PLC Chiller Control
Operations Manual

Dometic Group Marine Division
Rev. 20141015
L-3388 English
P/N 337810
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INTRODUCTION

The Dometic PLC controls is a microcontroller-based unit designed to control multiple chillers. This design allows the user flexibility in the application and improved controls and protection.

This application supports the following:

- Selection and sequencing of up to six chillers
- Selection and sequencing of two chill water pumps and two sea water pumps
- Selection and sequencing of up to 6 EH heaters
- Sequencing of devices for runtime equalization
- Alarms and interlocks
- Troubleshooting help

The two main interfaces supported will be the LCD display, referred to as the PGD1 screen, and the HMI touchscreen.

Figure 1: PGD1 Button Description

PGD1 NAVIGATION

Enter Button

The PGD1 controller screen will automatically boot up to the Main screen. This screen allows you to enable or disable the chiller by pressing the Enter button. Pressing the Enter button will take you to the area of screen you wish to modify. Press multiple times if required.

Scroll Up/Down Buttons

This button will be used to modify the value such as temperature setpoint or probe adjustment values. The Scroll Up or Scroll Down button will also navigate you from page to page of the controller. The flashing cursor must be in the upper left-hand corner for the page navigation. Pressing enter repeatedly will move it to that location.

Esc Button

The Esc button is used to exit your present screen and take you back one screen. Pressing it multiple times will take you back to the Main screen.

Prg Button

This button takes you to the system menus. Once at the menus, use the scroll buttons to scroll through the various options. Pressing enter will select that menu item.

Alarm Button

This button will flash red if there is an active alarm. Pressing this button will take you to the active alarm screen to display the alarm. Once in the alarm screen, use the up/down buttons to scroll through alarms. The Alarm screen captures a snapshot of the system parameters at the time of the fault. Press and hold the Alarm button for 3 seconds to clear the active alarm if the fault has been corrected.

See Appendix 2 for the complete PGD1 navigation screens.
TOUCHSCREEN NAVIGATION

MAIN PAGE

Figure 2: Main Page

The Alarm Icon will appear on any screen when there is an active Alarm.

Home Screen Picture is customizable.

System Navigation Thru any of the 6 Icons.

**Chiller Enable**

Touching this icon will take you to the chiller operational screen, where you can enter setpoints for both heating and cooling and monitor chill water temperatures and pump current information.

**Chiller Summary**

Touching this icon will take you to the summary screen, where you can see the state of your HP, LP and FS and view your stage water temperature out for all available stages. Touching a stage on the screen will take you to that chiller stage for additional information.

**Chiller Stage**

Touching this icon will take you to the first stage, where the system refrigerant circuit and chilled water circuit can be monitored. This screen has multiple hotspots where all stage parameters can be viewed. If the system has the installed option, additional available hotspot icons will appear to view additional information. Forward and back buttons will navigate to the next stage.

**Trends**

Touching this icon will take you to the trending screen where you can view graphically how your system has been performing. The graph data is downloadable to a USB stick. Water temperatures and pressures as well as compressor current are available for graphing.

**Alarms**

Touching this icon will take you to the active alarm screen where alarms can be reviewed and cleared. Alarm history can also be viewed from here by using the navigation buttons on the top that take you to the alarm history. Using the drop-down menu will allow you to go back from minutes to months in the fault history. There is also an information icon that will take you to a help screen to display the possible causes of your alarm to aid in the troubleshooting of your system.
**REMOTE SUPPORT**
Touching this icon takes you to the screen where you can enable a third party to view your system over an Internet connection via a VNC (Virtual Network Computing) server.

**Figure 3: Touch Locations on Screen**

**LOGO**
The touchscreen logo is customizable. Pressing the logo will return you to the Main menu screen from any sub-screens. Some screens contain pop-up screens with information. To exit a pop-up, simply touch the X to close the screen.

**OFF ICON**
Off icon will be illuminated only if the system is in a run state. Touch the Off icon to turn off the system.

**COOL ICON**
Cool will be illuminated only if the system is in cooling. Touch this icon to put the system in cool mode and the word cool will appear on the screen.

**HEAT ICON**
Heat will be illuminated only if the system is in heating. Touch this icon to put the system in heat mode and the word heat will appear on the screen.

**ELECTRIC HEAT ICON: ONLY IF OPTION IS INSTALLED**
Electric Heat will be illuminated only if the system is in heating. Touch this icon to put the system in heat mode and the word heat will appear on the screen.

**SETPOINT THERMOMETERS**
These icons are touched to adjust the cooling or heating setpoints. A pop-up window will appear where you can set the staging up and down temperature differential and hysteresis.

See Appendix 1 for complete touchscreen navigation.
GENERAL

The chiller system will come programmed from the factory with the options enabled for that system. Although the system offers flexibility, these options require certain modules and can only be enabled at the factory.

The programmable logic controller (PLC) is internally grounded with isolation between inputs and outputs. Additionally, the output relays offer double isolation so that different voltages can be used for groups of relays.

The system will utilize various sensor types for measuring analog temperature and pressure. For temperature measurements, the system will use NTC type 10K@77° thermistors. Pressure transducers are ratiometric 0-650 PSI (45 bar) range for both suction and discharge monitoring. Water pressure transducers for sea water and chill water are 0-50 PSI (345 kPa).

DIGITAL INPUTS

Digital inputs are used to monitor the status of the protection circuits for the system.

SAFETY INPUTS

All discrete inputs will be checked before the system will be enabled. Any faults detected on start-up must be verified and cleared via the PLC before system will start normal operation.

FS – CHILL WATER FLOW SWITCH

With the system in either heating or cooling mode the Flow signal must be present prior to system starting or a stage being enabled. In operation if Flow is lost for more than 5 consecutive seconds, the compressor or heat relay will be disabled. A flow switch fault will be recorded and displayed.

If the system detects three flow switch faults within a 30-minute time frame, a CW Flow fault will be recorded and system will be in lockout and a manual restart will be required. The PLC will not allow the compressor or electric heat relay to be energized for the stage that has lost flow or the whole system if a common flow switch is being used.

Fault must be manually acknowledged via the PLC and cleared prior to re-enabling the system or stage.

FS – SEA WATER FLOW SWITCH/PRESSURE SWITCH (OPTIONAL)

With the system in either heating or cooling mode, the Flow signal must be present prior to system starting or a stage being enabled. In operation if Flow is lost for more than 5 consecutive seconds, the compressor or heat relay will be disabled. A flow switch fault will be recorded and displayed.

If the system detects three flow switch faults within a 30-minute time frame, a SW Flow fault will be recorded and system will be in lockout and a manual restart will be required. The PLC will not allow the compressor or electric heat relay to be energized for the stage that has lost flow or the whole system if a common flow switch is being used.

Fault must be manually acknowledged via the PLC and cleared prior to re-enabling the system or stage.

REFRIGERANT HI – HIGH SIDE PRESSURE LIMIT

The PLC will immediately acknowledge an open circuit if the HI pressure switch is tripped and deenergize the compressor. It will record and display high pressure fault on the alarm screen. If the PLC detects a high pressure fault during operation, a HP fault will be displayed and recorded. The PLC will not allow the compressor relay to be energized.

The fault must be manually acknowledged via the PLC and cleared prior to re-enabling the system or stage. The HP limit is fixed value and is chosen at the factory depending on the refrigerant being used on that system.

REFRIGERANT LOW – LOW SIDE PRESSURE LIMIT

The PLC will immediately acknowledge an open circuit if the low pressure switch is tripped and deenergize the compressor. It will record and display high pressure fault on the alarm screen. If the PLC detects a high pressure fault during operation, a HP fault will be displayed and recorded. The PLC will not allow the compressor relay to be energized.

The fault must be manually acknowledged via the PLC and cleared prior to re-enabling the system or stage. The LP limit is fixed value and is chosen at the factory depending on the refrigerant being used on that system.

CONDENSER MONITORING – LOW SIDE PRESSURE LIMIT (OPTIONAL)

The condenser monitoring system has a low pressure sensor that when tripped will inform the user that the anode needs replacing. This system will coat the interior of the condenser and extend the life of the condenser.
**ANALOG INPUTS**

**COMPRESSOR OVERLOAD INPUT LIMIT (OPTIONAL)**

If the compressor has installed thermal overloads, these will be monitored and if tripped the PLC will register and overload fault.

**LOW VOLTAGE DETECTION (OPTIONAL)**

The system input voltage will be monitored. If the voltage is outside the acceptable range, a low voltage alarm will occur and the fault will be logged in the system.

**HIGH LIMIT TEMPERATURE**

The high limit temperature sensor is continuously monitored whether in Cooling, Reverse Cycle or Electric Heat mode.

This sensor is used to detect a high temperature condition in the supply water from the chiller. If the chilled water temperature is sensed to be greater than 125°F (51.7°C), all enabled compressor relays will be deenergized, turning off the compressor(s) if operating in reverse cycle mode. If electric heat is being used, all enabled heater relays will be deenergized, turning off the heating element(s). As the temperature falls, the compressor or electric heat relay will re-energize when the temperature reaches 110°F (43.3°C).

A high temperature fault will be recorded and displayed if the system exceeds the alarm setpoint. This a programmable value that is set at the factory. In a high temperature situation, PLC will not allow the compressor or electric heat relay to be energized. The fault must be manually acknowledged on the active alarm screen and cleared prior to re-enabling the system or stage.

If a temperature sensor is bad or not connected, the PLC will display an alarm for that sensor.

**FREEZE TEMPERATURE**

The low limit temperature sensor is continuously monitored whether in Cooling, Reverse Cycle or Electric Heat mode.

This sensor is used to detect a freeze condition in the supply water from the chiller. If the chilled water temperature is sensed to be less than 38°F (3.3°C), then the compressor relay will be deenergized, shutting off the compressor. As the temperature rises, the compressor relay will re-energize when the temperature reaches 42°F (5.6°C).

A low temperature fault will be recorded and displayed if the system falls below the alarm setpoint. This is a programmable value that is set at the factory. In a low temperature situation, PLC will not allow the compressor or electric heat relay to be energized. The fault must be manually acknowledged on the active alarm screen and cleared prior to re-enabling the system or stage.

If a temperature sensor is bad or not connected, the PLC will display an alarm for that sensor.

**OIL TEMPERATURE (OPTIONAL)**

Oil temperature is monitored to enable or disable the optional crankcase heater. If the oil temperature exceeds the programmed limit according to the type of oil in the system the compressor will be disabled.

This fault will be displayed and recorded. The alarm must be acknowledged and cleared for that stage to be used.

**PRESSURE TRANSDUCERS**

**Suction Side Refrigerant (Optional)**

The suction pressure is continuously monitored by the PLC. If the suction pressure is below the alarm setpoint for longer than the programmed time, a fault will occur. This low suction fault will be recorded and displayed on the alarm screen.

The fault must be manually acknowledged via the PLC and cleared prior to re-enabling the system or stage. The LP limit is a programmable value and is set at the factory depending on the refrigerant being used on that system.

**Discharge Side Refrigerant (Optional)**

The discharge pressure is continuously monitored by the PLC. If the discharge pressure is above the alarm setpoint for longer than the programmed time, a fault will occur. This high pressure fault will be recorded and displayed on the alarm screen.

The fault must be manually acknowledged via the PLC and cleared prior to re-enabling the system or stage. The HP limit is a programmable value and is set at the factory depending on the refrigerant being used on that system.
SW Differential Pressure (Optional)
The sea water differential pressure is continuously monitored by the PLC. If the DP is above the alarm setpoint for longer than the programmed time, a fault will occur. This DP fault will be recorded and displayed on the alarm screen.

This fault is to notify the user of possible problems with the sea water circuit. It will not shut down the system.

CW Pressure (Optional)
The chill water pressure is continuously monitored by the PLC. If the pressure is above the alarm setpoint for longer than the programmed time, a fault will occur. This pressure fault will be recorded and displayed on the alarm screen.

This fault is to notify the user of possible problems with the chill water circuit. It will not shut down the system.

RELAY OUTPUTS

COMP – Compressor
PLC COMP output will provide switched power to the contactor coils for the compressor for normal on/off operation. When used in conjunction with a VFD, this output will be used as the enable/disable function for VFD. The PLC will also provide an output for two-speed operation for select compressors if requested for light load operation.

CWP – Chill Water Pump
PLC CWP output will provide switched power to the contactor coils for the chill water pump.

SWP – Sea Water Pump
PLC SWP output will provide switched power to the contactor coils for the sea water pump.

RV – Reversing Valve
PLC RV output will provide switched power to the contactor coils for the reversing valve.

EH – Electric Heat
PLC EH output will provide switched power to the contactor coils for the electric heat.

CCH – Crank Case Heater
PLC CCH output will provide switched power to the contactor coils for the crank case heater.

Fault
Provides a Normally Open (NO) contact point. Any fault condition will close the NO contact. This output can be used to power a light, relay, or interface to a ship’s monitoring system.

SYSTEM OVERVIEW

System Power-up

Software Revision
Upon applying power to the system, the display will indicate the software revision number or display it on the main status screen.

PLC is enabled and waiting for user selection.

Startup
The PLC Chiller controller will operate a multistage chiller plant.
During initial setup, the system will be configured for the number of stages and the available options.
Select between Return water or Supply water control.
User-selectable metric or imperial units.
Chill water setpoint will be entered for Cool and Heat mode.
Once enabled, CW and SW pumps will be turned on for operation.
OPERATIONAL CHECKS

PLC will check all CW flow switches for faults.
PLC will check SW flow or pressure switch for faults if option is enabled.
PLC will check HP and LP switches for faults.
Individual stage faults will only disable that stage.
Common faults, i.e., SW IN and CCW Return, will disable the whole system.

SETPOINTS

COOLING
Cooling setpoint is a PLC adjustable parameter from 40°F (4°C) to 55°F (13°C) in one degree increments. To adjust the cooling setpoint, simply touch the PLC screen and change to desired new setpoint. In cooling mode, you will not be able to enter a number outside of this range.

HEATING
Heating setpoint is a PLC adjustable parameter from 100°F (38°C) to 120°F (49°C) in one degree increments. To adjust the heating setpoint, simply touch the PLC screen and change to desired new setpoint. In heating mode you will not be able to enter a number outside of this range.

COMPRRESSOR STAGING TIME
Compressor staging time is a PLC adjustable parameter from 10 seconds to 110 seconds in 10-second increments. The user will not be able to enter a number outside this range. Once the PLC initiates a cooling cycle, the staging time is the time it will take (in seconds) for the next compressor relay to close.

RUN MODE – COOLING
Compressor rotation is active during run mode. The compressor with the lowest running hours will be enabled first and compressor with the highest running hours will be disabled first.
First stage will be enabled and the compressor will start after CW and SW flows are stable for 10 seconds (default).
First stage will continue to run for 1 minute before enabling the next stage. If there is a delta T programmed °F from setpoint, enable the next stage.
If there is a delta T programmed °F from setpoint, disable longest running stage.
Delta T range will be programmable (1, 2 or 3 degrees).

RUN MODE – REVERSE CYCLE HEATING
Compressor rotation is active during run mode. The compressor with the lowest running hours will be enabled first and compressor with the highest running hours will be disabled first.
Check sea water temperature; if water temperature is 40°F (4°C), enable reverse cycle heating.
Enable reverse cycle heat only for the system.
First stage heating will be enabled and the compressor will start after CW and SW flows are stable for 20 seconds.
First stage will continue to run for 5 minutes before enabling the next heater stage. If there is a delta T programmed °F from setpoint, enable the next stage. If there is a delta T programmed °F from setpoint, disable longest running stage.
Delta T range will be programmable (1, 2 or 3 degrees).

RUN MODE – ELECTRIC HEATING
Heater rotation is active during run mode. The heater with the lowest running hours will be enabled first and the heater with the highest running hours will be disabled first.
Check sea water temperature; if water temperature is 40°F (4°C), disable reverse cycle heating.
Enable electric heat only for the system.
First stage will be enabled and the electric heater will start after CW flow is stable for 10 seconds.
First stage will continue to run for 5 minutes before enabling the next heater stage. If there is a delta T programmed °F from setpoint, enable the next stage. If there is a delta T programmed °F from setpoint, disable longest running stage.
Turn on the sea water pump every 8 hours for 5 minutes to determine sea water temperature. If 40°F (4°C), notify the user that reverse cycle heating is available.
OPERATIONAL MODES

Pump Operation

Chilled Water Pump
The chilled water pump relay shall close if the system is in heat mode or cool mode. The pump will be enabled 5 seconds prior to the first stage being enabled.

If the pump is equipped with optional current sensors, pump operation is monitored and reported as a fault if pump current is below programmed setpoint.

Sea Water Pump
The sea water pump will have a selectable operating mode between continuous operation or cycle with compressor operation. The sea water pump relay shall close 5 seconds before the compressor starts in heating or cooling modes and will open 5 seconds after the last compressor cycle is completed. If immersion heating is available and used, the sea water pump will be disabled.

If pump is equipped with optional current sensors, pump operation is monitored and reported as a fault if pump current is below programmed setpoint.

Cooling Mode
Cooling mode is entered when Cool is selected on the touchscreen or with the display buttons. The system will automatically start cooling depending on temperature setpoint. The pumps will operate as described in the pump operation section.

• The board will energize the compressor relay if return water/supply water temperature is programmed differential degree(s) above the cooling setpoint and the staging delay has elapsed.
• The compressor will continue to run until the cooling setpoint has been reached or an alarm condition exists. A stage will have a minimum run time of 5 minutes before it can be turned off and a minimum off time of 5 minutes before it can be re-enabled.
• If the system calls for a stage to be toggled on/off, the next available stage will be used that meets the staging criteria.
• Load shedding will occur in multistage operation when approaching chilled water setpoint.

The reversing valve is toggled to relieve head pressure at the end of a compressor run cycle unless a pump-down routine is in use in the system.

The pump-down scheme is available only with tube and shell condensers. When the compressor is disabled after a normal run cycle, a pump-down will remove the refrigerant from the evaporator.

The advantage of a pump-down system is that the liquid refrigerant is stored in the receiver and condenser when the compressor is not operating. This prevents liquid migrating to the compressor crankcase during the off cycle and the ensuing possibility of liquid slugging at compressor start-up.

Heating Mode
Reverse Cycle Heating mode is entered when Heat is selected on the touchscreen or with the display buttons. The system will automatically start heating depending on the temperature setpoint. The pumps will operate as described in the pump operation section.

• The reversing valve relay will be energized to change the unit to operate in Reverse Cycle Heating mode.
• The PLC will energize the compressor relay if return water temperature is programmed differential degree(s) below the heating setpoint and the staging delay has elapsed. The compressor will continue to run and the reversing valve will remain energized until the heating setpoint has been reached or an alarm condition exists. After setpoint is reached, the compressor relay will deenergize as will the reversing valve after a 2-second delay.
• A stage will have a minimum run time of 5 minutes before it can be turned off and a minimum off time of 5 minutes before it can be re-enabled. If the system calls for a stage to be toggled on/off, the next available stage will be used that meets the staging criteria.
• At the end of a cycle, the reversing valve is toggled to relieve head pressure unless a pump-down routine is in use in the system.

Electric Heating mode is entered when Electric Heat is selected on the touchscreen or with the display buttons. The system will automatically start heating depending on the temperature setpoint.

• The PLC will energize the heater relay if return water temperature is programmed differential degree(s) below the heating setpoint and the staging delay has elapsed.
- A stage will have a minimum run time of 1 minute before it can be turned off and a minimum off time of 1 minute before it can be re-enabled. If the system calls for a stage to be toggled on/off, the next available stage will be used that meets the staging criteria.

**PUMP-DOWN MODE**

Pump-down will be selected as part of the system configuration upon original commissioning.

If the system has an Electronic Expansion Valve (EEV) then the enable signal to the EEV will be disabled for the pump-down to start. Once the suction pressure falls below 40 PSI (276 kPa), the compressor will be disabled.

If the system has a pump down solenoid then the enable signal to the solenoid valve will be disabled for the pump-down to start. Once the suction pressure falls below 40 PSI (276 kPa), the compressor will be disabled.

**MAINTENANCE TEST MODE**

Figure 4: Maintenance Test Mode

**Test Mode Setup**

The configuration time is programmable when running the system in Test Mode.

Figure 5

This mode is to be used during commissioning or troubleshooting of the system. During this operation, there are programmed timers that will turn off the relay outputs after a 5-second delay. This mode is not intended for continuous operation. The mechanical safety switches are still active in this mode. The PLC will allow you to start the various components without the required inputs prior to starting such as water flow.
**COMP – COMPRESSOR**
Manual operation of the compressor is allowed. Safety conditions are overridden and must be done by qualified personnel. All alarm conditions are overridden.

**CWP – CHILLED WATER PUMP**
Manual operation of the chill water pump is allowed. Safety conditions are overridden and must be done by qualified personnel. All alarm conditions are overridden.

**SWP – SEA WATER PUMP**
Manual operation of the sea water pump is allowed. Safety conditions are overridden and must be done by qualified personnel. All alarm conditions are overridden.

**VALVE – REVERSING VALVE**
Manual operation of the reversing valve is allowed. Safety conditions are overridden and must be done by qualified personnel. All alarm conditions are overridden.

**HEATER – ELECTRIC HEAT**
Manual operation of the electric heat is allowed. Safety conditions are overridden and must be done by qualified personnel. All alarm conditions are overridden.

**CALIBRATION**
Under the service section of the controller, the user can enter to make probe adjustments.

**Figure 7**

In this mode during commissioning, the analog inputs can have calibration offsets programmed.
Figure 8

All temperature and pressure measurements will have ± adjustment capabilities.

Figure 9

**Disabling Stage or Stages**

Entering into maintenance mode will allow the user to disable a stage from operation.

Figure 10

The technician will be able to disable an active stage for maintenance operations.

Once the stage has been disabled, the system can be returned to normal operation and ignore the disabled state of the stage that is undergoing maintenance.

Once repairs are completed, the stage will be re-enabled from the maintenance screen and return to normal operation.
APPENDIX 1: TOUCHSCREEN NAVIGATION

Main Page

Figure 11

The Alarm Icon will appear on any screen when there is an active Alarm.

Home Screen Picture is customizable.

System Navigation Thru any of the 6 Icons.

Chiller Enable

Figure 12

Touch Locations on Screen

OFF ICON    Cool ICON    Return to Main Menu

Touch here to adjust Setpoint, Differential and Hysteresis

Heat ICON

Common Chilled Water

Setpoints

Stage Demand: 1

Chilled Water Pump: 1

Sea Water Pump: 1

Active Setpoint: 45 °F

15:30:05

04/25/14

Pump Current

Water Temperatures
**CHILLER SETPOINTS**

Figure 13

Adjust temp here pop-up window will appear.

To change the stage up and down simply touch the number and a pop-up will appear and enter the new value. Stage Up value must be higher than stage Down.

**CHILLER SUMMARY**

Figure 14

Chiller Summary screen will display the current status of each stage. It will also display if that stage is in a Alarm Retry mode. Touching the chiller # will take you directly to that stage.
APPENDIX 1: TOUCHSCREEN NAVIGATION

Figure 15

Touch the logo to return to Home Screen

Touch wrench icon to go to maintenance selection of stage.

PLC HMI Screen

Chiller Control will need to change to Yes and select the stage you wish to take offline.

CHILLER STAGE

Figure 16

PLC HMI Screen

When system is in run mode additional icons will appear to indicate cooling and heating.

Depending on what features are enabled different icons will become hotspots for navigation and open another window.
With an EEV installed you can monitor the valve position and view your suction pressure and temperature. Superheat setpoint and actual will be displayed.

This pop-up window will appear when VFD’s are installed accessed from hotspot button.
**TRENDS**

*Figure 19*

PLC HMI Screen

Data will be shown on graph back a month to review how the system has been operating.

*Figure 20*

PLC HMI Screen

The USB Icon will allow you to dump data on to a USB flash drive.

Drive must be inserted prior or you will get this message.
ACTIVE ALARMS

Figure 21

Active Alarm Reset. Additional Alarm info is available by touching this Icon.

ALARM HISTORY

Figure 22

Alarm History can be pulled for several weeks or months.
**ALARM HELP**

Figure 23

**PLC HMI Screen**

Use drop down menu to get additional information on causes.

Figure 24

**PLC HMI Screen**

**Probable Cause**

1. Discharge pressure switch opened or pressure above setpoint.
2. No or very low sea water flow in cool mode.
3. No or very low sea water flow in heat mode. See Alarm Help Info.
4. Defective discharge pressure switch or pressure transducer.

**Troubleshooting Procedure**

1. Check for proper refrigerant pressure with gauge.
2. If pressure reading is normal, check for defective pressure switch or transducer.
3. You may momentarily bypass the pressure switch by connecting a jumper across the it to see if the fault clears.
4. Assure proper sea water and loop water flow, and make sure water strainers are not clogged.

Use drop down menu to get additional information on causes.
REMOTE SUPPORT

Figure 25

Remote Support

Touchscreen IP address is displayed and used for remote monitoring.

REMOTE ENABLE

Figure 26

Remote Enable

Touchscreen IP address is displayed and used for remote monitoring.
REMOTE CONFIGURATION

Figure 27

PLC HMI Screen

Touchscreen IP address is displayed and used for remote monitoring.

WEB PAGE

Figure 28

PLC HMI Screen

Dometic Homepage can be accessed for additional product information.
APPENDIX 2: PGD1 SCREEN NAVIGATION

Main Menu options are in order from A to H in the controller.

**MENU A: ON/OFF UNIT**

The system on/off control is available on the status screen but is also available here on this menu selection.

To turn the unit on or off, press the Prg button and scroll to select ON/OFF Unit. Press enter.

**Figure 29**

Press enter to move the cursor to the selection. Use the up/down button to change the value and press enter to select.

**Figure 30**

Scrolling down will take you to end of program.

**Figure 31**
**Menu B: Setpoints**

Press Prg to bring up Main menu. Scroll to find setpoints and press enter.

**Figure 32**

This will bring up the cool setpoint screen with stage up and down cooling differential and hysteresis.

**Figure 33**

This is the configuration for a three-stage system. Press enter to change the cool setpoint. The cursor will move to temperature setting. Use the up/down buttons to change value and then press enter to scroll to next item. The stage up and down increases the number of stages turned on or off depending on the temperature differential and based on hysteresis. The stage up is the degree above setpoint and stage down is the hysteresis from stage up.

For example:

- SP= 45 deg, Stage up is SP +1 = 46 will turn on first stage. SP= 45 deg, Stage down is SP +0= 45 will turn off first stage.
- SP= 45 deg, Stage up is SP +4 = 49 will turn on second stage. SP= 45 deg, Stage down is SP +2 = 47 will turn off second stage.
- SP= 45 deg, Stage up is SP +6 = 51 will turn on third stage. SP= 45 deg, Stage down is SP +5 = 49 will turn off third stage.

Follow the same process for setting the heating setpoint.

**Figure 34**
Press the Esc button to exit out of the programming or use scroll to continue to the other parameters.

**MENU C: CLOCK AND SCHEDULER**

To set the time and date:

- Press the Prg button to bring up the Main menu.

**Figure 35**

Scroll until you find Clock/Scheduler and press enter.

**Figure 36**

Press enter to move the cursor to the date or time to change the value. When finished, press enter to get the cursor to the upper left-hand corner of screen. Now press the Scroll Down button to move to next screen.

**Figure 37**

On this screen, the user can enable or disable daylight savings (DST). Pressing the scroll down again will take you to the end of the programming parameters for time.
**APPENDIX 3**

**Dometic Chiller – Serial Connections**

*All serial devices (i.e., EVO, pCOe, VFD, pGD1 and pGDTouch) must be addressed manually. This is not automatic from the pCO controller. The pCO controller will only look for these devices to be at a specific address.>*

**pCO5+ address #1 - Stages 1, 2 & 3**

- Fieldbus 1 (PCO100FD10) = Carel devices; pCOe and EVO
  - Address 1 = EVO Stage 1
  - Address 2 = EVO Stage 2
  - Address 3 = EVO Stage 3
  - Address 4 = Pump A/B Current
  - Address 5 = Crankcase Heater I/O for stages 1-3
  - Address 6 = Load Banking I/O
  - Address 7 = Comp Current & PD relays & Secondary Flow Switches for stages 1-3
  - Address 8 = Cond Out Temp & Cond Sw for stages 1-3
  - Address 9 = System Extended I/O (glycol, CCW flow meter, SW press, cw press)
  - Address 10 = Load Shedding switches 1-3
- Fieldbus 2 (Builtin-J26) = 3rd party devices; Altivar 312 or 212 VFDs
  - Address 1 = VFD Stage 1
  - Address 2 = VFD Stage 2
  - Address 3 = VFD Stage 3
- pLAN (Builtin-J11)
  - Optional connection to second pCO5+ at address #2 for stages 4, 5 & 6
  - Optional connection to pGDTouch 7" at address #30
  - Optional connection to second pGDTouch 7" at address #29
- pLAN (Builtin-J10)
  - Optional connection to pGD1 at address #32
- BMS2 (Builtin-J25)
  - Connection to pGDTouch 13" (Local 13" or STIIIC 13")

**pCO5+ address #2 - Stages 4, 5 & 6**

- Fieldbus 1 (PCO100FD10) = Carel devices; pCOe and EVO
  - Address 1 = EVO Stage 4
  - Address 2 = EVO Stage 5
  - Address 3 = EVO Stage 6
  - Address 4 = n/a
- Address 5 = Crankcase Heater I/O for stages 4-6
- Address 6 = n/a
- Address 7 = Comp Current & PD relays & Secondary Flow Switches for stages 4-6
- Address 8 = Cond Out Temp & Cond Sw
- Address 9 = n/a
- Address 10 = Load Shedding switches 4-6

• Fieldbus 2 (Builtin-J26) = 3rd party devices; Altivar 312 or 212 VFDs
  - Address 1 = VFD Stage 4
  - Address 2 = VFD Stage 5
  - Address 3 = VFD Stage 6

• pLAN (Builtin-J11)
  - Mandatory connection to first pCO5+ at address #1

• pLAN (Builtin-J10)
  - Optional connection to second pGD1 at address #31

• BMS2 (Builtin-J25)
  - Connection to pGDTouch 13” (Local 13” or STIIC 13”)