Controls Operation and Troubleshooting

CONTENTS

Page

SAFETY CONSIDERATIONS 2
GENERAL 2
Abbreviations Used in This Manual 2
HARDWARE 2
Main Control Board 2
SIOB (Starfire Input/Output Board) 3
IOB (Input/Output Board) 3
IOB Configuration 3
19DV IOB Components and Wiring 3
Communication Cables 3
Sensors 13
- PRESSURE TRANSDUCERS
- TEMPERATURE SENSORS

Controls Outputs 13
- EVAPORATOR/CONDENSER WATER PUMP
- INLET GUIDE VANE
- ECONOMIZER DAMPER VALVE
- ENVELOP CONTROL VALVE
- VFD

PIC5 USER INTERFACE 13
Web Connection 13
General Interface Features 14
- ICONS
- SCREENS

PIC5 CONTROL OPERATION 18
Start-Stop Control 18
- LOCAL
- LOCAL SCHEDULE
- REMOTE
- NETWORK

Compressor Run Status 18
Chiller Start-Up Sequence 18
- PRE-START CHECK
- START-UP

Chiller Shutdown Sequence 19
Refrigerant Lubrication Control 19
Control Points 19
- SET POINT
- CONTROL POINT TEMPERATURE
- TEMPERATURE RESET
- CAPACITY CONTROL
- RAMP LOADING
- SURGE CORRECTION CONTROL
- ENVELOP/HOT GAS BYPASS (HGBP) CONTROL
- ECONOMIZER DAMPER VALVE CONTROL
- DEMAND LIMIT
- OVERRIDE CONTROL
- RECYCLE CONTROL
- RUNNING TIMERS AND COUNTERS
- WATER PUMPS CONTROL (FREEZE PREVENTION)

Page

- CONTROL TEST
- MOTOR ROTATION CHECK
- SWIFT RESTART (CAPACITY RECOVERY™)
- COOLING TOWER CONTROL
- WATER PUMP CONTROL
- HEAD PRESSURE CONTROL
- ICE BUILD OPTION
- TIME SCHEDULE
- BLACK BOX
- PRESSURE TRANSDUCER CALIBRATION
- TEMPERATURE SENSOR CALIBRATION
- ALARM EMAIL
- PROGNOSTICS
- MASTER SLAVE CONTROL

Pumpdown/Lockout 27
Displaying Data Trends 28
Hydraulic Option 28
- WATER FLOW MEASUREMENT
- WATER PRESSURE DIFFERENCE MEASUREMENT
- MARINE OPTION(S)

DIAGNOSTICS AND TROUBLESHOOTING 29
Displaying Alarms 29
Resetting Alarms 29
Alarm/Alert Codes 29
Event States 44
TOUCH SCREEN SETTINGS FOR THE CONTROLLER 44
Unit IP Address 44
Web Address 45
System Configuration 45
General Display Settings 46
- TOUCH SCREEN CALIBRATION

Touch Screen Configuration Language 47
Ethernet/IP Connection Problems 48
- UNIT IS POINT-TO-POINT CONNECTED TO A PC
- UNIT IS CONNECTED TO THE LOCAL NETWORK
- ETHERNET CONNECTION ON THE PC
- JAVA APPLICATION CONFIGURATION

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE 50
APPENDIX B — INPUT/OUTPUT BOARD (IOB) AND HUMAN MACHINE INTERFACE (HMI) DIP SWITCH SETTINGS 87
APPENDIX C — INPUT/OUTPUT BOARD (IOB) STATUS INDICATORS 89
APPENDIX D — NETWORK CONFIGURATION 90

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

SAFETY CONSIDERATIONS

Installing, starting up, and servicing this equipment can be hazardous due to system pressures, electrical components, and equipment location (roof, elevated structures, etc.). Only trained, qualified installers and service mechanics should install, start up, and service this equipment. When working on this equipment, observe precautions in the literature, and on tags, stickers, and labels attached to the equipment, and any other safety precautions that apply. Follow all safety codes. Wear safety glasses and work gloves. Use care in handling, rigging, and setting this equipment, and in handling all electrical components.

⚠ WARNING

Electrical shock can cause personal injury and death. Shut off all power to this equipment during installation. Use lock out/tag out procedures and be aware that there may be more than one disconnect switch. Be sure to tag all disconnect locations to alert others not to restore power until work is completed. Even when the main circuit breaker or isolator is switched off, certain circuits may still be energized, since they may be connected to a separate power source.

⚠ WARNING

Electrical currents cause components to get hot either temporarily or permanently and may cause burns. Handle power cable, electrical cables and conduits, terminal box covers, and motor frames with great care.

⚠ CAUTION

This unit uses a microprocessor control system. Do not short or jumper between terminations on circuit boards or modules; control or board failure may result.

Be aware of electrostatic discharge (static electricity) when handling or making contact with circuit boards or module connections. Always touch a chassis (grounded) part to dissipate body electrostatic charge before working inside control center.

Use extreme care when handling tools near boards and when connecting or disconnecting terminal plugs. Circuit boards can easily be damaged. Always hold boards by the edges and avoid touching components and connections.

This equipment uses, and can radiate, radio frequency energy. If not installed and used in accordance with the instruction manual, it may cause interference to radio communications. The PIC5 control boards have been tested and found to comply with the limits for a Class A computing device pursuant to International Standard in North America EN 61000-2/3 which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Always store and transport replacement or defective boards in anti-static shipping bag.

GENERAL

This publication contains operation and troubleshooting information for PIC (Product Integrated Control) 5, a system for controlling 19DV semi-hermetic centrifugal liquid chillers. This publication is based on 19DVPIC5 Version 4.0 software (SCG-SR-20M200400).

The PIC5 control system monitors and controls all operations of the chiller. The microprocessor control system matches the capacity of the chiller to the cooling load while providing state-of-the-art chiller protection. The system controls cooling load within the set point plus or minus the dead band by sensing the water or brine temperature and regulating the inlet guide vane via a mechanically linked actuator motor, and regulating VFD (variable frequency drive) speed and regulating VFD (variable frequency drive) speed of the compressor. The guide vane is a variable flow pre-whirl assembly that controls the refrigeration effect in the cooler by regulating the amount of refrigerant vapor flow into the compressor. An increase in guide vane opening increases capacity. A decrease in guide vane opening decreases capacity. The microprocessor-based control center protects the chiller by monitoring the digital and analog inputs and executing capacity overrides or safety shutdowns as necessary.

The PIC5 control system also provides access to a Control Test function covering all outputs except compressor relay outputs.

Abbreviations Used in This Manual — The following abbreviations are used in this manual:

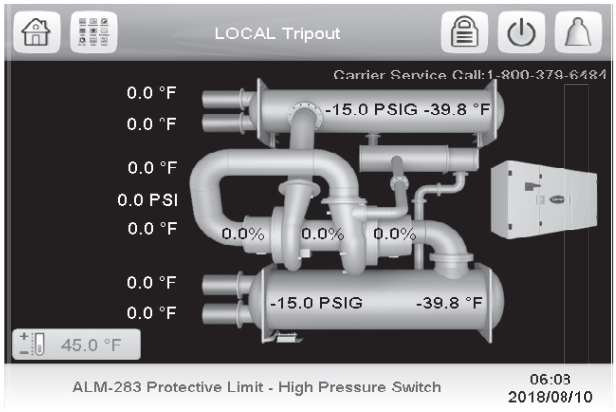
CCM	— Chiller Control Module
CCN	— Carrier Comfort Network®
CCN mode	— Operating mode: CCN
EC	— Envelop Control (Hot Gas Bypass)
ECDW	— Entering Condenser Water
ECW	— Entering Chilled Water
EXV	— Electronic Expansion Valve
HMI	— Human Machine Interface
I/O	— Input/Output
IOB	— Input/Output Board
LCDW	— Leaving Condenser Water
LCW	— Leaving Chilled Water
LED	— Light-Emitting Diode
LEN	— Local Equipment Network (internal communication linking the main board to slave boards)
MCB	— Main Control Board
PIC	— Product Integrated Control
RLA	— Rated Load Amps
SRD	— Split Ring Diffuser
TFT	— Thin Film Transistor
VFD	— Variable Frequency Drive
UI	— User Interface

HARDWARE

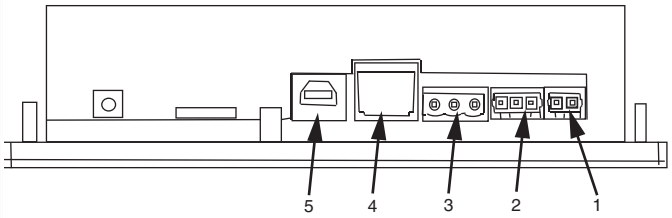
The PIC5 control system consists of one main control board, an input/output board (IOB) for purge control, and four IOB modules. All boards communicate via an internal LEN bus. PIC5 is also compatible with unit-mounted VFD options that utilize Modbus[1]. This application requires a LEN to Modbus protocol converter module for freestanding starters and VFDs.

Main Control Board — The main control board is supplied from a 24 VAC supply reference to earth ground. In the event of a power supply interrupt, the unit restarts automatically without the need for an external command. However, any faults active when the supply is interrupted are saved, and may in certain cases prevent a circuit or unit from restarting. Figure 1 shows the main control interface and connectors.

1. Modbus is a registered trademark of Schneider Electric.



PIC 5 CONTROL INTERFACE



1 - POWER SUPPLY CONNECTOR
2 - LEN CONNECTOR
3 - CCN CONNECTOR
4 - ETHERNET CONNECTOR
5 - USB CONNECTOR

PIC 5 BOTTOM VIEW

Fig. 1 — PIC5 Control Interface and Connectors

⚠CAUTION

Maintain the correct polarity when connecting the power supply to the boards. Otherwise, the boards may be damaged.

SIOB (Starfire Input/Output Board) — The SIOB is the purge control module, supplied from a 24VAC supply reference to earth ground.

IOB (Input/Output Board) — The IOB is supplied from a 24 VAC supply reference to earth ground.

IOB CONFIGURATION — The input/output boards can be configured for different types of input/output. If an input or output type is supported for the specific channel then it can be modified in the Configuration Menu as shown in Table 1:

Table 1 — IOB Configuration

ANALOG INPUT	
0	Disable
1	0 to 5 VDC
2	4 to 20 mA
3	10 kΩ (thermistor)
4	5 kΩ (thermistor)
5	Ohm (Shift_Dis)
6	100 Ohm RTD

ANALOG OUTPUT	
0	Disable
1	4 to 20 mA
2	0 to 10 VDC

19DV IOB COMPONENTS AND WIRING — The components listed in Tables 2-5 are available at the user's terminal block on the IOB. Some are available only if the unit is operating in Remote mode. Table 6 lists SIOB inputs and outputs. Figures 2-5 show IOB wiring diagrams and Fig. 6 is the legend. Figures 7-10 show additional control wiring.

Communication Cables — The communication transmission cables have the following electrical characteristics:

- 2 signal conductors and one ground conductor of 20 AWG or larger, 100% shielded
- One tinned copper braid (65% coverage)

Recommended cables are shown below:

USAGE	CABLE
Intra-Building	Belden 8772
High Temperature	Belden 85240
Plenum	Belden 89418

To avoid potential interference, route communication cables between the starter and the chiller control panels as far away as possible from high voltage cable and other likely disturbances. Always separate communication cables from other cables and always run wiring as directly as possible.

Table 2 — 19DV IOB1 Connections

DESCRIPTION	CHANNEL	TERMINAL	TYPE	OPTIONAL
Entering Chilled Water Temperature	AI1	J16-1,5	5 kΩ	—
Leaving Chilled Water Temperature	AI2	J16-2,6	5 kΩ	—
Entering Condenser Water Temperature	AI3	J16-3,7	5 kΩ	—
Leaving Condenser Water Temperature	AI4	J16-4,8	5 kΩ	—
Evaporator Refrigerant Liquid Temperature	AI5	J15-6,12	5 kΩ	—
Discharge Gas Temperature	AI6	J15-5,11	5 kΩ	—
Condenser Pressure	AI7	J15-4,10	5 VDC	—
Evaporator Pressure	AI8	J15-3,9	5 VDC	—
Chiller Status Output (ON=20mA, OFF=4mA, TRIPOUT=8mA, Not Off and Compressor not running=12mA)	AO1	J14-1,4	4 to 20 mA	Yes
Evaporator Flow Switch	DI1	J13-5 (5TB-9,10)	24 VAC	Yes, NO (dry contact)
Condenser Water Flow Switch	DI2	J13-6 (5TB-11,12)	24 VAC	Yes, NO (dry contact)
Remote Contact	DI3	J13-7 (5TB-13,14)	24 VAC	Yes, NO (dry contact); closed indicates start chiller signal
Remote Emergency Stop Input	DI4	J13-8 (5TB-15, 16)	24 VAC	Yes, NO (dry contact); closed indicates stop chiller signal
Economizer Bypass Valve	DO1	J12-7	24 VAC	Yes
Refrigerant Pump	DO2	J12-10	24 VAC	—
Chiller Alarm Relay	DO3	J12-2 (5TB-3,4)	24 VAC	Yes
Vapor Venting Line SV (Free cooling option)	DO4	J12-5	24 VAC	Yes

LEGEND
IOB — Input/Output Board
NO — Normally Open
SV — Solenoid Valve

NOTES:
1. See Fig. 2 for IOB1 wiring diagram.
2. For pressure readings, only Vout (output) terminal is indicated. See Fig. 2 for Vin (+) and ground (–).
3. Defaults are shown. In some cases the IOB can be configured differently depending on job requirements.

Table 3 — 19DV IOB2 Connections

DESCRIPTION	CHANNEL	TERMINAL	TYPE	OPTIONAL
Motor Winding Temperature 1	AI1	J16-1,5	5 kΩ	—
EC/HGBP Valve Feedback	AI3	J16-3,7	4 to 20 mA	Yes
Pump Output Pressure	AI5	J15-6,12	5 VDC	—
Bearing Outlet Pressure	AI6	J15-5,11	5 VDC	—
Bearing Inlet Pressure	AI7	J15-4,10	5 VDC	—
Auto Demand Limit Input	AI8	J15-3,9 (5TB-23,24)	4 to 20 mA	Yes
Refrigerant Leak Sensor	AI9	J15-2,8 (5TB,25,26)	4 to 20 mA	Yes
Pump Input Pressure	AI10	J15-1,7	5 VDC	—
Guide Vane 1 Output	AO1	J14-1,4	4 to 20 mA	—
EC/HGBP Modulating Output	AO3	J14-3,6	4 to 20 mA	Yes
Liquid Level Switch	DI2	J13-6	24 VAC	—
High Pressure Switch	DI3	J13-7,3	24 VAC	—
Ice Build Contact	DI4	J13-8,4, (5TB-17,18)	24 VAC	Yes, NO (dry contact)
Condenser Control Valve	DO1	J12-7	24 VAC	—
Evaporator Control Valve	DO2	J12-10	24 VAC	—
Condenser Filling Valve	DO3	J12-2	24 VAC	—
Economizer Isolation Valve (Liquid Bypass Option)	DO4	J12-5	24 VAC	—

LEGEND
EC — Envelope Control
HGBP — Hot Gas Bypass
IOB — Input/Output Board
NO — Normally Open

NOTES:
1. See Fig. 3 for IOB2 wiring diagram.
2. For pressure readings, only Vout (output) terminal is indicated. See Fig. 3 for Vin (+) and ground (–).
3. Defaults are shown. In some cases the IOB can be configured differently depending on job requirements.

Table 4 — 19DV IOB3 Connections

DESCRIPTION	CHANNEL	TERMINAL	TYPE	OPTIONAL
1st Stage Bearing Temperature	AI1	J16-1,5	5 kΩ	—
2nd Stage Bearing Temperature	AI2	J16-2,6	5 kΩ	—
Refrigerant Supply Bearing Temperature	AI3	J16-3,7	5 kΩ	—
Guide Vane 2 Actual Position Bearing Temperature	AI4	J16-4,8	4 to 20 mA	—
Remote Reset Temperature	AI5	J15-6,12 (5TB-27,28)	5 kΩ	Yes
Guide Vane 1 Actual Position	AI6	J15-5,11	4 to 20 mA	—
Common Chilled Water Supply (CHWS) Temperature	AI7	J15-4, 10 (5TB,29,30)	5 kΩ	Yes
Auto Water Temperature Reset	AI8	J15-3,9 (5TB-31,32)	4 to 20 mA	Yes
Common Chilled Water Return (CHWR) Temperature	AI9	J15-2, 8 (5TB-37,38)	5 kΩ	Yes
Head Pressure Output	AO1	J14-1,4	4 to 20 mA	Yes
Guide Vane 2 Output	AO3	J14-3, 6 (5TB-5,6)	4 to 20 mA	No
Spare Safety	DI3	J13,7 (5TB-19,20)	24 VAC	Yes, NO (dry contact)
Power Request Feedback	DI4	J13-4 (5TB-21,22)	24 VAC	Yes
Free Cooling Mode	DO3	J12-2 (5TB-5,6)	24 VAC	Yes
Power Request Output	DO4	J12-5 (5TB-7,8)	24 VAC	Yes

LEGEND
IOB — Input/Output Board
NO — Normally Open

NOTES:
1. See Fig. 4 for IOB3 wiring diagram.
2. For pressure readings, only Vout (output) terminal is indicated. See Fig. 4 for Vin (+) and ground (–).
3. Defaults are shown. In some cases the IOB can be configured differently depending on job requirements.

Table 5 — 19DV IOB4 Connections

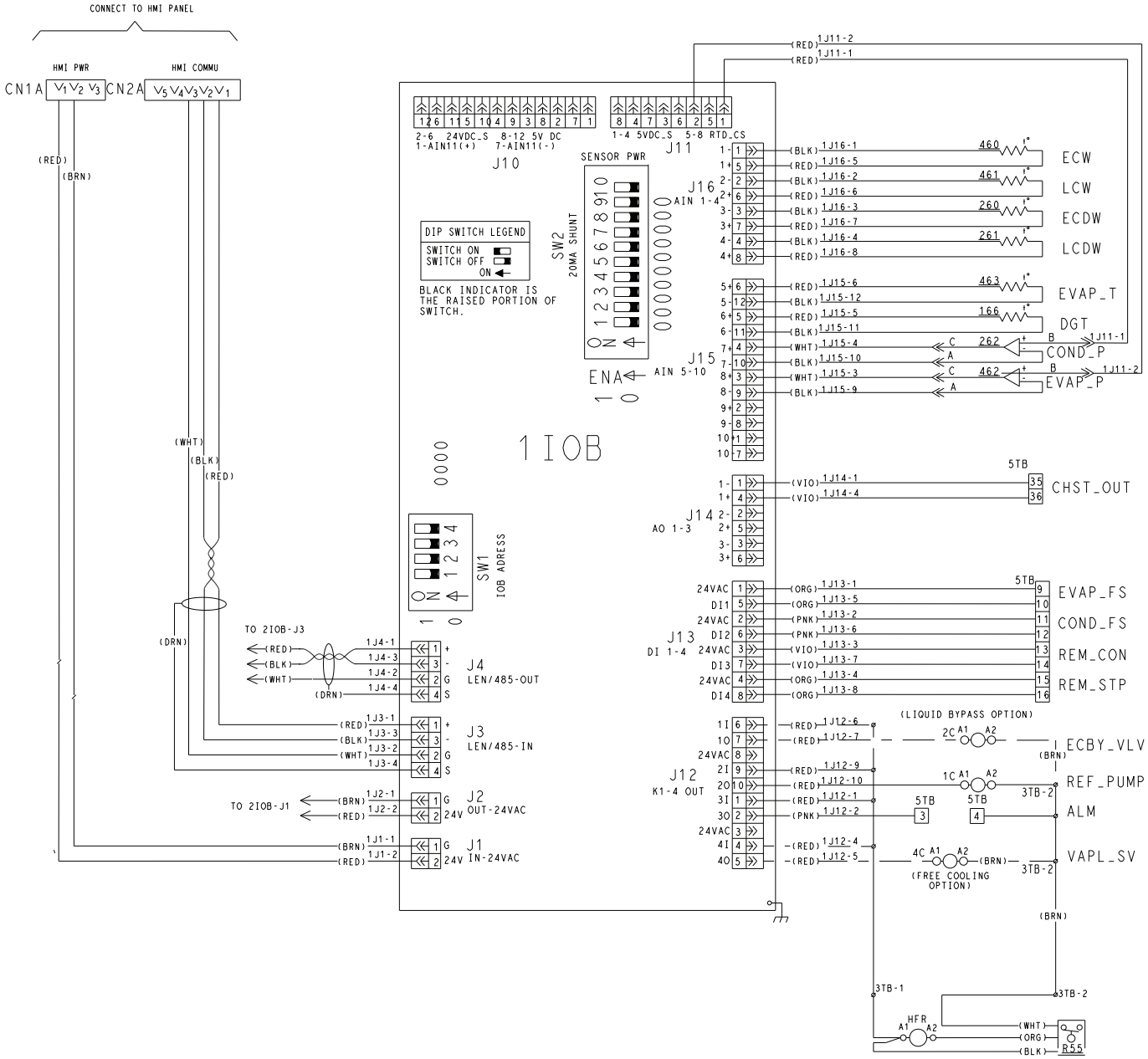
DESCRIPTION	CHANNEL	TERMINAL	TYPE	OPTIONAL
Leaving Condenser Water Pressure	AI3	J16-7	5 VDC	Yes
Entering Condenser Water Pressure	AI4	J16-8	5 VDC	Yes
Leaving Evaporator Water Pressure / Condenser Water Delta P	AI5	J15-6	5 VDC	Yes
Entering Evaporator Water Pressure / Chilled Water Delta P	AI6	J15-5	5 VDC	Yes
Evaporator Water Flow Measurement	AI8	J15-3, 9	4 to 20 mA	Yes
Condenser Water Flow Measurement	AI9	J15-2, 8	4 to 20 mA	Yes
Customer Alert	DI3	J13-3, 7 (5TB-63,64)	24 VAC	Yes, NO (dry contact)
Free Cooling Start Switch	DI4	J13-4, 8 (5TB-63,64)	24 VAC	Yes, NO (dry contact), closed = flow
Chilled Water Pump	DO1	J12-7 (5TB-67)	24 VAC	—
Condenser Water Pump	DO2	J12-10 (5TB-68)	24 VAC	—
Tower Fan High	DO3	J12-2 (5TB-69)	24 VAC	Yes
Tower Fan Low	DO4	J12-5 (5TB-70)	24 VAC	Yes

LEGEND
IOB — Input/Output Board
NO — Normally Open

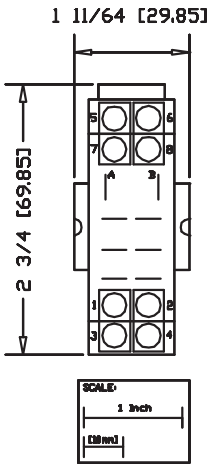
NOTES:
1. See Fig. 5 for IOB4 wiring diagram.
2. For pressure readings, only Vout (output) terminal is indicated. See Fig. 5 for Vin (+) and ground (–).
3. Defaults are shown. In some cases the IOB can be configured differently depending on job requirements.

Table 6 — SIOB Input/Output Descriptions

DESCRIPTION	CHANNEL	TERMINAL	TYPE	OPTIONAL
Purge Compressor Inlet Temperature	AI1	J25-1,2	5 kΩ	—
Low Level Switch Relay	DI1	J1-1, 2	24 VAC	—
High Level Switch Relay	DI2	J1-3, 4	24 VAC	—
Purge Condenser Valve	DO1	J2-2	24 VAC	—
Purge Compressor Valve	DO2	J2-1	24 VAC	—
Purge Pumpout Valve	DO3	J6-2	24 VAC	—
Purge Drainage Valve	DO4	J6-1	24 VAC	—
Purge Regeneration Valve	DO5	J23-2	24 VAC	—
Purge Discharge Valve	DO6	J22-2	24 VAC	—
Purge Vacuum Pump Relay	DO7	J7-7, 8	24 VAC	—
Purge Compressor Contactor	DO8	J7-5, 6	24 VAC	—
Purge Heater Contactor	DO10	J7-1, 2	24 VAC	—



NOTE: A suitable 24 VAC relay is Carrier part number 19XV05005503. Carrier recommends using a relay with a contact rating of 10 amp sealed RMS or greater.



19XV05005503 BASE DIMENSIONS
(REFERENCE)
DIMENSIONS IN INCHES [MM]

PART NO.	NO. OF PIN
19X4003501	2 PIN
19X4003502	4 PIN
19X4003503	6 PIN
19X4003504	8 PIN
19X4003505	10 PIN
19X4003506	12 PIN

LEGEND FOR FIG. 2-7

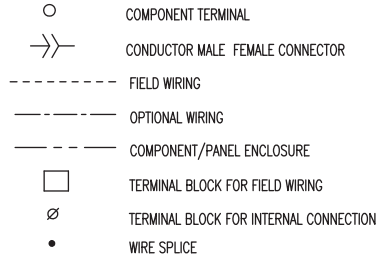


Fig. 2 — IOB 1

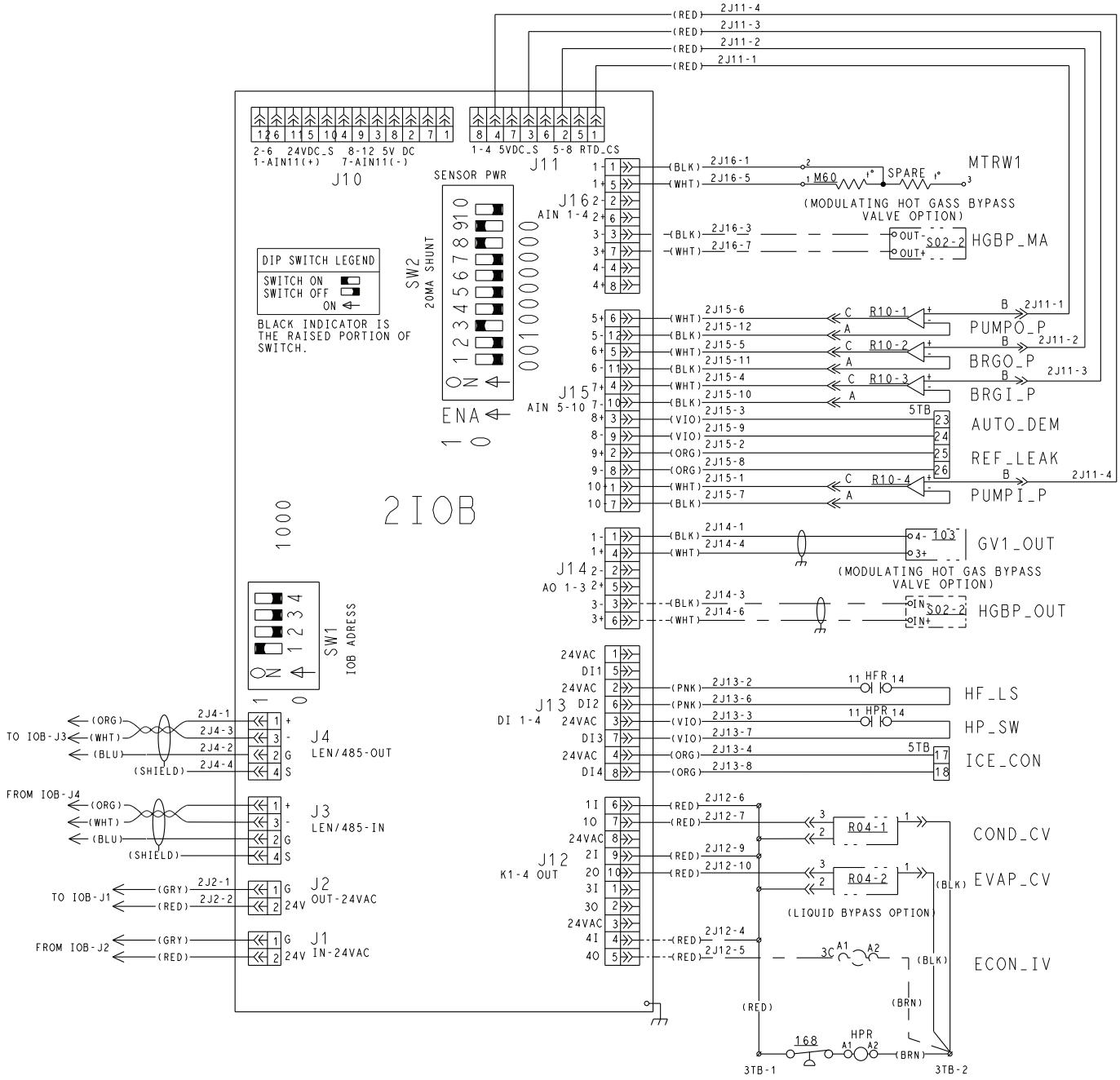

2J11-4
2J11-3
2J11-2
2J11-1
(RED)
12 6 11 5 10 4 9 3 8 2 7 1
2-6 24VDC_S 8-12 5V DC
1-AIN11(+) 7-AIN11(-)
J10
8 4 7 3 6 2 5 1
1-4 5VDC_S 5-8 RTD_CS
J11
SENSOR PWR
J16
AIN 1-4
SW2
20MA SHUNT
ON 1 2 3 4 5 6 7 8 9 10
0 0 1 0 0 0 0 0 0 0
ENA
DIP SWITCH LEGEND
SWITCH ON
SWITCH OFF
ON
BLACK INDICATOR IS THE RAISED PORTION OF SWITCH.
J15
AIN 5-10
2IOB
1000
SW1
IOB ADRESS
ON 1 2 3 4
J14
AO 1-3
J13
DI 1-4
J12
K1-4 OUT
24VAC
DI1
DI2
DI3
DI4
1I
1O
2I
2O
3I
3O
4I
4O
2J16-1
2J16-5
2J16-3
2J16-7
2J15-6
2J15-12
2J15-5
2J15-11
2J15-4
2J15-10
2J15-3
2J15-9
2J15-2
2J15-8
2J15-1
2J15-7
2J14-1
2J14-4
2J14-3
2J14-6
2J13-2
2J13-6
2J13-3
2J13-7
2J13-4
2J13-8
2J12-6
2J12-7
2J12-9
2J12-10
2J12-4
2J12-5
(BLK)
(WHT)
(VIO)
(ORG)
(PNK)
M60
SPARE
MTRW1
(MODULATING HOT GASS BYPASS VALVE OPTION)
S02-2
HGBP_MA
R10-1
R10-2
R10-3
R10-4
PUMPO_P
BRGO_P
BRGI_P
PUMPI_P
5TB
AUTO_DEM
REF_LEAK
GV1_OUT
(MODULATING HOT GAS BYPASS VALVE OPTION)
HGBP_OUT
HFR
HF_LS
HPR
HP_SW
ICE_CON
R04-1
R04-2
COND_CV
EVAP_CV
(LIQUID BYPASS OPTION)
ECON_IV
168
3TB-1
3TB-2
TO IOB-J3
FROM IOB-J4
TO IOB-J1
FROM IOB-J2
(SHIELD)
(GRY)
J4
LEN/485-OUT
J3
LEN/485-IN
J2
OUT-24VAC
J1
IN-24VAC

Fig. 3 — IOB 2

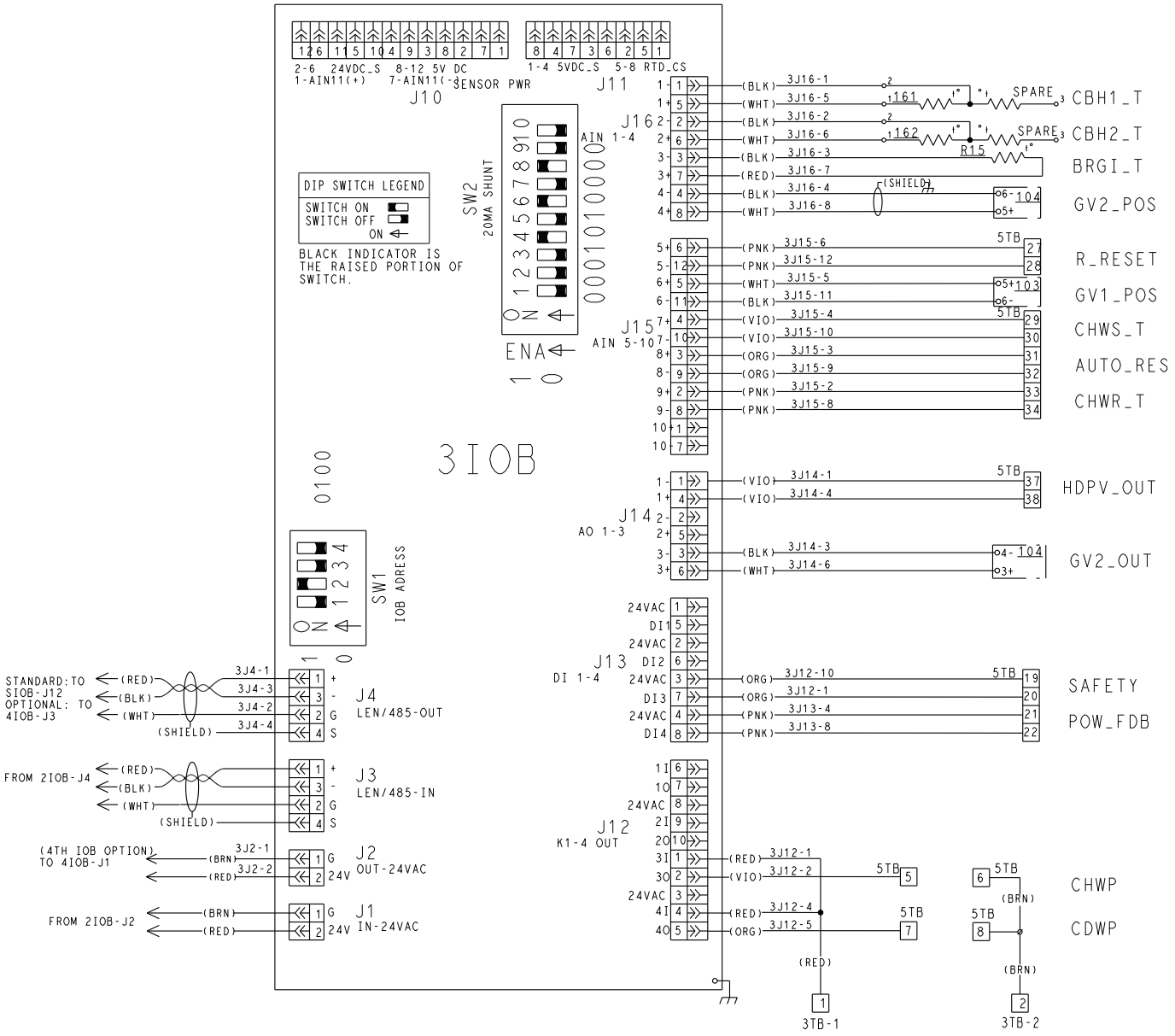
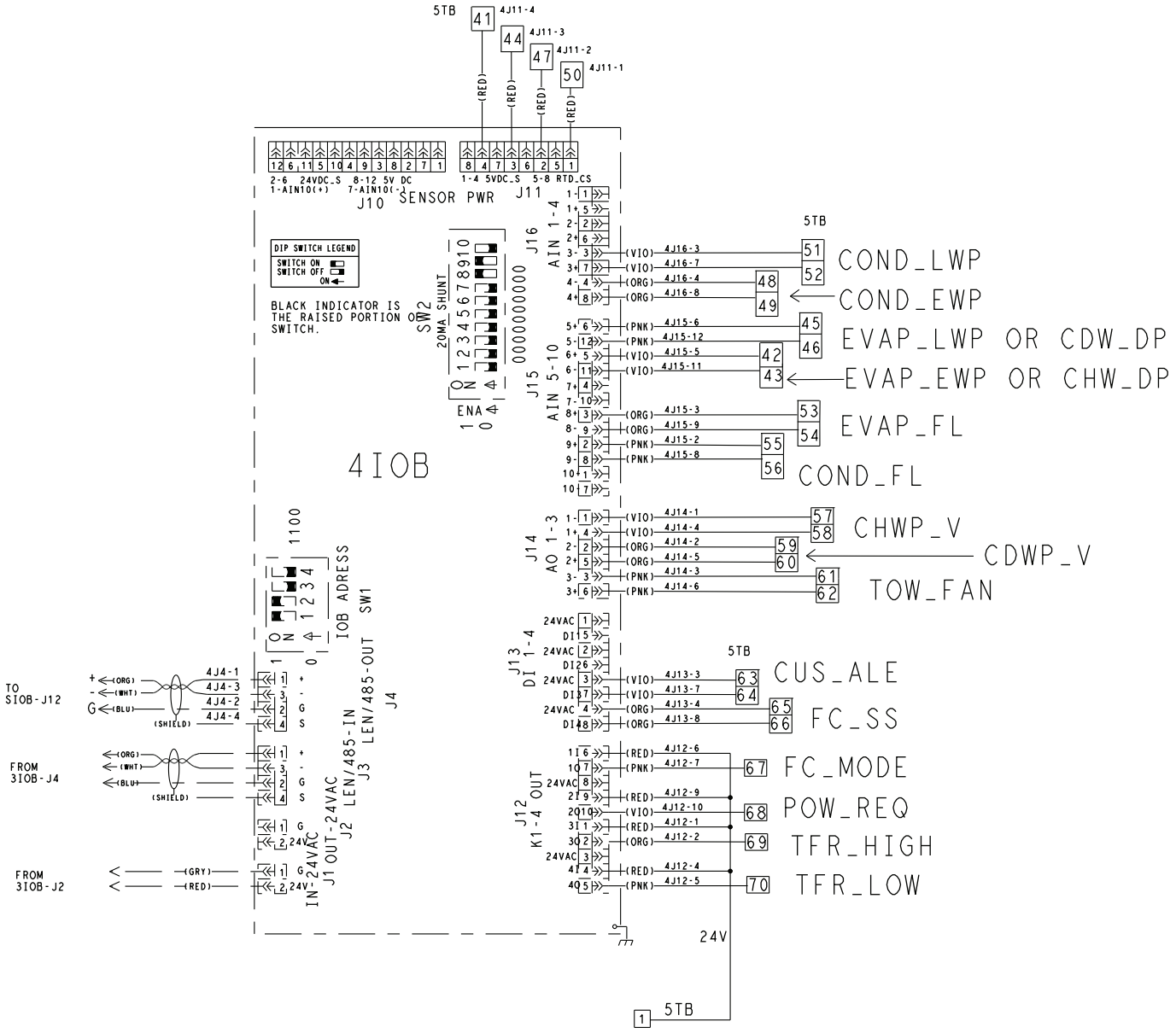

3IOB
J10
J11
J16
J15
J14
J13
J12
J4
J3
J2
J1
SW1
IOB ADRESS
SW2
20MA SHUNT
DIP SWITCH LEGEND
SWITCH ON
SWITCH OFF
ON
BLACK INDICATOR IS THE RAISED PORTION OF SWITCH.
2-6 24VDC_S 8-12 5V DC
1-AIN11(+) 7-AIN11(-) SENSOR PWR
1-4 5VDC_S 5-8 RTD_CS
AIN 1-4
AIN 5-10
AO 1-3
DI 1-4
K1-4 OUT
LEN/485-OUT
LEN/485-IN
OUT-24VAC
IN-24VAC
STANDARD:TO 5IOB-J12
OPTIONAL: TO 4IOB-J3
FROM 2IOB-J4
(4TH IOB OPTION) TO 4IOB-J1
FROM 2IOB-J2
SPARE
R15
CBH1_T
CBH2_T
BRGI_T
GV2_POS
R_RESET
GV1_POS
CHWS_T
AUTO_RES
CHWR_T
HDPV_OUT
GV2_OUT
SAFETY
POW_FDB
CHWP
CDWP
3TB-1
3TB-2

Fig. 4 — IOB 3



THIS TYPICAL DRAWING SHOWS THE CARRIER STANDARD PRESSURE TRANSDUCER WHICH IS 5VDC POWER SUPPLY.

Fig. 5 — IOB 4

LEGEND			ECBY_VLV	ECONOMIZER BYPASS VALVE			
⬭	DENOTES INTERNAL COMPONENT TERMINAL		ECDW	ENTERING CONDENSER WATER TEMPERATURE		461	LEAVING CHILLED WATER TEMPERATURE THERMISTOR
→⟩⟩—	DENOTES CONDUCTOR MALE/FEMALE CONNECTOR		ECON_IV	ECONOMIZER VENT VALVE ACTUATOR		462	EVAPORATOR PRESSURE TRANSDUCER
			ECW	ENTERING CHILLED WATER TEMPERATURE		463	EVAPORATOR REFRIGERANT LIQUID TEMPERATURE THERMISTER
- - - - - - -	FIELD WIRING		EVAP_CV	EVAPORATOR CONTROL VALVE		M60	MOTOR WINDING TEMPERATURE 1(THERMISTOR/PT100)
— ——— —	OPTIONAL WIRING					P00	PURGE DEVICE
——— · · ———	COMPONENT/PANEL ENCLOSURE		EVAP_EWP	ENTERING EVAPORATOR WATER PRESSURE		R04-1	CONDENSER CONTROL VALVE
⏚	SHIELD WIRE		EVAP_FL	EVAPORATOR WATER FLOW MEASUREMENT		R04-2	EVAPORATOR CONTROL VALVE
⟩⟨⟩⟨	TWISTED WIRE		EVAP_FS	EVAPORATOR WATER FLOW SWITCH		R10-1	REFRIGERANT PUMP OUTLET PRESSURE TRANSDUCER
▭	TERMINAL BLOCK FOR FIELD WIRING		EVAP_LWP	LEAVING EVAP WATER PRESSURE		R10-2	BEARING OUTLET PRESSURE TRANSDUCER
•	WIRE SPLICE		EVAP_P	EVAPORATOR PRESSURE		R10-3	BEARING INLET PRESSURE TRANSDUCER
⌀	INTERNAL TERMINAL BLOCK/TERMINAL		EVAP_T	EVAPORATOR REFRIGERANT TEMPERATURE		R10-4	REFRIGERANT PUMP INLET PRESSURE TRANSDUCER
			FC_MODE	FREE COOLING MODE		R15	BEARING REF SUPPLY TEMP THERMISTOR
BLK	BLACK		FC_SS	FREE COOLING START SWITCH		R45	REFRIGERANT PUMP
BLU	BLUE		FIRE_LOCK	FIRE ALARM INTERLOCK		R55	HIGH FLOAT LIQUID LEVEL SWITCH
BRN	BROWN		GV1/2_POS	IGV1/2 ACTUAL POS		S01-2	HIGH FLOAT LIQUID LEVEL SWITCH
GRN	GREEN		GV1/2_OUT	IGV1/2 OUTPUT		S02-1	ECONOMIZER VENT VALVE ACTUATOR
GRY	GREY		HDPV_OUT	HEAD PRESSURE OUTPUT		S02-2	MODULATING HOT GAS CONTROL VALVE ACTUATOR
RED	RED		HGBP_MA	MODULATING HOT GAS VALVE FEEDBACK		S02-3	FREE COOLING VENT VALVE ACTUATOR
ORG	ORANGE		HGBP_OUT	MODULATING HOT GAS VALVE OUTPUT MA			INSTRUMENT CODE(WITHIN THE CONTROL PANEL)
WHT	WHITE		HF_LS	HIGH FLOAT LIQUID LEVEL SWITCH		1C	REFRIGERANT PUMP CONTACTOR
YEL	YELLOW		HP_SW	HIGH PRESSURE SWITCH		2C	LIQUID BYPASS VALVE RELAY
G/Y	GREEN/YELLOW		ICE_CON	ICE BUILD CONTACT		3C	ECONOMIZER VENT VALVE RELAY
CONTROL ABBREVIATION LIST			LCDW	LEAVING CONDENSER WATER TEMPERATURE		4C	FREE COOLING VENT VALVE RELAY
ALM	CHILLER ALARM		LCW	LEAVING CHILLED WATER TEMPERATURE		1~3CB	MICRO CIRCUIT BREAKER
AUTO_DEM	DEMAND LIMIT INPUT		MTRW1	MOTOR WINDING TEMPERATURE 1		1FU	FUSE,5A,TIME-DELAY,13/32" X 1-1/2"
AUTO_RES	AUTO WATER TEMP RESET		PUMPI_P	PUMP INLET PRESSURE		2FU	FUSE,5A,TIME-DELAY,13/32" X 1-1/2"
BRGI_P	BEARING INLET PRESSURE		PUMPO_P	PUMP OUTLET PRESSURE		1-4 IOB	1-4 INPUT OUTPUT BOARD 1-4
BRGI_T	BEARING REF SUPPLY TEMP		REF_LEAK	REFRIGERANT LEAK DETECTOR		1TB	TERMINAL BLOCK FOR POWER CONNECTION
BRGO_P	BEARING OUTLET PRESSURE		REF_PUMP	REFRIGERANT PUMP		2TB	INTERNAL 115/120 V TERMINAL BLOCK
CBH1_T	1ST STAGE BEARING TEMP		REM_CON	REMOTE CONTACT INPUT		3TB	INTERNAL 24V TERMINAL BLOCK
CBH2_T	2ND STAGE BEARING TEMP		TFR_HIGH	TOWER FAN HIGH		4TB	TERMINAL BLOCK FOR VFD CONNECTION
CDWP	CONDENSER WATER PUMP		TFR_LOW	TOWER FAN LOW		5TB	TERMINAL BLOCK FOR CUSTOMER OPTIONAL CONNECTION
CDWP_V	CONDENSER WATER PUMP(VARIABLE SPEED OUTPUT)		TOW_FAN	TOWER FAN(VARIABLE)			
CHWP	CHILLED WATER PUMP		VAPL_SV	VAPOR VENTING LINE SV		7TB	230V/115V TERMINAL BLOCK (PURGE PANEL)
CHWP_V	CHILLED WATER PUMP(VARIABLE SPEED OUTPUT)		INSTRUMENT CODE (OUTSIDE CONTROL PANEL REFER PID DRAWING)			1TR	TRANSFORMER 1 230V-115V/24V 100VA
CHST_OUT	CHILLER RUNNING(ON/OFF/READY)		103	1ST STAGE IGV		2TR	TRANSFORMER 2 230V-115V/24V 100VA
COND_CV	CONDENSER CONTROL VALVE		104	2ND STAGE IGV		CN1A/B	CONNECTOR FOR HMI POWER
COND_DCV	CONDENSER DRAIN VALVE		161	1ST BEARING TEMP THERMISTOR		CN2A/B	CONNECTOR FOR HMI COMMUNICATION
COND_EWP	ENTERING CONDENSER WATER PRESSURE		162	2ND BEARING TEMP THERMISTOR		HFR	HIGH FLOAT LEVEL SWITCH
COND_FL	CONDENSER WATER FLOW MEASUREMENT		166	2ND STAGE COMPRESSOR DISCHARGE TEMPERATURE THERMISTOR		HPR	HIGH PRESSURE SWITCH RELAY
COND_FS	CONDENSER WATERFLOW SWITCH		168	HIGH PRESSURE SWITCH		HMI	HMI TOUCH SCREEN AND MAIN BOARD SAIA
COND_LWP	LEAVING COND WATER PRESSURE		260	ENTERING CONDENSER WATER TEMPERATURE THERMISTOR		SIOB	STANDARD INPUT OUTPUT BOARD (PURGE PANEL)
COND_P	CONDENSER PRESSURE		261	LEAVING CONDENSER WATER TEMPERATURE THERMISTOR		TB-G	COPPER TERMINAL BLOCK FOR GROUND
CUS_ALE	CUSTOMER ALERT		262	CONDENSER PRESSURE TRANSDUCER			
DGT	COMPRESSOR DISCHARGE TEMPERATURE		460	ENTERING CHILLED WATER TEMPERATURE THERMISTOR			

Fig. 6 — 19DV Control Panel Abbreviations

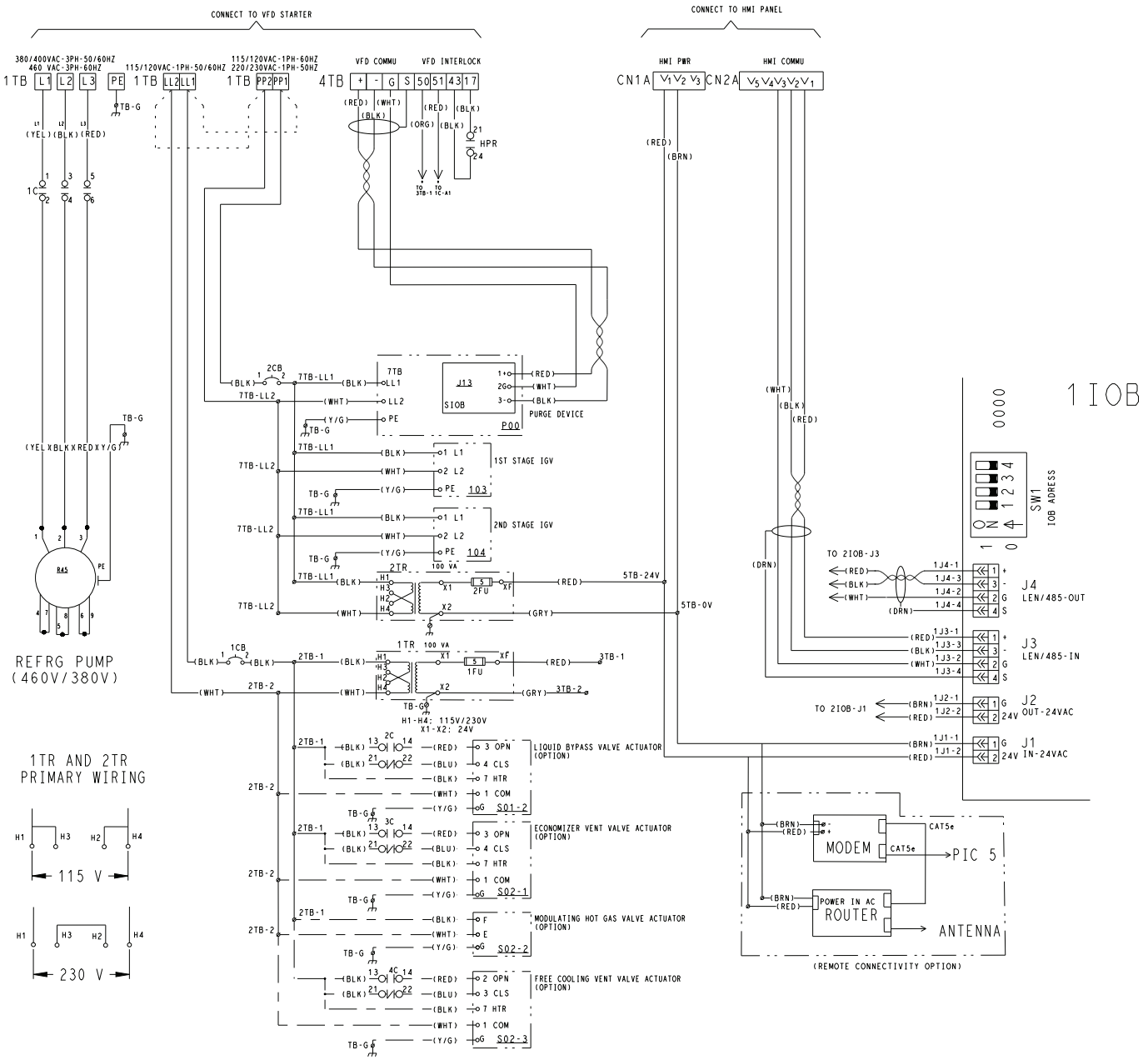


Fig. 7 — 19DV Control Wiring

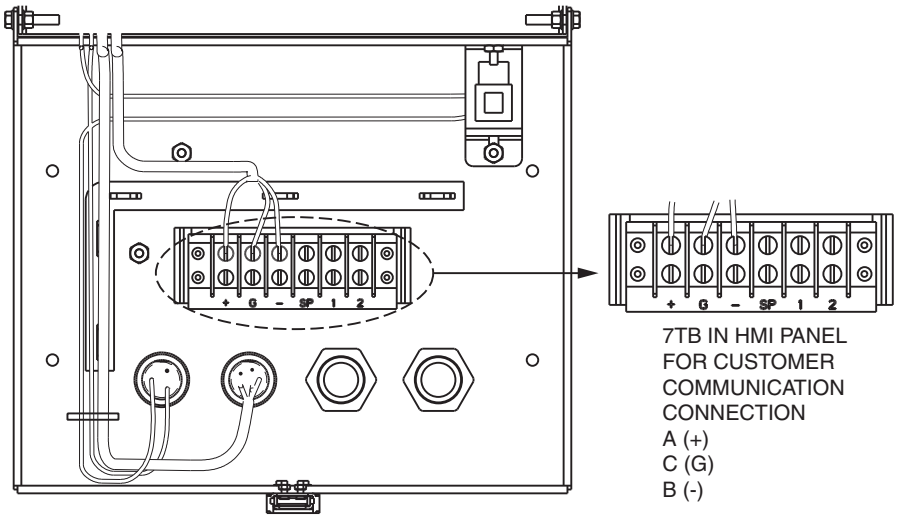


Fig. 8 — HMI Panel

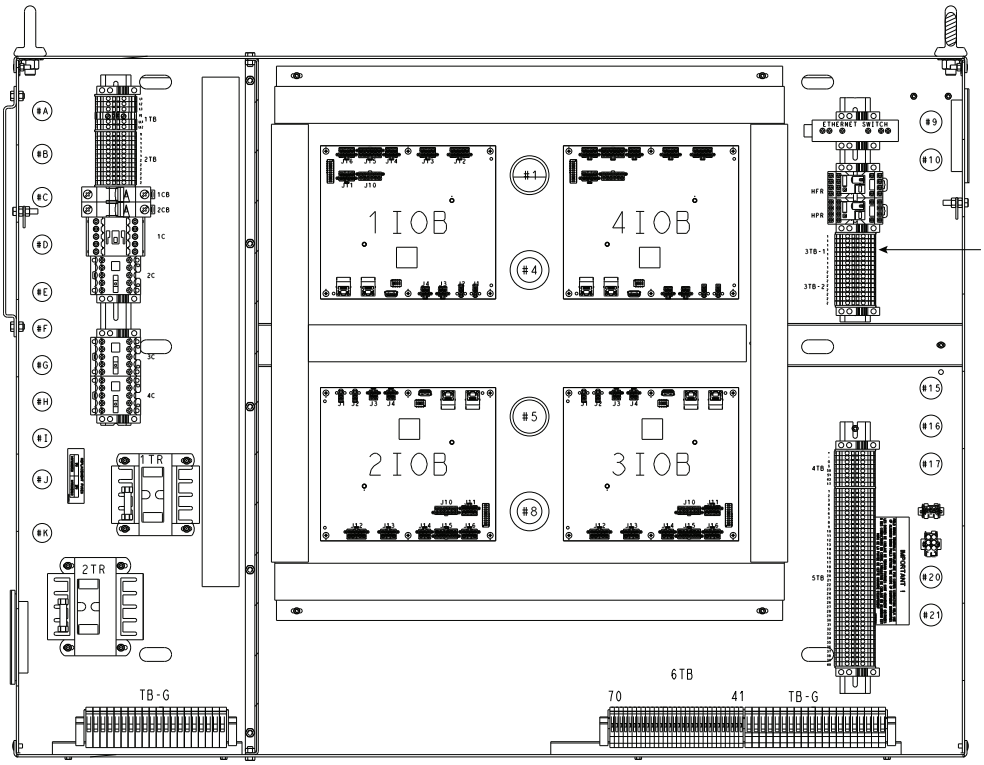


Fig. 9 — 19DV Control Panel

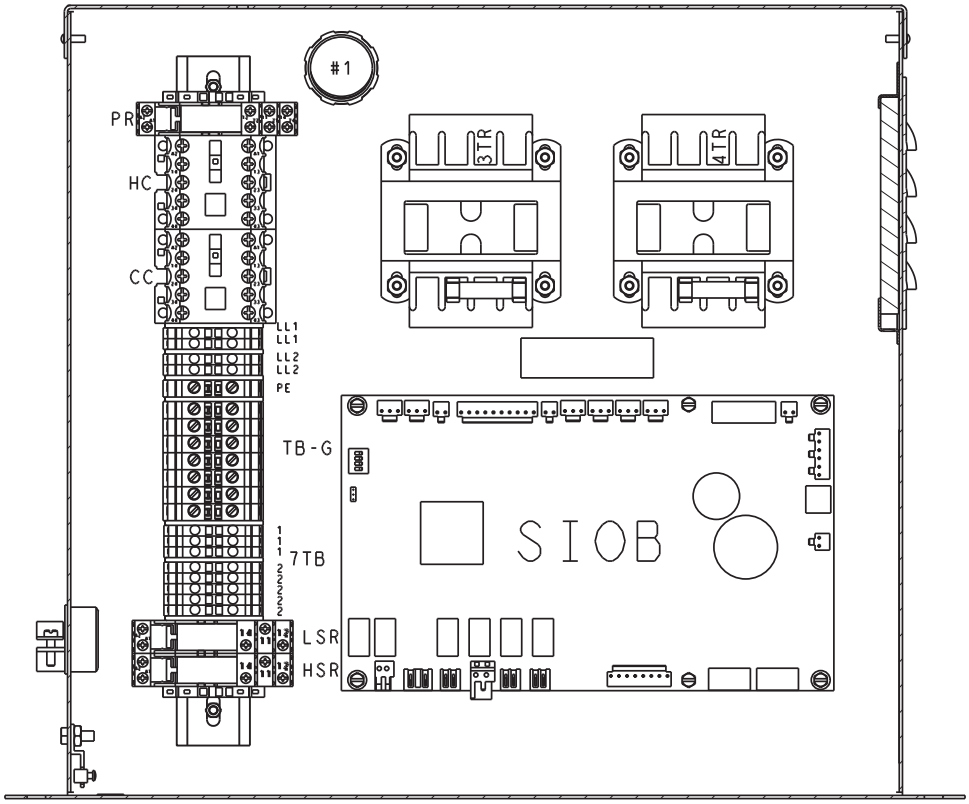


Fig. 10 — 19DV Purge Panel

Sensors

PRESSURE TRANSDUCERS — Pressure transducers measure and control the pressures in the unit. These electronic sensors deliver 0 to 5 VDC. The transducers can be calibrated through the controller. The pressure transducers are connected to the IOBs. See Table 7.

Table 7 — Pressure Transducers

PRESSURE TRANSDUCER	PURPOSE
Pump Input Pressure	Measures the pressure at the input of the refrigerant pump
Pump Output Pressure	Measures the pressure at the output of the refrigerant pump
Bearing Inlet Pressure	Measures the pressure at the bearing inlet
Bearing Outlet Pressure	Measures the pressure at the bearing outlet
Evaporator	Measures evaporator pressure
Condenser	Measures condenser pressure
Evaporator Water Pressure Difference	(Optional) Measures pressure difference between entering and leaving water.
Condenser Water Pressure Difference	(Optional) Measures pressure difference between entering and leaving water.
Evaporator Entering Water	(Optional) Measures pressure of evaporator entering water
Evaporator Leaving Water	(Optional) Measures pressure of evaporator leaving water
Condenser Entering Water	(Optional) Measures pressure of condenser entering water
Condenser Leaving Water	(Optional) Measures pressure of condenser leaving water

TEMPERATURE SENSORS — The system uses electronic sensors to measure and control the temperatures in the unit. There are three types of temperature sensors: 5K thermistor, 10K thermistor, and RTD (resistance temperature detector, 100 ohm, 3-wire) based on IOB channel configurations. The temperature sensor range is –40°F (–40°C) to 245°F (118°C). See Table 8.

Table 8 — Temperature Sensors

TEMPERATURE SENSOR	PURPOSE
Entering Chilled Water	Measures entering evaporator water temperature
Leaving Chilled Water	Measures leaving evaporator water temperature
Entering Condenser Water	Measures entering condenser water temperature
Leaving Condenser Water	Measures leaving condenser water temperature
Evaporator Refrigerant Liquid	Measures evaporator refrigerant liquid temperature
Compressor Discharge	Measures compressor discharge temperature
1st Stage Bearing	Measures the temperature of the bearings in the first stage of the compressor
2nd Stage Bearing	Measures the temperature of the bearings in the second stage of the compressor
Bearing Refrigerant Supply	Measures the temperature of the refrigerant supply for the bearings
Chilled Water Supply (Optional)*	Measures the temperature of the chilled water supply
Chilled Water Return (Optional)*	Measures the temperature of the chilled water return
Motor Winding	Measures the temperature of each phase of the compressor motor

* Separate inputs used when the chiller is in network mode.

NOTE: Text in parentheses indicates applicable product.

Controls Outputs

EVAPORATOR/CONDENSER WATER PUMP — The controller can regulate an optional evaporator/condenser water pump.

INLET GUIDE VANE — The inlet guide vane adjusts the refrigerant vapor flow into the compressor to adapt to change in the operating conditions of the machine. To adjust the refrigerant flow, the guide vane opens or closes to vary the cross-section of the refrigerant path. The high degree of accuracy with which the guide vane is positioned ensures that the flow of refrigerant is precisely controlled.

ECONOMIZER DAMPER VALVE — The economizer damper control opens or closes the economizer damper valve to maintain a minimum refrigerant pressure difference between the evaporator and economizer.

ENVELOP CONTROL VALVE — The modulating Envelop Control valve artificially loads the chiller and keeps it running under low load conditions or helps to prevent surge conditions. Since this function can also reduce the operating efficiency of the machine, this is a user-selectable and configurable option.

VFD — The VFD modifies motor frequency to allow compressor start-up and capacity control. The VFD controls continually monitor parameters in order to ensure compressor protection. Should a problem occur, the controller triggers an alarm and the compressor is stopped.

PIC5 USER INTERFACE

The PIC5 Human Machine Interface (HMI) is a color 10.4-in. TFT touch screen. Navigation is either direct from the touch screen interface or by connecting to a web interface at the Ethernet IP port of the controller. The navigation menus are the same for both connection methods.

Web Connection — Two web connections may be authorized at the same time. When two users are connected simultaneously, there is no priority between users; that is, the last modification is in effect regardless of the user.

Connection is from a personal computer using a Java-enabled web browser. See the section Touch Screen Settings for the Controller on page 44 for configuration instructions. The minimum browser configuration includes:

- Microsoft Internet Explorer (version 8 or higher) or Mozilla Firefox (version 3.5.2 or higher). In the advanced connection options, add the unit address to the address list. Do not use a proxy server.
- Java platform (version 6 or higher). In the control panel, deselect (uncheck) the option that allows storing temporary internet files and use a direct connection.

To access the PIC5 user interface, enter the IP address of the unit in the address bar of the web browser. The IP address can be viewed or changed from the PIC5 interface. For more infor-

General Interface Features

ICONS — Table 9 shows general interface icons.

Table 9 — Interface Icons

ICON	MEANING
	Green: Indicates unit is running Gray: Indicates unit is off
	Home
	Main menu
	Indicates user is logged off
	Indicates user is logged in
	Gray: Indicates no alarm or alert is active Red: Indicates alarm or alert
	Back (not visible in main menu)
	Previous and next screen

SCREENS — The Human Machine Interface includes the following screens:

- Welcome screen
- Home screen, which displays the main parameters
- Menu screens for navigation
- Data/configuration screens, which list the parameters by type
- Operating mode selection screen
- Password entry and language selection screen
- Parameter modification screen
- Time schedule screen

If the interface is not used for a long period, it goes into screen-saver mode and displays a black screen. However, the control is always active and the unit operating mode remains unchanged. When the user presses the black screen, the Welcome screen is displayed.

Welcome Screen —The Welcome screen (see Fig. 11) is displayed when the unit is switched on or when the user presses the screen when the interface has gone into screen-saver mode. The Welcome screen displays the current software version number. To exit from this screen, press the Home icon .

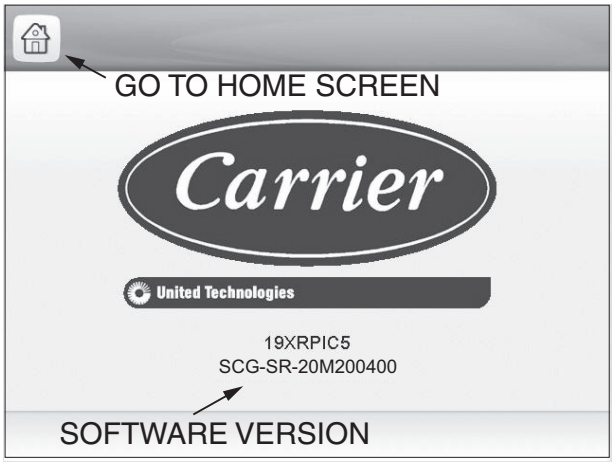


Fig. 11 — Welcome Screen

System Overview (Home) Screen — Figure 12 shows the system overview screen. Press a component image to see current status. For details, see Status Display Screens on page 17.

LEGEND

1	—	Home Screen Access Button
2	—	Main Menu Access Button
3	—	User Login Screen Access Button
4	—	Unit Start/Stop Access Button
5	—	Alarm Menu Access Button
6	—	Condenser Saturated Pressure and Temperature
7	—	Evaporator Saturated Pressure and Temperature
8	—	Guide Vane 2 Position Percentage
9	—	Motor Load Current Percentage
10	—	Guide Vane 1 Position Percentage
11	—	Condenser Water Inlet and Outlet Temperature
12	—	First Stage Bearing Temp
13	—	Refrigerant Pressure Differential
14	—	Second Stage Bearing Temp
15	—	Evaporator Water Inlet and Outlet Temperature
16	—	VFD Status

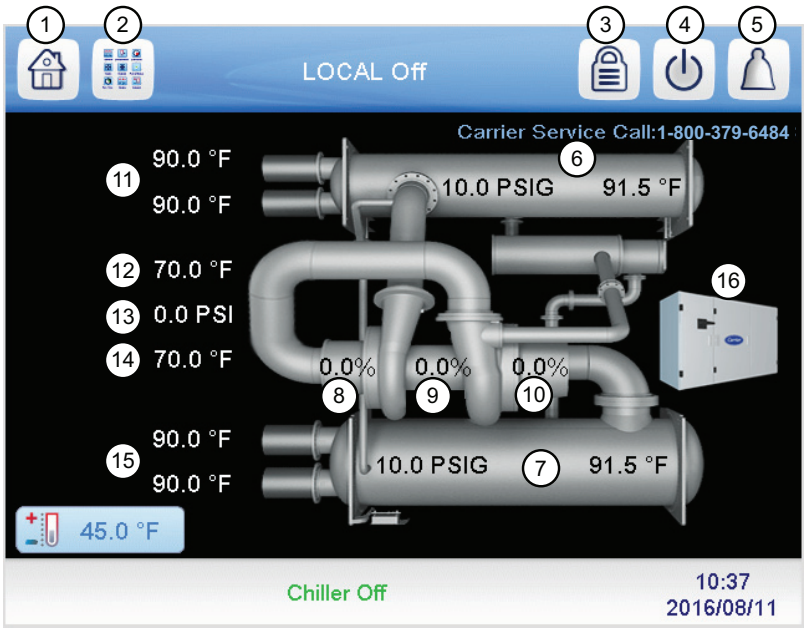


Fig. 12 — System Overview (Home) Screen

Messages — The Set Point screen, On/Off screen, User Login screen, and Main Menu screens described in the next sections may display status messages at the bottom of the screen. See Table 10.

Table 10 — Status Messages

MESSAGE	STATUS
COMMUNICATION FAILURE!	Equipment controller did not respond while reading the table content.
ACCESS DENIED!	Equipment controller does not allow access to one of the table data blocks.
LIMIT EXCEEDED!	The value entered exceeds the table limits.
Save changes?	Modifications have been made. The interface waits to confirm exit; press Save or Cancel.
HIGHER FORCE IN EFFECT!	Equipment controller rejected a Force or Auto command because the interface force level is lower than that of the equipment controller.

Set Point Screen — The Set Point screen displays the current set point table. See Fig. 13. For more information about these settings, see the Set Point section on page 19.



Fig. 13 — Set Point Screen

Unit Start/Stop Screen — The Unit Start/Stop screen allows the user to select the unit operating mode.

For unit start-up, with the unit in Local Off mode, press the gray Off icon to display the list of operating modes. Select the required mode to start up the chiller. See Fig. 14.

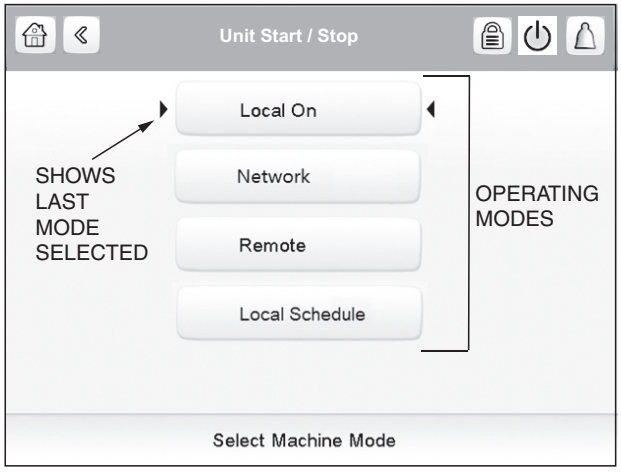


Fig. 14 — Unit Start/Stop Screen

When a start-up mode is selected, a status screen displays the progress of the start-up sequence (Fig. 15).

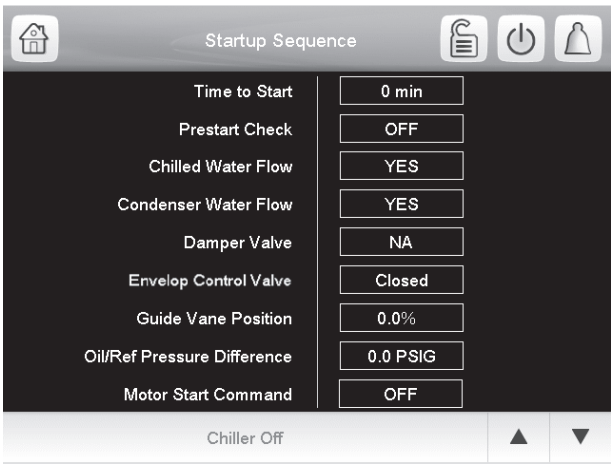


Fig. 15 — Start-Up Sequence Progress

To stop the unit, press the green On icon . Then press Confirm Stop to stop the unit, or press the Back icon to cancel the stop and return to the previous screen. See Fig. 16.

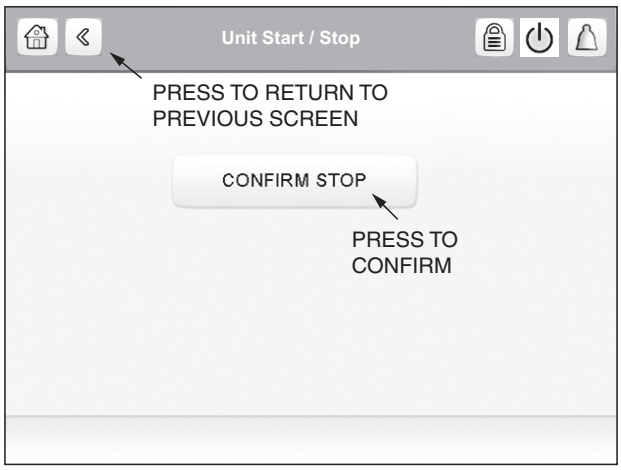
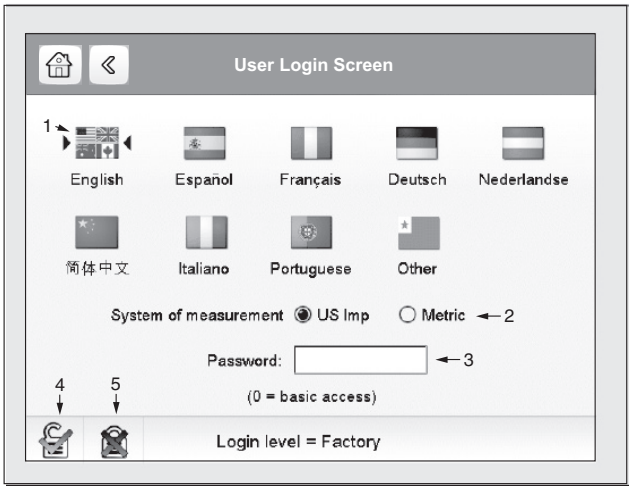


Fig. 16 — Confirm Stop

User Login Screen — Use this screen to login or log off and to set interface language and measurement system. See Fig. 17. There are three levels of password access:

- Basic access allows the user to view all data without a password.
- User access gives the user the additional ability to view and change many configuration settings, including set points and schedules. The default User password is 1111.
- Factory access allows access to critical factory configuration settings and only authorized users will have access to these menus.



LEGEND

1 — Arrows indicate active language

2 — Measurement system (Metric or US Imperial)

3 — Enter password

4 — Login

5 — Log off

Fig. 17 — User Login Screen

Main Menu Screen — To access the Main Menu screen, press the Main Menu icon . Press the icons on the screen to access the appropriate table or menu. Press the arrows at the bottom right corner, if present, to navigate through pages of tables. The options shown on the Main Menu screen depend on the user's level of access (see the section User Login Screen on page 15). Figure 18 shows the Main Menu screen as it appears for the User level of access.

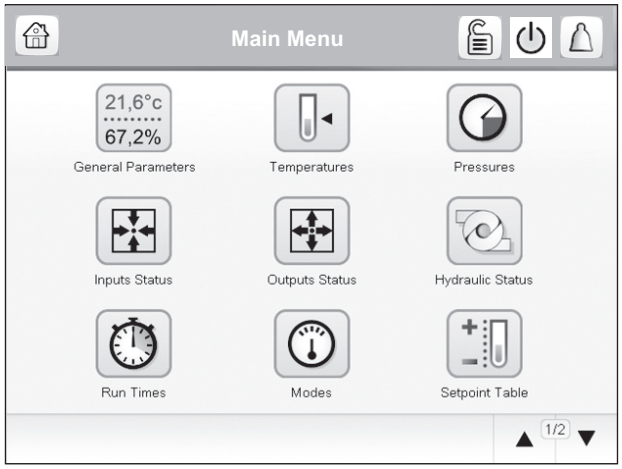


Fig. 18 — Main Menu Screen (User Access)

Configuration Screen — To access the Configuration menu, press the Configuration icon on page 2 of the Main Menu (User, Service, or Factory access level). The Configuration menu opens. Then press the General Configuration icon on the Configuration menu. Press the arrows at the bottom right corner to navigate through pages. See Fig. 19. (Certain configuration settings are available only for Service or Factory access levels.) Refer to Appendix A, page 58 for more information about Configuration options.

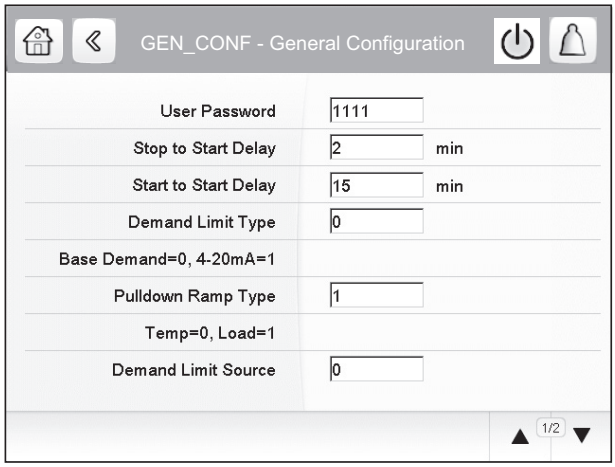


Fig. 19 — General Configuration Screen

After changing a value, press Return. The Save and Cancel icons are displayed. Press the Save icon to save the changed value. Figure 20 shows an example.

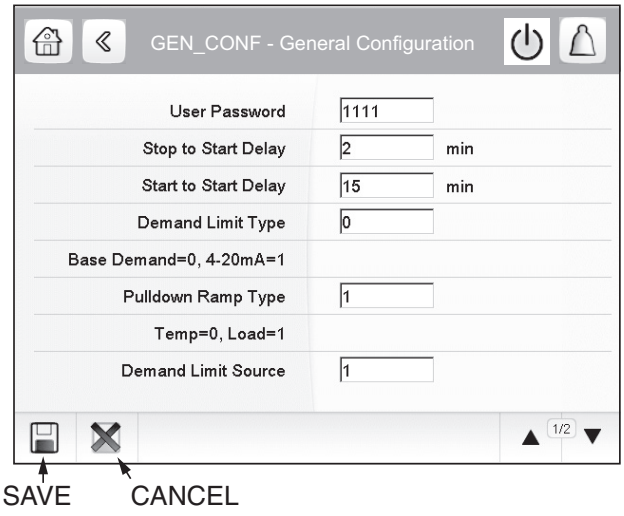


Fig. 20 — Saving a Change (General Configuration)

Schedule Menu Screen — To access the Schedule menu screen, press on the Configuration menu screen. Select Local Schedule, Ice Build Schedule, or Network Schedule as applicable. Press the arrows at the bottom right corner to navigate through the time periods. See Fig. 21.

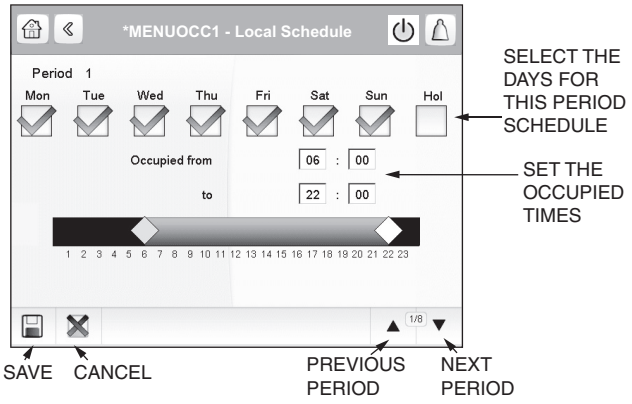


Fig. 21 — Local Schedule Menu Screen

Status Display Screens — Figure 22 shows the system status overview (home) screen. Press any component on the screen to see the status of that component. Press the arrows at the bottom right corner to navigate through the component status displays. Fig. 23-27 show the component status displays.

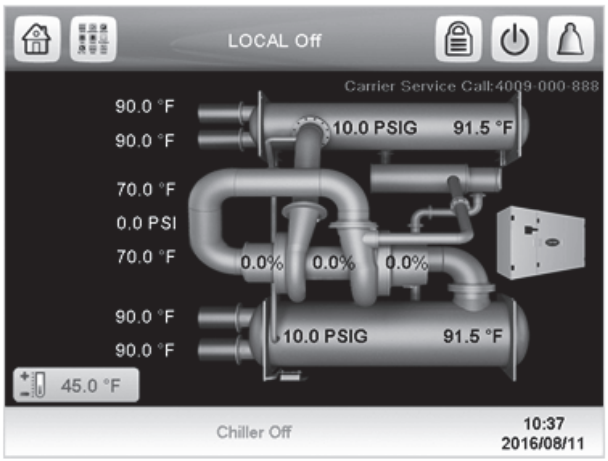


Fig. 22 — System Overview (Home) Screen

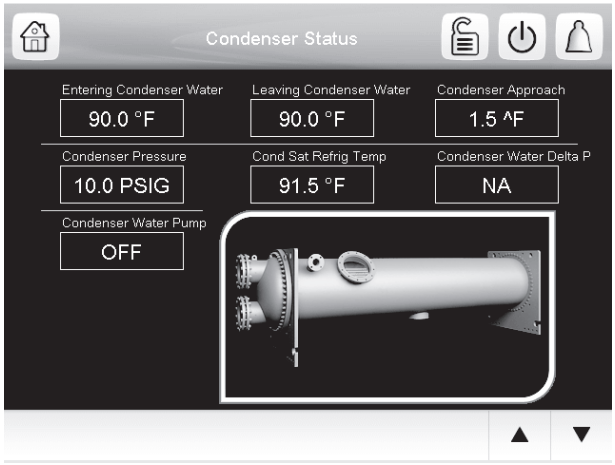


Fig. 23 — Condenser Status



Fig. 24 — Evaporator Status

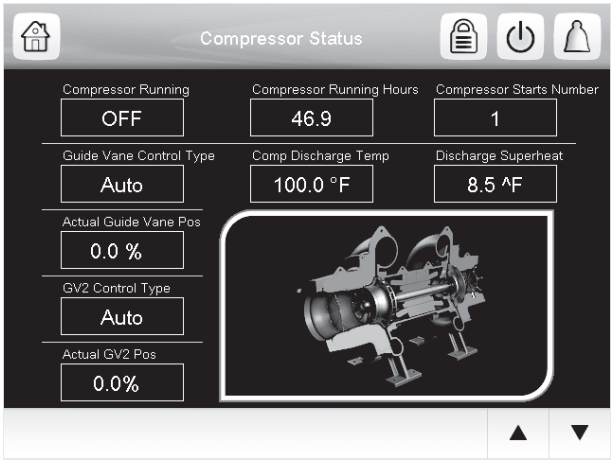


Fig. 25 — Compressor Status

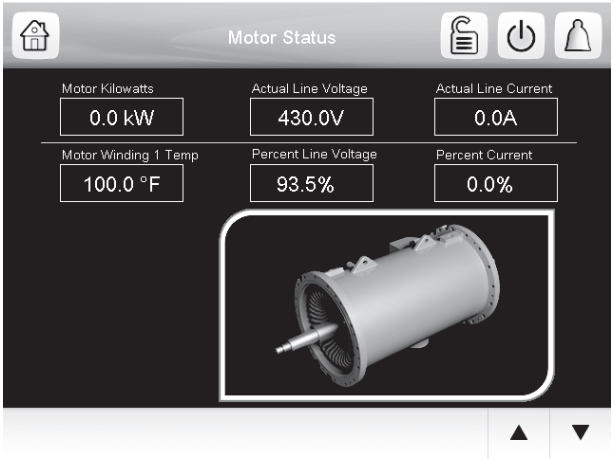


Fig. 26 — Motor Status

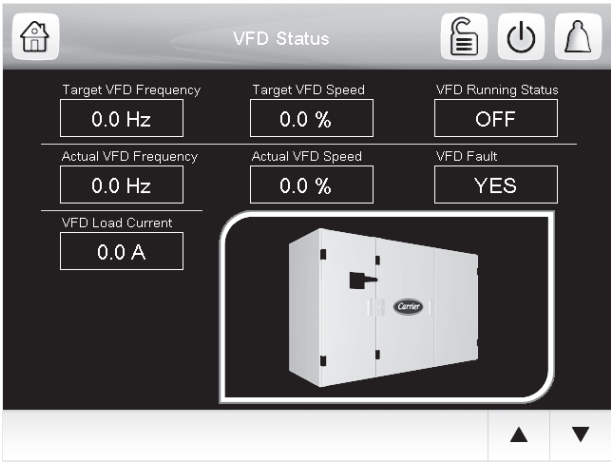


Fig. 27 — VFD Status

PIC5 CONTROL OPERATION

Start-Stop Control — This function controls the chiller START-STOP command. The four selectable control modes are as follows: LOCAL, LOCAL SCHEDULE, REMOTE, or NETWORK. See Unit Start/Stop Screen on page 15. Specific control sources are valid to start or stop the chiller for each control mode.

LOCAL — When the control mode is LOCAL, the chiller can be started by the "Local ON" button on the PIC5 interface screen, and can be shut down by the Confirm Stop button on the screen or by the EMSTOP software point.

LOCAL SCHEDULE — When the control mode is LOCAL SCHEDULE, the chiller will be started automatically if the configurable local schedule is Occupied. The chiller can be shut down by the unoccupied schedule, the Stop button on the PIC5 interface screen, or by the EMSTOP software point.

REMOTE — When the control mode is REMOTE, the chiller will be started by the remote discrete input (REM_CON) located on the I/O board. The chiller can be shut down by the remote discrete input, the Stop button on the PIC5 interface screen, or by the EMSTOP software point.

NETWORK — When the control mode is NETWORK, the chiller can be started and stopped by the CHIL_S_S and CHIL_OCC software points, which are written by other equipment through network commands and network schedule (both must be TRUE for chiller to start). To shut down the chiller, use the EMSTOP software point or stop using the HMI.

NOTE: There is a STOP OVERRIDE point in the GENUNIT table. If this point is enabled the chiller cannot be started.

Compressor Run Status — Compressor run status is shown at the top of the system overview (home) screen. Table 11 lists chiller status numbers, names, and descriptions.

Chiller Start-Up Sequence

PRE-START CHECK — Once start-up begins, the controller performs a series of pre-start tests to verify that all pre-start alerts and safeties are within limits. Progress is shown on the Startup Sequence screen (see Fig. 28). This screen can be accessed by touching the mode title (top blue bar) of the home screen. Table 12 lists pre-start alert and alarm conditions.

Table 11 — Compressor Run Status

STATUS NO.	STATUS NAME	DESCRIPTION
0	OFF	STATSTOP is STOP, no alarm.
1	CTLTEST	Controls Test is active.
2	PUMPDOWN	Pumpdown is active.
3	LOCKOUT	Lockout is active.
4	RECYCLE	Recycle shutdown completed on low load in effect until the need for cooling resumes; non-fault condition.
5	TRIPOUT	Shutdown completed due to alarm fault condition.
6	TIMEOUT	The controller is delaying the start sequence until the Start to Start or Stop to Start timers have elapsed.
7	PRESTART	The chiller is in the process of system checking before energizing the compressor motor.
8	STARTUP	Normal start-up in progress.
9	AUTORST	Auto Restart in progress.
10	RAMPING	Ramp loading in progress. The chiller has started and is gradually increasing its load to control electrical demand charges.
11	RUNNING	The chiller has completed ramp loading following start-up. Normal running mode, no override or demand limit.
12	OVERRIDE	Running with Override active.
13	DEMAND	Running with Demand Limit active. The chiller is prevented from loading further because it has reached an AVERAGE LOAD CURRENT limit or a MOTOR KILOWATTS limit.
14	SHUTDOWN	Compressor shutdown in progress.
15	FREECOOL	Free Cooling in Progress
16	CONDFLSH	Condenser Flush in Progress (Note: Available for "Marine Option" only).

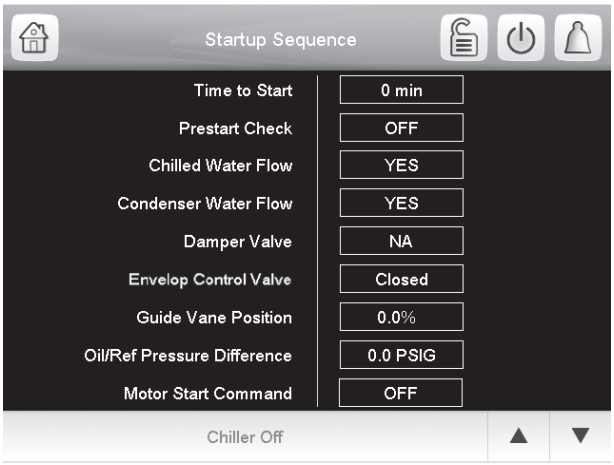


Fig. 28 — Start-Up Sequence Screen

Table 12 — Pre-Start Alerts and Alarms

PRE-START ALERT CONDITION	STATE NO.	ALARM OR ALERT
STARTS IN 12 HOURS >= 8	100	Alert
CONDENSER PRESSURE >= COND PRESS OVERRIDE – 20 psi	102	Alert
Number of recycle restart in the last 4 hours is greater than 5	103	Alert
COMP BEARING TEMP >= COMP BEARING ALERT– 10°F (5.5°C)	230	Alarm
COMP MOTOR WINDING TEMP >= MOTOR TEMP OVERRIDE – 10°F (5.5°C)	231	Alarm
COMP DISCHARGE TEMP >= COMP DISCHARGE ALERT– 10°F (5.5°C)	232	Alarm
EVAP_SAT < Evap trip point* + EVAP OVERRIDE DELTA T or EVAP REFRIG LIQUID TEMP < Evap trip point* + EVAP OVERRIDE DELTA T	233	Alarm
ACTUAL LINE VOLTAGE <= UNDERVOLTAGE THRESHOLD (n/a for UM VFDs)	234	Alarm
ACTUAL LINE VOLTAGE >= OVERVOLTAGE THRESHOLD (n/a for UM VFDs)	235	Alarm
Guide vane 1 has not been calibrated successfully	236	Alarm

*Evap trip point = 33°F (0.6°C) (water) or EVAP REFRIG TRIPPOINT (brine).

The compressor RUN STATUS parameter on the default screen line now reads PRESTART. If a test is not successful, the start-up is delayed or aborted. If all tests are successful, the chilled water pump relay energizes, and the main screen line now reads STARTUP.

START-UP — One second after the successful pre-start check, the chilled water and condenser water pump relays are energized.

Five seconds later, the control monitors the chilled water and condenser water flow devices and waits until the WATER FLOW VERIFY TIME (service-configured, default 5 minutes) expires to confirm water flow.

After water flow is verified, the water temperature is compared to CONTROL POINT + $^1/_2$ CHILLED WATER DEADBAND. If the temperature is less than or equal to this value, the control turns off the condenser pump relay and goes into RECYCLE mode.

If the RECYCLE condition is not satisfied, the start-up sequence continues and checks the guide vane position. The guide vanes are opened to the initial position specified with GV1 Closure at Startup in the Option Configuration menu.

If an EC/HGBP or economizer damper valve is equipped and enabled, the control checks that the position of these valves is fully closed.

If the vanes and valves positions are verified and the refrigerant pump pressure difference is less than 2.5 psi (17.2 kPa), the refrigerant pump relay is energized.

The control then waits the operator-configured verification time (default 40 seconds) for the refrigerant pressure difference to reach 12 psi. After the refrigerant pressure is verified, the control waits 20 seconds for prelube, and after achieving and maintaining the refrigerant pressure, the compressor start relay energizes to start the compressor.

Chiller Shutdown Sequence — Chiller shutdown begins if any of the following occurs:

- Local OFF button is pressed
- A recycle condition is present (see the previous section)
- The time schedule has gone into unoccupied mode when in either Network or Local Schedule control mode
- The chiller protective limit has been reached and chiller is in alarm
- The start/stop status (CHIL_S_S) is overridden to stop from the network when in Network mode

If the chiller is normally shut down from running, a soft-stop shutdown will be performed. The soft-stop feature closes the guide vanes of the compressor automatically if a non-alarm stop signal occurs before the compressor motor is deenergized.

Any time the compressor is directed to STOP (except in the cases of a fault shutdown), the guide vanes are directed to close and VFD will be commanded to minimum speed for a variable speed compressor. The compressor shuts off when any of the following is true:

- PERCENT LOAD CURRENT (%) drops below the SOFT STOP AMPS THRESHOLD
- ACTUAL GUIDE VANE POSITION drops below 4%
- Four minutes have elapsed since the stop was initialized

When any of these conditions is true, the shutdown sequence stops the compressor by deactivating the compressor start relay. The guide vanes are then commanded to the fully closed position. The refrigerant pump relay will be turned off after 120 seconds post-lube.

Finally, the chilled water/brine pump and condenser water pump are shut down.

Refrigerant Lubrication Control — As part of the pre-lube process, the Bearing Input Refrigerant Pressure is compared to the Bearing Output Refrigerant Pressure. If the Bearing Input Refrigerant Pressure (BRGI_P) is less than 5 psi (34.5 kPa) higher than the Bearing Output Refrigerant Pressure (BRGO_P), the liquid level in the condenser is checked. If the liquid level switch is ON, refrigerant is pumped from the evaporator to the condenser until the liquid level switch is OFF. Once the condenser liquid level is satisfied, the Evaporator Temperature (EVAP_T) is compared to the Leaving Condenser Water Temperature. When the Evaporator Temperature is 10 degrees higher than the Leaving Condenser Water Temperature or the Refrigerant Lubrication Pressure Difference is at least 12 psi, the refrigerant pump remains on the compressor is turned ON.

The refrigerant pump relay is always ON when the compressor is running.

Control Points

SET POINT — The set point can be configured at the Setpoint menu (“USER” access level).

The set point is determined by the heat/cool mode, EWT (entering water temperature) option, and ice build option. See Table 13.

Table 13 — Set Point Determination

EWT CONTROL OPTION	HEAT/COOL MODE	
	COOLING	HEATING
Disabled	Cooling LCW Set Point	Heating LCDW Set Point
Enabled	Cooling ECW Set Point	Heating ECDW Set Point

NOTES:
1. The ice build option is disabled when heat/cool mode is set to Heating.
2. When the ice build option is enabled and ice build is active, the control point is the Ice Build Set Point and the controlled water temperature is the leaving chilled water temperature.

CONTROL POINT TEMPERATURE — Capacity control is based on achieving and maintaining a control point temperature, which is the sum of a valid set point (from the SETPOINT screen) and a temperature reset value. In Cooling mode, the control point temperature is equal to the set point plus temperature reset. In Heating mode, the control point temperature is equal to the set point minus temperature reset.

The control point can be viewed directly on the main screen or the General Parameters menu.

TEMPERATURE RESET — Three types of chilled water or brine reset are available and can be viewed or modified on the Reset Configuration screen.

The default screen indicates when the chilled water reset is active. The control point Reset on the General Parameters screen indicates the amount of reset.

To activate a reset type, access the Reset Configuration (RESETCFG) screen and input all configuration information for that reset type.

Reset Type 1: 4 to 20 mA Temperature Reset — Reset Type 1 is an automatic reset utilizing a 4 to 20 mA analog input signal provided from any external sensor, controller, or other device which is appropriately configured. For this type, Degrees Reset At 20 mA is configured in the RESETCFG table.

Reset Type 2: Remote Temperature Reset — Reset Type 2 is an automatic water temperature reset based on a remote temperature sensor input signal. This function can be accessed by setting the following configurations:

1. Configure the remote temperature at which no reset occurs (Remote temp → NO RESET).
2. Configure the remote temperature at which full reset occurs (Remote temp → FULL RESET).
3. Enter the amount of reset (Deg Reset Water DT Full).

Reset Type 3: Controlled Water Temp Delta Reset — Reset Type 3 is an automatic controlled water temperature reset based on heat exchanger temperature difference. This function can be accessed by setting the following configurations:

1. Configure the controlled water temperature delta T at which no reset occurs (Controlled Water DELTA T → NO RESET).
2. Configure the controlled water temperature delta T at which full reset occurs (Controlled Water DELTA T → FULL RESET).
3. Enter the amount of reset (Deg Reset Water DT Full).

CAPACITY CONTROL — Capacity control provides chilled or condenser water temperature control by modulating the position of the inlet guide vane 1, and VFD speed for variable speed compressors.

For 19DV when increased capacity is needed, the control will first try to increase IGV TARGET POSITION if it has not reached the travel limit; if the travel limit has been reached, the control increases VFD TARGET SPEED. If decreased capacity is needed, the control first tries to decrease VFD TARGET SPEED if it has not reached the minimum VFD speed; if the minimum VFD speed has been reached, the control decreases IGV TARGET POSITION instead. See Fig. 29.

From the compressor relay closed point to the end of ramp loading, the VFD TARGET SPEED is the configured VFD start-up speed. When the chiller is running normally, the capacity control determines whether and how much to change VFD TARGET SPEED. When the chiller is in the shut-down process, VFD TARGET SPEED will be the minimum VFD speed.

NOTE: If the VFD option is set to NO VFD, or the compressor relay is not closed, VFD TARGET SPEED will be 0.

The guide vane position is determined by the Capacity Control function under normal conditions and other functions in abnormal conditions, which include capacity inhibit request or capacity decrease request. The guide vane actuator is driven by comparing the guide vane target position and the actual position. Guide vane position is limited to a value between zero and IGV Travel Limit, which is configured from the Service Configuration menu. When the chiller is shutting down or off, the guide vane is always driven to zero during normal shutdown. Guide Vane 2 is forced based on linear interpolation of set points based on Guide Vane 1 position (see 19DV Configuration).

RAMP LOADING — The ramp loading control slows the rate at which the compressor loads up. This control can prevent the compressor from loading up during the short period of time when the chiller is started and the chilled water loop has to be brought down to CONTROL POINT (Setpoint Table). Ramp loading helps reduce electrical demand charges by slowly bringing the chilled water to CONTROL POINT. The total power draw during this period remains almost unchanged. If the power outage lasts for more than 3 hours, then Temperature Ramp Loading will be used regardless of user configuration and the minimum loading rate (1°F/min) will be used.

Two methods of ramp loading are available: temperature ramp loading and motor load ramp loading.

Temperature Ramp Loading — Temperature ramp loading limits the rate at which the controlled water temperature decreases for cooling and increases for heating during ramping by reducing on cooling mode or increasing in heating mode the PULLDOWN SET POINT (Maintenance Menu → Capacity) at the configured rate, until the pulldown set point is less than the cooling mode control point or greater than the heating mode control point. The PULLDOWN RAMP TYPE (Configuration Menu → General Configuration) is configured to 0 for temperature ramp loading.

Motor Load Ramp Loading — Motor load ramp loading limits the rate at which either the load current percentage or motor kilowatt percentage increases by incrementing the ramp demand limit at the configured rate. The PULLDOWN RAMP TYPE (Configuration Menu → General Configuration) is configured to 1 for motor load ramp loading.

If DEMAND LIMIT SOURCE (Configuration Menu → General Configuration) is set to AMPS, then PERCENT LOAD CURRENT is used for motor load ramp loading. If DEMAND LIMIT SOURCE is set to kW, then MOTOR PERCENT KILOWATTS is used for motor load ramp loading.

The motor load ramp loading algorithm shall be deactivated when the Ramp Demand Limit is greater than or equal to the ACTIVE DEMAND LIMIT (General Parameters). It is also deactivated when Ramp Demand Limit is greater than or equal to 80%. There will be a one-minute delay for the compressor to be uploaded to target load (ramping load target 80% or ACTIVE DEMAND LIMIT if less than 80%) after ramping load demand limit is set to 80% (or ACTIVE DEMAND LIMIT if less than 80%).

SURGE CORRECTION CONTROL — There are two stages for surge correction: envelop control (surge prevention) and surge protection.

Envelop Control — A surge condition occurs when the lift becomes so high that the gas flow across the impeller reverses. This condition can eventually cause compressor damage. The surge prevention algorithm notifies the operator that chiller operating conditions are marginal and to take action, such as lowering entering condenser water temperature, to help prevent compressor damage.

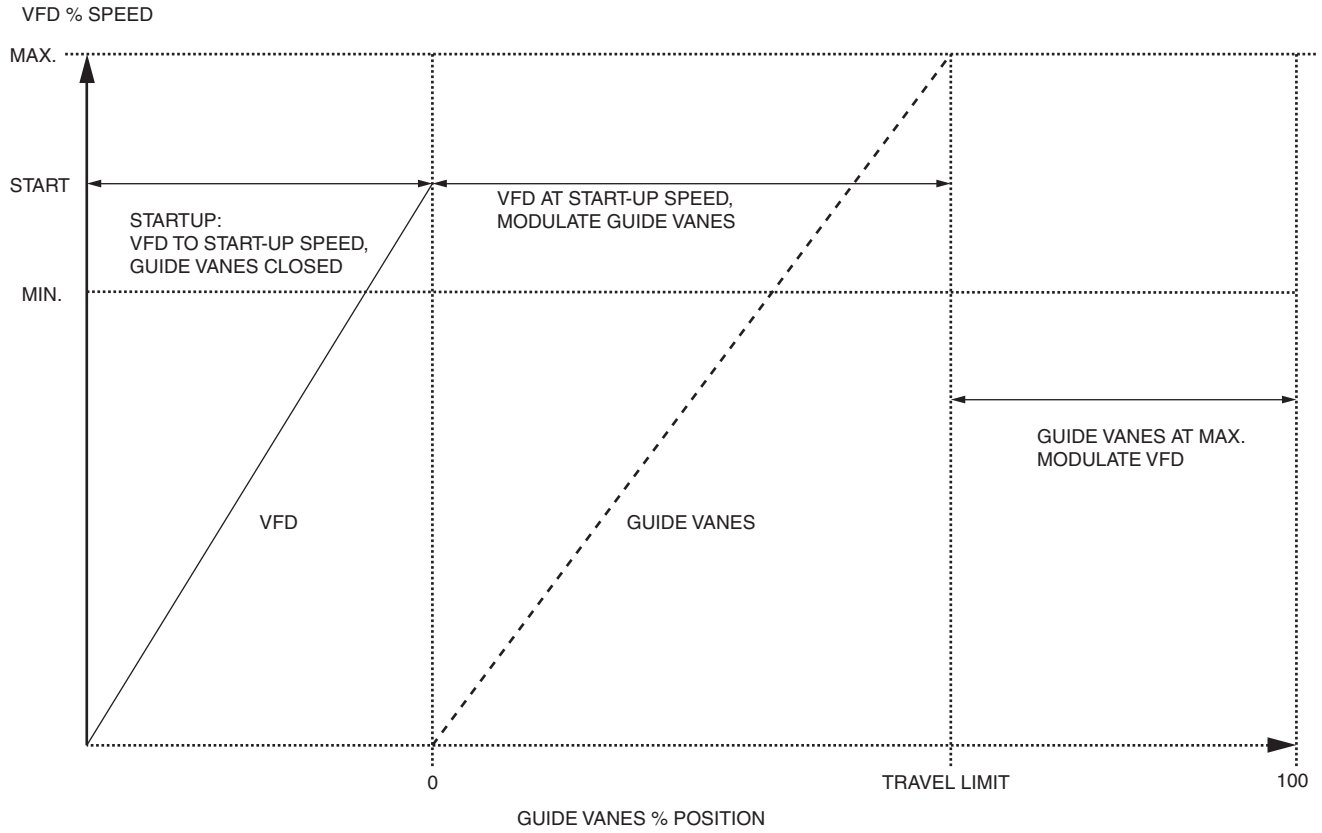


Fig. 29 — Guide Vane Position and VFD Speed

If a high sound condition occurs at low guide vane position, the EC/HGBP valve is used to decrease the sound level. The envelop control algorithm is an operator-configurable feature that can determine if lift conditions are too high for the compressor and then take corrective action. High efficiency mode or low noise mode can be selected. Lift is defined as the difference between the saturated temperature at the impeller eye and at the impeller discharge. The maximum lift a particular impeller wheel can perform varies with the gas flow across the impeller and the size of the wheel.

If Actual Lift is higher than reference lift, a capacity inhibit signal will be sent. If Actual Lift is higher than reference lift plus Envelop High Deadband, a capacity decrease signal will be sent. If Actual Lift is lower than reference lift minus Envelop Low Deadband, these 2 signals will be canceled. Capacity Control will respond to these 2 signals and make correction on IGV1 TARGET POSITION, VFD TARGET SPEED, and EC/HGBP actuator. To improve system performance SURGE PROFILE OFFSET will be incremented by 1 if no surge prevention has been active in the past 5 minutes. The Reference Lift will subtract the SURGE PROFILE OFFSET prior to comparing to Actual Lift.

Surge Protection — The Surge Protection algorithm will run after SURGE DELAY TIME has elapsed when compressor has been commanded to turn on. It compares the present PERCENT LOAD CURRENT value with the previous value once every second. If the difference exceeds the maximum AMPS change value (SURGE DELTA % AMPS + [PERCENT LINE CURRENT / 10]), an incidence of surge has occurred, and the surge protection signal will be sent.

When an incidence of surge determined in this manner has occurred, the SURGE COUNTS will be incremented by one. On receiving the surge protection signal, Capacity Control will make corrections on IGV1 TARGET POSITION, VFD TARGET SPEED, and EC/HGBP actuator. When correction is in effect, Surge Protection Count will increase by 1 when a command for either IGV decrease, VFD speed increase, or EC/HGBP actuator activation is required for correction. Guide vane movement will be inhibited for 1 minute after surge protection ends.

Chiller will do 259 Alarm shutdown under the following conditions.

- If Surge Protection Counts exceed 20 within a Surge Time Period. Note that if VFD, then VFD target speed must equal max before this alarm is activated.
- If IGV, VFD, and HGBP cannot be further adjusted for surge protection when Surge Protection Counts exceed 4 within a Surge Time Period.

If IGV, VFD, and HGBP control cannot correct the problem, the chiller will initiate a shutdown alarm when the surge count is greater than 4.

ENVELOP/HOT GAS BYPASS (HGBP) CONTROL — This function is used to artificially load the chiller and keep it running under low load conditions or to prevent surge conditions. Since this also reduces the performance of the machine, EC/HGBP Control is a user-selectable option.

The EC/HGBP control valve is a modulating type controlled by a 4 to 20 mA signal.

Envelop/hot gas bypass operation has three different modes when installed (hgbp_opt > 0) and enabled (hgbp_sel > 0):

- Envelop control and surge protection — Each compressor has unique lift characteristics that can be plotted to determine performance. The controller will determine operating conditions that could result in compressor surge and activate the bypass valve to prevent surge until the chiller operating parameters are in a safe area on the curve where the valve may be closed again.
- Envelop (HGBP) low load operation — In this condition, the valve will be opened to prevent a recycle shutdown from occurring. The valve will remain open until this

minimal loading condition has passed and there is no surge condition present.
- Combination for envelop control and surge correction, as well as low load operation — When this option is selected, both EC for envelop control/surge protection and EC for low load operation will be performed. Surge protection will take higher priority if both conditions are satisfied.

DEMAND LIMIT — The PIC5 controls provide a feature for limiting AVERAGE LOAD CURRENT or MOTOR KILOWATTS by limiting capacity via guide vane control/VFD control. The limit may be applied in two ways. The first is called ACTIVE DEMAND LIMIT, which is equal to a BASE DEMAND LIMIT value (set in the SETPOINT screen, default value 100%). ACTIVE DEMAND LIMIT may also be forced to be different from BASE DEMAND LIMIT by manually overriding (forcing) the value via a CCN network device. If the DEMAND LIMIT SOURCE exceeds the ACTIVE DEMAND LIMIT by 5% or less, capacity will be inhibited. If the DEMAND LIMIT SOURCE exceeds the ACTIVE DEMAND LIMIT by more than 5%, capacity will be decreased.

Alternatively, the limit may be applied by AUTO DEMAND LIMIT INPUT, an optional 4 to 20 mA input. This demand limit control option (4 to 20 mA DEMAND LIMIT TYPE) is externally controlled by a 4 to 20 mA signal. The option is set up on the Configuration Menu → GENERAL CONFIGURATION screen. When enabled, 4 mA will set ACTIVE DEMAND LIMIT to 100% of the DEMAND LIMIT SOURCE (regardless of the value of BASE DEMAND LIMIT), and 20 mA will set ACTIVE DEMAND LIMIT to the value configured for DEMAND LIMIT AT 20 mA in the Configuration Menu → SERVICE PARAMETERS screen.

OVERRIDE CONTROL — Capacity overrides can prevent some safety shutdowns caused by exceeding the motor amperage limit, evaporator refrigerant low temperature safety limit, motor high temperature safety limit, and condenser high pressure limit. In these cases there are two stages of capacity control:

1. When the value of interest crosses the first stage set point into the override region, the capacity is prevented from increasing further, and the status line on the PIC5 controller indicates the reason for the override. Normal capacity control operation is restored when the value crosses back over the first stage set point, leaving the override region.
2. When the value of interest is in the override region and further crosses the second stage set point, the capacity is decreased until the value meets the override termination condition. The PIC5 controls resume normal capacity control operation after the override termination condition has been satisfied. (In the case of high discharge superheat, there is an intermediate stage.)

Table 14 summarizes these override parameters.

Other types of override events do not override control guide vane or VFD operation, but are reported:

- High compressor discharge temperature override — If the COMP DISCHARGE TEMP is greater than the COMP DISCHARGE ALERT threshold, then high discharge temperature override will be displayed in the main screen until the COMP DISCHARGE TEMP is less than the COMP DISCHARGE ALERT threshold – 2°F (1.1°C).
- High compressor bearing temperature override — For compressor/frame 6 and 7, if one of the compressor bearing temperatures is greater than the compressor bearing temperature Alert (Configuration Menu → Protective Limit Config) threshold, then High Bearing Temp Override shall be active until all of the compressor bearing temperatures are less than Comp Bearing Temp Alert minus 2°F (1.1°C).
- Low Discharge Superheat Temperature Override — This override is ignored during the first 5 minutes after chiller start-up.

RECYCLE CONTROL — The chiller may cycle off and wait until the load increases to restart when the compressor is running in a lightly loaded condition. This normal cycling is known as “recycle.”

In cooling mode, a recycle shutdown is initiated when either of the following conditions is true:

- Leaving chilled water temperature (or entering chilled water temperature, if the EWT CONTROL OPTION is enabled) is more than 5°F (2.8°C) below the CONTROL POINT.
- Leaving chilled water temperature (or entering chilled water temperature, if the EWT CONTROL OPTION is enabled) is below the CONTROL POINT, and the chilled water temperature difference is less than the RECYCLE SHUTDOWN DELTA T.

In heating mode, a recycle cycle shutdown occurs when either of the following conditions is true:

- Leaving condenser water temperature (or entering condenser water temperature, if the EWT CONTROL OPTION is enabled) is more than 5°F (2.8°C) below the CONTROL POINT.
- Leaving condenser water temperature (or entering condenser water temperature, if the EWT CONTROL OPTION is enabled) is above the CONTROL POINT, and the condenser water temperature difference is less than the RECYCLE SHUTDOWN DELTA T.

NOTE: Recycle shutdown will not occur if the CONTROL POINT has been changed by more than 1°F (0.56°C) within the previous 5 minutes of operation.

When the chiller is in RECYCLE mode, the chilled water pump relay remains energized so the chilled water temperature can be monitored for increasing load. The recycle control uses RECYCLE RESTART DELTA T to check when the compressor should be restarted. In cooling mode, the compressor will restart when the leaving chilled water temperature (or entering chilled water temperature, if the EWT CONTROL OPTION is enabled) is greater than the CONTROL POINT plus the RECYCLE RESTART DELTA T for 5 consecutive seconds. In heating mode, the compressor will restart when the leaving condenser water temperature (or entering condenser water temperature, if the EWT CONTROL OPTION is enabled) is less than the CONTROL POINT minus the RECYCLE RESTART DELTA T for 5 consecutive seconds.

RUNNING TIMERS AND COUNTERS — The PIC5 control maintains two run-time clocks: COMPRESSOR ONTIME and SERVICE ONTIME. COMPRESSOR ONTIME indicates the total lifetime compressor run hours. SERVICE ONTIME is a resettable timer that can be used to indicate the hours since the last service visit or any other event. A separate counter tallies compressor starts as TOTAL COMPRESSOR STARTS. All of these can be viewed on the RUN TIMES screen. Both Ontime counters roll over to 0 at 500,000 hours. Manual changes to SERVICE ONTIME from the screen are permitted at any time. If the controller is replaced, one opportunity before the first start-up with the new controller is provided to set COMPRESSOR ONTIME and TOTAL COMPRESSOR STARTS to the last readings retained with the prior controller.

The chiller also maintains a start-to-start timer and a stop-to-start timer. These timers limit how soon the chiller can be started and are displayed on the system overview (home) and RUN TIMES screens. They can be configured in the Configuration Menu → GENERAL CONFIGURATION screen. They must expire before the chiller starts. If the timers have not expired, the RUN STATUS parameter on the System Overview (Home) and GENERAL PARAMETERS screen reads TIMEOUT.

Table 14 — Override Parameters

OVERRIDE CONDITION	OVERRIDE PARAMETER	FIRST STAGE CAPACITY INHIBIT	DEFAULT VALUE/ CONFIGURABLE RANGE	SECOND STAGE CAPACITY DECREASE	OVERRIDE TERMINATION
High condenser pressure override (Unit Type Heat/Cool=1 in Configuration Menu → Factory Parameters. Before configuring Unit Type = 1 verify that unit is able to withstand pressure - note all North America units are of 72 PSI design.)	CONDENSER PRESSURE	> COND PRESS OVERRIDE HIGH	55 psig/20-56 psig	> COND PRESS OVERRIDE HIGH + 2.4 psi	< COND PRESS OVERRIDE HIGH — 1 psi
High compressor discharge temperature	COMP DISCHARGE TEMP	>COMP DISCHARGE ALERT	200°F/125-200°F (93.3°C/51.7-93.3°C)		COMP DISCHARGE TEMP <COMP DISCHARGE ALERT-2°F (1.1°C)
High compressor bearing temperature	COMP BEARING TEMP	>COMP BEARING TEMP ALERT DV	104°F/90-120°F (40°C/32.2-48.9°C)		COMP BEARING TEMP <COMP BEARING TEMP ALERT DV-2°F (1.1°C)
Low evaporator temperature override	CALC EVAP SAT TEMP or EVAP REFRIG LIQUID TEMP	< EVAP SAT OVERRIDE TEMP (EVAP SAT OVERRIDE TEMP = EVAP TRIPPOINT + EVAP OVERRIDE DELTA T)		< EVAP SAT OVERRIDE TEMP - 1°F (0.56°C)	> EVAP SAT OVERRIDE TEMP + 2°F (1.1°C)
High motor temperature override	COMP MOTOR WINDING TEMP	> COMP MOTOR TEMP OVERRIDE	200°F/150-200°F (93.3°C/65.6-93.3°C)	COMP MOTOR WINDING TEMP > COMP MOTOR TEMP OVERRIDE + 10°F (5.6°C)	COMP MOTOR WINDING TEMP < COMP MOTOR TEMP OVERRIDE – 2°F (1.1°C)
Rectifier Overload (32VS VFD only)	RECTIFIER OVERLOAD	>100%		>102%	<98%
High current override	PERCENT LINE CURRENT	PERCENT LINE CURRENT > 100%		PERCENT LINE CURRENT > 105%; 102% WHEN 32VS VFD INSTALLED	PERCENT LINE CURRENT <= 100%
Low discharge superheat override	Discharge Superheat (DSH)	< DSH REQUIRED + 1		< DSH REQUIRED –3	> DSH REQUIRED + 2
Low source temperature protection override	Leaving water temperature (heating mode)	< LWT PROTECTION SETPOINT – 2°F (1.1°C)			>LWT PROTECTION SETPOINT + 0.5°F (0.3°C)

WATER PUMPS CONTROL (FREEZE PREVENTION)

NOTE: In order to energize the chilled and condenser pump to prevent evaporator and condenser tube freeze-up, the hydraulic system should be enabled first (this can be configured in the Configuration Menu → FACTORY PARAMETERS screen).

Evaporator Freeze Prevention — When the evaporator saturated refrigerant temperature or evaporator refrigerant temperature is less than the EVAP REFRIG TRIPPOINT + REFRIG OVERRIDE DELTA T (configurable from 2°F to 5°F (1.1°C to 2.8°C) in the Configuration Menu → PROTECTIVE LIMIT CONFIG screen), an OVERRIDE—LOW EVAP REFRIG TEMP event will occur.

For any running status, if either of the conditions below is true then unit will shut down under Alarm PROTECTIVE LIMIT - EVAPORATOR FREEZE (State 261):

- Evaporator saturated refrigerant temperature or evaporator refrigerant temperature is equal to or less than the EVAP REFRIG TRIPPOINT (33°F [0.6°C] for water, (configurable for brine in Configuration Menu → PROTECTIVE LIMIT CONFIG screen) plus 1°F (0.56°C).
- Leaving chilled water temperature or entering chilled water temperature is less than EVAP REFRIG TRIPPOINT plus 1°F (0.56°C).

NOTE: If the chiller is in recycle mode, it will transition to TRIPOUT, and the CHILLED WATER PUMP will remain on.

The alarm will be clearable when the evaporator saturated refrigerant temperature, evaporator refrigerant temperature, leaving chilled water temperature, and entering chilled water temperature rise 5°F (2.8°C) above the EVAP REFRIG TRIPPOINT.

Condenser Pump Control — The chiller will monitor the condenser pressure and may turn on the condenser pump. If the condenser pressure is greater than or equal to the COND PRESS OVERRIDE, and the entering condenser water temperature is less than 115°F (46.1°C), the condenser pump will energize to try to decrease the pressure and Process Alert - High Condenser Pressure Chiller Off (Alert 157) will be generated. The pump will turn off when the condenser pressure is 3.5 psi (24.1 kPa) less than the pressure override and the condenser refrigerant temperature is less than or equal to the entering condenser water temperature plus 3°F (1.7°C).

NOTE: COND PRESS OVERRIDE is found in the Configuration Menu → PROTECTIVE LIMIT CONFIG screen.

Condenser Freeze Prevention — This control helps prevent condenser tube freezing by energizing the condenser pump relay. The PIC5 module controls the pump and, by starting it, helps to prevent the water in the condenser from freezing.

When the chiller is off and condenser saturated refrigerant temperature is less than or equal to the condenser freeze point, the condenser water pump will be energized (Alarm State 262, PROTECTIVE LIMIT - CONDENSER FREEZE). The fault state will clear and the pump will turn off when the condenser saturated refrigerant temperature is more than 5°F (2.7°C) above the condenser freeze point and the entering condenser water temperature is greater than the condenser freeze point. If the chiller is in recycle shutdown mode when the condition occurs, the controls will transition to a non-recycle shutdown.

CONTROL TEST — This feature allows the operator to quick-test the controls and related hardware, including all unit-controlled outputs except compressor output.

The unit must be off to run the test function. If the unit is on, the test function cannot be accessed. The compressor can only be started after the control test is finished. The test function also requires the user to enter the User password if it has not already been entered. All control test parameters are accessible through the Quick Test table. To perform the control test function, set the first item Quick Test Enable in the Quick Test table to Enable.

Unless otherwise noted, all protective limits remain active during the controls test.

Discrete Outputs — When the control test is enabled, discrete outputs can be enabled using the Quick Test table. Discrete valves that can be tested in Quick test are: GV1 Open, GV1 Close, Refrigerant Pump Relay, Damper Open, Damper Close, Condenser Pump Relay, Evaporator Pump Relay, Alarm Relay, and Alert Relay.

NOTE: For refrigerant pressure, a value ≥ 10 psi within 15 seconds after the oil pump is turned on indicates a confirmation of pressure (Oil Pres Test Passed=YES).

Analog Output — When the control test is enabled, the following analog outputs can be enabled by entering the positions in the QCK_TST table:

- Head Pressure Valve
- Chiller Status Output (Q_CHST)

Guide Vane Calibration — The guide vane position should be calibrated before starting the chiller. Guide vane calibration can be started by setting Quick Test Enable to Enable and GV1/GV2 Calibration Enable to Enable.

- The fully closed guide vane feedback mA value will be in the range of 3 mA to 5 mA.
- The fully opened guide vane feedback mA value will be in the range of 19 mA to 20.8 mA.

MOTOR ROTATION CHECK — The motor rotation check should be initiated before starting the chiller. Motor Rotation Check can be performed by setting Quick Test Enable to Enable; check proceeds as follows. Note that operator must verify clockwise rotation through first stage suction pipe sightglass.

- Fully open GV1
- Open evaporator control valve and condenser drain valve, close condenser control valve and evaporator control valve. Run the refrigerant pump for 30 seconds
- Start the motor and ramp to 5Hz in 10 seconds
- Stop the motor once its speed reaches 5Hz
- Stop the refrigerant pump 1 minute after the motor speed reaches 5Hz. Reset all 4 refrigerant lubrication valves to close
- Close GV1 3 minutes after the motor speed reaches 5Hz

SWIFT RESTART (CAPACITY RECOVERY™) — This function is designed for data center or other applications. It allows the chiller to be restarted quickly to meet building load requirements.

To enable this function, the AUTO RESTART OPTION point in the CONF_OPT table should be set to ENABLE.

The water flow verification time, refrigerant prelube time and other delays will be decreased compared to a normal start-up.

COOLING TOWER CONTROL — If WATER PRESSURE OPTION in the CONF_OPT table is set to 1 or 2, there will be another optional hydraulic control I/O board in the PIC5 control system to allow PIC5 control for the water pumps and cooling tower fans (high speed and low speed).

The cooling tower fans are controlled by the pressure difference between condenser and evaporator and entering water temperature of condenser. The objective is to maintain the entering condenser water temperature in the optimal range.

WATER PUMP CONTROL — Note that chiller must always maintain pump control or warranty may be voided.

HEAD PRESSURE CONTROL — If the chiller system is equipped with a head pressure control valve, and the HEAD PRESSURE VALVE option in the CONF_OPT table is ENABLED, the PIC5 control system will control the opening of the head pressure valve to maintain the pressure difference between condenser and evaporator. The output of this valve is 4 to 20 mA type.

Before using this function, the pressure difference values for 20 mA and 4 mA should be set.

The head pressure valve should be in fully closed position when chiller is in OFF mode.

ICE BUILD OPTION — The PIC5 controller provides an ice build option based on efficiency improving point. The ICE BUILD OPTION in the CONF_OPT table should be set to ENABLED to make ice build active, and the following two parameters should be configured:

- Ice_recy (ICE BUILD RECYCLE) indicates whether recycle option is enabled in ice build mode.
- Ice_term (ICE BUILD TERMIN SOURCE) indicates how the ice build is terminated. There are three types: temperature (0), dry contact (1), or combined temperature and dry contact (2).

TIME SCHEDULE — The PIC5 control provides three schedules:

- Local schedule
- Ice build schedule
- Network schedule

Each schedule has 8 time segments. If two time segments overlap, the unoccupied time segment takes priority.

There are 16 holiday time segments. Each holiday time segment is determined by three parameters—month, start date, and holiday days. The controller will be in unoccupied mode when a holiday time segment is active. PIC5 includes a Daylight Savings Time function. Use Broadcast Menu to enable this feature and configure start and end dates.

BLACK BOX — The black box task continuously stores parameters in memory every 5 seconds. Reporting of a chiller operation alarm triggers the controller to generate a collection of data records. Each collection contains up to 180 records that consist of 168 records (corresponding to 14 min.) before the alarm and 12 records (corresponding to 1 min.) after the alarm. Each record is associated with a time stamp. Files are saved as csv files; up to 20 files can be stored.

The black box file can be uploaded with the Carrier S-Service tool. Once the upload is done, the original files are automatically deleted.

PRESSURE TRANSDUCER CALIBRATION — The HMI pressure readings are displayed in the Main Menu → Pressures screen. See Fig. 30 and 31.

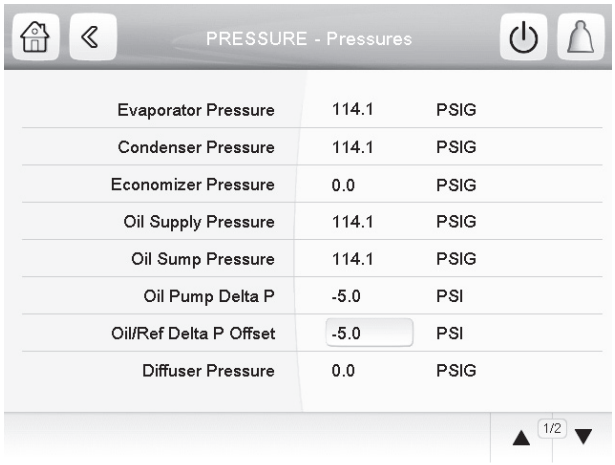


Fig. 30 — Pressures Screen, Page 1

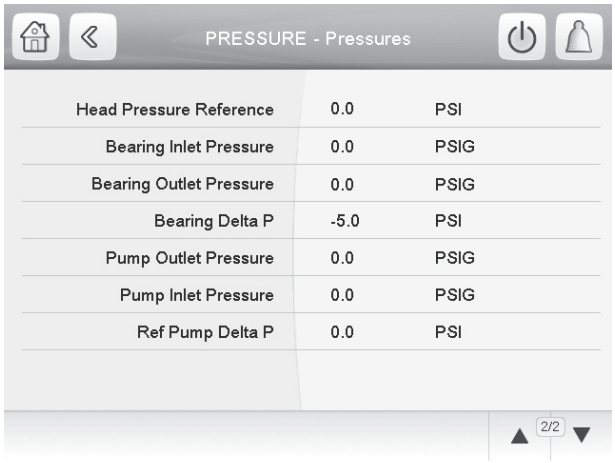


Fig. 31 — Pressures Screen, Page 2

Once a year the pressure transducers should be checked against a pressure gage. Attach a set of accurate refrigeration gages to the transducer being checked and compare the two readings. If there is a difference the transducer can be calibrated as described below (the Oil Pump Delta P reading should be zero when the compressor is off). Calibration requires Service level access to the HMI.

NOTE: It is usually not necessary to calibrate at initial start-up unless chiller is at high altitude.

1. Go to Main Menu → Maintenance Menu → Pressure Sensor Calib. See Fig. 32 and 33.

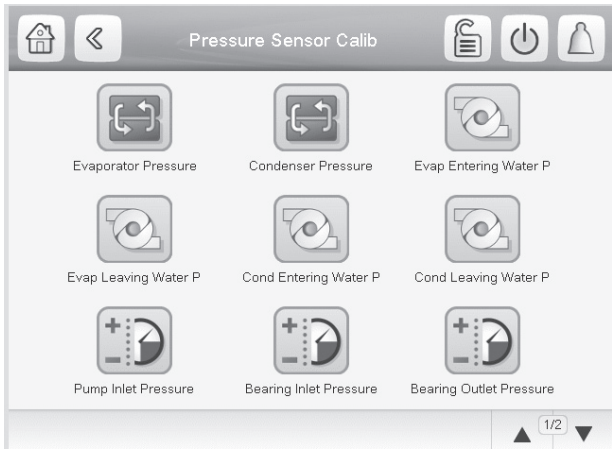


Fig. 32 — Pressure Sensor Calib Screen, Page 1

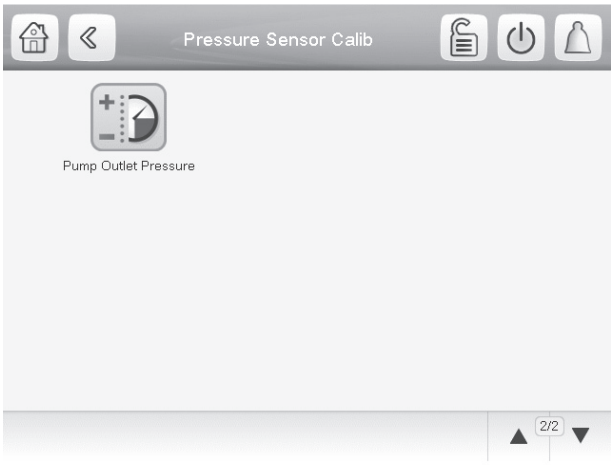


Fig. 33 — Pressure Sensor Calib Screen, Page 2

2. Each transducer is supplied with 5 vdc from the IOB. Calibration is done by selecting the appropriate Pressure Sensor option on the Pressure Sensor Calib screen. The screen for the selected option is displayed. Figure 34 shows the Evap Pressure Sensor screen (PRSCAL01 as an example.

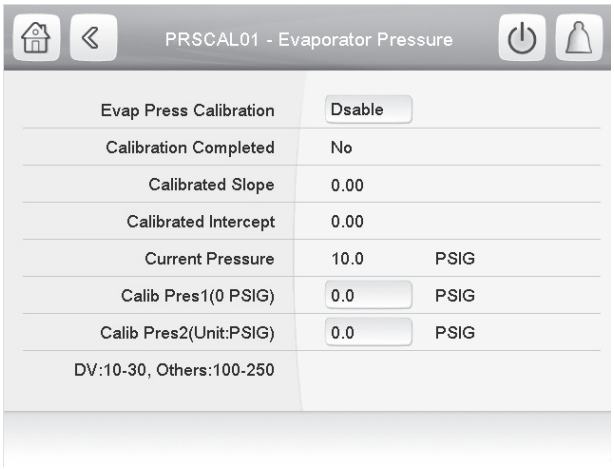


Fig. 34 — Evap Pressure Sensor Screen

3. Set Calibration Enable to Enable.

   Calibration for this sensor is complete and the new slope and intercept will be used for the calibrated transducer in the pressure or temperature tables.
4. With the transducer at atmospheric pressure (zero gage pressure), ensure that "Calib Press1 (0 PSI)" = 0 PSIG.
5. Pressurize the transducer to a known pressure between 100 and 250 psig, and enter that pressure as read from calibrated gage in the "Calib Press2 (10-30PSI)" field and press "OK."
6. Screen will show "Calibration Completed = Yes" upon successful calibration. To exit, use the arrow key or click the Home button.

TEMPERATURE SENSOR CALIBRATION — The four water temperature sensors can be separately calibrated to have their temperature readings offset by a specified amount. Follow these steps for each sensor:

1. Go to Main Menu → Maintenance Menu → Temp Sensor Calib. See Fig. 35.

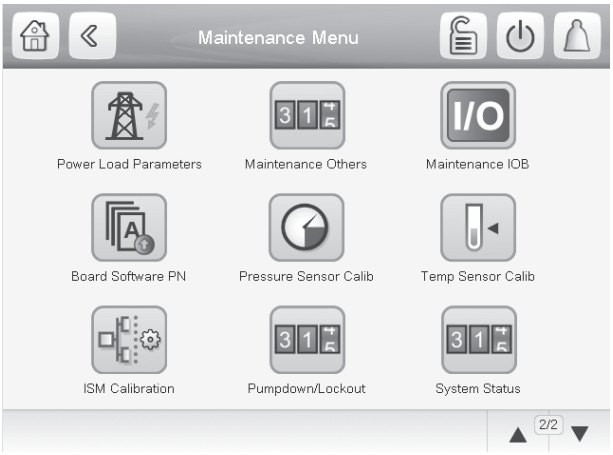


Fig. 35 — Maintenance Menu Calibration

2. Place the temperature sensor in a 32°F (0°C) water solution.
3. Read the sensor raw temperature on the Maintenance screen.
4. Calculate the offset to be applied as follows:
   32 – sensor raw temp (°F)

   Example:

   ECW sensor raw temperature reads 32.6°F.

   ECW temperature offset must be set to –0.6°F
   (32 – 32.6 = –0.6)
5. In the Temp Sensor Calib screen, enter the temperature offset for the appropriate sensor as calculated in Step 4. See Fig. 36 and 37.

   NOTE: The offset cannot exceed ± 2°F (1.1°C).

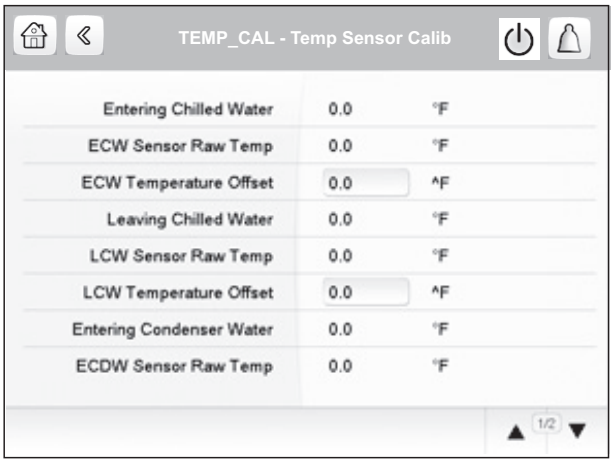


Fig. 36 — Temp Sensor Calib Screen, Page 1

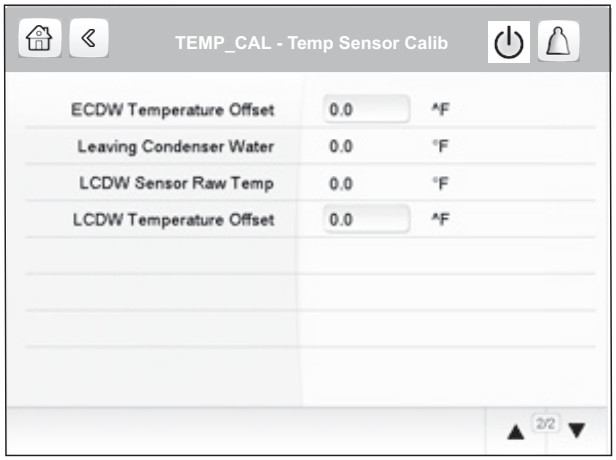


Fig. 37 — Temp Sensor Calib Screen, Page 2

6. Verify that the measured temperature value is the same as the controlled temperature.

ALARM EMAIL — The alarm email function sends automatic email messages to specified service personnel for remote maintenance purposes. This function can be set up from the second page of Configuration Menu → E-Mail Configuration (EMAILCFG). Subsequently if there is an alarm the function will send an e-mail message. Another message is sent when all alarms return to normal. See Fig. 38-40.

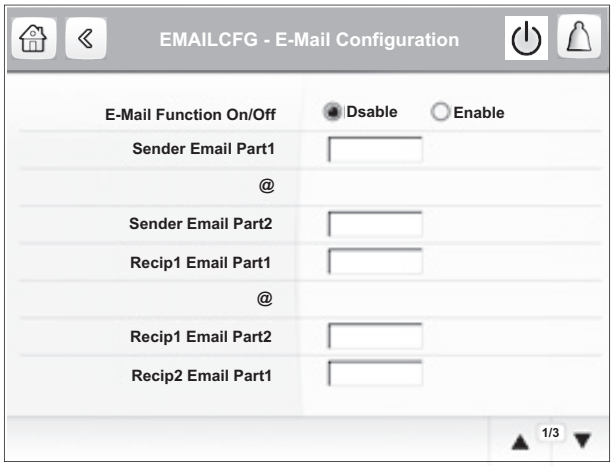


Fig. 38 — E-Mail Configuration Screen, Page 1

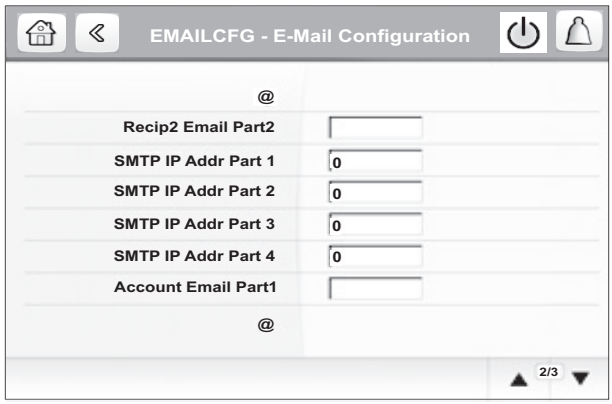


Fig. 39 — E-Mail Configuration Screen, Page 2

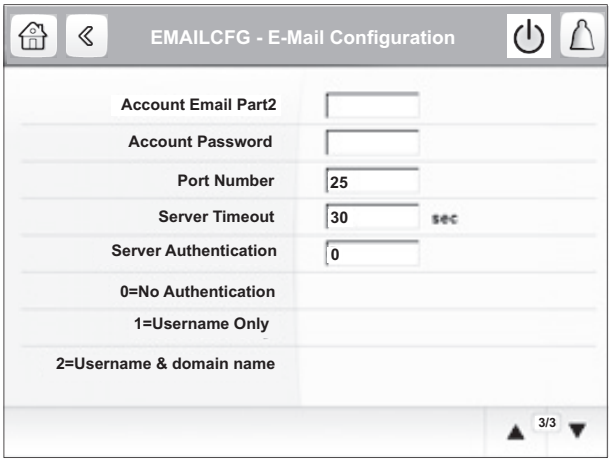


Fig. 40 — E-Mail Configuration Screen, Page 3

The alarm task runs periodically. At each alarm task run time, the status change of each alarm is checked and one email message is sent to each specified recipient when one or more alarms are switched on. When all alarms return to normal, another e-mail message is sent to remote maintenance service personnel.

The e-mail message provides the unit description and location stored in the CTRL_ID table, available from the CONFIGURATION menu. See Fig. 41.

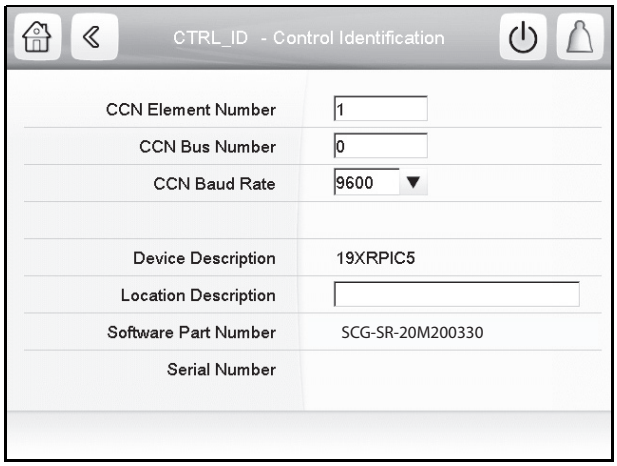


Fig. 41 — CTRL_ID Screen

PROGNOSTICS — This diagnostic and prognostic function is designed for service and to help resolve problems before they affect operating efficiency and the chiller life. The CONF_PRG (Prognostics Config) screen is available from the Alarm Menu.

The Compressor Performance Plot and Hx Performance Plot are available from the Alarm Menu.

MASTER SLAVE CONTROL — This control, available from page 2 of the Configuration Menu, provides the capability to operate 2 chillers in Master/Slave mode. The slave chiller should be set to NETWORK mode and controlled by the master chiller.

The two chillers can be configured to be in parallel or in series. When they are in series mode, the master chiller's evaporator must be downstream. The lead chiller shall always be started first, and the lag chiller shall be maintained at zero percent capacity. When the lead chiller cannot be loaded anymore, then the lag start timer is started. The lag chiller shall always be stopped prior to lead chiller.

If a communication failure is detected between the master and the slave chillers, all master/slave functions are disabled and chillers return to stand-alone operations until communication is reestablished. If middle sensor is installed, this, among other things, can be configured in the Master Slave Config table. Fig. 42-44 show Master/Slave Config options.

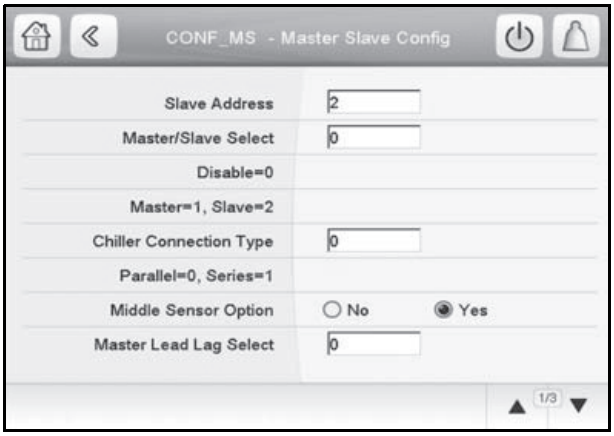


Fig. 42 — Master/Slave Config Screen, Page 1

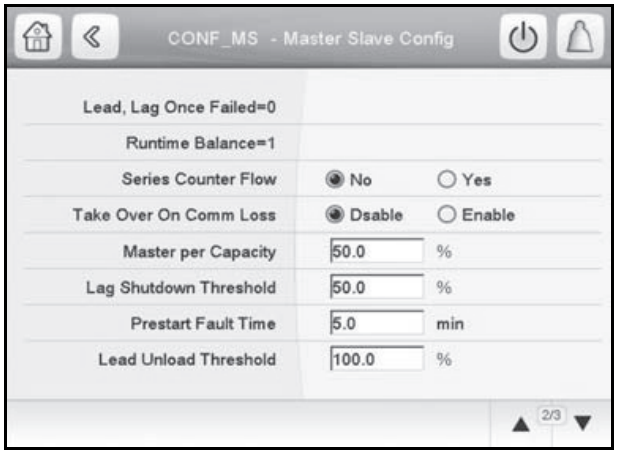


Fig. 43 — Master/Slave Config Screen, Page 2

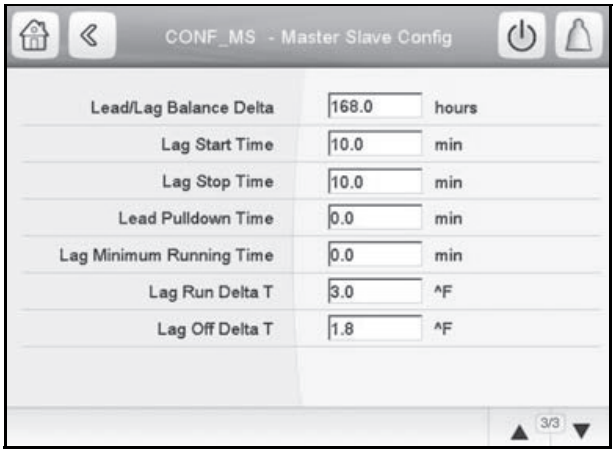


Fig. 44 — Master/Slave Config Screen, Page 3

Pumpdown/Lockout — The Pumpdown/Lockout feature prevents compressor start-up when there is no refrigerant in the chiller. To access this function one must be logged in as Advanced User/Service or higher. The feature can accessed from the Maintenance Menu. See Fig. 45.

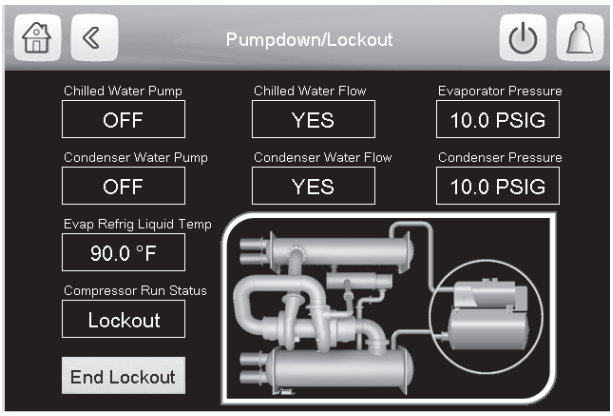


Fig. 45 — Pumpdown/Lockout Screen

The Pumpdown/Lockout function provides precautions when an external pumpout unit is removing refrigerant from chiller. When the lockout is activated, the controller takes the following steps:

- Starts water pumps and confirm flows
- Monitors evaporator pressure, condenser pressure, and evaporator refrigerant temperature during pumpout procedures
- Turns pumps off after pumpdown
- Proceeds to lock out the compressor

The Terminate Lockout feature ends the Pumpdown/Lockout after refrigerant is added. Press End Lockout on the Pumpdown/Lockout menu in order to initiate the process, which proceeds as follows:

- Starts pumps and confirm flows
- Monitors evaporator pressure, condenser pressure, evaporator temperature during charging process
- Terminates compressor lockout

Displaying Data Trends — The PIC5 control system offers the ability to configure and display color-coded system trends without a password. Select Main Menu → Trending.

On the Trending screen (see Fig. 46), check the data to be tracked, and set the beginning and end points for the selected data. To change a data color, select the colored square and choose a new color from the pop-up color bar. To view data trends, select the down arrow at the bottom right of the Trendings screen. The next page displays the selected data in the chosen colors. See Fig. 47.

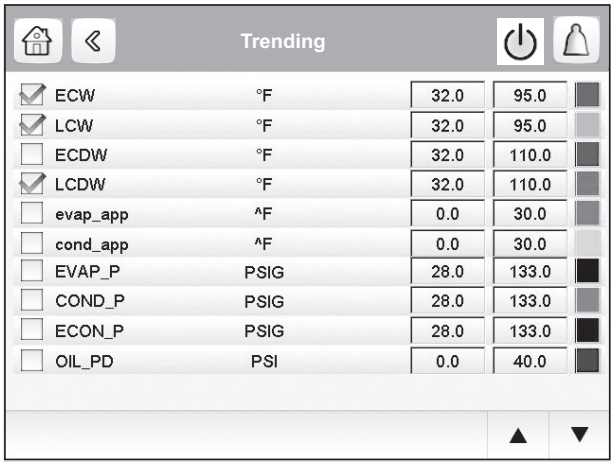


Fig. 46 — Trending Screen Set-Up Page



Fig. 47 — Trending Screen Display Page

Hydraulic Option

WATER FLOW MEASUREMENT — PIC5 Controller provides the function of measuring water flow rate.

Equipped with a field installed flow meter, it can compute the water flow rate from the input signal sent from the evaporator/condenser water flow sensor (4 to 20 mA) to the IOB (see Fig. 5, IOB4 wiring schematic).

Step 1: Set Factory Parameters → IOB4 Option as "Yes."

Step 2: Set Option Configuration → Water Flow Measurement as "1 = Flow Meter," and enter the corresponding value of Water Flow at 4 mA and 20 mA.

Step 3: In "Inputs Status" menu, confirm that evaporator/condenser water flow sensor is working and giving correct readings.

Step 4: In "Hydraulic Status" menu, check evaporator/condenser water flow rate value. (The flow rate value will be linear interpolated by actual reading and configured water flow rate at 4 mA/20 mA.)

Water flow can also be computed from water pressure sensors or water pressure drop sensors (see IOB4 wiring schematic). IOB4 Option must be Enabled and Water Flow Measurement option configured as "2 = Water Pres. Difference" and the evaporator/condenser pressure drop baseline and water flow must be entered as inputs. Then review Step 3 and 4 as above.

Equipped with a normally open flow switch, the evaporator/condenser water flow can be directly indicate the flow status (see IOB1 wiring schematic).

WATER PRESSURE DIFFERENCE MEASUREMENT — When entering and leaving water pressure transducers or 4 to 20 mA water pressure differential transducers are installed, the PIC5 can compute or read the water pressure difference between entering and leaving water pressure, and thereby determine if the water is flowing. After the water pump is switched on, if the water pressure difference reaches the threshold, the water flow check is passed and the chiller can start. Otherwise there will be an alarm shutdown.

Step 1: Set Factory Parameters → IOB4 Option as "Yes."

Step 2: Set Option Configuration → Water Pressure Option as either "1 = Pres" or "2 = Pres.D" (4 to 20 mA signal). Note that for Option 2 the Water Pres Drop @ 20 mA must also be set in Option Configuration.

Step 3: In "Hydraulic Status" menu, check Condenser Water Delta P, Condenser Water Flow, Evaporator Water Delta P, Evaporator Water Flow.

MARINE OPTION(S) — A marine (shipboard) chiller has different requirements compared with typical chillers.

NOTE: These options are not intended to be used for comfort cooling applications.

Power Request — If Factory Parameters → Power Request Option is enabled, when chiller is starting up, it will send power request signal and alert 104 while verifying water flow. After it receives permission to start feedback, the start-up will proceed. The power request signal will remain active until the compressor is switched on. If start feedback has not been received 5 minutes after power request is sent, or permission to start feedback is deactivated before compressor is switched on, the start-up process will terminate and trigger an alarm. If Factory Parameters → Cont Power Request option is enabled, the power request signal will remain active after the compressor is switched on. Should the signal be deactivated while the compressor is running, an alarm shutdown will be triggered.

Evaporator Approach Calculation — If Option Configuration → Evap App Calc Selection is set to Sat Temp, evaporator approach will be calculated from evaporator leaving water temperature and evaporator saturated temperature.

If this option is set to Ref Temp, evaporator approach will be calculated from evaporator leaving water temperature and evaporator refrigerant temperature.

Free Cooling — If Factory Parameters → Free Cooling Option is enabled, any one of the following will make the chiller start free cooling.

- Enable General Parameters → Start Free Cooling
- In Network Mode, enable General Parameters → Start Free Cooling from CCN, BACNet[1], or Modbus[2].
- Close Free Cooling Start Switch contact.

When free cooling is in progress, the chiller will take these actions:

- Switch on evaporator and condenser water pump
- Open head pressure valve to maximum opening position
- Open guide vane to maximum opening position
- Activate free cooling mode output contact.
- Display Free Cooling mode on the homepage.

Free cooling mode will only be activated when chiller is not running. If the chiller is running, free cooling start request will be ignored. When free cooling is in progress, chiller is not able to start up.

Condenser Flush — To prevent the chiller being corroded after left unused for a long time, it is suggested to flush the condenser once every week.

If Option Configuration → Condenser Flush Alert is enabled, when condenser pump has been not running for 7 days, alert 166 will be triggered to remind user to flush condenser. Activate condenser flush by enabling General Parameters → Start Condenser Flush. Alert 166 will be reset automatically after condenser flush is activated.

Condenser Flush will last for 2 hours and then end automatically. During Condenser Flush, the chiller will take these actions:

- Switch on the condenser water pump
- Open head pressure valve to maximum opening position
- Display Condenser Flush mode on the homepage.

Condenser Flush mode will only be activated when chiller is not running. If the chiller is running, Condenser Flush start request will be ignored. When free cooling is in progress, If chiller is commanded to start during condenser flush it will automatically end and chiller will start up normally.

1. BACnet is a registered trademark of ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers).
2. Modbus is a registered trademark of Schneider Electric.

DIAGNOSTICS AND TROUBLESHOOTING

The 19DV PIC5 control system has many fault tracing aid functions. The local interface and its various menus give access to all unit operating conditions.

If an operating fault is detected, an alarm is activated. The alarm code is displayed in the Alarms menu, sub-menus Reset alarms and Current alarms. The control may record up to 10 current alarms and alerts.

Displaying Alarms — The alarm icon  on the interface (see the section Icons on page 14) indicates unit status as follows:

- A flashing red LED shows that the unit is operating but there is an alert.
- A steady red LED shows that the unit has been shut down due to a fault.

The Reset Alarms option on the main menu displays up to five alarm codes that are active on the unit. Table lists alarm codes.

Resetting Alarms — When the cause of the alarm has been identified and corrected, the alarm can be reset either automatically or manually (depending on the type of alarm). See Table for alarms that are eligible for automatic reset.

In the event of a power supply interrupt, if Auto Restart Option is set to ENABLE in the Option Configuration menu, the unit restarts automatically without the need for an external command.

A manual reset must be run from the main menu via the Reset Alarms Feature.

Once the alarm has been corrected or reset, all information regarding solved alarms is stored in the Alarm History. Alarm History will store last 50 alarms even after alarms have been corrected or reset.

Alarm/Alert Codes — Table 15 lists PIC5 alarm codes. Table 16 lists PIC5 alert codes. These do not cause machine shutdown and are automatically reset when the situation returns to normal.

Table 15 — PIC5 Alarm Codes

ALARM CODE (ALARMRST)	ALARM TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALM-200	ALM-200 Sensor Fault — Leaving Chilled Water	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between leaving chilled water temperature sensor and IOB connector. Check for disconnected, grounded, or shorted wiring. Check IOB channel type configurations.
ALM-201	ALM-201 Sensor Fault — Entering Chilled Water	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between entering chilled water temperature sensor and IOB connector. Check for disconnected, grounded, or shorted wiring. Check IOB channel type configurations.
ALM-202	ALM-202 Sensor Fault — Leaving Cond Water Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between leaving condenser water temperature sensor and IOB connector. Check for disconnected, grounded, or shorted wiring. Check IOB channel type configurations.
ALM-203	ALM-203 Sensor Fault — Entering Cond Water Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between entering condenser water temperature sensor and IOB connector. Check for disconnected, grounded, or shorted wiring. Check IOB channel type configurations.
ALM-204	ALM-204 Sensor Fault — Comp Discharge Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between compressor discharge temperature sensor and connector. Check for disconnected, grounded, or shorted wiring.
ALM-205	ALM-205 Sensor Fault — Oil Sump Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between oil sump temperature sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
ALM-206	ALM-206 Sensor Fault — Oil Supply Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between oil supply temperature sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
ALM-207	ALM-207 Sensor Fault — Evap Refrig Liquid Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between evaporator refrigerant liquid temperature sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
ALM-208	ALM-208 Sensor Fault — Low Speed Motor End Bearing Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between low speed motor end bearing temperature sensor and IOB connector. Check for disconnected, grounded, or shorted wiring. Check IOB channel type configurations.
ALM-209	ALM-209 Sensor Fault — Low Speed Comp End Bearing Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between low speed compressor end bearing temperature sensor and IOB connector. Check for disconnected, grounded, or shorted wiring. Check IOB channel type configurations.
ALM-210	ALM-210 Sensor Fault — High Speed Motor End Bearing Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between high speed motor end bearing temperature sensor and IOB connector. Check for disconnected, grounded, or shorted wiring. Check IOB channel type configurations.
ALM-211	ALM-211 Sensor Fault — High Speed Comp End Bearing Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between high speed compressor end bearing temperature sensor and IOB connector. Check for disconnected, grounded, or shorted wiring. Check IOB channel type configurations.

Table 15 — PIC5 Alarm Codes (cont)

ALARM CODE (ALARMRST)	ALARM TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALM-212	ALM-212 Sensor Fault — Comp Motor Winding 1 Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between compressor motor temp 1 sensor and IOB connector. Check for disconnected, grounded, or shorted wiring. Check IOB channel type configurations.
ALM-213	ALM-213 Sensor Fault — Comp Motor Winding 2 Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between compressor motor temp 2 sensor and IOB connector. Check for disconnected, grounded, or shorted wiring. Check IOB channel type configurations.
ALM-214	ALM-214 Sensor Fault — Comp Motor Winding 3 Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between compressor motor temp 3 sensor and IOB connector. Check for disconnected, grounded, or shorted wiring. Check IOB channel type configurations.
ALM-215	ALM-215 Sensor Fault — Condenser Pressure	Automatic if the voltage measured by the sensor returns to normal	Unit shuts down	Check condenser pressure transducer wiring. Confirm that 5 v reference signal is available between IOB connector. Check for disconnected, grounded, or shorted wiring. Check for condensation in transducer connector. Check SW2 dip switch in IOB for the channel configuration.
ALM-216	ALM-216 Sensor Fault — Evaporator Pressure	Automatic if the voltage measured by the sensor returns to normal	Unit shuts down	Check evaporator pressure transducer wiring. Confirm that 5 v reference signal is available between IOB connector. Check for disconnected, grounded, or shorted wiring. Check for condensation in transducer connector. Check SW2 dip switch in IOB for the channel configuration.
ALM-217	ALM-217 Sensor Fault — Economizer Pressure	Automatic if the voltage measured by the sensor returns to normal	Unit shuts down	Check economizer pressure transducer wiring. Confirm that 5 v reference signal is available between IOB connector. Check for disconnected, grounded, or shorted wiring. Check for condensation in transducer connector. Check SW2 dip switch in IOB for the channel configuration.
ALM-218	ALM-218 Sensor Fault — Diffuser Pressure	Automatic if the voltage measured by the sensor returns to normal	Unit shuts down	Check diffuser pressure transducer wiring. Confirm that 5 v reference signal is available between IOB connector. Check for disconnected, grounded, or shorted wiring. Check for condensation in transducer connector. Check SW2 dip switch in IOB for the channel configuration.
ALM-219	ALM-219 Sensor Fault — Oil Sump Pressure	Automatic if the voltage measured by the sensor returns to normal	Unit shuts down	Check oil sump pressure transducer wiring. Confirm that 5 v reference signal is available between IOB connector. Check for disconnected, grounded, or shorted wiring. Check for condensation in transducer. Check SW2 dip switch in IOB for the channel configuration.
ALM-220	ALM-220 Sensor Fault — Oil Supply Pressure	Automatic if the voltage measured by the sensor returns to normal	Unit shuts down	Check oil supply pressure transducer wiring. Confirm that 5 v reference signal is available between IOB connectors. Check for disconnected, grounded, or shorted wiring. Check for condensation in transducer connector. Check SW2 dip switch in IOB for the channel configuration.
ALM-221	ALM-221 Sensor Fault — Thrust Bearing Oil Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check wiring between Thrust Bearing Oil Temp Sensor and IOB connector. Check for disconnected, grounded or shorted wiring. Check IOB configuration.
ALM-222	ALM-222 Sensor Fault — Subcooler Outlet Temp	Automatic if the temperature measured by the sensor returns to normal	Units shuts down	Check sensor resistance. Check wiring. Check IOB configuration.

Table 15 — PIC5 Alarm Codes (cont)

ALARM CODE (ALARMRST)	ALARM TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALM-223	ALM-223 Sensor Fault — Purge Compressor Suction Temp	Automatic if the temperature measured by the sensor returns to normal	Units shuts down	Check sensor resistance. Check wiring. Check IOB configuration.
ALM-224	ALM-224 Sensor Fault — Carbon Tank Temp	Automatic if the temperature measured by the sensor returns to normal	Units shuts down	Check sensor resistance. Check wiring. Check IOB configuration.
ALM-225	ALM-225 Sensor Fault — Pump Inlet Pressure	Automatic if the voltage measured by the sensor returns to normal	Units shuts down	Check wiring to pressure transducer. Confirm that 5V reference signal is available between IOB connectors. Check for disconnected, grounded, or shorted wiring. Check for condensation in transducer connector. Check board dip switch settings.
ALM-226	ALM-226 Sensor Fault — Bearing Inlet Pressure	Automatic if the voltage measured by the sensor returns to normal	Units shuts down	Check wiring to pressure transducer. Confirm that 5V reference signal is available between IOB connectors. Check for disconnected, grounded, or shorted wiring. Check for condensation in transducer connector. Check board dip switch settings.
ALM-227	ALM-227 Sensor Fault — Bearing Outlet Pressure	Automatic if the voltage measured by the sensor returns to normal	Units shuts down	Check wiring to pressure transducer. Confirm that 5V reference signal is available between IOB connectors. Check for disconnected, grounded, or shorted wiring. Check for condensation in transducer connector. Check board dip switch settings.
ALM-228	ALM-228 Sensor Fault — Common CHWS Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between Common CHWS Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
ALM-229	ALM-229 Sensor Fault — Common CHWR Temp	Automatic if the temperature measured by the sensor returns to normal	Unit shuts down	Check sensor resistance. Check for proper wiring between Common CHWR Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
ALM-230	ALM-230 Prestart Failure — High Bearing Temperature	Manual	Unit shuts down. Compressor is not allowed to start.	Check Comp Bearing Temp in Temperature screen. Check oil heater and oil cooler for proper operation. Check for low oil level, partially closed oil supply valves, clogged oil filters. Check the compressor bearing temperature sensor wiring and accuracy to IOB connector. Check Comp Bearing Temp Alert setting.
ALM-231	ALM-231 Prestart Failure — High Motor Temperature	Manual	Unit shuts down. Compressor is not allowed to start.	Check Comp Motor Wind Temp in Temperature screen. Check motor temperature sensor for wiring and accuracy to IOB connector. Check motor cooling line and isolation valves for proper operation or restrictions, check refrigerant filter/drier. Check for excessive starts within a short time span. Check Comp Motor Temp Override setting.
ALM-232	ALM-232 Prestart Failure — High Discharge Temperature	Manual	Unit shuts down. Compressor is not allowed to start.	Check Comp Discharge Temp in Temperature screen. Allow compressor discharge temperature sensor to cool. Check compressor discharge temperature sensor wiring to IOB connector. Check for excessive starts. Check Comp Discharge Alert setting.
ALM-233	ALM-233 Prestart Failure — Low Refrigerant Temperature	Manual	Unit shuts down. Compressor is not allowed to start.	Check Evaporator Pressure, Evap Sat Refrig Temp, and Evap Refrig Liquid Temp in Temperature screen. Check Evaporator Pressure transducer and Evaporator Refrigerant Liquid Temperature sensor wiring and accuracy to IOB connector. Check for low chilled water supply temperatures. Check refrigerant charge. Check REFRIG OVERRIDE DELTA T and EVAP REFRIG TRIPPOINT in Configuration screen.
ALM-234	ALM-234 Prestart Failure — Low Line Voltage	Manual	Unit shuts down. Compressor is not allowed to start.	Check ACTUAL LINE VOLTAGE. Check UNDERVOLTAGE THRESHOLD in ISM_CONF screen. Check voltage supply. Check wiring to ISM J3-L1, J3-L2, and J3-L3. Check voltage transformers and switch gear. Consult power utility if voltage is low.

Table 15 — PIC5 Alarm Codes (cont)

ALARM CODE (ALARMRST)	ALARM TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALM-235	ALM-235 Prestart Failure — High Line Voltage	Manual	Unit shuts down. Compressor is not allowed to start.	Check ACTUAL LINE VOLTAGE. Check OVERVOLTAGE THRESHOLD in ISM_CONF screen. Check voltage supply. Check voltage transformers and switch gear. Consult power utility if voltage is high.
ALM-236	ALM-236 Guide Vane 1 — Calibration Not Completed	Manual	Unit shuts down. Compressor is not allowed to start.	Perform Guide Vane Calibration in Quick Calibration screen. Check guide vane actuator feedback potentiometer and wiring to IOB connector.
ALM-237	ALM-237 Prestart Failure — No Power Supply	Manual	Unit shuts down. Compressor is not allowed to start.	If WATER VERIFICATION TIME has passed after REQUEST TO START had been sent, there is still no PERMISSION TO START received
ALM-238	ALM-238 Guide Vane 2 — Calibration Not Completed	Manual	Units shuts down.	Compressor is not allowed to Start. Perform Guide Vane Calibration in Quick Calibration screen. Check guide vane actuator feedback potentiometer and wiring to IOB connector.
ALM-239	ALM-239 Envelop Control Valve Calibration Not Completed	Manual	Unit shuts down. Compressor is not allowed to start.	EC valve calibration failed during control test mode or prestart check.
ALM-250	ALM-250 Protective Limit — Oil Pressure Difference Failure	Manual	Unit shuts down.	Check oil pump. Check oil filter. Check oil pump wiring.
ALM-251	ALM-251 Protective Limit — Low Chilled Water Flow	Manual	Unit shuts down.	Perform Chilled Water pump test in Quick Test screen. Check evaporator refrigerant liquid temperature and leaving chilled water temperature sensor accuracy and wiring to IOB. Check chilled water valves, pumps, and strainers. Check EVAP REFRIG TRIPPOINT, EVAP APPROACH ALERT, EVAP FLOW DELTA P CUTOUT, and WATER FLOW VERIFY TIME settings. Check load resistors, optional water flow switches or water flow delta P transducer calibration and wiring to IOB. Check for 5.0 v reference voltage between IOB connectors.
ALM-252	ALM-252 Protective Limit — Low Condenser Water Flow	Manual	Unit shuts down.	Perform Condenser Water pump test in Quick Test screen. Check condenser pressure transducer and leaving condenser water temperature sensor accuracy and wiring. Check condenser water valves and strainers. Check COND PRESS OVERRIDE, COND APPROACH ALERT, COND FLOW DELTA P CUTOUT, and WATER FLOW VERIFY TIME settings. Check load resistors, optional water flow switches or water flow delta P transducer calibration and wiring to IOB. Check for 5.0 v reference voltage between IOB connectors.
ALM-253	ALM-253 Protective Limit — High Discharge Temperature	Manual	Unit shuts down.	Check for closed compressor discharge isolation valve. Check if chiller was operating in surge conditions. Check compressor discharge temperature sensor resistance or voltage drop. Check for proper wiring to IOB connectors. Check for proper condenser flow and temperature. Check for proper inlet guide vane and optional diffuser actuator operation. Check for COMP DISCHARGE TEMP > 220°F (104°C) Check for fouled tubes, plugged water strainers, or noncondensables in the condenser.

Table 15 — PIC5 Alarm Codes (cont)

ALARM CODE (ALARMRST)	ALARM TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALM-254	ALM-254 Protective Limit — Low Evaporator Refrigerant Temperature	Manual	Unit shuts down.	Check for proper refrigerant charge. Check float valve operation. Check for closed condenser liquid line isolation valve. If problem occurs at high load, check for low condenser pressure which causes inadequate refrigerant flow through condenser flask orifices. Check for proper chilled water flow and temperature. Confirm that condenser water enters bottom row of condenser tubes first (reversed condenser water flow may cause refrigerant to stack in the condenser). Check evaporator pressure transducer and evaporator refrigerant liquid temperature and leaving chilled water sensors. Check for division plate gasket bypass. Check for fouled tubes. Check pressure transducer and temperature sensor wiring to the IOB.
ALM-255	ALM-255 Protective Limit — High Motor Temperature	Manual	Unit shuts down.	Check compressor motor winding temperature sensor accuracy and wiring to IOB. Check motor cooling line and spray nozzle for proper operation or restrictions. Check motor cooling filter/drier and isolation valves. Look for refrigerant flow through motor cooling line sight glass. Check for excessive starts within a short time span.
ALM-256	ALM-256 Protective Limit — High Bearing Temperature	Manual	Unit shuts down.	Check oil heater for proper operation; confirm that oil heater is de-energized when compressor is running. Check for low oil level, partially closed oil line isolation valves, or clogged oil filter. Check oil cooler refrigerant thermal expansion valves; confirm that expansion valve bulbs are secured to the oil lines and insulated. Check compressor bearing temperature sensors accuracy and wiring to IOB. This fault can result from excessive operation at low load with low water flow to the evaporator or condenser. Very high discharge and volute temperatures may increase the oil sump temperature. Elevated sump temperature may result from an excessively high oil level reaching the bottom of the bull gear, causing it to churn the oil.
ALM-257	ALM-257 Protective Limit — High Condenser Temperature	Manual	Unit shuts down.	Check CONDENSER PRESSURE. Check for high condenser water temperatures, low water flow, fouled tubes. Check for division plate/gasket bypass or plugged condenser water strainers. Check for noncondensables in condenser. Check condenser pressure transducer wiring and accuracy to IOB. Configure COND PRESS OVERRIDE in configuration screen. NOTE: This alarm is not caused by the high condenser pressure switch.
ALM-258	ALM-258 Protective Limit — Spare Safety Device	Manual	Unit shuts down.	Spare safety input has been closed.
ALM-259	ALM-259 Protective Limit — Excessive Compressor Surge	Manual	Unit shuts down.	Five SURGE PROTECTION COUNTS occurred within SURGE TIME PERIOD. VFD Only: Surge prevention alarm declared when ACTUAL VFD SPEED is at least 90%. Check for high condenser water temperatures, low water flow, fouled tubes. Check CONDENSER APPROACH. Check condenser water strainers. Check for division plate/gasket bypass. Check for noncondensables in condenser. Check surge prevention parameters in OPTIONS screen. Compare cooling tower control settings and performance against design/selection temperatures across the entire operating range of the chiller. Check EVAPORATOR APPROACH and chilled water flow.
ALM-260	ALM-260 Protective Limit — Compressor Start Relay Start Failure	Manual	Unit shuts down.	Check motor starter 1M contactor wiring. Check ISM current sensors.

Table 15 — PIC5 Alarm Codes (cont)

ALARM CODE (ALARMRST)	ALARM TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALM-261	ALM-261 Protective Limit — Evaporator Frozen	Manual	Unit shuts down.	Check CALC EVAP SAT TEMP, EVAP REFRIG LIQUID TEMP, and EVAP REFRIG TRIPPOINT. Check for proper refrigerant charge. Check float valve operation. Confirm that optional refrigerant liquid line isolation valve is open. Check for proper Chilled Water flow and temperature. Confirm that condenser water enters bottom row of condenser tubes first (reversed condenser water flow may cause refrigerant to stack in the condenser). Check evaporator pressure transducer and evaporator refrigerant liquid temperature sensor. Check for evaporator water box division plate gasket bypass. Check for fouled tubes.
ALM-262	ALM-262 Protective Limit — Condenser Frozen	Manual	Unit shuts down.	The Cond Sat Refrig Temp is less than the Condenser Freeze Point. Check Condenser Freeze Point in configuration. Condenser water too cold or chiller shut down with brine below 32°F (0°C) in cooler so equalization temperature in chiller approached 32°F (0°C). Check condenser pressure transducer and wiring to IOB. Check condenser water temperature sensors and wiring to IOB. Check refrigerant charge.
ALM-263	ALM-263 Protective Limit — Invalid Diffuser Config	Manual	Unit shuts down.	Check SRD Configurations.
ALM-264	ALM-264 Protective Limit — Diffuser Position Fault	Manual	Unit shuts down.	Confirm that Diffuser Option in SRD Configuration screen has not been Enabled if compressor does not have a split ring diffuser. May indicate rotating stall condition. Check rotating stall transducer wiring accuracy and sealing. Check diffuser schedule and guide vane schedule in SRD Configuration screen. Check for proper operation of diffuser and inlet guide vane actuators including inlet guide vane calibration. Check diffuser actuator coupling for rotational slip. Check for electrical noise in IOB Diffuser Pressure wiring. Do not continue to operate compressor except for diagnostic purposes.
ALM-265	ALM-265 Protective Limit — Refrigerant Leak	Manual	Unit shuts down.	REFRIGERANT LEAK OPTION is Enabled and the REFRIGERANT LEAK SENSOR output exceeded REFRIGERANT LEAK ALARM mA. Check for refrigerant leaks. Check leak detector for proper operation. Check REFRIGERANT LEAK ALARM mA setting in the OPTIONS screen. Check 4 to 20 mA or 1 to 5 v output from refrigerant leak sensor to IOB. Confirm that IOB SW2 dip switch 1 is in the correct position.
ALM-266	ALM-266 Protective Limit — IOB Low Voltage	Automatic	Unit shuts down.	Check IOB 24 VAC power supply and the transformer output voltage.
ALM-267	ALM-267 Protective Limit — Guide Vane Fault	Manual	Unit shuts down.	Alarm before start indicates guide vane opening has not closed to less than 4%. Alarm while running indicates guide vane position is < –1% or > 103%. Enter Quick Test and conduct Guide Vane Calibration. Check wiring between the guide vane feedback potentiometer and IOB terminals. Check the 10,000 ohm guide vane position feedback potentiometer or 4 to 20mA current.
ALM-268	ALM-268 Protective Limit — Damper Valve Fault	Manual	Unit shuts down.	Check damper valve wirings. Do a control test on the damper valve to check the feedback signals.
ALM-269	ALM-269 Protective Limit — EC Valve Fault	Manual	Unit shuts down.	Check EC valve wirings. Do a control test on the EC/HGBP valve to check the feedback signals.
ALM-270	ALM-270 Protective Limit — High Cond Water Flow	Manual	Unit shuts down.	Check condenser water pressure sensor and wirings.
ALM-271	ALM-271 Protective Limit — Emergency Stop	Automatic	Unit shuts down.	Check EMSTOP command from network and the remote stop dry contact from IOB.

Table 15 — PIC5 Alarm Codes (cont)

ALARM CODE (ALARMRST)	ALARM TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALM-272	ALM-272 Protective Limit — ISM Config Conflict	Automatic	Unit shuts down.	Configuration data in controller and ISM are mismatched. In Maintenance menu, choose Maintains ISM config→Delete ISM config: NO — Upload ISM configuration data to HMI YES- Download ISM configuration to ISM
ALM-273	ALM-273 Protective Limit — Swift Restart Limit Exceeded	Manual	Unit shuts down.	Understand the reason and correct why Swift Restart happens frequently.
ALM-274	ALM-274 Protective Limit — Chiller Lockout	Automatic	Unit shuts down.	Check chiller lockout input in IOB
ALM-275	ALM-275 Protective Limit — Fire Alarm	Automatic	Unit shuts down.	Check fire alarm input in IOB
ALM-276	ALM-276 Protective Limit — Stop Override	Manual	Unit shuts down.	Check stop override point status in GENUNIT table
ALM-277	ALM-277 Protective Limit — UI Freeze Reboot	Manual	Units shuts down	PIC5+ Power on reset, UI module freeze because of unknown cause
ALM-278	ALM-278 Protective Limit — VFD Config Conflict	Automatic when communication comes back to normal	Units shuts down	Configurations in PIC5 is different than configurations in maintenance table for 32VS (DCISB board).
ALM-279	ALM-279 Protective Limit — VFD Config Failure	Manual	Units shuts down	PIC5+ VFD configuration exceeds the VFD limits. Check VFD Configurations and Save.
ALM-280	ALM-280 Protective Limit — High VFD speed	Manual	Unit shuts down.	Check VFD actual speed
ALM-282	ALM-282 Protective Limit — Displacement Switch	Manual	Unit shuts down.	Check impeller displacement switch.
ALM-283	ALM-283 Protective Limit — High Pressure Switch	Manual	Unit shuts down.	Check high pressure switch.
ALM-284	ALM-284 Protective Limit — Power Feedback Loss	Manual	Unit shuts down.	Check Power Feedback Input.
ALM-285	ALM-285 Protective limit — low refrigerant pressure difference	Manual	Unit shuts down	Refrigerant pressure below allowable values. Check refrigerant pump and differential between supply and return.
ALM-290	ALM-290 Protective Limit — Long time purge active	Manual	Unit shuts down	Alarm occurs if purge system does conterminous pumpout for more than one hour. Check wire and signal to pumpout solenoid valve.
ALM-291	ALM-291 Protective Limit — Drainage system failure	Manual	Unit shuts down	Alarm occurs if purge system drainage valve has been open for longer than Drainage Valve Action Alarm Time (default 30 min) while level in purge tank remains high. Check wire and signal to pumpout solenoid valve.
ALM-296	ALM-296 Protective Limit — High Evaporator Pressure	Manual	Unit shuts down.	Check evaporator pressure sensor input. Check evaporator pressure cutout configurations.
ALM-300	ALM-300 Loss Communication with ISM	Automatic when communication returns to normal (Swift Restart eligible) NOTE: When the Auto Restart option is enabled, the Swift Restart algorithm allows for quicker restart and decreases the normal start-up delays and verification times	Unit shuts down.	Check LEN communication cable. Check the wiring and termination resistor settings.
ALM-301	ALM-301 Loss of Communication with IOB 1	Automatic when communication returns to normal	Unit shuts down.	Check LEN communication cable. Check the wiring and termination resistor settings.
ALM-302	ALM-302 Loss of Communication with IOB 2	Automatic when communication returns to normal	Unit shuts down.	Check LEN communication cable. Check the wiring and termination resistor settings.
ALM-303	ALM-303 Loss of Communication with IOB 3	Automatic when communication returns to normal	Unit shuts down.	Check LEN communication cable. Check the wiring and termination resistor settings.
ALM-304	ALM-304 Loss of Communication with IOB 4	Automatic when communication returns to normal	Unit shuts down.	Check LEN communication cable. Check the wiring and termination resistor settings.
ALM-305	ALM-305 Loss of Communication with IOB 5	Automatic when communication returns to normal	Unit shuts down.	Check LEN communication cable. Check the wiring and termination resistor settings.
ALM-306	ALM-306 Loss of Communication with IOB 6	Automatic when communication returns to normal	Unit shuts down.	Check LEN communication cable. Check the wiring and termination resistor settings.
ALM-307	ALM-307 LEN Scan Error	Manual	Unit shuts down.	Check LEN bus hardware physical wiring and software log
ALM-308	ALM-308 Loss Communication with VFD	Automatic when communication returns to normal	Unit shuts down.	Bus installation fault or defective slave board
ALM-309	ALM-309 Loss Communication with VFD Gateway (LEN)	Manual	Unit shuts down.	Bus installation fault or defective slave board
ALM-310	ALM-310 Loss Communication with VFD (Modbus)	Manual	Unit shuts down.	Bus installation fault or defective slave board
ALM-350	ALM-350 Sensor Fault — 19DV 1st Stage Bearing Temp	Manual	Units shuts down	Check sensor resistance. Check for proper wiring between sensor and IOB connector. Check for disconnected, grounded or shorted wiring. Check IOB dip switch settings.

Table 15 — PIC5 Alarm Codes (cont)

ALARM CODE (ALARMRST)	ALARM TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALM-351	ALM-351 Sensor Fault — 19DV 2nd Stage Bearing Temp	Manual	Units shuts down	Check sensor resistance. Check for proper wiring between sensor and IOB connector. Check for disconnected, grounded or shorted wiring. Check IOB dip switch settings.
ALM-352	ALM-352 Sensor Fault — 19DV Pump Outlet Pressure	Manual	Units shuts down	Check wiring to pressure transducer Confirm that 5V reference signal is available between IOB connectors. Check for disconnected, grounded, or shorted wiring. Check for condensation in transducer connector. Check board dip switch settings.
ALM-400	ALM-400 ISM Fault — Line Voltage Dropout	Manual	Units shut down	Any LINE VOLTAGE < 50% MOTOR RATED Temporary loss of voltage. SINGLE CYCLE DROPOUT in the ISM_CONF screen is Enabled and two LINE VOLTAGES < 50% MOTOR RATED LINE VOLTAGE.
ALM-401	ALM-401 ISM Fault — Line Phase Loss	Manual	Units shut down	LINE VOLTAGE or there is an excessive difference between the smallest LINE CURRENT and the largest LINE CURRENT. Check the ISM_HIST screen. Check MOTOR RATED LINE VOLTAGE in ISM_CONF screen. Check phase to phase and phase to ground power distribution bus voltage. Check current transformer wiring leading to ISM terminal block J4 and line voltage wiring leading to ISM terminal block J3. Check wiring and hardware between building power supply and motor. Current imbalance may improve if power or motor leads are rotated in the same phase sequence. Consult power company. Medium voltage applications only: Check voltage potential transformers and VOLT TRANSFORMER RATIO in ISM_CONF screen.
ALM-402	ALM-402 ISM Fault — High Line Voltage	Manual	Units shut down	High LINE VOLTAGE for an excessive amount of time. Check LINE VOLTAGE in ISM_HIST screen. Check MOTOR RATED LINE VOLTAGE and OVERVOLTAGE THRESHOLD in ISM_CONF screen. Check phase to phase and phase to ground distribution bus voltage. Consult power company. Medium voltage applications only: Check voltage potential transformers and VOLT TRANSFORMER RATIO in ISM_CONF screen. Check wiring to ISM J3-VL1, J3-VL2 and J3-VL3.
ALM-403	ALM-403 ISM Fault — Low Line Voltage	Manual	Units shut down	Low LINE VOLTAGE for an excessive amount of time. Check LINE VOLTAGE in ISM_HIST screen. Check MOTOR RATED LINE VOLTAGE and UNDERVOLTAGE THRESHOLD in ISM_CONF screen. Check phase to phase and phase to ground distribution bus voltage. Check connections to ISM terminal block J3. Consult power company. Medium voltage applications only: Check voltage potential transformers and VOLT TRANSFORMER RATIO in ISM_CONF screen. Check wiring to ISM J3-VL1, J3-VL2 and J3-VL3.
ALM-404	ALM-404 ISM Fault — Line Current Imbalance	Manual	Units shut down	Current imbalance > CURRENT % IMBALANCE for greater than the CURRENT IMBALANCE TIME. Check settings in ISM_CONF screen. Check ISM_HIST screen. Check current transformer wiring leading to ISM terminal block J4. Verify phase to phase and phase to ground line voltage. Check wiring and hardware between building power supply and motor. Current imbalance may improve if power or motor leads are rotated in the same phase sequence.
ALM-405	ALM-405 ISM Fault — Line Voltage Imbalance	Manual	Units shut down	Voltage Imbalance > VOLTAGE % IMBALANCE for greater than the VOLTAGE IMBALANCE TIME. Check settings in ISM_CONF screen. Check ISM_HIST screen. Check line voltage wiring leading to ISM terminal block J3. Verify phase to phase and phase to ground line voltage. Check wiring and hardware between building power supply and motor.

Table 15 — PIC5 Alarm Codes (cont)

ALARM CODE (ALARMRST)	ALARM TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALM-406	ALM-406 ISM Fault — Overload Trip	Manual	Units shut down	Any phase current > 108% RLA for excessive time period. Alarm can result from significant load side current imbalance when running at full load. Check ISM_HIST screen. Check entering condenser water temperature and water flow rate. Check MOTOR RATED LOAD AMPS and STARTER LRA RATING in ISM_CONF screen. VFD applications only: Any phase current > 120% for excessive time period.
ALM-407	ALM-407 ISM Fault — Motor Locked Rotor Trip	Manual	Units shut down	Any LINE CURRENT > MOTOR LOCKED ROTOR TRIP for excessive time while running after the LOCKED ROTOR START DELAY has expired. Check MOTOR LOCKED ROTOR TRIP and MOTOR CURRENT CT RATIO in ISM_CONF screen. Check motor nameplate data. Check ISM_HIST screen. Check motor wiring and motor winding resistance. Temporarily enable SINGLE CYCLE DROP OUT to capture power disturbances.
ALM-408	ALM-408 ISM Fault — Starter Lock Rotor Trip	Manual	Units shut down	Any LINE CURRENT > STARTER LRA RATING. Check STARTER LRA RATING and MOTOR CURRENT CT RATIO in ISM_CONF screen. Check ISM_HIST screen. Check starter label data. Check motor wiring and motor winding resistance
ALM-409	ALM-409 ISM Fault — Ground Fault	Manual	Units shut down	Any GROUND FAULT current > GROUND FAULT CURRENT threshold for a duration > GROUND FAULT PERSISTENCE after the GROUND FAULT START DELAY has expired. Check these settings and GROUND FAULT CT RATIO in ISM_CONF screen. Check ISM_HIST screen. Check Motor and Current Transformers Confirm that ground fault current transformer orientation is correct and that the correct motor leads have been routed through the ground fault current transformers in the right direction. Check for condensation on motor terminals or inside of motor leads. Check motor power leads for phase to phase or phase to ground shorts. Disconnect motor from starter and megger motor windings to ground and phase to phase. Call Carrier Service.
ALM-410	ALM-410 ISM Fault — Phase Reversal Trip	Manual	Units shut down	The ISM has detected that the input power is phased BAC instead of ABC. Confirm that the phase sequence wired to ISM terminal block J3 is consistent with the power wiring to the starter. Swap two power leads at the starter.
ALM-411	ALM-411 ISM Fault — Line Frequency Trip	Manual	Units shut down	LINE FREQUENCY FAULTING in ISM_CONF screen is enabled and the LINE FREQUENCY has deviated approximately 7% from nominal value. Check ISM_HIST screen. Check FREQUENCY = 60 HZ? In ISM_CONF screen. Check line frequency. If operating from a generator, check generator size and speed.
ALM-412	ALM-412 ISM Fault — Starter Module Reset	Manual	Units shut down	AUTO RESTART OPTION in OPTIONS screen is disabled and there was a temporary loss of 115 V ISM control voltage supply. Check ISM_HIST screen. Check wiring leading to ISM terminals J1- LL1 and J1-LL2. Check control power circuit breaker, control power transformer and control power circuit fuses. Monitor chiller utility power for disruptions. Improve ISM ground connection, apply measures to reduce electrical noise to ISM. Consult power company.
ALM-413	ALM-413 ISM Fault — Start Contact Fault	Manual	Units shut down	1M Aux. contacts open with 1CR = ON + 3 sec.
ALM-414	ALM-414 ISM Fault — Transition Contact Fault	Manual	Units shut down	2M Aux. contacts open with 1CR/Transition = ON + 3 Sec
ALM-415	ALM-415 ISM Fault — Oil Pump/hps Failure	Manual	Units shut down	Check safety circuit Oil Pump Aux relay and/High pressure switch operation.
ALM-416	ALM-416 ISM Fault — Starter Fault	Manual	Units shut down	Starter Fault = Open w/1CR = ON, check starter safety circuit.

Table 15 — PIC5 Alarm Codes (cont)

ALARM CODE (ALARMRST)	ALARM TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALM-417	ALM-417 ISM Fault — Motor Amps Not Sensed	Manual	Units shut down	The ISM has not sensed sufficient current for an excessive delay after 1M has closed. Check the MOTOR CURRENT CT RATIO and the MOTOR RATED LOAD AMPS in the ISM_CONF screen. Check VFD OPTION in SETUP 2 screen. Check for wiring of current transformers to the J4 ISM terminals. Check if main circuit breaker has tripped. Check ISM_HIST screen
ALM-418	ALM-418 ISM Fault — Excessive Acceleration Time	Manual	Units shut down	Any line current remains high for an excessive time duration following 1M aux and either 2M aux or transition contact closure. Check that inlet guide vanes are fully closed at start up. Check ISM_HIST screen. Check Motor Rated Load Amps in ISM_CONF screen. Reduce condenser pressure if possible.
ALM-419	ALM-419 ISM Fault — Excessive Motor Amps	Manual	Units shut down	AVERAGE LINE CURRENT > 110% for an excessive amount of time. Check MOTOR RATED LOAD AMPS and MOTOR CURRENT CT RATIO in ISM_CONF time. Check ISM_HIST screen. Check for conditions that cause excessive lift. Check guide vane actuator for proper operation. Confirm that guide vanes will fully close prior to start-up.
ALM-420	ALM-420 ISM Fault — Start/transition Contact Fault	Manual	Units shut down	1M/2M Aux Contact Stop Fault; Check 1M/2M Contactors and Aux. The 1M aux or 2M aux contacts are closed during power up or the 1M aux or 2M aux contacts remain closed for an excessive delay following a STOP command. Check wiring and dry contacts leading to ISM J2-9 and J2-10 and J2-11 and J2-12.
ALM-421	ALM-421 ISM Fault — Motor Amps When Stopped	Manual	Units shut down	High line current measured on any phase after power up or STOP command. Check the MOTOR CURRENT CT RATIO and the MOTOR RATED LOAD AMPS in the ISM_CONF screen. Check VFD OPTION in SETUP 2 screen. Check ISM_HIST screen. Check for high inrush current during power-up. Confirm that the starter de-energizes the motor when the ISM removes 115V from ISM J9-2. Confirm that the correct STARTER TYPE has been selected in the ISM_CONF screen
ALM-422	ALM-422 ISM Fault — Starter Module Failure	Manual	Units shut down	Remove power and re-power ISM.
ALM-423	ALM-423 ISM Fault — Calibration Factor Error	Manual	Units shut down	Remove power and re-power ISM
ALM-424	ALM-424 ISM Fault — Invalid Configuration Error	Manual	Units shut down	Remove power and re-power ISM
ALM-425	ALM-425 VFD Fault — Single Cycle Dropout	Manual	Units shut down	Line Voltage on 2 Phases < 50% for 1 Cycle. Preset Alarm/Prestart Alert, Configure SINGLE CYCLE DROPOUT in ISM_CONF screen
ALM-426	ALM-426 VFD Fault — Line Current Imbalance	Manual	Units shut down	Possibly line current threshold imbalance is too low. Possible harmonics on input. The power source quality is not acceptable.
ALM-427	ALM-427 VFD Fault — High Line Voltage	Manual	Units shut down	The line voltage is too high
ALM-428	ALM-428 VFD Fault — Low Line Voltage	Manual	Units shut down	The line voltage is too low
ALM-429	ALM-429 VFD Fault — Low DC Bus Voltage	Manual	Units shut down	Input voltage is too low — possibly DC bus capacitor damage.
ALM-430	ALM-430 VFD Fault — High DC Bus Voltage	Manual	Units shut down	Input voltage is too high — possible increase the decrease ramping time.
ALM-431	ALM-431 VFD Fault — VFD Power On Reset	Manual	Units shut down	VFD cycles power due to issue — Power On Reset objective is to get to a known state
ALM-432	ALM-432 VFD Fault — Ground Fault	Manual	Units shut down	Any of the 3 input sensors senses a current greater than 40A. Disconnect drive from utility power and check that there are no phases shorted to ground. Disconnect motor from VFD and megger motor.
ALM-433	ALM-433 VFD Fault — Line Phase Reversal	Manual	Units shut down	Reverser connections of any two line conductors to drive.
ALM-434	ALM-434 VFD Fault — Motor Overload Trip	Manual	Units shut down	Verify motor nameplate FLA setting, decrease load if possible.
ALM-435	ALM-435 VFD Fault — Rectifier Power Fault	Manual	Units shut down	
ALM-436	ALM-436 VFD Fault — Inverter Power Fault	Manual	Units shut down	

Table 15 — PIC5 Alarm Codes (cont)

ALARM CODE (ALARMRST)	ALARM TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALM-437	ALM-437 VFD Fault — Rectifier Overcurrent	Manual	Units shut down	Verify entered motor data, verify input voltage balance.
ALM-438	ALM-438 VFD Fault — Inverter Overcurrent	Manual	Units shut down	Verify entered motor data, verify output wire connections.
ALM-439	ALM-439 VFD Fault — Condenser High Pressure	Manual	Units shut down	Condenser High Pressure or the Safety Stop was detected — Reset the switch and reset alarm after determining cause of fault.
ALM-440	ALM-440 VFD Fault — Motor Amps Not Sensed	Manual	Units shut down	After start command is sent and motor amps not sensed after 2s. Verify motor wiring, verify wiring for DCIB and power module.
ALM-441	ALM-441 VFD Fault — Motor Acceleration Fault	Manual	Units shut down	Increase motor acceleration ramping time.
ALM-442	ALM-442 VFD Fault — Stop Fault	Manual	Units shut down	Motor amps sensed when stopped
ALM-443	ALM-443 VFD Fault — Rectifier Overtemp	Manual	Units shut down	Check for proper VFD cooling fan operation and possible blockage.
ALM-444	ALM-444 VFD Fault — Inverter Overtemp	Manual	Units shut down	Check for proper VFD cooling fan operation and blockage
ALM-445	ALM-445 VFD Fault — Motor Current Imbalance	Manual	Units shut down	Verify no motor phases are shorted to ground. Verify CT wiring to rule out signal noise causing fault. Check motor current imbalance setting,
ALM-446	ALM-446 VFD Fault — Line Voltage Imbalance			Check fault history for values. Check phase to phase and phase to ground. check bus voltage, if applicable increase line voltage imbalance, verify fault not caused by noise, consult power company.
ALM-447	ALM-447 VFD Fault — Frequency Fault	Manual	Units shut down	verify connections between HVIB and DCIB
ALM-448	ALM-448 VFD Fault — VFD Comm Fail	Manual	Units shut down	Verify VFD communications cable
ALM-449	ALM-449 VFD Fault — VFD Fault	Manual	Units shut down	
ALM-450	ALM-450 VFD Fault — VFD Start Inhibit	Manual	Units shut down	
ALM-451	ALM-451 VFD Fault — VFD Checksum Error	Manual	Units shut down	
ALM-452	ALM-452 VFD Fault — Inductor Overtemp Switch	Manual	Units shut down	
ALM-453	ALM-453 VFD Fault — Incompatibility Fault	Manual	Units shut down	

Table 16 — PIC5 Alert Codes

ALERT CODE (ALARMRST)	ALERT TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
PRESTART ALERTS				
ALT-100	ALT-100 Prestart Alert — Starts Limit Exceeded	Automatic when the situation returns to normal	Turn on Alert relay.	Check STARTS IN 12 HOURS in Run times screen. Enable “Enable Excessive Starts” option in Service menu if additional start is required. NOTE: Recycle restarts and auto restarts after power failure are not counted in Starts Limit.
ALT-101	ALT-101 Prestart Alert — Low Oil Temperature	Automatic when the situation returns to normal	Alert relay is ON.	Check OIL SUMP TEMP in default screen. Check oil heater contactor/relay and power. Check oil sump temperature sensor wiring and accuracy. Check oil level and oil pump operation. Check EVAP SAT TEMP.
ALT-102	ALT-102 Prestart Alert — High Condenser Pressure	Automatic when the situation returns to normal	Alert relay is ON.	Check CONDENSER PRESSURE. Check condenser pressure transducer wiring and accuracy. Check for high condenser water temperatures. Check COND PRESS OVERRIDE in configuration.
ALT-103	ALT-103 Prestart Alert — Excessive Recycle Starts	Automatic when the situation returns to normal	Alert relay is ON.	Chiller load is too low to keep compressor on line and there have been more than 5 starts in 4 hours. Increase chiller load, adjust hot gas bypass to open at a higher load, increase recycle RESTART DELTA T in service menu. Check hot gas bypass isolation valve position.
ALT-104	ALT-104 Prestart Alert — Waiting for Start Permission	Automatic when the situation returns to normal	Alert relay is ON.	Power request option is enabled.
SENSOR ALERTS				
ALT-120	Alt-120 Sensor Alert — Remote Temperature Out of Range	Automatic when the situation returns to normal	Alert relay is ON.	Type 2 Temperature Reset is Enabled and remote temperature reset sensor is out of range. Check ENABLE RESET TYPE and TEMPERATURE RESET settings in TEMP_CNTL screen. Check remote temperature reset sensor resistance or voltage drop. Check for proper wiring to IOB. Check IOB channel type configurations and SW2 dip switch setting in IOB.
ALT-121	Alt-121 Sensor Alert — Auto Water Temp Reset	Automatic when the situation returns to normal	Alert relay is ON.	Check Temp Reset Configuration. Confirm that Auto Water Temp Reset Input is between 4 mA and 20 mA. Confirm that wiring to IOB connector is not grounded.
ALT-122	Alt-122 Sensor Alert — Auto Demand Limit Input	Automatic when the situation returns to normal	Alert relay is ON.	20 mA DEMAND LIMIT OPT is Enabled, Ice Build is not Active, and Auto Demand Limit Input on IOB is < 2 mA. Check 20 mA DEMAND LIMIT OPT and DEMAND LIMIT AT 20 mA in Service screen. Confirm that Auto Demand Limit Input is between 4 mA and 20 mA. Confirm that wiring to IOB connector is not grounded. Check IOB channel type configurations and SW2 dip switch setting in IOB.
ALT-123	Alt-123 Sensor Alert — VFD Speed Out of Range	Automatic when the situation returns to normal	Alert relay is ON.	Check VFD speed feedback input in ISM
ALT-124	Alt-124 Sensor Alert — Humidity Sensor	Automatic when the situation returns to normal	Alert relay is ON.	Check humidity sensor input in IOB
ALT-125	Alt-125 Sensor Alert — Refrigerant Leak Input	Automatic when the situation returns to normal	Alert relay is ON.	Check refrigerant leak optional input in IOB
ALT-126	Alt-126 Sensor Alert — Diffuser Pos Feedback	Automatic when the situation returns to normal	Alert relay is ON.	Check diffuser position feedback.
ALT-127	ALT-127 Sensor Alert — VFD Current Input	Automatic when the situation returns to normal	Alert relay is ON.	Check VFD current input
ALT-128	Alt-128 Sensor Alert — High Cond Water Pressure	Automatic when the situation returns to normal	Alert relay is ON.	Check optional condenser water pressure sensor. Check condenser water flow.
ALT-129	Alt-129 Sensor Alert — Leaving Cond Water Temp	Automatic when the situation returns to normal	Alert relay is ON.	Leaving condenser water temperature sensor reading is out of range. Check leaving condenser water sensor resistance or voltage drop. Check for proper wiring to IOB. Check IOB channel type configurations.
ALT-130	ALT-130 Sensor Alert — Entering Cond Water Temp	Automatic when the situation returns to normal	Alert relay is ON.	Entering condenser water temperature sensor reading is out of range. Check entering condenser water sensor resistance or voltage drop. Check for proper wiring to IOB. Check IOB channel type configurations.

Table 16 — PIC5 Alert Codes (cont)

ALERT CODE (ALARMRST)	ALERT TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALT-131	ALT-131 Sensor Alert — Entering Cond Water Press	Automatic when the situation returns to normal	Alert relay is ON.	Check entering condenser water pressure sensor voltage drop. Check for proper wiring to IOB. Check IOB channel type configurations.
ALT-132	ALT-132 Sensor Alert — Entering Chilled Water Press	Automatic when the situation returns to normal	Alert relay is ON.	Check entering chilled water pressure sensor voltage drop. Check for proper wiring to IOB. Check IOB channel type configurations.
ALT-133	ALT-133 Sensor Alert — Leaving Cond Water Press	Automatic when the situation returns to normal	Alert relay is ON.	Check leaving condenser water pressure sensor voltage drop. Check for proper wiring to IOB. Check IOB channel type configurations.
ALT-134	ALT-134 Sensor Alert — Leaving Chilled Water Press	Automatic when the situation returns to normal	Alert relay is ON.	Check leaving chilled water pressure sensor voltage drop. Check for proper wiring to IOB. Check IOB channel type configurations.
ALT-135	ALT-135 Sensor Alert — Guide Vane Position	Automatic when the situation returns to normal	Alert relay is ON.	Check guide vane position feedback. Check guide vane actuator wiring. Do recalibration.
ALT-136	ALT-136 Configuration Error — Temp Reset	Automatic when the situation returns to normal	Alert relay is ON.	Check temperature reset configurations.
ALT-137	ALT-137 Configuration Error — Controlled Water Delta T Reset	Automatic when the situation returns to normal	Alert relay is ON.	Check controlled water temperature reset configurations.
ALT-138	ALT-138 Configuration Error — Head Pressure	Automatic when the situation returns to normal	Alert relay is ON.	Check head pressure configurations.
ALT-139	ALT-139 Sensor Alert - Guide Vane 2 Position	Automatic when the situation returns to Normal	Alert relay is ON.	Check guide vane position feedback, Check guide vane actuator wiring. Do recalibration.
ALT-146	Alt-146 Process Alert - High Ref Filter Delta Pressure	Automatic when the situation returns to Normal	Alert relay is ON.	Alert occurs if the refrigerant pump delta pressure exceeds 9 psig while pump is running. This could be an indication of low flow.
ALT-147	Alt-147 Process Alert - Drainage System Failure	Automatic when the situation returns to Normal	Alert relay is ON.	Alert occurs when the refrigerant level in tank remains high after 20 minutes with purge drain solenoid valve open. Check to ensure solenoid valve is actually open, check high level purge tank signal and associated wiring.
ALT-148	Alt-148 Process Alert- Purge Daily Pumpout Limit Exceeded	Automatic when the situation returns to Normal	Alert relay is ON.	Alert indicates that purge time has exceeded daily configured limit (default 50 minutes). This is a possible indication of excessive non-condensibles entering the vacuum side of the chiller system. Check the the purge operation time over the last 7 days. Ensure purge system and all solenoid valves operates normally prior to trying to identify possible leaks.
ALT-149	Alt-149 Process Alert - Low Bearing Delta Pres Difference	Automatic when the situation returns to Normal	Alert relay is ON.	This alert will appear if compressor is running and the pressure difference across the bearings plus any offsets are less than 13 psig. This alert could be an indication of blockage.
		PROCESS ALERTS		
ALT-150	ALT-150 Process Alert — Low Discharge Superheat	Automatic when the situation returns to normal	Alert relay is ON.	Check for oil loss from compressor or excess oil charge. Check for excess refrigerant charge. Verify that the valves in the oil reclaim lines are open. Check oil reclaim strainers. Check actual SUPERHEAT in Temperature screen.
ALT-151	ALT-151 Process Alert — High Evaporator Approach	Automatic when the situation returns to normal	Alert relay is ON.	Check EVAP APPROACH ALERT setting. Check Evaporator Water Flow. Check evaporator refrigerant liquid temperature and leaving chilled water temperature sensor resistances and voltage drop. Check evaporator refrigerant liquid temperature and leaving chilled water temperature sensor wiring to the IOB terminal block. Check for oil loss or low refrigerant charge. Check oil reclaim line isolation valves and strainers. Confirm that the optional refrigerant liquid line isolation valve is open. Check for float valve operation and for refrigerant stacking in the condenser. Check chilled water valves and strainers. Check for air in the evaporator water box or division plate bypass. Check for fouled tubes. Confirm that the oil reclaim system is working. Take oil sample and check for mineral oil contamination. Check for 20°F (11°C) temperature difference between leaving chilled water and leaving condenser water.

Table 16 — PIC5 Alert Codes (cont)

ALERT CODE (ALARMRST)	ALERT TEXT DESCRIPTION	RESET TYPE	ACTION TAKEN BY CONTROL	POSSIBLE CAUSE
ALT-152	ALT-152 Process Alert — High Condenser Approach	Automatic when the situation returns to normal	Alert relay is ON.	Check COND APPROACH ALERT setting. Check Condenser Water Flow. Check condenser pressure transducer and leaving condenser water temperature sensor resistance or voltage drop. Check condenser shell temperature against condenser pressure measured with a refrigerant gage for evidence of noncondensables in refrigerant charge. Check for condenser water box division plate bypass. Check condenser pressure transducer and leaving condenser water sensor wiring to the CCM. Check for air in the condenser water box. Confirm that the condenser tubes are not fouled.
ALT-153	ALT-153 Process Alert — High Noise Region	Automatic when the situation returns to normal	Alert relay is ON.	Check the envelop control configurations and running conditions. Check EC/HGBP valve action.
ALT-154	ALT-154 Process Alert — Damper Valve Alert	Automatic when the situation returns to normal	Alert relay is ON.	Check damper valve wiring and position feedback inputs.
ALT-155	ALT-155 Process Alert — Low Oil Pressure Difference	Automatic when the situation returns to normal	Alert relay is ON.	Check oil pump wiring and oil filter. Quick test oil pump as necessary.
ALT-156	ALT-156 Process Alert —EC Valve Alert	Automatic when the situation returns to normal	Alert relay is ON.	Check EC/HGBP valve wiring and feedback inputs.
ALT-157	ALT-157 Process Alert — High Condenser Pressure Chiller Off	Automatic when the situation returns to normal	Alert relay is ON.	Check condenser pressure sensor input. Check condenser pressure override configurations.
ALT-158	ALT-158 Process Alert — Prognostic Alert	Automatic	Alert relay is ON.	Check prognostic status and configuration screen for detailed information.
ALT-159	ALT-159 Process Alert — LEN Scan Warning	Manual	Alert relay is ON.	Check LEN bus traffic with bus monitor.
ALT-160	ALT-160 Process Alert — Oil Filter Replacement	Manual	Alert relay is ON.	Check oil filter.
ALT-161	ALT-161 Process Alert — Transducer Calibration	Manual	Alert relay is ON.	Do the indicated transducer calibration.
ALT-162	ALT-162 Process Alert — Low Refrigerant Charge	Manual	Alert relay is ON.	Confirm that the unit has low refrigerant charge before adding refrigerant into chiller.
ALT-164	ALT-164 Process Alert — Displacement Switch	Manual	Alert relay is ON.	Check impeller displacement switch.
ALT-165	ALT-165 Process Alert — High Oil Supply Temperature	Automatic when the situation returns to normal	Alert relay is ON.	Check oil supply temperature and OIL EXV status (not only applicable if Oil EXV control enabled).
ALT-166	ALT-166 Process Alert — Condenser Flushing	Automatic	Alert relay is ON.	Flush condenser.
ALT-168	ALT-168 Process Alert — Refrigerant EXV	Automatic	Alert relay is ON.	EXV does not pass enough flow to fulfill required sub cooler outlet temperature. Check temperature sensors and their routing.
ALT-169	ALT-169 Process Alert — High Evaporator Pressure	Automatic	Alert relay is ON.	Check evaporator pressure sensor input. Check evaporator pressure override configurations.
		MASTER SLAVE ALERTS		
ALT-170	ALT-170 Master Slave Alert — Master Slave Same Address	Manual	Master slave work independent	Check master slave address configurations.
ALT-171	ALT-171 Master Slave Alert — Conflict SW Version	Manual	Master slave work independent	Check master slave software version number.
ALT-172	ALT-172 Master Slave Alert — Conflict Cooling Heating Mode	Manual	Master slave work independent	Check master slave cooling heating selection.
ALT-173	ALT-173 Master Slave Alert — Incorrect Slave Control Type	Manual	Master slave work independent	Check slave control type.
ALT-174	ALT-174 Master Slave Alert — Slave Tripout	Manual, automatic in Master side	Master slave work independent	Check slave chiller alarms.
ALT-175	ALT-175 Master Slave Alert — Incorrect Master Control Type	Manual	Master slave work independent	Check master control type.
ALT-176	ALT-176 Master Slave Alert — No Communication Master Slave	Automatic	Master slave work independent	Check communication between master and slave, wiring, etc.
ALT-179	ALT-179 Master Slave Alert — Master CCN Write Rejection	Manual	Master slave work independent	Check CCN communication, hardware, and software.
ALT-180	ALT-180 Master Slave Alert — Address Not Slave	Manual	Master slave work independent	Check master slave configurations.

Event States — An event state is a specific set of conditions that the controller may encounter when controlling the chiller. Event states are repeatable, predictable, and represent known states of the control. When the control is in a particular state, a unique message is associated with that state. The event state messages are displayed on the default screen of the control panel and are listed in Table 17.

Table 17 — Event States

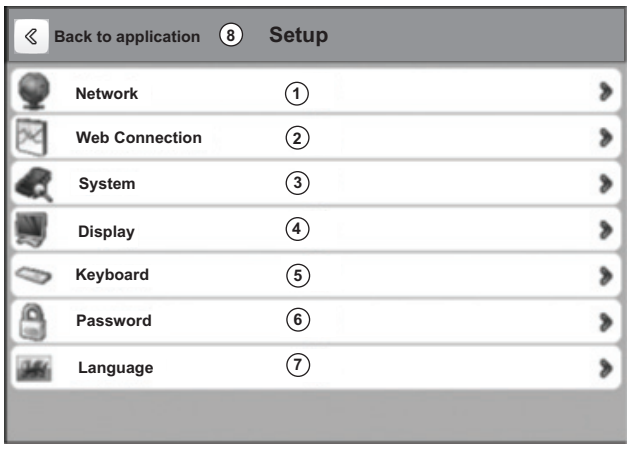
EVENT NO.	DESCRIPTION
1	Chiller Off
2	Chiller Tripout
3	Pumpdown Lockout
4	Terminate Pumpdown Lockout
5	Guide Vane 1 Calibration
6	Quick Test in Progress
7	Ice Build Done
8	Ice Build In Progress
9	Free Cooling In Progress
10	Auto Restart Pending
11	Condenser Flush In Progress
13	Envelop Control Valve Calibration
20	Startup Inhibited — Loadshed in Effect
21	Prestart Check in Progress
22	Timeout — Delay to Start in XX Min
23	Recycle in Progress
24	Startup in Progress
25	Swift Restart In Progress
30	Ramp Loading — Temperature
31	Ramp Loading — Motor Load
32	Ramp Loading — Capacity Inhibit
39	Demand Limit — Capacity Inhibit
40	Demand Limit — Capacity Decrease
41	Demand Limit — Inhibit Clamp
45	Override — High Condenser Pressure
47	Override — High Motor Temperature
48	Override — Low Evap Refrig Temp
50	Override — High Bearing Temp
51	Override — Low Discharge Superheat
52	Override — Manual VFD Speed Target
53	Override — High Motor Current
54	Override — High Discharge Temp
55	Override — Low Source Temp
60	Running — Temp Reset by 4-20 mA Signal
61	Running — Temp Reset by Remote Temp Sensor
62	Running — Temp Reset by Water DT
63	Running — Cooling Leaving Chilled Water
64	Running — Cooling Entering Chilled Water
65	Running — Heating Leaving Cond Water
66	Running — Heating Entering Cond Water
67	Envelop Control — Surge Correction
68	Envelop Control — Acts Before Recycle Shutdown
69	Envelop Control — Low Load Application
70	Envelop Control — Forced
71	Running — VFD Rampdown
72	Running — Guide Vane Position Forced
73	Running — VFD Speed Forced
74	Surge Prevention — Low
75	Surge Prevention — High
76	Surge Protection

Table 17 — Event States (cont)

EVENT NO.	DESCRIPTION
77	Running — VFD Overcurrent
79	Running — Damper Valve Forced
80	Operation — Oil EXV Forced
81	Running — Head Pressure Valve Forced
85	Running — Vapor Source Valve Forced
90	Shutdown — Normal
91	Shutdown — Alarm
93	Shutdown — Recycle
94	Shutdown — Recycle Ice Build
95	Shutdown — Compressor Deenergized
96	Shutdown — Emergency Stop
97	Transducer Calibration in Effect
98	ISM Calibration in Effect

TOUCH SCREEN SETTINGS FOR THE CONTROLLER

The Setup screen is accessible only from the controller touch screen, and is not password-protected by default. To access the Setup display, press anywhere on the screen (except on buttons or text fields) for 4 seconds. The Setup screen is displayed. See Fig. 48.



LEGEND

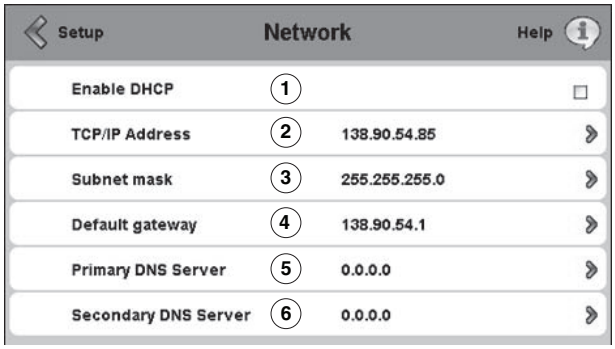
1 — Network: System properties for Ethernet interface
2 — Web Connection: Configuration for web-based welcome page
3 — System: Software version, buzzer
4 — Display: Settings such as contrast, backlighting
5 — Keyboard: Not applicable
6 — Password: For " Setup" access
7 — Language: For " Setup" only
8 — Return to application

Fig. 48 — Setup Screen

Unit IP Address — On the Setup screen, press Network to display the network parameters. See Fig. 49.

If "Enable DHCP" is checked the PIC5 will attempt to automatically populate IP settings from Dynamic Host Configuration Protocol (DHCP) server.

NOTE: You must request an IP address, the subnet mask, and the default gateway from the system administrator before connecting the unit to the local Ethernet network.



LEGEND

1 — Enable DHCP
2 — IP address
3 — Subnet mask
4 — Default gateway
5 — Primary DNS Server
6 — Secondary DNS Server

Fig. 49 — Network Screen

To change IP address manually, press TCP/IP Address to display the TCP/IP Address screen. See Fig. 50.

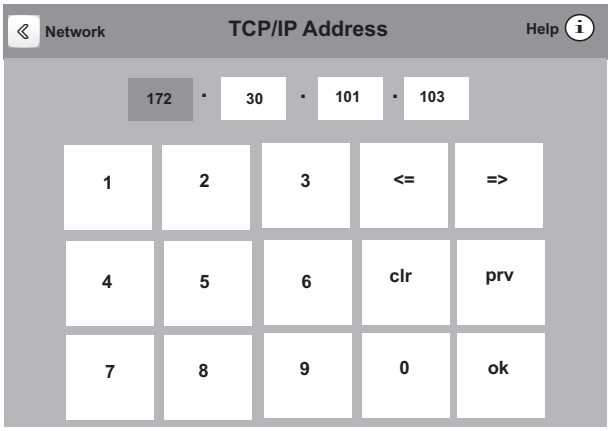


Fig. 50 — TCP/IP Address Screen

Enter the new address and validate it by pressing OK. Return to the Network screen and enter the subnet mask and default gateway using the same method. Then return to the application and save the changes. See Fig. 51.



Fig. 51 — Save Changes

Web Address — This configuration is normally done at the factory and is not typically modified in the field. To check the parameters, press Web Connection. The Startup Connection screen is displayed. See Fig. 52.

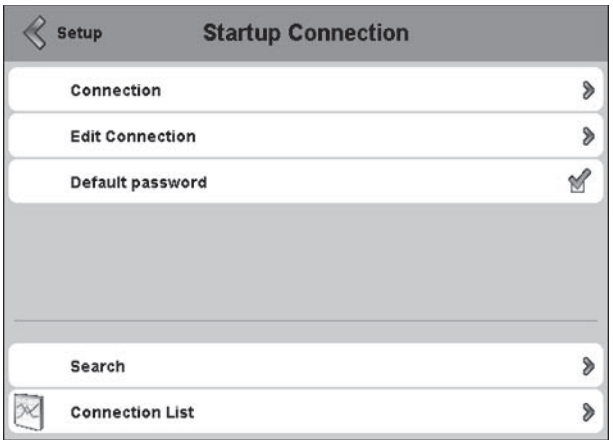
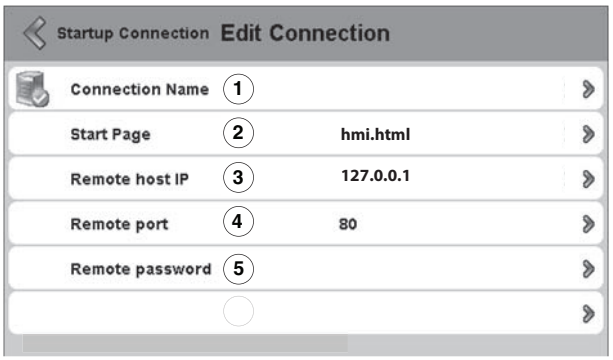


Fig. 52 — Startup Connection

If needed, press "Edit Connection." See Fig. 53. Default parameters are shown; to modify, press a specific parameter.

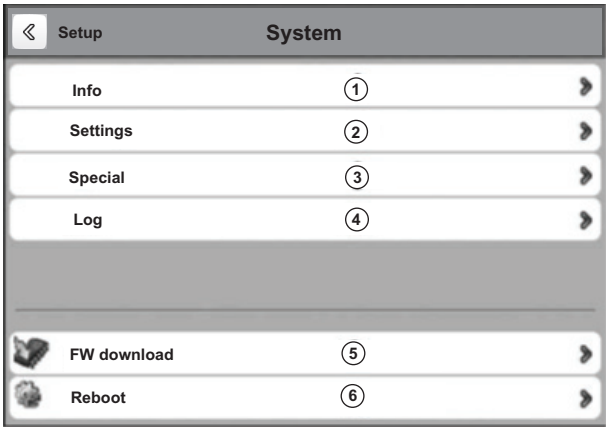


LEGEND

1 — Connection Name: startup
2 — Start Page Name: hmi.html
3 — Remote host IP: Not applicable for the application. Do not modify.
4 — Remote port: Not applicable for the application. Do not modify.
5 — Remote password: Not applicable for the application. Do not modify.

Fig. 53 — Edit Connection

System Configuration — On the main Setup screen (see Touch Screen Settings for the Controller on page 44), press System. The System screen is displayed. See Fig. 54.

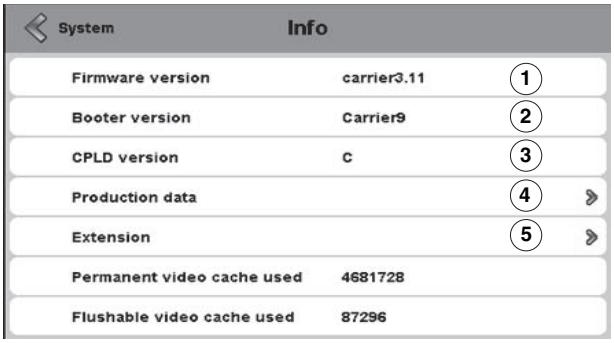


LEGEND

1 — Software version
2 — Settings: Systems Settings
3 — Special: Reset to 0, flash formatting, clock parameters. Do not modify.
4 — Log: Unit start-up history
5 — Firmware update (not applicable)
6 — Unit reboot

Fig. 54 — System Screen

Press Info on the System screen to display detailed information about the HMI panel. See Fig. 55.

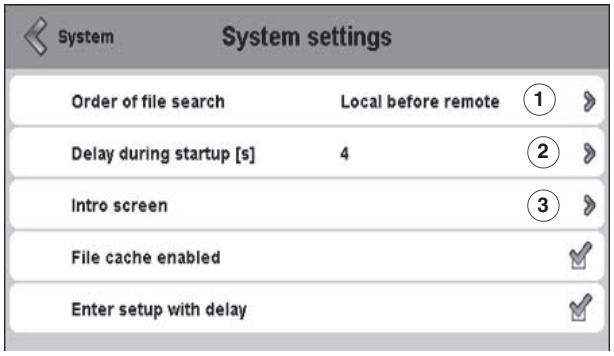


LEGEND

1 — Firmware version that is loaded in panel
2 — Boot loader version that is loaded in panel
3 — Complex Programmable Logic Device (CPLD) version
4 — Detailed production data of panel
5 — Details of extended hardware

Fig. 55 — System Information

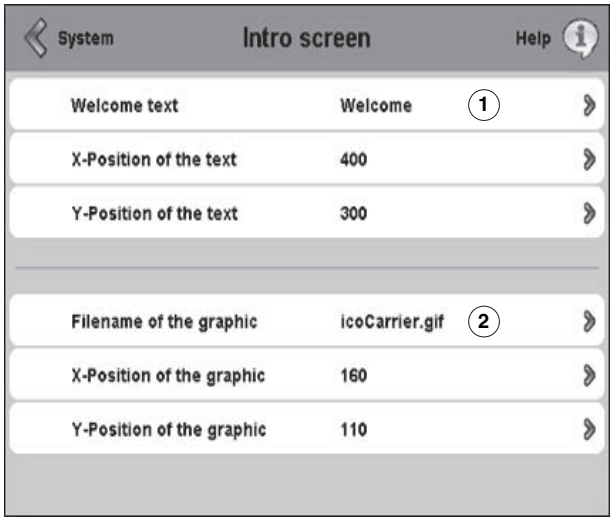
On the System screen, press Settings to display the System Settings screen. See Fig. 56.



1 — Order of file search: Local before remote. Do not modify.
2 — Delay during startup(s): Do not modify.
3 — Intro screen: Information on the system start-up screen.

Fig. 56 — System Settings

On the System Settings screen, press Intro screen to customize the Welcome screen (see the Welcome Screen section on page 14). See Fig. 57.

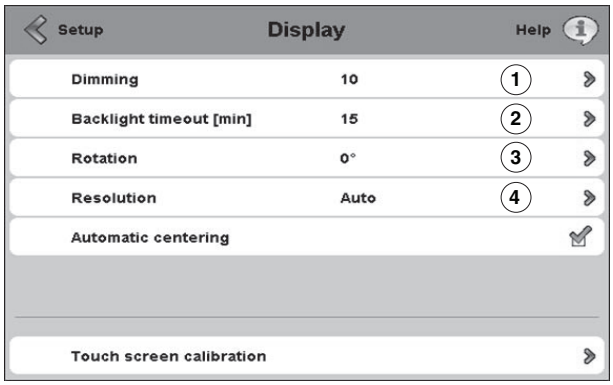


LEGEND

1 — Welcome message text; default: Welcome
2 — Filename of graphic; default: ico.Carrier.gif (Carrier logo)

Fig. 57 — Intro Screen Settings

General Display Settings — To set contrast, screensaver, screen image rotation, and touch screen calibration, press Display on the Setup screen (see the section Touch Screen Settings for the Controller on page 44). The Display screen opens. See Fig. 58.



LEGEND

1 — Dimming: Contrast control
2 — Backlight timeout (min): Inactivity time until screensaver is displayed (screen goes black)
3 — Rotation of screen image
4 — Resolution
5 — Touch screen calibration

Fig. 58 — Display Settings

TOUCH SCREEN CALIBRATION — Depending on the user and the position of the panel, it may be necessary to calibrate the touch screen if the cursor does not move precisely with the user's touch. When the user presses Touch Screen Calibration, a white box with crosshairs appears on the display screen. Touch the center of the crosshair sight with a touch pen or similar blunt-ended stylus (do not use a metal object). When the crosshair sight is touched, it moves to a new position; touch the center of the crosshairs again. When all positions have been configured, the crosshairs disappear. Click on the now blank box on the display and check the precision of the setup (the cursor should move with the user's touch). This completes the calibration and the white box disappears.

Touch Screen Configuration Language — To set the language for touch screen configuration screens, press Language on the Setup screen (see the section Touch Screen Settings for the Controller on page 44). The Language screen offers the options shown in Fig. 59.

NOTE: The language selection on this screen controls only the display language for interface settings, not the language for the unit application. See User Login Screen on page 15 for instructions on setting the unit application language.

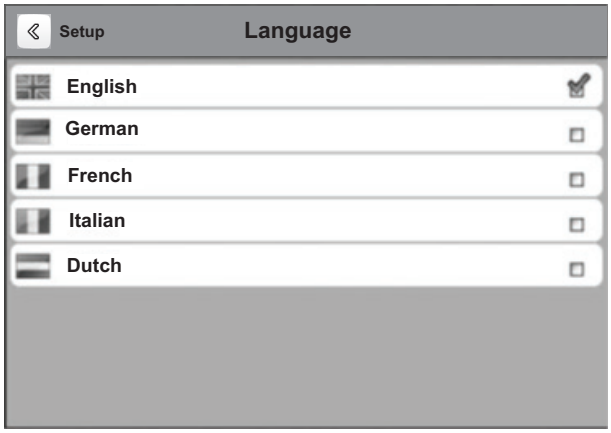


Fig. 59 — Touch Screen Configuration Language

Table 18 — Hardware Problems

SYMPTOMS	POSSIBLE CAUSES	CHECKS	SOLUTIONS
The unit does not respond to the instructions sent by the supervision PC on the CCN bus.	Problem at the RS485 converter level of the PC or connection problem on the primary CCN bus.	Check the CCN cable connections. The unit CCN address is 0.1 and the communication speed is 9600 baud by default.	Replace the RS485 connector.
Communication problem when connecting two buses (primary bus and secondary bus).	Electrical problem between 0 v CCN of the primary bus and 0 v CCN of the secondary bus.	Check the connection of the metal part of the interface casing to earth.	Connect the metal part of the interface casing to earth.

Table 19 — Web Interface Problems

SYMPTOMS	POSSIBLE CAUSES	CHECKS	SOLUTIONS
Start-up page loads, then goes to fault state.	Network property details are not valid. Ethernet network is not available.	Check the network parameters (see the section Ethernet/IP Connection Problems on page 48). Check to see if the orange LED on the unit is flashing.	Contact your system administrator. Check the Ethernet connection to the local network if the orange LED does not flash.
While accessing the unit via the web browser, the Java platform launches, but remains blocked. No file is loaded.	Proxy server problem in the local network.	Contact your system administrator.	In agreement with the system administrator, open the Runtime Java control panel and select Direct Connection in the system parameters and/or request in the web browser (Tools→Options→ Connection→ System parameters) that no proxy server is used to go to the local addresses. If possible, uncheck “use of an automatic configuration script.” Restart the web browser.
The application has been launched, but the screens are not shown in the web browser.	A proxy server is used to access the unit and this supplies the old screens to the browser. Incorrect configuration of the Java application.	Check that the web browser does not go via a proxy server to access the unit. Check that the Java application does not store the internet files on the PC.	Open the browser and in the system connection parameters add the IP address of the unit in the proxy exceptions. (Tools→Options →Connection→System parameters→“No proxy for”). See the section Java Application Configuration on page 49.
Cannot connect via http server	HTTP Server = Dsable under Network Configuration Menu	Check status in Network Configuration Menu screen.	Set value to requirements.

NOTES:
1. The unit cannot automatically obtain the network parameters via a DHCP (Dynamic Host Configuration Protocol) server.
2. The intranet site address of the unit is the IP address.

Ethernet/IP Connection Problems — Use the following methods to troubleshoot:

UNIT IS POINT-TO-POINT CONNECTED TO A PC — Ensure controller is powered on prior to configuration and check Ethernet connection and PC Network Interface Card (NIC).

NOTE: In addition to the following procedure, it may be necessary to check the Ethernet connection and/or configure the PC network board.

In Network Settings, open Local Area Connection Properties. Select Internet Protocol and click Properties. See Fig. 60.

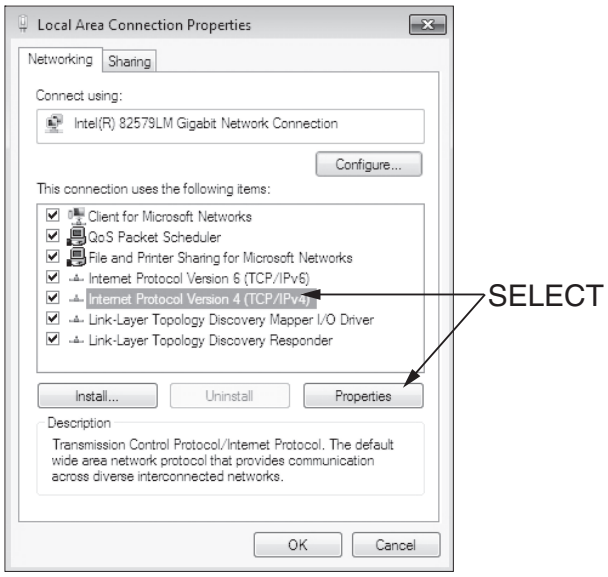


Fig. 60 — Local Area Connection Properties

The Internet Protocol Properties window is displayed.

- If no IP address is configured in the General and Alternative Configuration tabs, the unit IP address must be configured to 169.254.xxx.xxx. Modify the unit IP address and then restart the system.
- If the PC has a fixed IP address configured in one of the two tabs (General and Alternative Configuration), the IP address of the PC and the unit IP address must have the system and sub-system fields in common. The last part of the IP address is the host number and must be unique on the sub-system. For example: Unit address — 172.30.101.11 and PC address — 172.30.101.182. In this example, 172.30 corresponds to the network, and 101 corresponds to the sub-system. Carry out the necessary modifications and try to access the unit again.

In the case of a problem, open a Windows command window (Start, Execute, type **cmd** and press Enter), then type the command **ping**, followed by the unit IP address. In the example shown in Fig. 61, the PC receives four positive responses (replies).

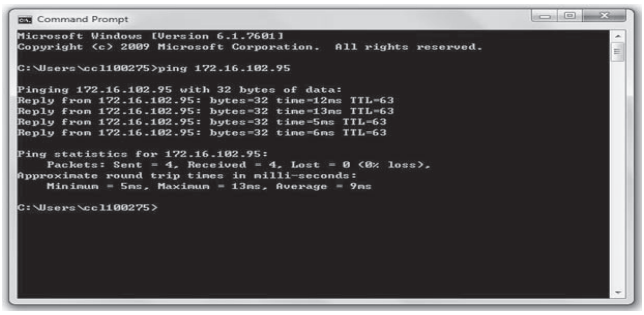


Fig. 61 — Ping — Positive Replies

In the example shown in Fig. 62, the PC receives four negative responses (request timed out).

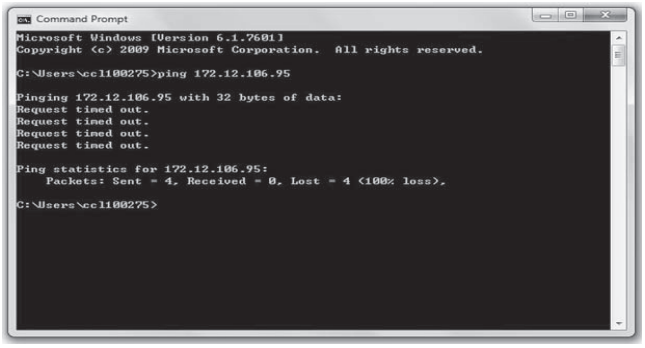


Fig. 62 — Ping — Negative Responses

If the PC receives four negative responses, check the internet browser parameters to determine if a proxy server or an automatic configuration script has been configured. If this is the case:

- Deselect the proxy server or the configuration script and restart the browser,
- Or refer to the section Java Application Configuration (page 49).

Try to access the unit again. If the PC still does not receive a response from the unit, restart the unit. Contact your system administrator.

UNIT IS CONNECTED TO THE LOCAL NETWORK — The unit is connected to the local network by an uncrossed cable, and the unit is energized. Open a Windows command window (Start, Execute, type **cmd** and press Enter), then type the command **ping**, followed by the unit IP address.

If the responses are positive (see Fig. 61), the internet browser configuration is faulty. Check the system parameters of the internet browser to determine if a proxy server or an automatic configuration script has been configured (Tools→ Internet Options→ Connections→ System Parameters). See Fig. 63.

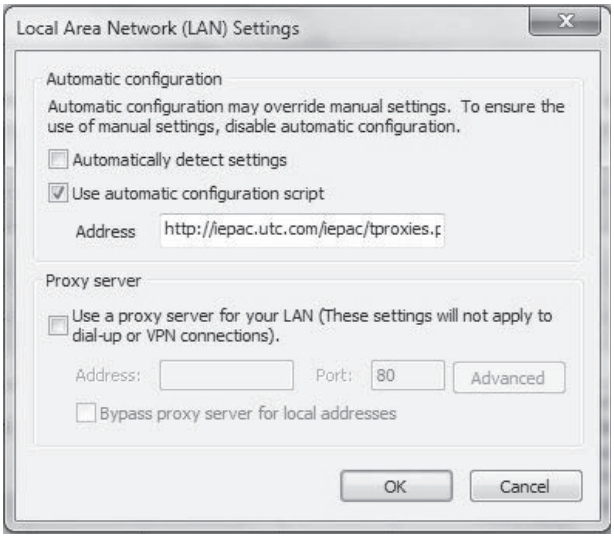


Fig. 63 — Local Area Network Settings

If a proxy server is used, add the unit IP address to the exceptions list of the proxy server (advanced proxy configuration). See Fig. 64.

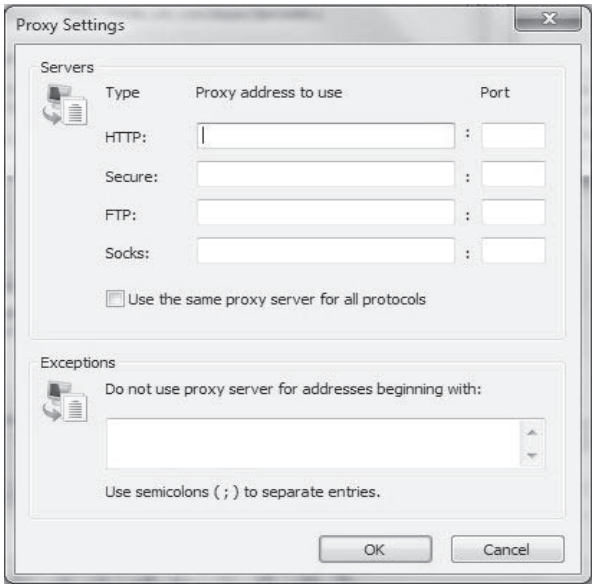


Fig. 64 — Proxy Settings

If a configuration script is used, it is not possible to add the unit IP address to the exceptions list. In this case, see the section Java Application Configuration below.

If the response to the "ping" command is negative, verify the IP address of the PC and the IP address of the unit. They must have the system network and sub-system in common. The last part of the IP address is the host number and must be unique on the sub-system; for example: Unit address — 172.30.101.11 and PC address — 172.30.101.182. In this example, 172.30 corresponds to the system network, and 101 corresponds to the sub-system. The host numbers are 11 and 182 respectively.

ETHERNET CONNECTION ON THE PC — Open the network configuration window of the PC and double-click Network Connections. Find the system interface board and check that no red "X" appears on the icon.

The connection to the local network must be authorized and in the connected status. If this is not the case, check the connections and authorize/repair the network connection.

JAVA APPLICATION CONFIGURATION — Open the Internet configuration window of the PC and double-click the Java application icon. If Java is not installed, a free download is available at http://www.java.com.

If Java has already been installed, check if it is used by other applications. If so, check that these are compatible with the following settings in the Java control panel. See Fig. 65.

- Network settings: In the Java Control Panel, click Network Settings. Select a direct connection to bypass the proxy server or select the automatic configuration script. See Fig 66.

- Temporary internet files: In the Java Control Panel, click Settings in the Temporary Internet Files section. Be sure the setting Keep temporary files on my computer is unchecked (clear). See Fig. 67.

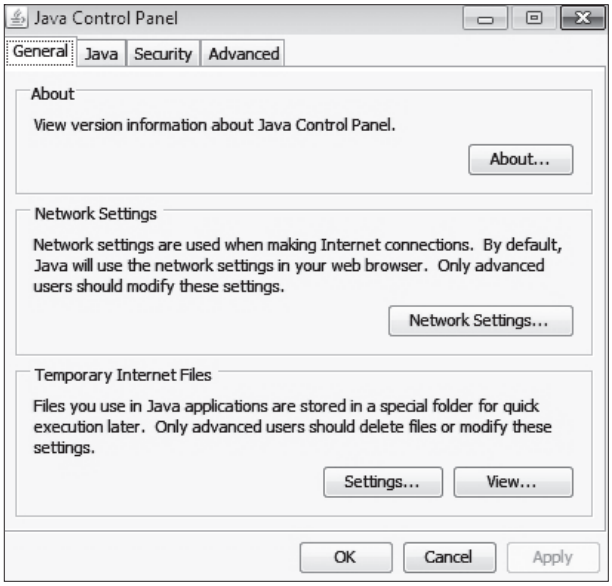


Fig. 65 — Java Control Panel



Fig. 66 — Network Settings

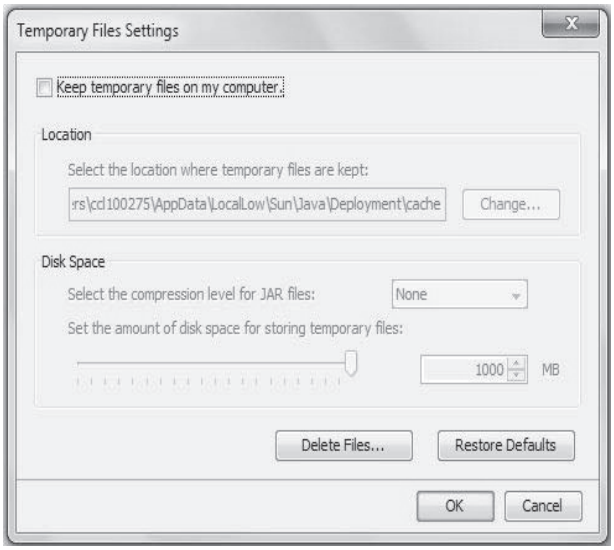
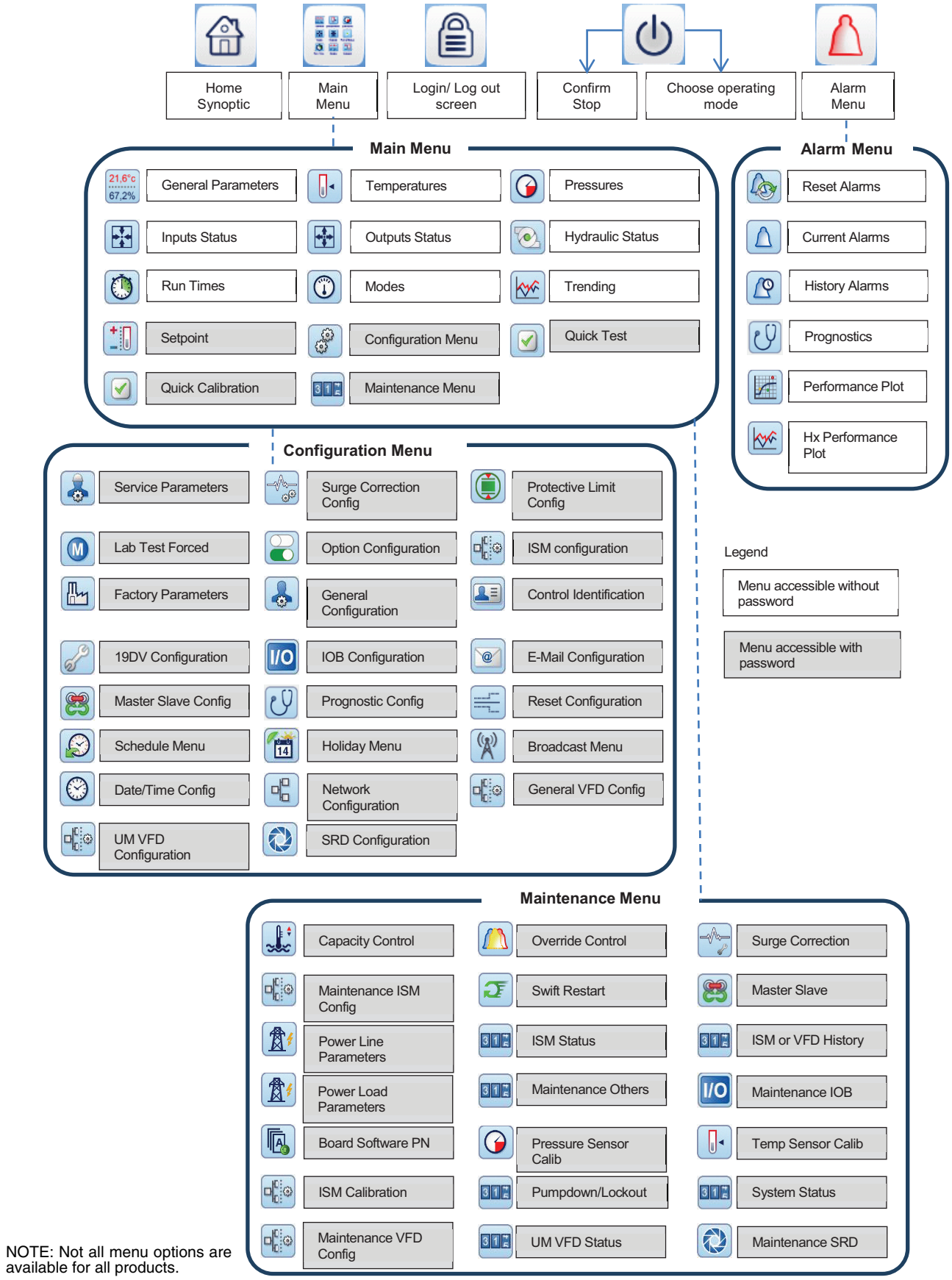


Fig. 67 — Temporary File Settings

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE



NOTE: Not all menu options are available for all products.

Fig. A — Screen Structure, Basic Level (All) Access (No Password Required)

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Main Menu Description

ICON	DISPLAYED TEXT*	ACCESS	ASSOCIATED TABLE	PAGE NO.
	General Parameters	All	GENUNIT	52
	Temperatures	All	TEMP	53
	Pressures	All	PRESSURE	53
	Inputs Status	All	INPUTS	54
	Outputs Status	All	OUTPUTS	55
	Hydraulic Status	All	HYDRLIC	56
	Run Times	All	RUNTIME	56
	Modes	All	MODES	57
	Setpoint	User	SETPOINT	57
	Configuration Menu	User	CONFIG	58
	Quick Test	Service	QCK_TEST	69
	Quick Calibration	Service	QCK_CALI	70
	Maintenance Menu	Service	MAINTAIN	71
	Trending	All	TRENDING	—

* Displayed text depends on the selected language (default is English).

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

General Parameters

CCN TABLE NAME: GENUNIT

PIC5 PATH: Main Menu → General Parameters

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Control Mode 0 = Local, 1 = Network 2 = Remote, 3 = Local Sched	ctl_mode	0 to 3			RO
2	Compressor1 Run Status	cm_stas1	0 to 16†			RO
3	Deter Start Stop Command	stop/start				RO
4	Network: Cmd Start/Stop	CHIL_S_S	NO/YES			RW**
5	Network:Cmd Occupied	CHIL_OCC	NO/YES			RW**
6	Cooling / Heating Select	HC_SEL	COOL/HEAT	COOL		RW
7	Control Point	CTRL_PNT	10.0 to 160.0		°F	RW**
8	Control Point Reset	reset	–30.00 to 30.00		°F	RO
9	Actual Setpoint	setpoint	10.0 to 150.0		°F	RO
10	Percent Load Current	AMPS_P	0.0 to 999.0		%	RO
11	Motor Percent Kilowatts	KW_P	0 to 100		%	RO
12	Actual Demand Limit	DEM_LIM	10.0 to 100.0	100	%	RW**
13	Emergency Stop	EMSTOP	NO/YES	0		RW**
14	Chiller State Number	ch_state	0 to 500			RO
15	Local Schedule Occupied	oc_occ	NO/YES			RO
16	Ice Schedule Occupied	ice_occ	NO/YES			RO
17	MS Start Stop Command	ms_stsp	STOP/START			RO
18	Remote Reset Alarm	REM_RST	NO/YES			RO
19	Stop Override	STP_OVER	NO/YES	NO		RW
20	Start Free Cooling	FC_START	NO/YES	NO		RW
21	Start Condenser Flush	CF_START	NO/YES	NO		RW
22	BACnet Occupied	BAC_OCC	NO/YES			RO

LEGEND

RO — Read Only
RW — Read/Write

* Default value is shown only if configurable in this table.

† 0 = OFF, 1 = CTLTEST, 2 = PUMPDOWN, 3 = LOCKOUT, 4 = RECYCLE, 5 = TRIPOUT, 6 = TIMEOUT, 7 = PRESTART, 8 = STARTUP, 9 = AUTORST, 10 = RAMPING, 11 = RUNNING, 12 = OVERRIDE, 13 = DEMAND, 14 = SHUTDOWN, 15 = FREECOOL, 16 = CONDFLSH

** RW from network.

NOTE: The PIC5 controls platform is utilized across multiple product lines. In this appendix, all PIC5 software lines are shown; not all lines are applicable for the 19DV product, such as Line 21, Oil Sump Temp, in the Temperatures table on the next page.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Temperatures

CCN TABLE NAME: TEMP

PIC5 PATH: Main Menu → Temperatures

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Entering Chilled Water	ECW	–40.0 to 245		°F	RO
2	Leaving Chilled Water	LCW	–40.0 to 245		°F	RO
3	Entering Condenser Water	ECDW	–40.0 to 245		°F	RO
4	Leaving Condenser Water	LCDW	–40.0 to 245		°F	RO
5	Evap Sat Refrig Temp	EVAP_SAT	–40.0 to 245		°F	RO
6	Evap Refrig Liquid Temp	EVAP_T	–40.0 to 245		°F	RO
7	Evaporator Approach	evap_app	0.0 to 99.0		°F	RO
8	Condenser Approach	cond_app	0.0 to 99.0		°F	RO
9	Cond Sat Refrig Temp	COND_SAT	–40.0 to 245		°F	RO
10	Comp Discharge Temp	DGT	–40.0 to 245		°F	RO
11	Discharge Superheat	DSH	–20.0 to 99.0		°F	RO
12	Thrust Bearing Oil Temp	MTRB_OIL	–40.0 to 245		°F	RO
13	Thrust Bearing Temp	MTRB	–40.0 to 245		°F	RO
14	Low Speed ME Brg Temp	MTRB1	–40.0 to 245		°F	RO
15	Low Speed CE Brg Temp	MTRB2	–40.0 to 245		°F	RO
16	High Speed ME Brg Temp	MTRB3	–40.0 to 245		°F	RO
17	High Speed CE Brg Temp	MTRB4	–40.0 to 245		°F	RO
18	Comp Motor Winding 1 Temp	MTRW1	–40.0 to 245		°F	RO
19	Comp Motor Winding 2 Temp	MTRW2	–40.0 to 245		°F	RO
20	Comp Motor Winding 3 Temp	MTRW3	–40.0 to 245		°F	RO
21	Oil Sump Temp	OILT_SMP	–40.0 to 245		°F	RO
22	Oil Supply Temp	OILT_DIS	–40.0 to 245		°F	RO
23	Actual Lift	LIFT_A	0.0 to 200.0		°F	RO
24	VDO High Lift Load Line	LIFT_1	0.0 to 200.0		°F	RO
25	VDO Low Lift Load Line	LIFT_2	0.0 to 200.0		°F	RO
26	Remote Reset Sensor	R_RESET	–40.0 to 245		°F	RO
27	Common CHWS Temp	CHWS_T	–40.0 to 245		°F	RO
28	Common CHWR Temp	CHWR_T	–40.0 to 245		°F	RO
29	Heat Recl Entering Temp	HR_EWT	–40.0 to 245		°F	
30	Heat Recl Leaving Temp	HR_LWT	–40.0 to 245		°F	
31	Purge Comp Suction Temp	PGC_SUCT	–40.0 to 245		°F	
32	1st Stage Bearing Temp	CBH1_T	–40.0 to 245		°F	
33	2nd Stage Bearing Temp	CBH2_T	–40.0 to 245		°F	
34	BRG Ref Supply Sat Temp	BRGI_SAT	–40.0 to 245		°F	
35	Bearing Ref Supply Temp	BRGI_T	–40.0 to 245		°F	
36	Purge Inlet Temp	PGINTMP	–40.0 to 245		°F	

Pressures (Associated Table: PRESSURE)

CCN TABLE NAME: PRESSURE

PIC5 PATH: Main Menu → Pressures

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Evaporator Pressure	EVAP_P	–15.0 to 250.0		psig	RO
2	Condenser Pressure	COND_P	–15.0 to 250.0		psig	RO
3	Economizer Pressure	ECON_P	–15.0 to 250.0		psig	RO
4	Oil Supply Pressure	OILP_DIS	–15.0 to 250.0		psig	RO
5	Oil Sump Pressure	OILP_SMP	–6.7 to 420.0		psig	RO
6	Oil Pump Delta P	OIL_PD	–15.0 to 250.0		psig	RO
7	Oil Pump Delta P Offset	pd_off	–5.0 to 5.0		psi	RW
8	Diffuser Pressure	DIFF_P	–15.0 to 250.0		psig	RO
9	Head Pressure Reference	HEAD_P	–15.0 to 250.0		psig	RO
10	Bearing Inlet Pressure	BRGI_P	–15.0 to 250.0		psig	RO
11	Bearing Outlet Pressure	BRGO_P	–15.0 to 250.0		psig	RO
12	Bearing Delta P	REF_PD	–15.0 to 250.0		psid	RO
13	Pump Output Pressure	PUMPO_P	–15.0 to 250.0		psig	RO
14	Pump Input Pressure	PUMPI_P	–15.0 to 250.0		psig	RO
15	Ref Pump Delta P	PUMP_PD	–15.0 to 250.0		psid	RO

LEGEND

RO — Read Only
RW — Read/Write

*Default value is shown only if configurable in this table.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Inputs Status

CCN TABLE NAME: INPUTS

PIC5 PATH: Main Menu → Inputs Status

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Compressor Start Contact	STAR_AUX	OPEN/CLOSE			RO
2	Compressor Run Contact	RUN_AUX	OPEN/CLOSE			RO
3	Damper Valve Fully Closed	DMP_FC	NO/YES			RO
4	Damper Valve Fully Opened	DMP_FO	NO/YES			RO
5	Damper Valve Status 0=Closed, 1=Interim, 2=Opened 3=Failure	DMP_ACT	0 to 3			RO
6	EC Valve Fully Closed	HGBP_FC	NO/YES			RO
7	EC Valve Fully Opened	HGBP_FO	NO/YES			RO
8	EC Valve Status 0=Closed, 1=Interim, 2=Opened 3=Failure	HGBP_ACT	0 to 3			RO
9	High Pressure Switch	HP_SW	OPEN/CLOSE			RO
10	Remote Contact	REM_CON	OPEN/CLOSE			RO
11	Emergency Stop Contact	E_STOP	OPEN/CLOSE			RO
12	Ice Build Contact	ICE_CON	OPEN/CLOSE			RO
13	Chiller Lockout	REM_LOCK	OPEN/CLOSE			RO
14	Spare Safety Input	SAFETY	OPEN/CLOSE			RO
15	Starter Fault Feedback	STARTFLT	OPEN/CLOSE			RO
16	Fire Security Interlock	FS_LOCK	OPEN/CLOSE			RO
17	Guide Vane 1 Actual Ohms	GV1_OHMS			ohms	RO
18	Guide Vane 1 Actual Pos	GV1_ACT			%	RO
19	Guide Vane 2 Actual Pos	GV2_ACT			%	RO
20	Actual VFD Speed Per	VFD_ACT			%	RO
21	Diffuser Actual Pos	DIFF_ACT			%	RO
22	Auto Demand Limit Input	AUTO_DEM			mA	RO
23	Auto Water Temp Reset	AUTO_RES			mA	RO
24	Refrig Leak Sensor	REF_LEAK			mA	RO
25	VFD Speed Feedback	VFD_IN			V	RO
26	Guide Vane 2 Pos Feedback	GV2_MA			mA	RO
27	Guide Vane 1 Pos Feedback	GV1_MA			mA	RO
28	VFD Current Input	VFDC_MA			mA	RO
29	Actual ECV Pos Per	HGBPACTP			%	RO
30	ECV Current Feedback	HGBP_MA			mA	RO
31	ISM Trip Relay Status	TRIPR	OPEN/CLOSE			RO
32	BACnet Dongle	bacdongl	NO/YES			RO
33	Displacement Switch	SHAFTDIS	OPEN/CLOSE			RO
34	Power Request Feedback	POW_FDB	NO/YES			RO
35	Free Cool Start Switch	FC_SS	Off/On			RO
36	Customer Alert	CUS_ALE	OPEN/CLOSE			RO
37	Purge Level Switch Low	PGLE_LO	OPEN/CLOSE			RO
38	Purge Level Switch High	PGLE_HI	OPEN/CLOSE			RO
39	Liquid Level Switch	HF_LS	OPEN/CLOSE			RO

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Outputs Status

CCN TABLE NAME: OUTPUTS

PIC5 PATH: Main Menu → Outputs Status

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Diffuser Output	DIFF_OUT	4.0 to 20.0		mA	RO
2	Head Pres Output	HDPV_OUT	4.0 to 20.0		mA	RO
3	Chiller Status Output	CHST_OUT	4.0 to 20.0		mA	RO
4	VFD Speed Output	VFD_OUT	4.0 to 20.0		mA	RO
5	Oil EXV Output	EXV_OUT	4.0 to 20.0		mA	RO
6	Oil EXV Target	exv_tgt	0.0 to 100.0		%	RO
7	Liquid Level EXV Output	LLC_EXVO			mA	RO
8	Liquid Level EXV Output	llc_exvt			%	RO
9	Oil Pump VFD Output mA	OP_VFD	4.0 to 20.0		mA	RO
10	Oil Pump VFD Target	op_vfd_t			%	RO
11	Head Pres Valve Tgt Pos	hdpv_tgt	0.0 to 100.0		%	RO
12	Guide Vane1 Output	GV1_OUT	0-20		mA	RO
13	Guide Vane2 Output	GV2_OUT	0-20		mA	RO
14	EC Valve Output mA	HGBP_OUT	4.0 to 20.0		mA	RO
15	Alarm Relay	ALM	OFF/ON		OFF/ON	RO
16	Alert Relay	ALE	OFF/ON		OFF/ON	RO
17	Guide Vane2 Output	GV2_OUT			mA	RO
18	Starter Trans Sw Status	TRANS	OFF/ON		OFF/ON	RO
19	Damper Valve Close	DMP_CL	OFF/ON		OFF/ON	RO
20	Damper Valve Open	DMP_OP	OFF/ON		OFF/ON	RO
21	Guide Vane 1 Decrease	GV1_DEC	OFF/ON		OFF/ON	RO
22	Guide Vane 1 Increase	GV1_INC	OFF/ON		OFF/ON	RO
23	EC Valve Close	HGBP_OFF	OFF/ON		OFF/ON	RO
24	EC Valve Open	HGBP_ON	OFF/ON		OFF/ON	RO
25	Oil Heater Relay	OIL_HEAT	OFF/ON		OFF/ON	RO
26	Oil Pump Relay	OIL_PUMP	OFF/ON		OFF/ON	RO
27	Tower Fan Relay High	TFR_HIGH	OFF/ON		OFF/ON	RO
28	Tower Fan Relay Low	TFR_LOW	OFF/ON		OFF/ON	RO
29	Damper Valve Tgt Pos 0=Close,1=Hold, 2=Open	dmp_tgt	0 to 2			RO
30	EC Valve Tgt Pos 0=Close,1=Hold, 2=Open	hgbp_tgt	0 to 2			RO
31	Power Request	POW_REQ	OFF/ON			RO
34	Free Cooling Mode	FC_MODE	NO/YES			RO
35	VFD Coolant Solenoid	VFD_SOL	OFF/ON			RO
36	Vapor Source SV	VS_SV	OFF/ON			RO
37	Refrigerant Pump	REF_PUMP	OFF/ON		mA	RO
38	Economizer Bypass Valve	ECBY_VLV	OFF/ON			RO
39	Economizer Isolation VLV	ECON_IV	OFF/ON			RO
40	Condenser Control Valve	COND_CV	OFF/ON			RO
41	Evaporator Control Valve	EVAP_CV	OFF/ON			RO
42	Evaporator Drain Valve	EVAP_DV	OFF/ON			RO
43	Condenser Drain Valve	COND_DV	OFF/ON			RO
44	Purge Cond Valve	EVAP_PSV	OFF/ON			RO
45	Purge Comp Valve	COMP_PSV	OFF/ON			RO
46	Purge Pumpout Valve	PUMP_PSV	OFF/ON			RO
47	Purge Drainage Valve	DRASVON	OFF/ON			RO
48	Purge Regeneration Valve	REG_PSV	OFF/ON			RO
49	Purge Discharge Valve	DIS_PSV	OFF/ON			RO
51	Purge Vacuum Pump	PGAPUMP	OFF/ON			RO
52	Purge Compressor	PG_COMP	OFF/ON			RO
53	Purge Heater	PG_HEAT	OFF/ON			RO
54	Vapor Source SV	VS_SV	OFF/ON			RO
55	Vapor Venting Line SV	VAPL_SV	OFF/ON			RO
56	Condenser Filling Valve	COND_FCV	OFF/ON			RO

LEGEND

RO — Read Only

*Default value is shown only if configurable in this table.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Hydraulic Status

CCN TABLE NAME: HYDRLIC

PIC5 PATH: Main Menu → Hydraulic Status

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Condenser Water Pump	CDWP	OFF/ON			RO
2	Condenser Water Flow	CDW_FLOW	NO/YES			RO
3	Cond Water Flow Value	CDW_FV	0-10,000	0.0	GPM	RO
4	Entering Cond Water Pres	COND_EWP	–6.7 to 420.0		psig	RO
5	Leaving Cond Water Pres	COND_LWP	–6.7 to 420.0		psig	RO
6	Condenser Water Delta P	cdw_pd	–10.0-10.0	0.0	psi	RW
7	Condenser Delta P Offset	cdw_off	–10.0-10.0	0.0	psig	RW
8	Cond Water Pulldown/Min	cdw_pull	–20 to 20.0		°F	RO
9	Chilled Water Pump	CHWP	OFF/ON			RO
10	Chilled Water Flow	CHW_FLOW	NO/YES			RO
11	Chilled Water Flow Value	CHW_FV	–10.0 to 10.0	0.0	psi	RW
12	Entering Chilled Water P	EVAP_EWP	–6.7 to 420.0		psig	RO
13	Leaving Chilled Water P	EVAP_LWP	–6.7 to 420.0		psig	RO
14	Chilled Water Delta P	chw_pd	–6.7 to 420.0		psig	RO
15	Chilled Delta P Offset	chw_off	–10 to 10.00	0.0	psig	RW
16	Chilled Water Pulldown/Min	chw_pull	–20 to 20.0		°F	RO
17	Chilled Water Flow Input	CHWF_IN	4 to 20		mA	RO
18	Cond Water Flow Input	CDWF_IN	4 to 20		mA	RO
19	Chilled Water Pres Drop	CHW_PDMA	4 to 20		mA	RO
20	Cond Water Pres Drop	CDW_PDMA	4 to 20		mA	RO
21	Evap Water Flow Switch	EVAP_FS	OPEN/CLOSE			
22	Cond Water Flow Switch	COND_FS	OPEN/CLOSE			
23	Tower Fan Relay High	TFR_HI	OFF/ON			RO
24	Tower Fan Relay Low	TFR_LO	OFF/ON			RO
25	Controlled Water DT	ctrlw_dt	–40.0 to 245.0		°F	RO
26	Chilled Water Flow Status 0=Fail or Not Started 1=Success, 2=Verifying	chw_fl_s	0 to 2			RO
27	Cond Water Flow Status 0=Fail or Not Started 1=Success, 2=Verifying	cdw_fl_s	0 to 2			RO
28	Pumpdown/Lockout State	pdown_st	0 to 255			RO

LEGEND

RO — Read Only
RW — Read/Write

*Default value is shown only if configurable in this table.

Run Times

CCN TABLE NAME: RUNTIME

PIC5 PATH: Main Menu → Run Times

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Starts in 12 Hours	ST_CNT12	0 to 8			RO
2	Compressor Starts Num	C_STARTS	0 to 99999			RO
3	Compressor Running Hrs	COMP_HRS	0 to 500000.0		hr	RO
4	After Service Hrs	SRV_HRS	0 to 500000.0	0.0	hr	RW
5	Stop to Start Timer	spst_tim	1.0 to 15.0		min	RO
6	Start to Start Timer	stst_tim	4.0 to 45.0		min	RO
7	Oil Lubrication Duration	oilb_dur	1000 to 8000		hr	RO
8	Oil Storage Duration	oils_dur	5000 to 15000		hr	RO
9	Recy Startup in 4 Hours	RCYSTCNT	0 to 6			RO
10	Swift Restarts in 1 Hour	SWIFTCNT	0 to 4			RO
11	Total Pumpout Numbers	PGP_NO				RO
12	Total Pumpout Time	PGP_TM			min	RO
13	Purge Pumpout in 24 Hrs	pgp_tm_d			min	RO
14	Avg Daily Purge in 7 Day	pgp_tm_w			min	RO

LEGEND

RO — Read Only
RW — Read/Write

*Default value is shown only if configurable in this table.
NOTE: The displayed runtime is updated every hour. To avoid the loss of data in case of disruption, the values are backed up.

Modes

CCN TABLE NAME: MODES

PIC5 PATH: Main Menu → Modes

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Normal Shutdown	shut_nor	NO/YES			RO
2	Recycle Shutdown	shut_rcy	NO/YES			RO
3	Alarm Shutdown	shut_alm	NO/YES			RO
4	Recycle Startup	str_rcy	NO/YES			RO
5	Temperature Ramping	tmp_ramp	NO/YES			RO
6	Load Ramping	ld_ramp	NO/YES			RO
7	IGV1 Inhibiting	gv1_inh	NO/YES			RO
8	Ice Building	ice_act	NO/YES			RO
9	Ice Build Terminated	ice_term	NO/YES			RO
10	Ice Build Recy Startup	ice_rcy	NO/YES			RO
11	Ramp Loading	ramp_act	NO/YES			RO
12	Demand Limit	dem_act	NO/YES			RO
13	VFD Rampdown	vfdrpact	NO/YES			RO
14	Demand Limit Inhibit	dem_inh	NO/YES			RO
15	Evaporator Frozen	evapfrze	NO/YES			RO
16	Condenser Frozen	condfrze	NO/YES			RO
17	Recycle Shutdown Done	rcysh_cm	NO/YES			RO
18	NonRecycle Shutdown Done	nrysh_cm	NO/YES			RO
19	In Alarm	alm_act	NO/YES			RO
20	In Override	over_act	NO/YES			RO
21	Purge Active	pg_act	NO/YES			RO
22	Comp 1 Run State Val	cm_stat1			Integer	RO

LEGEND

RO — Read Only

*Default value is shown only if configurable in this table.

Setpoint

CCN TABLE NAME: SETPOINT

PIC5 PATH: Main Menu → Setpoint

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Cooling ECW Setpoint	ecw_sp	15.0 to 120.0	60.0	°F	RW
2	Cooling LCW Setpoint	lcw_sp	10.0 to 120.0	45.0	°F	RW
3	Heating ECDW Setpoint	ecdw_sp	63.0 to 150.0	104.0	°F	RW
4	Heating LCDW Setpoint	lcdw_sp	68.0 to 150.0	113.0	°F	RW
5	Ice Build Setpoint	ice_sp	15.0 to 60.0	40.0	°F	RW
6	Base Limit Demand	dem_base	10.0 to 100.0	100.0	%	RW
7	EWT Control Option	EWT_OPT	DSABLE/ENABLE	DSABLE		RW

LEGEND

RW — Read/Write

*Default value is shown only if configurable in this table.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Configuration Menu for 19DV

Navigation: MAIN MENU → CONFIGURATION MENU

ICON	DISPLAYED TEXT	ACCESS	ASSOCIATED TABLE	PAGE NO.
	Service Parameters	Service	SERVICE1	59
	Surge Correction Config	Service	CFGSURGE	60
	Protective Limit Config	Service	CFGLIMIT	60
	Lab Test Forced	Service	LABONLY	Factory only
	Option Configuration	Service	CONF_OPT	61
	UM VFD Configuration	Service	CFGUMVFD	63
	Factory Parameters	Factory	FACTORY	62
	General Configuration	User	GEN_CONF	62
	Control Identification	User	CTRL_ID	Info. only
	19DV Configuration	Service	CFG_19DV	63
	General VFD Parameters	Service	CFGGEVFD	62
	SRD Configuration	Service	CONF_SRD	63
	IOB Configuration	Service	CONF_IOB	64
	E-Mail Configuration	Service	EMAILCFG	64
	Master Slave Config	Service	CONF_MS	65
	Reset Configuration	User	RESETCFG	65
	Schedule Menu	User	SCHEDULE	66
	Holiday Menu	User	HOLIDAY	67
	Broadcast Menu	User	BROADCAST	67
	Date/Time Configuration	User	DATETIME	68
	Network Configuration	Service	CONNECT	68

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Service Parameters

CCN TABLE NAME: SERVICE1

PIC5 PATH: Main Menu → Configuration Menu → Service Parameters

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Service Password	ser_pass	0 to 65535	2222		RW
2	Atmospheric Pressure	atom_pre	8 to 15	14.5	psi	RW
3	GV1 Travel Limit	gv1_lim	30 to 100	80	%	RW
4	GV1 Closure at Startup	gv1stpos	0 to 40	4	%	RW
5	Controlled Fluid DB	ctrl_db	0.5 to 2.0	1.0	°F	RW
6	Derivative EWT Gain	ewtdgain	1.0 to 3.0	2.0		RW
7	Proportional Dec Band	gv1decdb	2.0 to 10.0	6.0		RW
8	Proportional Inc Band	gv1incdb	2.0 to 10.0	6.5		RW
9	Maximum GV Movement	max_gv	2.0 to 4.0	2.0	%	RW
10	Demand Limit At 20 mA	dem_20ma	10 to 100	40	%	RW
11	Demand Limit Prop Band	dem_pdb	3.0 to 15.0	10.0	%	RW
12	Amps or KW Ramp per Min	ldramprt	5 to 20	10	%	RW
13	Temp Ramp Rate per Min	tmramprt	1 to 10	3	°F	RW
14	Recycle Shutdown Delta T	rcysh_dt	0.5 to 4.0	1.0	°F	RW
15	Recycle Restart Delta T	rcyst_dt	2.0 to 10.0	5.0	°F	RW
16	Damper Valve Act Delay	dmp_dly	0 to 20	5	min	RW
17	Comp Discharge Alert	dgt_alrt	125 to 200	200	°F	
18	Comp Motor Temp Override	mt_over	150 to 200	200	°F	
19	Comp Bearing Temp Alert	tb_alert	155.0 to 175.0	175	°F	
20	Comp Bearing Temp Trip	tb_trip	175 to 185	185	°F	
21	Comp Bearing Alert R6/7	tb_alt2	185 to 210	210	°F	
22	Comp Bearing Trip R6/7	tb_trip2	210 to 220	220	°F	
23	Purge Active Temp SP	pgt_set	30 to 90	65		RW
24	Enable Excessive Starts	ex_start	YES/NO	NO		RW
25	Oil Stir Cycle (19XR6/7) 0 = No stir, 1 = 30s/30m, 2 = 1m/4hr, 3 = Comb 0&1	oilstiro	0 to 3	1		RW
26	Minimum Brine LWT	bri_min	10.0~34.0	34.0	°F	RW
27	Heating LWT Protec Set	lwtp_sp	41.0~50.0	42.8	°F	
28	Liquid Bypass Temp Band	lqby_lmt	2 to 10	3	^F	
29	Evap Flow Delta P Cutout	evap_cut	0.5 to 50	5	psi	
30	Cond Flow Delta P Cutout	cond_cut	0.5 to 50	5	psi	
31	Cond Hi Flow DP Limit	cond_val	0.5 to 50	5	psi	
32	Cond Hi Flow Alarm		DSABLE/ENABLE	DSABLE		

LEGEND

RW — Read/Write

*Default value is shown only if configurable in this table.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Surge Correction Config

CCN TABLE NAME: CFGSURGE

PIC5 PATH: Main Menu → Configuration Menu → Surge Correction Config

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Surge Line Configuration 0=PR, 1=Delta T	sgl_cfg	0 to 1	0		RW
2	IGV1 Pos Configuration 0-Degree, 1=Percentage	gv1c_sel	0 to 1	0		RW
3	Surge Delta Tsmax	dts_max	0.0 to 150.0	70.0	°F	RW
4	Surge Delta Tsmin	dts_min	0.0 to 150.0	45.0	°F	RW
5	PR at Full Load Opening	pr_ful	1.0000 to 5.0000	3.0000		RW
6	PR at Min. Opening	pr_min	1.0000 to 5.0000	1.5000		RW
7	IGV1 Full Load Open Deg	gv1_dful	90 to 120.0	88.0	degree	RW
8	Sound Ctrl IGV1 Open Deg	gv1_dmed	10.0 to 40.0	27.0	degree	RW
9	IGV1 Minimum Open Deg	gv1_dmin	0.0 to 10.0	2.0	degree	RW
10	IGV1 Maximum Open Deg	gv1_dmax	90.0 to120.0	109.0	degree	RW
11	IGV1 Minimum Position	gv1_pmin	0 to 100	5	%	RW
12	IGV1 Full Load Position	gv1_pful	0 to 100	100	%	RW
13	Envelop Line Offset	sgl_off	1.0 to 3.0	2.0	°F	RW
14	Envelop Lower Deadband	sql_hoff	0.5 to 3.0	1.5	°F	RW
15	Envelop Upper Deadband	sql_hoff	0.1 to 3.0	1.5	°F	RW
16	Surge Line Shape Factor	sgl_shfh	–1.000 to 0.000	–0.010		RW
17	Sound Line Shape Factor	sgl_shfl	0.000 to 1.000	0.010		RW
18	Envelop Speed Factor	sgl_spdf	0.00 to 3.00	2.00		RW
19	Surge Delay Time	surg_del	0 to 120	15	sec	RW
20	Surge Time Period	surge_t	7 to 10	8	min	RW
21	Surge Delta Amps %	surge_a	5 to 40	20	%	RW
22	GV1 Close Step Surge	gvstp_sg	1.0 to 3.0	2.0	%	RW
23	VFD Speed Step Surge	vfdstpsg	1.0 to 5.0	1.5	%	RW
24	EC Valve Step Surge	hbpstsg	1.0 to 10.0	4.0	%	
25	Surge Profile Offset	sgl_pro	0.0 to 5.0	0.0	^F	
26	High Efficiency Mode	high_eff	DSABLE/ENABLE	DSABLE		RW
27	High Noise Alert	noi_alt	DSABLE/ENABLE	DSABLE		RW

LEGEND

RW — Read/Write

*Default value is shown only if configurable in this table.

Protective Limit Config

CCN TABLE NAME: CFGLIMIT

PIC5 PATH: Main Menu → Configuration Menu → Protective Limit Config

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Evap Approach Alert	evap_al	0.5 to 15	5	°F	RW
2	Cond Approach Alert	cond_al	0.5 to 15	6	°F	RW
3	Cond Press Override Low	cpov_lo	90 to 157	140	psig	RW
4	Cond Press Override High	cpov_hi	200 to 265	250	psig	RW
5	Cond Press Cutout Low	cpcut_lo	155 to 160	160	psig	RW
6	Cond Press Cutout High	cpcut_hi	270 to 275	275	psig	RW
7	Evap Override Delta T	ert_ovdt	2 to 5	3	°F	RW
8	Evap Refrig Trippoint	ert_trip	0 to 40	33	°F	RW
9	High Evap Press Override	ep_ov	90 to 157	140	psig	RW
10	High Evap Press Cutout	ep_cut	160 to 170	165	°F	RW
11	Hi Evap Press Override DV	ep_ov	90 to 157	140	psi	RW
12	Hi Evap Press Cutout DV	ep_cut	160 to 170	165	psi	RW
13	Cond Pre Override DV 44	cpov_dl	20.0 to 41.0	40.0	psi	RW
14	Cond Pre Cutout DV 44	cpcut_dl	44.0 to 45.5	44.0	psi	RW
15	Cond Pre Override DV 72	cpov_dh	20.0 to 56.0	55.0	psi	RW
16	Cond Pre Cutout DV 72	cpcut_dh	59.0 to 60.3	59.0	psi	RW
17	Comp Bearing Trip XR6/7	tb_trip2	210 to 220	220	°F	RW
18	Minimum Brine LWT	bri_min	10 to 34	34	°F	RW
19	Heating LWT Protect Set	lwtp_sp	41 to 50	42.8	°F	RW
20	Evap Flow Delta P Cutout	evap_cut	0.5 to 50	5	psig	RW
21	Cond Flow Delta P Cutout	cond_cut	0.5 to 50	5	psig	RW
22	Cond Hi Flow DP Limit	cond_val	0.5 to 50	50	psig	RW
23	Cond Hi Flow Alarm	cond_alm	DSABLE/ENABLE	DSABLE		RW
24	Comp Bearing Alert DV	tb_alt3	90.0 to 120.0	104.0	F	RW
25	Comp Bearing Trip DV	tb_trip3	121.0 to 150.0	122.0	F	RW

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Option Configuration

CCN TABLE NAME: CONF_OPT

PIC5 PATH: Main Menu → Configuration Menu → Option Configuration

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Auto Restart Option	astart	DSABLE/ENABLE	DSABLE		RW
2	Common Sensor Option	commsens	DSABLE/ENABLE	DSABLE		RW
3	EC Valve Option 0 = No, 1= Cont 2 = On/Off, 3 = 4-20 mA	hgbp_opt	0 to 3	0		RW
4	EC Selection 0 = Disable, 1 = Surge 2 = Low Load, 3 = Comb	hgbp_sel	0 to 3	0		RW
5	ECV Open IGV1 Position	hpop_gv1	0.5 to 10	5.0	%	RW
6	ECV Close IGV1 Position	hgcl_gv1	1.5 to 20	10.0	%	RW
7	ECV Off DT for Low Load	hgb_toff	0.5 to 10.0	4.0	^F	RW
8	ECV On DT for Low Load	hgb_ton	0.5 to 10.0	2.0	^F	RW
9	ECV Low Load DB	hgbp_ldb	0.5 to 2.0	1.0	^F	RW
10	Head Pres Valve Option	hdpv_opt	DSABLE/ENABLE	DSABLE		RW
11	Head Pres Delta P 0%	hdp_0	20.0 to 85.0	25.0	psig	RW
12	Head Pres Delta P 100%	hdp_100	20.0 to 85.0	50.0	psig	RW
13	Head Pressure Min Output	hdpv_min	0.0 to 100.0	0.0	%	RW
14	Tower Fan High set point	tfh_sp	55 to 105	75		RW
15	Refrigerant Leak Option	leak_en	DSABLE/ENABLE	DSABLE		RW
16	Refrig Leakage Alarm mA	exv_opt	4 to 20	20		RW
17	Oil EXV Option	leak_ma	DSABLE/ENABLE	DSABLE	mA	RW
18	Oil Temp High Threshold	oil_high	100 to 140	120	°F	RW
19	Oil Temp Low Threshold	oil_low	90 to 130	110	°F	RW
20	Gas Torque Factor	gt_fact	0.25 to 3.0	1	°F	RW
21	Guide Vane/SRD Factor	gv_srd_f	0.7 to 1.20	0.95		RW
22	Power Recovery Timeout	pd_tcfg	0 to 60	15	min	RW
23	Condenser Flush Alert	cfa_opt	DSABLE/ENABLE	DSABLE		RW
24	Customer Alert Option	cusa_opt	DSABLE/ENABLE	DSABLE		RW
25	Ice Build Option	ice_opt	DSABLE/ENABLE	DSABLE		RW
26	Ice Build Recycle	ice_recy	DSABLE/ENABLE	DSABLE		RW
27	Ice Build Termin Source 0 = Temp, 1 = Contact, 2 = Both	ice_term	0 to 2	0		RW
28	Water Pressure Option	wp_opt	DSABLE/ENABLE	DSABLE		RW
29	Water Flow Measurement 0 = No, 1 = Digital, 2 = Analog	wfm_opt	0-2	0		RW
30	Water Flow Determination 0=Sat Temp, 1= Flow Switch	fs_opt	0 to 1			RW
31	Water Flow at 4 mA	flow4ma	0-200	0.00	GPS	RW
32	Water Flow at 20mA	flow20ma	0-200	0.00	GPS	RW
33	Evap Flow Rate Baseline	chwf_bas	0-150	0.00	GPS	RW
34	Evap Pres Drop Baseline	evpd_bas	0-20	0.00	PSI	RW
35	Cond Flow Rate Baseline	cdwf_bas	0-150	0.00	PSI	RW
36	Cond Pres Drop Baseline	cdpd_bas	0-20	0.00	PSI	RW
37	Water Pres Drop @ 20mA	wpd_20ma	0-40	10.00	PSI	RW
38	Max Oil Pressure Diff	opvfdmax	35-60	50	PSI	RW
39	Oil Pump VFD Max Step	opvfdstp	0-10	7	%	RW
40	Vapor Source SV Delay	vssv_dly	0-10	5	min	RW
41	Vapor Source SV Option	vssv_dly	DSABLE/ENABLE	DSABLE		RW
42	Liquid Bypass Selection	lqby_sel		0		RW
43	Purge On Idle Option	pgon_opt		0		RW
44	Evap Liquid Temp Opt	evap_ref	DSABLE/ENABLE	Enable		
45	Evap App Calc Selection Sat Temp = 0, Ref Temp = 1	evap_ref	0/1	1		RW

LEGEND

RW — Read/Write

*Default value is shown only if configurable in this table.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Factory Parameters

CCN TABLE NAME: FACTORY

PIC5 PATH: Main Menu → Configuration Menu → Factory Parameters

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Factory Password	fac_pass	0 to 65535	4444		RW
2	Chiller Type 0=19XR6/7, 1=19XR2-5/E/D/V, 2=19DV	chil_typ	0 to 2	0		RW
3	Unit Type 0 = Cool Only, 1 = Heat Machine	unit_typ	0 to 1	0		RW
4	Comp 0 = Single, 1 = Dual	comp_typ	0 to 1	1		RW
5	Chilled Medium Type	chmedium	WATER/BRINE	WATER		RW
6	Cond Shell Side MAWP 0=185 psi, 1=300 psi	cond_typ	0 to 1	0		RW
7	19DV Design Pressure 0=44 psi, 1=72 psi	comp_pre	0 to 1	0		RW
8	Country Code	coun_cod	0 to 500	86		RW
9	Free Cooling Option	freecool	YES/NO	NO		RW
10	VFD Option 0 = No, 1 = FS, 2=Carrier, 3=Rockwell LF2, 4=EATON, 5=Rockwell Std Tier	vfd_opt	0 to 5	0		RW
11	IOB3 Option (19XR2-E/D/V)		YES/NO	YES		RW
12	IOB4 Option	hyd_opt	YES/NO	NO		RW
13	Guide Vane1 Type 0 = Digital, 1 = Analog	gv1_type	0 to 1	0		RW
14	VFD Feedback Voltage Sel 0 = 0 to 5 V, 1 = 0 to 10 V	vfd_fdv	0 to 1	0		RW
15	Marine Option	mrn_opt	DSABLE/ENABLE	DSABLE		RW
16	Power Request Option	pr_opt	DSABLE/ENABLE	DSABLE		RW
17	Cont. Power Request	cpr_opt	DSABLE/ENABLE	DSABLE		RW
18	Purge System Option	pg_opt	DSABLE/ENABLE	DSABLE		RW
19	Liquid Bypass Option	lqby_opt	DSABLE/ENABLE	DSABLE		RW
20	Heat Reclaim Option 0=No, 1=Full, 2=Partial	heatrecl	YES/NO	NO		RW

General Configuration

CCN TABLE NAME: GEN_CONF

PIC5 PATH: Main Menu → Configuration Menu → General Configuration

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	User Password		1 to 9999	1111		RW
2	Stop to Start Delay	min_off	1 to 15	2	min	RW
3	Start to Start Delay	strt_dly	4 to 45	15	min	RW
4	Demand Limit Type 0 = Base Demand, 1 = 4 to 20 mA	dem_sel	0 to 1	0		RW
5	Pulldown Ramp Type 0 = Temp, 1= Load	ramp_slct	0 to 1	1		RW
6	Demand Limit Source 0 = amps, 1 = kW	DEM_SLCT	0 to 1	0		RW

LEGEND

*Default value is shown only if configurable in this table.

RW — Read/Write

General VFD Config

CCN TABLE NAME: CFGGEVFD

PIC5 PATH: Main Menu → Configuration Menu → General VFD Config

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	VFD Gain	vfd_gain	0.10 to 1.50	0.75		RW
2	VFD Max Speed Per	vfd_max	90.0 to 110.0	100.0	%	RW
3	VFD Min Speed Per	vfd_min	65.0 to 100.0	70.0	%	RW
4	VFD Start Speed Per	vfd_str	65.0 to 100.0	100.0	%	RW
5	VFD Current Limit	vfdculm	0.0 to 99999.0	250	amp	RW
6	VFD Load Current 20 mA	vfdc20ma	10.0 to 5000.0	200.0	amp	RW
7	Comp Frequency 100%	comp_100	45.0 to 62.0	50.0	Hz	RW
8	VFD Load Current Input	vfd_ldap	DSABLE/ENABLE	ENABLE		RW

Unit Mount VFD

CCN TABLE NAME: CFGUMVFD

PIC5 PATH: Main Menu → Configuration Menu → UM VFD Configuration

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Compressor Speed 100%	comp_hz	47 to 110	50	Hz	RW
2	Rated Line Voltage	rlv_i	200-13800	460	V	RW
3	Motor Nameplate Current	rla	10 to 1500	200	AMPS	RW
4	Motor Rated Load Current	rla_load	10 to 1500	200	AMPS	RW
5	Motor Nameplate Voltage	rlv	200 to 13800	460	Volts	RW
6	Motor Nameplate RPM	rpm	1500 to 3600	3000	rpm	RW
7	Motor Nameplate KW	rlkw	0 to 5600	1500	KW	RW
8	Skip Frequency 1	skipfrq1	0.0 to 102.0	102	Hz	RW
9	Skip Frequency 2	skipfrq2	0.0 to 102.0	102	Hz	RW
10	Skip Frequency 3	skipfrq3	0.0 to 102.0	102	Hz	RW
11	Skip Frequency Band	skipband	0.0 to 102.0	0	Hz	RW
12	Increase Ramp Time	ramp_inc	5 to 60	30	sec	RW
13	Decrease Ramp Time	ramp_dec	5 to 60	30	sec	RW
14	Line Voltage Imbalance%	lvim_th	1 to 10	10	%	RW
15	Line Volt Imbalance Time	lvim_per	1 to 10	10	sec	RW
16	Line Current Imbalance%	lcim_th	5 to 40	40	%	RW
17	Line Current Imbal Time	lcim_per	1 to 10	10	sec	RW
18	Motor Current Imbalance%	mcim_th	5 to 40	40	%	RW
19	Motor Current Imbal Time	mcim_per	1 to 10	10	sec	RW
20	Single Cycle Dropout	scycd_en	0 to 1	0		RW
21	PWM Switch Frequency 0=2KHZ, 1=4KHZ	pwm_freq	0 to 1	0		RW
22	Restore Defaults	res_def	0 to 1	0		RW
23	LEN Comm Timeout	com_tout	0 to 255	10	sec	RW
24	Modbus Comm Timeout	mod_tout	0 to 255	2	sec	RW
25	Gateway Modbus Baud Rate 4800=1, 9600=2, 19200=3, 38400=4	gw_baud	1 to 4	2		RW

19DV Configuration

CCN TABLE NAME: CFG_19DV

PIC5 PATH: Main Menu → Configuration Menu → 19DV Configuration

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Motor Pole Pair Single=1, Double=2		1 to 2	1		RW
2	IGV2 Travel Limit	gv2_lim	0 to 100	96	%	RW
3	IGV2 Minimum Degree	gv2_dmin	0 to 20	2.0		RW
4	IGV2 Full Load Open Deg	gv2_dfw	10 to 100	90.0		RW
5	IGV2 Actuator Max Deg	gv2_dmax	90 to 120	94.0		RW
6	IGV2 Deg @IGV1 20 Deg	gv2_d20		28.1		RW
7	IGV2 Deg @IGV1 30 Deg	gv2_d30		37.2		RW
8	IGV2 Deg @IGV1 50 Deg	gv2_d50		71.6		RW
9	Comp Based Speed Hz	vfd_ratf	10 to 200	80.5	Hz	RW
10	Purge Regen Lasting Time	reg_tim	0 to 65535	120	min	RW
11	Daily PG Pumpout Limit	pgpumplm	20 to 200	50	min	RW

LEGEND

RW — Read/Write

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

IOB Configuration

CCN TABLE NAME: CONF_IOB

PIC5 PATH: Main Menu → Configuration Menu → IOB Configuration

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
3	IOB1 AI#1 Type		0 to 6	4		RW
4	IOB1 AI#2 Type		0 to 6	4		RW
5	IOB1 AI#3 Type		0 to 6	4		RW
6	IOB1 AI#4 Type		0 to 6	4		RW
7	IOB1 AI#9 Type		0 to 5	2		RW
8	IOB1 AO#1 Type		0 to 2	1		RW
9	IOB2 AI#1 Type		0 to 6	4		RW
10	IOB2 AI#2 Type		0 to 6	4		RW
11	IOB2 AI#3 Type		0 to 6	4		RW
12	IOB2 AI#4 Type		0 to 6	0		RW
13	IOB2 AI#8 Type		0 to 5	0		RW
14	IOB2 AI#9 Type		0 to 5	0		RW
15	IOB2 AI#10 Type		0 to 5	5		RW
16	IOB2 AO#1 Type		0 to 2	1		RW
17	IOB2 AO#2 Type		0 to 2	1		RW
17	IOB3 AI#1 Type		0 to 6	4		RW
18	IOB3 AI#2 Type		0 to 6	4		RW
19	IOB3 AI#3 Type		0 to 6	4		RW
20	IOB3 AI#4 Type		0 to 6	4		RW
21	IOB3 AI#5 Type		0 to 5	0		RW
22	IOB3 AI#6 Type		0 to 5	5		RW
23	IOB3 AI#8 Type		0 to 5	0		RW
24	IOB3 AI#9 Type		0 to 5	0		RW
25	IOB3 AI#10 Type		0 to 5	0		RW
26	IOB3 AO#1 Type		0 to 2	1		RW
27	IOB3 AO#2 Type		0 to 2	1		RW
28	IOB4 AI#1 Type		0 to 6	0		RW
29	IOB4 AI#2 Type		0 to 6	0		RW
30	IOB4 AI#3 Type		0 to 6	0		RW
31	IOB4 AI#4 Type		0 to 6	0		RW
33	IOB4 AI#5 Type		0 to 6	0		RW
34	IOB4 AI#6 Type		0 to 6	0		RW
35	IOB4 AI#7 Type		0 to 6	0		RW
36	IOB4 AI#10 Type		0 to 6	0		RW

E-Mail Configuration

CCN TABLE NAME: EMAILCFG

PIC5 PATH: Main Menu → Configuration Menu → E-Mail Configuration

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	E-Mail Function		DSABLE/ENABLE	DSABLE		RW
2	Sender Email Part 1		24 characters			RW
3	Sender Email Part 2		24 characters			RW
4	Recip 1 Email Part 1		24 characters			RW
5	Recip 1 Email Part 2		24 characters			RW
6	Recip 2 Email Part 1		24 characters			RW
7	Recip 2 Email Part 2		24 characters			RW
8	SMTP IP Addr Part 1		0 to 255	0		RW
9	SMTP IP Addr Part 2		0 to 255	0		RW
10	SMTP IP Addr Part 3		0 to 255	0		RW
11	SMTP IP Addr Part 4		0 to 255	0		RW
12	Account Email Part 1		24 characters			RW
13	Account Email Part 2		24 characters			RW
14	Account Password		24 characters			RW
15	Port Number		0 to 255	25		RW
16	Server Timeout		0 to 255	30	sec	RW
17	Server Authentication 0 = No Authentication, 1 = Username Only 2 = Username & domain name		0 to 2	0		RW

LEGEND

*Default value is shown only if configurable in this table.

RW — Read/Write

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Master Slave Configuration

CCN TABLE NAME: CONF_MS

PIC5 PATH: Main Menu → Configuration Menu → Master Slave Config

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Slave Address	slv_addr	1 to 236	2		RW
2	Master/Slave Select 0=Disable, 1=Master, 2=Slave	msl_sel	0 to 2	0		RW
3	Chiller Connection Type 0=Parallel, 1=Series	ms_type	0 to 1	0		RW
4	Middle Sensor Option	mids_opt	YES/NO	YES		RW
5	Master Lead/Lag Select 0=Lead change to Lag Once Failed 1=Runtime Balance	lead_sel	0 to 1	0		RW
6	Series Counter Flow	serct_fl	YES/NO	NO		RW
7	Take Over on Comm Loss	toocl	0 to 1	0		RW
8	LAG Shutdown Threshold	lag_shut	25 to 75	50	%	RW
9	Prestart Fault Time	pref_tim	2 to 30	5	min	RW
10	Lead Unload Threshold		50 to 100	100	%	RW
11	Lead/Lag Balance Delta	ll_bal_d	40 to 400	168	hr	RW
12	Lag Start Time	lstr_tim	2 to 30	10	min	RW
13	Lag Stop Time	lstp_tim	2 to 30	10	min	RW
14	Lead Pulldown Time	lead_pul	0 to 60	0	min	RW
15	Lag Minimum Run Time	lag_mini	0 to 150	0	min	RW
16	Lag Run Delta T	lagrundt	0 to 10.0	3.0	^F	RW
17	Lag Off Delta T	lagoffdt	0 to 10.0	1.8	^F	RW

Prognostics Config

CCN TABLE NAME: CONF_PRG

PIC5 PATH: Main Menu → Configuration Menu → Prognostics Config

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Prog Function Enable	prog_en	YES/NO	NO		RW
2	Oil Change Done	oilch_cm	YES/NO	YES		RW
3	Oil Filter Change Done	oilfc_cm	YES/NO	YES		RW
4	Trans Calibration Done	tracl_cm	YES/NO	YES		RW
5	Refrigerant Charge Done	refch_cm	YES/NO	YES		RW
6	Oil Filter PD Threshold	oilfl_th	–6.7 to 420	10	psig	RW
7	Oil Lub Expire Time	oilch_nt	1000.0 to 8000.0	2000.0	hr	RW
8	Oil Storage Expire Time	oilst_nt	5000.0 to 15000.0	8640	hr	RW
9	Trans Calib Threshold	refgc_th	0 to 5	2	psig	RW
10	Low Charge Cond Approach	rch_cath	20 to 40	20	°F	RW
11	Evap Design Approach	ep_dgap	0 to 10	3	°F	RW
12	Bearing Degradation	beart_th	100 to 230	200	°F	RW

Reset Configuration

CCN TABLE NAME: RESETCFG

PIC5 PATH: Main Menu → Configuration Menu → Reset Configuration

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Temp Reset Type 0 = No, 1 = 4 to 20 mA 2 = Remote Temp, 3 = Water DT [delta temperature]	res_sel	0 to 3	0		RW
2	Degrees Reset At 20 mA	der_20ma	–30.0 to 30.0	10.0	°F	RW
3	Maximum Deg Temp Reset	deg_rset	–30.0 to 30.0	10.0	°F	RW
4	Remote Temp Full Reset	remtm_fu	–40.0 to 245.0	65.0	°F	RW
5	Remote Temp No Reset	remtm_no	–40.0 to 245.0	85.0	°F	RW
6	Deg Reset Water DT Full	drwdt_fu	–30.0 to 30.0	10.0	°F	RW
7	Controlled DT Full Reset	ctldt_fu	0.0 to 15.0	0.0	°F	RW
8	Controlled DT No Reset	ctldt_no	0.0 to 15.0	10.0	°F	RW

LEGEND

*Default value is shown only if configurable in this table.

RW — Read/Write

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Schedule Menu

Navigation: MAIN MENU → CONFIGURATION MENU → SCHEDULE MENU

ICON	DISPLAYED TEXT	ACCESS	ASSOCIATED TABLE
	Local Schedule	User	
	Ice Build Schedule	User	
	Network Schedule	User	

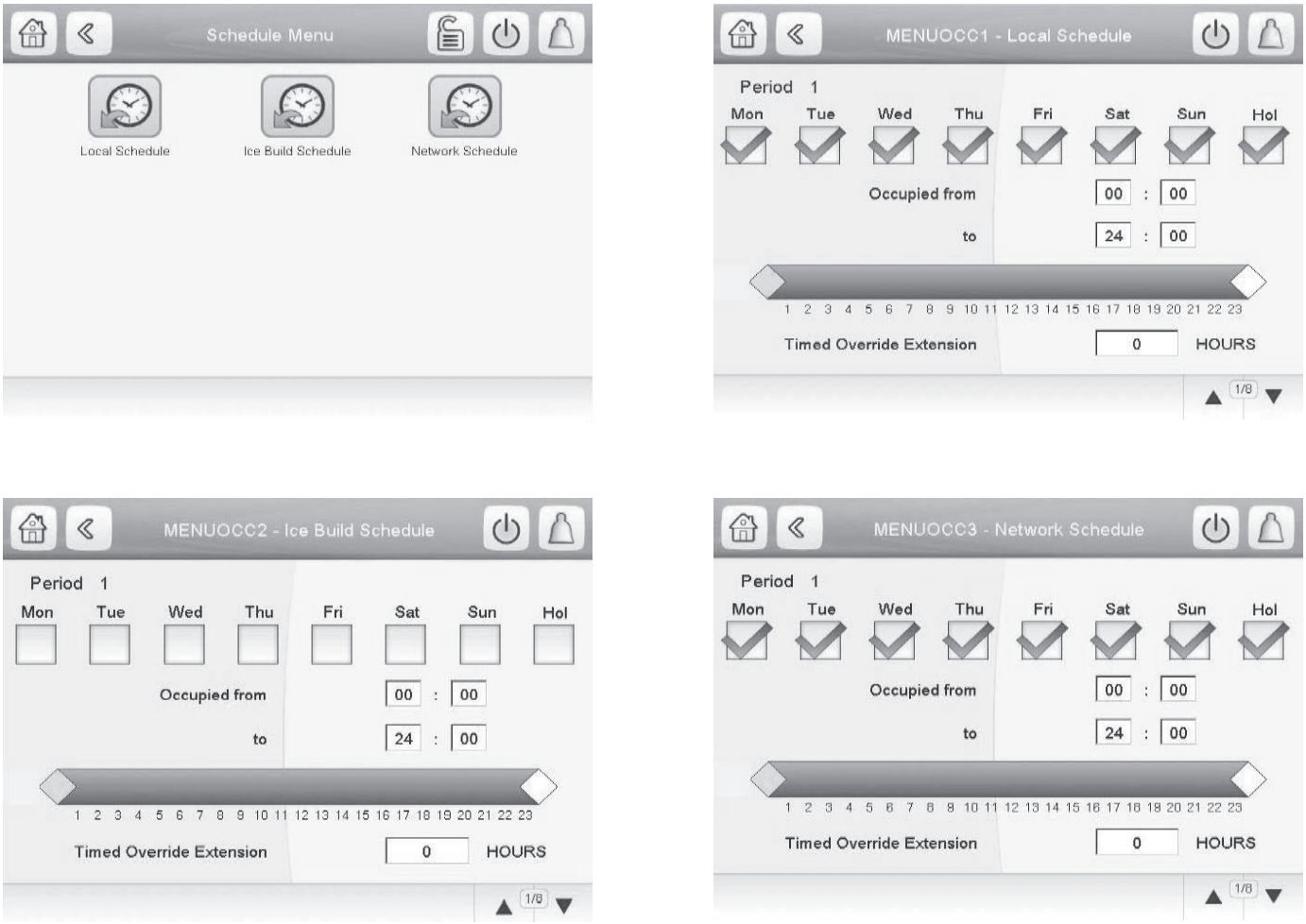


Fig. B — Schedule Menu and Submenus

Holiday Menu

Navigation: MAIN MENU → CONFIGURATION MENU → HOLIDAY MENU

The Holiday Menu has 16 submenus (HOLDY-01 to HOLDY_16), so it is possible to set 16 different holiday periods. For more information about holiday periods, see the Time Schedule section on page 24. Figure C below shows the Holiday Menu and a sample submenu.

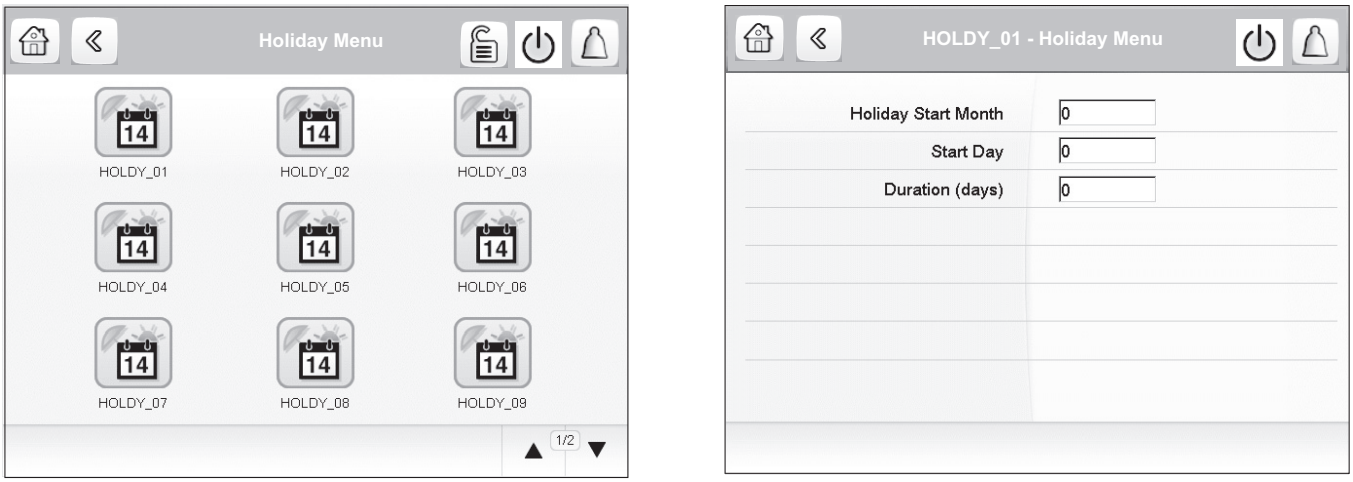


Fig. C — Holiday Menu and Submenu

Broadcast Menu

Navigation: MAIN MENU → CONFIGURATION MENU → BROADCAST MENU

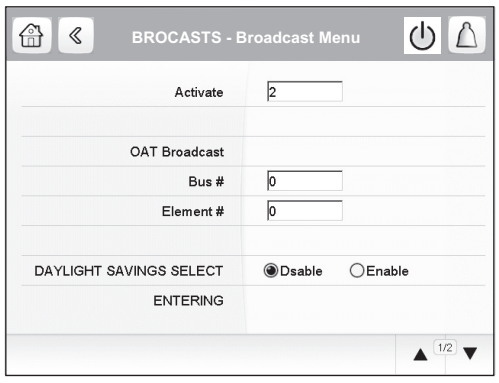


Fig. D — Broadcast Menu

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Date/Time Configuration

Navigation: MAIN MENU → CONFIGURATION MENU → DATE/TIME CONFIGURATION

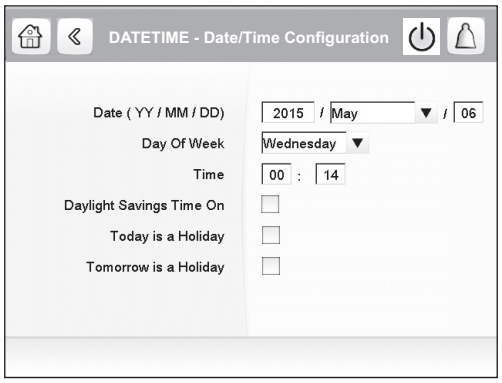


Fig. E — Date/Time Configuration Menu

Network Configuration

CCN TABLE NAME: CONNECT

PIC5 PATH: Main Menu → Configuration Menu → CONNECT

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
	MODBUS CONFIGURATION					
1	RS485 Port 0 0=CCN, 1=BACnet MS/TP, 2=Modbus RTU		0 to 2	0		RW
2	Modbus TCP Enable		DSABLE/ENABLE	DSABLE		RW
3	Modbus Server UID	ser_UID	1 to 255			
4	Modbus Metric Unit	metric	NO/YES	YES		RW
5	Modbus RTU Parity Option 0=No Parity, 1=Odd Parity 2=Even Parity, 3= Low 4 = High					
6	Modbus Stop Bit 0= 1 Bit, 1= 2 Bits	stop_bit	0 to 1	0		RW
7	Modbus RS485 Baudrate 0=9600, 1=19200, 2=38400	baudrate				RW
8	Modbus Litte Endian		NO/YES	NO		
9	Modbus Real Type		NO/YES	NO		
	BACNET CONFIGURATION					
10	BACnet/IP Enable	bacena	DSABLE/ENABLE	ENABLE		RW
11	BACnet Metric Unit	bacunit	NO/YES	YES		RW
12	BACnet Network	network	1 to 9999	1601		RW
13	BACnet Identifier		Ident 0 to 9999999	1600001		RW
14	ALC Auto ID Scheme		DSABLE/ENABLE	DSABLE		RW
15	BACnet Alarms Enable		DSABLE/ENABLE	DSABLE		RW
16	BACnet Schedule Enable		DSABLE/ENABLE	DSABLE		RW
17	MS/TP Mac Address		1 to 127	1		RW
18	MS/TP Baud rate 0=9600, 1=19200, 2=38400, 3=57600, 4=76800, 5=115200					
19	MS/TP Max Info Frames		1 to 255	5		
	CALL HOME CONFIGURATION					
20	Call Home Option	ch_opt	DSABLE/ENABLE	DSABLE		RW
21	Call Home IP Addr Part 1	ch_ip_P1	0 to 255	140		RW
22	Call Home IP Addr Part 2	ch_ip_P2	0 to 255	206		RW
23	Call Home IP Addr Part 3	ch_ip_P3	0 to 255	129		RW
24	Call Home IP Addr Part 4	ch_ip_P4	0 to 255	10		RW
25	HTTP Server		DSABLE/ENABLE	DISABLE		
26	HTTP Auto Disable Time		0 to 999	20	min	RW

LEGEND

RW — Read/Write

*Default value is shown only if configurable in this table.

NOTES:
1. The BACnet network and the device object identifier can be modified. The default identifier has been chosen to easily recognize the chiller on a BACnet network. The first two digits are the BACnet CARRIER vendor number (16). These parameters must be unique on the BACnet network. They must be modified if more than one Carrier chiller is connected to the BACnet network.
2. Changing one of these BACnet parameters will cause a reboot of the board after 1 minute.
3. Changing IP address from the PIC5 SETUP menu will require a manual reboot or power cycle of the PIC5 controller in order to rebuild the BACnet stack.
4. For more information, see APPENDIX D — NETWORK CONFIGURATION on page 90.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Quick Test Menu

Navigation: MAIN MENU → QUICK TEST

Quick Test

CCN TABLE NAME: QCK_TEST

PIC5 PATH: Main Menu → Quick Test

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Quick Test Enable	QCK_TEST	0 to 1	0		RW
2	Quick Test Oil Heater	Q_OILH	0 to 1	0		RW
3	Quick Test Oil/Ref Pump	Q_OILP	0 to 1	0		RW
4	Oil/Ref Pres Test Passed	OP_PASS	0 to 1	0		RO
5	Oil/Ref Pump Delta Press	OIL_PDQ			psi	RO
6	Quick Test Oil EXV	Q_EXV	0 to 100	0	%	RW
7	Quick Test Head Val Pos	Q_HDP	0 to 100	0	%	RW
8	Quick Test Chiller Stat	Q_CHST	4 to 20	4	mA	RW
9	Guide Vane 1 Tested Pos	Q_GV1POS	0 to 100	0	%	RW
10	Guide Vane 2 Tested Pos	Q_GV2POS	0 to 100	0	%	RW
11	Quick Test GV1 Open	Q_GV1OP	OFF/ON	OFF		RW
12	Quick Test GV1 Close	Q_GV1CL	OFF/ON	OFF		RW
13	GV1/SRD Joint Test	Q_GVSRD	DISABLE/ENABLE	DISABLE		RW
14	Quick Test Diffuser Pos	Q_SRD	0 to 100	0		RW
15	Guide Vane 1 Actual Pos	Q_GV1ACT			%	RW
16	Diffuser Target Pos	Q_DIFTGT			%	RW
17	Quick Test ECV Open	Q_HGBPOP	OFF/ON	OFF		RW
18	Quick Test ECV Close	Q_HGBPCL	OFF/ON	OFF		RW
19	EC Valve Tested Pos	Q_HGBP_T	0 to 100	0	%	RW
20	Quick Test Damper Open	Q_DMPOP	OFF/ON	OFF		RW
21	Quick Test Damper Close	Q_DMPCL	OFF/ON	OFF		RW
22	Quick Test Alarm Output	Q_ALM	OFF/ON	OFF		RW
23	Quick Test Alert Output	Q_ALE	OFF/ON	OFF		RW
24	Quick Test Cond Pump	Q_CDWP	OFF/ON	OFF		RW
25	Condenser Water Flow	CDW_FLOW	YES/NO			RO
26	Quick Test Chilled Pump	Q_CHWP	OFF/ON	OFF		RW
27	Chilled Water Flow	CHW_FLOW	YES/NO			RO
28	Condenser Water Delta T	CDW_DT	-22.2 to 136.1		F	RO
29	Chilled Water Delta T	CHW_DT	-22.2 to 136.1		F	RO
30	Quick Test LLC EXV	Q_LLCEXV	0 to 100	0	%	RW
31	Quick Test VFD Cooling	Q_VFDCOL	OFF/ON	OFF		RW
32	QCK TST Vapor Venting SV	Q_VAPLSV	OFF/ON	OFF		RW
33	Quick Test Vapor SV	Q_VSSV	OFF/ON	OFF		RW
34	Quick Test Condenser CV	Q_CONDSV	OFF/ON	OFF		RW
35	Quick Test Evaporator CV	Q_EVAPSV	OFF/ON	OFF		RW
36	QCK TST Evap Drain CV	Q_OPRLUB	OFF/ON	OFF		RW
37	QCK TST Cond Drain CV	Q_PRELUB	OFF/ON	OFF		RW
38	Quick Test Purge Cond SV	Q_CDPSV	OFF/ON	OFF		RW
39	Quick Test Purge Comp SV	Q_CMPSV	OFF/ON	OFF		RW
40	Quick Test Pumpout SV	Q_POPSV	OFF/ON	OFF		RW
41	QCK TST Drainage SV	Q_DROPR	OFF/ON	OFF		RW
42	Quick Test Rege SV	Q_RGPSV	OFF/ON	OFF		RW
43	Quick Test Discharge SV	Q_DCPSV	OFF/ON	OFF		RW
44	Quick Test Vaccum Pump	Q_PVPSV	OFF/ON	OFF		RW
45	Quick Test Purge Comp	Q_PCPSV	OFF/ON	OFF		RW
46	Quick Test Purge Heater	Q_PHPSV	OFF/ON	OFF		RW
47	Motor Rotation Check	Q_MRC	DISABLE/ENABLE	DISABLE		RW
48	Check State IDLE=0, PreLub=1, Rotat=2, PosLub=3, End=4	Q_MRC_ST	0 to 4	0		RO
51	Quick Test Eco Bypass	Q_ECBP	OFF/ON	OFF		RW
52	QCK TST Eco Isolation	Q_ECONIV	OFF/ON	ON		RW
53	QCK TST Cond Filling VLV	Q_CONDCV	OFF/ON	OFF		RW
54	Quick Test Lo Tower Fan	Q_LOWFAN	OFF/ON	OFF		RW
55	Quick Test Hi Tower Fan	Q_HIFAN	OFF/ON	OFF		RW

LEGEND

RO — Read Only
RW — Read/Write

*Default value is shown only if configurable in this table.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Quick Calibration Menu

Navigation: MAIN MENU → QUICK Calibration

Quick Calibration

CCN TABLE NAME: QCK_CALI

PIC5 PATH: Main Menu → Quick calibration

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Quick Test Enable	QCK_TEST	DSABLE/ENABLE	DSABLE		RW
2	GV1 Calibration Enable	GV1_CAL	DSABLE/ENABLE			RW
3	GV1 Calibration Status					
4	0 = no calibration/Failure, 1= in progress, 2= completed	GV1_STAT				RO
5	Guide Vane 1 Actual Ohms	GV1_OHM	0-12000		Ohms	RO
6	Guide Vane 1 Ohms 100%	GV1_MAXO	0-12000		Ohms	RO
7	Guide Vane 1 Ohms 0%	GV1_MINO	0-12000		Ohms	RO
8	Guide Vane 1 Actual mA	GV1_MAF	0-20.80		mA	RO
9	Guide Vane 1 mA 100%	GV1_MAXA	0-20.80		mA	RO
10	Guide Vane 1 mA 0%	GV1_MINA	0-20.80		mA	RO
11	GV2 Calibration Enable	GV2_CAL	DSABLE/ENABLE			RW
12	GV2 Calibration Status					
13	0 = no calibration/Failure, 1= in progress, 2= completed	GV2_STAT				RO
14	Guide Vane 2 Actual mA	GV2_MAF	0-20.80		mA	RO
15	Guide Vane 2 mA 100%	GV2_MAXA	0-20.80		mA	RO
16	Guide Vane 2 mA 0%	GV2_MINA	0-20.80		mA	RO
17	EC Valve Calib Enable	HGBP_CAL	DSABLE/ENABLE			RW
18	EC Valve Calib Status					
19	0 = no calibration/Failure, 1= in progress, 2= completed	HGBP_ST				RO
20	EC Valve Actual mA	HGBP_AMA	0-20.80		mA	RO
21	EC Valve mA 100%	HBP_MAXA	0-20.80		mA	RO
22	EC Valve mA 0%	HBP_MINA	0-20.80		mA	RO

LEGEND

RO — Read Only
RW — Read/Write

*Default value is shown only if configurable in this table.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Maintenance Menu

Navigation: MAIN MENU → MAINTENANCE MENU

ICON	DISPLAYED TEXT*	ACCESS	ASSOCIATED TABLE	PAGE NO.
	Capacity Control	Service	CAPACTRL	72
	Override Control	Service	OVERRIDE	72
	Surge Correction	Service	MAISURGE	73
	Maintenance VFD Config	Service	VFD_MCFG	74
	Swift Restart	Service	MAISWRST	74
	Master Slave	Service	MAIN_MS	75
	Power Line Parameters	Service	POWER_I	75
	ISM or VFD History	Service	MAIISMH	76
	Power Load Parameters		POWER_O	76
	UM VFD Status		VFD_STAT	77
	Maintenance Others	Service	MAIOTHER	78
	Maintenance IOB	Service	MAIIOB	79
	Board Software PN	Service	MAI_BDSN	79
	Pressure Sensor Calib	Service	PRES_CAL	80
	Temp Sensor Calib	Service	TEMP_CAL	84
	Pumpdown/Lockout	Service	PUMPDOWN	85
	System Status	Service	SYS_STAT	86

*Displayed text depends on the selected language (default is English).

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Capacity Control

CCN TABLE NAME: CAPACTRL

PIC5 PATH: Main Menu → Maintenance Menu → Capacity Control

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Total Error + Resets	tot_err			°F	RO
2	Control Point Error	ctrl_err			°F	RO
3	Controlled Water Temp	ctrl_wt			°F	RO
4	Control Point	ctrl_pnt			°F	RO
5	Actual Set Point	setpoint			°F	RO
6	Entering Water Change DT	ewt_dt			°F	RO
7	Enter Water Temp Reset	ewt_res			°F	RO
8	Leaving Water Temp Reset	lwt_res			°F	RO
9	Discharge Gas Temp Reset	dgt_res			°F	RO
10	Capacity Delta	capa_dlt	0 to 100		%	RO
11	Target GV1 Pos	gv1_tgt			%	RO
12	GV1 Pos Change Delta	gv1delta			%	RO
13	Target GV2 Position	gv2_tgt	0 to 2		%	RO
14	VFD Speed Change Flag 0 = Stop, 1 = Change, 2 = Cont	vfd_chg	0 to 2			RO
15	Target VFD Speed Percent	vfd_tgt			%	RO
16	VFD Speed Change Delta	vfd_dlta				RO
17	EC Valve Target Percent	hgbp_tp	0 to 100		%	RO
18	Capacity Inhibit Flag	cap_inh	NO/YES			RO
19	Capacity Decrease Flag	cap_dec	NO/YES			RO
20	Condenser Water Delta T	cdw_dt			°F	RO
21	Chilled Water Delta T	chw_dt			°F	RO
22	Pulldown Set Point	pull_set			%	RO
23	Demand Limit Inh Clamp	deinhclm			%	RO
24	Ramping Demand Limit Val	ramp_dem	NO/YES			RO
25	Compressor is Running	comp_run	NO/YES			RO
26	Comp1 Run State Val	cm_stat1	0 to 14		%	RO

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only

Override Control

CCN TABLE NAME: OVERRIDE

PIC5 PATH: Main Menu → Maintenance Menu → Override Control

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Capacity Inhibit	cap_inho	NO/YES			RO
2	Capacity Decrease	cap_deco	NO/YES			RO
3	High Condenser Pressure	cpov_fl	NO/YES			RO
4	Low Discharge Superheat	dshov_fl	NO/YES			RO
5	Low Suction Sat Temp	sstov_fl	NO/YES			RO
6	High Motor Temp	mtov_fl	NO/YES			RO
7	High Bearing Temp	tbov_fl	NO/YES			RO
8	Low Source Temp	lstov_fl	NO/YES			RO
9	High Discharge Temp	dgtov_fl	NO/YES			RO
10	High Motor Current	ampov_fl	NO/YES			RO
11	Required DSH	dsh_req			°F	RO
12	Evap Sat Override Temp	ert_over			°F	RO
13	IGV Step DSH Increase	dshinstp			%	RO
14	IGV Step DSH Decrease	dshdestp			%	RO
15	Cond Press Trip Value	cp_trip			psig	RO
16	Condenser Pressure Override Value	cp_ov			psig	RO

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Surge Correction

CCN TABLE NAME: MAISURGE

PIC5 PATH: Main Menu → Maintenance Menu → Surge Correction

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Surge Region 0 = No, 1 = Low, 2 = High, 3 = Deadband, 4 = Noise	act_reg	0 to 4			RO
2	Active Delta Tsat	dts_act			°F	RO
3	Calc Ref Delta Tsat	dts_cal			°F	RO
4	High Eff Delta Tsat	dts_he			°F	RO
5	Amps Change Surge Prot	amps_dta			%	RO
6	Max Amps Change Value	amch_max			%	RO
7	Surge Counts	sc				RO
8	Surge Protection Counts	spc				RO
9	Surge Prevention Active	surg_act	NO/YES			RO
10	Surge Protection Active	surg_pro	NO/YES			RO
11	EC Valve Change Flag 0 = Close, 1 = Hold, 2 = Open	hgbp_chg	0 to 2			RO
12	Cal Surge Delta Tsmax	dts_maxc	0 to 150.0		°F	RO
13	Cal Surge Delta Tsmin	dts_minc	0 to 150.0		°F	RO
14	Cal Surge Delta Tsmed	dts_medc	0 to 150.0		^F	RO
15	IGV1 Full Load Position	gv1_sful	0 to100.0		%	RO
16	IGV1 Minimum Position	gv1_smin	0.0 to 100.0		%	RO
17	Opti-Sound IGV1 Position	gvi_smed			%	RO
18	Envelop Line Optimized	enlp_opt	NO/YES			RO

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Maintenance VFD Config

CCN TABLE NAME: VFD_MCFG

PIC5 PATH: Main Menu → Maintenance Menu → Maintenance VFD Config

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	VFD Config Conflict	vfd_cflt	NO/YES	No		RO
2	Delete VFD Config Yes = Delete, No = Keep	del_vfdc	NO/YES	No		RW
3	Motor Rated Load Current	rla_load		200	amps	RO
4	Motor Nameplate Current	rla		200	amps	RO
5	Motor Nameplate Voltage	rlv		460	volts	RO
6	Motor Nameplate RPM	rpm		3000	rpm	RO
7	Motor Nameplate kW	rlkw		1500	kW	RO
8	Compressor Speed 100%	comp_100		50	Hz	RO
9	Skip Frequency 1	skipfrq1		102	Hz	RO
10	Skip Frequency 2	skipfrq2		102	Hz	RO
11	Skip Frequency 3	skipfrq3		102	Hz	RO
12	Skip Frequency Band	skipband		0	Hz	RO
13	Increase Ramp Time	ramp_inc		30	sec	RO
14	Decrease Ramp Time	ramp_dec		30	sec	RO
15	Line Voltage Imbalance%	lvim_th		10	%	RO
16	Line Volt Imbalance Time	lvim_per		10	sec	RO
17	Line Current Imbalance%	lcim_th		40	%	RO
18	Line Current Imbal Time	lcim_per		10	sec	RO
19	Motor Current Imbalance%	mcim_th		40	%	RO
20	Motor Current Imbal Time	mcim_per		10	sec	RO
21	Single Cycle Dropout	scycd_en	DSABLE/ENABLE	DSABLE		RO
22	PWM Switch Frequency 0 = 2 kHz, 1 = 4 kHz	pwm_freq	0/1	0		RO
23	Restore Defaults	res_def	NO/YES	No		RO
24	Communication Timeout	com_tout		10	sec	RO

Swift Restart

CCN TABLE NAME: MAISWRST

PIC5 PATH: Main Menu → Maintenance Menu → Swift Restart

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	SRD Position @Shutdown	srd_shut	0 to 100		%	RO
2	VFD Speed @Shutdown	vfd_shut	0 to 100		%	RO
3	GV1 Position @Shutdown	gv1_shut	0 to 100		%	RO
4	Evap Sat Temp @Shutdown	est_shut	–40 to 280		°F	RO
5	Power Recovery Duration	pd_dur	0 to 65535		min	RO
6	Power Down Active	power_dn	NO/YES			RO
7	Auto Restart Active	auto_rst	NO/YES			RO
8	Swift Restart Active	sw_rst	NO/YES			RO

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Master Slave

CCN TABLE NAME: MAIN_MS

PIC5 PATH: Main Menu → Maintenance Menu → Master Slave

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Unit is Lead or Lag 0 = Disable 1 = Lead 2 = Lag	lead_lag	0 to 2			RO
2	Master Control Type 0 = Local 1 = Network 2 = Remote 3 = Local Sched	ms_ctrl	0 to 3			RO
3	Slave Control Type 0 = Local 1 = Network 2 = Remote 3 = Local Sched	sl_ctrl	0 to 3			RO
4	Lead Lag Communication	ll_comm	TRUE/FALSE			RO
5	Master Slave Fault 0 = No Fault 1 = Master 2 = Slave 3 = Both	ll_fault	0 to 3			RO
6	Slave Run Status	lagstat	0 to 14			RO
7	Slave Start/Stop	lag_s_s	START/STOP			RO
8	Capacity Decrease	CAP_DECL	NO/YES			RO
9	Capacity Inhibit	CAP_INHL	NO/YES			RO
10	Master Chiller Running	MST_RUN	NO/YES			RO
11	Local Surge Status	LCL_SRG	0 to 3			RO
12	Remote Surge Status	RMT_SRG	0 to 3			RO
13	EWT Control Option	EWT_OPT	DSABLE/ENABLE			RO
14	Demand Limit Source 0 = Amps, 1 = KW	DEM_SLCT	0 to 1			RO
15	Lag Start Timer	lagstart	0 to 60		min	RO
16	Lag Stop Timer	lagstop	0 to 60		min	RO
17	Prestart Fault Timer	preflt	0 to 30		min	RO
18	Pulldown Timer	pulltime	0 to 30		min	RO
19	Pulldown: Delta T / Min	pull_dt	0 to 100		°F	RO
20	Lead/Lag Hours Delta	ll_hr_d	–99999 to 99999		hours	RO
21	Overrid Control Point	ctrpntov	10 to 160.0		°F	RO
22	Overrid Act Demand Limit	demlimov	10 to 100.0		%	RO

Power Line Parameters

CCN TABLE NAME: POWER_I

PIC5 PATH: Main Menu → Maintenance Menu → Power Line Parameters

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Line Current Phase 1	LN_AMPS1			amp	RO
2	Line Current Phase 2	LN_AMPS2			amp	RO
3	Line Current Phase 3	LN_AMPS3			amp	RO
4	Actual Line Current	AMPS_A			amp	RO
5	Percent Line Current	AMPS_P			%	RO
6	Ground Fault Phase 1	GRFT_1			amp	RO
7	Ground Fault Phase 2	GRFT_2			amp	RO
8	Ground Fault Phase 3	GRFT_3			amp	RO
9	Line Voltage Phase 1	LN_VOLT1			V	RO
10	Line Voltage Phase 2	LN_VOLT2			V	RO
11	Line Voltage Phase 3	LN_VOLT3			V	RO
12	Actual Line Voltage	VOLT_A			V	RO
13	Percent Line Voltage	VOLT_P			%	RO
14	Motor Kilowatts	KW			kW	RO
15	Motor Kilowatts Hours	KWH			kW	RO
16	Line Frequency	LN_FREQ			Hz	RO
17	Power Factor	POW_FACT				RO
18	Line Current Imbalance%	In_imb_i			%	RO
19	Line Voltage Imbalance%	In_imb_v			%	RO

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

ISM or VFD History

CCN TABLE NAME: MAIISMH

PIC5 PATH: Main Menu → Maintenance Menu → ISM History

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Line Current Phase 1	AMPS_H1			amp	RO
2	Line Current Phase 2	AMPS_H2			amp	RO
3	Line Current Phase 3	AMPS_H3			amp	RO
4	Line Frequency	FREQ_H			Hz	RO
5	Ground Fault Phase 1	GRFT_H1			amp	RO
6	Ground Fault Phase 2	GRFT_H2			amp	RO
7	Ground Fault Phase 3	GRFT_H3			amp	RO
8	Phase 1 Faulted	phase_h1	NO/YES			RO
9	Phase 2 Faulted	phase_h2	NO/YES			RO
10	Phase 3 Faulted	phase_h3	NO/YES			RO
11	I2T Sum Heat Phase 1	sum1ht_h			%	RO
12	I2T Sum Heat Phase 2	sum2ht_h			%	RO
13	I2T Sum Heat Phase 3	sum3ht_h			%	RO
14	Line Voltage Phase 1	VOLT_H1			V	RO
15	Line Voltage Phase 2	VOLT_H2			V	RO
16	Line Voltage Phase 3	VOLT_H3			V	RO
17	DC Bus Voltage	bus_volt			V	RO

Power Load Parameters

CCN TABLE NAME: POWER_O

PIC5 PATH: Main Menu → Maintenance Menu → Power Load Parameters

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	VFD Load Current	VFD_LOAD			amp	
2	Percent VFD Load Current	amps_p_o			%	
3	Ground Fault Current	gf_amps			amp	
4	Motor Current Imbalance%	mt_imb_i			%	
5	Motor Actual Frequency	MOT_FREQ			Hz	
6	Motor Target Frequency	tgt_freq			Hz	
7	DC Bus Voltage	bus_volt			V	
8	DC Bus Voltage Reference	bus_ref			V	
9	Load Current Ph 1(U)	ld_amps1			amp	
10	Load Current Ph 2(V)	ld_amps2			amp	
11	Load Current Ph 3(W)	ld_amps3			amp	
12	Actual VFD Speed Per	vfd_act			%	
13	Motor Power Factor	motor_pf				
14	Motor Kilowatts	motor_kw			kW	
15	Motor Overload	motor_ov			%	
16	Motor Kilowatt-Hours	motorkwh				
17	Rectifier Overload	rect_ov			%	
18	Inverter Overload	inv_ov			%	
19	Motor Overload Factor	ov_fact				
20	VFD Cold Plate Temp	cp_temp			°F	
21	Inverter Temperature	inv_temp			°F	
22	Rectifier Temperature	rec_temp			°F	
23	Shunt Trip Relay Status	tripr	0 to 1			
24	Precharge Relay Status	prechar	0 to 1			
25	VFD Run Relay Status	vfd_run	0 to 1			
26	Precharge Feedback	prech_fd	0 to 1			
27	VFD Load Factor	VFD_FACT				
29	LR Temp Switch	lrtem_sw	0 to 1			
30	VFD Alarm Code	alm_code				
31	VFD Status Word	stat_wd				
32	VFD Command Word	cmd_wd				
33	VFD Start Inhibit Status	str_inh				
34	VFD Appl Digital Output	appl_do				
35	Safety Stop Status	safestop	0 to 1			
36	SPD Feedback	spd_fd	0 to 1			
37	High VFD Current	VFDC_HI	NO/YES			

LEGEND

RO — Read Only

*Default value is shown only if configurable in this table.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

UM VFD Status

CCN TABLE NAME: VFD_STAT

PIC5 PATH: Main Menu → Maintenance Menu → UM VFD Status

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Single Cycle Dropout	cycle_1	NO/YES	NO		RO
2	Line Current Imbalance	lineim_i	NO/YES	NO		RO
3	High Line Voltage	hi_volt	NO/YES	NO		RO
4	Low Line Voltage	low_volt	NO/YES	NO		RO
5	Low DC Bus Voltage	lo_dcbus	NO/YES	NO		RO
6	High DC Bus Voltage	hi_dcbus	NO/YES	NO		RO
7	VFD Power On Reset	vfd_por	NO/YES	NO		RO
8	Ground Fault	grnd_flt	NO/YES	NO		RO
9	Line Phase Reversal	ph_rev	NO/YES	NO		RO
10	Motor Overload Trip	motor_ov	NO/YES	NO		RO
11	Start Complete	start_ok	NO/YES	NO		RO
12	Rectifier Power Fault	rect_pu	NO/YES	NO		RO
13	Invert Power Fault	inv_pu	NO/YES	NO		RO
14	Rectifier Overcurrent	rect_oi	NO/YES	NO		RO
15	Inverter Overcurrent	inv_oi	NO/YES	NO		RO
16	Condenser High Pressure	prs_trip	NO/YES	NO		RO
17	Motor Amps Not Sensed	no_amps	NO/YES	NO		RO
18	Motor Acceleration Fault	accelflt	NO/YES	NO		RO
19	Stop Complete	stop_ok	NO/YES	NO		RO
20	Stop Fault	ampstop	NO/YES	NO		RO
21	Rectifier Overtemp	rect_ot	NO/YES	NO		RO
22	Inverter Overtemp	inv_ot	NO/YES	NO		RO
23	Motor Current Imbalance	motim_i	NO/YES	NO		RO
24	Line Voltage Imbalance	lineim_v	NO/YES	NO		RO
25	Frequency Fault	freqflt	NO/YES	NO		RO
26	VFD Comm Fault	vfd_comm	NO/YES	NO		RO
27	VFD Fault	vfdfault	NO/YES	NO		RO
28	Read Config Complete	readone	NO/YES	NO		RO
29	VFD Start Inhibit	strt_inh	NO/YES	NO		RO
30	VFD Checksum Error	checksum	NO/YES	NO		RO
31	Inductor Overtemp Switch	inot_sw	NO/YES	NO		RO
32	Incompatibility Fault	incomp	NO/YES	NO		RO

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Maintenance Others

CCN TABLE NAME: MAIOTHER

PIC5 PATH: Main Menu → Maintenance Menu → Maintenance Others

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	5V Sensor Power Monitor	tran_v			V	RO
2	Evap Pres Trans Volts	evapp_v			V	RO
3	Cond Pres Trans Volts	condp_v			V	RO
4	Econ Pres Trans Volts	econp_v			V	RO
5	Diffuser Pres Tran Volts	diffp_v			V	RO
6	Oil Sump Pres Tran Volts	opsmp_v			V	RO
7	Oil Sup Pres Trans Volts	opdis_v			V	RO
8	Evap Enter Water Volts	evewp_v			V	RO
9	Evap Leave Water Volts	evlwp_v			V	RO
10	Cond Enter Water Volts	cdewp_v			V	RO
11	Cond Leave Water Volts	cdlwp_v			V	RO
12	Bearing In Trans Volt	brgi_v			V	RO
13	Bearing Out Trans Volt	brgo_v			V	RO
14	Pump Output Trans Volt	pumpo_v			V	RO
15	Pump Input Trans Volt	pumpi_v			V	RO
16	ECV Pos at Startup OK	hgbp_ok	NO/YES			RO
17	Damper Pos at Startup OK	dmp_ok	NO/YES			RO
18	Oil Pump Req Oil Heater	op_heat	NO/YES			RO
19	Oil Pump Req Prestart	op_prest	NO/YES			RO
20	Oil Pump Req Startup	op_start	NO/YES			RO
21	Oil Pump Req Shutdown	op_shut	NO/YES			RO
22	Oil Pump Req Swift Rst	op_srst	NO/YES			RO
23	Evap Pump Req Startup	ep_start	NO/YES			RO
24	Evap Pump Req Diagnostic	ep_diag	NO/YES			RO
25	Evap Pump Req Frozen	ep_freze	NO/YES			RO
26	Evap Pump Req Shutdown	ep_shut	NO/YES			RO
27	Evap Pump Req Pumpdown	ep_pdown	NO/YES			RO
28	Cond Pump Req Prestart	cp_prest	NO/YES			RO
29	Cond Pump Req Startup	cp_start	NO/YES			RO
30	Cond Pump Req Override	cp_overr	NO/YES			RO
31	Cond Pump Req Shutdown	cp_shut	NO/YES			RO
32	Cond Pump Req Tower	cp_tower	NO/YES			RO
33	Cond Pump Req Diagnostic	co_diag	NO/YES			RO
34	Cond Pump Req Frozen	cp_freze	NO/YES			RO
35	Cond Pump Req Pumpdown	cp_pdown	NO/YES			RO
36	Capacity Inhibit Ramping	cap_inhr	NO/YES			RO
37	Capacity Inhibit Demand	cap_inhd	NO/YES			RO
38	Capacity Decrease Demand	cap_decd	NO/YES			RO
39	Guide Vane Inh Surge	gv1_inhs	NO/YES			RO
40	Capacity Decrease Surge	cap_decs	NO/YES			RO
41	Capacity Inh Low SST	capinhst	NO/YES			RO
42	Capacity Dec Low SST	capdecst	NO/YES			RO
43	Capacity Inh Cond Pres	capinhcp	NO/YES			RO
44	Capacity Dec Cond Pres	capdeccp	NO/YES			RO
45	Capacity Inh Motor Temp	capinhmt	NO/YES			RO
46	Capacity Dec Motor Temp	capdecmt	NO/YES			RO
47	Capacity Inh Hi Current	capinham	NO/YES			RO
48	Capacity Dec Hi Current	capdecam	NO/YES			RO
49	Capacity Dec Low Temp	capdecls	NO/YES			RO
50	GV2 Position at Startup OK	gv2posok	NO/YES			RO

LEGEND

RO — Read Only

*Default value is shown only if configurable in this table.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Maintenance IOB

CCN TABLE NAME: MAIIOB

PIC5 PATH: Main Menu → Maintenance Menu → Maintenance IOB

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	IOB1 Power Supply Volt	vol_iob1			V	RO
2	IOB1 Num Peak Prev Sec	nm_peak1				RO
3	IOB1 Low Voltage Flag	low_vol1	NO/YES			RO
4	IOB1 24VAC Fuse Status	fusstat1	CLOSE/OPEN			RO
5	IOB2 Power Supply Volt	vol_iob2			V	RO
6	IOB2 Num Peak Prev Sec	nm_peak2				RO
7	IOB2 Low Voltage Flag	low_vol2	NO/YES			RO
8	IOB2 24VAC Fuse Status	fusstat2	CLOSE/OPEN			RO
9	IOB3 Power Supply Volt	vol_iob3			V	RO
10	IOB3 Num Peak Prev Sec	nm_peak3				RO
11	IOB3 Low Voltage Flag	low_vol3	NO/YES			RO
12	IOB3 24VAC Fuse Status	fusstat3	CLOSE/OPEN			RO
13	IOB4 Power Supply Volt	vol_iob4			V	RO
14	IOB4 Num Peak Prev Sec	nm_peak4				RO
15	IOB4 Low Voltage Flag	low_vol4	NO/YES			RO
16	IOB4 24VAC Fuse Status	fusstat4	CLOSE/OPEN			RO
17	IOB5 Power Supply Volt	vol_iob5			V	RO
18	IOB5 Num Peak Prev Sec	nm_peak5				RO
19	IOB5 Low Voltage Flag	low_vol5	NO/YES			RO
20	IOB5 24VAC Fuse Status	fusstat5	CLOSE/OPEN			RO
21	IOB6 Power Supply Volt	vol_iob6			V	RO
22	IOB6 Num Peak Prev Sec	nm_peak6				RO
23	IOB6 Low Voltage Flag	low_vol6	NO/YES			RO
24	IOB6 24VAC Fuse Status	fusstat6	CLOSE/OPEN			RO

Board Software PN

CCN TABLE NAME: MAI_BDSN

PIC5 PATH: Main Menu → Maintenance Menu → Board Software PN

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	IOB #1 Soft Part Number	sn_iob1				RO
2	IOB #2 Soft Part Number	sn_iob2				RO
3	IOB #3 Soft Part Number	sn_iob3				RO
4	IOB #4 Soft Part Number	sn_iob4				RO
5	IOB #5 Soft Part Number	sn_iob5				RO
6	SIOB Software Part Number	sn_siob				RO
7	ISM Software Part Number	sn_ism				RO
8	Gateway Soft Part Number	sn_gw				RO
9	DCIB Soft Part Number	sn-dcib				RO
10	MBB SVN Revision	svn_rev				RO

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Pressure Sensor Calib (PRES_CAL) Menu Description

Navigation: MAIN MENU → MAINTENANCE MENU → PRESSURE SENSOR CALIB

ICON	DISPLAYED TEXT	ACCESS	ASSOCIATED TABLE	PAGE NO.
	Evap Pressure Sensor	Service	PRSCAL01	81
	Cond Pressure Sensor	Service	PRSCAL02	81
	Eco Pressure Sensor	Service	PRSCAL03	81
	Evap Entering Water P	Service	PRSCAL07	82
	Evap Leaving Water P	Service	PRSCAL08	82
	Cond Entering Water P	Service	PRSCAL09	83
	Cond Leaving Water P	Service	PRSCAL10	83
	Pump Input Pressure	Service	PRSCAL11	83
	Bearing Inlet Pressure	Service	PRSCAL12	83
	Bearing Outlet Pressure	Service	PRSCAL13	84
	Pump Outlet Pressure	Service	PRSCAL14	84

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Evap Pressure Sensor

CCN TABLE NAME: PRSCAL01

PIC5 PATH: Main Menu → Maintenance Menu → Pressure Sensor Calib → Evap Pressure Sensor

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Evap Pressure Sensor					
2	Calibration Enable	cal_en	DSABLE/ENABLE	DSABLE		RW
3	Calibration Completed	cal_st	NO/YES	NO		RO
4	Calibrated Slope	cal_s				RO
5	Calibrated Intercept	cal_i				RO
6	Current Pressure	cur_pres			psig	RO
7	Calib Press1 (0 PSI)	cal_p1	9 digit numeric string	0	psig	RW
8	Calib Press2 (10-30PSI)	cal_p2	9 digit numeric string	0	psig	RW

Cond Pressure Sensor

CCN TABLE NAME: PRSCAL02

PIC5 PATH: Main Menu → Maintenance Menu → Pressure Sensor Calib → Cond Pressure Sensor

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Cond Pressure Sensor					
2	Calibration Enable	cal_en	DSABLE/ENABLE	DSABLE		RW
3	Calibration Completed	cal_st	NO/YES	NO		RO
4	Calibrated Slope	cal_s				RO
5	Calibrated Intercept	cal_i				RO
6	Current Pressure	cur_pres			psig	RO
7	Calib Press1 (0 PSI)	cal_p1	9 digit numeric string	0	psig	RW
8	Calib Press2 (10-30PSI)	cal_p2	9 digit numeric string	0	psig	RW

Eco Pressure Sensor

CCN TABLE NAME: PRSCAL03

PIC5 PATH: Main Menu → Maintenance Menu → Pressure Sensor Calib → Eco Pressure Sensor

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Eco Pressure Sensor					
2	Calibration Enable	cal_en	DSABLE/ENABLE	DSABLE		RW
3	Current Pressure	cur_pres			psig	RO
4	Calib Press1 (0 PSI)	cal_p1	9 digit numeric string	0	psig	RW
5	Calib Press2 (100-250PSI)	cal_p2	9 digit numeric string	0	psig	RW
6	Calibrated Slope	cal_s				RO
7	Calibrated Intercept	cal_i				RO
8	Calibration Completed	cal_st	NO/YES	NO		RO

Evap Entering Water P

CCN TABLE NAME: PRSCAL07

PIC5 PATH: Main Menu → Maintenance Menu → Pressure Sensor Calib → Evap Entering Water P

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Evap Entering Water P					
2	Calibration Enable	cal_en	DSABLE/ENABLE	DSABLE		RW
3	Calibration Completed	cal_st	NO/YES	NO		RO
4	Calibrated Slope	cal_s				RO
5	Calibrated Intercept	cal_i				RO
6	Current Pressure	cur_pres			psig	RO
7	Calib Press1 (0 PSI)	cal_p1	9 digit numeric string	0	psig	RW
8	Calib Press2 (100-250PSI)	cal_p2	9 digit numeric string	0	psig	RW

Evap Leaving Water P

CCN TABLE NAME: PRSCAL08

PIC5 PATH: Main Menu → Maintenance Menu → Pressure Sensor Calib → Evap Leaving Water P

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Evap Leaving Water P					
2	Calibration Enable	cal_en	DSABLE/ENABLE	DSABLE		RW
3	Calibration Completed	cal_st	NO/YES	NO		RO
4	Calibrated Slope	cal_s				RO
5	Calibrated Intercept	cal_i				RO
6	Current Pressure	cur_pres			psig	RO
7	Calib Press1 (0 PSI)	cal_p1	9 digit numeric string	0	psig	RW
8	Calib Press2 (100-250PSI)	cal_p2	9 digit numeric string	0	psig	RW

LEGEND

RO — Read Only
RW — Read/Write

*Default value is shown only if configurable in this table.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

Cond Entering Water P

CCN TABLE NAME: PRSCAL09

PIC5 PATH: Main Menu → Maintenance Menu → Pressure Sensor Calib → Cond Entering Water P

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Cond Entering Water P					
2	Calibration Enable	cal_en	DSABLE/ENABLE	DSABLE		RW
3	Calibration Completed	cal_st	NO/YES	NO		RO
4	Calibrated Slope	cal_s				RO
5	Calibrated Intercept	cal_i				RO
6	Current Pressure	cur_pres			psig	RO
7	Calib Press1(0 PSI)	cal_p1	9 digit numeric string	0	psig	RW
8	Calib Press2 (100-250PSI)	cal_p2	9 digit numeric string	0	psig	RW

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only
RW — Read/Write

Cond Leaving Water P

CCN TABLE NAME: PRSCAL10

PIC5 PATH: Main Menu → Maintenance Menu → Pressure Sensor Calib → Cond Leaving Water P

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Cond Leaving Water P					
2	Calibration Enable	cal_en	DSABLE/ENABLE	DSABLE		RW
3	Calibration Completed	cal_st	NO/YES	NO		RO
4	Calibrated Slope	cal_s				RO
5	Calibrated Intercept	cal_i				RO
6	Current Pressure	cur_pres			psig	RO
7	Calib Press1(0 PSI)	cal_p1	9 digit numeric string	0	psig	RW
8	Calib Press2 (100-250PSI)	cal_p2	9 digit numeric string	0	psig	RW

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only
RW — Read/Write

Pump Input Press Cali

CCN TABLE NAME: PRSCAL11

PIC5 PATH: Main Menu → Maintenance Menu → Pressure Sensor Calib → Pump Input Press Cali

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Pump Input Press Cali	cal_en	DSABLE/ENABLE	DSABLE		RW
2	Calibration Completed	cal_st	NO/YES	NO		RO
3	Calibrated Slope	cal_s				RO
4	Calibrated Intercept	cal_i				RO
5	Current Pressure	cur_pres			psig	RO
6	Calib Press1 (0 PSI)	cal_p1	9 digit numeric string	0	psig	RW
8	Calib Press2 (10-30PSI)	cal_p2	9 digit numeric string	0	psig	RW

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only
RW — Read/Write

Bearing Inlet Pressure

CCN TABLE NAME: PRSCAL12

PIC5 PATH: Main Menu → Maintenance Menu → Pressure Sensor Calib → Bearing Inlet Pressure

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Pump Input Press Cali	cal_en	DSABLE/ENABLE	DSABLE		RW
2	Calibration Completed	cal_st	NO/YES	NO		RO
3	Calibrated Slope	cal_s				RO
4	Calibrated Intercept	cal_i				RO
5	Current Pressure	cur_pres			psig	RO
6	Calib Press1 (0 PSI)	cal_p1	9 digit numeric string	0	psig	RW
8	Calib Press2 (10-30PSI)	cal_p2	9 digit numeric string	0	psig	RW

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only
RW — Read/Write

Bearing Outlet Pressure

CCN TABLE NAME: PRSCAL13

PIC5 PATH: Main Menu → Maintenance Menu → Pressure Sensor Calib → Bearing Outlet Pressure

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Pump Input Press Cali	cal_en	DSABLE/ENABLE	DSABLE		RW
2	Calibration Completed	cal_st	NO/YES	NO		RO
3	Calibrated Slope	cal_s				RO
4	Calibrated Intercept	cal_i				RO
5	Current Pressure	cur_pres			psig	RO
6	Calib Press1 (0 PSI)	cal_p1	9 digit numeric string	0	psig	RW
8	Calib Press2 (10-30PSI)	cal_p2	9 digit numeric string	0	psig	RW

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only
RW — Read/Write

Pump Outlet Pressure

CCN TABLE NAME: PRSCAL14

PIC5 PATH: Main Menu → Maintenance Menu → Pressure Sensor Calib → Pump Outlet Pressure

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Pump Input Press Cali	cal_en	DSABLE/ENABLE	DSABLE		RW
2	Calibration Completed	cal_st	NO/YES	NO		RO
3	Calibrated Slope	cal_s				RO
4	Calibrated Intercept	cal_i				RO
5	Current Pressure	cur_pres			psig	RO
6	Calib Press1 (0 PSI)	cal_p1	9 digit numeric string	0	psig	RW
8	Calib Press2 (10-30PSI)	cal_p2	9 digit numeric string	0	psig	RW

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only
RW — Read/Write

Temp Sensor Calib

CCN TABLE NAME: TEMP_CAL

PIC5 PATH: Main Menu → Maintenance Menu → Temp Sensor Calib

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Entering Chilled Water	ECW			°F	RO
2	ECW Sensor Raw Temp	ECW_RAW			°F	RO
3	ECW Temperature Offset	ECW_OFF	–2.0 to 2.0	0	^F	RW
4	Leaving Chilled Water	LCW			°F	RO
5	LCW Sensor Raw Temp	LCW_RAW			°F	RO
6	LCW Temperature Offset	LCW_OFF	–2.0 to 2.0	0	^F	RW
7	Entering Condenser Water	ECDW			°F	RO
8	ECDW Sensor Raw Temp	ECDW_RAW			°F	RO
9	ECDW Temperature Offset	ECDW_OFF	–2.0 to 2.0	0	^F	RW
10	Leaving Condenser Water	LCDW			°F	RO
11	LCDW Sensor Raw Temp	LCDW_RAW			°F	RO
12	LCDW Temperature Offset	LCDW_OFF	–2.0 to 2.0	0	^F	RW

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only
RW — Read/Write

Pumpdown/Lockout (Screen 1)

Navigation: MAIN MENU → MAINTENANCE MENU → PUMPDOWN/LOCKOUT

PUMPDOWN — The control shall support the use of an external means to pump the refrigerant from the evaporator to the condenser for service purposes.

Upon entering Pumpdown, the following message is displayed:

Press OK to Start Pumpdown?

If the operator selects the OK key, chilled water pump and condenser water pump shall be turned on and the following message is displayed:

Water Flow Verifying...

If both flows are not confirmed before the WATER FLOW VERIFY TIME, then both pumps shall be de-energized and either, or both, of the following messages will be displayed:

Water Flow Verification Failed

At this point, EXIT will be the only course of action.

If both flows are confirmed, the following message will be displayed with the OK and Cancel soft key:

Continue?

When the operator confirms flow by pressing the OK soft key the following message will be displayed:

Please Remove Refrigerant. Press OK if Completed.

After operator removes refrigerant and then selects the OK soft key, the following message will be displayed:

Chiller Lockout in Effect

Once Lockout is in effect, a Startup will not be allowed until a Terminate Lockout (next section) is performed. The following message "Chiller Start or in Quick Test, Pumpdown/Lockout Denied" will be displayed.

The Hot Gas Bypass Relay shall be set to OFF to prevent it from being energized until Lockout is terminated. The only option the user has at this time is to exit Pumpdown.

TERMINATE LOCKOUT — Upon entering Terminate Lockout, the operator is prompted by the following message:

Chiller Lockout in Effect

Upon selecting the "End Lockout" key, the following message will be displayed:

Press OK to Terminate Lockout?

The CHILLED WATER PUMP and CONDENSER WATER PUMP shall be energized and water flows will be verified, and then the "Continue?" text will be displayed.

Operator should manually check the water flows. If operator presses the "Exit" button, the following description will be displayed.

Water Flow Verification Failed

At this point, EXIT will be the only course of action.

If OK button is pressed, the following message will be displayed:

Please Add Refrigerant. Press OK if Completed.

After adding refrigerant to chiller, the operator shall select the OK soft key to continue. Upon doing so, the operator is further prompted as follows:

Chiller Lockout Terminated

The operator can only exit Terminate Lockout at this point. Startup is once again allowed by the control and the Hot Gas Bypass Relay shall be enabled to be turned ON.

APPENDIX A — PIC5 SCREEN AND TABLE STRUCTURE (cont)

System Status

CCN TABLE NAME: SYS_STAT

PIC5 PATH: Main Menu → Maintenance Menu → System Status

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	System Control Mode	sys_ctlm				RO
2	System Status	sys_stat				RO
3	Master Run Status	mas_stat				RO
4	Slave Run Status	sla_stat				RO
5	System Percent Load	sys_perl			%	RO
6	System KW	sys_kw			kW	RO
7	System Control Point	sys_stlp			°F	RO
8	System Demand Limit	sys_dem			%	RO
9	Supply Liquid Temp	sys_supt				RO
10	Return Liquid Temp	sys_rent				RO

LEGEND

*Default value is shown only if configurable in this table.

RO — Read Only

Alarms Menu Description

ICON	DISPLAYED TEXT	ACCESS	ASSOCIATED TABLE	PAGE NO.
	Reset Alarms	All	ALARMRST	86
	Current Alarms	All	CUR_ALM	
	History Alarms	All	ALMHIST1	
	Prognostics	All	HEALTH	
	Performance Plot			
	Hx Performance Plot			
	Service Log			

Alarm Reset

CCN TABLE NAME: ALARMRST

PIC5 PATH: Main Menu → Alarm Menu → Alarm Reset

LINE	PIC5 DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE*	UNIT	READ/WRITE
1	Alarm Reset	RST_ALM	NO/YES	NO		RW
2	Alarm State	ALM_STAT				RO
3	Current Alarm 1	alarm_1c				RO
4	Current Alarm 2	alarm_2c				RO
5	Current Alarm 3	alarm_3c				RO
6	Current Alarm 4	alarm_4c				RO
7	Current Alarm 5	alarm_5c				RO
8	Jbus Current Alarm 1	alarm_1				RO
9	Jbus Current Alarm 2	alarm_2				RO
10	Jbus Current Alarm 3	alarm_3				RO
11	Jbus Current Alarm 4	alarm_4				RO
12	Jbus Current Alarm 5	alarm_5				RO

LEGEND

*Default value is shown only if configurable in this table.

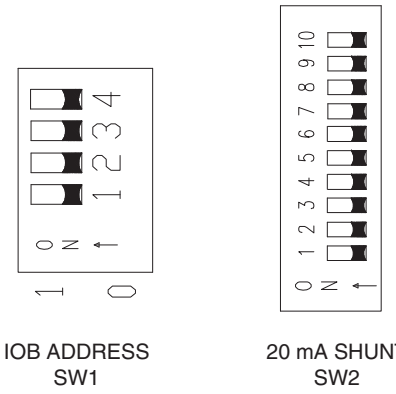
RO — Read Only
RW — Read/Write

NOTE: For more information about viewing and resetting alarms, see the Diagnostics and Troubleshooting section on page 29.

APPENDIX B — INPUT/OUTPUT BOARD (IOB) AND HUMAN MACHINE INTERFACE (HMI) DIP SWITCH SETTINGS

IOB Dip Switch Settings (Fig. F)

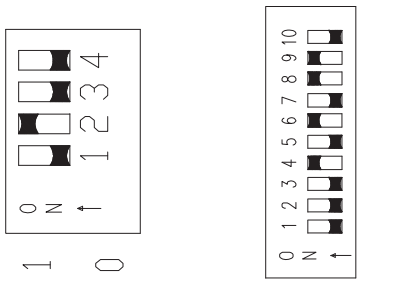
IOB	SW1 SETTING (1 TO 4)	SW2 SETTING (1 TO 10)
IOB-1	0000	0000000000
IOB-2	1000	0010000011
IOB-3	0100	0001000100
IOB-4	1100	0000000110



IOB ADDRESS SW1

20 mA SHUNT SW2

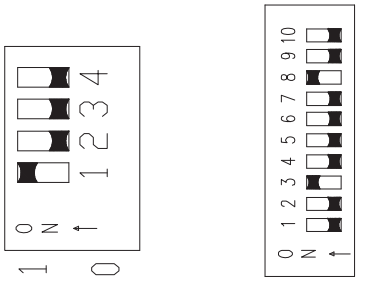
IOB-1 Dip Switch Settings



IOB ADDRESS SW1

20 mA SHUNT SW2

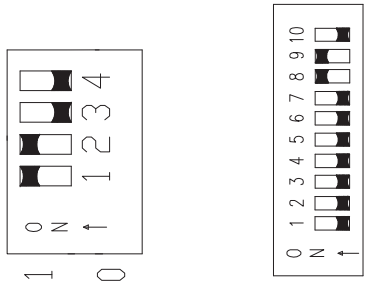
IOB-3 Dip Switch Settings



IOB ADDRESS SW1

20 mA SHUNT SW2

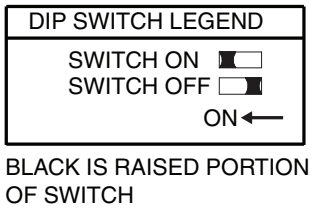
IOB-2 Dip Switch Settings



IOB ADDRESS SW1

20 mA SHUNT SW2

IOB-4 Dip Switch Settings



BLACK IS RAISED PORTION OF SWITCH

Fig. F — IOB Dip Switch Settings

APPENDIX B — INPUT/OUTPUT BOARD (IOB) AND HUMAN MACHINE INTERFACE (HMI) DIP SWITCH SETTINGS (cont)

HMI Dip Switch Settings — To access switches, remove the access cover on the back of the HMI panel. See Fig. G.

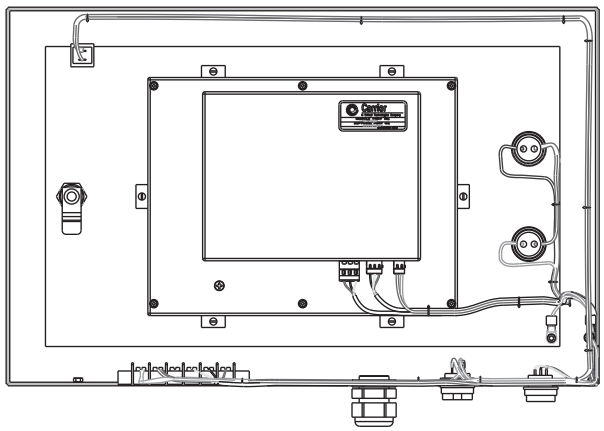


Fig. G — HMI Access Cover

Set the HMI dip switches as shown in Fig. H.

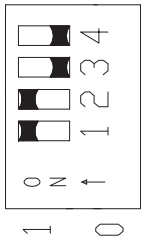


Fig. H — HMI Dip Switch Settings

APPENDIX C — INPUT/OUTPUT BOARD (IOB) STATUS INDICATORS

All control boards have LED indicators that show control board and communication status.

A red LED on each control module operates in the following manner:

- Power not present or power supply failure: LED is off
- Power present but microprocessor in Reset: LED is off
- Microprocessor operational but not communicating: LED flashes 3 seconds on, 3 seconds off
- Microprocessor operational and communicating with control system: LED flashes at 0.5 Hz rate (1 second on, 1 second off) in sync (±100 ms) with all other new control modules on the same communication bus
- Microprocessor in boot mode: LED flashes at 0.2 seconds on, 0.2 seconds off

Each independent communication port has a green status LED. The green LED is on when data is being transmitted by the board.

All RS485 ports have a green LED.

APPENDIX D — NETWORK CONFIGURATION

OBJECT NAME	OBJECT TYPE	INSTANCE	OPTION	PV ACCESS	DESCRIPTION
ALARMRST_alarm_1	AV	85		RO	Jbus Current Alarm 1
ALARMRST_alarm_2	AV	86		RO	Jbus Current Alarm 2
ALARMRST_alarm_3	AV	87		RO	Jbus Current Alarm 3
ALARMRST_alarm_4	AV	88		RO	Jbus Current Alarm 4
ALARMRST_alarm_5	AV	89		RO	Jbus Current Alarm 5
BACnet_COLOR	MV	8			Start Free Cooling
BACnet_PRIME_V	AV	150			Start Free Cooling
CAPACTRL_cm_stat1	AV	95		RO	Comp1 Run State Val
CAPACTRL_ctrl_wt	AV	90		RO	Controlled Water Temp
CAPACTRL_gv1_tgt	AV	91		RO	Target GV1 Pos
CAPACTRL_gv2_tgt	AV	92		RO	Target GV2 Pos
CAPACTRL_hgbp_tp	AV	94		RO	ECV Target Percent
CAPACTRL_vfd_tgt	AV	93		RO	Target VFD Speed Per
CFGSURGE_gv1_pful	AV	127		RO	IGV1 Full Load Position
CFGSURGE_gv1_pmin	AV	126		RO	IGV1 Minimum Position
CFGSURGE_sgl_hoff	AV	130		RO	Surge Line Upper DB
CFGSURGE_sgl_loff	AV	129		RO	Surge Line Lower DB
CFGSURGE_sgl_off	AV	128		RO	Surge Line Offset
CFGSURGE_sgl_pro	AV	134		RO	Surge Profile Offset
CFGSURGE_sgl_shfh	AV	131		RO	Surge Line Shape Factor
CFGSURGE_sgl_shfl	AV	132		RO	Sound Line Shape Factor
CFGSURGE_sgl_spdf	AV	133		RO	Surge Line Speed Factor
CONF_OPT_hgbp_opt No=0, Cont.=1, ON/OFF=2, mA=3	MV	6		RO	EC Valve Option
CONF_OPT_hgbp_sel Disable=0, Surge=1 Low Load=2, Comb=3	MV	7		RO	EC Valve Selection
CONF_PRG_oil_flt	AV	136		RO	Oil Filter Failure
CONF_PRG_oil_qly	AV	135		RO	Oil Quality
CONF_PRG_ref_chg	AV	138		RO	Refrig Charge Status
CONF_PRG_tran_dev	AV	137		RO	Transducer Deviation
CONNECT_bac_id	AV	140		RO	BACnet Identifier
CONNECT_bacena	BV	63		RO	BACnet/IP Enable
CONNECT_bacunit	BV	64		RO	BACnet Metric Unit
CONNECT_network	AV	139		RO	BACnet Network
FACTORY_chil_typ 19XR6/7=0,19XR2~E/D/V=1, 19DV=2	MV	4		RO	Chiller Type
FACTORY_vfd_opt No=0,FS VFD=1,Carrier=2 Rockwell LF2=3, Eaton=4 Rockwell STD=5	MV	5		RO	VFD Option
GENUNIT_AMPS_P	AV	4		RO	Percent Current
GENUNIT_BAC_OCC	BV	9		RO	BACnet Occupied
GENUNIT_ch_state	AV	7		RO	Chiller Status Code
GENUNIT_CHIL_OCC_rd	BV	3		RO	Network:Cmd Occupied
GENUNIT_CHIL_OCC_wr	BV	68	CMD	RW	Network:Cmd Occupied
GENUNIT_CHIL_S_S_rd	BV	2		RO	Network:Cmd Start/Stop
GENUNIT_CHIL_S_S_wr	BV	66	CMD	RW	Network:Cmd Start/Stop
GENUNIT_CTRL_PNT_rd	AV	1		RO	Control Point
GENUNIT_CTRL_PNT_wr	AV	147	CMD	RW	Control Point
GENUNIT_ctl_mode Local=0, Network=1 Remote=2, Local Sched=3	MV	1		RO	Control Mode
GENUNIT_DEM_LIM_rd	AV	6		RO	Actual Demand Limit
GENUNIT_DEM_LIM_wr	AV	148	CMD	RW	Actual Demand Limit
GENUNIT_EMSTOP_rd	BV	5		RO	Emergency Stop
GENUNIT_EMSTOP_wr	BV	67	CMD	RW	Emergency Stop
GENUNIT_FC_START_rd	BV	8		RO	Start Free Cooling
GENUNIT_FC_START_wr	BV	69	CMD	RW	Start Free Cooling
GENUNIT_HC_SEL_rd	BV	4		RO	Cooling/Heating Select
GENUNIT_HC_SEL_wr	AV	149	CMD	RW	Cooling/Heating Select
GENUNIT_ice_occ	BV	7		RO	Ice Schedule Occupied
GENUNIT_KW_P	AV	5		RO	Motor Percent Kilowatts
GENUNIT_loc_occ	BV	6		RO	Local Schedule Occupied

APPENDIX D — NETWORK CONFIGURATION (cont)

OBJECT NAME	OBJECT TYPE	INSTANCE	OPTION	PV ACCESS	DESCRIPTION
GENUNIT_reset	AV	2		RO	Control Point Reset
GENUNIT_setpoint	AV	3		RO	Actual Setpoint
GENUNIT_statstop	BV	1		RO	Deter Start Stop Command
HYDRLIC_CDW_FLOW	BV	50		RO	Condenser Water Flow
HYDRLIC_CDW_FV	AV	58		RO	Cond Water Flow Value
HYDRLIC_cdw_pd	AV	59		RO	Condenser Water Delta P
HYDRLIC_CDWP	BV	49		RO	Condenser Water Pump
HYDRLIC_CHW_FLOW	BV	52		RO	Chilled Water Flow
HYDRLIC_CHW_FV	AV	60		RO	Chilled Water Flow Value
HYDRLIC_chw_pd	AV	61		RO	Chilled Water Delta P
HYDRLIC_CHWP	BV	51		RO	Chilled Water Pump
HYDRLIC_ctrlw_dt	AV	62		RO	Controlled Water DT
INPUTS_bacdongl	BV	20		RO	BACnet Dongle
INPUTS_DIFF_ACT	AV	47		RO	Diffuser Actual Pos
INPUTS_DMP_ACT **Cl=0,Inter=1,Op=2,Fail=3**	MV	2		RO	Damper Valve Status
INPUTS_E_STOP	BV	13		RO	Emergency Stop Contact
INPUTS_FS_LOCK	BV	18		RO	Fire Security Interlock
INPUTS_GV1_ACT	AV	44		RO	Guide Vane 1 Actual Pos
INPUTS_GV2_ACT	AV	45		RO	Guide Vane 2 Actual Pos
INPUTS_HF_LS	BV	23		RO	Liquid Level Switch
INPUTS_HGBP_ACT **Cl=0,Inter=1,Op=2,Fail=3**	MV	3		RO	EC Valve Status
INPUTS_HGBPACTP	AV	48		RO	Actual ECV Pos Per
INPUTS_HP_SW	BV	11		RO	High Pressure Switch
INPUTS_ICE_CON	BV	14		RO	Ice Build Contact
INPUTS_PGLE_HI	BV	22		RO	Purge Level Switch High
INPUTS_PGLE_LO	BV	21		RO	Purge Level Switch Low
INPUTS_REM_CON	BV	12		RO	Remote Contact
INPUTS_REM_LOCK	BV	15		RO	Chiller Lockout
INPUTS_SAFETY	BV	16		RO	Spare Safety Input
INPUTS_STAR_AUX	BV	10		RO	Compressor Start Contact
INPUTS_STARTFLT	BV	17		RO	Starter Fault Feedback
INPUTS_TRIPR	BV	19		RO	ISM Trip Relay Status
INPUTS_VFD_ACT	AV	46		RO	Actual VFD Speed Per
LABONLY_gv1_fc	BV	61		RO	GV1 Forced
LABONLY_gv2_fc	BV	62		RO	GV2 Forced
MAIN_MS_lag_s_s	BV	60		RO	Slave Start/Stop
MAIN_MS_lagstart	AV	121		RO	Lag Start Timer
MAIN_MS_lagstat	AV	120		RO	Slave Run Status
MAIN_MS_lagstop	AV	122		RO	Lag Stop Timer
MAIN_MS_lead_lag **Disable=0, Lead=1, Lag=2**	AV	116		RO	Unit is Lead or Lag
MAIN_MS_ll_comm	BV	59		RO	Lead Lag Communication
MAIN_MS_ll_fault **No Fault=0, Master=1** **Slave=2, Both=3**	AV	119		RO	Master Slave Fault
MAIN_MS_ll_hr_d	AV	125		RO	Lead/Lag Hours Delta
MAIN_MS_ms_ctrl	AV	117		RO	Master Control Type
MAIN_MS_preflt	AV	123		RO	Prestart Fault Timer
MAIN_MS_pulltime	AV	124		RO	Pulldown Timer
MAIN_MS_sl_ctrl **Local=0, Network=1** **Remote=2, Local Sched=3**	AV	118		RO	Slave Control Type
MAIN_SRD_diff_alm	BV	58		RO	SRD Rotating Stall Alarm
MAIN_SRD_diff_tgt	AV	112		RO	Diffuser Target Pos
MAIN_SRD_diffault	BV	57		RO	Diffuser Fault
MAIN_SRD_lift_1	AV	114		RO	VDO High Lift Load Line
MAIN_SRD_lift_2	AV	115		RO	VDO Low Lift Load Line
MAIN_SRD_lift_a	AV	113		RO	Actual Lift
MAISURGE_act_reg **No=0, Low=1, High=2** **Deadband=3, Noise=4**	AV	96		RO	Surge Region
MAISURGE_dts_act	AV	97		RO	Actual Delta Tsat
MAISURGE_dts_cal	AV	98		RO	Calc Ref Delta Tsat
MAISURGE_dts_maxc	AV	103		RO	Cal Surge Delta Tsmax

APPENDIX D — NETWORK CONFIGURATION (cont)

OBJECT NAME	OBJECT TYPE	INSTANCE	OPTION	PV ACCESS	DESCRIPTION
MAISURGE_dts_medc	AV	105		RO	Cal Surge Delta Tsmed
MAISURGE_dts_minc	AV	104		RO	Cal Surge Delta Tsmin
MAISURGE_enlp_opt	AV	109		RO	Envelope Line Optimized
MAISURGE_gv1_sful	AV	106		RO	IGV1 Full Load Position
MAISURGE_gv1_smed	AV	108		RO	Opti-Sound IGV1 Position
MAISURGE_gv1_smin	AV	107		RO	IGV1 Minimum Position
MAISURGE_sc	AV	99		RO	Surge Counts
MAISURGE_spc	AV	100		RO	Surge Protection Counts
MAISURGE_surg_act	AV	101		RO	Surge Prevention Active
MAISURGE_surg_pro	AV	102		RO	Surge Protection Active
OUTPUTS_ALE	BV	25		RO	Alert Relay
OUTPUTS_ALM	BV	24		RO	Alarm Relay
OUTPUTS_CHST_OUT	AV	51		RO	Chiller Stat Output mA
OUTPUTS_COMP_PSV	BV	39		RO	Purge Comp Valve
OUTPUTS_COMP_SR	BV	26		RO	Compressor Start Relay
OUTPUTS_COND_CV	BV	34		RO	Condenser Control Valve
OUTPUTS_COND_DCV	BV	37		RO	Condenser Drain Valve
OUTPUTS_COND_FCV	BV	48		RO	Condenser Filling Valve
OUTPUTS_COND_PSV	BV	38		RO	Purge Cond Valve
OUTPUTS_DIFF_OUT	AV	49		RO	Diffuser Output mA
OUTPUTS_DIS_PSV	BV	42		RO	Purge Discharge Valve
OUTPUTS_DRASVON	BV	40		RO	Purge Drainage Valve
OUTPUTS_ECON_IV	BV	33		RO	Economizer Isolation VLV
OUTPUTS_EVAP_CV	BV	35		RO	Evaporator Control Valve
OUTPUTS_EVAP_DCV	BV	36		RO	Evaporator Drain Valve
OUTPUTS_EXV_OUT	AV	53		RO	Oil EXV Output mA
OUTPUTS_GV1_DEC	BV	27		RO	Guide Vane 1 Decrease
OUTPUTS_GV1_INC	BV	28		RO	Guide Vane 1 Increase
OUTPUTS_GV1_OUT	AV	56		RO	Guide Vane1 Output
OUTPUTS_GV2_OUT	AV	57		RO	Guide Vane2 Output
OUTPUTS_HDPV_OUT	AV	50		RO	Head Pres Output mA
OUTPUTS_llc_exvt	AV	54		RO	Liquid Level EXV Target
OUTPUTS_OIL_HEAT	BV	29		RO	Oil Heater Relay
OUTPUTS_OIL_PUMP	BV	30		RO	Oil Pump Relay
OUTPUTS_op_vfd_t	AV	55		RO	Oil Pump VFD Target
OUTPUTS_PG_COMP	BV	44		RO	Purge Compressor
OUTPUTS_PG_HEAT	BV	45		RO	Purge Heater
OUTPUTS_PGAPUMP	BV	43		RO	Purge Vacuum Pump
OUTPUTS_REG_PSV	BV	41		RO	Purge Regeneration Valve
OUTPUTS_TFR_HIGH	BV	31		RO	Tower Fan Relay High
OUTPUTS_TFR_LOW	BV	32		RO	Tower Fan Relay Low
OUTPUTS_VAPL_SV	BV	47		RO	Vapor Venting Line SV
OUTPUTS_VFD_OUT	AV	52		RO	VFD Speed Output mA
OUTPUTS_VS_SV	BV	46		RO	Vapor Source SV
POWER_I_AMPS_A_I	AV	66		RO	Actual Line Current
POWER_I_AMPS_P_I	AV	67		RO	Percent Line Current
POWER_I_KW	AV	70		RO	Motor Kilowatts
POWER_I_ln_imb_v	AV	72		RO	Line Voltage Imbalance%
POWER_I_POW_FACT	AV	71		RO	Motor Power Factor
POWER_I_VOLT_A	AV	68		RO	Actual Line Voltage
POWER_I_VOLT_P	AV	69		RO	Percent Line Voltage
POWER_O_alm_code	AV	84		RO	VFD Alarm Code
POWER_O_amps_p_o	AV	74		RO	Percent VFD Load Current
POWER_O_bus_volt	AV	76		RO	DC Bus Voltage
POWER_O_enc_temp	AV	81		RO	VFD Enclosure Temp
POWER_O_inv_temp	AV	82		RO	Inverter Temperature
POWER_O_lrtem_sw	BV	54		RO	LR Temp Switch
POWER_O_MOT_FREQ	AV	75		RO	Motor Actual Frequency
POWER_O_motor_kw	AV	79		RO	Motor Kilowatts
POWER_O_motor_pf	AV	78		RO	Motor Power Factor
POWER_O_motorkwh	AV	80		RO	Motor Kilowatt-Hours
POWER_O_prech_fd	BV	53		RO	Precharge Feedback

OBJECT NAME	OBJECT TYPE	INSTANCE	OPTION	PV ACCESS	DESCRIPTION
POWER_O_rec_temp	AV	83		RO	Rectifier Temperature
POWER_O_spd_fd	BV	55		RO	SPD Feedback
POWER_O_vfd_act	AV	77		RO	Actual VFD Speed Per
POWER_O_VFD_LOAD	AV	73		RO	VFD Load Current
POWER_O_VFDC_HI	BV	56		RO	High VFD Current
PRESSURE_COND_P	AV	37		RO	Condenser Pressure
PRESSURE_DIFF_P	AV	40		RO	Diffuser Pressure
PRESSURE_ECON_P	AV	38		RO	Economizer Pressure
PRESSURE_EVAP_P	AV	36		RO	Evaporator Pressure
PRESSURE_HEAD_P	AV	41		RO	Head Pressure Reference
PRESSURE_OIL_PD	AV	39		RO	Oil Pump Delta P
PRESSURE_PUMP_PD	AV	43		RO	Ref Pump Delta P
PRESSURE_REF_PD	AV	42		RO	Bearing Delta P
QCK_TEST_Q_DIFTGT	AV	111		RO	Diffuser Target Pos
QCK_TEST_Q_GV1ACT	AV	110		RO	Guide Vane 1 Actual Pos
RUNTIME_C_STARTS	AV	63		RO	Compressor Starts Num
RUNTIME_COMP_HRS	AV	64		RO	Compressor Running Hrs
RUNTIME_SRV_HRS	AV	65		RO	After Service Hrs
SETPOINT_dem_base	AV	146		RW	Base Demand Limit
SETPOINT_ecdw_sp	AV	143		RW	Heating ECDW Setpoint
SETPOINT_ecw_sp	AV	141		RW	Cooling ECW Setpoint
SETPOINT_EWT_OPT	BV	65		RW	EWT Control Option
SETPOINT_ice_sp	AV	145		RW	Ice Build Setpoint
SETPOINT_lcdw_sp	AV	144		RW	Heating LCDW Setpoint
SETPOINT_lcw_sp	AV	142		RW	Cooling LCW Setpoint
TEMP_BRGI_T	AV	35		RO	Bearing Ref Supply Temp
TEMP_CBH1_T	AV	33		RO	1st Stage Bearing Temp
TEMP_CBH2_T	AV	34		RO	2nd Stage Bearing Temp
TEMP_cond_app	AV	17		RO	Condenser Approach
TEMP_COND_SAT	AV	18		RO	Cond Sat Refrig Temp
TEMP_DGT	AV	19		RO	Comp Discharge Temp
TEMP_DSH	AV	20		RO	Discharge Superheat
TEMP_ECDW	AV	10		RO	Entering Condenser Water
TEMP_ECW	AV	8		RO	Entering Chilled Water
TEMP_evap_app	AV	16		RO	Evaporator Approach
TEMP_EVAP_SAT	AV	14		RO	Evap Sat Refrig Temp
TEMP_EVAP_T	AV	15		RO	Evap Refrig Liquid Temp
TEMP_HR_EWT	AV	12		RO	Heat Recl Entering Temp
TEMP_HR_LWT	AV	13		RO	Heat Recl Leaving Temp
TEMP_LCDW	AV	11		RO	Leaving Condenser Water
TEMP_LCW	AV	9		RO	Leaving Chilled Water
TEMP_MTRB	AV	22		RO	Thrust Bearing Temp
TEMP_MTRB_OIL	AV	21		RO	Thrust Bearing Oil Temp
TEMP_MTRB1	AV	23		RO	Low Speed ME Brg Temp
TEMP_MTRB2	AV	24		RO	Low Speed CE Brg Temp
TEMP_MTRB3	AV	25		RO	High Speed ME Brg Temp
TEMP_MTRB4	AV	26		RO	High Speed CE Brg Temp
TEMP_MTRW1	AV	27		RO	Motor Winding 1 Temp
TEMP_MTRW2	AV	28		RO	Motor Winding 2 Temp
TEMP_MTRW3	AV	29		RO	Motor Winding 3 Temp
TEMP_OILT_DIS	AV	31		RO	Oil Supply Temp
TEMP_OILT_SMP	AV	30		RO	Oil Sump Temp
TEMP_PGC_SUCT	AV	32		RO	Purge Comp Suction Temp
TL_AMPS_P	TL	1	IR	RW	Percent Current
TL_ECDW	TL	4	IR	RW	Entering Condenser Water
TL_ECW	TL	2	IR	RW	Entering Chilled Water
TL_LCDW	TL	5	IR	RW	Leaving Condenser Water
TL_LCW	TL	3	IR	RW	Leaving Chilled Water

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