

HP COOL TECH, INC.

PowerPump

OPERATIONS MANUAL

Series 12000



TABLE OF CONTENTS

| Page | Topic |
|--------|------------------------------|
| 3 | Introduction |
| 3 | Specifications |
| 4 | Warning |
| 5, 6 | Safety |
| 7 | Alarm and Warning Codes |
| 8 | Filter Replacement Procedure |
| 9 | Coolant Line Color Code |
| 10, 11 | Variable HMI |
| 12, 13 | Orifice Chart |

Please read and understand the contents of this manual prior to use of the HP Cool Tech High Pressure Coolant Pump. Failure to follow Safety and Checklist Instructions may result in damage to the unit, or injury to personnel.

INTRODUCTION

We are proud to bring to market the HP Cool Tech, Inc high pressure coolant pump, a high pressure coolant delivery system.

The HP Cool Tech, Inc high pressure coolant pump was developed in a machine shop, by machinists, for use in the machine shop environment.

Their hands on experience has resulted in the design and development of a unit that solves "real world" problems and helps meet the demands of today's fast paced manufacturing environment.

The HP Cool Tech, Inc high pressure coolant pump will facilitate the processing of a variety of materials through the delivery of high pressure coolant at stable temperatures right to the contact point of tooling and material. Chips will be evacuated at a rapid rate which will permit the use of more aggressive feeds and speeds. This in turn will result in shorter cycle times, improved finishes and increased tool life.

Specifications

| | |
|------------------|--|
| Main Motor: | 10 HP |
| Voltage: | 208/230/460-3 Phase 60 HZ |
| Control Power: | 24 VDC |
| Feed Pressure: | 5-50 PSI |
| Fluid Type: | Vascomill HD 22 or Equivalent |
| Output Ports: | 4/8 |
| Output Pressure: | Electronic, Multi Pressure 50-2000 PSI |
| Flow Rate: | Variable Volume .41 up to 8.0 GPM |
| Filter: | 5u |
| Dry Weight: | 600 LBS |

Program Syntax: #1132=SETPOINT
(setpoint: any whole number between 50 and 2000)

WARNING!!!

This unit is designed to produce a flow of coolant at extremely high pressure! AS SUCH:

- 1. All hoses must be secured to hold 2,000 lbs of pressure.**
- 2. All guards and safety features must be in place on machine.
Coolant running at high pressure can cut or inject into the body.**
- 3. Safety glasses must be worn while using this equipment, High pressure oil can cause serious, permanent eye injury.**
- 4. Small pinholes must be repaired immediately as they have a potential to cause injury.**
- 5. Only trained personnel should operate, repair or maintain the DP Tech, Inc High pressure pump.**

SAFETY

Warning to End User of the HP Cool Tech, Inc. high pressure coolant pump
This system is designed to deliver coolant under high pressure to your machining process.

Precautions must be taken to protect personnel and equipment.

1. The HP Cool Tech, Inc. high pressure coolant pump must be installed by qualified technicians
2. All machine doors must be in place with all safety locks in operating condition prior to operating the HP Cool Tech, Inc. high pressure coolant pump.
3. Certain oils can form a mist under high pressure operating conditions. This represents a potential fire hazard. Therefore, it is recommended that the machine be attended during operation or fire suppression equipment be installed.
4. Prior to operation it is recommended that any cracked or missing guards on the machine be replaced.
5. Chip guards and spindle caps must be in place prior to use of the HP Cool Tech, Inc. high pressure coolant pump.
6. Careful consideration must be given to oil line placement while using the HP Cool Tech, Inc. high pressure coolant pump as the high pressure can force fine chips into areas of the machine required to remain free of machining debris. (Collets, Guide Bushing, Collet Slots, etc)
Regular maintenance of these areas should be performed to prevent excessive build up.
7. High voltage is present in the cabinet of the HP Cool Tech, Inc. high pressure coolant pump and should be serviced by qualified personnel only.
8. PRIOR TO the beginning of maintenance or repair of the HP Cool Tech, Inc. high pressure coolant pump, the assigned technician will:
 - A. Locate and render inoperative any energy providing sources to the equipment.
These sources include, but are not limited to:

- Electrical
- Mechanical
- Stored energy such as springs and air pressure

9. Due to the potential for mist / smoke to form under high pressure conditions, the use of mist control or air filtration device is recommended.

ALARMS

The unit is M-code driven

Alarms and warnings are displayed on the CNC monitor and are designed to inform the user the operating conditions of the high pressure pump.

| CODE | ALARM | CAUSE | ACTION |
|------|-----------------------------|--|--|
| 1500 | INVERTER ALARM | | READ ALARM ON INVERTER AND FOLLOW INSTRUCTION IN INVERTER MANUAL. |
| 1501 | LOW PRESSURE | OUTPUT PRESSURE BELOW 50PSI | SETPOINT BELOW 50 PSI. LOW FLOOD COOLANT SUPPLY. DAMAGED PUMP COUPLER. WRONG PUMP ROTATION. |
| 1502 | CLOGGED FILTER | FILTER BAG DIRTY | FOLLOW CHANGE FILTER BAG PROCEDURE. |
| 1503 | OVER PRESSURE | OUTLET PRESSURE ABOVE HIGH LIMIT. | PRESET PRESSURE RELIEF VALVE DAMAGED OR OUT OF CALIBRATION. |
| 1504 | SETPOINT EXCEEDS HIGH LIMIT | SETPOINT ABOVE 2000 PSI. | POWER DOWN CNC. |
| 1505 | COMMUNICATIONS LOSS | COMM LOSS BETWEEN HIGH PRESSURE PUMP AND CNC | VERIFY EMBEDDED SETTINGS. POWER UP HIGH PRESSURE PUMP. CHECK CAT5e CABLE CONNECTIONS |

| CODE | WARNING | CAUSE | ACTION |
|------|-------------------|---------------------------------------|---|
| 2500 | CHANGE FILTER BAG | FILTER OUTLET PRESSURE BELOW 5 PSI | CHANGE FILTER BAG |
| 2501 | ACT > SETPOINT | MOTOR RPM BELOW 90 | INCREASE SETPOINT OUTPUT BELOW .41 GPM, CHECK ORIFICE CHART. OPEN ADDITIONAL PORT |
| 2502 | ACT < SETPOINT | MOTOR RPM AT 1770 DAMAGED PUMP | DECREASE SETPOINT TO MATCH OUTPUT ON ORIFICE CHART. CHECK OUTPUT WITH ORIFICE SMALLER .085 TO PRODUCE 2000 PSI |

Filter Replacement Procedure

Periodically the filter bag and screen will require maintenance to ensure the optimum running condition of the HP Cool Tech, Inc. PowerPump. Change bag and clean filter as follows:

1. Power off Machine
2. Lock out Machine coolant pump
3. Lock out HP Cool Tech PowerPump
4. Open drain valve, allow oil to drain
5. ENSURE PRESSURE GAGES OF CANISTER READ "0" BEFORE PROCEEDING
6. Open canister filter top
7. Remove filter bag and basket, discard used filter bag
8. Thoroughly clean filter basket to remove all chips and fines
9. Clean inside canister to remove all chips and fines
10. Inspect O-ring on the filter basket, replace if damaged
11. Install new bag and basket in canister
12. Install filter hold down ring
13. Close canister and secure the cover with eyebolts
14. Unlock machine coolant pump and HP Cool Tech PowerPump
15. Manually activate machine flood coolant
16. Allow canister to fill with oil with drain valve open for several minutes
17. Close drain valve
18. Visually inspect system for leaks
19. In MDI mode, activate last coolant line (either 4th or 8th depending on configuration of your pump) This will ensure entire system is purged of chips / contamination.
20. Verify strong, steady oil through the sub spindle.
21. Check for leaks
22. Resume operation

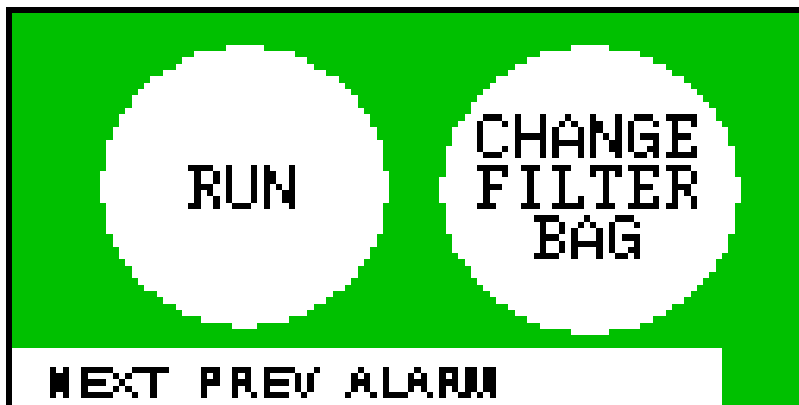
High Pressure Coolant Lines

| M Code | Color Code | Tool |
|---------------|-------------------|-------------|
| PORT 1 | YELLOW | |
| | | |
| | | |
| PORT 2 | GREEN | |
| | | |
| | | |
| PORT 3 | BLUE | |
| | | |
| | | |
| PORT 4 | ORANGE | |
| | | |
| | | |
| PORT 5 | RED | |
| | | |
| | | |
| PORT 6 | PURPLE | |
| | | |
| | | |
| PORT 7 | GRAY | |
| | | |
| | | |
| PORT 8 | BLACK | |
| | | |

OPERATOR NOTES:

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VARIABLE HMI TOUCH SCREEN



“Run/Filter Warning” will display when the pump is running

“Change Filter Bag” on the HMI notifies the operator that the coolant pressure is dropping due to the filter bag accumulating chips. This condition should be corrected at this time. When the bag is changed, the indicator will not light again until the condition reoccurs.



“Filter Reset”. In the event a clogged filter bag significantly impedes the flow of coolant, the pump will activate an E-Stop condition and the “Filter Reset” light will go on. The filter **must** be changed at this time. When the bag is changed the CNC Reset must be pushed to clear the alarm.

“Press Reset” In the event of low pressure output, (below 50 PSI), the pump will activate an E-Stop condition and the “Press Reset” light will go on.

Causes: Clogged coolant supply line

Damaged pump coupling
Volume output exceeds capacity
Low voltage
Pressure set below 50 PSI

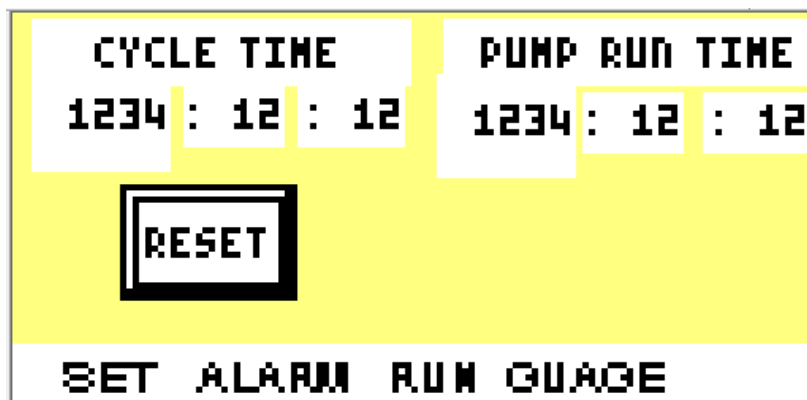
Resolve the cause and press the CNC Reset button.

“Inverter Reset” In the event of an inverter fault the pump will activate an E-Stop condition and the “Inverter Reset light will go on.

See the drive manual for the alarms. Resolve the condition and press the “CNC Reset” button.

“System Over Pressure” In the event the output pressure exceeds the high limit the pump will activate an E-Stop condition and the “System Over Pressure” will go on.

Resolve the condition and press the CNC Reset button.



“Cycle Time” is a timer which can be reset at any time.
The clock increments when the pump is running.

“Pump Run Timer is a timer which cannot be reset and increments when the pump is running to display the total pump run time.

| | | Gallons per Minute | | | | | | |
|-----------------|-------|--------------------|-------|-------|-------|-------|-------|-------|
| | | Orifice Diameter | | | | | | |
| Pressure PSI | 0.010 | 0.015 | 0.020 | 0.025 | 0.030 | 0.035 | 0.040 | 0.045 |
| 50 | 0.02 | 0.04 | 0.07 | 0.11 | 0.16 | 0.22 | 0.28 | 0.36 |
| 100 | 0.02 | 0.06 | 0.10 | 0.16 | 0.22 | 0.30 | 0.40 | 0.50 |
| 150 | 0.03 | 0.07 | 0.12 | 0.19 | 0.27 | 0.37 | 0.49 | 0.62 |
| 200 | 0.04 | 0.08 | 0.14 | 0.22 | 0.32 | 0.43 | 0.56 | 0.71 |
| 250 | 0.04 | 0.09 | 0.16 | 0.25 | 0.35 | 0.48 | 0.63 | 0.80 |
| 300 | 0.04 | 0.10 | 0.17 | 0.27 | 0.39 | 0.53 | 0.69 | 0.87 |
| 350 | 0.05 | 0.10 | 0.19 | 0.29 | 0.42 | 0.57 | 0.74 | 0.94 |
| 400 | 0.05 | 0.11 | 0.20 | 0.31 | 0.45 | 0.61 | 0.80 | 1.01 |
| 450 | 0.05 | 0.12 | 0.21 | 0.33 | 0.47 | 0.65 | 0.84 | 1.07 |
| 500 | 0.06 | 0.13 | 0.22 | 0.35 | 0.50 | 0.68 | 0.89 | 1.13 |
| 550 | 0.06 | 0.13 | 0.23 | 0.36 | 0.52 | 0.71 | 0.93 | 1.18 |
| 600 | 0.06 | 0.14 | 0.24 | 0.38 | 0.55 | 0.75 | 0.97 | 1.23 |
| 650 | 0.06 | 0.14 | 0.25 | 0.40 | 0.57 | 0.78 | 1.01 | 1.28 |
| 700 | 0.07 | 0.15 | 0.26 | 0.41 | 0.59 | 0.81 | 1.05 | 1.33 |
| 750 | 0.07 | 0.15 | 0.27 | 0.43 | 0.61 | 0.83 | 1.09 | 1.38 |
| 800 | 0.07 | 0.16 | 0.28 | 0.44 | 0.63 | 0.86 | 1.12 | 1.42 |
| 850 | 0.07 | 0.16 | 0.29 | 0.45 | 0.65 | 0.89 | 1.16 | 1.47 |
| 900 | 0.07 | 0.17 | 0.30 | 0.47 | 0.67 | 0.91 | 1.19 | 1.51 |
| 950 | 0.08 | 0.17 | 0.31 | 0.48 | 0.69 | 0.94 | 1.23 | 1.55 |
| 1000 | 0.08 | 0.18 | 0.31 | 0.49 | 0.71 | 0.96 | 1.26 | 1.59 |
| 1050 | 0.08 | 0.18 | 0.32 | 0.50 | 0.72 | 0.99 | 1.29 | 1.63 |
| 1100 | 0.08 | 0.19 | 0.33 | 0.52 | 0.74 | 1.01 | 1.32 | 1.67 |
| 1150 | 0.08 | 0.19 | 0.34 | 0.53 | 0.76 | 1.03 | 1.35 | 1.71 |
| 1200 | 0.09 | 0.19 | 0.34 | 0.54 | 0.77 | 1.05 | 1.38 | 1.74 |
| 1250 | 0.09 | 0.20 | 0.35 | 0.55 | 0.79 | 1.08 | 1.41 | 1.78 |
| 1300 | 0.09 | 0.20 | 0.36 | 0.56 | 0.81 | 1.10 | 1.43 | 1.81 |
| 1350 | 0.09 | 0.21 | 0.37 | 0.57 | 0.82 | 1.12 | 1.46 | 1.85 |
| 1400 | 0.09 | 0.21 | 0.37 | 0.58 | 0.84 | 1.14 | 1.49 | 1.88 |
| 1450 | 0.09 | 0.21 | 0.38 | 0.59 | 0.85 | 1.16 | 1.51 | 1.92 |
| 1500 | 0.10 | 0.22 | 0.39 | 0.60 | 0.87 | 1.18 | 1.54 | 1.95 |
| 1550 | 0.10 | 0.22 | 0.39 | 0.61 | 0.88 | 1.20 | 1.57 | 1.98 |
| 1600 | 0.10 | 0.22 | 0.40 | 0.62 | 0.89 | 1.22 | 1.59 | 2.01 |
| 1650 | 0.10 | 0.23 | 0.40 | 0.63 | 0.91 | 1.24 | 1.62 | 2.04 |
| 1700 | 0.10 | 0.23 | 0.41 | 0.64 | 0.92 | 1.26 | 1.64 | 2.08 |
| 1750 | 0.10 | 0.23 | 0.42 | 0.65 | 0.94 | 1.27 | 1.66 | 2.11 |
| 1800 | 0.11 | 0.24 | 0.42 | 0.66 | 0.95 | 1.29 | 1.69 | 2.14 |
| 1850 | 0.11 | 0.24 | 0.43 | 0.67 | 0.96 | 1.31 | 1.71 | 2.16 |
| 1900 | 0.11 | 0.24 | 0.43 | 0.68 | 0.98 | 1.33 | 1.73 | 2.19 |
| 1950 | 0.11 | 0.25 | 0.44 | 0.69 | 0.99 | 1.34 | 1.76 | 2.22 |
| 2000 | 0.11 | 0.25 | 0.44 | 0.69 | 1.00 | 1.36 | 1.78 | 2.25 |

Gallons per minute will vary based on hose type, diameter and fittings.

| | | Gallons per Minute | | | | | | |
|-----------------|-------|--------------------|-------|-------|-------|-------|-------|-------|
| | | Orifice Diameter | | | | | | |
| Pressure PSI | 0.050 | 0.055 | 0.060 | 0.065 | 0.070 | 0.075 | 0.080 | 0.085 |
| 50 | 0.44 | 0.53 | 0.63 | 0.74 | 0.86 | 0.99 | 1.12 | 1.27 |
| 100 | 0.62 | 0.75 | 0.89 | 1.05 | 1.22 | 1.40 | 1.59 | 1.80 |
| 150 | 0.76 | 0.92 | 1.10 | 1.29 | 1.49 | 1.71 | 1.95 | 2.20 |
| 200 | 0.88 | 1.06 | 1.27 | 1.49 | 1.72 | 1.98 | 2.25 | 2.54 |
| 250 | 0.98 | 1.19 | 1.41 | 1.66 | 1.93 | 2.21 | 2.52 | 2.84 |
| 300 | 1.08 | 1.30 | 1.55 | 1.82 | 2.11 | 2.42 | 2.76 | 3.11 |
| 350 | 1.16 | 1.41 | 1.67 | 1.96 | 2.28 | 2.62 | 2.98 | 3.36 |
| 400 | 1.24 | 1.50 | 1.79 | 2.10 | 2.44 | 2.80 | 3.18 | 3.59 |
| 450 | 1.32 | 1.60 | 1.90 | 2.23 | 2.58 | 2.97 | 3.37 | 3.81 |
| 500 | 1.39 | 1.68 | 2.00 | 2.35 | 2.72 | 3.13 | 3.56 | 4.02 |
| 550 | 1.46 | 1.76 | 2.10 | 2.46 | 2.86 | 3.28 | 3.73 | 4.21 |
| 600 | 1.52 | 1.84 | 2.19 | 2.57 | 2.98 | 3.42 | 3.90 | 4.40 |
| 650 | 1.58 | 1.92 | 2.28 | 2.68 | 3.11 | 3.56 | 4.06 | 4.58 |
| 700 | 1.64 | 1.99 | 2.37 | 2.78 | 3.22 | 3.70 | 4.21 | 4.75 |
| 750 | 1.70 | 2.06 | 2.45 | 2.88 | 3.34 | 3.83 | 4.36 | 4.92 |
| 800 | 1.76 | 2.13 | 2.53 | 2.97 | 3.44 | 3.95 | 4.50 | 5.08 |
| 850 | 1.81 | 2.19 | 2.61 | 3.06 | 3.55 | 4.08 | 4.64 | 5.24 |
| 900 | 1.86 | 2.26 | 2.68 | 3.15 | 3.65 | 4.19 | 4.77 | 5.39 |
| 950 | 1.92 | 2.32 | 2.76 | 3.24 | 3.75 | 4.31 | 4.90 | 5.54 |
| 1000 | 1.97 | 2.38 | 2.83 | 3.32 | 3.85 | 4.42 | 5.03 | 5.68 |
| 1050 | 2.01 | 2.44 | 2.90 | 3.40 | 3.95 | 4.53 | 5.15 | 5.82 |
| 1100 | 2.06 | 2.49 | 2.97 | 3.48 | 4.04 | 4.64 | 5.28 | 5.96 |
| 1150 | 2.11 | 2.55 | 3.03 | 3.56 | 4.13 | 4.74 | 5.39 | 6.09 |
| 1200 | 2.15 | 2.60 | 3.10 | 3.64 | 4.22 | 4.84 | 5.51 | 6.22 |
| 1250 | 2.20 | 2.66 | 3.16 | 3.71 | 4.31 | 4.94 | 5.62 | 6.35 |
| 1300 | 2.24 | 2.71 | 3.23 | 3.79 | 4.39 | 5.04 | 5.74 | 6.48 |
| 1350 | 2.28 | 2.76 | 3.29 | 3.86 | 4.48 | 5.14 | 5.85 | 6.60 |
| 1400 | 2.33 | 2.81 | 3.35 | 3.93 | 4.56 | 5.23 | 5.95 | 6.72 |
| 1450 | 2.37 | 2.86 | 3.41 | 4.00 | 4.64 | 5.32 | 6.06 | 6.84 |
| 1500 | 2.41 | 2.91 | 3.47 | 4.07 | 4.72 | 5.42 | 6.16 | 6.96 |
| 1550 | 2.45 | 2.96 | 3.52 | 4.13 | 4.80 | 5.50 | 6.26 | 7.07 |
| 1600 | 2.49 | 3.01 | 3.58 | 4.20 | 4.87 | 5.59 | 6.36 | 7.18 |
| 1650 | 2.52 | 3.05 | 3.63 | 4.27 | 4.95 | 5.68 | 6.46 | 7.29 |
| 1700 | 2.56 | 3.10 | 3.69 | 4.33 | 5.02 | 5.76 | 6.56 | 7.40 |
| 1750 | 2.60 | 3.15 | 3.74 | 4.39 | 5.10 | 5.85 | 6.65 | 7.51 |
| 1800 | 2.64 | 3.19 | 3.80 | 4.46 | 5.17 | 5.93 | 6.75 | 7.62 |
| 1850 | 2.67 | 3.23 | 3.85 | 4.52 | 5.24 | 6.01 | 6.84 | 7.72 |
| 1900 | 2.71 | 3.28 | 3.90 | 4.58 | 5.31 | 6.09 | 6.93 | 7.83 |
| 1950 | 2.74 | 3.32 | 3.95 | 4.64 | 5.38 | 6.17 | 7.02 | 7.93 |
| 2000 | 2.78 | 3.36 | 4.00 | 4.70 | 5.45 | 6.25 | 7.11 | 8.03 |

Gallons per minute will vary based on hose type, diameter and fittings.