



## INSTALLATION, OPERATION, & MAINTENANCE MANUAL

### CS Series



MP Systems - 34 Bradley Park Road, East Granby, CT 06026 USA - Phone + 1 (877)-689-1860 -  
Email [mpteam@mp-systems.net](mailto:mpteam@mp-systems.net)



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.



**CS SERIES INSTALLATION, OPERATION, MAINTENANCE MANUAL****DOCUMENT PART #: B CS OPERATOR**

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## 1. Symbology

Symbology contained in this manual.

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

## 1.1. Introduction

This manual contains instructions for installation, operation and maintenance of CS Series auxiliary chiller systems as well as indicating residual risk associated with them. This manual has been specifically compiled and produced to enable easy and safe use by appropriate personnel.

All associated rights, in particular the rights of reproduction, publication and translation, are retained by the producer in accordance with authors rights.

*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 CS Series auxiliary chiller system.

## 1.2. Features & Benefits

- Maintain tank temperature within +/- 1°F of set temperature.
- Maintain tank temperature: ambient or static temperature (Standard Feature)
- Standard 5MC filter bag.
- Internal 1HP circulation pump.
- Low maintenance, less downtime.
- Minimize need to modify offsets throughout the day to compensate for temperature fluctuations.
- Provides longer tool life due to regulated coolant temperature.
- Help maintain tight tolerances on parts affected by thermal expansion.

### 1.3. Intended Uses

*MP SYSTEMS* CS Series are built to withstand the harsh environments of CNC machining. The CS Series is designed for machining applications where increased coolant temperatures are causing users to chase offsets.

The CS Series operating temperatures range from 70°F - 95°F (max) ambient air temperature. CS Series utilizes an open-loop system designed to pull coolant from and return to machine tool tank.

The CS Series filter and chiller is not meant to clean the tank, but rather meant to protect the heat exchanger.



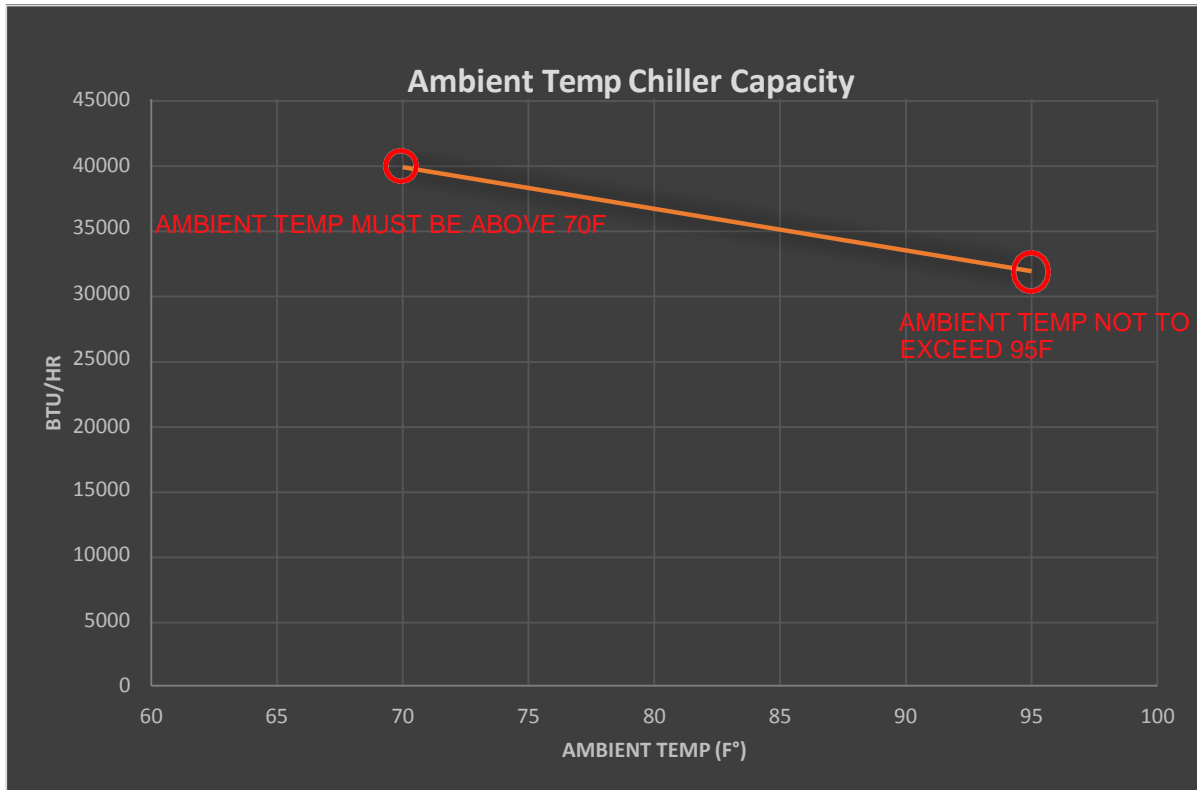
**Operating Temperature:** 70°F - 95°F (max) ambient air temperature.

**Viscosity Range:** Intended for use with water based coolant or oils with viscosity of 90 – 140 SUS @ 100°F



# Ambient Temperature Chart

Ambient temperature is not to exceed 95°F or go below 70°F. Loss in capacity results outside the operating range. Set point temperature greater than 2° below ambient temperature. Loss of capacity is possible.



Pump Model	RF8/VR8	RT/VRT/RF16/VR16
HP PUMP	15264	30528
Circulation Pump	2544	2544
Feed Pump	2544	2544
Total BTU Load	20352	35616

To calculate heat load on machine add total kilowatt or horsepower rating of coolant pumps in machine tank. 1kW=3412 BTU total kW X 3412 = total BTU's 1HP=2544 BTU total HP X 2544 = total BTU's

If you have any questions, comments, or concerns, please call us at (877) 689-1860 to speak to a Service Technician

## 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 the CS Series;

- 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 CS Series must be operated with all panels in place and secured.
- Dangerous voltage contained within CS Series; before carrying out any operations on CS Series, ensure that the electrical supply has been switched off.
- Operating CS Series with safety protection removed is strictly forbidden.
- Before installing CS Series 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

CS Series has 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, CS Series contains 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 CS Series 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 the CS Series, 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 CS Series, switch off the electrical supply at the main isolator.
- Work on the CS Series 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 CS Series.
- 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. Specifications



**All specifications are subject to change**

All MP Systems equipment ships with identification label. The label is located by main disconnect on front of the system.

The label contains

- **Serial Number**
- **Build Date**
- **Series/ Model**
- **Operating voltage (CS 36 @ 208-230/480v)**
- **FLA/ Largest Load for determining power service requirements**

### 3.1. Electrical Specifications



All power for motors and hydraulics is derived from CS Series power input source.  
**Main Power: 3 Phase @ 60Hz**

Model	208-230 VAC	460 VAC	kVA
CS 36	15	8	7
CS 36 RFP	15	8	

Motor	HP	RPM	208-230 VAC FLA	460 VAC FLA
Circulation Pump	1.0	3450	3.4 – 3.5	1.7
Condensing Unit 36 BTU	2.75	3450	11.5	6.3
P IC PUMP 1 HP (RFP)	1.0		3.2	1.9

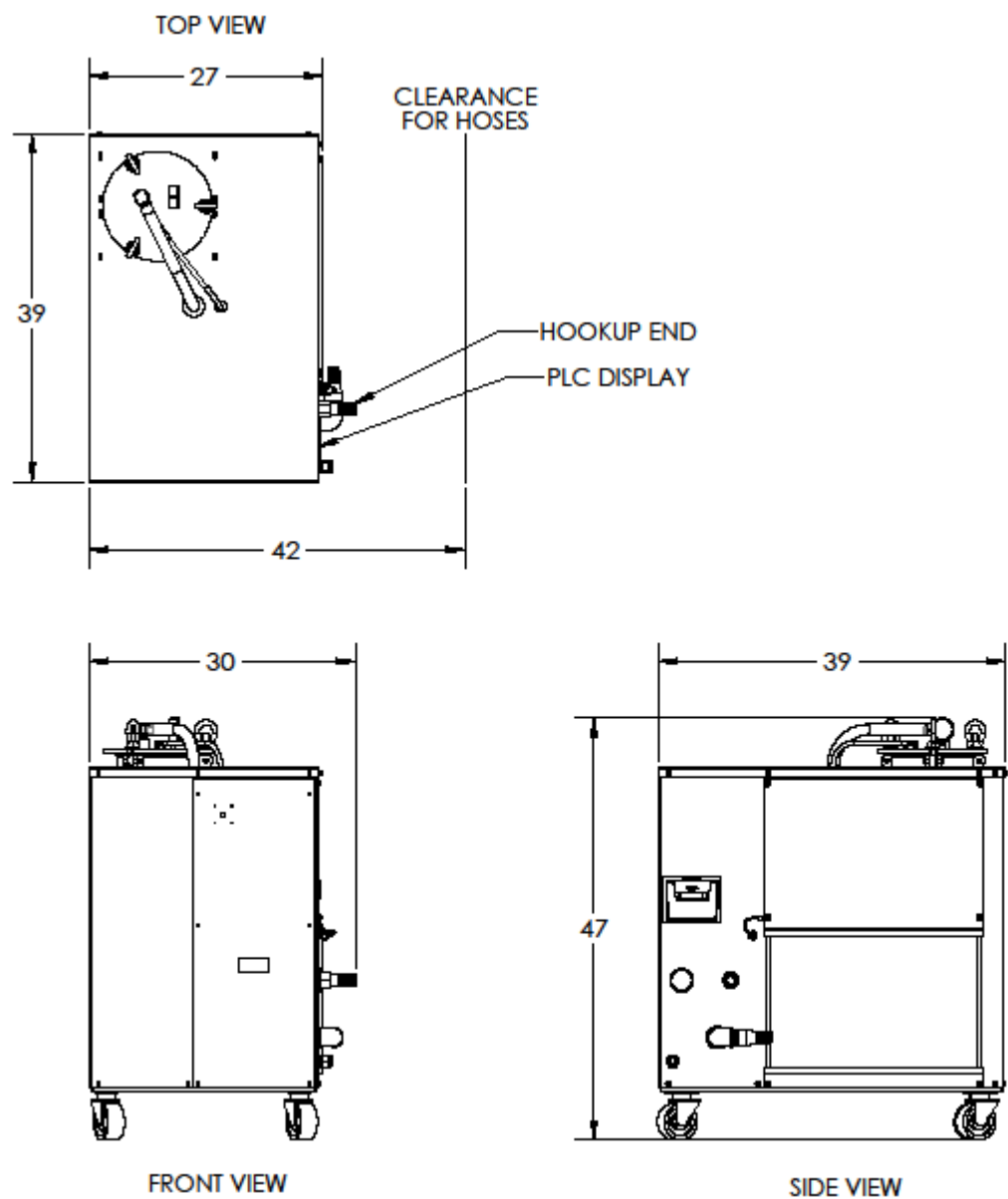
Control Power CS 36	Control Signal	Alarm Circuit
150VA Transformer	24vdc	NC
120VAC Secondary		NO
Primary Fused		

### 3.2. Mechanical Specifications

Model	CS 36
Length	38.5"
Width	25.5"
Height	40.25"
Weight	610 lbs

Filter	Area	Dimensions	Rating
HB BAG ORING #2 5MC 7x32	4.4 ft <sup>2</sup>	7" x 32"	5 Micron

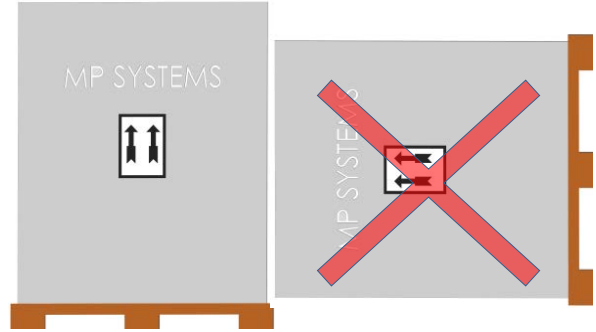
3.2.1. Floor Layout



## 4. Moving & Storage

### 4.1. 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.

### 4.2. Transport & Carriage

The machine must be transported in a vertical position (casters/wheels down). Machine tank **MUST BE EMPTY** before moving. CS Series has 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 **Section 3.2. Mechanical Specifications** 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.

### 4.3. 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.



### 4.4. Storage

The CS Series 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 CS Series 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.



## 5. Installation

All *MP SYSTEMS*, CS Series are shipped on wooden pallets designed for the safe transport of the CS Series auxiliary chiller unit. A large *MP SYSTEMS* container protects the CS Series from any unnecessary damage during transportation.

### 5.1. Installation Kit Components

<b><u>COMPONENT</u></b>	<b><u>QUANTITY/LENGTH</u></b>
Power/Control Harness	1
Spare 5 Micron Filter Bag	2
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	4
Weld Clamp (Mounting Dip Tubes)	2
Run Signal Jumper	1
Self-Taping Hex Screws (Mounting Weld Clamps)	2
Machine Tool Specific Installation Components	1

### 5.2. Recommended Tools for Installation



- Phillips Head Screwdriver
- Flat Blade Screwdriver
- Drill
- 7/8" Step Drill
- 1 1/4" Conduit Punches or equivalent size hole saw.
- Multiple Size Adjustable Wrenches
- 12" Pipe Wrench (Minimum)
- Metric Hex Keys


### 5.3. Electrical Installation

Before connecting electrical power, pay close attention to the electrical data on machine plate.  
Ensure that the voltage of the power supply is compatible with that specified on plate.

All installation work must be carried out by qualified personnel.

Always consult machine tool wiring diagram before connecting power.

		LOCK OUT/TAG OUT any and all power disconnect switches before performing any work on equipment.
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	Be sure to observe local and federal electrical codes in effect. Observe the technical supply conditions imposed by the power supply company.
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### 5.3.1. Selecting Voltage

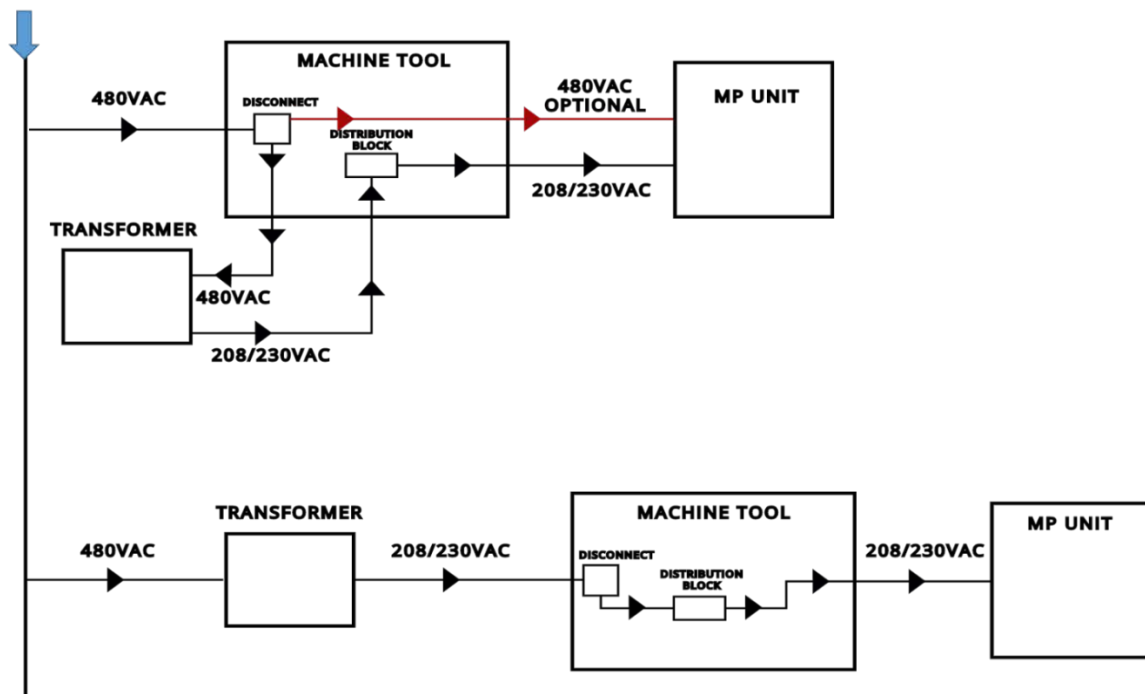
Many large industrial facilities run on 480v 3phase @ 60Hz electricity. Most machine tools in the United States require a step down transformer as the machine tools, typically, run on 200 +/- 10% VAC. 208-230v is the standard voltage for *MP Systems* units.

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

MP Systems provides circuit breaker kits for CS Series units.



Please see diagram below.



### 5.3.2. Power/Signal Harness Installation

#### **3 Phase Power Installation**

1. Mount supplied power/signal harness with hardware provided in installation kit and route cable;
  - Make sure CS Series power/signal cable can reach mounted power/signal harness.
  - If 3/4" conduit plug is not available, knock out hole and use supplied cord grip.
2. Wire power cable in parallel with machine tool power;
  - Be sure to leave enough cable to properly earth the unit.
3. Locate proper earthing point. Attach using supplied ring terminals.



3 phase power installation should be performed by qualified personnel.

#### **Control/Signal Installation**

- CS Series utilize 24vdc control signals
  - Relays will need to be installed to use other control voltage.
- NC alarms are wired in series with machine tool
  - Recommended
- NO alarms are wired in parallel
- Wires 6 & 5 will be used if machine tool control voltage is to be used
- Wires 6 & 9 will be used if using MP Systems +24v
  - Must use dry contact

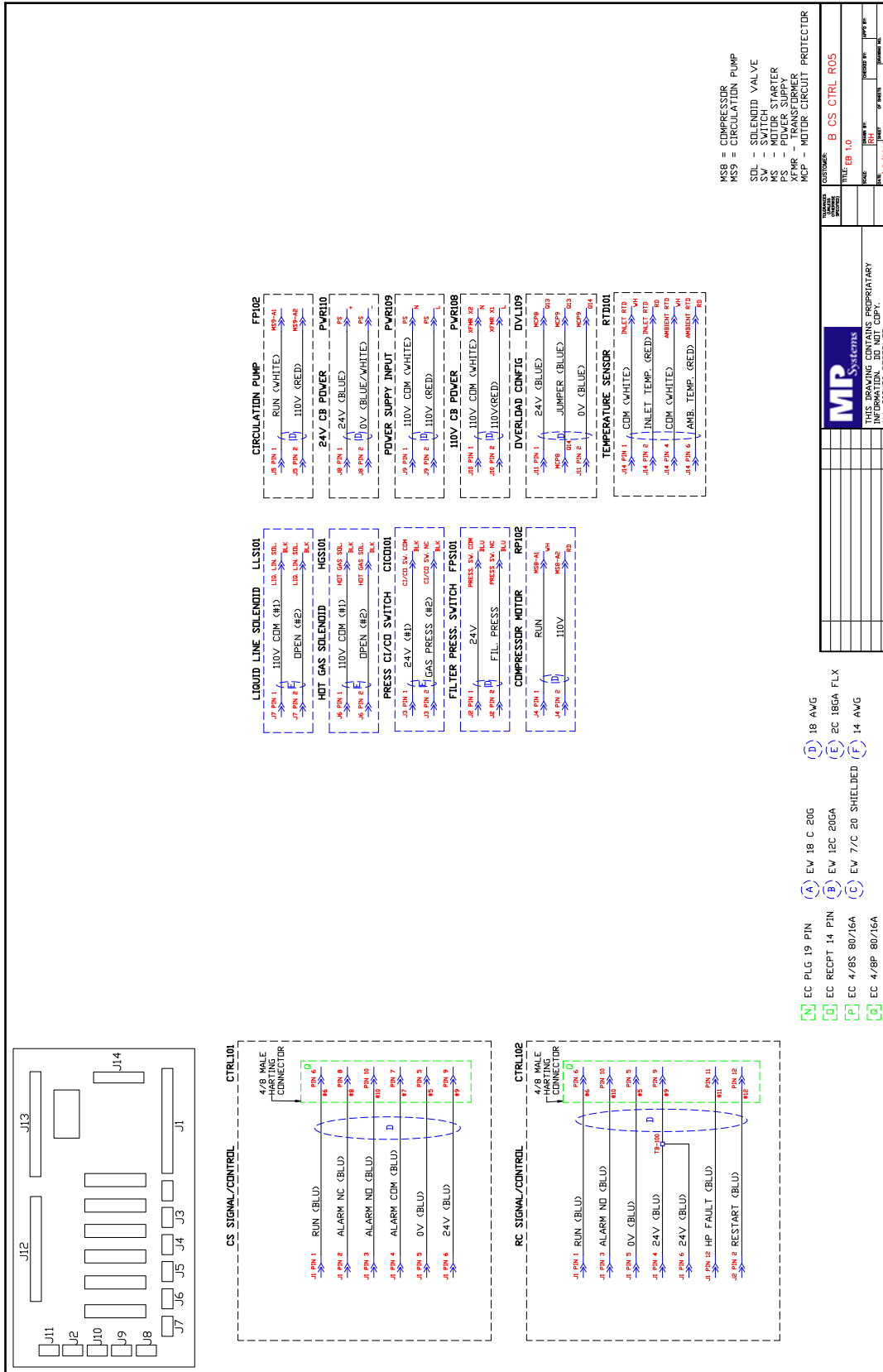
#### **Circuit breaker kits are available.**

<b><u>MODEL / VOLTAGE</u></b>	<b><u>PART #</u></b>
CS Series - 208/230VAC	AK CB20 KIT
CS Series - 460VAC	AK CB20 KIT



Please refer to machine FLA to ensure proper circuit breaker kit is used.

### 5.3.2.1. Harness Signal Diagram

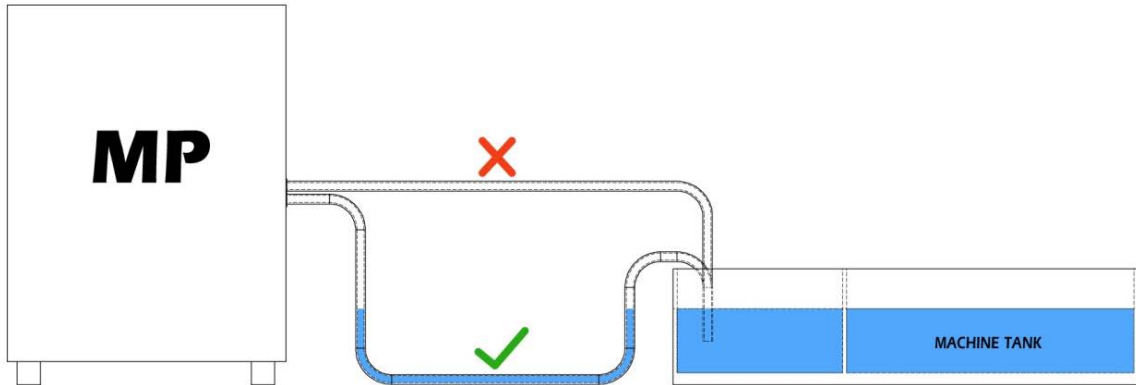


#### 5.4. Low Pressure Installation

For best results be sure the 1 1/4" low pressure hoses are lying flat on the floor. This will ensure coolant from unit will not drain back to machine tool coolant tank. Hoses not lying on the floor may lead to air becoming entrained in coolant and can also lead to supply pump losing prime.

The image below illustrates proper hose routing.

Use dip tubes supplied in the installation kit. *Consult MP SYSTEMS before using fittings on tank faces.*



## 6. Operation



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

CS Series is designed to maintain machine tool coolant temperature to ambient or a set level. The CS Series is designed to remove up to 36,000 BTUs / hr @ 70° F ambient. Coolant is pumped from machine tool coolant tank through CS Series where the coolant is cooled to ambient temperature than is returned to machine tank for use on tooling.

### 6.1. Filling & Priming



**After all hoses are connected to CS Series the internal feed pump must be primed before first use.**

#### **To Prime:**

- Remove side door panel and open ball valve located on the bottom of the filter vessel.
- Using the filter as a funnel, pour coolant into filter.
- Keep valve open until coolant comes out of the feed pump inlet and starts to fill hose on the inlet side of the feed pump. This may take a few minutes.
- After hose is about 3/4" full of coolant, close the T-handle ball valve and reseal filter vessel.
- 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. Reset alarm using PLC.**

## 6.2. Testing

- Ensure all connections are secure and no hoses are rubbing.
- Supply pump properly primed.
- Prime valve has been closed.
- Ensure motor rotation for all motors present in unit rotate clockwise.
- Activate M-Codes and ensure corresponding port on unit activates.
- Power off unit, machine tool should indicate an alarm.
  - Power unit back on, machine tool alarm should reset after 10 seconds.

## 6.3. Settings

	<b>Caution:</b> Modifying PLC settings may result in malfunction. Please contact <i>MP SYSTEMS</i> before modifying PLC settings.
	Parameters that can be modified through <b>PLC SETTINGS ARE SUBJECT TO CHANGE</b>





### 6.3.1. CS Series PLC Settings

#### MAIN SCREEN

- ### - Control Mode (Setpoint/Ambient Tracking)
- ### ~ F- Ambient/Setpoint Temperature
- ### ~ F- On/Off
- ### ~ F- Inlet Temperature
- # - Compressor Status
- # - Circulation Pump Status
- ## - Operating Mode [HI, LO, HT, SL]



### > ### ~ F ###  
I > ### ~ F # # #

#### INFO SCREEN

① (Information) Button on PLC control pad will display current PLC version.

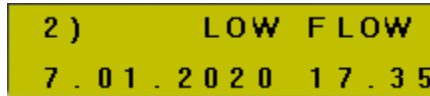
- ### - Run Signal Source [SIG, SHD, OVR]
- ### ~ F- Ambient Temperature



EPP CS V2 . 19  
### AMB > ### ~ F

#### ALARM SCREEN

▲ ▼ (Up, Down) Button on PLC control pad will Display the last 10 alarms along with the date and time of occurrence.



2 ) LOW FLOW  
7 . 0 1 . 2 0 2 0 1 7 . 3 5

Press [1] & [2] keys simultaneously to access password screen. Use this function to access the following menu options.

### 6.3.1.1. PLC User Menu

#### **0515 [↵] – User Menu**

##### **SET TIME -**

Sets system time. 24hr Clock Format  
(for scheduling and logging events)

TIME : HH : MM : SS  
    < < ~ 2 : 4 6 : 4 4 > >

##### **DATE – DD/MM/YY**

Sets system date  
(for scheduling and logging events)

DATE : DD / MM / YY  
    < < ~ 1 / 0 8 / 2 0 > >

##### **TRACKING TEMPERATURE ABOVE AMBIENT –**

Provides an offset (above ambient) when  
chiller is set to tracking mode.

Default = 0°F

TRACK ~F > AMBIENT  
    < < ~ 0 ~F > >

##### **TEMPERATURE CONTROL MODE –**

Determines if chiller's target temperature will  
be fixed (static) or allowed to match ambient  
temperature (tracking).

Default = Tracking

MODE : TRACKING = 1  
STATIC = 0      < < ~ > >

##### **STATIC TEMPERATURE –**

Set static/constant temperature.

Default = 72°F

STATIC SETPOINT :  
    < < ~ 2 ~F > >

##### **AUTOMATIC SCHEDULE ON/OFF -**

Chiller runs automatically based  
on day and time of the week.

Default = off

SCHEDULED RUN :  
ON - 1 OFF - 0    < < ~ > >

##### **MON-FRI AUTOMATIC START/STOP –**

Sets chiller start and stop times  
Monday – Friday. 24hr format

WEEKDAY TIME  
    < < ~ 0 : 0 0 - 0 0 : 0 0 > >

##### **SAT-SUN AUTOMATIC START/STOP –**

Sets chiller start and stop times  
Saturday – Sunday. 24hr format

WEEKEND TIME  
    < < ~ 0 : 0 0 - 0 0 : 0 0 > >

##### **DEFAULT RESET –**

Reset PLC settings to factory defaults.

Code = 1234

DEFAULTS : RESET  
    < < ~ ~ ~ ~ > >

### 6.3.1.2. PLC Setup Menu

#### 3434 [ ↵ ] – Setup Menu

##### **ALARM MODE –**

Sets alarm output signal as latching or pulsing

Default = on

ALARM: LATCH  
ON - 1 OFF - 0 <<~>>

##### **CHILLER SLEEP MODE –**

Determines if chiller will hibernate when inlet temperature is equal to target temperature for a specified time.

Chiller will restart automatically if inlet temperature is no longer equal to or below target temperature.

Default = on

SLEEP MODE:  
ON - 1 OFF - 0 <<~>>

##### **SLEEP MODE DELAY–**

Elapsed time before chiller will hibernate when inlet temperature is equal to target temperature for a specified time.

Default = 5 min

SLEEP MODE: DELAY  
MM : SS <<~5:00>>

##### **FEED PUMP SLEEP CYCLE -**

Enable/Disable automatic cycle of feed pump while chiller is in sleep mode

**DO NOT MODIFY** contact MP Systems

Default = off

FP SLEEP CYCLE:  
ON - 1 OFF - 0 <<~>>

##### **FEED PUMP CYCLE ON TIME -**

Duration of time that feed pump will remain on When FP SLEEP CYCLE is on.

**DO NOT MODIFY** contact MP Systems

Default = 5 min

FP CYCLE ON:  
MM : SS <<~5:00>>

##### **FEED PUMP CYCLE OFF TIME -**



Duration of time that feed pump will remain off When FP SLEEP CYCLE is on.

**DO NOT MODIFY** contact MP Systems

Default = 5 min


FP CYCLE OFF:  
MM : SS <<~5:00>>

## 6.4. Alarms

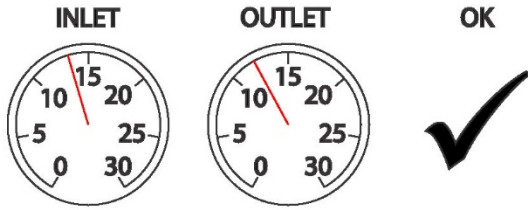
	The machine uses one alarm output to interface with machine tool. If a fault occurs, a signal is sent to the alarm circuit on machine tool, which, typically, will put machine tool into a feed hold. The units PLC will display fault type.
	Alarm will not clear off PLC display until fault has been rectified. Once fault has been remedied, press [ ← ] to clear alarm.

All CS Series utilize 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.

Alarm Display	Symptom(s)	Cause
Dirty Filter/Low Flow	<ul style="list-style-type: none"> <li>▪ Clogged Filter</li> <li>▪ No Coolant Flow</li> </ul>	Filter outlet pressure is below 2 psi while running.
AC Error	Contact MP Systems	Refrigerant pressure sensors out of range.
Temp Out of Range	<ul style="list-style-type: none"> <li>▪ Frozen Heat Exchanger.</li> <li>▪ Sensor Failure.</li> <li>▪ Sensor Unplugged.</li> </ul>	Inlet, Outlet, or Ambient sensor reading out of normal operating range.

	MP Systems recommends using Normally Closed alarm circuits. This will allow machine tool to go into alarm if the CS Series ever becomes disconnected from machine tool.
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## 6.4.1. Identifying Flow

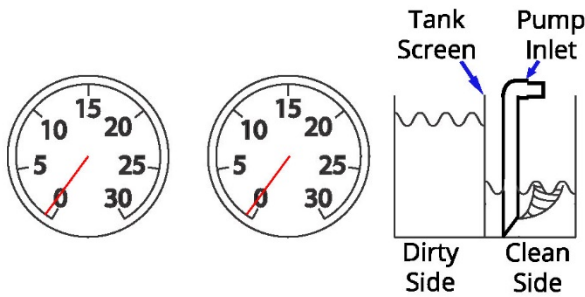


INLET AND OUTLET PRESSURES ARE MEASURED ON EITHER SIDE OF THE FILTER.

**MONITOR PRESSURE WHEN THE FEED PUMP IS RUNNING.**

IF THE TWO PRESSURES ARE THE SAME AND ABOVE 5 PSI, THEN THE FILTER IS CLEAN AND THE PUMP IS OPERATING CORRECTLY.

### SUCKING AIR



IF THE TWO PRESSURES ARE BELOW 5 PSI, THEN THE FEED PUMP IS SUCKING IN AIR, OR IS NOT PRIMED. IF PUMP IS PRIMED, CHECK MOTOR ROTATION AND INLET CONDITIONS.

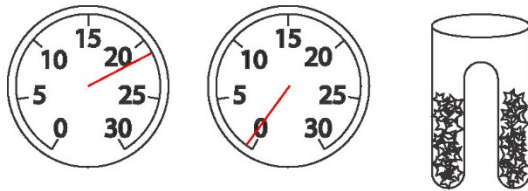
THE FLUID LEVEL AROUND PUMP INLET CAN CHANGE WHEN RUNNING IF THE FEED PUMP IS PULLING COOLANT OUT OF THE CLEAN SIDE FASTER THAN IT CAN FLOW BACK IN THROUGH THE SCREENS.

-SCREENS IN TANK CLEAR.

-HOSE CLAMPS SECURE.

-DIP TUBE TOUCHING BOTTOM OF TANK.

### DIRTY FILTER



AS THE FILTER GETS DIRTY THE INLET AND OUTLET PRESSURES WILL BECOME FARTHER APART.

WHEN THERE IS A PRESSURE DIFFERENTIAL OF 15 PSI OR MORE, THE FILTER IS DIRTY AND NEEDS TO BE CHANGED.

ST PRESSURE EX

FOR USE ON C,E,S,U, AND V SERIES PUMPS

## 7. 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 **Section 2. Safety Measures**

It is good practice to carry out periodic checks on machine, in order to ensure it is working properly. Routine maintenance does not require special technical knowledge; however, it should be carried out by trained personnel.

Maintenance operations are essential for keeping the unit at its highest efficiency, from the point of view of both efficiency and energy usage.

### 7.1. Routine Maintenance

<b><u>ROUTINE MAINTENANCE</u></b>		
<b>Group/Component</b>	<b>Operation</b>	<b>Maintenance Interval</b>
Machine Structure	Visually check condition of structure (areas of corrosion and/or dents).	Monthly
Hydraulic Circuit	HOSES – Visual check for leaks in hydraulic circuit.	Weekly
	FILTERS – Replace as needed.	Daily/Weekly/Monthly
	FLUID – Check quality and cleanliness of fluid in tank.	Monthly
	PRESSURE – Check pressure when machine is in use. Pressure must be within range listed on machine.	Monthly
Electrical Components	Check current usage and seating of electrical components.	Yearly

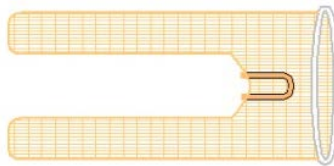
### 7.1.1. Filter Bag Replacement

1. Switch power to 'OFF' position.
2. Let system pressure equalize for, up to, 30 seconds.
3. Remove 3 eye-bolt on filter cover.
  - Lift away filter cover.
4. Slowly lift filter bag, using handles on filter bag.
  - Coolant/cutting fluid will gradually drain out of filter bag.
5. Install replacement filter bag.
6. Replace filter cover;
  - Secure 3 eye-bolts.
7. Continue normal operation.

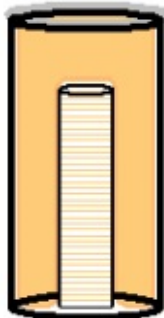
Grab tab, inside filter bag, pull towards embedded O-ring (inside-out). Keep filter bag even all the way around, this will make installing replacement bag much easier.



Filter bag should look similar to the image below.



Be sure filter bag slides over filter cone, center of filter basket.



Do not force filter bag to one side of filter basket cone!



## 8. Spare Parts

Part	Part Number #
Filter Bag	HB BAG ORING #2 7x32
Media Filter	MF 24X16X.5
O Ring	M ORING MPA



*MP SYSTEMS* recommends stocking (10) spare filter bags.