

**CDR QUICK START GUIDE R06 – REFER TO OPERATOR’S MANUAL FOR MORE INFO.**

**\*WARNING – PUMP STARTS AUTOMATICALLY. TURN OFF BEFORE SERVICING\***

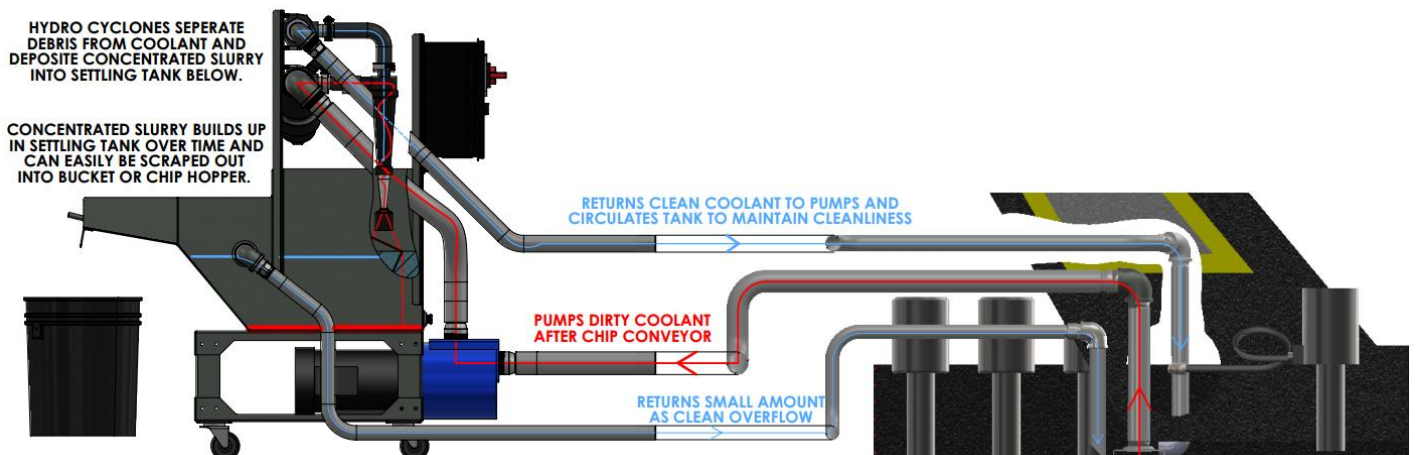
**\*WARNING – PUMP MUST BE PRIMED BEFORE USE\***

The CDR filtration system is intended to be used on high volume machining centers with filtering conveyors (500µm or finer) or magnetic conveyors (Severe Duty CDR models only) running water-based coolant. It works best filtering fine material with a specific gravity of 2 or higher. It is not to be used with cutting oil. It is not intended to replace a filtering conveyor, but to be used as secondary, finer filtration to prevent sludge and fine debris from accumulating throughout the tank.

Severe Duty models use an additional filter vessel containing a perforated screen basket that can be manually emptied, cleaned, and re-used. The purpose of this vessel is to capture particles larger than 1/16” that would normally be automatically removed by a filtering conveyor. The basket will hold up to 1.5 gallons of chips before it needs to be emptied.

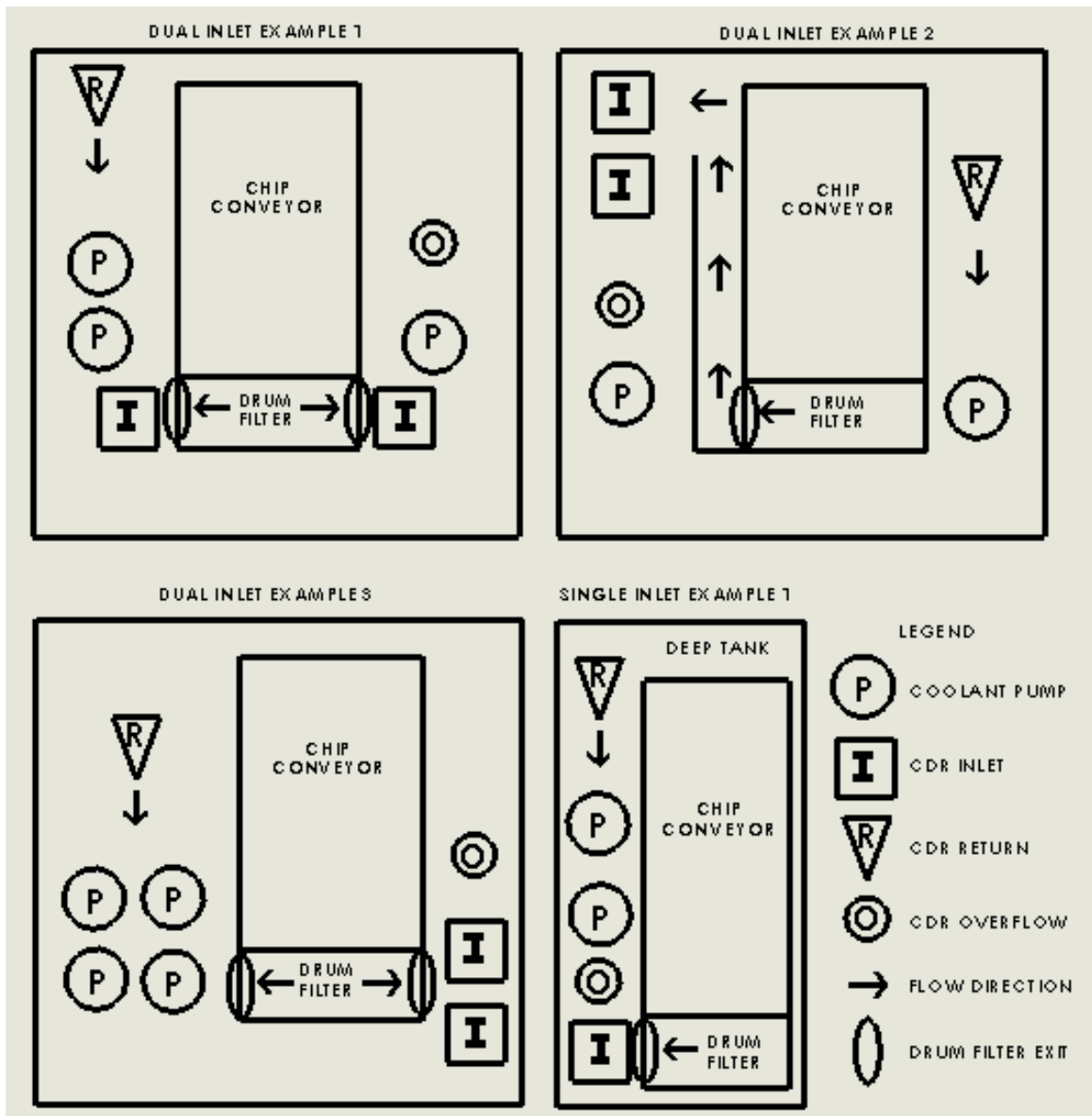
Be sure to inspect conveyor filter(s) before installing CDR. Wearing appropriate gloves or using a scoop, take a sample of debris from the machine tank, dry through a coffee filter, and spread out across a piece of paper. There should be no individual particles larger than 1/32” (the thickness of a credit card). If there is, this indicates a tear in the filter screen, or the screen(s) are plugged, and the coolant level in conveyor is piling up too high and debris is bypassing the conveyor. These issues will need to be addressed before adding secondary filtration. A properly working filtering conveyor is the best way to automatically remove a large amount of the chips being produced by most machining operations.

- CDR typical installation time required: 4 Hours
- A full installation kit is provided to adapt to most tank configurations.
- Low pressure plumbing kit includes inlet, return, and overflow dip tubes, hoses, and clamps.
- 3 Phase power kit w/circuit breaker provided to pull power directly from machine.
- CDR can be set to automatically run when powered on, or with scheduled run clock.
- Status indicator light and HMI screen removes need for alarm interface with machine.
- May require hole saws to modify tank, see appendix in back for more information.
- The CDR requires roughly 24” x 48” of floor space that is located next to the coolant tank.
- The Severe Duty “SD” model requires roughly 34” x 50” of floor space to include filter.



## 1. Understand tank layout to determine suction, return, and overflow locations.

- Remove power completely from the chip conveyor and machine.
  - Ensure chip conveyor CAN NOT turn on or injury may occur.
- Remove any access panels on top of the tank that will allow for a good view or feel of the tank layout. Understanding the tank layout is easiest when there is no coolant present. If coolant is present, wear appropriate elbow length gloves.
- First, identify how many coolant outlets the conveyor has, and their locations.
- Next, feel around the tank for any baffles, walls, and screens.
- Draw a simple “top down” view of the tank and conveyor on a piece of paper.
- In this drawing, include all conveyor outlets, baffles, walls, screens, coolant pumps, etc.
- Last, draw the flow path of coolant in the tank after it leaves the conveyor.
- Doing this will greatly help identify the best possible place to locate the suction, return, and overflow dip tubes. It will also help identify which direction the return flow should be pointed to get optimal tank circulation.
- Refer to the drawings below as examples only. Exact tank configurations may vary.



Some pipe fittings are sent loose, and extra fittings are included to allow for optimal configurations.

Use quality pipe sealant/tape when installing. Tighten fittings securely.

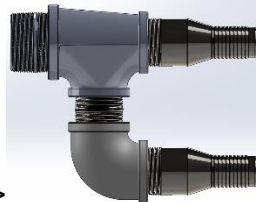
## 2. Install Inlet, Return, and Overflow fittings and dip tubes.

### • Suction Inlet(s) – Dual 1 1/4” vs Single 2” explanation

- The standard installation kit will come with two - 1 1/4” suction inlets to accommodate lower coolant levels while running and help prevent air from being pulled into the pump.
- For dual inlets, a minimum coolant depth of 4” while running coolant is required.
- A single 2” inlet can be used for deep tanks (12” +), with single conveyor outflow.
  - Only certain models of machines will get this type of install kit.
- For a single inlet, a minimum coolant depth of 6” must be maintained when running.

### • Install Pump Inlet Fitting(s)

- The CDR is shipped with no pump inlet fitting(s) installed. They can be found in the kit.
- For Dual Inlet configurations, install the assembled 2” NPT X 1 1/4” Barbs fittings into the front of the pump using appropriate pipe sealant and ensure it is fully tightened.
- For Single inlet configurations, install the 2” NPT by 2” Barb. See photos for reference.



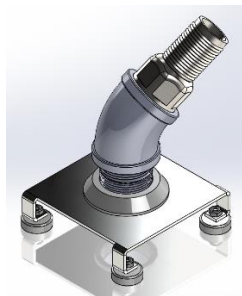
Dual 1 1/4” Inlets Assembly >



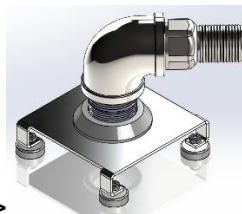
Single 2” Inlet Hose Barb >

### • Install Inlet Dip Tube(s)

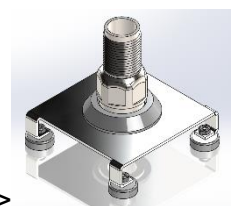
- The suction inlet(s) should be located as close to the chip conveyor coolant outlet(s) as possible, or directly in the path of flow after the conveyor outlet(s).
- The idea is to pick up and filter the dirty coolant right as it enters the tank before the debris has a chance to settle. If debris is allowed to settle, it will remain in tank.
- They can usually be installed through a spare coolant pump opening, or by removing an access panel on the tank. In some applications, a hole may need to be cut to route the hose through properly. Refer to the “hole saw guide” for info on how to cut holes in sheet metal.
- In some scenarios, the two suction inlets will be installed in different areas of the tank.
- In other scenarios, it is perfectly fine to locate the two suction inlets near each other.
  - Be sure to provide some space (2” at least) between the two low level plates.
- For dual inlets, configure plumbing to allow for proper hose routing depending on the location of the inlet plates. Most installs will use the 45-degree fitting with barb. Ex 1.



Ex 1. 45-Deg>

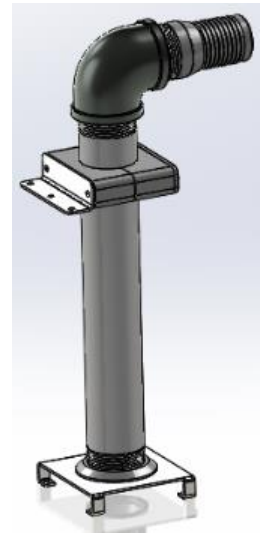


Ex 2. 90-Deg>



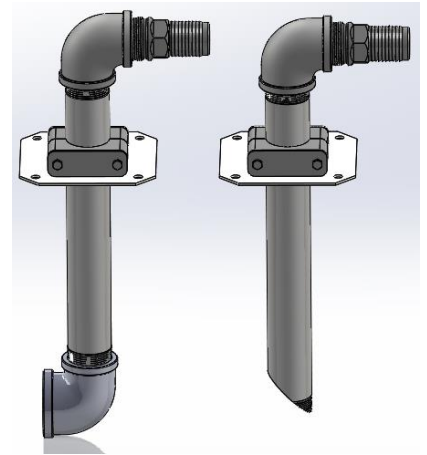
Ex 3. Vertical>

- For single 2" inlet, assemble the supplied dip tube pipe components and green clamp to fasten to tank top. ----->
  - Ensure that the bottom of plate touches the bottom of tank.



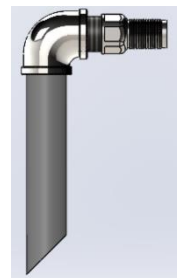
- **Install 1 1/2" Return Dip Tube**

- Install on opposite side of tank from the Inlet(s) to create counterflow back to inlet and circulate the tank.
- **Important – Be sure to aim return flow appropriately.**
  - **Mark the top of dip tube with an arrow indicating which direction the bottom is pointing to help ensure it is aimed properly once installed in tank.**
- Usually installed near existing coolant pumps in tank to provide an excess of coolant to the pump(s) area.
- Configure plumbing depending on tank layout.
  - Both scenarios will use a 90 and hose barb on top.
  - An adapter plate with a pre-cut hole is provided to replace a generic coolant pump cover.
  - Use threaded pipe and larger 90 elbow on bottom to provide concentrated directional flow. **Be sure to feed threaded pipe through adapter plate before attaching bottom elbow.**
  - Use pipe with angle cut on bottom for scenarios where directional flow is not desired.
- **Be sure to tighten fittings so that when the hose and bracket are installed, the direction of flow is pointing in the correct direction to create proper counterflow in tank.**
- **Do not restrict return flow. This will cause severe loss in filtration efficiency.**



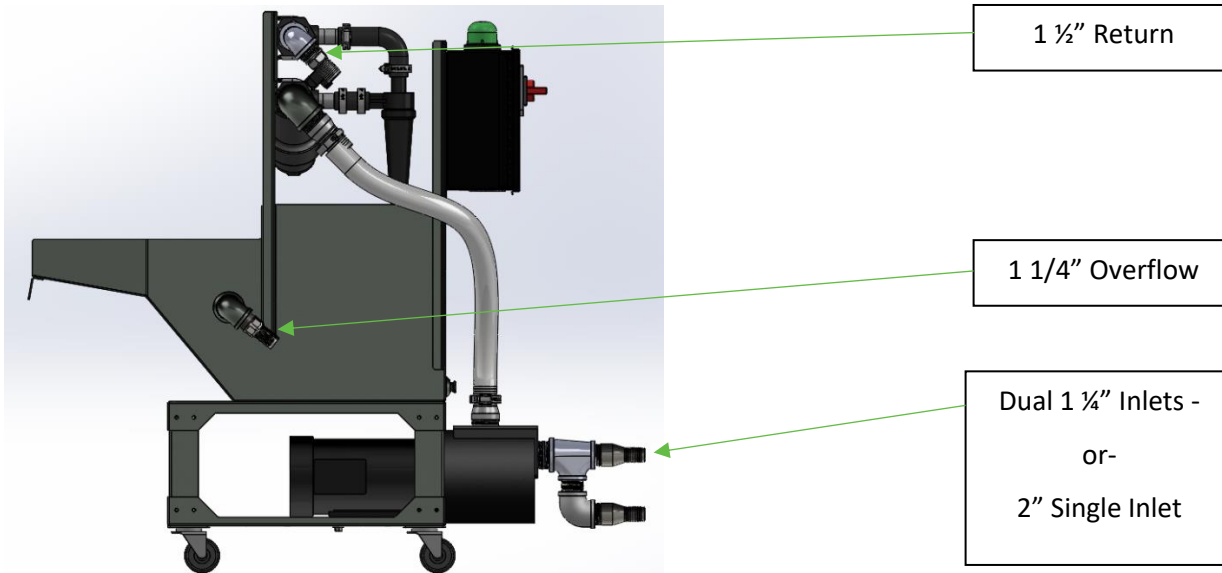
- **1 1/4" Overflow**

- Overflow is low flow (2gpm) and gravity fed from CDR settling tank port.
- Dip tube must be lower in height than the CDR settling tank overflow port.
- Usually placed on same side of tank as inlet but not on top of inlet.
- If no space available near inlet, place in most convenient location.
- Use green clamp to secure to top of tank.



Tighten hose clamps securely. Use provided 5/16" hand driver for standard worm gear clamps.

### 3. Attach hoses and tighten clamps

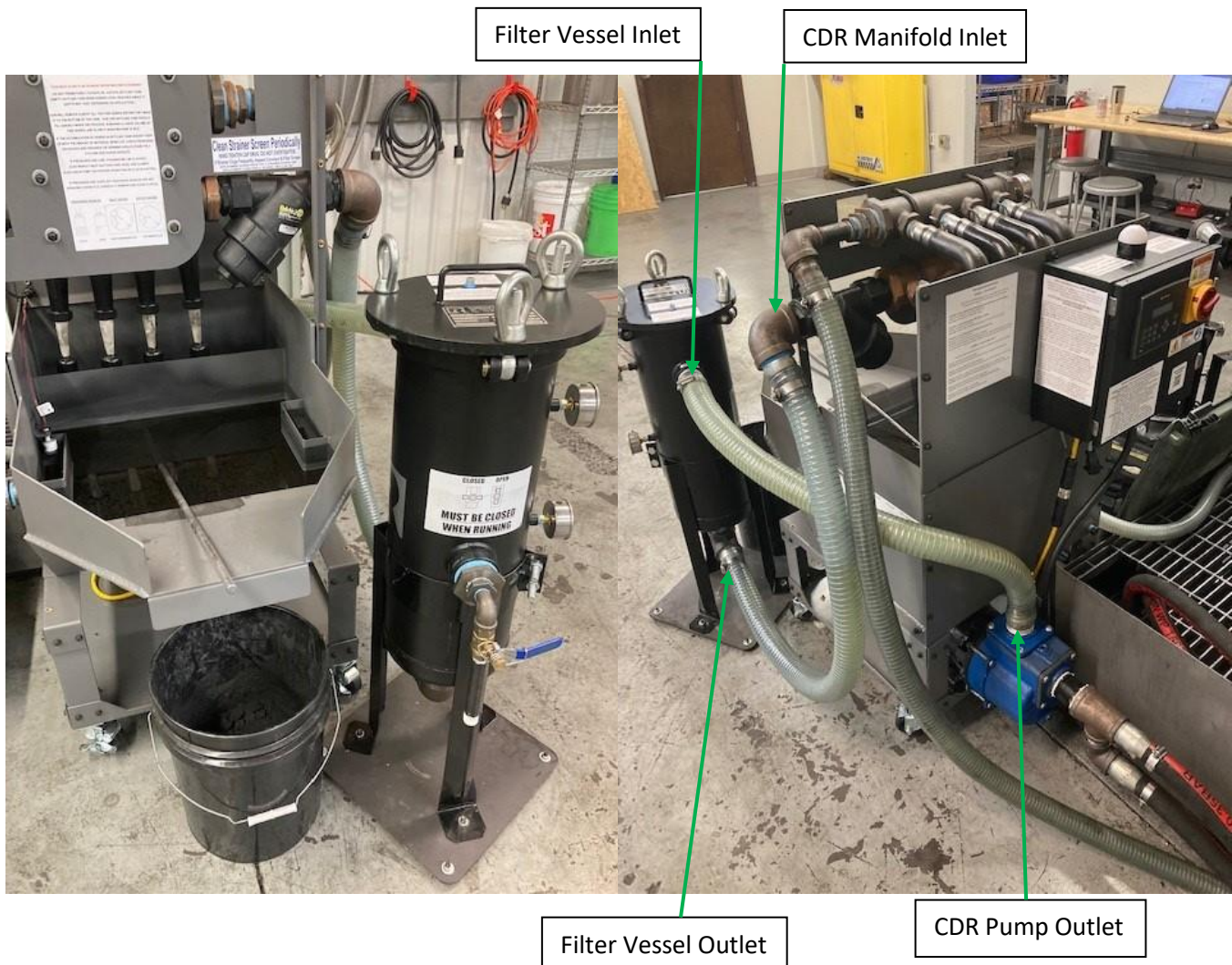


- All hoses should be carefully routed and cut as short as the layout allows.
- Use supplied green clamps to secure dip tubes or hoses to tank.
- Attach inlet hose(s) to pump inlet(s) and tighten clamp(s).
- If using dual magnetic low-level plates, attach hose(s), tighten clamps then install one in tank.
  - Leave one magnetic low level out of the tank to use as a funnel for priming pump.
- If using single 2" dip tube, wait to attach inlet hose to dip tube until after priming.
- 1 1/2" Return hose should be routed and attached to return dip tube in a way that ensures the proper flow direction on the bottom of return tube. Reference the directional mark on top.
- 1 1/4" Overflow hose should be short and have a direct, gradual slope down into the tank.
  - Overflow hose **MUST NOT** be positioned higher than overflow port on settling tank.
  - Overflow port on settling tank **MUST BE** higher than overflow dip tube in machine tank.



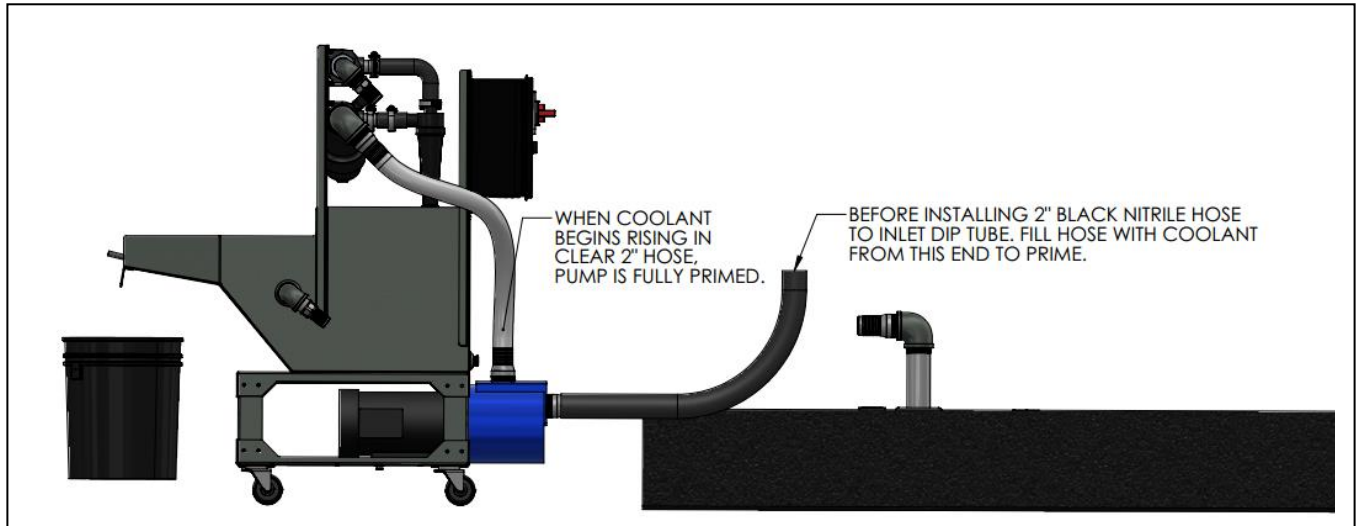
- 80GPM to 60GPM conversion. (Optional – Contact MP Systems)
  1. For smaller tanks, 80GPM may be too high of a flow rate and cause spillover.
  2. Simply remove one hydro-cyclone and it's hose barbs from the manifold assembly and install the provided 1" NPT plugs into the manifolds in place of the hose barbs.

- **Severe Duty “SD” models only:**
- For Severe Duty models, there is an additional filter vessel that will need to be installed between the CDR pump outlet, and the CDR inlet manifold. Longer hoses are provided in the installation kit. The purpose of this vessel is to capture all particles larger than 1/16” but allow all the fine particles to flow through and be removed by the hydro-cyclones. There is a #1 size 1/16” perforated screen basket that can be manually emptied, cleaned, and re-used.
- **IMPORTANT – Be sure to set filter life timer in CDR software to alert operator when to empty the filter basket. See label on side of CDR electrical panel for instructions or refer to manual. If timer is not set, or setting is too long, the basket will overflow, and hoses/pump will clog.**
  1. Remove the 2” hose connecting outlet of CDR pump to cyclone inlet manifold.
  2. Position filter vessel near front corner of CDR settling tank. See image below.
  3. Install 2” hose from CDR pump outlet to filter vessel inlet.
  4. Install 2” hose from filter vessel bottom outlet to CDR cyclone manifold inlet.
  5. Make sure all hose clamps are tightened securely using the provided 5/16” nut driver.
- **IMPORTANT – Filter vessel drain valve must be kept CLOSED while running.**



#### 4. Prime Pump & Fill Setting Tank

- Ensure inlet hose(s) are attached to the inlet of pump and the clamps are tightened securely.
- Fill the inlet hose from the dip tube end, so coolant fills both the hose and pump casting completely from inlet side. You should be able to see coolant rising out of clear 2" pump outlet hose when full.
- Filling one hose and holding it higher than pump inlet fittings will cause fluid to fill the second inlet hose for dual inlet setups.
- Fill the CDR settling tank reservoir with coolant until fluid begins to drain back to machine tank through overflow hose. (Roughly 15 gallons of coolant will be required)



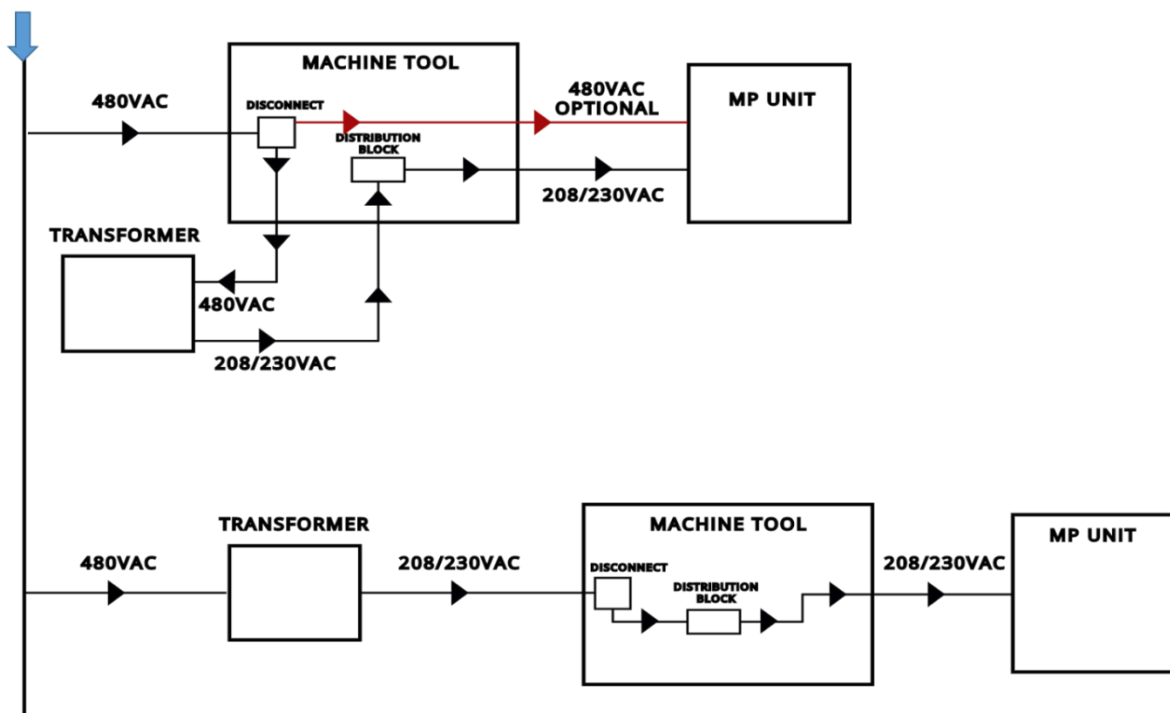
## 5. Install 3-Phase Power

Many large industrial facilities run on 480v 3phase @ 60Hz electricity. Most machine tools in the United States require a step-down transformer as the machine tools, typically, run on 200 +/- 10% VAC. **208-230v is the standard voltage for MP Systems units.** (Optionally, 480V units can be purchased, voltage cannot be changed in the field)

Utilizing machine tool voltage makes lockout/tag-out far easier and allows it to comply with most local regulations.

Power can either be pulled from the machine tool electrical cabinet using the provided circuit breaker and cabling in the installation kit if the machine tool breaker allows, or from a separate drop.

- CDR kit contains power cable, circuit breaker, twist lock plug, and all necessary connectors.
- Following local electrical codes, install 3phase power to 208-230VAC line (480V optional).
- The CDR is phased Red, White, Black.
- Connect twist lock plug into receptacle on bottom of CDR electrical panel.
- **\*Warning, pump may auto start when CDR disconnect is turned on\***





## 6. Select desired method of Starting and Stopping the system.

### A. Manual Operation using On/Off Buttons on PLC. (Factory Default)

- The pump can be manually turned on/off by pressing the #9 (ON) and #0 (OFF) buttons.

### B. Auto Start When Powered On (Optional)

- The pump can be set to automatically turn on when the unit is powered up.
- To configure, enter PLC settings by pressing buttons 1 & 2 on PLC keypad.
- Enter pass "0515" and press enter to cycle through screens.
- On the auto start screen, change the setting from 0 to 1 and press enter.
- Cycle power off, then on to begin using auto start function.
- **\*Warning, pump will auto start\***
- The screen will now display "AUTO" and the function is now enabled.
- #9 ON/#0 OFF buttons will still function to override auto controls; however, it will automatically START when power is cycled back on.

### C. Scheduled Start/Stop RTC function (Optional)

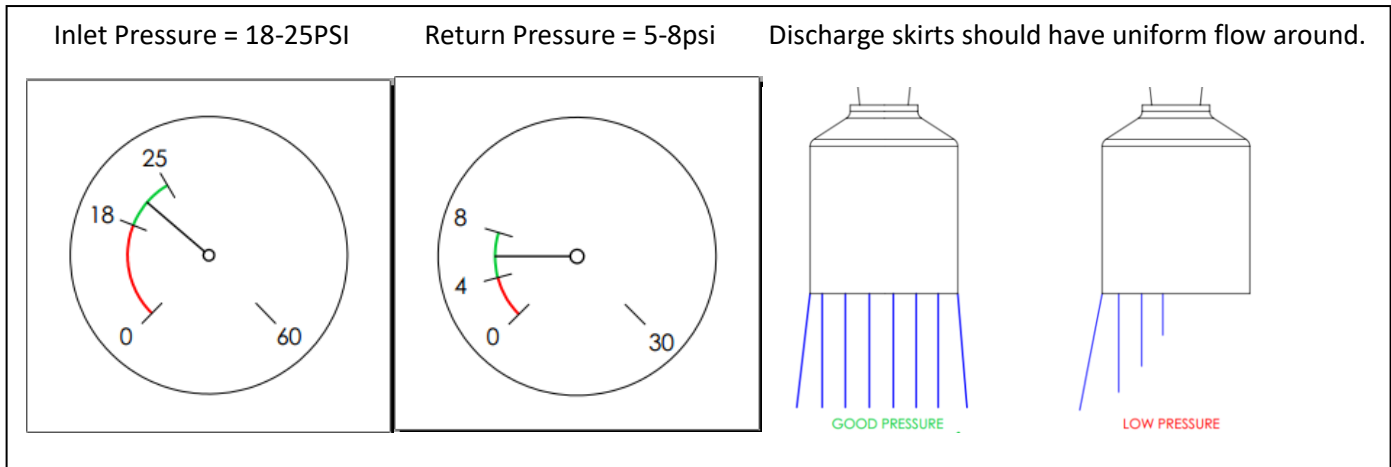
- The CDR can be started and stopped by a scheduled RTC timer. Ex. 6am-6pm
- The CDR must be powered on for this function to work.
- To configure, enter PLC settings by pressing buttons 1 & 2 on PLC keypad.
- Enter pass "0515" and press enter to cycle through screens.
- Once you reach the appropriate screen, Set current time. Set current date.
- Enable scheduled run by entering "1" **\*Warning, pump may auto start\***
- Set weekday start run time and end run time. **\*Warning, pump may auto start\***

## D. Install External Run Signal (Optional)

- The CDR can be automatically turned on and off by connecting to a machine signal.
- Identify a device or signal in the machine that will turn on whenever the machine is in a “ready” or “running” state. **DO NOT connect to the E-stop circuit.**
- MP Systems recommends connecting into the Green Tower Light 24vdc signal.
  - This signal is always on when the machine is running in auto mode.
- Install the provided multiconductor cable into the machine cabinet and ensure there is enough length of cable to reach the CDR electrical panel.
- Connect the two ends of the 14pin connector together beneath the CDR e-panel.
- Locate the green light output from the machine. Cut wire and crimp female tab onto output wire close to output connect. Connect MP wire #1 (CDR Run Signal) along with green light wire into male tab. Connect both tabs together. Connect MP Wire #5 (0v) to the light’s 0v reference source.
- **If using external signal, the function will need to be enabled on PLC.**
- To configure, enter PLC settings by pressing buttons 1 & 2 on PLC keypad.
- Enter pass “0515” and press enter button to cycle through screens.
- On the external signal screen, change the setting from 0 to 1 and press enter.
- **\*Warning, pump may auto start\***
- The screen will now display “AUTO” and the function is now enabled.
- Note: Other signal(s) may be used. Wires #9 (MP +24v) & #1 (Pump On) can be wired across normally open dry contacts if available.

## 7. Start system and do preliminary check.

- Motor rotation. Pump motor should rotate clockwise when looking at fan.
- Pressure Gauges. Inlet should be around 20psi, Return should be around 6psi.
  - If inlet pressure is low, pump may not be primed properly or may have loose connection on inlet plumbing. System will alarm after 10 seconds if pressure is low.
- Discharge skirt flow. All 4 filters should have minimal but equal flow around perimeter of skirts.
- Overflow. Ensure overflow hose allows for settling tank to freely flow back to machine tank.
- Tank circulation. Ensure proper circulation of tank flow from return back to inlet dip tube.
- Check mode of operation or run signal functionality.
- Debris Load Test. Refer to document on CDR or in Operator's Manual for instructions.



## HOLE SAW GUIDE

When installing MP Systems products, the correct location of the dip tubes is important to a successful install. The best way to do this is to use a preexisting hole in the tank can be used to pass the various pipes through the tank top. This is not only quick and easy, but also gives you a perfect window to be able to see what is going on in your tank for troubleshooting. Sometimes, this is simply not an option and a hole must be drilled in the tank.

If you find yourself in a pinch, most hardware stores like Home Depot or Lowes will have the required hole saws available, you will want to find a **bi-metallic hole saw** like a Milwaukee or Lenox depending on which store you go to. These tend to be the best option in a hurry, however they will wear out, so if you have a lot of holes to drill, it may be wise to purchase more than one.

If you know ahead of time that you will need them, then they can be ordered from McMaster, or MP Systems stocks and can ship a kit with all the necessary components.

HIGH PRESSURE	PURGE	CDR	PIPE SIZE	HOLE SAW	McMaster	MP Systems
X	X	X	1 1/4"	1 3/4"	3789A29	AK HOLE SAW KIT
		X	1 1/2"	2"	3789A33	AK HOLE SAW KIT
		X	2"	2 1/2"	3789A39	AK HOLE SAW KIT
	X		2 1/2"	3"	3789A45	AK HOLE SAW KIT
X	X	X	ALL	ARBOR	3789A61	AK HOLE SAW KIT
X	X	X	ALL	PIN 3/16 X 2	97395A618	AK HOLE SAW KIT

Cutting a hole in sheet metal seems like a common task, however doing it right will not only be safer, but can also improve tool life, cut speed, and cut quality (clean vs. jagged edges).

1. Start by measuring twice. Use the green pipe clamp for the dip tube you are installing to help layout where the hole needs to be drilled, as well as where the fasteners will need to go for the clamp. Use a center punch to locate the holes and prevent drill drift.
2. Use the appropriate size drill to make a pilot hole in the center of the cut. **\*NOTE\*** Only the drill should be used at this point, do not use the drill bit while attached to the hole saw. When the drill breaks through, you can damage the hole saw by "punching" the sheet metal and breaking or bending the teeth.
3. Install the blank pin in the arbor, then thread on the hole saw. (In a pinch, an old drill bit installed backwards can work as a guide too) Be sure to set your drill to low speed and change from drilling to torque mode.
4. Apply cutting fluid and begin cutting, feathering the trigger to maintain a moderate speed.
5. Be sure to continuously add cutting fluid to keep the hole saw cool and lubricate the cut.

