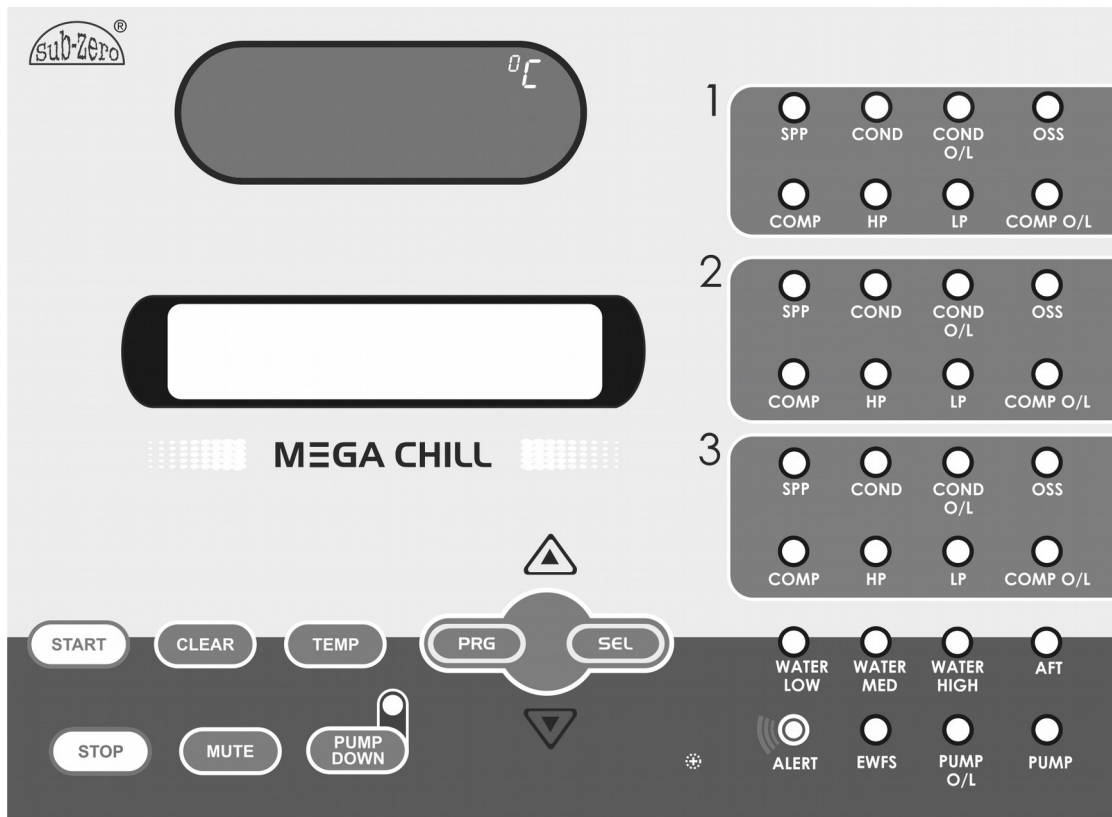


# 3-COMP CHILLER CONTROLLER



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### Introduction

**The “MEGA CHILL-3Comp” is a three compressor chiller controller . This integrates all the required functions of the chiller.**

**It is very user friendly due to the LCD provided which gives all the parameters, messages, alarms etc on the display. In addition to the LCD there are LED’s provided for instant status on all controls in the system.**

## **HARDWARE DESCRIPTION**

The basic system comprises :

- Control (Display) board
- INPUT/OUTPUT board

## **WARNING :**

HP, LP, Antifreeze faults are by default in manual reset mode. They remain in manual reset mode until the user resets to normal conditions by pressing the CLEAR button. These can be changed to auto reset by changing P4 parameter.

## **CONTROL ACTIONS**

- Regulation of Chiller temperature based on the control sensor location.

## **Control Board :**

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### **LIQUID CRYSTAL DISPLAY (LCD)**

The Liquid Crystal Display shows the values of the controlled parameters, the selected set-point, the alarm thresholds and all other information concerning the controlled variables.

DISPLAY types :

2 rows X 16 characters LCD

### **LIGHT EMITTING DIODES (LED)**

#### **LEDs INDICATING THE STATUS OF THE DEVICES**

There are different LED indications on the control board front panel. They give the following information :

- Red blinking LED “ALERT” : Indicates that there is a fault
- Red LED devices : Indicates that there is a fault in that particular device
- Green LED devices : Indicates that the device is OK
- Blank (inactive) LED indicates that the device is inactive.

## **DESCRIPTION OF INPUTS / OUTPUTS**

### **ANALOGUE INPUTS**

#### **Probes**

1. **CONTROL** : used as the main controlling probe based on which the setpoint will regulate the system.
2. **Condenser Inlet** : Senses Condenser Inlet temperature
3. **Condenser Outlet**: Senses Condenser Outlet temperature.
4. **Water Inlet** : Senses Water (CHILLER) Inlet temperature
5. **Water Outlet** : Senses Water (CHILLER) Outlet temperature
6. **Antifreeze** : Used to trip compressors below AFT set point .

### **DIGITAL INPUTS**

Controller manages the following protections :

- High Pressure trip for the compressor1(HP1)
- Low Pressure Trip for the compressor1.(LP1)
- Compressor Overload trip1(COMP O/L1)
- OSS - Oil Safety Switch (OSS1)
- Single Phase Preventor Trip1(SPP1)
- High Pressure trip for the compressor2(HP2)
- Low Pressure Trip for the compressor2.(LP2)
- Compressor Overload trip2(COMP O/L2)
- OSS - Oil Safety Switch (OSS2)
- Single Phase Preventor Trip2(SPP2)
- High Pressure trip for the compressor3(HP3)
- Low Pressure Trip for the compressor3.(LP3)
- Compressor Overload trip3(COMP O/L3)
- OSS - Oil Safety Switch (OSS3)
- Single Phase Preventor Trip3(SPP3)
- Condenser Fan1 O/L Trip (FAN O/L1 )
- Condenser Fan2 O/L Trip (FAN O/L2 )
- Condenser Fan3 O/L Trip (FAN O/L3 )
- Pump Overload Trip
- Evaporator Water Flow Switch Trip

The controller informs the user of a fault condition via a buzzer and an ALARM-RELAY.

### **DIGITAL OUTPUTS (RELAY)**

1. Chiller Pump
2. Compressor1
3. Condenser Fan1
4. Compressor2
5. Condenser Fan2
6. Compressor3
7. Condenser Fan3

8. Water SV
9. Alarm
10. Pumpdown SV1
11. Pumpdown SV2
12. Pumpdown SV3

## **KEYPAD**

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### **START**



Press and hold this key for 4 seconds to bring the controller in an operative status from the stand-by status in which it normally is after being powered on except if H2 parameter is set to AUTOSTART mode.

### **STOP**



Press and hold this key for 4 seconds to stop the system and operate in Stand By mode.

### **MUTE**



Press this key for 1 second, to disable the buzzer and alarm relay.

### **RESET**



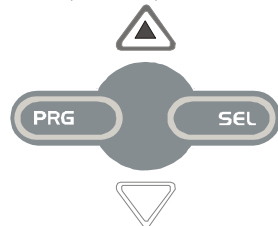
Press and hold this key for 4 seconds to reset HP,LP and antifreeze alarms which have been set for MANUAL RESET incase P4 parameter is set to MANUALRESET mode.

### **TEMP**



Press and hold this key for 1 seconds to display temperatures for all probes. Use up/down key to scroll through the various probes attached. To exit this mode, press the temp key.

### **PRG, SEL, UP & DWN**



**Used to enter programming mode.**

## **REGULATION OF CHILLER TEMPERATURE**

The regulation of the Brine temperature is based on the CONTROL probe.

## SET-POINT AND DIFFERENTIAL

Set-point is the temperature at which the chiller temperature has to be regulated, at which time the compressor will go off. Differential is the temperature added after which the compressor restarts. For example, if Set-point is 7°C and differential is 2°C, then compressor will switch off at 7°C and restart at  $7+2 = 9^{\circ}\text{C}$ .

### \*\*\*\*\*ALARMS\*\*\*\*\*

Incase of all alarms corresponding LCD readouts and LED signals will display, and the system will act accordingly. For example if there is an HP1 error, Compressor1 will trip and restarts with the time delay.

### PARAMETER SETTINGS :

All “working” parameters are protected with a hardware key to prevent any unauthorized access to the data. Press PRG + SEL for more than 5 seconds to enter the parameter mode. To change any parameter PROKEY must be inserted before entering to the programming mode.

Display will flash parameter “t1” . Using UP/DOWN key user can scroll all the parameters . By pressing “SEL” key user can view and change respective parameter value. Press PRG to store and exit from that particular parameter. To End Programming press SEL key when LED display shows EP

If you do not press any button within 20 seconds after having entered this procedure, the unit will return to normal operation without storing the values of the modified parameters.

### Setting and displaying set parameters.

Para	Probe	Set by	Min	Max	Fac.	M.U	Variation
T1	<b>Control Probe calibration.</b> It may so happen that during the course of time there may be a slight offset in the actual temperature and the temperature shown. For example if the actual temperature is 20°C and the temperature on the controller shows 22°C, set this parameter to -2°C and once out of this mode, the temperature will display 20°C (22-2°C)	U	-10	10	0	°C	0.5
T2	Antifreeze probe calibration. Setting as in T1.	U	-10	10	0	°C	0.5
R1	<b>Set point for compressor1</b>	U	R4	R3	10	°C	0.5
R2	<b>Set point for compressor2</b>	U	R4	R3	7	°C	0.5

<b>R3</b>	<b>Set point for compressor3</b>	U	R4	R3	7.5	°C	0.5
<b>R4</b>	<b>Differential for compressor1</b>	U	1.0	10.0	2.0	°C	0.5
<b>R5</b>	<b>Differential for compressor2</b>	U	1.0	10.0	2.0	°C	0.5
<b>R6</b>	<b>Differential for compressor3</b>	U	1.0	10.0	2.0	°C	0.5
<b>R7</b>	<p><b>Maximum Cooling Setpoint</b> Once set at a particular range, this will not allow the set point to go above this range and below R4 setting. Example: Setting this parameter at 25°C will not allow the set point to go above 25°C. Also if the temperature reaches 25°C the display will show Ht (High Temp) indicating that the temperature has gone above the range in this parameter and at this point the alarm will come on.</p>	F	R6	50	50	°C	0.5
<b>R8</b>	<p><b>Minimum Cooling Setpoint</b> Use UP/DOWN keys to get desired range &amp; press set key to confirm. Once set at a particular range, this will not allow the set point to go below this range and above R3 setting Example: Setting this parameter at -30°C will not allow the set point to go below -30°C. Also if the temperature reaches -30°C the display will show Lt (Low Temp) indicating that the temperature has gone below the range in this parameter and at this point the alarm will come on.</p>	F	-30	R5	-30	°C	0.5
<b>C1</b>	<p><b>Time delay for compressor1 restart</b> E.g. If this parameter is set at 3MIN, then after cutting off the compressor1 at set temperature compressor1 will not Restart for a minimum of 3min. This time delay is also active at power on of the system .</p>	F	0	20	3	Min	1
<b>C2</b>	<p><b>Time delay for compressor2 restart</b> E.g. If this parameter is set at 3MIN, then after cutting off the compressor2 at set temperature compressor2 will not Restart for a minimum of 3min. This time delay is also active at power on of the system .</p>	F	0	20	3	Min	1
<b>C3</b>	<p><b>Time delay for compressor3 restart</b> E.g. If this parameter is set at 3MIN, then after cutting off the compressor3 at set temperature compressor3 will not Restart for a minimum of 3min. This time delay is also active at power on of the system .</p>	F	0	20	3	Min	1
<b>C4</b>	<b>Time delay between any two compressors start.</b>	F	0	120	10	Sec	1

	E.g. If this Parameter is set to 30sec ,then second compressor will come on after 30sec delay from first compressor switch on.						
<b>F1</b>	<b>Fan Operating Mode</b> 0=Fan Always On 1=Fan on with compressor	F	0	1	0	Flag	1
<b>F2</b>	<b>Starting Time of Fans</b> Fans will start these many seconds before the compressor starts .	F	0	120	20	Sec	1
<b>A0</b>	<b>AFT Probe Active</b> <b>To activate Antifreeze(AFT) Probe Function</b> 0 = Disable AFT probe. 1 = Enable AFT probe.	F	0	1	0	Flag	1
<b>A1</b>	<b>Antifreeze set point for AFT Probe</b>	F	-30	R1	4	°C	1
<b>A2</b>	<b>Differential for AFT Probe</b>	F	1	10	2	°C	1
<b>P1</b>	<b>Flow switch alarm delayed at power on.</b> System will activate the alarm only if the error persists for more than P1 secs at system start up.	F	0	120	5	Sec	1
<b>P2</b>	<b>Flow Switch Alarm delay during normal operation.</b> If this parameter is set at 10 seconds , the system will activate the flow switch alarm only if the error persists for or more than 10 seconds .In this manner a false alarm can be avoided during normal operation.	F	0	90	5	Sec	1
<b>P3</b>	<b>Low Pressure Alarm delayed during compressor start up</b>  If this parameter is set at 30 seconds , the system will activate the low pressure switch alarm only if the error persists for or more than 30 seconds .In this manner a false alarm can be avoided due to low pressure at compressor start up.	F	0	120	40	Sec	1
<b>P4</b>	<b>Reset of alarms.</b> 0= Manual Reset for HP,OSS and AFT alarms 1= Auto Reset for HP,OSS and AFT alarms	F	0	1	0	Flag	1
<b>H0</b>	<b>PUMP Start Logic</b> <b>PUMP with Comp</b> It defines Pump working logic. 0= Pump Always On. 1= Pump On/Off with Comp.	F	0	1	0	Flag	1
<b>H1</b>	<b>To activate Pumpdown procedure</b> This parameter is used to activate or deactivate pumpdown procedure at every refrigeration cycle . 0 = Inactivate Pumpdown	F	0	1	0	Flag	0

	1 = Activate Pumpdown						
<b>H2</b>	<b>AUTOSTART on power on.</b> 0=Standby on power on. 1=Autostart on power on.	F	0	1	0	Flag	1
<b>H3</b>	<b>Phase Errors</b> <b>R Y B Phase Error</b> 0= Inactive. 1= Active. Incase of 0 system will ignore R Y B errors.	F	0	1	1	Flag	1
<b>H4</b>	<b>UNIT1 SELECTION</b> 0= Unit1 Inactive 1= Unit1 Active Incase of 0 system will not activate compressor1 and all its faults.	F	0	1	1	Flag	1
<b>H5</b>	<b>UNIT2 SELECTION</b> 0= Unit2 Inactive 1= Unit2 Active Incase of 0 system will not activate compressor1 and all its faults.	F	0	1	1	Flag	1
<b>H6</b>	<b>UNIT3 SELECTION</b> 0= Unit3 Inactive 1= Unit3 Active Incase of 0 system will not activate compressor1 and all its faults.	F	0	1	1	Flag	1
<b>H7</b>	<b>Fault in standby</b> It Enable/Disable fault sensing in standby mode. 0 = Disable. 1 = Enable.	F	0	1	0	Flag	1
<b>FO</b>	<b>Fault sense logic of digital inputs</b> 0 = Faults at 0V. 1 = Faults at 230V.	F	0	1	0	Flag	1
<b>LP</b>	<b>Keypad lock.</b> 0= Keypad Active 1=Keypad Locked	U	0	1	0	Flag	1
<b>FS</b>	<b>Factory set parameters</b> 1=Factory set parameters.	F	0	1	0	Flag	1
<b>EP</b>	<b>End programming mode.</b> Once in this mode press the SET key. The controller goes into the normal mode and all settings are saved.	F				Flag	

**Technical Specifications :**

1. Analog Inputs : Japanese NTC thermistors

Resolution : 0.5 °C  
Accuracy : +/- 1°C

2. Controlling Temp. Range : -30 to 50 °C



3. Digital Inputs : Potential Inputs 230Vac
4. Digital Output (Relay)  
Rating : 230Vac, 8A (resistive) All digital outputs are fused
5. Operating Temperature +5 °C to +50°C
6. Operating Humidity max 80% (non –condensing)
7. Mounting : Panel mounting type
8. Fuse :1.5A
9. Power Source :Transformer Rating

Input : 230Vac,50Hz

Output :

Secondary 1 : 9Vac,350mA

Secondary 2 : 10Vac,500mA

