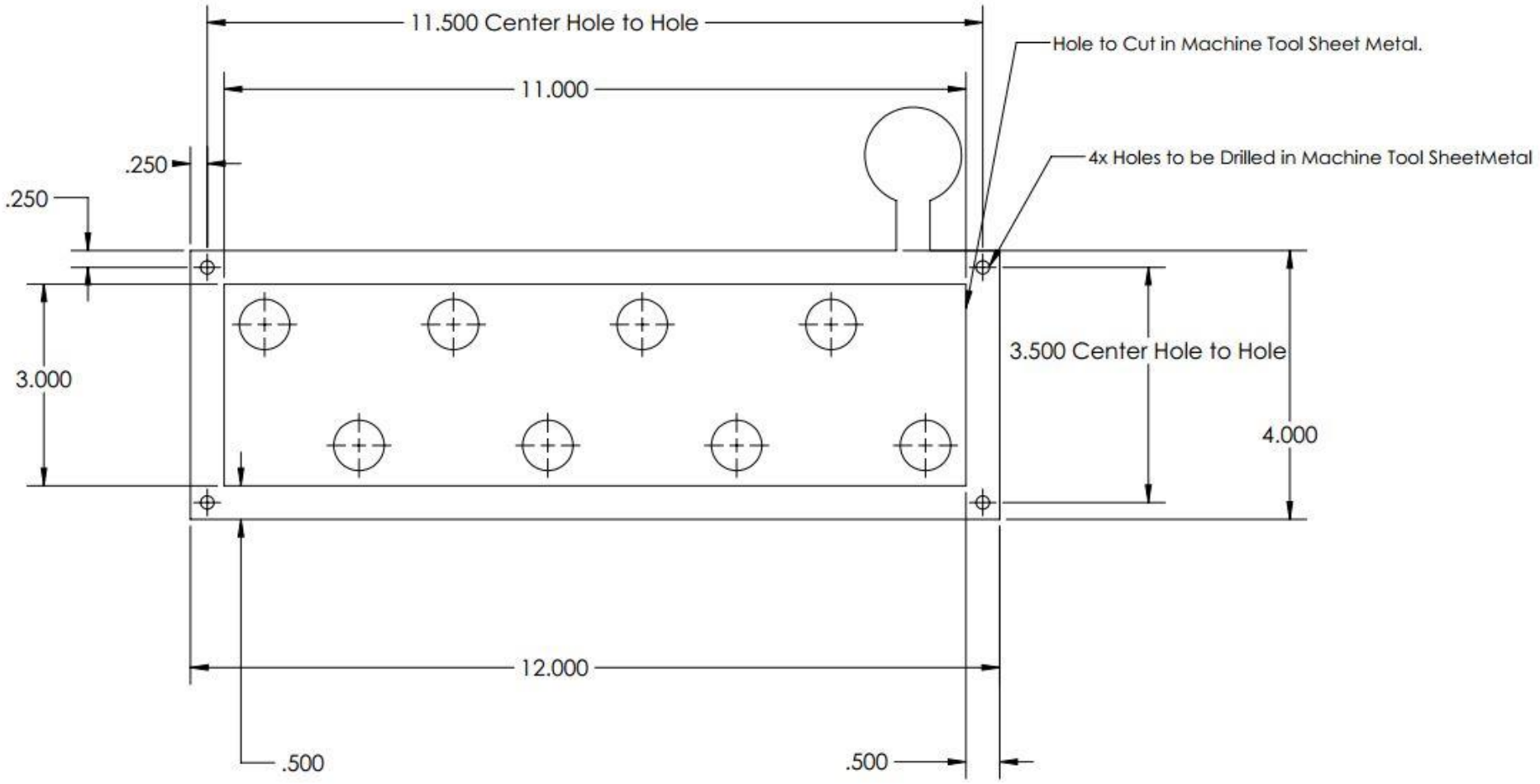
	Inside lines will vary machine to machine and application to application.

7.5.2. Generic 8 Port Remote Manifold Installation

A small 3” x 11” hole will need to be cut out of machine cabinet for proper installation of remote manifold. A mounting bracket ships with remote manifold install kit for ease of installation.

1. Locate suitable location for remote manifold to be installed. *Make sure location chosen for remote manifold installation has proper clearance inside machine tooling cabinet for installation of high pressure lines.
2. Once a suitable location is located, using supplied mounting bracket mark out the inside of supplied bracket for hole outline (If no mounting bracket is included please refer to next page for hole locations.)
3. Drill 4 pilot holes in each corner of 3” x11” rectangle. Holes must be large enough for small jigsaw blade or sawzall blade to fit through.
4. Cut out rectangle starting in one of the four pilot holes.
5. Using supplied mounting bracket lineup center hole with hole in machine cabinet and mark the 6 screw holes on perimeter of mounting bracket.
6. Tap 6 holes for M6.
7. Using a high performance RTV Silicone Gasket maker or a comparable substance, make a seal around perimeter of mounting bracket making sure to go around all screw holes to ensure proper seal.
8. Mount remote manifold to machine cabinet with supplied M6 socket cap screws.
9. Attach ¼” relief line to top of remote manifold run to ¼” dip tube in machine tool reservoir.
10. Attach ½” high pressure feed line to outlet on V-2 Series.
11. Connect yellow control signal harness to yellow control signal harness on V-2 Series.




11.500 Center Hole to Hole
11.000
.250
.250
Hole to Cut in Machine Tool Sheet Metal.
4x Holes to be Drilled in Machine Tool SheetMetal
3.000
3.500 Center Hole to Hole
4.000
12.000
.500
.500

8. Operation

	A few steps must be taken before *MP SYSTEMS* auxiliary coolant and chip control system can be put into operation.

8.1. Filling & Priming

After all hoses are connected to V-2 Series the internal feed pump must be primed before first use.

	Make sure inlet hose to feed pump is as short as possible and not above tank level.

To Prime:

- Remove side door panel and open the ball valve located on bottom of the filter vessel.
- Using the filter as a funnel, pour coolant into filter vessel, you can see coolant start to trickle out of feed pump inlet.
- Keep this valve open until coolant comes out of the feed pump inlet and starts to fill up the hose on the inlet side of the feed pump. This may take a few minutes.
- After the hose is about ¾ full of coolant, close the T-handle ball valve and reseal the filter lid.
- The feed pump has now been primed with coolant and it is ready for motor rotation check and operation.

	Feed pump may need to be run a few times on startup to pull full prime. Rest alarm using illuminated red alarm reset button a couple times to allow pump to run if necessary. Contact MP Systems with any issues.

8.2. Testing

1. Make sure all connections are secure and no hoses are rubbing.
2. Make sure Feed Pump is properly primed.
3. Make sure Prime Valve is closed after priming.
4. Check motor rotation on both High Pressure and feed pumps.(Clockwise Rotation)
5. Fire the High Pressure M-Code to ensure that corresponding solenoid/port is opening.
6. For Lathes, while M-Code is on index the turret and check magnetism on the Dump solenoid. (A label inside V-2 Series will designate dump solenoid)
7. Trip the overload inside the V-2 Series electrical panel to ensure machine reports error and stops running.

8.3. Start Up

Coolant from the machine tool is pumped into the top of filter vessel. The coolant is pumped by a self-priming pump inside the V Series high pressure system through a set of valves. Coolant flows through a 5 micron nominal size #2 polyester filter bags. The filters contain a built in O-Ring to prevent dirt and debris from bypassing filter bag. A relief valve is in place to allow any unused coolant/pressure to be returned to the tank.

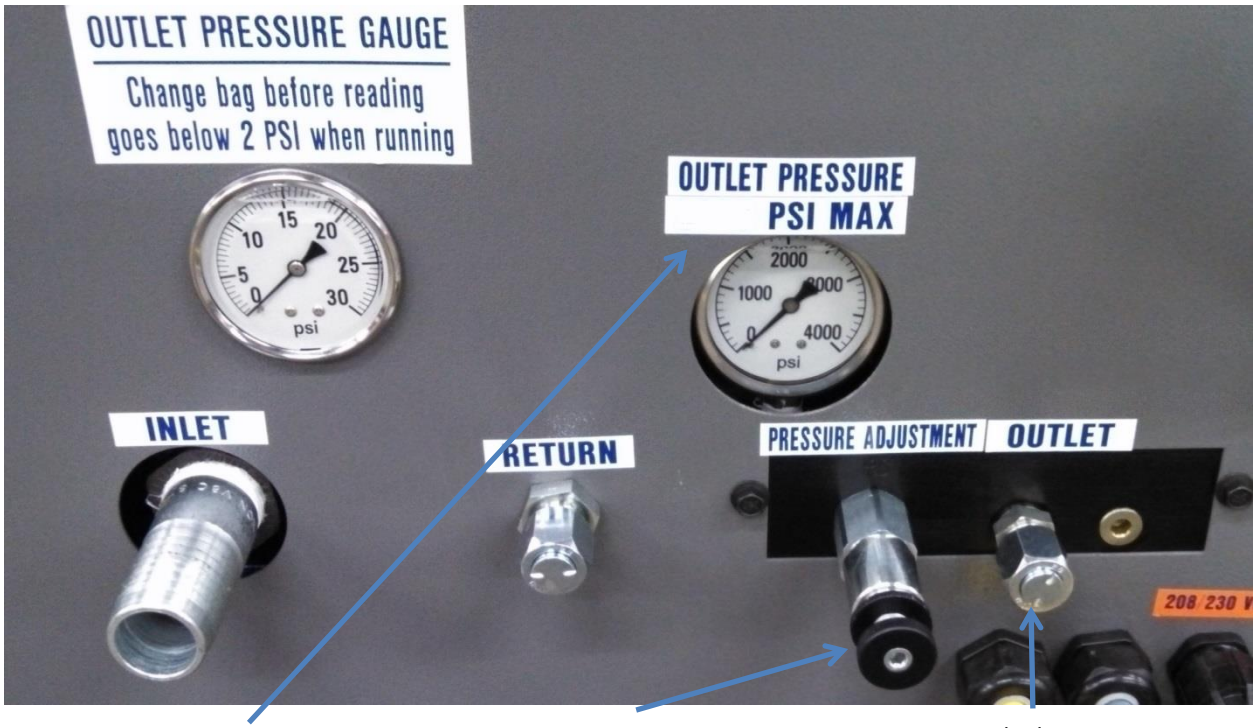
*Applies to all V Series variants.

8.3.1. Initial Pressure Setting

After V-2 Series has been primed and checked for proper function the output manifold must be set to desired PSI. Please refer to max output label above output gauge. DO NOT SET ABOVE MAX PSI, DOING SO WILL VOID WARRANTY.

1. Before setting pressure make sure pressure regulator is backed out all the way, counter clock wise.
2. Make sure all outlets on pump are capped.
3. Turn on high pressure by activating the proper M-Code
4. Slowly turn regulator clock wise to achieve desired PSI. This will 'dead head' the pump to maximum output so as to not let the pump ever go over rated PSI setting.
5. Once desired pressure is acquired shut down high pressure system.
6. Reattach supplied high pressure lines.
7. High Pressure system is ready to run.

*On lathe applications, when high pressure is tee'd into machine tools low pressure pump, simply place high pressure hose leading from the tee in to machine coolant reservoir & secure. This will ensure no coolant spills while running low pressure pump.



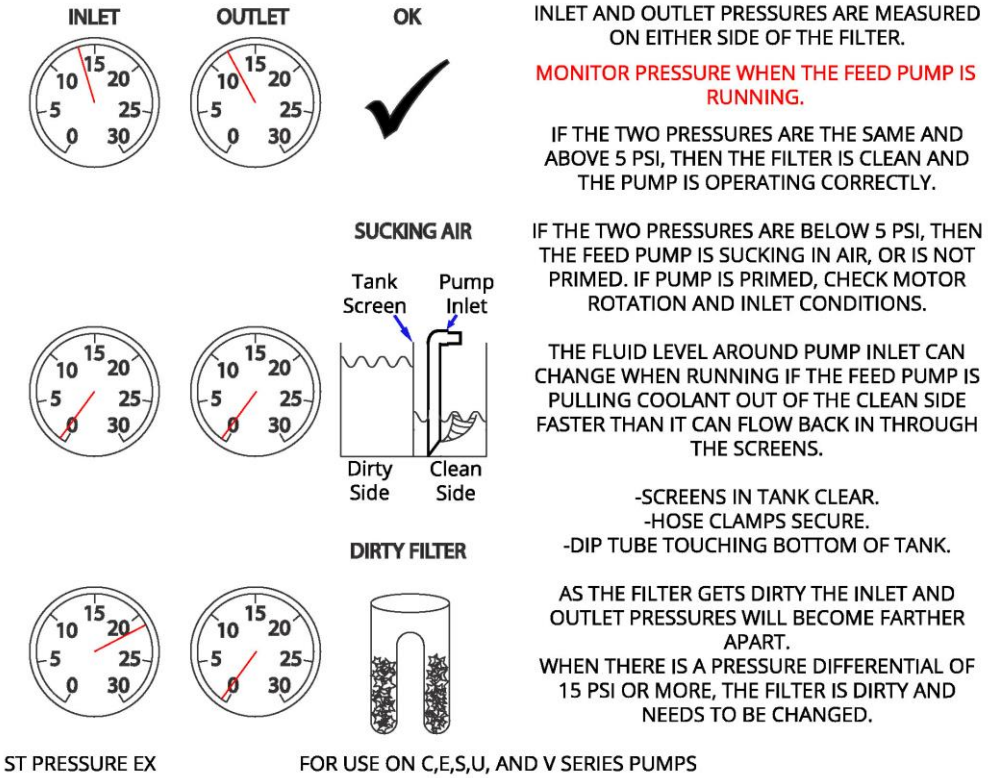
8.4. Alarms

All V-2 Series high pressure systems use one alarm output, NC (Normally Closed) or NO (Normally Open) to interface with machine tool. If a fault occurs, a signal is sent to the alarm circuit on machine tool, which will put machine tool in to feed hold.

MP Systems recommends using Normally Closed alarm circuits. This will allow machine tool to go into alarm if the V-2 Series ever becomes disconnected from machine tool.

8.4.1. Alarm Descriptions

Alarm Display	Symptom(s)	Cause
Red Light	1. Clogged Filter(s) 2. Prime Issue 3. Machine Coolant Tank Screen Clogged 4. Clogged Hose(s) 5. Sucking in Air 6. Improper Feed Pump Rotation.	Pressure is below 2psi on filter outlet when running.



9. Maintenance

	Before carrying out any operation on unit or accessing internal components, ensure that the power supply has been switched to the 'OFF' position. Before working on the unit, carefully read the safety instructions set out in the **Safety Measures** section

Regular scheduled maintenance consists of filter bag changes, maintaining Hydracell™ crankcase oil, and possible feed pump maintenance. Most issues can be eliminated or reduced by maintaining clean filter bags. Long term service items include the pump head and fluid components inside the machine tool such as added nozzles.

Filter bag service intervals will vary widely depending upon application. Filter bag must be changed when the pump goes into alarm. As the filter bag becomes plugged, the feed pump will run more often. Smaller the fines the more often the filter bag will need to be replaced.

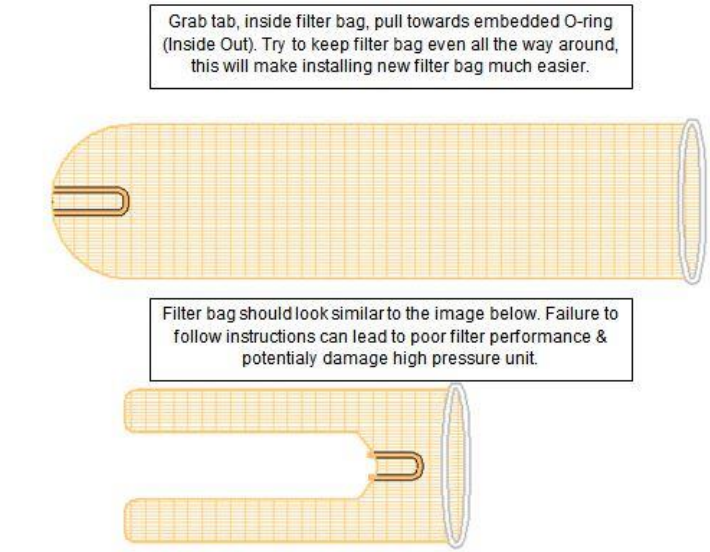
Filter Bag must be changed when Red Dirty Filter Button is illuminated. After filter bags have been replaced, press Red Button to clear fault.

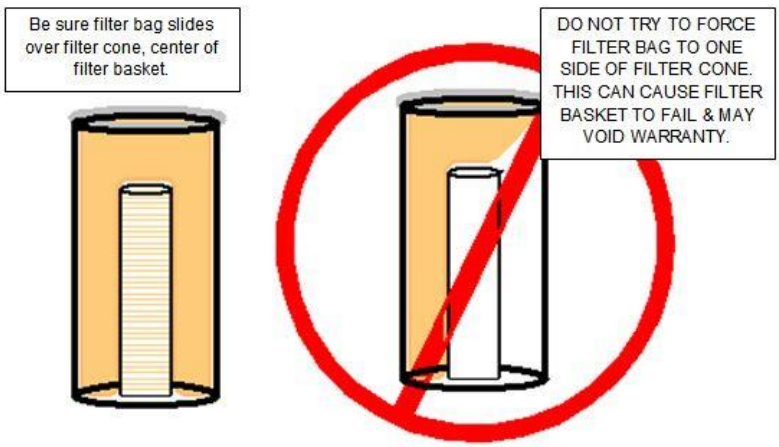
- Work material or chip sizes that stay suspended in the coolant will cause false filter alarms.
- Higher viscosity coolants tend to shorten filter bag life.
- Air entrapped in the coolant will lower flood pump pressure and shorten filter bag life.

9.1. Filter Bag Replacement

To change a Filter Bag:

1. Power off V-2 Series High pressure system.
2. Let pressure equalize for 30 seconds.
3. Loosen 3 galvanized eye bolts on filter cover Lift away filter top.
4. Slowly lift filter bag by handles on bag seal (coolant should drop as bag is lifted)
5. Install new bag.
6. Replace filter top and secure 3 galvanized eye bolts.





9.2. Basic Pump Maintenance

Pump Crank Case Maintenance (HydraCell™ Only)

- Hydracell™ (crank case) uses high quality 10w 30 motor oil. (MP Systems recommends Synthetic motor oil).
- Change after first 100 hours.
- After initial change, change every 2000 hours of pump operation.

10. Options & Accessories

This section will cover the operation, maintenance and installation of certain options and accessories that are available on the V series high pressure system. This section will cover the following options:

- Local 2 Port
- Local 4 Port
- Local 8 Port
- Remote 8 Port
- Remote 12 Port
- Heat Exchanger (HX)

10.1. Options

Option	Description/Use
• Local 2 Port Valve Block	• Typically used on mills or simple lathes
• Local 4 Port or 8 Port Valve Block	• Local valve blocks simplify the V-2 Series high pressure system • Local valve blocks tend to make house routing much more difficult • Some set ups will greatly benefit from this option
• Remote 8 Port Valve Block	• MP Systems standard configuration for V-2 Series high pressure system • The remote valve block is mounted on machine tool with 8 ports facing inside the cabinet • This allows for only one house running form the V-2 Series to the machine tool • Another benefit of the remote valve block is the reduced pressure on ports 3&4
• Remote 12 Port	• MP Systems offers an add-on for the 8 port remote valve block • It adds an extra 4 ports for a total of 12 port • Very useful for a more permanent hose routing on more complex machines
• Heat Exchanger (HX)	• V-2 Series heat exchanger is used to compensate for the heat that the V-2 Series may introduce to the machine tool system • The heat exchanger removes the excess heat that our motor introduces to the system

11. Spare Parts

Part Name	Part Number	
Filter Bag	HB BAG ORING #2 5MC 7X32	
O Ring	M ORING MPA	
5gpm – Gear Pump (Oil Only)	P OIL PUMP 5 GPM	
High Pressure Motor Contactor	ED CA7 30 00 120	
Heat Exchanger and Supply Pump Motor Contactor	ED CA8 9 10 120	
7.5HP Motor Overload	**200, 208-230VAC**	**460VAC**
	ED KTA7 25H 25A	ED KTA7 25H 16
1HP Feed/Supply Pump Overload	**200, 208-230VAC**	**460VAC**
	ED KTA7 25S 4A	ED KTA7 25S 2.5 ED KTA7 25S 6.3A

Please call *MP SYSTEMS* at 877-689-1860 with any other part request that may not be listed on the above table.

11.1. Relief Valve Identifier

Parker Style
Red Handle: HV RELIEF VALVE
100-100 PSI (water pumps)
Black Handle: HV RELIEF VALVE
500-2000 PSI (oil pumps)

Hydroven Style
Black Handle: HV RELIEF VALVE
250-1250 PSI H (water pumps)
Red Handle: HV RELIEF VALVE
500-2000 PSI H (oil pumps)

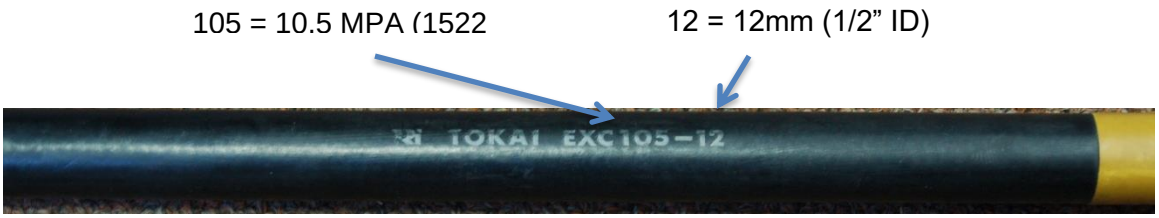
Appendix A: Hoses & Fittings

Identifying High Pressure Hoses & Fittings.

Most high pressure hoses will have the MPA/PSI and size clearly labeled on the hose. This section will cover how to interrupt hose labels. For any questions please call MP Systems @ 877-689-1860

Minimum Rating	
MPA	**PSI**
7	1015 PSI
14	2030 PSI

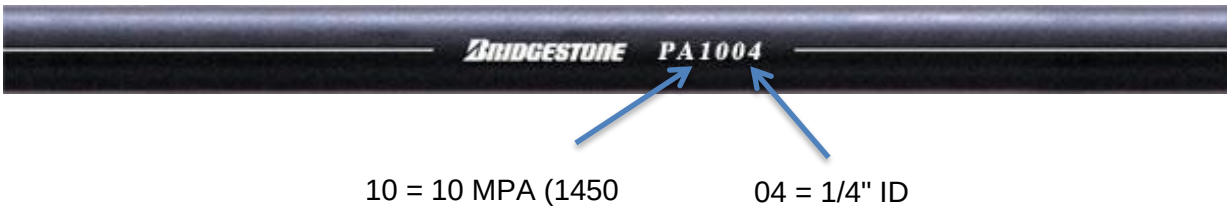
Tokai High Pressure Hoses:



The picture above is labeled EXC105-12. 105, 12 represent pressure rating and hose size, respectively.

105 = 10.5 MPA (1522 PSI)

12 = 12 MM (1/2”)

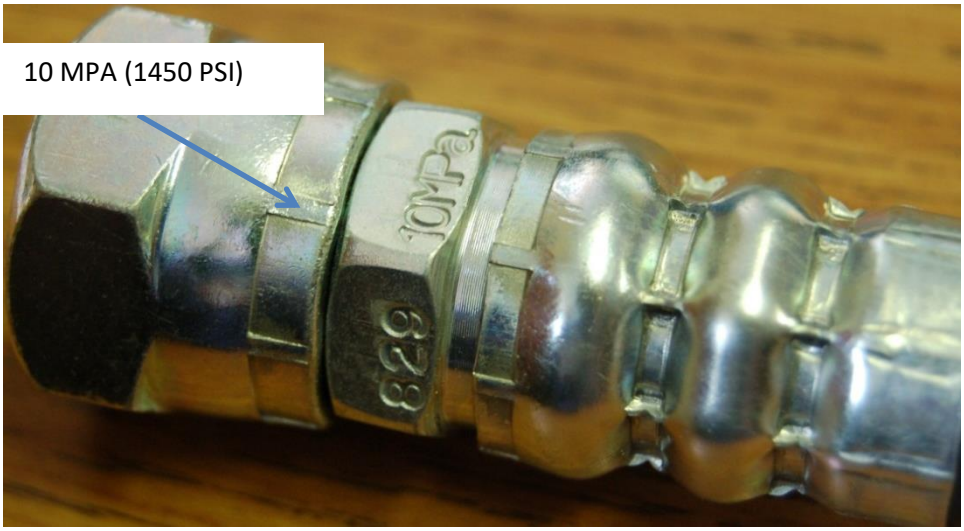


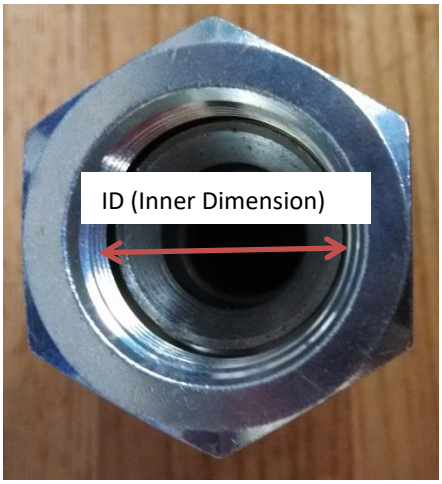
The picture above is labeled PA1004, 10 and 04 represent pressure rating and hose size, respectively.

10 = 10 MPA (1450 PSI)

04 = 1/4" ID

The crimp on hose fitting is the most important information when determining proper high pressure hose rating. Some high pressure hoses may be properly rated but the fittings may not be properly rated. Use caution and make sure to check both MPA ratings to ensure proper high pressure hose rating.





To determine the size of the fitting the ID (Inner Dimension) of the fitting must be measured.

Appendix B: Pipe Sizing

Pipe Sizing

The following table will help identifying pipe sizes.

Pipe Trade Size	OD(Outer Diameter) Inches	Wall Thickness	
		Schedule 40	Schedule 80
1/8”	0.045”	0.068”	0.095”
1/4"	0.540”	0.088”	0.119”
3/8”	0.675”	0.091”	0.126”
1/2"	0.840”	0.109”	0.147”
3/4"	1.050”	0.113”	0.154”
1”	1.315”	0.133”	0.179”
1 ¼”	1.660”	0.140”	0.191”
1 ½”	1.900”	0.145”	0.200”
2”	2.375”	0.154”	0.218”
2 ½”	2.875”	0.203”	0.276”
3”	3.500”	0.216”	0.300”

The following table contains approximate dimensions of female pipe fittings.

Pipe Trade Size	ID(Inner Dimension) Inches
1/8”	.330”
1/4”	.450”
3/8”	.590”
1/2"	.725”
3/4"	.920”
1”	1.170”
1 1/4"	1.510”
1 1/2"	1.750”
2”	2.230”
2 1/2"	2.650”
3”	3.280”

Appendix C: Power Harness

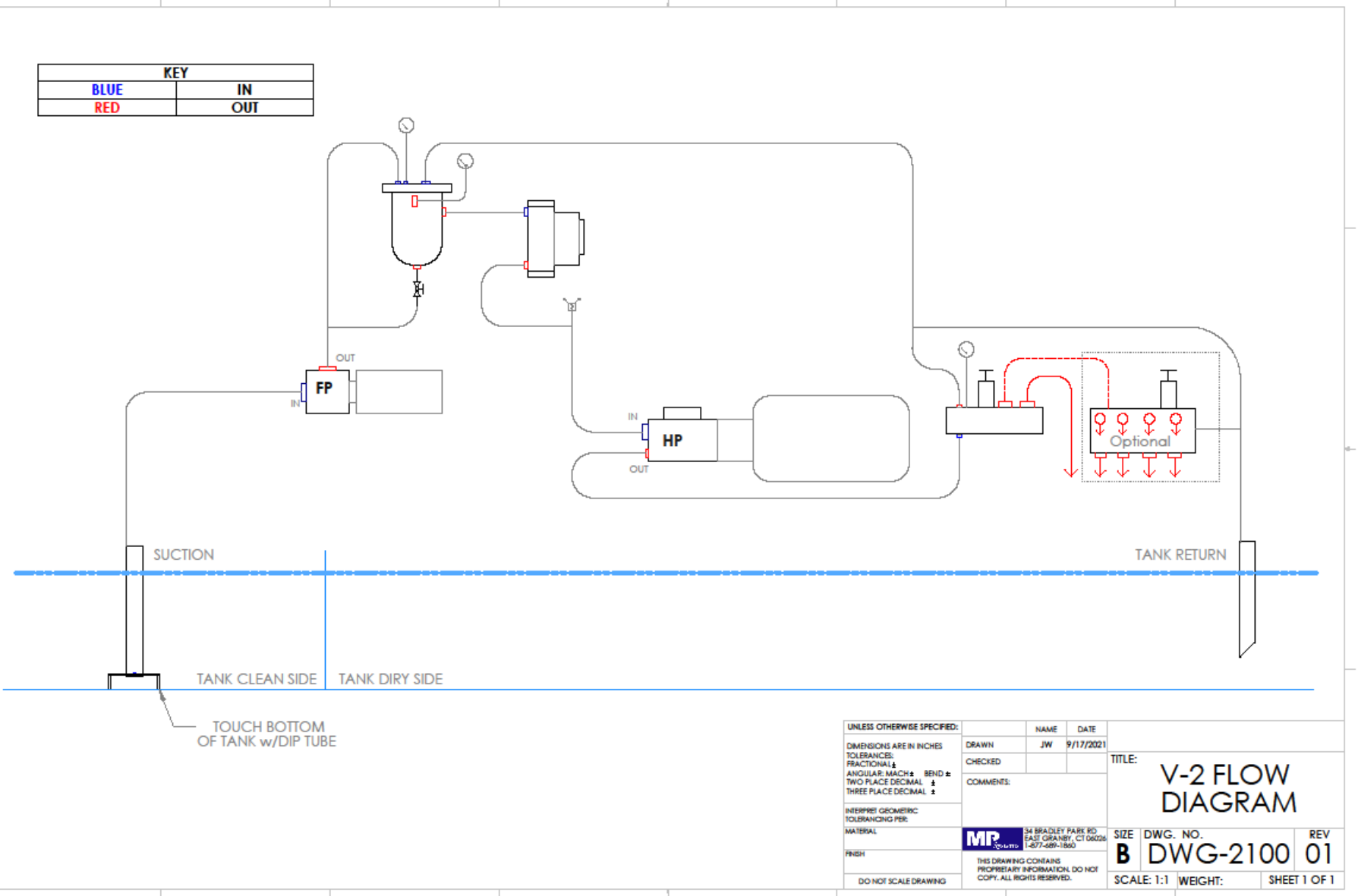
V Series Power Cable & Power Harness

MP Systems V Series high pressure system comes equipped with a 10 gauge SJEOOW cable for Power Cable& Power Harness. If supplied V Series Power cable/harness are not adequate for local electrical code please contact MP Systems @ 877-689-1860.

Power Feed to MP Systems

If local electrical code requires a circuit breaker to feed power to MP Systems V Series high pressure system, MP Systems offers them separately.

V Series Model	Part Number #
V Series – 200, 208/230V	AK CB40 KIT
V Series - 480V	AK CB20 KIT



UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	JW	9/17/2021
TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	CHECKED		
	COMMENTS:		
INTERPRET GEOMETRIC TOLERANCING PER:			
MATERIAL			
FINISH			
DO NOT SCALE DRAWING			

MP Systems
34 BRADLEY PARK RD
EAST GRANBY, CT 06026
1-877-689-1860

TITLE: V-2 FLOW DIAGRAM

SIZE	DWG. NO.	REV
B	DWG-2100	01

SCALE: 1:1 | WEIGHT: | SHEET 1 OF 1

All MP Systems equipment comes standard with a 2 year parts warranty. Warranty is void if proper installation, specification, and operational procedures are not followed. Use only filter bags purchased directly from MP Systems to maintain warranty of flow related parts. Contact MP Systems directly for warranty claims.

MP Systems
34 Bradley Park Road
East Granby, CT 06026
Phone 877-689-1860 • Fax 860-653-2877
Email: info@mp-systems.net