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Sequence of Operations & HMI Operations Manual

Ecologix CHCM
Commercial Air-to-Water Chillers & Pump Module
CHCM24-6, CHCE24-6, & CHPSR4-15HP

ECOLOGIX HEATING TECHNOLOGIES INC.

90 Monarch Road.
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CHCM24-6 Series Commercial Chillers



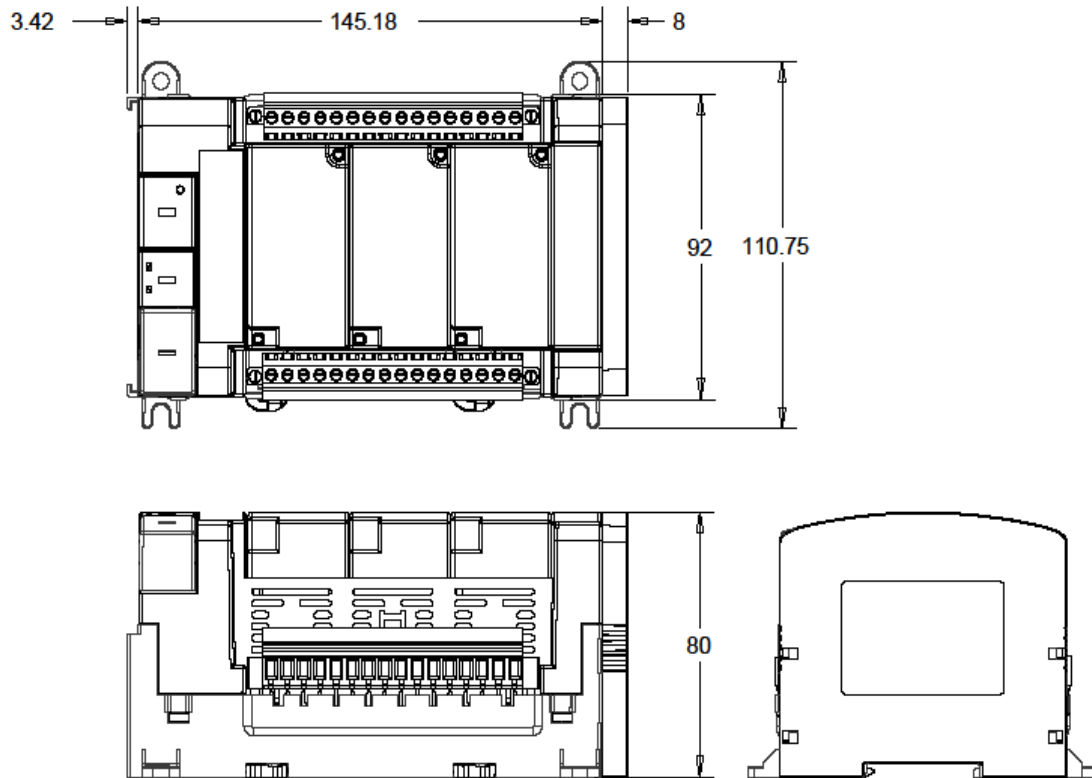
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PLC DRAWING

Allen Bradley 2080-L50E-24QBB Micro800 Programable Controller



OVERVIEW

- The CHCM24-6 is the main unit that has the Allen Bradley system controller and the 1st-stage/digital compressor unit.
- The CHCE24-6 is the expansion unit consisting of three (3) 8-ton sections. The staging controls are supplied by the Allen Bradley controller in the main chiller unit.
- The CHPSR4-15HP pump module has a VFD to control the large 15hp system pump to supply a constant pressure (40PSI) to the process loop. When not in use, the disconnect on the VFD can be shut off if desired. Refer to Grundfos VFD manual for adjusting settings if required.

PLC & HMI EQUIPMENT

- Allen Bradley Micro800 Programable Controller 2080-L50E-24QBB
- Allen Bradley Micro800 Non-Isolated Unipolar Analog Output Plug-in Module 2080-OF2
- Allen Bradley Micro800 Non-Isolated Thermocouple Plug-in Module 2080-TC2
- Allen Bradley PanelView 800 HMI Terminal 2711R-T4T

PLC POINTS LIST

Analog Inputs

- CH0, Chiller Temperature In, Type K Thermocouple
- CH1, Chiller Temperature Out, Type K Thermocouple

Digital Inputs

- I-00, Control Board Alarm

Analog Outputs

- V0-0, 0-10V Modulating Compressor Speed

Digital Outputs

- O-00, On/Off for Compressor 0 Modulating
- O-01, On/Off for Compressor 1
- O-02, On/Off for Compressor 2
- O-03, On/Off for Compressor 3
- O-04, On/Off for Compressor 4
- O-05, On/Off for Compressor 5

Serial Port

- Serial Port, HMI/PLC Communication

Ethernet Port

- Reserved for SCADA

PLC Controller IP Address

- IP Address: 192.168.1.20
- Subnet Mask: 255.255.255.0

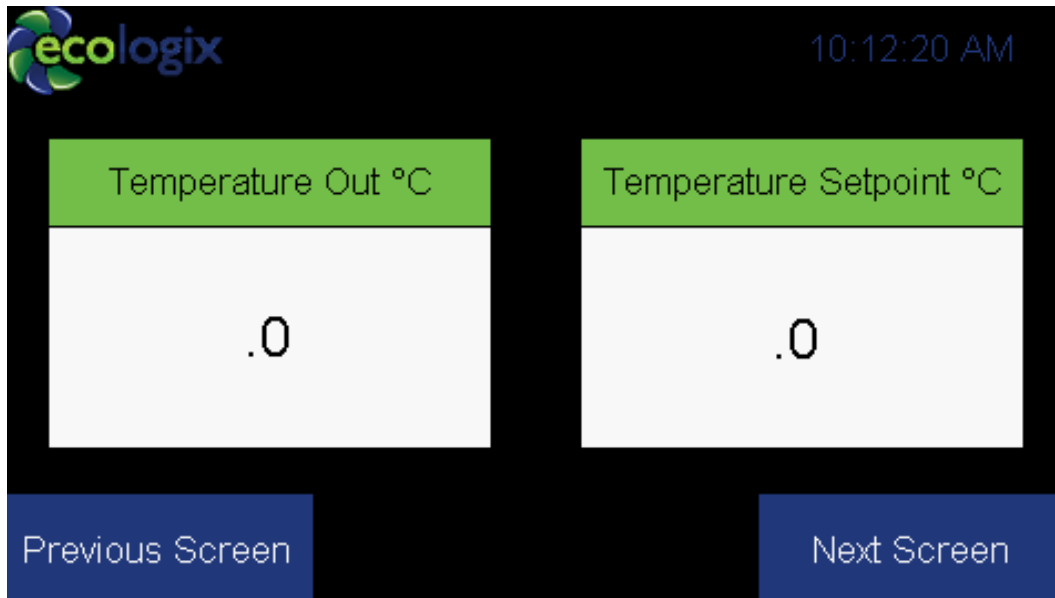
SEQUENCE OF OPERATIONS

- Chiller output and input temperature are measured.
- PID control is used to maintain chiller output temperature by controlling compressor staging and modulation.
- Modulating compressor speed is based on PID control.
- The modulating compressor will turn off if speed command is below 20%.
- Additional compressors will turn on or off as needed to maintain setpoint.
- There is a 1-minute time delay for each compressor to turn on.
- Every day, at desired time, compressor staging order will change to maintain similar runtime on each compressor.
- If chiller temperature output is less than freeze protection setpoint all compressors will shut off.
- Manual compressor control and PID control parameters can be accessed by factory trained technicians.

HMI Operation

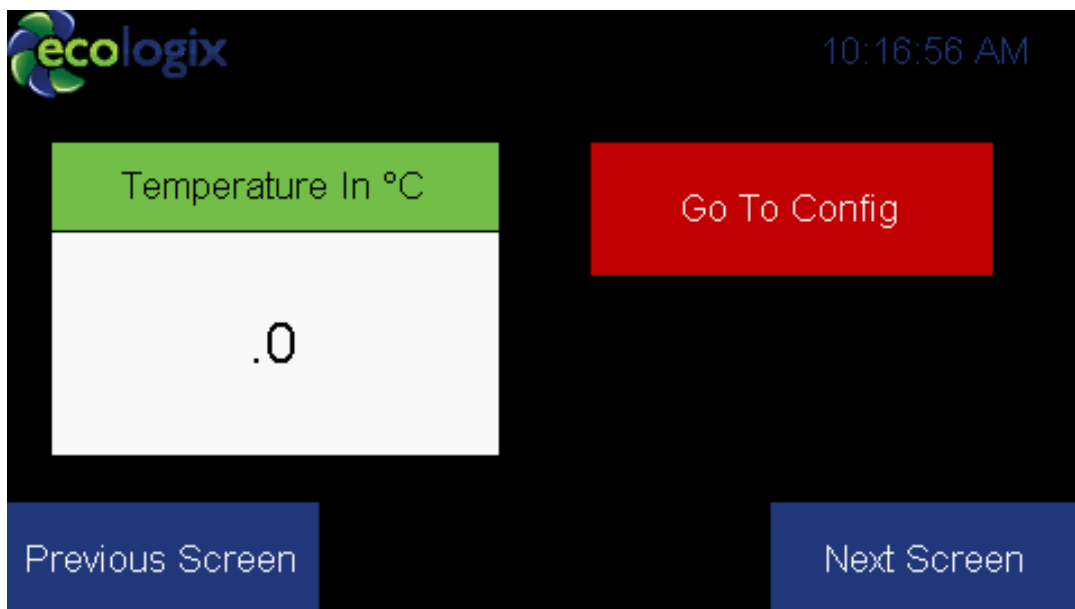
Screen 1

- Displays chiller output temperature and chiller output temperature setpoint in °C.
- Chiller output temperature setpoint can be configured.



Screen 2

- Displays chiller input temperature in °C.
- Go To Config takes user to HMI configuration, to be used by factory technicians only.
- HMI configuration allows user to set screen program, including commissioning program, and set time/date.





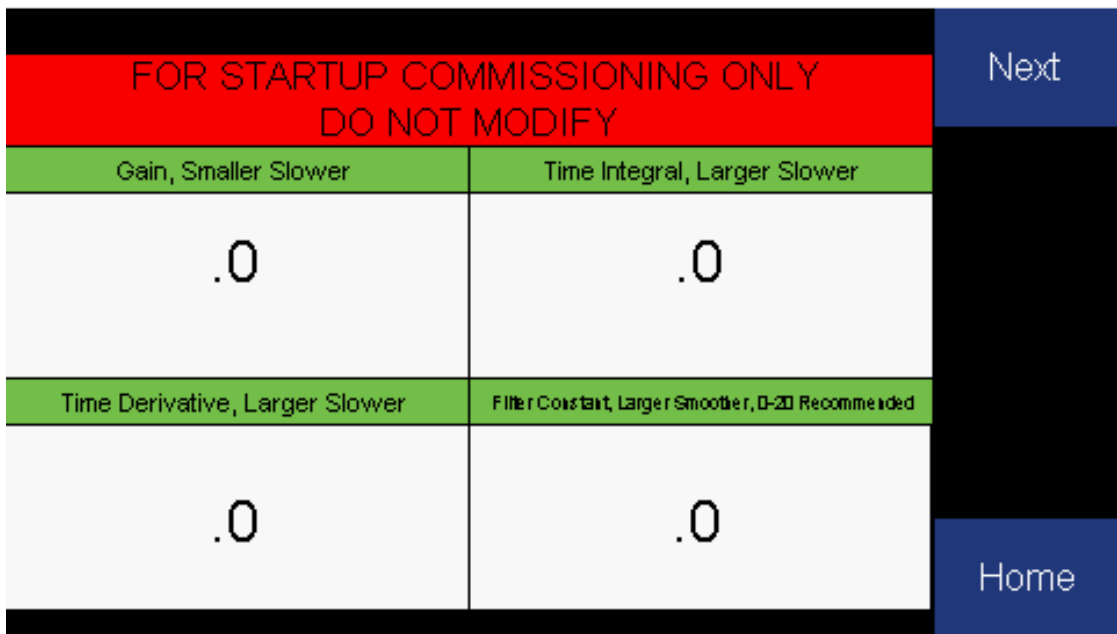
Screen 3

- Displays freeze protection setpoint in °C.
- Displays compressor staging changeover time.
- Freeze protection setpoint and compressor staging changeover time can be set.



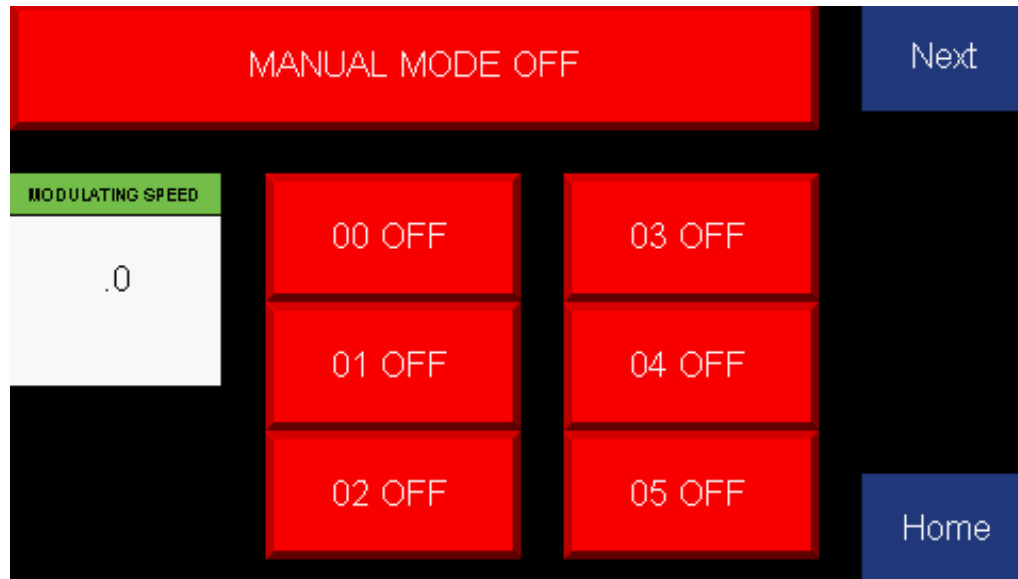
PID Control Parameters

- Accessible only to factory trained technicians.
- PID control parameters are to be modified by factory trained technicians during commissioning only.
- Displays gain, time integral, time derivative, filter constant.
- Gain, time integral, time derivative, filter constant can be set.



Compressor Manual Control

- Accessible only to factory trained technicians.
- Compressor manual control is to be used by factory trained technicians during commissioning only.
- Modulating compressor speed can be set.
- Compressors can be toggled on or off.



WARRANTY

This product is warranted by Ecologix Heating Technologies Inc to be free from defects in materials and workmanship that affect product performance under normal use and maintenance within the applicable periods specified below. Replacements furnished will carry only the un-expired portion of the original warranty.

Two-Year Parts

Ecologix Heating Technologies Inc will provide replacement parts for **ANY part** that fail within two years of purchase, subject to the **terms** below.

Five-Year Parts

Ecologix Heating Technologies Inc will provide replacement parts for any **heating coils, cooling coils, compressors, Allen Bradley controller, cabinetry and piping** that fail within five years of purchase, subject to the **terms** below.

Terms

- ❖ Reasonable proof of original purchase date must be provided in order to establish the effective date of the warranty, failing which, the effective date will be based on the date of manufacture plus thirty days.
The warranty does not cover failure or damages caused by:
 - improper installation or operation
 - accident, abuse or alteration
 - operation of device at temperatures or pressures outside of the rated capacities
 - lime or scale deposits
 - corrosive operating environment
 - equipment moved from original installation location
- ❖ Replacements furnished under this warranty will be F.O.B. Ecologix Heating Technologies Inc product distribution points in the United States and Canada. They will be invoiced at regular prices. The account will be credited the full amount when the defective part is received by Ecologix, examined and approved as a valid warranty.
- ❖ Warranty applies to the original purchaser, but may be transferred to another owner provided the equipment is not moved from the original installation site.
- ❖ This warranty does not apply to labour, freight or any other cost associated with the service repair or operation of the product.
- ❖ Ecologix shall not be liable for any direct, special, incidental or consequential damages caused by the use, misuse, or inability to use this product.
- ❖ Ecologix is under no legal obligations to rectify, including but not limited to, lost profits, downtime, good will, damages to, or replacement of equipment and property
- ❖ Purchaser assumes all risk and liability of loss, damage or injury to purchaser and purchaser's property and to others and their property arising out of the use, misuse or inability to use this product.