HENNIG

PROTECT YOUR SUCCESS

INSTALLATION GUIDE

VARIFLOW HIGH-PRESSURE COOLANT SYSTEMS

VARIFLOW

The VariFlow Gen4 high pressure coolant system offers top of the line performance in a small, economic package. Utilizing our Adaptive Flow Control, the VariFlow dynamically adjusts the flow of coolant to output the desired pressure that can be set from the VariFlow's HMI or the machine's optional m-codes. This variable flow system can reduce energy consumption, coolant foaming and heat generated from a pump running at a fixed flow. The new VariFlow Gen4 sets a new standard for high pressure coolant systems by bringing top of the line technology to a small platform that is priced similarly to the competitor's base models.

Your Hennig system undergoes 100% end-of-line test and inspection to verify proper function, prior to packing and shipment.

For questions regarding your system, or assistance in new applications, contact a customer service representative: 815-636-9900 or info@hennig-inc.com

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SYSTEM OVERVIEW

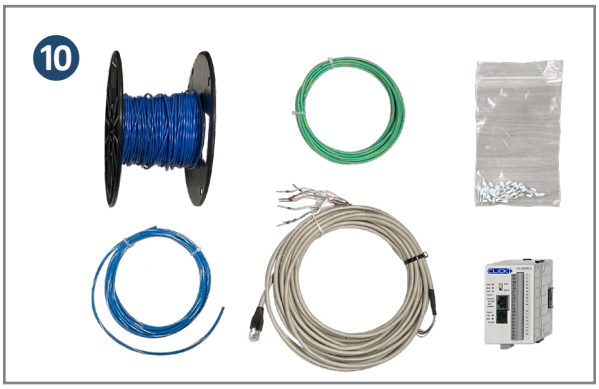
Unit Specifications	
Voltage	3 Phase, 230 Volts, 50/60 Hertz (460V option)
Full Load Amperage	25 amps
Max Pressure	1,000 PSI
Max Flow	8 gpm
Filter	5 micron bag (10 micron optional)
Inlet	Mounted suction hose w/ foot valve
Outlet	3/8" NPT female
System Dimensions (L x W x H)	25.5" (647.7 mm) x 26.5" (673.1 mm) x 37.5" (952.5 mm)

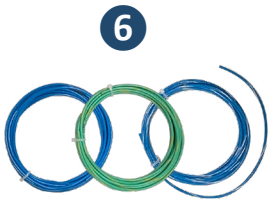
Features

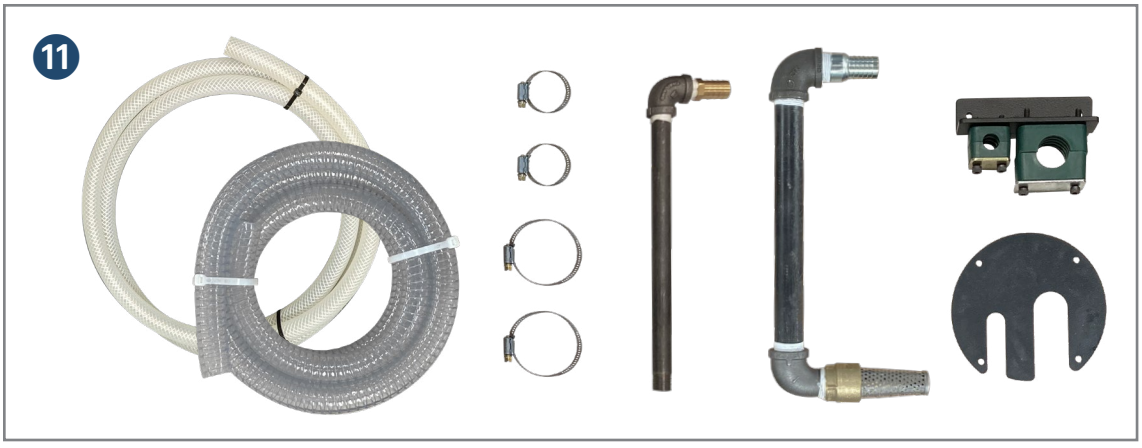
- Adaptive Flow Control
- 250 PSI (17.2 bar)
- 500 PSI (34.4 bar)
- 750 PSI (51.7 bar)
- 1,000 PSI (69 bar)
- Up to 8 GPM (30.3 l/min)
- 25 Gallon Reservoir
- Single Plug Electrical Interface
- User Interface
- Caster Wheels
- 2 Year Warranty
- System Status Light
- Less than 80 dB running

Included with your system

1. Female connector/cable assembly
2. High-pressure hose extension
3. Relays (24V, 115V, 230V)
4. Terminals (bag of ~50)
5. 3-pole breaker
6. Extra install wire
7. 3/8" and 1/2" BSPP/JIS fittings
8. 3/8" and 1/2" JIC fittings
9. 3/8" and 1/2" JIS sealing cones
10. M-code kit
11. Feed/relief kit







LIFT POINTS LOCATION

Hoist the system from both lift points.

The top of the system has two 3/8-16 threaded holes. Eye bolts are included.

Note: Both side doors must be mounted while lifting.

Lift Points

INSTALL FEED/RELIEF MOUNT

1. **Find a suitable location on the coolant tank to pull coolant.**

   Coolant must be pulled from the clean side of the tank. If no suitable location can be found, remove the pump that's being replaced by the VariFlow system and use that space for the feed/relief mount.

2. **Install the feed/relief mount.**

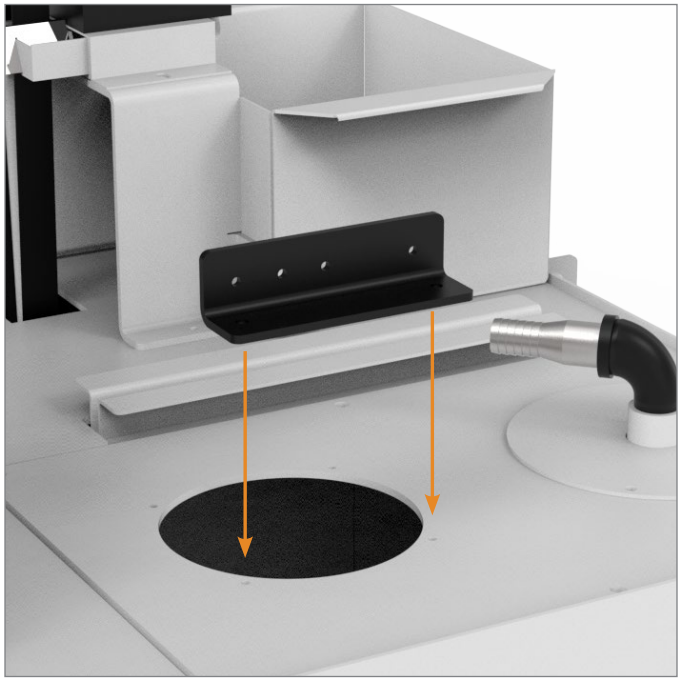
   Drilling may be required if the existing tank holes don't line up or none are available.

3. **Attach the feed and relief pipes to the mount.**

   Ensure the barb fittings are at the top.

   1. **Feed pipe**
      Adjust height so the foot valve is close to the bottom of the tank but not making contact.

   2. **Relief pipe**
      Adjust height so that the opening is submerged roughly 2" to reduce foaming the coolant.



Feed/Relief mount installation

Feed/Relief pipe installation

CONNECT COOLANT HOSES

The rear of the system has three coolant connections and the power cable.

1 Coolant feed 2 High-pressure out 3 Relief out 4 Power cable

1. **Connect the coolant feed tube.**
   One end to the feed pipe. Other end to the rear of the VariFlow.

2. **Connect the relief hose.**
   One end to the relief pipe. Other end to the rear of the VariFlow.

3. **Connect the high-pressure hose.**
   One end to the high-pressure outlet on rear of the VariFlow. Other end to the high-pressure through-spindle line on the machine tool.

   Note: A high-pressure hose may need to be custom made depending on length and fittings that come with the machine. The install kit comes with a 3/8" NPT extension hose, 3/8" NPT to 3/8" JIS and JIC or 3/8" NPT to 1/2" JIS and JIC, as these are common for high pressure lines on machines.

Coolant hoses and power cable locations

FEMALE CONNECTOR MOUNTING

1. **Find a suitable location for the female connector housing.**

   The connector (included in the install kit) should be within reach of the cable coming off the VariFlow while leaving slack so the VariFlow can be moved around without disconnecting.

2. **Mount connector to the machine.**

   Once mounted, determine the wire routing and wire length from the connector to the machine's electrical box. Ensure wires can be safely placed away from moving parts so they don't get damaged.

   Note: Connector comes with whip/pigtail pre-wired. If whip/pigtail isn't long enough, extend on your own or contact Hennig for a new/longer whip.

Female connector mounted to CNC enclosure, shown with male connector attached.

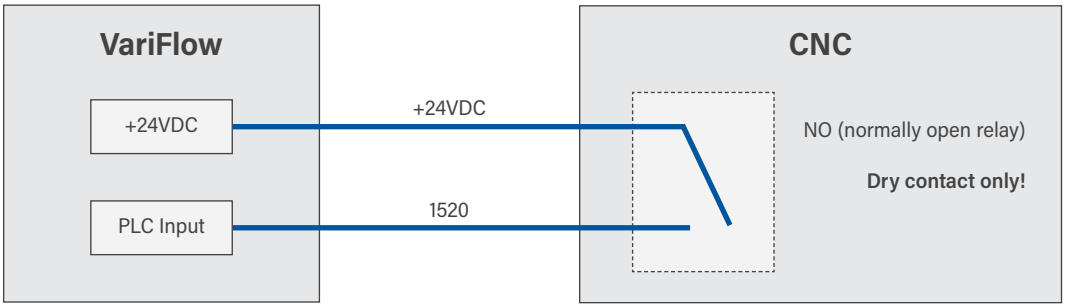
CNC ELECTRICAL CABINET WIRING

Note: The relay is used to trigger the run signal. Typically, the easiest is the use the 230V coil relay and trigger it with the through spindle coolant contactor.

Electrical Connections

Plug Pin Number	Wire Color	Wire Label	Description
4	Green/Yellow (ground)	PE	Ground, 12AWG
1-3	Black (power)	U0, V0, W0	230 VAC IN, 50-60 Hz, 25 amps, 12AWG
5	Blue (control signal)	1520	Run signal. Contact close to +24VDC. 20AWG
6	Blue (control signal)	1440	Alarm signal. Contact close to 1451. 20AWG
9	Blue (control signal)	+24VDC	Run signal. Contact close to 1520. 20AWG
10	Blue (control signal)	1451	Alarm signal. Contact close to 1440. 20AWG

Run Diagram



1. **Pull pigtail wires through to the machine's electrical box.**

2. **Install the 3-pole breaker and relay.**

   Locate an open slot in the CNC's electrical box and mount the breaker and relay.

3. **Supply 230 volt, 3-phase power to the top of the breaker.**

4. **Connect female connector to the bottom of the breaker.**

   Locate and attach black wires U0, V0, W0 (from the female connector) to the bottom of the breaker.

5. **Connect female connector to relay.**

   Locate and attach blue signal wires (1520, +24VDC) from the female connector to the COM and NO (normally open) on the relay.

   - +24VDC to COM
   - 1520 to NO

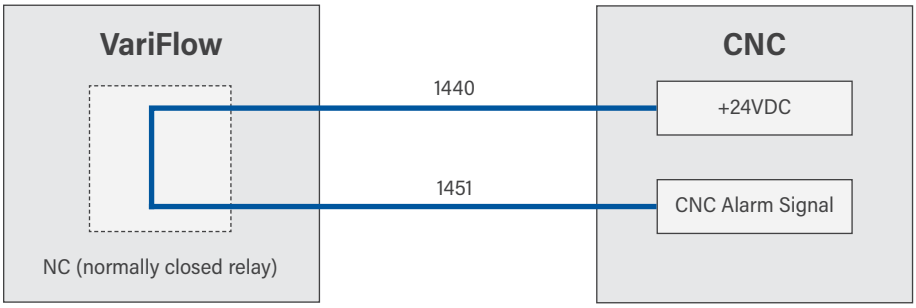
6. **Connect contactor to the relay.**

   Locate and attach black wires from bottom of contactor (U, V) to the on relay (A1, A2).

   - U to A1
   - V to A2

ALARM SIGNAL WIRING

Alarm Signal Diagram



Connect CNC alarm signal to the VariFlow PLC.

Note: The PLC is located in the VariFlow's electrical box.

Locate and attach blue wires (1440, 1451) from the VariFlow PLC relay to the CNC machine.

- 1440 to CNC +24VDC
- 1451 to CNC alarm signal

Note: From the factory, the VariFlow comes wired with a Normally Closed (NC) Alarm Signal. If your application needs a Normally Open (NO) Alarm Signal, you will need to change the alarm wires from Relay 27 (NC) to Relay 26 (NO) on the PLC.

VariFlow PLC alarm signal

PRIMING THE SYSTEM

1. **Verify system is ready for priming.**

   Ensure all filters, O-rings, hoses, and clamps are in place and properly sealed.

2. **Remove fill port plug.**

   The plug is located on top of the coolant feed hose port on the back of the VariFlow system.

3. **Fill with coolant.**

   Pour coolant/water into the fill port. Ensure all air bubbles are removed from the pump and the coolant feed hose.

2. **Replace fill port plug.**

   Use thread tape to ensure the plug is properly sealed.

Fill port plug

CHECK SYSTEM PHASING

IMPORTANT! Before first start-up, follow the steps below to check the rotation of the feed pump to confirm system phasing is correct.

Note: The system comes with a fill pump switch on the side of the electrical box. The fill pump switch is set to "off" when shipped so it will not run dry on initial power up.

1. Attach power cable.

If not already done, connect the male end of the power cable from the VariFlow to the female connector.

2. Manually run the priming pump.

There are two ways to run the priming pump:

- Use the switch on the outside of the electrical box (circled in orange)
- Use the contactor in the electrical panel

Note: If coolant is not being pulled up the line into the prime pump, turn the system off and repeat the priming procedure from page 9 until the pump is able to pull coolant from the tank.

3. Check the pump rotation.

Looking through the rear guard, make sure the pump fan is turning the same direction as the arrow sticker on the pump. If the fan is not turning the same direction as the arrow, stop the pump and swap two of the main black power wires (from the CNC electrical cabinet) at the Hennig supplied breaker. Run the pump to verify the turning direction is correct.

4. Enable the fill pump.

Turn on the system and then turn on the fill pump switch. The system will automatically fill the tank and turn the fill pump on/off as needed.

5. Great job, you did it!

You've installed your VariFlow High-Pressure Coolant System. Go to the next page for operation instructions.

Fill pump switch location

OPERATION

Check to make sure the VariFlow power is turned on. Once turned on, the VariFlow has a main power disconnect on the electrical box, which allows for the system to turn on/off with a signal from the CNC machine. Once installation is complete, the operation of the system is pretty straight-forward, typically requiring pressure adjustments as the only "operation".

How it works

The VariFlow system is equipped with our Adaptive Pressure Control, which regulates the flow of coolant to output the desired pressure regardless of the orifice size in the tool (within capabilities of the pump). The Adaptive Pressure Control uses different "pump ramp characteristics" to prevent the system from overshooting the pressure set-point when a small orifice tool is being used, as well as preventing a long "ramp up" time when using large orifice tools.

"Pump Ramp" Characteristics

- If the pressure set point is <500psi, the pump will start increasing pressure from a low speed set point (avoids pressure overshoot)
- If the pressure set point is >500psi, the pump will start increasing pressure from a high speed set point (avoids slow speed to get to pressure set point)

Setting the pressure

Note: When the machine gives the control a signal for high pressure coolant, the high pressure pump turns on automatically and defaults to a set pressure of 1,000 psi.

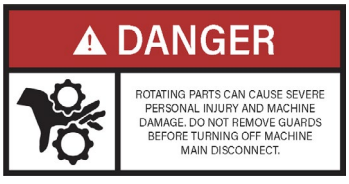
To change the pressure, simply use the F1 - F4 buttons on the HMI to select the desired pressure.

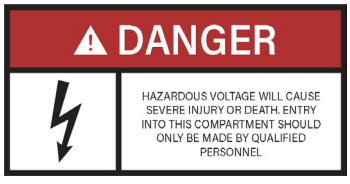
- F1 - 250 psi
- F2 - 500 psi
- F3 - 750 psi
- F4 - 1,000 psi (default)
- F5 - used for priming a dry high-pressure pump*

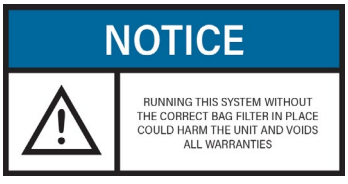
If the system gets an alarm, the logo will change to red and the HMI display will indicate the error.

****In the event the high-pressure pump runs dry, first prime the system using the steps on page 9. Once you've manually primed the system, press F5 while the system is idle to prime the high-pressure pump. If the high- pressure pump still isn't priming properly, check the filter for blockage. Clean and replace the filter if needed. Refer to page 13 for filter maintenance.***

For troubleshooting, refer to page 19.







MAINTENANCE: FILTER REPLACEMENT

NOTICE

RUNNING THIS SYSTEM WITHOUT THE CORRECT BAG FILTER IN PLACE COULD HARM THE UNIT AND VOIDS ALL WARRANTIES

To prolong the life of the system and to ensure proper operation, the filter must be replaced every 3-6 months, depending on its use.

1. **Remove the cover panel.**

   Loosen the 1/4 turn locks (x4) and remove the cover panel.

   Note: Loosen the locks roughly a quarter turn to unlock them. Do not remove all the way.

2. **Remove the filter cover plate.**

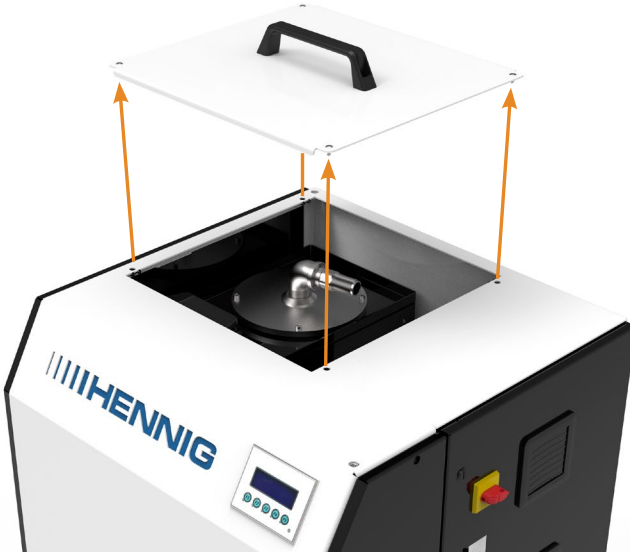
   Loosen the worm clamp from the inlet hose and remove the hose from the barb fitting. Using a 6mm allen wrench, remove the M8 bolts (x6) holding the filter cover plate. Remove the filter cover plate, providing access to the filter.

3. **Replace the filter.**

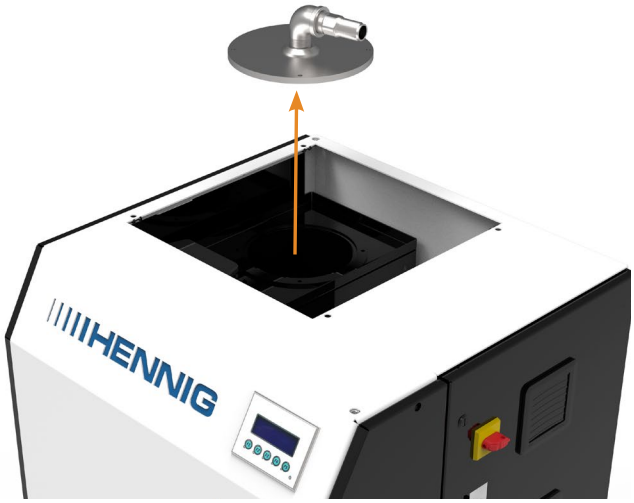
   Remove the filter by simply lifting it out using the handles built into the top ring of the bag. Before inserting the new filter bag, inspect the cover plate and o-ring for damage or deformation and replace if necessary. Insert the new filter bag.

4. **Reinstall the filter cover plate, inlet hose, and cover panel.**

   Finger tighten the 6 bolts, then tighten bolts with an allen wrench in a star pattern to ensure a proper seal. Then attach the inlet hose to the barb fitting and tighten the worm clamp. Reinstall the cover panel.



Top cover panel



Filter cover plate

MAINTENANCE: CHANGING OIL

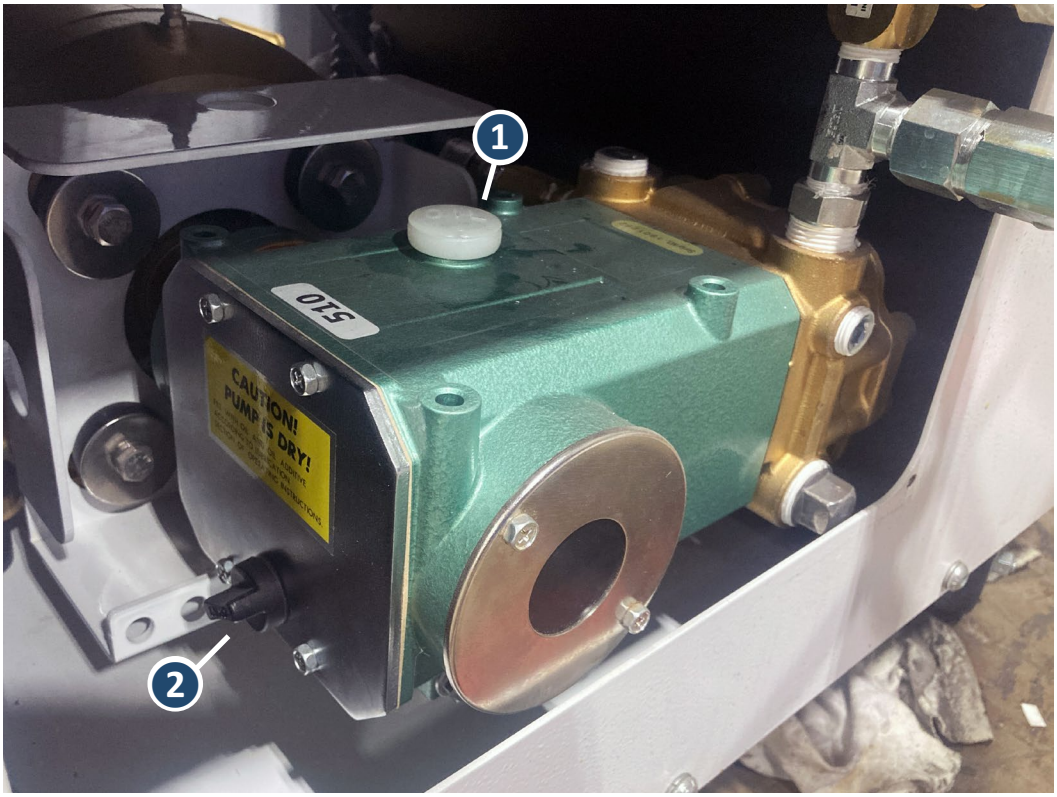
1. Remove the oil dipstick.

2. Place a small container or pan underneath the oil drain plug.

3. Remove the oil drain plug and completely drain oil.

4. Replace oil drain plug and fill with Genuine pump oil until oil level is between the marks on the dipstick. Use genuine pump oil (part # 8571982).

CAUTION! Do not overfill or underfill, as it will damage the pump.



1 *oil dip stick* 2 *drain plug*

M-CODE PRESSURE INSTALLATION (OPTIONAL)

The Click PLC can take 4 spare m-code inputs and send the following pressures to the VariFlow coolant system: 250 PSI, 500 PSI, 750 PSI and 1,000 PSI. The system's HMI can also be used to select your desired pressure.

Required tools

- Small flathead screwdriver
- Wire cutters
- Hand drill
- Zip ties
- PLC upload cable (supplied)

1. Mount the "Click PLC" in the machine tool's electrical cabinet near the spare m-code i/o board or relays.

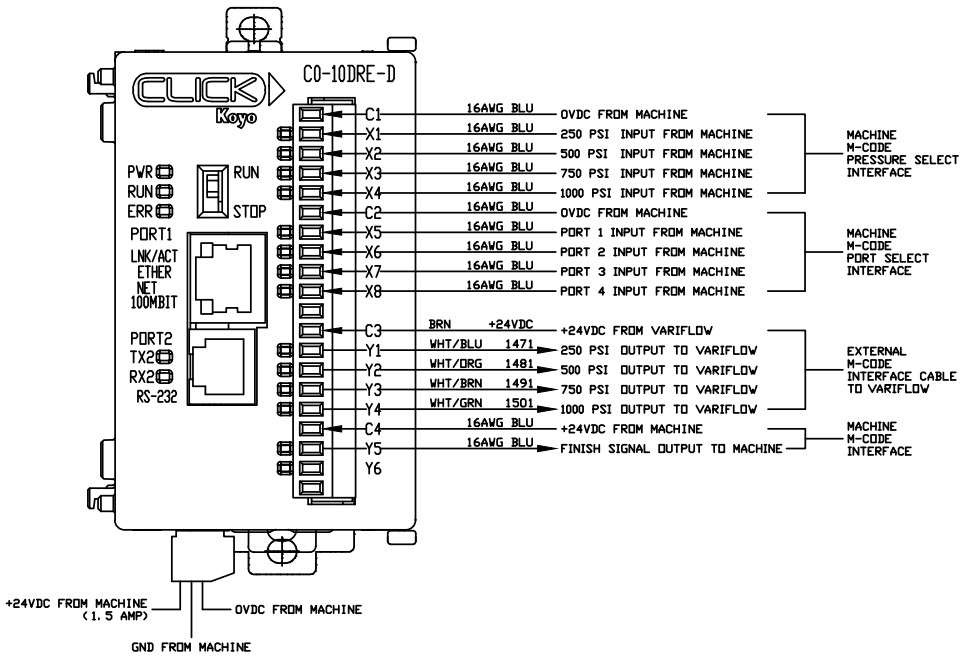
2. Source 24 VDC power and GND and wire into the bottom plug on the PLC according to the terminal descriptions.

3. Plug connector in on the side of the VariFlow system and wire according the diagram below (standard) or page 17 (2 port).

4. Connect spare m-code relays to the Click PLC according to the wiring diagram below.

5. Connect m-code finish signal (if required) according to the wiring diagram below (standard) or page 17 (2 port).

Click PLC wiring to VariFlow (standard)



2-PORT MANIFOLD INSTALLATION (OPTIONAL)

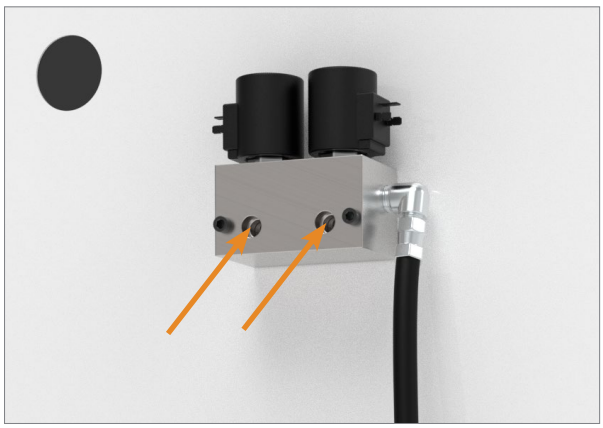
1. Mount the manifold on the rear of the VariFlow with supplied M6 bolts, lock washers and nuts.

2. Install 90 degree fitting in the output of the VariFlow. Attach hose to the output fitting and the manifold input fitting.

2-PORT MANIFOLD INSTALLATION (OPTIONAL)

3. Install desired output fittings into manifold outputs and connect hoses from the machine.

The 2 port manifold comes with a second set of fittings to ensure you have the right connection for your standard hoses.



3/8" and 1/2" BSPP/JIS fittings

3/8" and 1/2" JIC fittings

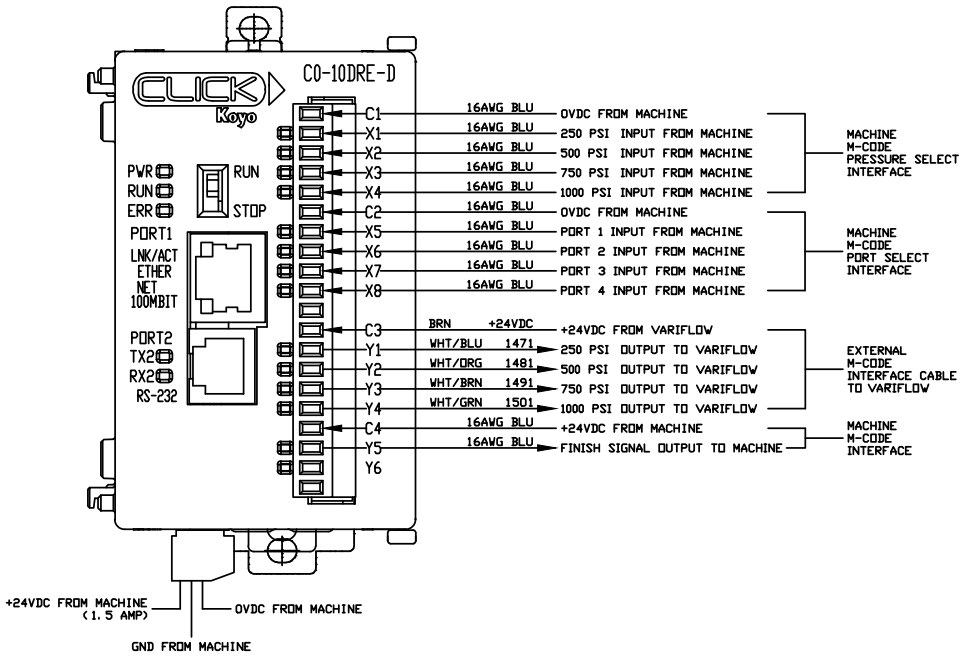
3/8" and 1/2" JIS sealing cones

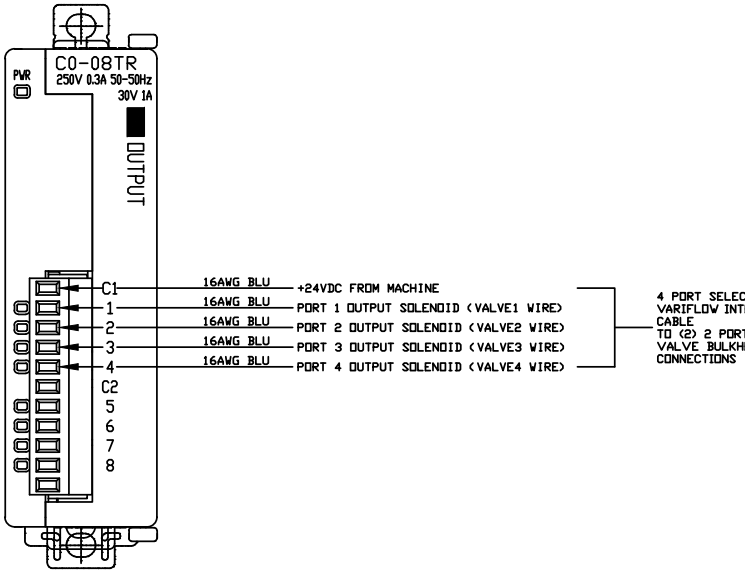
4. Remove left side panel (electrical box side) to access the underside of the electrical box. The panel is secured with 6 allen head bolts.

5. Connect cable to both coils and feed plug into the variflow system. Remove the plug cap, and plug the cable into the receptacle on bottom of variflow electrical box.

2-PORT MANIFOLD INSTALLATION (OPTIONAL)

6. Wire manifold wiring from interface plug into click PLC following wiring diagram.





WIRING EXAMPLE

Machine: Okuma Genos M460-VE

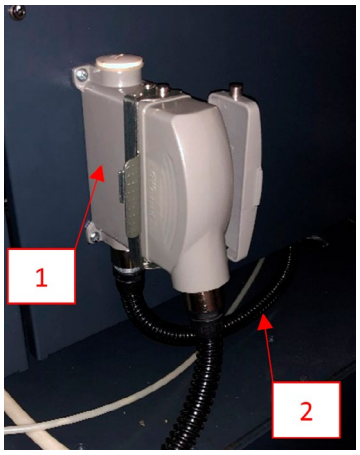
This is an example of how to wire the power, control signal, alarm circuit and four additional m-code signals to control four different pressure settings on the VariFlow.

1. Find a suitable location to mount the female connector housing included in the install kit. This should be close to the main electrical cabinet of the CNC while also close enough to the VariFlow.

2. Route the flexible conduit/wires into the CNC's electrical cabinet.

3. Mount the supplied 3-pole breaker near the CNC's coolant pump contactors.

4. Using the supplied black, 12ga wiring/crimp connectors, source 3-phase, 208/220 VAC from the top of one of the CNC's coolant contactors/overloads and connect to the top of the 3-pole breaker.



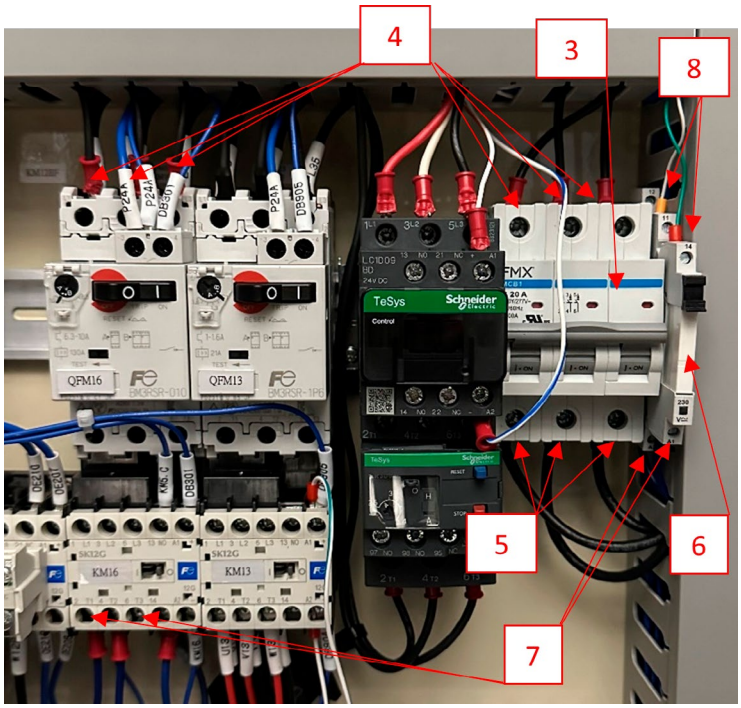
5. Connect the three 12ga black wires from the VariFlow female plug whip to the bottom of the 3- pole breaker.

6. Mount the supplied 24vdc relay next to the 3-pole breaker.

7. Using the supplied wire, connect relay coil terminals A1 and A2 to two of the contactor outputs to the OEM high pressure pump (labeled T1 and T3 in the sample picture. Disconnect the OEM high pressure pump if applicable.

8. Connect the blue wires (+24 VDC, 1520) from the VariFlow female plug whip to the Normally Open terminals (11 and 14) of the supplied relay.

9. Connect the blue wires (1440, 1451) from the VariFlow female connector whip IN SERIES with one of the CNC's overload alarm signals (9). See pages 7-8 to ensure correct outputs from the PLC.



PARTS LIST

Part #	Description
880.19008.0055	HMI Interface Panel (LCD screen/buttons)
880.19008.0054	VariFlow PLC
885518	Bag filter basket
880.18030.0000	5 HP VFD, 230VAC
881405	Feed pump
881404	High pressure pump assembly
885523	Bag filter element (10 micron)
885550	Bag filter element (5 micron)
885524	Bag filter housing o-ring
880.27000.0011	Run relay (230V)
880.27008.0035	Run relay (120V)
880.27000.0013	Run relay (24V)
	High-pressure pump seal kit (sold as kit with parts below)
8571949	Inlet valve (x3)
8571950	Outlet valve (x3)
8571951	Seal (x3)

TROUBLESHOOTING

Symptom	Issue	Solution
VariFlow does not come on when machine tool calls for high pressure coolant.	▪ VariFlow disconnect switch is off ▪ Machine tool is off ▪ VariFlow "Run relay" is not functioning	▪ Turn on VariFlow disconnect switch ▪ Turn on machine tool ▪ Replace "Run relay" (880.27000.0011)
VariFlow creates too much pressure	The pressure relief valve is adjusted incorrectly	Using a tool with small orifice size, turn the VariFlow on and adjust the pressure to factory setting of 1,000 psi or to your desired pressure
VariFlow doesn't create enough pressure	▪ The orifice size in the tool is too big to create the desired pressure ▪ The pressure relief valve is adjusted incorrectly	▪ Use a tool with a smaller orifice size ▪ Using a tool with small orifice size, turn the VariFlow on and adjust the pressure to factory setting of 1,000 psi or your desired pressure.
VariFlow comes on for a few seconds and then shuts off with an alarm	▪ Filters are clogged ▪ VariFlow has lost prime	▪ Replace the filter. See page 12 for replacement instructions. ▪ Prime the system. See page 9 for priming instructions.
VariFlow does not stay primed	▪ Machine tool's coolant level is low ▪ Foot valve is not working properly ▪ Fill pump is not working properly	▪ Add coolant to the machine tool ▪ Take apart and clean the foot valve, or replace if necessary. ▪ Check fill pump switch ▪ Check tank float function ▪ Replace fill pump

HENNIG®

PROTECT YOUR SUCCESS

WE'VE GOT YOUR BACK

Hennig Worldwide has been a global leader since 1950, specializing in chip and coolant management, machine protection, and facility safety. We work with a wide variety of manufacturers and other facilities worldwide, helping them create and maintain safe and efficient workplaces. Our commitment to excellence extends beyond our services—we actively contribute to local communities, create regional jobs, and support the global needs of machine tool customers.

ISO 9001 : 2015
REGISTERED

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