



United Technologies

CONTROL USER MANUAL



PIC 5+ Control for 19 Series Centrifugal Chiller

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1 - SAFETY CONSIDERATIONS

1.1 - General Description

Installation, start-up and servicing of equipment can be hazardous if certain factors particular to the installation are not considered: operating pressures, presence of electrical components and voltages and the installation site (elevated plinths and built-up up structures). Only properly qualified installation engineers and highly qualified installers and technicians, fully trained for the product, and are authorized to install and start-up the equipment safely. During all servicing operations all instructions and recommendations which appear in the installation and service instructions for the product, as well as on tags and labels fixed to the equipment, components and accompanying parts supplied separately, must be read, understood and followed.

- Apply all standard safety codes and practices.
- Wear safety glasses and gloves.
- Use the proper tools to move heavy objects. Move units carefully and set them down gently.

1.2 - Avoid Electrocution

Only personnel qualified in accordance with IEC (International Electro technical Commission) recommendations may be permitted access to electrical components. It is particularly recommended that all sources of electricity to the unit should be shut off before any work is begun. Remember to shut off the main power supply at the main circuit breaker or isolator.

CAUTION: *The equipment uses and emits electromagnetic signals. Tests have shown that the equipment conforms to all applicable codes with respect to electromagnetic compatibility.*

RISK OF ELECTROCUTION: *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.*

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

2 - GENERAL DESCRIPTION

2.1 - General Description

PIC 5+ control is a control system for controlling 19 Series which include both legacy and next generation centrifugal water-cooled chillers. The control system monitors and controls all operations of the chiller. The microprocessor control system matches the cooling or heating capacity of the chiller to the cooling or heating load while providing state-of-the-art chiller protection. The system controls cooling or heating load within the set point plus and 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 speed if the compressor is a variable speed 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, if required.

PIC 5+ control also gives access to a Control Test function covering all outputs except compressor relay outputs.

2.2 - Abbreviations Used

The following abbreviations are used frequently:

CCN	Carrier Comfort Network
CCN mode	Operating mode: CCN
ECDW	Entering Condenser Water
ECW	Entering Chilled Water
EC	Envelope Control
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)
RLA	Rated Load Amps
VFD	Variable Frequency Drive
ISM	Integrated Starter Module
MCB	Main Control Board
IOB	Input/Output Board

3 - HARDWARE DESCRIPTION

3.1 - General Description

The 19 Series PIC 5+ control system consists of one main control board (SAIA board), an ISM (Integrated Starter Module) and three basic IOBs (Input/output Board Module) and optional IO boards per system requirements. All boards communicate via an internal LEN bus. If a Rockwell or Eaton Unit Mounted VFD is installed, a LEN-MODBUS protocol converter module is required.

3.1.1 - Main Control Board

Figure 1: 19 Series PIC 5+ Control Interface

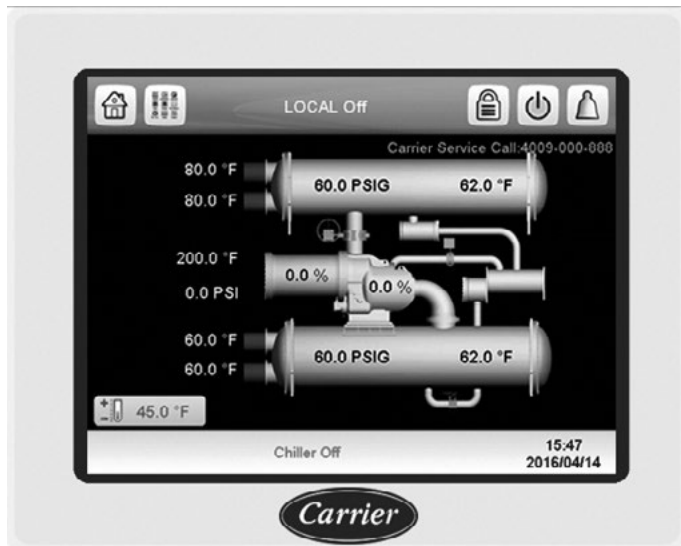
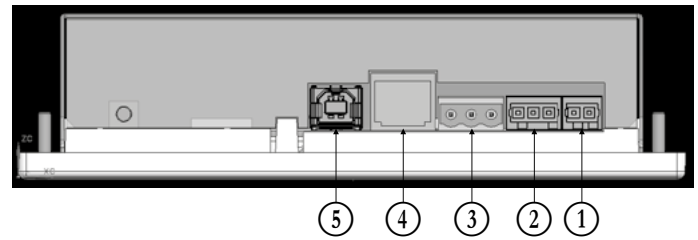


Figure 2: 19 Series PIC 5+ Control Interface (View From Below)



Legend

1. Power supply connector (24 VAC)
2. LEN connector
3. CCN connector
4. Ethernet connector
5. USB connector

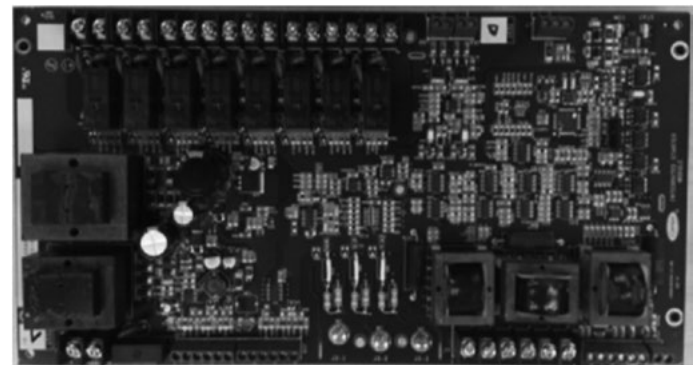
The main control board is supplied from a 24 VAC supply referred to earth.

CAUTION: Maintain the correct polarity when connecting the power supply to the boards; otherwise the boards may be damaged.

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.

3.1.2 - ISM (Integrated Starter Module)

ISM is motor control module, and it is supplied from an 115VAC supply referred to earth.

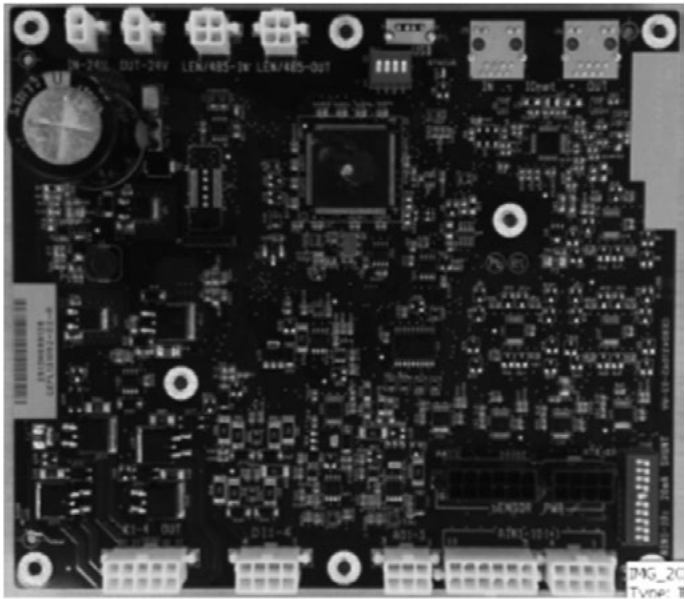


ISM input / output description is as below:

DESCRIPTION	POINT NAME	TYPE	PIN NUMBER
STARTER FAULT	STARTFLT	Dry Contact	J2-7,8
COMPRESSOR START CONTACT	STAR_AUX	Dry Contact	J2-9,10
COMPRESSOR RUN CONTACT	RUN_AUX	Dry Contact	J2-11,12
LINE VOLTAGE V1	LN_VOLT1	0-5 Volt	J3-1
LINE VOLTAGE V2	LN_VOLT2	0-5 Volt	J3-2
LINE VOLTAGE V3	LN_VOLT3	0-5 Volt	J3-3
LINE CURRENT C1	LN_AMPS1	0-5 Volt	J4-1,2
LINE CURRENT C2	LN_AMPS2	0-5 Volt	J4-3,4
LINE CURRENT C3	LN_AMPS3	0-5 Volt	J4-5,6
GROUND FAULT PHASE 1	GRFLT_31	0-5 Volt	J5-1,2
GROUND FAULT PHASE 2	GRFLT_23	0-5 Volt	J5-3,4
GROUND FAULT PHASE 3	GRFLT_12	0-5 Volt	J5-5,6
VFD SPEED FEEDBACK	VFD_IN	0-10 Volt/ 0-5 Volt	J6-1,2
VFD TARGET SPEED	VFD_OUT	0-20 mA	J8-1,2
COMPRESSOR START RELAY	COMP_SR	Relay	J9-1,2
COMPRESSOR TRANS RELAY	TRANS	Relay	J9-3,4
SHUNT TRIP RELAY	TRIPR	Relay	J9-5,6

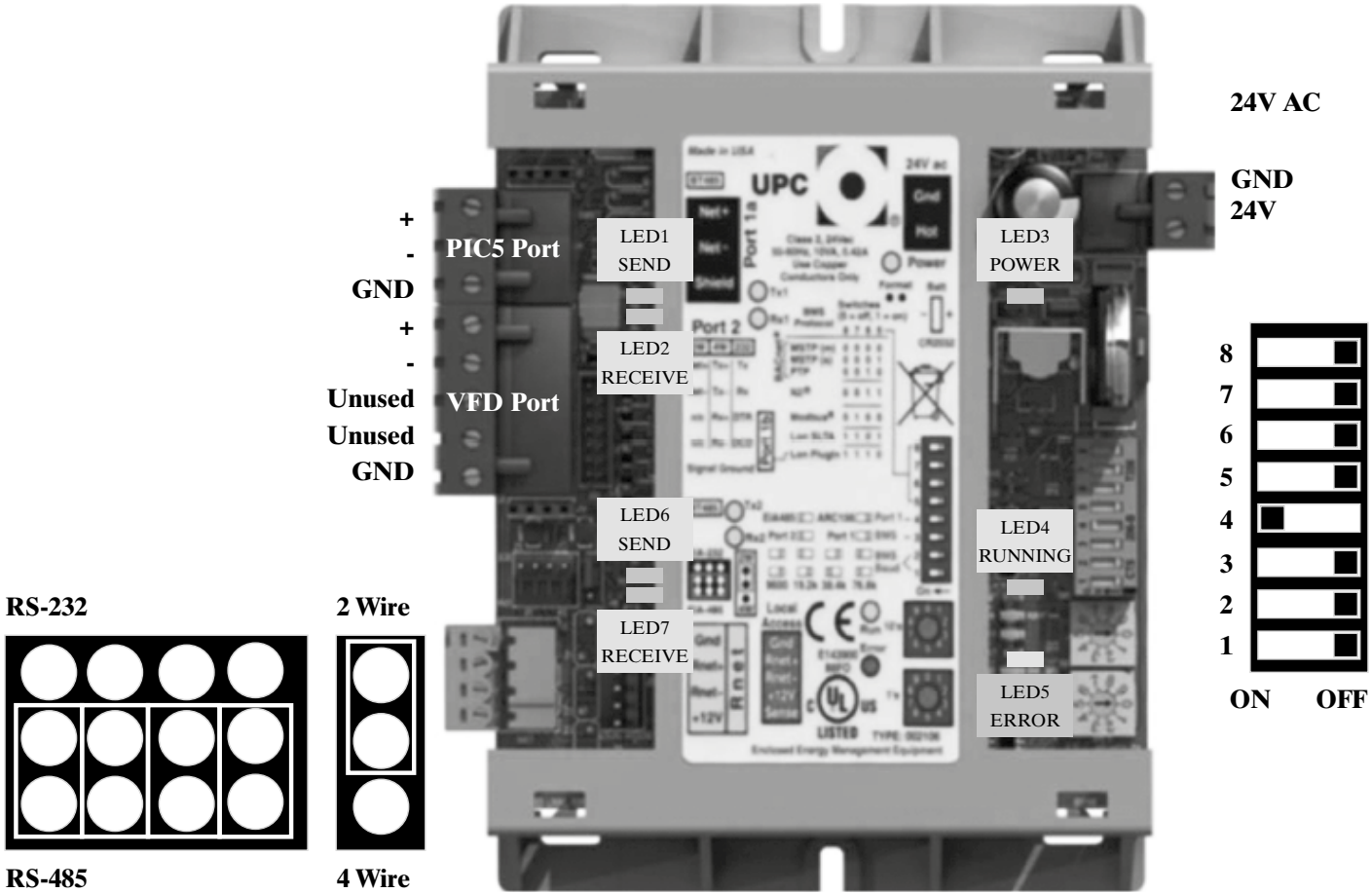
3.1.3 - IO Board

IO Board is Input/output Board, and it is supplied from a 24VAC supply referred to earth.



For the IOB input / output description, please refer to section 3.4.

3.1.4 - LEN -> MODBUS Protocol Converter



LEN -> MODBUS Protocol converter is connected between IOBs and VFD. Please refer the decription in the above picture.

3.2 - Sensors

Pressure transducers:

Pressure transducers are used to 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.

Sensor	Detailed Description	Chiller Configuration
Evaporator pressure transducer	This transducer measures the pressure of the evaporator.	Standard for 19XR2~E/V/D, 19XR6/7 and 19DV
Condenser pressure transducer	This transducer measures the pressure of the condenser	Standard for 19XR2~E/V/D, 19XR6/7 and 19DV
Economizer pressure transducer	This transducer measures the pressure of the economizer	Standard for 19XR6/7
Oil supply pressure transducer	This transducer measures the oil pressure in the oil discharge piping	Standard for 19XR2~E/V/D and 19XR6/7
Oil sump pressure transducer	This transducer measures the Oil pressure in the oil sump	Standard for 19XR2~E/V/D and 19XR6/7
Pump Output Pressure	This transducer measures the pressure of pump output	Standard for 19DV
Bearing Outlet Pressure	This transducer measures the pressure of bearing outlet	Standard for 19DV
Bearing Inlet Pressure	This transducer measures the pressure of bearing inlet	Standard for 19DV
Pump Input Pressure	This transducer measures the pressure of pump input	Standard for 19DV
Evaporator water pressure difference transducer (Option)	This optional transducer measures the evaporator pressure difference between entering and leaving water.	Optional for 19XR2~E/V/D, 19XR6/7 and 19DV
Condenser water pressure difference transducer (Option)	This optional transducer measures the condenser pressure difference between entering and leaving water.	Optional for 19XR2~E/V/D, 19XR6/7 and 19DV
Evaporator entering water pressure transducer (Option)	This is an option transducer, and it measures the pressure of evaporator entering water	Optional for 19XR2~E/V/D, 19XR6/7 and 19DV
Evaporator leaving water pressure transducer (Option)	This is an optional transducer, and it measures the pressure of evaporator leaving water	Optional for 19XR2~E/V/D, 19XR6/7 and 19DV
Condenser entering water pressure transducer (Option)	This is an optional transducer, and it measures the pressure of condenser entering water	Optional for 19XR2~E/V/D, 19XR6/7 and 19DV
Condenser leaving water pressure transducer (Option)	This is an optional transducer, and it measures the pressure of condenser leaving water	Optional for 19XR2~E/V/D, 19XR6/7 and 19DV

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 (three wirings, MINCO S100308) based on the IOB channel configurations.

Sensor	Detailed Description	Chiller Configuration
Entering chilled water temperature sensor	measures the temperature of entering evaporator water.	Standard for 19XR2~E/V/D, 19XR6/7 and 19DV
Leaving chilled water temperature sensor	measures the temperature of leaving evaporator water.	Standard for 19XR2~E/V/D, 19XR6/7 and 19DV
Entering condenser water temperature sensor	measures the temperature of entering condenser water.	Standard for 19XR2~E/V/D, 19XR6/7 and 19DV
Leaving condenser water temperature sensor	measures the temperature of leaving condenser water.	Standard for 19XR2~E/V/D, 19XR6/7 and 19DV
Evap refrig liquid temperature sensor	measures the temperature of evaporator refrigerant liquid.	Standard for 19XR2~E/V/D, 19XR6/7 and 19DV
Comp discharge temperature sensor	measures the Compressor discharge temperature.	Standard for 19XR2~E/V/D, 19XR6/7 and 19DV
Low speed motor end bearing temperature sensor	measure the low speed motor end bearing temperature	Standard for 19XR6/7
Low speed comp end bearing temperature sensor	measure the low speed compressor end bearing temperature	Standard for 19XR6/7
High speed motor end bearing temperature sensor	measure the high speed motor end bearing temperature	Standard for 19XR6/7
High speed comp end bearing temperature sensor	measure the high speed compressor end bearing temperature	Standard for 19XR6/7
Comp thrust bearing oil temperature sensor	Measure the compressor thrust bearing oil temperature	Standard for 19XR2~E/V/D
1st Stage Bearing Temp	Measure the 1st stage bearing temperature	Standard for 19DV
2nd Stage Bearing Temp	Measure the 2nd stage bearing temperature	Standard for 19DV
Bearing Ref Supply Temp	Measure the bearing ref supply temperature	Standard for 1-9DV
Motor winding temperature sensors	The 3 sensors measure the temperature of compressor motor windings	Standard for 19XR2~E/V/D, 19XR6/7 and 19DV 19XR2~E/V/D and 19DV only has 1 sensor.
Oil sump temperature sensor	measures the compressor sump temperature of oil	Standard for 19XR2~E/V/D and 19XR6/7
Oil supply temperature sensor	measures the oil temperature in the oil discharge piping	Standard for 19XR2~E/V/D and 19XR6/7

The temperature sensor range is -40 ~ +245°F.

3.3 - Controls Outputs

Evaporator / Condenser water pump

The controller can regulate an optional evaporator / condenser water pump.

Inlet Guide Vane

The Inlet Guide vane (IGV) is used to adjust the refrigerant vapor flow into compressor to change in the operating conditions of the machine. To adjust the refrigerant flow, the guide vane moves open or close 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 (used for NGC chiller or the chiller which is equipped with electrical damper valve)

The economizer damper control positions the economizer damper valve open or closed to maintain a minimum refrigerant pressure difference between the evaporator and economizer.

Damper vapor source solenoid valve (used for 19XRC)

Damper vapor source solenoid valve adjusts the pressure difference between Economizer and Evaporator according to pressure difference between damper cap and flow passage.

EC Valve

The envelope control 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 operating efficiency of the machine, this is a user selectable option.

VFD

The VFD allows compressor start-up and capacity control by modifying the motor frequency. The aviator continually monitors many compressor parameters in order to ensure its protection. If a problem occurs, the frequency aviator triggers an alarm and, if necessary, stops the compressor.

3.4 - Connections at the User's Terminal Block

The components listed below are available at the user's terminal block on the IOB. Some of them can only be used if the unit operates in the remote operating type (Remote mode).

The following table summarizes the connections at the I/O boards.

19XR6/7 I/O Mapping:

Description	Channel #		Board #	Option
Entering Chilled Water Temperature	AI1		IOB1	
Leaving Chilled Water Temperature	AI2		IOB1	
Entering Condenser Water Temp	AI3		IOB1	
Leaving Condenser Water Temp	AI4		IOB1	
Evap. Refrigerant Liquid Temperature	AI5		IOB1	
Comp Discharge Temperature	AI6		IOB1	
Condenser Pressure	AI7		IOB1	
Evaporator Pressure	AI8		IOB1	
Economizer Pressure	AI9		IOB1	
FS VFD Load Current	AI10		IOB1	For Freestanding VFD option
Chiller Status Output mA	AO1		IOB1	User option, 4~20mA 4mA=OFF 8mA=Tripout 12mA=Shutdown 20mA=Running
Oil EXV Output (4-20ma)	AO2		IOB1	Factory option, 4~20mA
Evap Wate Flow Switch	DI1		IOB1	User option, dry contact, "Closed" indicates "FLOW"
Cond Water Flow Switch	DI2		IOB1	User option, dry contact, "Closed" indicates "FLOW"
Remote Contact Input	DI3		IOB1	User option, dry contact, "Closed" indicates Turn ON the chiller
Remote Emergency Stop Input	DI4		IOB1	User option, dry contact, "Closed" indicates chiller emergency stop
Stage 1 IGV Increase	DO1		IOB1	Used for ON/OFF type guide vane actuator
Stage 1 IGV Decrease	DO2		IOB1	Used for ON/OFF type guide vane actuator
Chiller Alarm Relay	DO3		IOB1	User option, 24VAC output, recommend with external power supply
Chiller Alert Relay	DO4		IOB1	User option, 24VAC output, recommend with external power supply
Motor Winding Temperature 1	AI1		IOB2	
Motor Winding Temperature 2	AI2		IOB2	
Motor Winding Temperature 3	AI3		IOB2	
Oil Supply Temperature	AI4		IOB2	Factory option
Oil Sump Temperature	AI5		IOB2	
Oil Supply Pressure	AI6		IOB2	
Oil Sump Pressure	AI7		IOB2	
Auto Demand Limit Input	AI8		IOB2	User option, 4~20mA
Refrigerant Leak Sensor	AI9		IOB2	User option, 4~20mA
Displacement Switch	AI10		IOB2	
Guide Vane1 Output	AO1		IOB2	
Damper Valve Feedback Fully Open	DI1		IOB2	

Description	Channel #		Board #	Option
Damper Valve Feedback Fully Close	DI2		IOB2	
High Pressure Switch	DI3		IOB2	
Ice Build Contact	DI4		IOB2	User option, dry contact
Oil Heater Relay	DO1		IOB2	
Oil Pump Relay	DO2		IOB2	
Economizer Damper Valve Open	DO3		IOB2	
Economizer Damper Valve Close	DO4		IOB2	
Low Speed ME Brg Temp	AI1		IOB3	
Low Speed CE Brg Temp	AI2		IOB3	
High Speed ME Brg Temp	AI3		IOB3	
High Speed CE Brg Temp	AI4		IOB3	
Remote Reset Sensor	AI5		IOB3	User option, 5K thermistor
Guide Vane 1 Actual Pos	AI6		IOB3	
Common CHWS Temp	AI7		IOB3	Used for lead lag option
Auto Water Temp Reset	AI8		IOB3	User option, 4~20mA
Common CHWR Temp	AI9		IOB3	Used for lead lag option
Head Pressure Output	AO1		IOB3	Factory option
EC Valve Feedback Fully Open	DI1		IOB3	Factory option
EC Valve Feedback Fully Close	DI2		IOB3	Factory option
Spare Safety	DI3		IOB3	User option, dry contact, normal open
Power Request Feedback	DI4		IOB3	Marine option
EC Valve Solenoid / Open	DO1		IOB3	Factory option
EC Valve Close	DO2		IOB3	Factory option
Free Cooling Mode	DO3		IOB3	Factory option
Power Request Output	DO4		IOB3	Marine option
Entering Evap Water Pressure	AI3		IOB4	User option, if IOB4 installed, same as follows
Leaving Evap Water Pressure	AI4		IOB4	User option
Entering Cond Water Pressure	AI5		IOB4	User option
Leaving Cond Water Pressure	AI6		IOB4	User option
Evap Water Flow Measurement	AI8		IOB4	User option, 4~20mA
Cond Water Flow Measurement	AI9		IOB4	User option, 4~20mA
Chilled Water Pump (Variable)	AO1		IOB4	User option, 4~20mA/0~5V
Condenser Water Pump (Variable)	AO2		IOB4	User option, 4~20mA/0~5V
Tower Fan (Variable)	AO3		IOB4	User option, 4~20mA/0~5V
Customer Alert	DI3		IOB4	Marine option, dry contact
Free Cooling Start Switch	DI4		IOB4	Marine option, dry contact
Chilled Water Pump	DO1		IOB4	User option
Condenser Water Pump	DO2		IOB4	User option
Tower Fan High	DO3		IOB4	User option
Tower Fan Low	DO4		IOB4	User option

19XR2~E/V/D I/O, 19XRC mapping:

Description	Channel #		Board #	Option
Entering Chilled Water Temperature	AI1		IOB1	
Leaving Chilled Water Temperature	AI2		IOB1	
Entering Condenser Water Temperature	AI3		IOB1	
Leaving Condenser Water Temperature	AI4		IOB1	
Evap. Refrigerant Liquid Temperature	AI5		IOB1	
Comp Discharge Temperature	AI6		IOB1	
Condenser Pressure	AI7		IOB1	
Evaporator Pressure	AI8		IOB1	
FS VFD Load Current	AI10		IOB1	For free standing VFD
Variable Speed Oil Pump	AO1		IOB1	Factory option
Oil EXV Output	AO2		IOB1	Factory option, 4~20mA
EC Valve Output mA	AO3		IOB1	Factory option, 4~20mA
Chiller Lockout Input	DI1		IOB1	User option, dry contact, normal open
Spare Safety	DI2		IOB1	User option, dry contact, normal open
Remote Contact Input	DI3		IOB1	User option, dry contact, "Closed" indicates Turn ON the chiller
Remote Emergency Stop Input	DI4		IOB1	User option, dry contact, "Closed" indicates chiller emergency stop
Stage 1 IGV Increase	DO1		IOB1	
Stage 1 IGV Decrease	DO2		IOB1	
Chiller Alarm Relay	DO3		IOB1	User option, 24VAC output, recommend with external power supply
Motor Winding Temperature 1	AI1		IOB2	
Thrust Bearing Oil Temperature	AI2		IOB2	
Oil Sump Temperature	AI3		IOB2	
Oil Supply Temperature	AI4		IOB2	Factory option
Guide Vane 1 Actual Pos	AI5		IOB2	
Oil Supply Pressure	AI6		IOB2	
Oil Sump Pressure	AI7		IOB2	
EC Valve Feedback	AI8		IOB2	Factory option, 4~20mA
Motor Winding Temperature 2	AI9		IOB2	For high voltage motor
Motor Winding Temperature 3	AI10		IOB2	For high voltage motor
Diffuser Pressure	AI11		IOB2	Factory option
Guide Vane1 Output	AO1		IOB2	Factory option, for 4~20mA type guide vane
Diffuser Output	AO2		IOB2	Factory option
Evap Water Flow Switch	DI1		IOB2	User option, dry contact, "Closed" indicates "FLOW"
Cond Water Flow Switch	DI2		IOB2	User option, dry contact, "Closed" indicates "FLOW"
Ice Build Contact	DI4		IOB2	User option, dry contact
Oil Heater Relay	DO1		IOB2	
Oil Pump Relay	DO2		IOB2	
EC Valve Solenoid / Open	DO3		IOB2	Factory option
Vapor Source SV	DO4		IOB2	Factory option, for 19XRC
Heat Reclaim Entering Temp	AI3		IOB3	Heat reclaim option
Heat Reclaim Leaving Temp	AI4		IOB3	Heat reclaim option
Remote Reset Sensor	AI5		IOB3	User option, 5K thermistor

Description	Channel #		Board #	Option
Auto Water Temp Reset	AI6		IOB3	User option, 4~20mA
Common CHWS Temp	AI7		IOB3	Used for lead lag option
Auto Demand Limit Input	AI8		IOB3	User option, 4~20mA
Common CHWR Temp	AI9		IOB3	Used for lead lag option
Refrigerant Leak Sensor	AI10		IOB3	User option, 4~20mA
Chiller Status Output mA	AO1		IOB3	User option, 4~20mA 4mA=OFF 8mA=Tripout 12mA=Shutdown 20mA=Running
Fire Security Interlock	DI1		IOB3	User option, dry contact, normal open
Customer Alert	DI2		IOB3	Marine option, dry contact
Free Cooling Start Switch	DI3		IOB3	Marine option, dry contact
Power Request Feedback	DI4		IOB3	Marine option
Chiller Alert Relay	DO2		IOB3	User option, 24VAC output, recommend with external power supply
Free Cooling Mode	DO3		IOB3	Marine option
Power Request Output	DO4		IOB3	Marine option
Entering Evap Water Pressure	AI3		IOB4	User option, if IOB4 installed, same as follows
Leaving Evap Water Pressure	AI4		IOB4	User option
Entering Cond Water Pressure	AI5		IOB4	User option
Leaving Cond Water Pressure	AI6		IOB4	User option
Evap Water Flow Measurement	AI8		IOB4	User option, 4~20mA
Cond Water Flow Measurement	AI9		IOB4	User option, 4~20mA
Chilled Water Pump (Variable)	AO1		IOB4	User option, 4~20mA/0~5V
Condenser Water Pump (Variable)	AO2		IOB4	User option, 4~20mA/0~5V
Tower Fan (Variable)	AO3		IOB4	User option, 4~20mA/0~5V
Chilled Water Pump	DO1		IOB4	User option, 24VAC output, recommend with external power supply
Condenser Water Pump	DO2		IOB4	User option, 24VAC output, recommend with external power supply
Tower Fan High	DO3		IOB4	User option, 24VAC output, recommend with external power supply
Tower Fan Low	DO4		IOB4	User option, 24VAC output, recommend with external power supply

19DV mapping:

Description	Channel #		Board #	Option
Entering Chilled Water Temperature	AI1		IOB1	
Leaving Chilled Water Temperature	AI2		IOB1	
Entering Condenser Water Temperature	AI3		IOB1	
Leaving Condenser Water Temperature	AI4		IOB1	
Evap. Refrigerant Liquid Temperature	AI5		IOB1	
Comp Discharge Temperature	AI6		IOB1	
Condenser Pressure	AI7		IOB1	
Evaporator Pressure	AI8		IOB1	
FS VFD Load Current	AI10		IOB1	For free standing VFD
Chiller Status Output mA	AO1		IOB1	User option, 4~20mA 4mA=OFF 8mA=Tripout 12mA=Shutdown 20mA=Running
Evap Water Flow Switch	DI1		IOB1	User option, dry contact, "Closed" indicates "FLOW"
Cond Water Flow Switch	DI2		IOB1	User option, dry contact, "Closed" indicates "FLOW"
Remote Contact Input	DI3		IOB1	User option, dry contact, "Closed" indicates Turn ON the chiller
Remote Emergency Stop Input	DI4		IOB1	User option, dry contact, "Closed" indicates chiller emergency stop
Economizer Bypass Valve	DO1		IOB1	x
Refrigerant Pump	DO2		IOB1	
Chiller Alarm Relay	DO3		IOB1	User option, 24VAC output, recommend with external power supply
Vapor Venting Line SV	DO4		IOB1	x
Motor Winding Temperature 1	AI1		IOB2	
EC Valve Feedback	AI3		IOB2	Factory option
Pump Outlet Pressure	AI5		IOB2	
Bearing Outlet Pressure	AI6		IOB2	
Bearing Inlet Pressure	AI7		IOB2	
Auto Demand Limit Input	AI8		IOB2	User option, 4~20mA
Refrigerant Leak Sensor	AI9		IOB2	User option, 4~20mA
Pump Inlet Pressure	AI10		IOB2	
Guide Vane1 Output	AO1		IOB2	
EC Valve Output mA	AO3		IOB2	Factory option
Liquid Level Switch	DI2		IOB2	
High Pressure Switch	DI3		IOB2	
Ice Build Contact	DI4		IOB2	User option, dry contact
Condenser Control Valve	DO1		IOB2	x
Evaporator Control Valve	DO2		IOB2	x
Condenser Filling Valve	DO3		IOB2	x
Economizer Isolation Valve	DO4		IOB2	x
1st Stage Bearing Temp	AI1		IOB3	
2nd Stage Bearing Temp	AI2		IOB3	
Bearing Ref Supply Temp	AI3		IOB3	
Guide Vane 2 Actual Pos	AI4		IOB3	
Remote Reset Sensor	AI5		IOB3	User option, 5K thermistor
Guide Vane 1 Actual Pos	AI6		IOB3	

Description	Channel #		Board #	Option
Common CHWS Temp	AI7		IOB3	Used for lead lag option
Auto Water Temp Reset	AI8		IOB3	User option, 4~20mA
Common CHWR Temp	AI9		IOB3	Used for lead lag option
Head Pressure Output	AO1		IOB3	Factory option
Guide Vane 2 Output	AO3		IOB3	
Spare Safety	DI3		IOB3	User option, dry contact, normal open
Power Request Feedback	DI4		IOB3	Marine option
Evaporator Drain Valve	DO1		IOB3	
Condenser Drain Valve	DO2		IOB3	
Free Cooling Mode	DO3		IOB3	Factory option
Power Request Output	DO4		IOB3	Marine option
Entering Evap Water Pressure	AI3		IOB4	User option, if IOB4 installed, same as follows
Leaving Evap Water Pressure	AI4		IOB4	User option
Entering Cond Water Pressure	AI5		IOB4	User option
Leaving Cond Water Pressure	AI6		IOB4	User option
Evap Water Flow Measurement	AI8		IOB4	User option, 4~20mA
Conde Water Flow Measurement	AI9		IOB4	User option, 4~20mA
Chilled Water Pump(Variable)	AO1		IOB4	User option, 4~20mA/0~5V
Condenser Water Pump(Variable)	AO2		IOB4	User option, 4~20mA/0~5V
Tower Fan(Variable)	AO3		IOB4	User option, 4~20mA/0~5V
Customer Alert	DI3		IOB4	Marine option, dry contact
Free Cooling Start Switch	DI4		IOB4	Marine option, dry contact
Chilled Water Pump	DO1		IOB4	User option
Condenser Water Pump	DO2		IOB4	User option
Tower Fan High	DO3		IOB4	User option
Tower Fan Low	DO4		IOB4	User option
Purge Level Switch Low	cDI-01		SIOB	User option
Purge Level Switch High	cDI-02		SIOB	User option
Purge Comp Suction Temp	AI-01		SIOB	User option
Purge Cond Valve	DO-01		SIOB	User option
Purge Comp Valve	DO-02		SIOB	User option
Purge Pumpout Valve	DO-03		SIOB	User option
Purge Drainage Valve	DO-04		SIOB	User option
Purge Regeneration Valve	cDO-05		SIOB	User option
Purge Discharge Valve	cDO-06		SIOB	User option
Purge Vacuum Pump	DO-07		SIOB	User option
Purge Compressor	DO-08		SIOB	User option
Purge Heater	DO-10		SIOB	User option

3.5 - LEN/CCN Communication Cable Cequirements:

The electrical characteristics of the transmission Cables shall be comprised of three conductors, (1.5 Pairs) two signals and one ground of 20 AWG or larger with 100% shield plus a tinned copper braid (65% coverage), embodied as one of the following types is recommended by Carrier:

- Belden #8772 (for intra building, 60 deg C)
- Belden #85240 (high temperature, 150 deg C)
- Belden #89418 (plenum cable, 200 deg C)

When LEN-MODBUS gateway which described in section 3.1.4 is used in the system, the communication cable for LEN and MODBUS sides should also follow this requirement.

The communication cable between ISM and IOB should be as far away from high voltage cable and other disturbance equipment as possible. The communication cable should be as short as possible and should be separated from other cables. Making the communication cable go through metal shield conduct is preferred.

4 - SETTING UP THE USER INTERFACE

4.1 - User Interface

The user interface is a colorful 10.4" TFT touch screen. Navigation is either direct from the touch screen interface or by connecting to a web interface via the Ethernet IP port of the controller.

The navigation menus are the same for both connection methods. Please note that only two web connections may be authorized at the same time.

4.2 - Web Connection

Connection from a PC is using a web browser with Java.

In order to access the HMI, the operator should 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 screen (see also section 8.2).

Minimum web browser configuration:

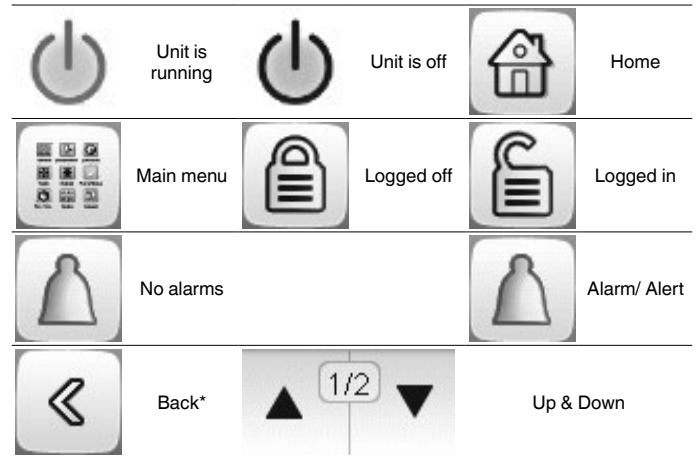
- Microsoft Internet Explorer (version 8 or higher) or Mozilla Firefox (version 3.5.2 or higher). In the advanced connection options add the unit address to the address list. Do not use a proxy server.
- Java platform (version 6 or higher). (In the control panel, click the option that allows storing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

For more information on the web browser and Java platform configuration, please refer to section 8 "Diagnostics and communication problem trouble shooting" and contact your network administrator.

NOTE: Two users can be connected simultaneously with no priority between users; the last modification will take effect.

4.3 - General Features

4.3.1 - Buttons



* Note that the "Back" button is not present in the main menu.

4.3.2 - Screens

The interface includes the following screens:

- Welcome screen,
- Synoptic screen with direct display of the main parameters,
- Menu screens for navigation,
- Data/configuration screens listing the parameters by type,
- Operating mode selection screen,
- Password entry and language selection screen,
- Parameter modification screen,
- Time schedule screen.

NOTE: If the interface is not used for a long period, it will go into screen saver mode with black screen. The control is always active, the operating mode remains unchanged. The interface screen is re-animated when the user presses the screen. The welcome screen is displayed.

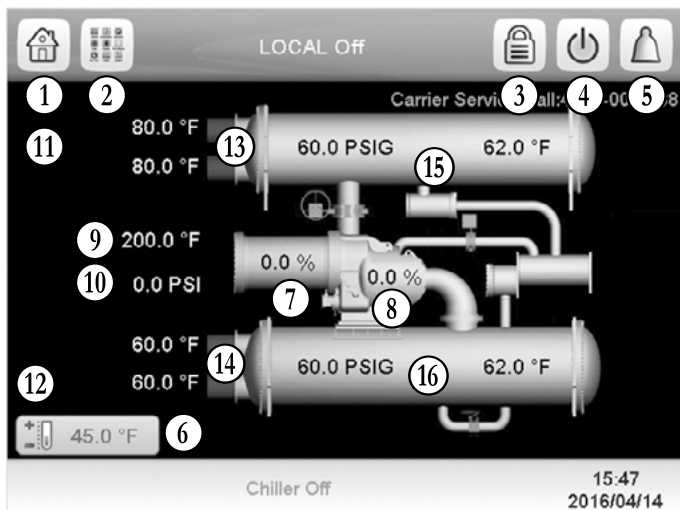
4.4 - Welcome Screen

The welcome screen is the first screen shown after switching the unit on or after the re-animation of the screen. It displays the application name as well as current software version number.

To exit from this screen press the following button:



4.5 - Synoptic Screen



1	Synoptic 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	Setpoint
7	Unit capacity percentage (motor load current percentage)
8	Guide Vane Position percentage
9	Oil temperature
10	Oil pressure delta
11	Condenser pump status (hydraulic System option is Enabled)
12	Evaporator pump status (hydraulic System option is Enabled)
13	Condenser water inlet and outlet temperature
14	Evaporator water inlet and outlet temperature
15	Condenser saturated temperature and pressure
16	Evaporator saturated temperature and pressure

Message: all screens described below can display an information message in the band at the bottom.

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

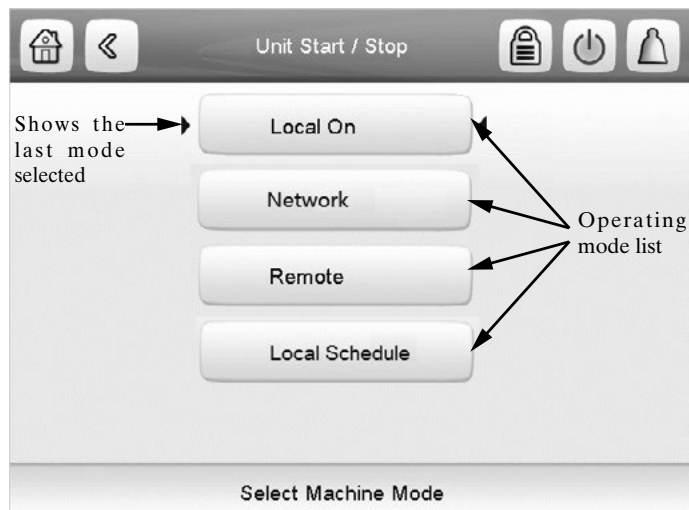
4.6 - Setpoint Screen

4.7 - On/Off Screen

The On/Off screen allows users to select the unit operating mode.

4.7.1 - Unit Start-up

With the unit in the Local Off mode, press the button  to display the list of operating modes. Select the expected mode to startup the chiller



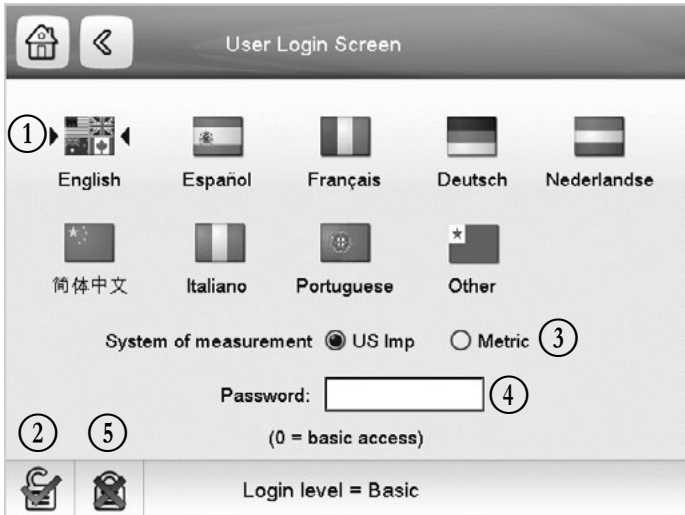
4.7.2 - Unit Stop

To Stop the unit - press the following button: 



Confirm the unit shut-down or return to the previous screen.

4.8 - Password/Language Screen



1	Cursor showing the activated language
2	Log in
3	Unit of measurement selection: Metric/Imperial
4	Enter the password
5	Log off

NOTE: Password validation is effective after pressing the Log-in button.

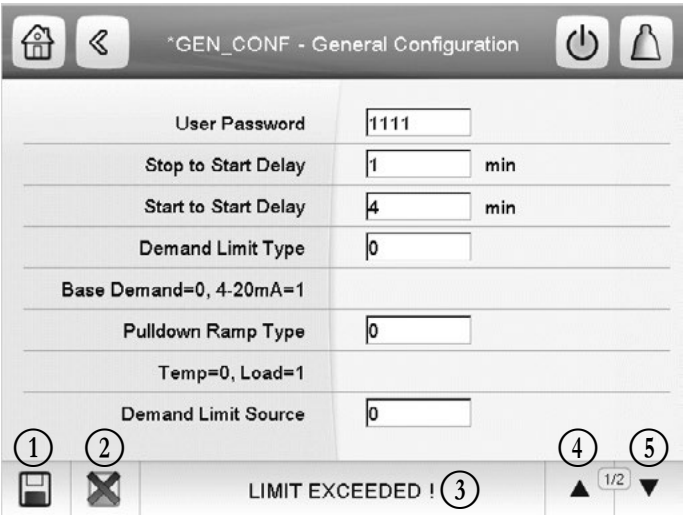
4.9 - Menu Screen

To access **Main menu**, press the following button:



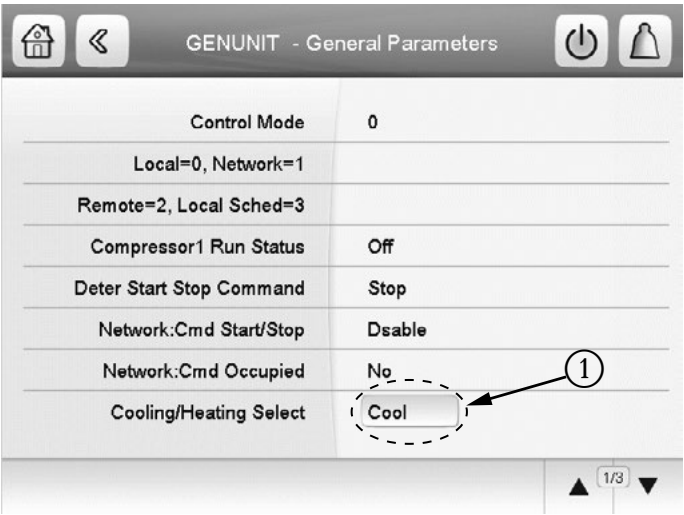
Touch the items to access the corresponding table/menu.

4.10 - Configuration Screen

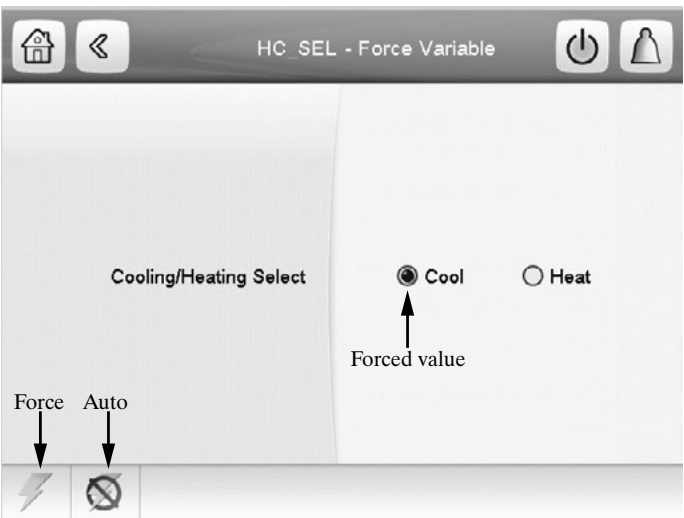


1	Save
2	Cancel
3	Message
4	Previous page
5	Next page

Below is an example to show how to force a point.

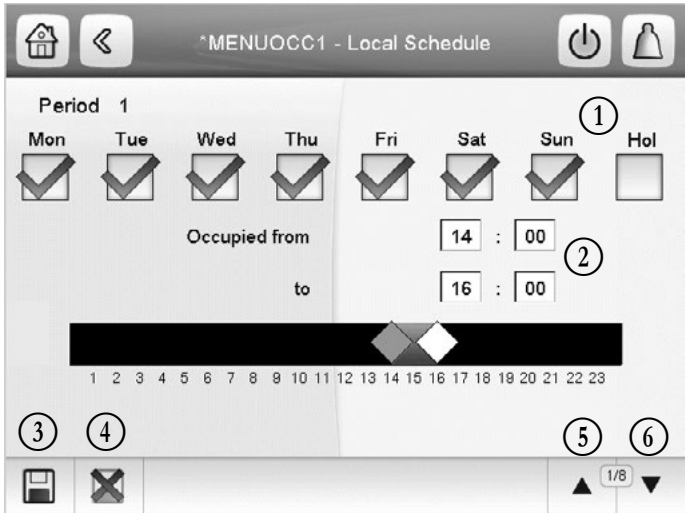


1	Forcible point
---	----------------



The Auto button cancels the force action on the point.

4.11 - Time Schedule Screen



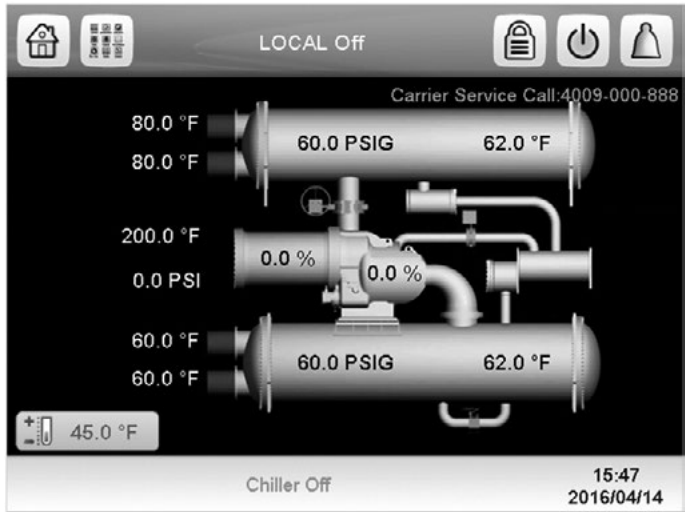
- 1 Selection of the applicable days for the time schedule
- 2 Modification of the period start and end schedules
- 3 Save
- 4 Cancel
- 5 Previous period
- 6 Next period

4.12 - 19XR6/7 Status Display Screens

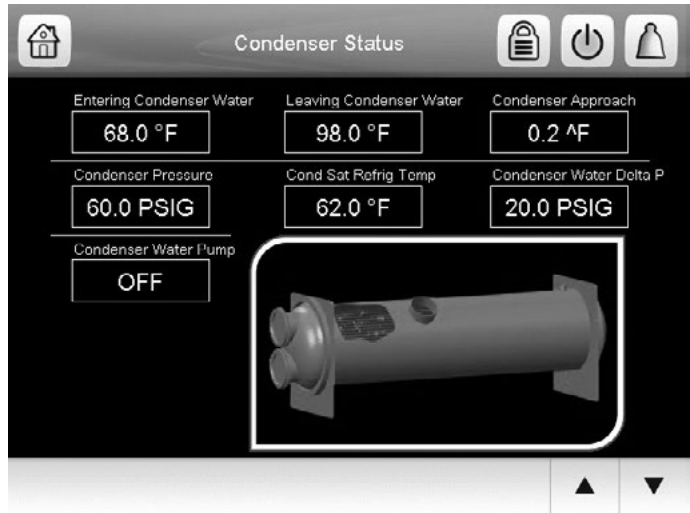
The following screens are designed for end user to check the components status.

4.12.1 - System Overview

The following screen is the system overview screen (default screen), by clicking the component in this screen, user can enter the specific component screen.



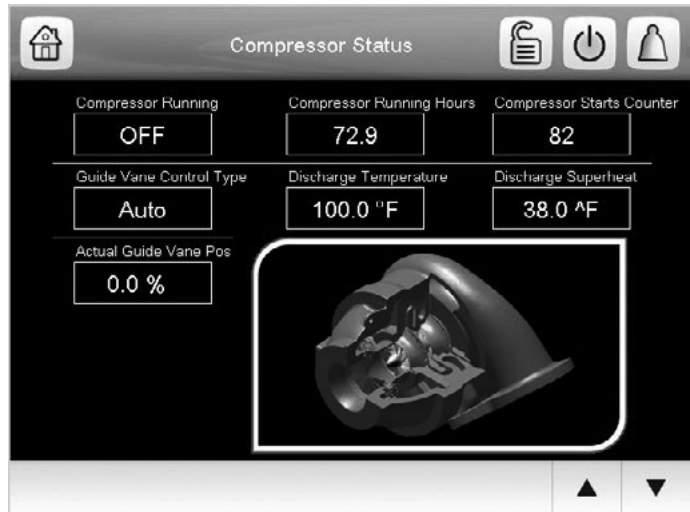
4.12.2 - Condenser Status



4.12.3 - Evaporator Status



4.12.4 - Compressor Status

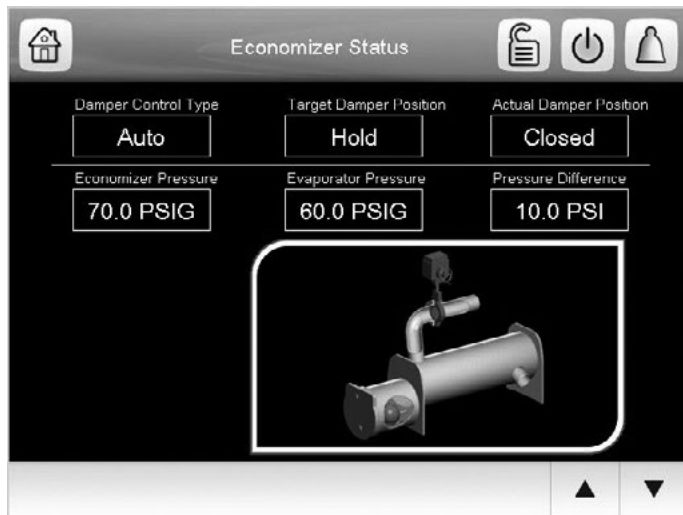


4.12.5 - Motor Status



4.12.6 - Economizer Status

The pressure difference shown in this screen is the pressure difference between economizer pressure and evaporator pressure.



4.12.7 - Transmission Status



4.12.8 - Envelope Control Status

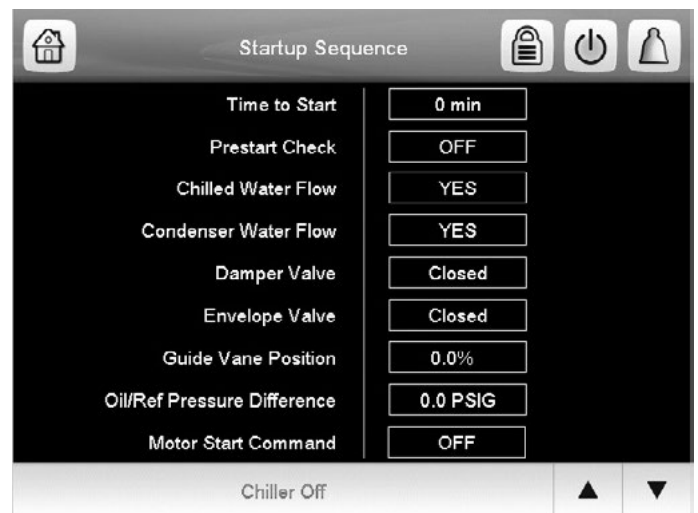


4.12.9 - VFD Status



4.12.10 - Startup Sequence

The following screen shows the sequence of startup check items. Touch the mode title of main screen to access this screen. Users are able to see which items has been checked in startup process.

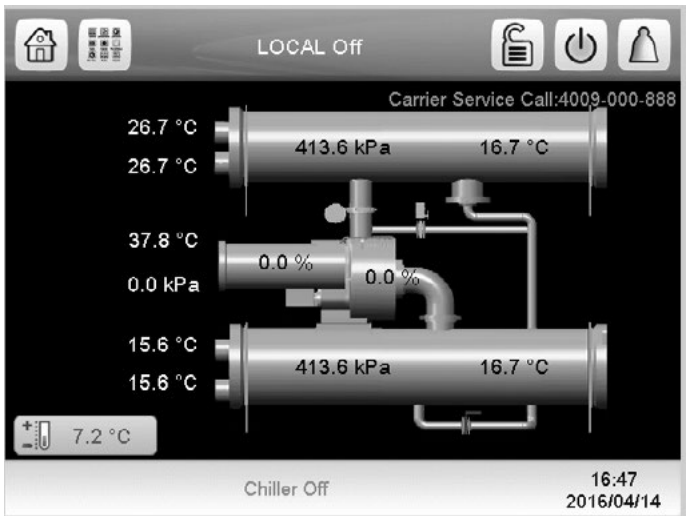


4.13 - 19XR2~E/V/D Status Display Screens

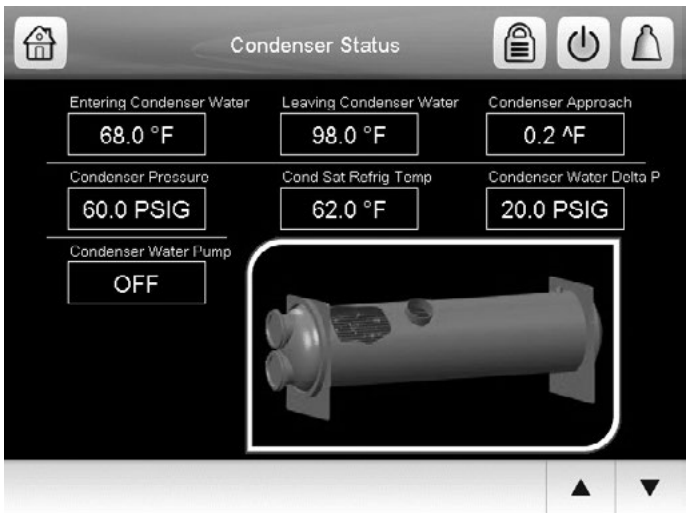
The following screens are designed for end user to check the components status.

4.13.1 - System Overview

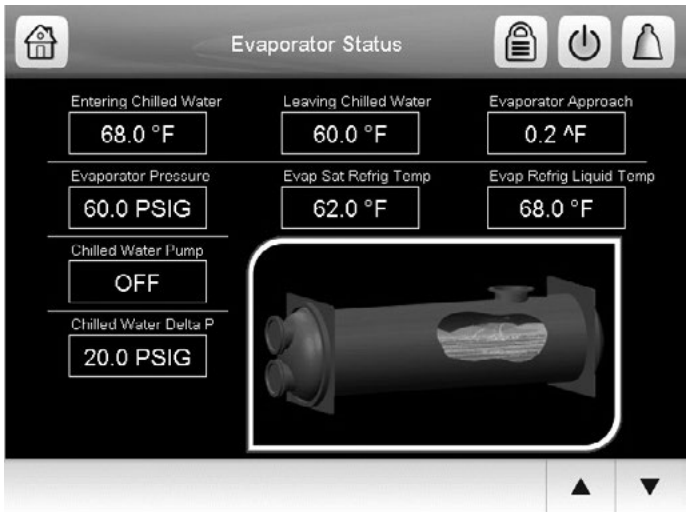
The following screen is the system overview screen (default screen), by clicking the component in this screen, user can enter the specific component screen.



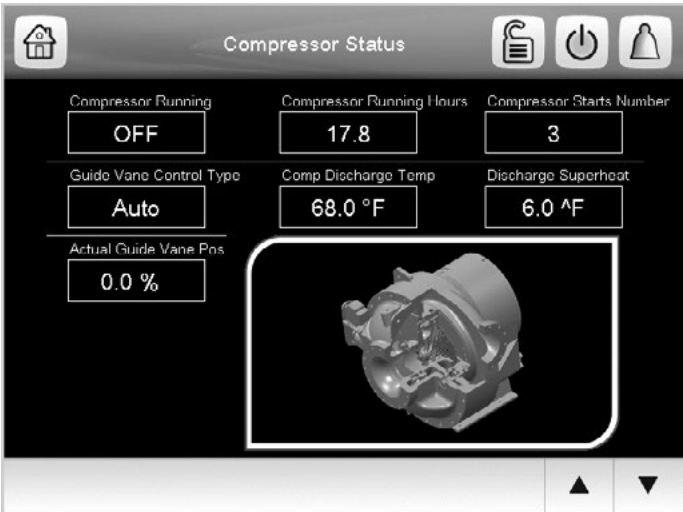
4.13.2 - Condenser Status



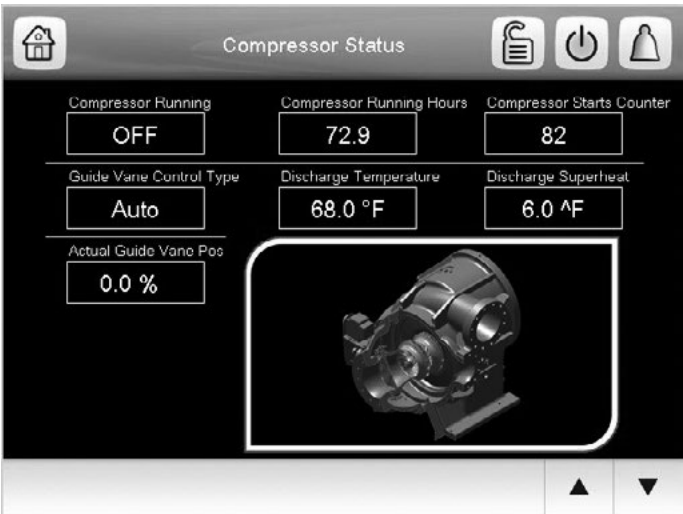
4.13.3 - Evaporator Status



4.13.4 - Compressor Status – Single Stage



4.13.5 - Compressor Status – Dual Stage



4.13.6 - Motor Status



4.13.7 - Transmission Status



4.13.8 - Envelope Control Status

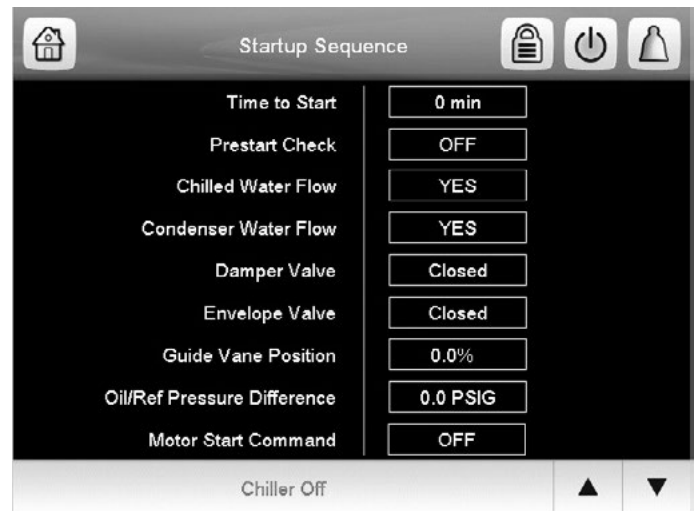


4.13.9 - VFD Status



4.13.10 - Startup Sequence

The following screen is showing the startup sequence after user push the startup button. User can check where we are in the startup process.

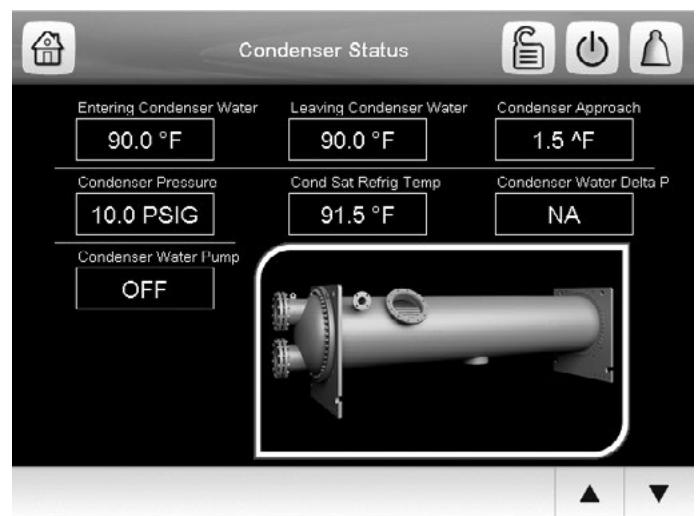


4.14 - 19DV Status Display Screens

4.14.1 - System Overview



4.14.2 - Condenser Status



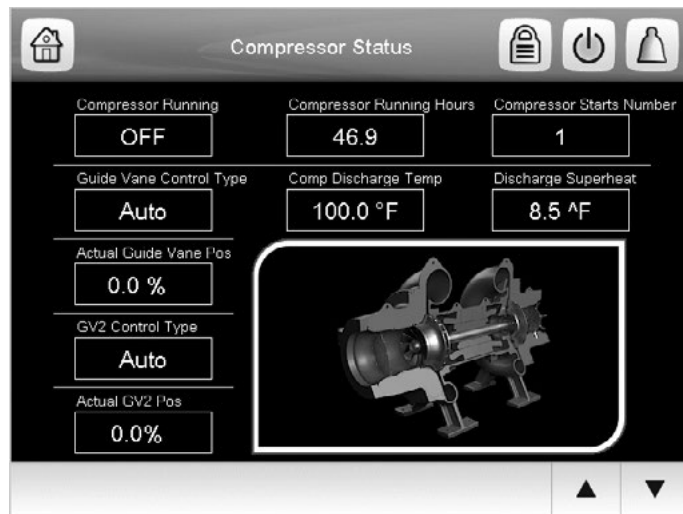
4.14.3 - Evaporator Status



4.14.6 - Envelope Control Status



4.14.4 - Compressor Status



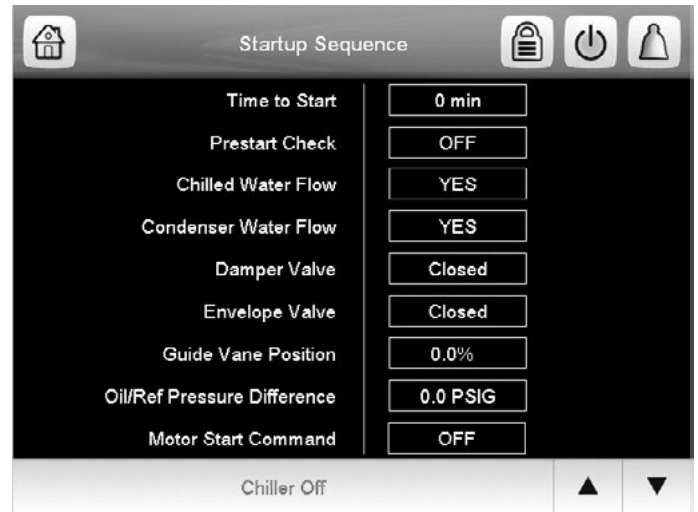
4.14.7 VFD Status



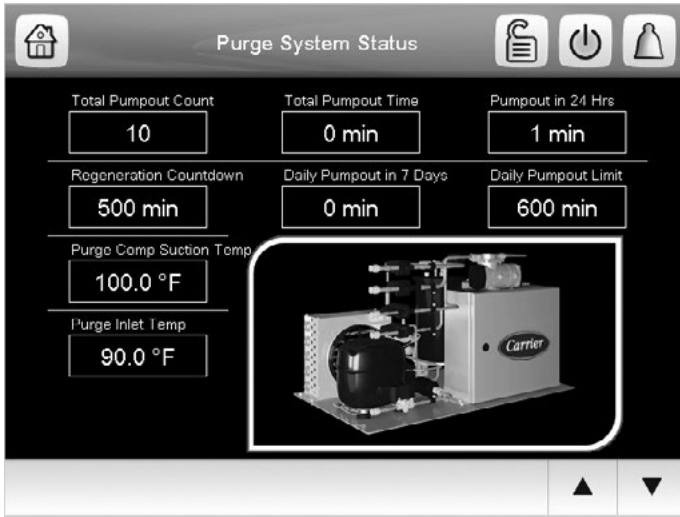
4.14.5 - Motor Status



4.14.8. Startup Sequence



4.14.9. Purge System Status



5 - 19 SERIES PIC 5+ CONTROL OPERATION

5.1 - Start/Stop Control

This function determines the chiller STATSTOP command.

There are 4 control modes (LOCAL, LOCAL SCHEDULE, REMOTE, NETWORK) can be selected. In a certain control mode, only appropriate control sources are valid to start or stop chiller.

Local

When control mode is LOCAL, the chiller can be started by “Local ON” button on UI screen and be shut down by “Confirm Stop” buttons on screen, EMSTOP software point.

Network

When control mode is NETWORK, chiller can be started and stopped by the CHIL_S_S and CHIL_OCC software point which is written by other equipment through network command and network schedule. Only when both points are written as “YES”; the chiller will start up. Also, chiller can be shut down by EMSTOP software point, STOP button on UI screen.

Local Schedule

When control mode is LOCAL SCHEDULE, chiller will be automatically started if configurable local schedule is occupied and be shut down by unoccupied schedule, EMSTOP software point, STOP button on UI screen.

Remote

When control mode is REMOTE, chiller will be started and shut down by the remote discrete input (IOB1_DI3: REM_CON) located on the I/O board. Also, chiller can be shut down by EMSTOP point, STOP button on UI screen.

NOTE: there is a STOP OVERRIDE point in GENUNIT table, if this point is enabled, the chiller cannot be started and chiller should be stopped if it is running.

5.2 - Compressor Run Status

Compressor Run Status is shown on the top of default screen.

STATUS #	STATUS NAME	DESCRIPTION
0	OFF	STATSTOP is STOP, no alarm.
1	CTLTEST	Control test is active
2	PUMPDOWN	Pump down is active
3	LOCKOUT	Lockout in 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 control is delaying the start sequence until the Start to Start and Stop to Start timers have elapsed
7	PRESTART	The chiller is in the process of the checks prior to energizing the compressor motor
8	STARTUP	Normal Startup in progress
9	AUTORST	Auto Restart in pending
10	RAMPING	Ramp loading in progress. The chiller has started and is slowly 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 the an AVERAGE LOAD CURRENT Limit or a MOTOR KILOWATTS Limit
14	SHUTDOWN	Shutdown compressor in progress
15	FREECOOL	Free Cooling in progress
16	CONDFLSH	Condenser Flush in progress

5.3 - Chiller Start-up Sequence

5.3.1 - Prestart 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 the limits.

PRESTART ALERT/CONDITION	State Number	Alarm or Alert
STARTS IN 12 HOURS >= 8	100	Alert
OIL SUMP TEMP <= 140F AND OIL SUMP TEMP <= EVAP_SAT + 50F	101	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- 10F	230	Alarm
COMP MOTOR WINDING TEMP >= MOTOR TEMP OVERRIDE - 10F	231	Alarm
COMP DISCHARGE TEMP >= COMP DISCHARGE ALERT- 10F	232	Alarm
EVAP_SAT < Evap trip point + EVAP OVERRIDE DELTA T		
OR		
EVAP REFRIG LIQUID TEMP < Evap trip point + EVAP OVERRIDE DELTA T		
NOTE: Evap trip point = 33F(water) or EVAP REFRIG TRIPPOINT(brine)	233	Alarm
ACTUAL LINE VOLTAGE <= UNDERVOLTAGE THRESHOLD		
(N/A for Eaton/Rockwell UM VFDs)	234	Alarm
ACTUAL LINE VOLTAGE >= OVERVOLTAGE THRESHOLD		
(N/A for Eaton/Rockwell UM VFDs)	235	Alarm
Guide vane 1 has not been calibrated successfully	236	Alarm

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

5.3.2 - Startup

One second later, the chilled 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 will be compared to CONTROL POINT plus 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 a RECYCLE mode.

If the RECYCLE condition is not satisfied, the start-up sequence continues and checks the guide vane position. For single-stage compressor (Comp(Single=0,Dual=1)=0 in FACTORY configuration), if the guide vanes are more than GUIDE VANE CLOSURE AT STARTUP, the start-up waits until the controller closes the vanes. For dual-stage compressor (Comp(Single=0,Dual=1)=1 in FACTORY configuration), guide vane is to be opened to the initial position "GV1 Closure at Startup" at "Option Configuration" menu.

If EC valve or Economizer damper valve is equipped and enabled, control checks the status of these valves position to be fully closed.

If the vanes and valves position are verified.

When chiller type is 19XR, the oil pump pressure difference is less than 6 psi (41.4 kPa), the oil pump relay will be energized. The control then waits until the oil pressure difference (OIL PRESS VERIFY TIME, operator-configured, default of 40 seconds) reaches a maximum of 18 psi (124 kPa). After oil pressure is verified, the control waits 40 seconds for oil prelube.

When chiller type is 19XR6/7, and oil pump kept OFF for over 50 hours. The oil prelube time will be 6 minutes instead of 40 seconds.

When chiller type is 19DV, The control will check the refrigerant pump pressure difference, refrigerant pump will be turned ON if it passed. Then controller waits until the refrigerant pump pressure difference reaches 12 psi (82.7 kPa). After ref pressure is verified, if high side float chamber with liquid level, refrigerant pump will be kept ON for 20 seconds; if not, refrigerant pump will be kept ON until there is liquid level, and then kept on 10 seconds after that.

The compressor start relay energizes to start the compressor.

5.4 - Chiller Shutdown Sequence

Chiller shutdown begins if any of the following occurs:

- Local OFF button is pressed
- A recycle condition is present (see Recycle Mode section)
- The time schedule has gone into unoccupied mode when in 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 shutdown from running, 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 command to minimum speed for variable speed compressor, and 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%
- 4 minutes have elapsed after initialize the stop

When any one of the above condition is true, the shutdown sequence stops the compressor by deactivating the compressor start relay.

Then the guide vane shall be closed and stay at the fully closed position.

When chiller type is 19XR2~E, the oil pump relay will be Turned OFF after 60 seconds post lube.

When chiller type is 19XR6/7, the oil pump relay will be Turned OFF after 120 seconds post lube.

When chiller type is 19DV, the refrigerant pump relay will be Turned OFF after 120 seconds post lube.

And then the chilled water/brine pump and condenser water pump will be shutdown.

5.5 - Oil Lubrication Control

As part of the pre-start checks executed by the controls, the oil sump temp is compared to evaporator saturated refrigerant temperature. If the oil temperature is less than 140° F (60° C) and less than evaporator saturated refrigerant temperature plus 50 ° F (27.8° C), the start-up will be delayed until either of these conditions is no longer true. Once this temperature is confirmed, the startup continues.

The oil heater relay is energized whenever the chiller compressor is off and the oil sump temperature is less than 140° F (60.0° C) or the oil sump temperature is less than the evaporator saturated refrigerant temperature plus 53° F (29.4° C). The oil heater is turned off when either of the following conditions is true:

Oil sump temperature is more than 152° F (66.7° C)

Oil sump temperature is more than 144° F (62.2° C) and more than the evaporator saturated refrigerant temperature plus 55° F (30.6° C).

The oil heater is always off when the compressor is running.

For chiller type 19XR2~E/V/D, oil pump will be energized for 30 seconds after each 30 minutes of oil heat relay being energized in order to stir the oil for more evenly distributed heating.

For chiller type 19XR6/7, 30sec/30min time interval is configurable in Service Parameters table->Oil Stir Cycle(19XR6/7):

Option 0(No stir), there will be no oil stir;

Option 1(30s/30m), oil pump will be energized for 30 seconds after each 30 minutes of oil heat relay being energized;

Option 2(1m/4h), oil pump will be energized for 1 minute after each 4 hours of oil heat relay being energized;

Option3(Comb.0&1), for the first 50 hours of chiller in not running status, oil stir will execute as option1. After 50 hours elapses, there will be no oil stir.

PIC 5+ can support variable oil pump control and this option is only available for 19XR2~E currently. The terminal channel is located in IOB1 AO1, and it is a 4~20mA signal. During operation, PIC 5+ control system will modulate the VFD speed to control the lubrication system oil pressure difference to between 25psi and 35psi.

5.6 - Refrigerant Lubrication Control

For the 19DV system, refrigerant is used to lubricate and cool the compressor bearings. The refrigerant lubrication system mainly includes refrigerant pump, four control valves, evaporator and condenser filter, moisture removal desiccant, bearing filter, liquid level switch and additive reclaim system.

When the chiller is powered on, the controller will maintain liquid level in condenser float chamber. Once operator push start button, the system will go into prestart check process. After prestart check ok, when refrigerant pump request is on for pre-lube and the bearing pressure difference is less than 5psi, if Liquid Level is not satisfy, then pump refrigerant from evaporator to condenser until Liquid Level is satisfied. Then, if evaporator temp plus leaving condenser water is less than 10F, pump refrigerant from evaporator to condenser,

after bearing pressure difference reaches 12psi, keep lasting for 20s until compressor is on; else if evaporator temp plus leaving condenser water is equal or larger than 10F, pump refrigerant from condenser to bearing and drain to condenser, if refrigerant pump didn't open for pumping liquid when start, open refrigerant pump after 10s, and after then, when bearing pressure difference reaches 12psi, keep lasting this process for 10s until compressor is on.. During pre-lubrication, if the bearing pressure difference is less than 8 psi for continuously 8 seconds, the chiller will shutdown.

The compressor will run after the pre-lubrication process. Refrigerant will be pumped to bearing and drain to evaporator from condenser float chamber. When chiller shutdown, the condenser control valve will be closed and the refrigerant will be pumped from evaporator to bearing and drain to condenser.

When the chiller is off, always open evaporator control valve. If liquid level is low, refrigerant will be pumped from evaporator to condenser float chamber until the liquid level switch is on and last 1 minutes after that.

5.7 - Control Point

5.7.1 - Set Point

Set point can be configured at menu "Setpoint" at "USER" access level.

The SETPOINT is determined by the HEAT/COOL MODE, EWT OPTION, and ICE BUILD OPTION in the below table.

Setpoint Determination

EWT Control Option:	Heat/Cool Mode = Cooling	Heat/Cool Mode = Heating
Disable	Cooling LCW Setpoint	Heating LCDW Setpoint
Enable	Cooling ECW Setpoint	Heating ECDW Setpoint

NOTE: Ice Build Option is Disabled when Heat/Cool Mode is set to Heating. When Ice Build Option is Enabled and ice build is active, the control point is the Ice Build Setpoint and the controlled water temperature is leaving chilled water temperature.

5.7.2 - Control Point

Capacity control is based on achieving and maintaining a CONTROL POINT temperature, which is the sum of the valid set point (from the SETPOINT screen) and a temperature reset value.

In cooling mode, Control Point is equal to the set point plus temperature reset, while in heating Control Point will be set point minus temperature reset.

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

5.7.3 - 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. Control point Reset on the "General Parameters" screen indicates the amount of reset.

To activate a reset type, access the 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.

At this type, Degrees Reset At 20 mA shall be configured in RESETCFG table.

RESET TYPE 2: REMOTE TEMPERATURE RESET

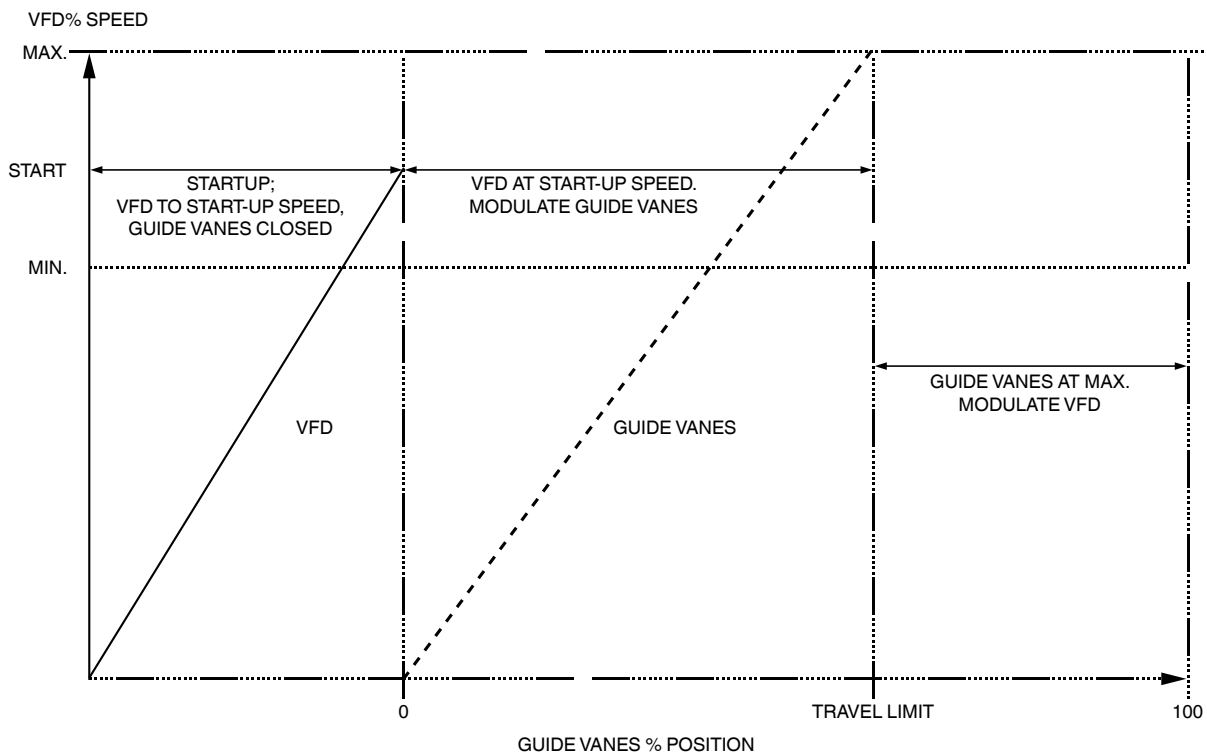
Reset Type 2 is an automatic water temperature reset based on a remote temperature sensor input signal. This function can be accessed by the following configurations:

- Configure the remote temperature at no reset occurs (Remote temp → NO RESET).
- Configure the remote temperature at full reset occurs (remote temp → FULL RESET).

5.8 - Capacity Control

Capacity control shall provide chilled or condenser water temperature control by modulating the position of the inlet guide vane 1, and VFD speed for variable speed compressor based.

If VFD OPTION is set to with VFD, when need to increase capacity, the control will first try to increase IGV TARGET POSITION if it has not reached the travel limit, otherwise increase VFD TARGET SPEED; when need to decrease capacity, the control will first try to decrease VFD TARGET SPEED if it has not reached the minimum VFD speed, otherwise decrease IGV TARGET POSITION.



Guide vane control

The control regulates the guide vane position as determined by the Capacity Control function in normal condition and other functions in abnormal conditions which include capacity inhibit request, capacity decrease request. The guide vane actuator is driven by guide vane target position and comparing to the actual feedback value.. Guide vane actual position is limited to between zero and “GV1 TRAVEL LIMIT” which is configured at “Service Configuration” menu. When chiller is shutting down or off, guide vane is always driven to zero.

Finally, 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 the following configurations:

- Configure the Controlled water temperature delta T at no reset occurs (Controlled Water DELTA T NO RESET).
- Configure the Controlled water temperature delta T at full reset occurs (Controlled Water DELTA T FULL RESET).
- Finally, enter the amount of reset (Deg reset water DT full).

VFD speed control

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

From compressor relay is commanded to be closed to the end of ramp loading, VFD TARGET SPEED will be set to startup speed.

When chiller is running normally, the control will get input from capacity control to see whether to change VFD TARGET SPEED and how much to change.

When chiller is in shut down process, VFD TARGET SPEED will be set to minimum VFD speed.

After the compressor relay is cut off, VFD TARGET SPEED will be set to 0.

5.9 - Ramp Loading

The ramp loading control slows down 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). This helps reduce electrical demand charges by slowly bringing the chilled water to CONTROL POINT. The total power draw during this period remains almost unchanged.

There are two methods of ramp loading:

Temperature ramp loading shall limit the rate at which the controlled water temperature decreases for cooling and increase for heating during ramping by reducing on cooling mode and increasing on heating the Pulldown Set Point (Maintenance Menu - Capacity) at the configured rate until the pulldown setpoint is less than for cooling mode Control point or greater than Control point for heating mode

Pull down ramp type shall be configured to 0 for temperature ramping.

Motor load ramp loading shall limit the rate at which either the percent load current or motor percent kilowatts increases by incrementing the ramp demand limit at the configured rate.

Pull down ramp type shall be configured to 1 for load ramping.

PULLDOWN RAMP TYPE (Configuration Menu – General Configuration) is configured to 1 then motor load shall determine the ramp rate. If DEMAND LIMIT SOURCE (Configuration Menu – General Configuration) is set to AMPS then PERCENT LOAD CURRENT shall be used as motor load. If DEMAND LIMIT SOURCE is set to kW then MOTOR PERCENT KILOWATTS shall be used as motor load

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

If the power outage more than 3 hours, then Temperature Ramp Loading will be used regardless user configuration. And the minimum loading rate ($1^{\circ}\text{F}/\text{min}$) will be used.

5.10 - Surge Correction Control

There are two stages for surge correction, surge prevention control and surge protection control.

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.

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 envelope control algorithm notifies the operator that chiller operating conditions are marginal and to take action to help prevent compressor damage such as lowering entering condenser water temperature.

A high sound condition occurs in low guide vane position case, envelope control valve can be used to decrease the sound level by opening this valve in low guide vane position case. To enable this function, we need configure “high efficiency mode” to “disable” in CFGSURGE table. The default is low noise mode (this mode is only valid for 19XR6&7)

5.10.1 - Surge Prevention Control

The surge prevention control algorithm is an operator-configurable feature that can determine if lift conditions are too high for the compressor and then take corrective action.

If Actual Lift is higher than reference lift, a capacity inhibit signal will be sent; If Actual Lift is higher than reference lift plus surge line Upper Deadband, a capacity decrease signal will be sent; If Actual Lift is lower than reference lift minus surge line Lower Deadband, these 2 signals will be canceled. Capacity Control will respond to these 2 signals and make correction on VFD TARGET SPEED, EC valve actuator IGV1 TARGET POSITION with the priority from high to low.

Before surge protection event occurs, if there is no surge prevention in the past 5 min, SURGE PROFILE OFFSET will increment by 1. Reference lift will minus SURGE PROFILE OFFSET before comparing to actual lift. SURGE PROFILE OFFSET is configurable in Surge Correction Configuration Table.

5.10.2 - Surge Protection

The Surge Protection algorithm will run after SURGE DELAY TIME elapsed when compressor has been commanded to turn ON. It will compare the present PERCENT LOAD CURRENT value with the previous value once every second. If the difference exceeds the maximum AMPS change value ($\text{SURGE DELTA \% AMPS} + (\text{PERCENT LOAD CURRENT} / 10)$), an incidence of surge has occurred, and 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 surge protection signal, Capacity Control will do correction by modulating VFD TARGET SPEED, EC valve actuator IGV1 TARGET POSITION with the priority from high to low.

When correction is in effective, Surge Protection Count will be increased by 1 when either one of IGV, VFD or EC actuator is operated to do correction.

Guide vane should be inhibited for 1 minute after surge protection ends.

Chiller will do alarm shutdown under following conditions:

- If SURGE PROTECTION COUNTS exceed 20 within a SURGE TIME PERIOD and VFD speed has reached the maximum speed
- If IGV, VFD and EC are not able to be operated to do surge protection, when surge count is greater than 4.

5.11 - Envelope Control Valve (EC) Control

The envelope control 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, this is a user selectable option.

There are 3 types of EC valve.

- Continuous: A valve controlled by 2 contactors, one to open valve, the other to close valve. If both contractors are opened, the valve will hold its position. This kind of valve has feedback signal of fully closed or fully opened.
- On/Off: A valve controlled by only 1 contactor. It can't hold its current position, and has no position feedback signal.
- mA: A valve controlled by 4-20mA signal. It has the most precise control and feedback.
- Envelope Control Valve operation will have three different modes when installed (hgbp_opt>0) and enabled (hgbp_sel>0).
- Envelope Control for surge correction

Most of the inputs to the function are required for determining the operating region for the compressor map. Each compressor has unique lift characteristics that can be plotted to determine performance. The controller will determine operating conditions that could result in surging of the compressor and activate the Envelope Control valve to prevent surge until the chillers operating parameters are in a safe area on the curve where the valve may be closed again.

- Envelope Control for low load operation

In this condition, envelope control valve will be opened to prevent a recycle shutdown from occurring. The envelope control valve will remain open until this minimal loading condition has passed and there is no surge condition present.

- Combination for surge correction and low load operation

When this option is selected, both EC for surge correction and EC for Low Load Operation will be performed. Surge condition will take higher priority if both conditions are satisfied.

5.12 - Economizer Damper Valve Control

The economizer damper control is to maintain the pressure difference between Evaporator Pressure and Economizer Pressure. Pressure in economizer should be always kept higher than the pressure in evaporator.

If the Chiller Type (Configuration Menu – Factory Parameters) is configured to 19XR2~E/V/D and without this electrical damper valve, this function shall be bypassed.

When the chiller is initially powered ON, the damper valve will be commanded to close. When compressor shuts down, the damper valve will be commanded to close.

The damper valve shall be acted based on the following table:

Condition	Economizer Damper Valve Status
Chiller initially Power ON	Fully Close
Compressor shutdown	Fully Close
During Damper Valve Act Delay	Fully Close
Economizer Pressure > Evaporator Pressure + Damper Valve Open DB	Open
Economizer Pressure < Evaporator Pressure + Damper Valve Close DB	Close
Otherwise	Keep the current position

Economizer Damper Control - 1

If the damper valve has been command to open for a continuous 5 minutes, and the Damper Valve Full Opened is still not TRUE, then control system should generate an alert 154.

If the damper valve has been command to close for a continuous 5 minutes, and the Damper Valve Full Closed is still not TRUE, then control system should generate an alert 154.

If compressor is running and if economizer pressure becomes less than or equal to evaporator pressure, alarm 268 shall be tripped and compressor shall be shutdown.

5.13 - Damper Vapor Source

For 19XRC improvement unit, there is vapor source damper which is controlled by a NC(normal closed when valve coil is deenergized) solenoid valve and the pressure difference between damper cap and flow passage.

The SV is closed when chiller is not running, and keep closed until a delay period after chiller starts up(delay timer vssv_dly is configurable in CONF_OPT table). And after this timer is timeout, the SV should be energized.

5.14 - Demand Limit

The 19 Series PIC 5+ controls provide a feature for limiting AVERAGE LOAD CURRENT or Motor KILOWATTS by limiting capacity via guide vane control/VFD control. The limit applied is called ACTIVE DEMAND LIMIT, which is equal to a BASE DEMAND LIMIT value (set in the SETPOINT Screen, default value 100%), or be determined by AUTO DEMAND LIMIT INPUT (an optional 4-20 mA input, described below). ACTIVE DEMAND LIMIT may also be forced to be different from BASE DEMAND LIMIT by manually overriding the value (forcing) writing a 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.

Demand Limit Control Option — the demand limit control option (4-20 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 as “DEMAND LIMIT AT 20 mA” in the CONFIGURATION MENU/SERVICE PARAMETERS screen.

5.15 - 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 all cases there are 2 stages of capacity control.

1. When the value of interest crosses the First Stage Set Point into the Override Region, the capacity are prevented from increasing further, and the status line on the 19 Series PIC 5+ 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 shall be decreased until the value meets the Override Termination Condition. The 19 Series PIC 5+ 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.)

Besides the above overrides, other types of override will not override control guide vane or VFD. Only override events 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 – 2F.

High Compressor Bearing Temperature Override

For 19XR6/7 and 19DV, if one of the compressor bearing temperature is greater than the compressor bearing temperature Alert threshold then High Bearing Temperature Override will be active until all of the compressor bearing temperature is less than Comp Bearing Temp Alert minus 2F.

For 19XR2~E/V/D chiller, if the calculated bearing temperature is greater than the bearing temperature alert threshold, then high bearing temperature override will be active until the calculated bearing temperature is less than the threshold minus 2F.

Low Discharge Superheat Temperature Override

Ignore low discharge superheat override during first 5 minutes after chiller startup completed. After 5 minutes elapse, for two stage 19XRE chiller, keep ignoring it until the first time (Cond pressure – Evap pressure) > 10psid; for 19XR6/7, keep ignoring it until the first time Damper becomes not fully closed for a consecutive 20 seconds; for 19DV, Ignore low discharge superheat override during first 5 minutes after chiller startup completed.

Override Condition	Override Parameter	First Stage Capacity Inhibit	Configurable Range Value	Second Stage Capacity Decrease	Override Termination
High Condenser Pressure OVERRIDE (185Psi condenser)	CONDENSER PRESSURE	> COND PRESS OVERRIDE LOW	For low condenser type 140psig (90 - 157 psig)	> COND PRESS OVERRIDE HIGH + 2.4 psi	< COND PRESS OVERRIDE HIGH - 1 psi
High Condenser Pressure OVERRIDE (300Psi Condenser)	CONDENSER PRESSURE	> COND PRESS OVERRIDE HIGH	For high condenser type 250 psig (200 – 265 psig)	> COND PRESS OVERRIDE LOW + 2.4 psi	< COND PRESS OVERRIDE LOW - 1 psi
High Condenser Pressure OVERRIDE (44Psi condenser)	CONDENSER PRESSURE	> COND PRESS OVERRIDE DV 44	For low condenser type 20psig (18 - 25psig)	> COND PRESS OVERRIDE HIGH + 2.4 psi	< COND PRESS OVERRIDE HIGH - 1 psi
High Condenser Pressure OVERRIDE (72Psi Condenser)	CONDENSER PRESSURE	> COND PRESS OVERRIDE DV 72	For high condenser type 55 psig (20 – 56 psig)	> COND PRESS OVERRIDE LOW + 2.4 psi	< COND PRESS OVERRIDE LOW - 1 psi
Low Evaporator Temperature override	CALC EVAP SAT TEMP or EVAP REFRIG LIQUID TEMP	< EVAP SAT OVERRIDE TEMP Note: EVAP SAT OVERRIDE TEMP = EVAP TRIPPOINT + EVAP OVERRIDE DELTA T		< EVAP SAT OVERRIDE TEMP – 1F	> EVAP SAT OVERRIDE TEMP
High Motor Temperature OVERRIDE	COMP MOTOR WINDING TEMP	> COMP MOTOR TEMP OVERRIDE	200 F 150 to 200 F	COMP MOTOR WINDING TEMP > COMP MOTOR TEMP OVERRIDE + 10 F (5.6 C)	COMPR MOTOR WINDING TEMP < COMP MOTOR TEMP OVERRIDE - 2 F (1.1 C)
High CURRENT override	PERCENT LINE CURRENT	PERCENT LINE CURRENT > 100% or RECTIFIER OVERLOAD (Only for 32VS VFD) > 100%		PERCENT LINE CURRENT > 105% (If 32VS VFD is installed, PERCENT LINE CURRENT or RECTIFIER OVERLOAD > 102%)	PERCENT LINE CURRENT <= 100%
Low Discharge Superheat Override	Discharge Superheat	< DSH REQUIRED + 1		< DSH REQUIRED – 3	> DSH REQUIRED + 2
Low Source Temp Protection Override	Leaving chilled water temperature (Heating mode)			< LWT Protection Setpoint (Protective Limit Config)– 2F	> LWT Protection Setpoint (Protective Limit Config)– 2F

5.16 - Recycle Control

Recycle Mode — The chiller may cycle off and wait until the load is increased to meet restart requirements when the compressor is running in a lightly loaded condition. This cycling is normal and is known as “recycle.” A recycle shutdown is initiated when any of the following conditions are true:

Cooling Mode

- 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.

Heating Mode

- Leaving condenser water temperature (or entering condenser water temperature, if the EWT CONTROL OPTION is enabled) is more than 5° F (2.8° C) above 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 one degree F 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. The compressor will restart when the chiller is:

Cooling Mode

- 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.

Heating Mode

- 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.

5.17 - Running Timers and Counters

19 Series PIC 5+ 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 on the HMI. Both Ontime counters roll over to 0 at 500,000 hours. Manual changes to SERVICE ONTIME from the screen are permitted at any time.

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. TIMERS are displayed on the RUNTIMES screen and can be configured in CONFIGURATION MENU/ GENERAL CONFIGURATION screen.

These timers must expire before the chiller starts. If the timers have not expired the RUN STATUS parameter on the Default and GENERAL PARAMETERS screen reads TIMEOUT.

The other two timers displayed on the RUNTIME screen are ‘swift restarts in 1 hour’ and ‘recy startup in 4 hours’. The first defines a maximum of 4 times of swift restarts can be applied for the chiller in 1 hour. The other clarifies that recycle restarts should be less than 5 times in 4 hours, otherwise system will not pass prestart check.

5.18 - Water Pumps Control

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 CONFIGURATION MENU/ FACTORY screen).

Evaporator Freeze Prevention

When the evaporator saturated refrigerant temperature or evaporator refrigerant temperature is less than the EVAP REFRIG TRIPPOINT plus the REFRIG OVERRIDE DELTA T (configurable from 2°F to 5°F (1.1°C to 2.8°C) in CONFIGURATION MENU/ PROTECTIVE LIMIT CONFIG screen), event “OVERRIDE – LOW EVAP REFRIG TEMP” will occur.

In all running status, if either of the following conditions is true:

- evaporator saturated refrigerant temperature or evaporator refrigerant temperature is equal to or less than the EVAP REFRIG TRIPPOINT (33° F or 0.6° C for water, configurable for brine in CONFIGURATION MENU/ PROTECTIVE LIMIT CONFIG screen) plus one degree F.
- Leaving chilled water temperature or entering chilled water temperature is less than EVAP REFRIG TRIPPOINT plus 1 degree F.

Then Protective Limit Alarm evaporator freeze will be displayed, the unit will shut down, if chiller is in recycle mode then it will transition to TRIPOUT, and the CHILLED WATER PUMP will remain on. The alarm will be clearable when 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 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. The default value is 140 psig (965 kPa) for 185PSI condenser and 250 psig (1724 kPa) for 300PSI condenser; default value is 10 psig (137.9kPa) for 44PSI condenser and 55 psig (379.2 kPa) for 72PSI condenser.*

Condenser Freeze Prevention — This control helps prevent condenser tube freeze-up by energizing the condenser pump relay. The 19 Series PIC 5+ 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.

5.19 - Controls Test

This function is used to test all controlled outputs except compressor output. The test function will only be allowed to run when the unit is Off.

User password is required to active this test function. All control test parameters shall be accessible in the table “QCK_TEST”. To perform the control test function, the first item “Quick Test Enable” in the “QCK_TST” table shall be set to enable. The “Quick Test Enable” item will be automatically disabled in one hour in order to make the controls go back to normal if someone forget to disable it.

Unless otherwise noted, all protective limits shall remain active during Controls Test.

5.19.1 - Discrete Outputs

When control test is enabled, the following discrete outputs can be enabled to be forced to ON by setting the according points to Yes in the quick test table.

Guide Vane Increase, Guide Vane Decrease, Oil Pump Relay, Oil Heater Relay, EC Valve Open, EC Valve Close, Economizer Damper Valve Open, Economizer Damper Valve Close, Alarm relay, Alert relay and Refrigerant Pump relay.

NOTE: *the following outputs cannot be force to ON at the same time*

Guide Vane Increase and Guide Vane Decrease;

EC Valve Open and EC Valve Close;

Economizer Damper Valve Open and Economizer Damper Valve Close

For oil pressure, a value ≥ 18 psi within 40 seconds after oil pump is turn ON will indicate a confirmation of pressure (Oil Pres Test Passed=YES).

For Refrigerant Pump, a value ≥ 10 psi within 15 seconds after refrigerant pump is turn ON will indicate a confirmation of pressure.

5.19.2 - Analog Output

When control test is enabled, the following analog outputs can be enabled to be driven to the commanded positions which input in the quick test table.

Head Pressure Valve, Diffuser Actuator, Oil EXV and chiller status output (Q_CHST)

5.19.3 - Guide Vane Calibration

Guide vane position should be calibrated before startup chiller.

Guide vane calibration can be started by setting “Quick Test Enable” to Enable and “GV1 calibration Enable” to Enable.

If the actuator type is digital, then

- The fully closed guide vane feedback resistance will be in the range of 62.5 Ohms to 688 Ohms
- The fully opened guide vane feedback resistance will be in the range of 6190 Ohms to 11496 Ohms

Else if the actuator type is analog, then

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

When chiller type is 19DV, guide vane 2 also need calibration, same as guide vane 1.

5.20 - Swift Restart

This function is designed for data center application, and it allows the chiller to be restarted swiftly to meet the building load requirements.

To enable this function, the “auto restart option” point in CONF_OPT table should be set to “ENABLE”.

The water flow verification time, oil prelube time and other delays will be decreased accordingly. If the control system and oil system are equipped UPS (uninterrupted power supply), the startup time will be decreased accordingly.

5.21 - Cooling Tower Control

If “water pressure option” in CONF_OPT table is ENABLED, there will be another optional hydraulic control I/O board in the PIC 5+ control system to allow PIC 5+ control 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 is the optimal range.

5.22 - Head Pressure Control

If the chiller system is equipped with head pressure control valve, and head pressure valve option in CONF_OPT table is ENABLED, then PIC 5+ control system will control the opening of head pressure valve to maintain the pressure difference between condenser and evaporator. The output of this valve is 4-20mA type.

Before using this function, the appropriate configurations should be in place. They are pressure difference value for 20mA and pressure difference for 4mA.

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

5.23 - Ice Build Option

PIC 5+ control provides ice build option based on efficiency improving point.

“ice build option” in CONF_OPT table should be set to ENABLED to make ice build active, and another two configurable parameters should be configured.

Ice_recy indicates whether recycle option is enabled in ice build mode or not.

Ice_term indicates how the ice build is terminated. There are three types, temperature, dry contact or combined temperature and dry contactor.

5.24 - Time Schedule

PIC 5+ control provides three schedules, they are:

Local schedule, Ice build schedule and Network schedule

There are 8 time segments in each schedule, if there is an overlap on the two time segments, then occupied time segment takes the high priority.

There are 16 holiday time segments in Holiday Menu, and each time segment is determined by three parameters, month, start date and holiday days. The controller will be in unoccupied mode when holiday is active.

PIC 5+ also provides Daylight Saving function. Broadcast Menu, enable this function and set the Daylight Saving start time and end time.

5.25 - Black Box

The black box task continuously stores operation parameters in the memory every 5 seconds. Reporting of chiller operation alarm would trigger the controller to generate a collection of the records. Each collection contains up to 180 records (15 minutes) which consist of 168 records (14 minutes) before the alarm and 12 records (1 minute) after. Each record is associated with a time stamp. These collections are saved as csv files. 20 files can be stored in total.

The black box file can be uploaded with Carrier S-Service tool. Once the upload is done, the original files saved in controller will be erased.

5.26 - Pressure Transducer Calibration

When pressure transducer calibration is performed, entering value shall result in a recalculation for the slope and intercept of the 2 values. Thereafter, the new slope and intercept values shall be used for voltage ratio to pressure conversions.

- **Step 1:** Set CALIBRATION ENABLE for certain pressure transducer
- **Step 2:** Put the transducer at atmosphere and enter 0 PSIG (0 kPa) to CALIB PRESS1
- **Step 3:** Give the transducer a known pressure (100-250 PSI (690-1700 kPa)) via Tool and enter this pressure to CALIB PRESS2
- **Step 4:** Recalculate calibrated Slope and Intercept

5.27 - Temperature Sensor Calibration

The four water temperature sensors can be calibrated per the following steps:

- **Step 1:** Place the temperature sensor at 32 °F (0 °C)

Drop each temperature sensor in a 32 °F (0 °C) water solution.

- **Step 2:** Read the sensor raw temperature in maintenance screen

Go to maintenance screen, read the corresponding sensor raw temp

Calculate the offset to be applied = 32 - sensor raw temp

Example:

ECW sensor raw temp reads 32.6 °F

ECW temperature offset must be configured to -0.6 ^F (32-32.6 = -0.6)

- **Step 3:** Configure the sensor offset

In temperature calibration screen, set the corresponding sensor temperature offset calculated in step 2.

Note, the offset cannot exceed +/- 2 ^F.

Example:

ECW temperature offset must be configured to -0.6 ^F (32-32.6= -0.6)

- **Step 4:** (optional) Verify that the sensor offset is configured correctly

Verify the following:

- Sensor raw temp has not changed.
- Sensor temperature offset now shows the configured value.
- Sensor control value is calibrated, and now shows 32 °F.

Example:

“ECW sensor raw temp” still reads 32.6 °F

“ECW temperature offset” now shows -0.6 ^F

“Entering Chilled Water” now shows 32 °F.

5.28 - ISM Calibration

5.28.1 - ISM Calibration on J8B 4-20mA Output

- **Step 1:** Input a test output mA value on the touchscreen UI

The controller will make ISM output this mA value.

- **Step 2:** Input the actual reading of mA value from VFD or mA meter
- **Step 3:** Recalculate calibration factor

Calibration Factor = 1000 * (Actual Reading mA - output mA)

Range: 0-2000.

5.28.2 - ISM Calibration on J6 0-10v Input

- **Step 1:** When chiller is running, record the VFD feedback voltage and the actual reading on ISM.
- **Step 2:** Shut down the chiller, enable ISM Calibration
- **Step 3:** Input the VFD feedback voltage
- **Step 4:** Input the actual reading of ISM
- **Step 5:** Recalculate calibration factor

Calibration Factor = 1000 * (VFD feedback voltage / ISM actual reading voltage)

Range: 800-1200

5.29 - Alarm Email

The purpose of the alarm email is to send e-mails to service for remote maintenance.

A service configuration table EMAILCFG is used for network properties configuration. Once the EMAILCFG table configuration is changed, a test email will be sent for checking configuration.

This task is checking the status of alarms. Once there is any alarm switches on, it would send the email with relative information. When all alarms go back to normal, an e-mail would be sent too.

The e-mail provides the unit description and location stored in the CTRL_ID table.

CCN Element Number	1
CCN Bus Number	0
CCN Baud Rate	38400
Device Description	19 Series PIC5+
Location Description	
Software Part Number	SCG-ST-20M200400
Serial Number	

5.30 - Prognostic

This prognostic function is designed for service trouble shooting, can be access from Alarm Menu. The prognostic function enables the service engineer to resolve the problem before they affected the operating efficiency and the chiller bottom life.

The following functions could be active only if the prognostic function is enabled (prog_en=YES)

The following screen is designed for prognostic. For each items, there are three different colors of traffic lamps to indicate the status. Green lamp indicate it is normal, red indicate there is problem and yellow lamp indicate it is near the problem region.

Compressor Ontime	0.9 HOURS
Total Compressor Starts	2
Oil Quality	●
Oil Filter	●
Refrigerant Transducer Deviation	●
Refrigerant Charge	●

5.31 - Master Slave Control

The control shall provide the capability to operate 2 chillers in Master/Slave mode. Slave chiller should be set to NETWORK mode and controlled by Master chiller.

The two chillers in Master/Slave control can be configured to be in parallel or in series mode. When they are in series mode, master chiller's evaporator must be in downstream, and user is able to configure which one's condenser is in downstream. The master chiller shall monitor all external commands as start/stop, demand limiting or setpoint configuration.

The master slave function shall provide the ability to select a lead chiller among the master and the slave chillers. Selection shall be based on the delta between the master and the slave run hours and shall try to optimize the runtime hours. If this function is unused then, the lead chiller shall always the master and should be changed to lag when it failed.

The lead chiller shall always be started firstly 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 then, all master/slave functions shall be disabled and chillers shall return to standalone operations until communication is reestablished.

If Middle sensor is installed, user can configure Middle Sensor Option in Master Slave Config table.

5.32 - Oil EXV Control

If the chiller system is equipped with Oil EXV control valve, and Oil EXV valve option in CONF_OPT table is ENABLED, then PIC 5+ control system will control the opening of Oil EXV valve to maintain the oil supply temperature. The output of this valve is 4-20mA type.

Before using this function, the appropriate configurations should be in place. They are Oil Temp High Threshold and Oil Temp Low Threshold.

1 minute after compressor starts, if oil supply temperature > Oil Temp High Threshold, oil EXV valve should be in fully opened position; if oil supply temperature < Oil Temp low Threshold, oil EXV valve should be in fully closed position; otherwise, oil EXV valve position will be calculated according to oil supply temperature.

During 1 minute after compressor starts or shutdown completed, the oil EXV valve should be in fully closed position

5.33 - Pumpdown/Lockout

The Pumpdown/Lockout feature prevents compressor start-up when there is no refrigerant in the chiller. This function is password-protected, user can access to this function via maintenance menu

When using Pumpdown/Lockout function, will observe freeze up precautions whiling using external pumpout to remove refrigerant from chiller:

- Start water pumps and confirm flows
- Monitor Evaporator pressure, Condenser pressure, Evaporator refrigerant temperature during pumpout procedures
- Turn pumps off after pumpdown
- Proceed to locks out compressor

The Terminate Lockout feature ends the Pumpdown/Lockout after refrigerant is added:

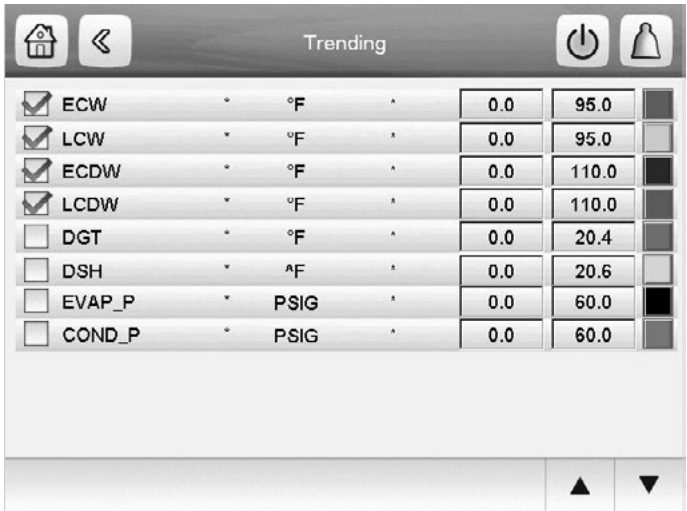
- Starts pumps and confirm flows
- Monitor Evaporator pressure, Condenser pressure, Evaporator temperature during charging process
- Terminates compressor lockout

5.34 - Trending

Accessing trending configuration screen does not require any specific login level.

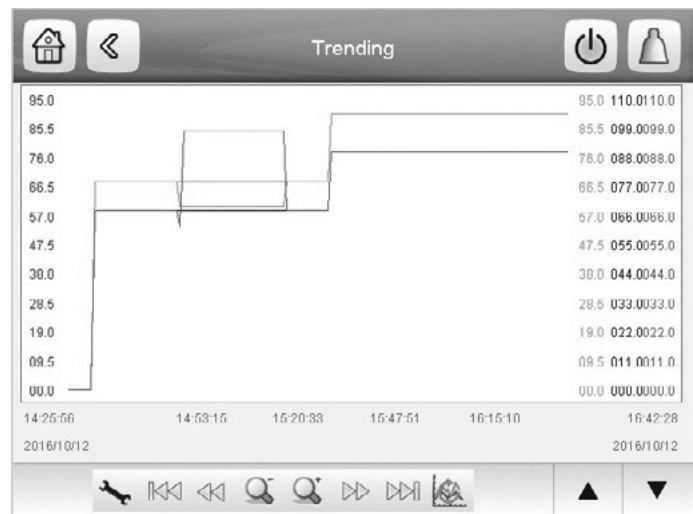
Just browse to Main Menu - > Trendings 

Configuration is saved using the appropriate button: 



ECW	LCW	ECDW	LCDW	DGT	DSH	EVAP_P	COND_P
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	95.0	110.0	110.0	20.4	20.6	60.0	60.0

The Trending screens are made to adjust and display the trending curves recorded by the system.



5.35 - Electronic Document

PIC 5+ controller provides online electronic documents. Users can view the electronic edition of User Manual online via computer.

See the following picture, click the button with wrench icon will lead you to user manual for chiller control. Click the button with question mark will lead you to user manual for Bacnet.



5.36 - Hydraulic Option Control

5.36.1 - Water Flow Measurement

PIC 5+ Controller provides the function of measuring water flow rate.

It can compute the water flow rate from the input signal sent from the evaporator/condenser water flow sensor (4-20ma) to the IOB if water flow meter is installed.

- **Step 1:** Set "Factory Parameters" -> "IOB4 Option" as "Yes".
- **Step 2:** Set "Option Configuration" -> "Water Flow Measurement" as "Flow Meter", and the corresponding value of Water Flow at 4ma and 20ma.
- **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 4ma/20ma)

It also can compute the water flow rate from the water pressure drop which is get from water pressure sensors or water pressure drop sensors

- **Step 1:** Set "Factory Parameters" -> "IOB4 Option" as "Yes".
- **Step 2:** Set "Option Configuration" -> "Water Flow Measurement" as "Water PD", and the corresponding value of Evap/Cond Flow Rate Baseline and Evap/Cond Pressure Drop Baseline.
- **Step 3:** See 5.34.2 for water pressure difference setting.
- **Step 4:** In "Hydraulic Status" menu, check evaporator/condenser water flow rate value.

If water flow switch is installed, then the water flow switch status will directly indicate the flow status

- **Step 1:** Set "Factory Parameters" -> "IOB4 Option" as "Yes".
- **Step 2:** Set "Option Configuration" -> "Water Flow Determination" as "Flow Switch"
- **Step 3:** In "Hydraulic Status" menu, check evaporator/condenser water flow.

5.36.2 - Water Pressure Difference Measurement

PIC 5+ Controller provides the function of measuring water pressure difference. When entering and leaving water pressure transducer is installed, or when water pressure drop transducer is installed, PIC 5+ can compute or read the water pressure difference between entering and leaving water pressure, and determine whether 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, then the chiller can start. Otherwise there will be an alarm shutdown.

For entering and leaving water pressure transducer:

- **Step 1:** Set "Factory Parameters" -> "IOB4 Option" as "Yes".
- **Step 2:** Set "Option Configuration" -> "Water Pressure Option" as "Pressure".
- **Step 3:** In "Hydraulic Status" menu, check Condenser Water Delta P, Condenser Water Flow, Evaporator Water Delta P, Evaporator Water Flow

For water pressure drop transducer:

- **Step 1:** Set "Factory Parameters" -> "IOB4 Option" as "Yes".
- **Step 2:** Set "Option Configuration" -> "Water Pressure Option" as "Pressure Drop".
- **Step 3:** Set "Option Configuration" -> "Water Pressure Drop @20mA" the rated value of the transducer.
- **Step 4:** In "Hydraulic Status" menu, check Condenser Water Delta P, Condenser Water Flow, Evaporator Water Delta P, Evaporator Water Flow

5.37 - Marine Option

Marine chillers are a little different from common chillers, and have a few new functions.

5.37.1 - Oil Stir

If "Factory Parameters" -> "Marine Option" is enabled, when chiller is not running, the oil pump will be switched on for 30 seconds every 3 hours, no matter oil heater is on or off. When oil stir is in progress, oil heater will be switched off.

5.37.2 - 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 the permission to start feedback, the start up will proceed. The power request signal will remain active till the compressor is switched on. If there is still no permission to start feedback 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 Opt" is enabled, the power request signal will remain active after the compressor is switched on. If permission to start feedback is deactivated while compressor is running, an alarm shutdown will be triggered.

5.37.3 - 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.

5.37.4 - Evaporator Liquid Temperature Calculation

If "Option Configuration" -> "Evap Liquid Temp Opt" is set to Enable, the controller will read evaporator liquid temperature from evaporator temperature transducer.

If this option is set to Dsable, evaporator liquid temperature will be calculated from evaporator pressure transducer.

5.37.5 - 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 or BACNet.
- Free Cooling Start Switch contact is closed.

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.

5.37.6 - Condenser Flushing

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. Then user can 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 automatically end. 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, condenser flush will automatically end and chiller will normally start up.

5.38 - Extended Open Protocol Connector

Ethernet connector and CCN connector on PIC 5+ controller can be configured to be a Modbus connector from software version 3.2 with the following steps:

- **Step 1:** Configuration Menu -> Network Configuration, Modbus Option set to Enable
- **Step 2:** Modbus Server Type set to 0(IP), Ethernet connector will be the Modbus connector; Set to 1(RS485), CCN connector will be the Modbus connector.
- **Step 3:** Wait 40s, controller will reboot automatically to save the configuration change.

Even if ethernet connector is configured to be the extended Modbus connector, it still can be configured to Bacnet with Bacnet dongle installed and Bacnet option set to enable.

5.39 - Purge Control

19DV equipped with purge control because the refrigerant working with low pressure.

Purge Control can be active (when Purge Inlet Temperature is greater than Purge Active Temperature Setpoint) or forced ON whenever chiller compressor is ON or chiller is OFF with Purge On Idle Option enable.

There will be 3 minutes delay after purge control is active. If purge control is forced or 3 minutes delay is expired, the system will purge refrigerant from condenser when chiller compressor is running or from compressor when chiller compressor is not running.

When Purge Compressor Suction Temp is less than 6F and purge level switch low is off, the system start to vacuum for about 10s. After that the system shall start 20s delay and then check Purge Compressor Inlet Temp again.

When refrigerant level in purge tank is high or Purge Compressor Suction Temp is less than 12F and purge level switch low is on, then drainage will be enable to drain refrigerant from purge tank until refrigerant level is low. Purge Drainage Valve will be ON to drain refrigerant from purge tank to evaporator regardless compressor is running or not

If Purge Pumpout Valve is accumulated ON for 100 minutes, purge system will do regeneration process regardless purge active or not.

5.40 - Motor Rotation Check

19DV provides Motor Rotation check function. In Quick Test table, enable quick test, then enable Motor Rotation Check. The controller will initiate the check process. Service will observe from the lens on chiller to see if the Motor is properly installed.

5.41 - Heat Reclaim UI

When chiller type is 19XR2~E/V/D, Configure Heat Reclaim option in Factory table, select Full or Partial. Heat Reclaim Entering Temp and Heat Reclaim Leaving Temp will show on the controller home page and condenser status page. (IO channel: IOB3 AI3 & AI4)

5.42 - Onboard Service Log

PIC 5+ controller provides onboard service log, it can be access from Alarm Menu. Service can add General or Carrier service log based on the login level. Service log contains service technician basic information, service content, and pre-stored maintenance sub items. Service log will be saved when controller reboot or software upgraded.

5.43 - Carrier Smart Password

PIC 5+ provides smart password for better security, and the password changes periodically. With smart password, only authorized people can login controller and do chiller service. Only carrier authorized technicians can access key product configuration and maintenance data.

5.44 - Heat Exchange Performance Plot

PIC 5+ provides Heat Exchange Performance Plot, it can be access from Alarm Menu. This function can be enabled in Prognostic table, set the threshold for condenser and evaporator LTD. After chiller running for 3 hours, the controller will start plotting with color according to LTD setting after chiller running 3 hours. So the user can get the LTD information more intuitively.

6 - DIAGNOSTICS – TROUBLESHOOTING

This section provides the overview of actions to be taken in case any operating problems occur.

6.1 - General

The 19 Series PIC 5+ 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.

6.2 - Displaying Alarms

The alarm icon on the interface (see section 4.5) allows the quick display of the unit status.

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

The “Reset alarms” menu on the main interface displays up to five alarm codes that are active on the unit.

6.3 - Resetting Alarms

When the cause of the alarm has been identified and corrected, the alarm can be reset, depending on the type either automatically or manually (once the action has been taken on the unit).

In the event of a power supply interrupt, if Auto Restart Option is set to ENABLE in Option configuration menu, 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 unit from restarting.

A manual reset must be run from the main interface via the ALARMRST menu, item RST_ALM.

NOTE: Please note that once the alarm has been corrected or reset, all information regarding solved alarms will be stored in the Alarm History.

6.4 - Alarm Codes

6.4.1 - General Alarm Codes

Alarm code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Temperature sensor faults				
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.
Alm-201	ALM-201 Sensor Fault - Entering Chilled Water	As above	As above	Check sensor resistance. Check for proper wiring between Entering Chilled Water Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-202	ALM-202 Sensor Fault - Leaving Cond Water Temp	As above	As above	Check sensor resistance. Check for proper wiring between Leaving Cond Water Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-203	ALM-203 Sensor Fault - Entering Cond Water Temp	As above	As above	Check sensor resistance. Check for proper wiring between Entering Cond Water Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-204	ALM-204 Sensor Fault - Comp Discharge Temp	As above	As above	Check sensor resistance. Check for proper wiring between Comp Discharge Temp Sensor and connector. Check for disconnected, grounded, or shorted wiring.
Alm-205	ALM-205 Sensor Fault - Oil Sump Temp	As above	As above	Check sensor resistance. Check for proper wiring between Oil Sump Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-206	ALM-206 Sensor Fault - Oil Supply Temp	As above	As above	Check sensor resistance. Check for proper wiring between Oil Supply Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-207	ALM-207 Sensor Fault - Evap Refrig Liquid Temp	As above	As above	Check sensor resistance. Check for proper wiring between Evap Refrig Liquid Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-208	ALM-208 Sensor Fault - Low Speed Motor End Bearing Temp	As above	As above	Check sensor resistance. Check for proper wiring between Low Speed Motor End Bearing Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-209	ALM-209 Sensor Fault - Low Speed Comp End Bearing Temp	As above	As above	Check sensor resistance. Check for proper wiring between Low Speed Comp End Bearing Temp 2 Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-210	ALM-210 Sensor Fault - High Speed Motor End Bearing Temp	As above	As above	Check sensor resistance. Check for proper wiring between High Speed Motor End Bearing Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-211	ALM-211 Sensor Fault - High Speed Comp End Bearing Temp	As above	As above	Check sensor resistance. Check for proper wiring High Speed Comp End Bearing Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-212	ALM-212 Sensor Fault - Comp Motor Winding 1 Temp	As above	As above	Check sensor resistance. Check for proper wiring between Compressor Motor Temp 1 Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-213	ALM-213 Sensor Fault - Comp Motor Winding 2Temp	As above	As above	Check sensor resistance. Check for proper wiring between Compressor Motor Temp 2 Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-214	ALM-214 Sensor Fault - Comp Motor Winding 3 Temp	As above	As above	Check sensor resistance. Check for proper wiring between Compressor Motor Temp 3 Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-221	ALM-221 Sensor Fault - Thrust Bearing Oil Temp	As above	As above	Check sensor resistance. Check for proper wiring between Thrust Bearing Oil Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-222	ALM-222 Sensor Fault – Bearing Refrig Supply Temp	As above	As above	Check sensor resistance. Check for proper wiring between Bearing Refrig Supply Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-223	ALM-223 Sensor Fault – Purge Comp Suction Temp	As above	As above	Check sensor resistance. Check for proper wiring between Purge Comp Suction Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-228	ALM-214 Sensor Fault – Common CHWS Temp	As above	As above	Check sensor resistance. Check for proper wiring between Common CHWS Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.

Alarm code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Alm-229	ALM-221 Sensor Fault – Common CHWR Temp	As above	As above	Check sensor resistance. Check for proper wiring between Common CHWR Temp and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-350	ALM-350 Sensor Fault - 19DV 1st Bearing Temp	As above	As above	Check sensor resistance. Check for proper wiring between 19DV 1st Bearing Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.
Alm-351	ALM-351 Sensor Fault - 19DV 2nd Bearing Temp	As above	As above	Check sensor resistance. Check for proper wiring between 19DV 2nd Bearing Temp Sensor and IOB connector. Check for disconnected, grounded, or shorted wiring.

Pressure transducer faults

Alm-215	ALM-215 Sensor Fault - Condenser Pressure	Automatic if the voltage transmitted 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.
Alm-216	ALM-216 Sensor Fault - Evaporator Pressure	As above	As above	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.
Alm-217	ALM-217 Sensor Fault - Economizer Pressure	As above	As above	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.
Alm-218	ALM-218 Sensor Fault - Diffuser Pressure	As above	As above	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.
Alm-219	ALM-219 Sensor Fault - Oil Sump Pressure	As above	As above	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 connector.
Alm-220	ALM-220 Sensor Fault - Oil Supply Pressure	As above	As above	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.
Alm-225	ALM-225 Sensor Fault – Pump Inlet Pressure	As above	As above	Check Pump Inlet 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.
Alm-226	ALM-226 Sensor Fault – Bearing Inlet Pressure	As above	As above	Check Bearing Inlet 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.
Alm-227	ALM-227 Sensor Fault – Bearing Outlet Pressure	As above	As above	Check Bearing Outlet 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.
Alm-352	ALM-352 Sensor Fault - 19DV Pump Outlet Pressure	As above	As above	Check 19DV Pump Outlet 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.

Prestart failure

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 Comp Bearing Temp sensor wiring and accuracy to IOB connector. Check Comp Bearing Temp Alert setting.
Alm-231	ALM-231 Prestart Failure - High Motor Temperature	As above	As above	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 Temp	As above	As above	Check Comp Discharge Temp in screen. Allow compressor discharge temperature sensor to cool. Check compressor discharge temperature sensor wiring and accuracy to IOB connector. Check for excessive starts. Check COMP DISCHARGE ALERT setting.

Alarm code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Alm-233	ALM-233 Prestart Failure - Low Refrigerant Temp	As above	As above	Check Evaporator Pressure, Evap Sat Rrefrig Temp, and Evap Rrefrig Liquid Temp. Check Evaporator Pressure transducer and Evaporator Refrigerant Liquid Temperature sensor wiring and accuracy. 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	As above	As above	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.
Alm-235	ALM-235 Prestart Failure - High Line Voltage	As above	As above	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	As above	As above	Guide Vane 1 Calibration in Quick Calibration screen. Check guide vane actuator feedback potentiometer and wiring to IOB connector.
Alm-237	ALM-234 Prestart Failure – No Power Supply	As above	As above	Check the Power Request Output and the Power Feedback input status.
Alm-238	ALM-238 Guide Vane 2 Calibration Not Completed	As above	As above	Guide Vane 2 Calibration in Quick Calibration screen. Check guide vane actuator feedback potentiometer and wiring to IOB connector.
Alm-239	ALM-239 Envelope Control Valve Calibration Not Completed	As above	As above	Envelope control valve Calibration in Quick Calibration screen. Check EC valve feedback potentiometer and wiring to IOB connector.

Protective limit

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	As above	As above	Perform Chilled Water pump test in Quick Test screen. Check Evap Refrig Liquid Temp 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	As above	As above	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 Temp	As above	As above	Check for closed compressor discharge isolation valve. Check if chiller was operating in surge conditions. Check COMP DISCHARGE TEMP 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 deg F. Check for fouled tubes, plugged water strainers, or non-condensable in the condenser.
Alm-254	ALM-254 Protective Limit - Low Evap Refrigerant Temp	As above	As above	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 flasc 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 EVAP REFRIG LIQUID TEMP 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	As above	As above	Check COMP MOTOR WINDING TEMP 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.

Alarm code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Alm-256	ALM-256 Protective Limit - High Bearing Temperature	As above	As above	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 COMP BEARING TEMP 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 Pressure	As above	As above	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. This Alarm is not caused by the High Condenser Pressure Switch.
Alm-258	ALM-258 Protective Limit - Spare Safety Device	As above	As above	Spare safety input has been closed
Alm-259	ALM-259 Protective Limit - Excessive Compressor Surge	As above	As above	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	As above	As above	Check motor starter 1M contactor wiring Check ISM current sensors
Alm-261	ALM-261 Protective Limit - Evaporator Frozen	As above	As above	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 EVAP REFRIG LIQUID TEMP sensor. Check for evaporator water box division plate gasket bypass. Check for fouled tubes.
Alm-262	ALM-262 Protective Limit - Condenser Frozen	As above	As above	The Cond Sat refig 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 deg F in cooler so equalization temperature in chiller approached 32 deg F. 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	As above	As above	Check SRD configurations
Alm-264	ALM-264 Protective Limit - Diffuser Position Fault	As above	As above	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	As above	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 4-20 mA or 1-5 V output from refrigerant leak sensor to IOB J15-5 Confirm that IOB SW2 dip switch 1 is in the correct position.

Alarm code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Alm-266	ALM-266 Protective Limit - IOB Low Voltage	Automatic	As above	Check IOB 24VAC power supply and the transformer output voltage
Alm-267	ALM-267 Protective Limit - Guide Vane 1 Fault	Manual	As above	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 Calibration and conduct Guide Vane Calibration. Check wiring between the guide vane feedback potentiometer and IOB terminals. Check the ohm guide vane position feedback potentiometer or 4-20mA current
Alm-268	ALM-268 Protective Limit - Damper Valve Fault	Manual	As above	Check damper valve wirings
Alm-269	ALM-269 Protective Limit - Envelope Control Valve Fault	Manual	As above	Check Envelope Control valve wirings
Alm-270	ALM-270 Protective Limit - High Cond Water Flow	Manual	As above	Check condenser water pressure sensor and wirings
Alm-271	ALM-271 Protective Limit - Emergency Stop	Automatic	As above	Check EMSTOP command from network and the remote stop dry contact from IOB
Alm-272	ALM-272 Protective Limit - ISM Config Conflict	Automatic	As above	Configuration data in controller and ISM are mismatch. In maintains 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 Restarts Limit Exceeded	Manual	As above	Check the reason why swift restart happens so frequently.
Alm-274	ALM-274 Protective Limit – Chiller Lockout	Automatic	As above	Check chiller lockout input in IOB
Alm-275	ALM-275 Protective Limit – Fire Alarm	Automatic	As above	Check fire alarm input in IOB
Alm-276	ALM-276 Protective Limit –Stop Override	Manual	As above	Check stop override point status in GENUIT table
Alm-277	Protective Limit - UI Freeze Reboot	Manual	Same as above	Power on reset PIC 5+ controller
Alm-278	Protective Limit - VFD Config Conflict	Manual	Same as above	Reset shall be automatic when the communication comes back to normal
Alm-279	Protective Limit - VFD Config Failure	Manual	Same as above	Check VFD Configurations and save it again
Alm-280	ALM-282 Protective Limit – High VFD Speed	Manual	As above	Check VFD actual speed
Alm-282	ALM-282 Protective Limit - Displacement Switch	Manual	As above	Check impeller displacement switch for NGC chiller
Alm-283	ALM-283 Protective Limit - High Pressure Switch	Manual	As above	Check high pressure switch for NGC chiller
Alm-284	ALM-284 Protective Limit - Power Feedback Loss	Manual	As above	Check Power Feedback Input
Alm-285	ALM-285 Protective Limit - Low Bearing Delta Pres Difference	Manual	As above	Check if the filter of refrigerant pump inlet is clogged. If clogged, please replace that filter. Check if refrigerant pump works. If pump fails, please replace refrigerant pump. Check if high float chamber has liquid. If no liquid, please wait until chiller automatically charge refrigerant into high float chamber. Check if bearing filter is clogged. If clogged, please replace bearing filter
Alm-286	Protective Limit - Low Liquid Level in High Float VLV	Manual	Same as above	Reset shall be manual
Alm-290	ALM-290 Protective Limit – Long Time Purge Active	Manual	As above	Check if there's large leak on chiller. Check if purge vacuum pump fails. If it fails, please replace this vacuum pump.
Alm-291	ALM-291 Protective Limit – Drainage System Failure	Manual	As above	Check if purge drain filter is clogged. If clogged, please replace that filter. Check if refrigerant pump can't work. If refrigerant pump fails, please replace this pump
Alm-292	ALM-292 Protective Limit - Guide Vane 2 Fault	Manual	As above	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 Calibration and conduct Guide Vane Calibration. Check wiring between the guide vane feedback potentiometer and IOB terminals. Check the 4-20mA current
Alm-293	ALM-293 Protective Limit - Low Ref Pump Pressure Difference	Manual	As above	Check refrigerant pump Check refrigerant pump wiring
Alm-294	ALM-294 Protective Limit - High Ref Filter Pressure Difference	Manual	As above	Check refrigerant filter Check refrigerant filter wiring
Alm-295	ALM-295 Protective Limit - High Bearing Refrig Supply Temp	Manual	As above	Check bearing refig supply temperature sensor
Alm-296	ALM-296 Protective Limit - High Evaporator Pressure	Manual	As above	Check evaporator pressure sensor input And check evaporator pressure cutout configurations
Alm-298	ALM-297 Protective Limit - Low Bearing Refrig Supply Subcooling	Manual	As above	Check bearing inlet pressure sensor input And check bearing ref supply temperature sensor

Alarm code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Communication Failure				
Alm-300	ALM-300 Loss Communication With ISM	Automatic when the communication comes back to normal	Unit shuts down.	Bus installation fault or defective slave board
Alm-301	ALM-301 Loss Communication With IOB1	As above	As above	Bus installation fault or defective slave board
Alm-302	ALM-302 Loss Communication With IOB2	As above	As above	Bus installation fault or defective slave board
Alm-303	ALM-303 Loss Communication With IOB3	As above	As above	Bus installation fault or defective slave board As above
Alm-304	ALM-304 Loss Communication With IOB4	As above	As above	Bus installation fault or defective slave board
Alm-305	ALM-305 Loss Communication With IOB5	As above	As above	Bus installation fault or defective slave board
Alm-306	ALM-306 Loss Communication With SIOB	As above	As above	Bus installation fault or defective slave board
Alm-307	ALM-307 LEN Scan Error	Manual	As above	Check LEN bus hardware physical wiring and software log
Alm-308	ALM-308 Loss Communication With VFD	Automatic when the communication comes back to normal	As above	Bus installation fault or defective slave board
Alm-309	ALM-309 Loss Communication With VFD Gateway (LEN)	As above	As above	Bus installation fault or defective slave board
Alm-310	ALM-310 Loss Communication With VFD (Modbus)	As above	As above	Bus installation fault or defective slave board
Alm-350	Sensor Fault - 19DV 1st Stage Bearing Temp	As above	As above	Tested when the compressor is on whatever the run status and the communication between Main board and IOBs is ok, If compressor 1st Bearing Temp is outside the range of -39.5 to 244.5°F
Alm-351	Sensor Fault - 19DV 2nd Stage Bearing Temp	As above	As above	Tested when the compressor is on whatever the run status and the communication between Main board and IOBs is ok, If compressor 2nd Bearing Temp is outside the range of -39.5 to 244.5°F
Alm-352	Sensor Fault - 19DV Pump Output Pressure	As above	As above	Tested when the compressor is whatever the run status and the communication between Main board and IOBs is ok, if Bearing Outlet Transducer voltage outside
Integrated Starter Module Alarms				
Alm-400	ALM-400 ISM Fault - Line Voltage Dropout	Manual	Unit shuts down.	Temporary loss of voltage. SINGLE CYCLE DROPOUT in the ISM_CONF screen is Enabled and two LINE VOLTAGES < 50% MOTOR RATED LINE VOLTAGE. Check ISM_HIST screen. Disable Single Cycle Dropout in VFD_CONF screen.
Alm-401	ALM-401 ISM Fault - Line Phase Loss	As above	As above	Any LINE VOLTAGE < 50% MOTOR RATED 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	As above	As above	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 & J3-VL3.
Alm-403	ALM-403 ISM Fault - Low Line Voltage	As above	As above	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 & J3-VL3.

Alarm code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Alm-404	ALM-404 ISM Fault - Line Current Imbalance	As above	As above	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	As above	As above	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.
Alm-406	ALM-406 ISM Fault - Overload Trip	As above	As above	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 for consistent entering condenser water temperature and water flow rates. 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	As above	As above	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	As above	As above	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-409	ALM-409 ISM Fault - Ground Fault	As above	As above	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. 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 merger motor windings to ground and phase to phase. Call Carrier Service.
Alm-410	ALM-410 ISM Fault - Phase Reversal Trip	As above	As above	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	As above	As above	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	As above	As above	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	As above	As above	Check 1M dry contact input
Alm-414	ALM-414 ISM Fault - Transition Contact Fault	As above	As above	Check 2M dry contact input
Alm-415	ALM-415 ISM Fault - Oil Pump / HPS Failure	As above	As above	Check high pressure switch and oil pump for legacy chiller and oil pump for NGC chiller

Alarm code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Alm-416	ALM-416 ISM Fault - Starter Fault	As above	As above	The ISM has received a start command and the starter has declared a Fault. The dry contacts connected to ISM J2-7 and J2-8 are open. See starter display for starter Fault Code. For Benshaw Inc. RediStart starters, view RediStart MICRO display. For VFD, check VFD display Fault History. Clear VFD faults with VFD keypad. For Allen-Bradley wye delta starters with RLA > 718 A, the TR3 timer may have expired as a result of a delayed transition.
Alm-417	ALM-417 ISM Fault - Motor Amps Not Sensed	As above	As above	The ISM has not sensed sufficient current for an excessive delay after 1M has closed. If LF1, verify J4 jumper on regulator card is on pins 1 and 2 (4-20mA). 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	As above	As above	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	As above	As above	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	As above	As above	Check 1M and 2M dry contact inputs
Alm-421	ALM-421 ISM Fault - Motor Amps When Stopped	As above	As above	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	As above	As above	Check ISM Hardware
Alm-423	ALM-423 ISM Fault - Calibration Factor Error	As above	As above	Check ISM Calibration Values
Alm-424	ALM-424 ISM Fault - Invalid Configuration Error	As above	As above	Check ISM Configurations
Alm-425	ALM-425 VFD Fault - Single Cycle Dropout	As above	As above	Temporary loss of voltage. Disable Single Cycle Dropout in CFGUMVFD screen.
Alm-426	ALM-426 VFD Fault - Line Current Imbalance	As above	As above	Check phase to phase and phase to ground power distribution bus voltage. Check Line Current Imbalance% in CFGUMVFD screen. Consult power company.
Alm-427	ALM-427 VFD Fault - High Line Voltage	As above	As above	Check phase to phase and phase to ground distribution bus voltage. Consult power company.
Alm-428	ALM-428 VFD Fault - Low Line Voltage	As above	As above	Check phase to phase and phase to ground distribution bus voltage. Consult power company.
Alm-429	ALM-429 VFD Fault - Low DC Bus Voltage	As above	As above	Verify phase-to-phase and phase-to-ground line voltage. VFD Circuit Board malfunction. Call Carrier Service.
Alm-430	ALM-430 VFD Fault - High DC Bus Voltage	As above	As above	Verify phase to phase and phase to ground line voltage. Monitor AC line for high transient voltage conditions. VFD Circuit Board malfunction. Call Carrier Service
Alm-431	ALM-431 VFD Fault - VFD Power On Reset	As above	As above	Temporary loss of VFD control voltage. Check VFD control power breaker, transformer and fuses
Alm-432	ALM-432 VFD Fault - Ground Fault	As above	As above	Check for condensation on motor terminals. Check motor power leads for phase to phase or phase to ground shorts. Disconnect motor from VFD and megger motor. Call Carrier Service.
Alm-433	ALM-433 VFD Fault - Line Phase Reversal	As above	As above	Reverse connections of any two line conductors to circuit breaker.
Alm-434	ALM-434 VFD Fault - Motor Overload Trip	As above	As above	Check VFD configurations Any phase current > 106% RLA. Can result from significant load side current imbalance when running at full load. Check entering condenser water temperature and water flow rate. Check Motor Rated Load Amps in CFGUMVFD screen.

Alarm code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Alm-435	ALM-435 VFD Fault - Rectifier Power Fault	As above	As above	Check VFD Status Malfunction within VFD Power Module. Call Carrier Service.
Alm-436	ALM-436 VFD Fault - Inverter Power Fault	As above	As above	Check VFD Status Malfunction within VFD Power Module. Call Carrier Service.
Alm-437	ALM-437 VFD Fault - Rectifier Overcurrent	As above	As above	Check VFD Status Check for high water temperatures or changes in water flow rates.
Alm-438	ALM-438 VFD Fault - Inverter Overcurrent	As above	As above	Check VFD Status Check for high entering water temperature or low condenser water flow. Check current settings in CFGUMVFD screen.
Alm-439	ALM-439 VFD Fault - Condenser High Pressure	As above	As above	Check Compressor Discharge High Pressure switch wiring and accuracy. Check for high condenser water temperatures, low water flow, fouled tubes. Check for division plate/gasket bypass. Check for noncondensables in refrigerant.
Alm-440	ALM-440 VFD Fault - Motor Amps Not Sensed	As above	As above	Check main circuit breaker for trip. Increase Current % Imbalance in CFGUMVFD screen.
Alm-441	ALM-441 VFD Fault - Motor Acceleration Fault	As above	As above	Check that inlet guide vanes are fully closed at start-up. Check Motor Rated Load Amps in CFGUMVFD screen. Reduce unit pressure if possible.
Alm-442	ALM-442 VFD Fault - Stop Fault	As above	As above	Check Inverter Power Unit VFD Circuit Board malfunction. Call Carrier Service.
Alm-443	ALM-443 VFD Fault - Rectifier Overtemp	As above	As above	Check Cooling and VFD Config. Check that VFD refrigerant isolation valves are open. Check VFD refrigerant cooling solenoid and refrigerant strainer. Check for proper VFD cooling fan operation and blockage.
Alm-444	ALM-444 VFD Fault - Inverter Overtemp	As above	As above	Check Cooling and VFD Config. Check that VFD refrigerant isolation valves are open. Check VFD refrigerant cooling solenoid and refrigerant strainer. Check for proper VFD cooling fan operation and blockage.
Alm-445	ALM-445 VFD Fault - Motor Current Imbalance	As above	As above	Check Motor Current Imbalance% in CFGUMVFD screen.
Alm-446	ALM-446 VFD Fault - Line Voltage Imbalance	As above	As above	Check phase-to-phase and phase-to-ground distribution bus voltage. Increase Line Voltage Imbalance% in CFGUMVFD screen.
Alm-447	ALM-447 VFD Fault - Frequency Fault	As above	As above	Check Power Supply If operating from a generator, check generator size and speed. Check utility power supply.
Alm-448	ALM-448 VFD Fault - VFD Comm Fail	As above	As above	Check VFD communication wiring and connectors. Check status lights on DPI Communications Interface Board. Call Carrier Service.
Alm-449	ALM-449 VFD Fault - VFD Fault	As above	As above	Check fault code and possible cause in corresponding type of VFD user manuals Call Carrier Service
Alm-450	ALM-450 VFD Fault - VFD Start Inhibit	As above	As above	The VFD Start Inhibit is derived from the Alarm bit being set in the VFD. The conditions causing the alarm must be corrected in the VFD to enable subsequent starts and operation
Alm-451	ALM-451 VFD Fault - VFD Checksum Error	As above	As above	Press Reset to Restore Configuration. Actual VFD checksum does not match calculated value.
Alm-452	ALM-452 VFD Fault - Inductor Overtemp Switch	As above	As above	Check Temp Switch and Cooling Fans. Check for cooling fan air flow obstructions
Alm-453	ALM-453 VFD Fault - Incompatibility Fault	As above	As above	Load compatible version files into drive

* Alarm code in ALARMRST table

6.4.2 - General Alert Codes

ALARMRST code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Prestart alert				
Alt-100	ALT-100 Prestart Alert - Starts Limit Exceeded	Automatic when the situation comes back 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. (Recycle restarts and auto restarts after power failure are not counted.)
Alt-101	ALT-101 Prestart Alert - Low Oil Temperature	As above	As above	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	As above	As above	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	As above	As above	Chiller load is too low to keep compressor on line and there has been more than 5 starts in 4 hours. Increase chiller load, adjust ecv to open at a higher load, increase recycle RESTART DELTA T in service menu. Check ec isolation valve position.
Alt-104	ALT-104 Prestart Alert - Waiting For Start Permission	As above	As above	Check whether Power Request Option is enabled by mistake. If the ship's power system not receive the power request signal, check the connection of power request output. If the ship's power system does not give the power permission signal, check the ship's power system. If the chiller does not receive the power permission signal, check the connect of power permission input.
Sensor alert				
Alt-120	ALT-120 Sensor Alert - Remote Temperature Out of Range	Automatic when the situation comes back 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 CCM J4-13 & J4-14.
Alt-121	ALT-121 Sensor Alert - Auto Water Temp Reset	As above	As above	CheckTemp 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	As above	As above	20mA 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.
Alt-123	ALT-123 Sensor Alert - VFD Speed Out Of Range	As above	As above	Check VFD speed feedback input in ISM
Alt-124	ALT-124 Sensor Alert - Humidity Sensor	As above	As above	Check humidity sensor input in IOB
Alt-125	ALT-125 Sensor Alert - Refrigerant Leak Input	As above	As above	Check refrigerant leak optional input in IOB
Alt-126	ALT-126 Sensor Alert - Diffuser Pos Feedback	As above	As above	Check Diffuser Position feedback
Alt-127	ALT-127 Sensor Alert - VFD Current Input	As above	As above	Check VFD current input
Alt-128	ALT-128 Sensor Alert - High Cond Water Pressure	As above	As above	Check optional condenser water pressure sensor Check condenser water flow
Alt-129	ALT-129 Sensor Alert - Leaving Cond Water Temp	As above	As above	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 for grounded sensor leads.
Alt-130	ALT-130 Sensor Alert - Entering Cond Water Temp	As above	As above	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 for grounded sensor leads.
Alt-131	ALT-131 Sensor Alert - Entering Cond Water Press	As above	As above	Check Entering Condenser Water pressure sensor voltage drop. Check for proper wiring to IOB. Check for grounded sensor leads.
Alt-132	ALT-132 Sensor Alert - Entering Chilled Water Press	As above	As above	Check Entering Chilled Water pressure sensor voltage drop. Check for proper wiring to IOB. Check for grounded sensor leads.
Alt-133	ALT-133 Sensor Alert - Leaving Cond Water Press	As above	As above	Check Leaving Condenser Water pressure sensor voltage drop. Check for proper wiring to IOB. Check for grounded sensor leads.
Alt-134	ALT-134 Sensor Alert - Leaving Chilled Water Press	As above	As above	Check Leaving Chilled Water pressure sensor voltage drop. Check for proper wiring to IOB. Check for grounded sensor leads.
Alt-135	ALT-135 Sensor Alert - Guide Vane 1 Position	As above	As above	Check guide vane 1 position feedback
Alt-136	ALT-136 Configuration Error - Temp Reset	As above	As above	Check temp reset configurations
Alt-137	ALT-137 Configuration Error - Controlled Water Delta T Reset	As above	As above	Check controlled water temp reset configurations

ALARMRST code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Alt-138	ALT-138 Configuration Error – Head Pressure	As above	As above	Check head pressure configurations
Alt-139	ALT – 139 Sensor Alert - Guide Vane 2 Position	As above	As above	Check guide vane 2 position feedback
Process alert				
Alt-146	Process Alert - High Ref Filter Delta Pressure	As above	As above	Reset shall be automatic when the situation comes back to normal
Alt-147	Process Alert - Drainage System Failure	As above	As above	Reset shall be automatic when the situation comes back to normal
Alt-148	Process Alert- Purge Daily Pumpout Limit Exceed	As above	As above	Reset shall be automatic when the situation comes back to normal
Alt-149	Process Alert - Low Bearing Delta Pres Difference	As above	As above	Reset shall be automatic when the situation comes back to normal
Alt-150	ALT-150 Process Alert - Low Discharge Superheat	Automatic when the situation comes back 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	As above	As above	Check EVAP APPROACH ALERT setting. Check Evaporator Water Flow. Check EVAP REFRIG LIQUID TEMP and LEAVING CHILLED WATER temperature sensor resistances and voltage drop. Check EVAP REFRIG LIQUID TEMP 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 degree temperature difference between leaving chilled water and leaving condenser water.
Alt-152	ALT-152 Process Alert - High Condenser Approach	As above	As above	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 non-condensable 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	As above	As above	Check the envelope control configurations
Alt-154	ALT-154 Process Alert - Damper Valve Alert	As above	As above	Check damper valve wiring and position feedback inputs
Alt-155	ALT-155 Process Alert - Low Oil Pressure Difference	As above	As above	Check oil pump wiring and oil filter Quick test oil pump as necessary
Alt-156	ALT-156 Process Alert - EC Valve Alert	As above	As above	Check EC valve wiring and feedback inputs
Alt-157	ALT-157 Process Alert - High Condenser Pressure Chiller Off	As above	As above	Check condenser pressure sensor input And check condenser pressure override configurations
Alt-158	ALT-158 Process Alert - Prognostic Alert	Automatic	As above	Check Alarm Menu – Prognostic table for detailed information
Alt-159	ALT-159 Process Alert – LEN Scan Warning	Manual	As above	Check LEN bus traffic with bus monitor
Alt-160	ALT-160 Process Alert – Oil Filter Replacement	Manual	As above	Check oil filter
Alt-161	ALT-161 Process Alert – Transducer Calibration	Manual	As above	Do the indicated transducer calibration
Alt-162	ALT-162 Process Alert – Low Refrigerant Charge	Manual	As above	Recharge the refrigerant into chiller
Alt-164	ALT-164 Process Alert – Displacement Switch Manual			Check impeller displacement switch
Alt-165	ALT-165 Process Alert – High Oil Supply Temp	Automatic	As above	Check oil supply temperature and OIL EXV status
Alt-166	ALT-166 Process Alert – Condenser Flushing	Automatic	As above	Flush condenser
Alt-167	ALT-167 Process Alert – Customer Alert	Automatic	As above	Check Customer Alert input contact
Alt-168	ALT-168 Process Alert - High Bearing Refrig Supply Temp	Automatic	As above	Check Bearing Refrig temperature sensor

ALARMRST code*	Description of the alarm text	Reset type	Action taken by the control	Possible cause
Alt-169	ALT-169 Process Alert - High Evaporator Pressure	Automatic	As above	Check evaporator pressure sensor input And check evaporator pressure override configurations
Alt- 191	ALT- 191 Process Alert - High Ref Filter Pressure Difference	Automatic	As above	Replace refrigerant filter

Master Slave Alert

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	As above	Check master slave SW version number
Alt-172	ALT-172 Master Slave Alert - Conflict Cooling Heating Mode	Manual	As above	Check master slave cooling heating selection
Alt-173	ALT-173 Master Slave Alert - Incorrect Slave Control Type	Manual	As above	Check slave control type
Alt-174	ALT-174 Master Slave Alert - Slave Tripout	Manual automatic in Master side	As above	Check slave chiller alarms
Alt-175	ALT-175 Master Slave Alert - incorrect Master Control Type	Manual	As above	Check master control type
Alt-176	ALT-176 Master Slave Alert - No Communication Master / Slave	Automatic	As above	Check communication between master and slave, wiring, etc.
Alt-179	ALT-179 Master Slave Alert - aster CCN Write Rejection	Manual	As above	Check CCN communication, hardware and software
Alt-180	ALT-180 Master Slave Alert - Slave address not slave	Manual	As above	Check master slave configurations

6.5 - Event States

A event state is a specific set of conditions which the controller may encounter when controlling the chiller. Event states are predictable and repeatable and represent known states of the control. If the control is in a particular state, there is a unique message associated with that state. The event states message are displayed on default screen of control panel.

Event No.	Description of event state
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
12	Guide Vane 2 Calibration
13	Envelope 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

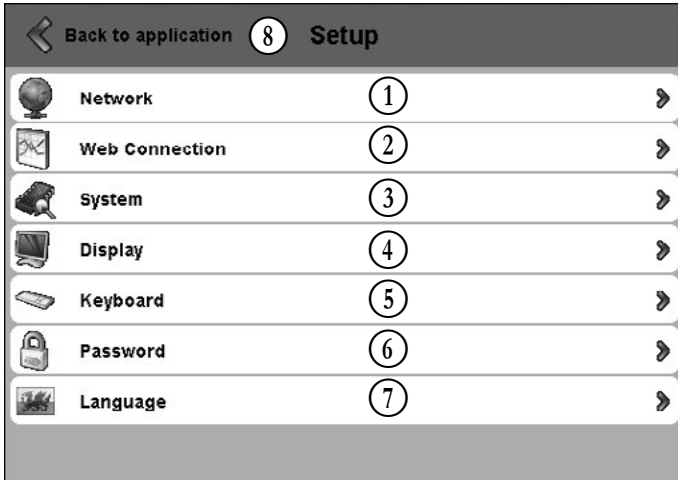
Event No.	Description of event state
60	Running - Temp Reset by 4-20 Ma Signal
61	Running - Temp Reset by Remote Temp Sensor
62	Running - Temp Reset by Water Dt
63	Running - Cooling Leaving Chilled Water
64	Running - Cooling Entering Chilled Water
65	Running - Heating Leaving Cond Water
66	Running - Heating Entering Cond Water
67	Envelope Control - Surge Correction
68	Envelope Control - Acts Before Recycle Shutdown
69	Envelope Control - Low Load Application
70	Envelope Control - Forced
71	Running - VFD Rampdown
72	Running - Guide Vane 1 Position Forced
73	Running - VFD Speed Forced
74	Surge Prevention - Low
75	Surge Prevention - High
76	Surge Protection
77	Running - VFD Overcurrent
79	Running - Damper Valve Forced
80	Operation - Oil EXV Forced
81	Running - Head Pressure Valve Forced
82	Purge - Forced
83	Running - Guide Vane 2 Position Forced
84	Operation - Refrigerant Lub Forced
85	Running - Vapor Source Valve Forced
87	Purge - Regeneration 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

7 - COLOUR TOUCH SCREEN INTERFACE PARAMETER SETTING

7.1 - Main Configuration Menu

The “Setup” display is only possible on the unit touch screen. To access the main configuration menu, press anywhere and at any time on the screen (excluding buttons or text fields) for 4 seconds.

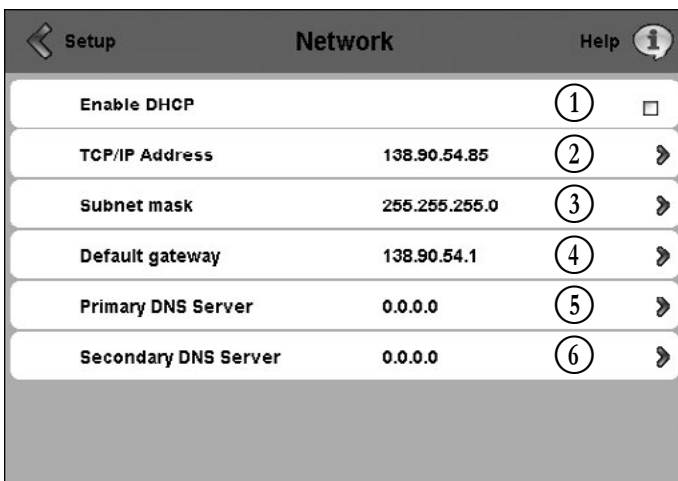
By default, access to the menu is not password-protected. The main configuration screen gives access to various unit parameters:



1	System properties for the Ethernet interface
2	Connection configuration, web welcome page
3	System: Software version, Buzzer
4	Display: Contrast, backlighted
5	Keyboard: Not applicable
6	Password for "Setup" access
7	Languages: for "Setup" only
8	Return to application

7.2 - Find and Modify the Unit IP Address

In the main configuration menu (see chapter 7.1) press on the network field “Network” to display the screen below.



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

If “Enable DHCP” is checked, PIC 5+ will automatically get IP settings from DHCP server, no need to set other items.

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

To change IP address manually, press on the second line with the IP address.

Enter the new address and validate it by pressing “OK”. Proceed in the same way with other network parameters.

Return to the application and save.

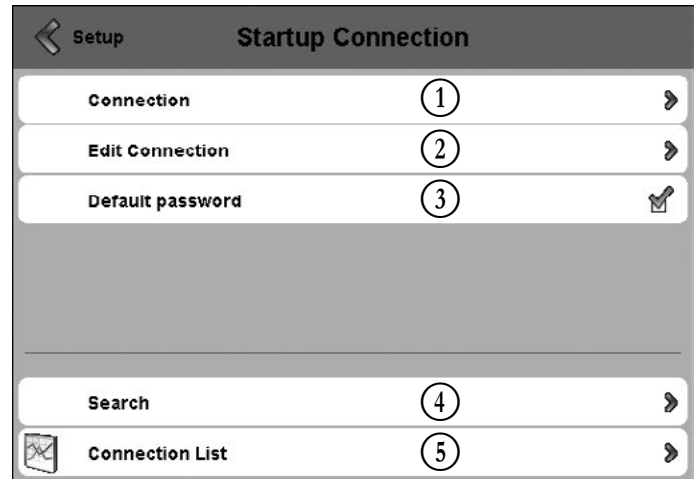


7.3 - Configuration of the Web Connection

This configuration is carried out at the factory and is not normally modified.

In the main configuration menu (see section 7.1), press on the “Web Connection” field.

The screen presented below is displayed:



Press “Edit Connection”

Field	Value	Indicator
Connection Name	startup	1
Start Page	vgatest.html	2
Remote host IP	138.90.54.88	3
Remote port	80	4
Remote password		5
Remote info		6

Default parameters for the application are given. Press a specific parameter to modify it in case it's not compliant with the screen given above.

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.
6	Remote info: Not applicable for the application. Do not modify.

7.4 - System Configuration

In the main configuration menu (see section 7.1), press the “System” field.

The screen below is displayed:

Field	Value	Indicator
Info		1
Settings		2
Special		3
Log		4
FW download		5
Reboot		6

1	Software version
2	System Settings
3	Reset to zero and flash formatting, clock parameters (do not modify)
4	Unit start-up history
5	Firmware update (not applicable)
6	Unit reboot

Press on the first field of the system screen to display the software version as well as the unit serial number.

Field	Value	Indicator
Firmware version	carrier3.11	1
Booter version	Carrier9	2
CPLD version	c	3
Production data		4
Extension		5
Permanent video cache used	4681728	
Flushable video cache used	87296	

1	Indicate the firmware version which loaded in this panel
2	Indicate the bootloader version which loaded in this panel
3	CPLD version
4	Show the detailed production data of this panel
5	Information regarding the extended hardware

Field	Value	Indicator
Order of file search	Local before remote	1
Delay during startup [s]	4	2
Intro screen		3
File cache enabled	☒	
Enter setup with delay	☒	

1	Interface order: local before remote (do not modify)
2	Start-up delay time (do not modify)
3	Information on the system start-up screen

Return to the previous screen: “System “

Press the fourth field “Intro screen” on the screen to display the configuration of the start-up information.

Field	Value	Indicator
Welcome text	Welcome	1
X-Position of the text	400	
Y-Position of the text	300	
Filename of the graphic	icoCarrier.gif	2
X-Position of the graphic	160	
Y-Position of the graphic	110	

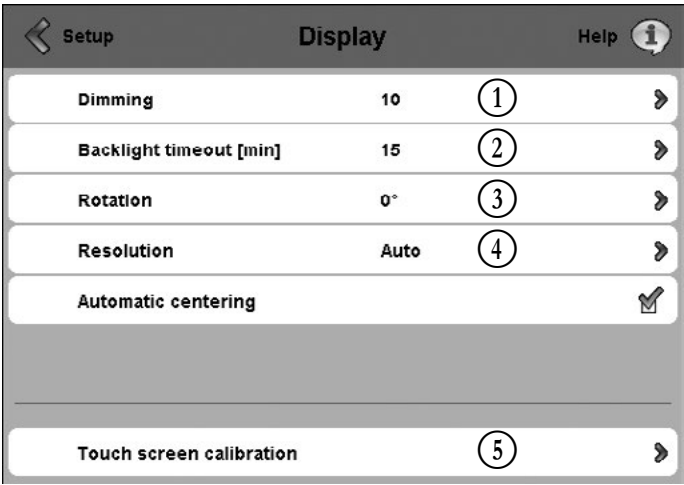
1	Welcome message at the start-up of the application: Welcome
2	Display of the Carrier logo at the start-up of the application

The default values are shown above.

7.5 - Display Configuration (Contrast, Cscreensaver, Calibration)

In the main configuration menu (see section 7.1), press the “Display” field.

The screen below is displayed.



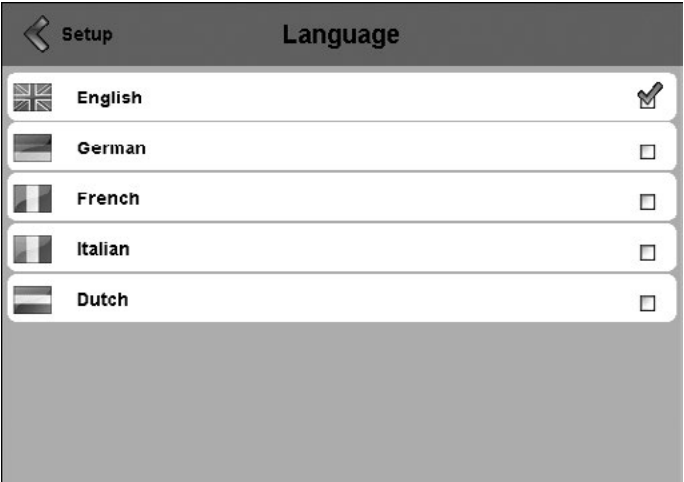
1	Contrast control
2	Time for the screensaver to be displayed. After the period defined the screen goes black.
3	Rotation of screen image
4	Resolution
5	Touch screen calibration

“Depending on the user and the position of the panel, it may be necessary to calibrate the touch screen. When you select “Touch Screen Calibration”, a white box with cross-hairs will appear on the display. Touch the center of the cross-hair sight with a touch pen or similar blunt-ended stylus (please do not use any metal objects). When the cross-hair sight is touched, it moves to a new position, where you have to touch the center of the cross 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 you). This completes the calibration and the white box disappears.”

The default values are shown above.

7.6 - Languages Available for the Touch Screen Configuration

In the main configuration menu (see section 7.1) press the “Language” field and select the language for the touch screen interface configuration menu screens.



NOTE: The supported languages above are separate from the languages supported by the unit application.

8 - DIAGNOSTICS AND COMMUNICATION PROBLEM TROUBLESHOOTING

8.1 - Hardware Problems

Symptoms	Possible causes	Checks to be made	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.

8.2 - Problems with the Use of the Web Interface

The intranet site address of the unit is the IP address.

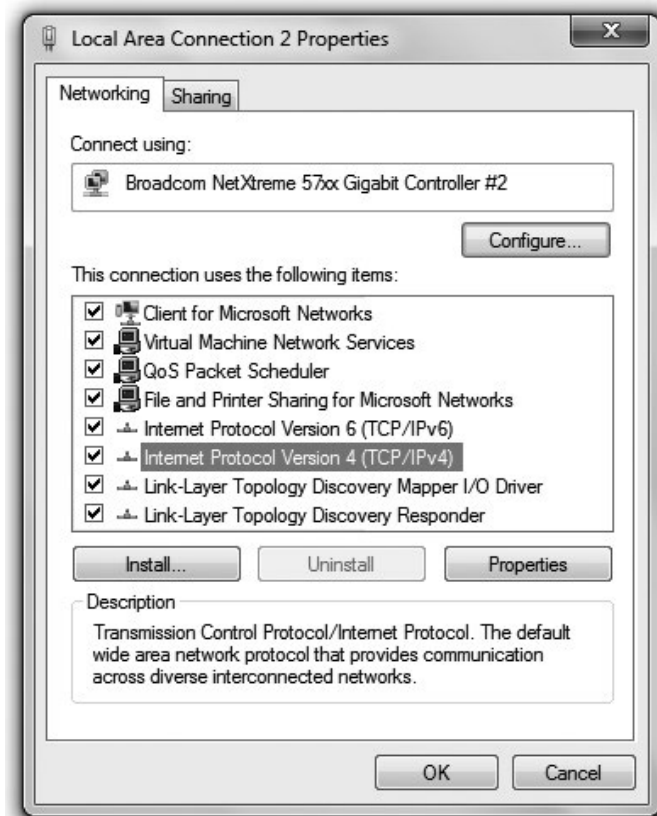
NOTE: THE UNIT CANNOT AUTOMATICALLY OBTAIN THE NETWORK PARAMETERS VIA A DHCP SERVER.

Symptoms	Possible causes	Checks to be made	Solutions
Loading of the start-up page, then fault.	Network property details are not valid, Ethernet network is not available.	Check the network parameters. Check for flashing of the orange LED on the unit.	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 your 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 untick "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 chapter 8.3.4.

8.3 - Ethernet/IP Connection

8.3.1 - The Unit is Point-to-point Connected to A PC

Make sure the controller is powered on before configuration.
Check Ethernet connection if necessary, and the PC NIC configuration (see also 8.3.3).



Click on the "Properties" button of the internet protocol.

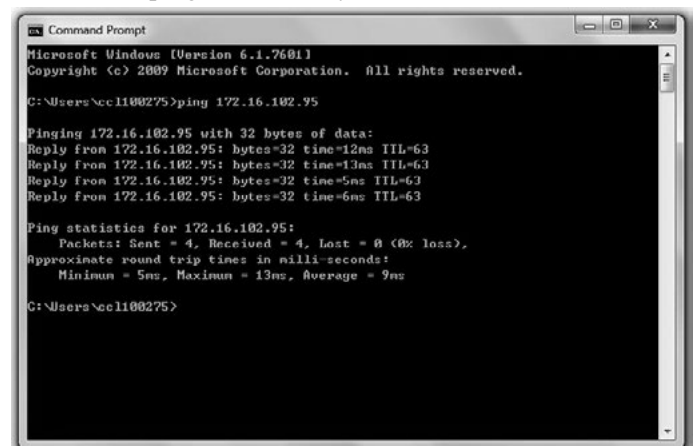
- If no IP address is configured in the "General" and "Alternative configuration" tabs, the unit IP address must be configured to 169.254.xxx.xxx. Modify the unit IP address and then restart the system.
- If the PC has a fixed IP address configured in one of the two tabs "General" and "Alternative configuration", 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.

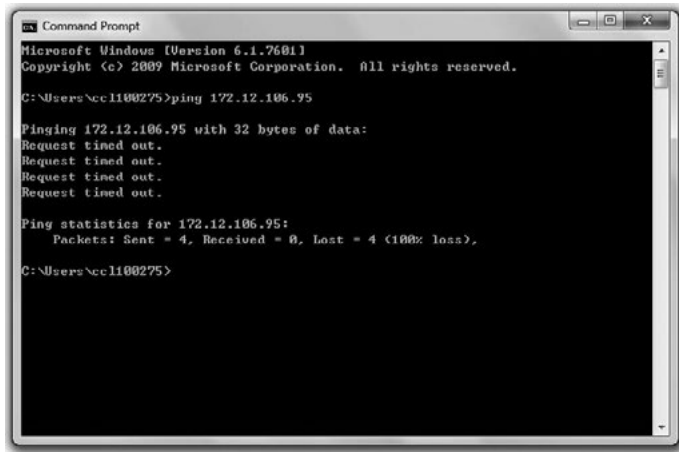
For example: Unit address: 172.30.101.11 and PC address: 172.30.101.182.

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 command window under Windows (Start, Execute, type "cmd"<Enter) then type the command: "ping", followed by the unit IP address.



In the screen above the PC receives four positive responses.



In the screen above the PC receives four 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 about the configuration of the Java application (see section 8.3.4).

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.

8.3.2 - Unit Connected to the Local Network.

The unit is energized. The unit is connected to the local network by an uncrossed cable and the unit is energized.

Open a command window under Windows (Click Start, then Execute, type "cmd" and press Enter), type the command "ping" followed by the unit IP address.

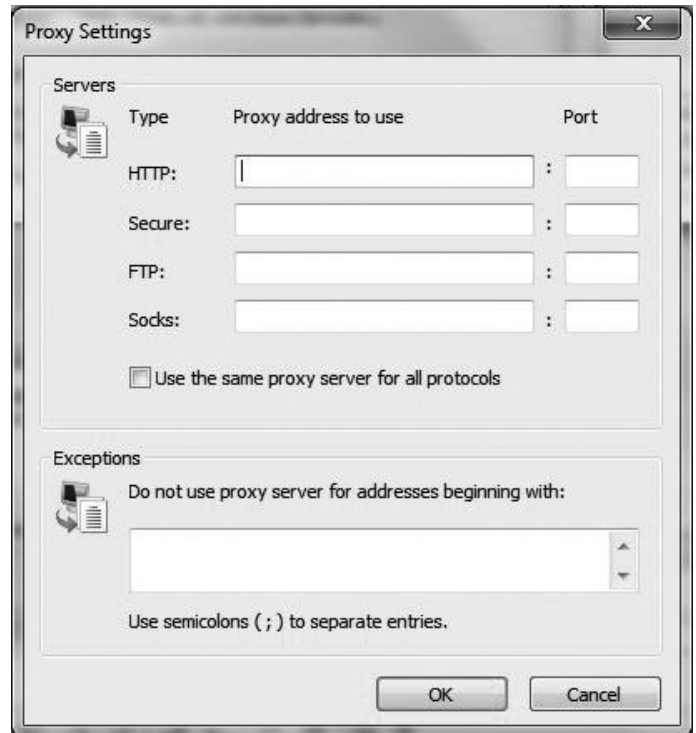
- If the responses are positive the problem comes from the internet browser configuration. Check the system parameters of the internet browser to determine if a proxy server or an automatic configuration script have been configured (Tools=> Internet Options => Connections => System Parameters).



Legend

1. Automatic configuration script
2. Proxy server
3. Advanced proxy configuration

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



If a configuration script is used, it is not possible to add the unit IP address to the exceptions list. For more information, please refer to the section on the Java application (see 8.3.4).

If the response to the "ping" command is negative, please verify the IP address of the PC and the IP address of the unit. They must have the system 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 network and 101 corresponds to the sub-system.

8.3.3 - Check the Ethernet Connection on the PC

- Open the configuration panel of the PC and double click on Network Connections.
- Find the system interface board and check that no red cross is shown on the icon.

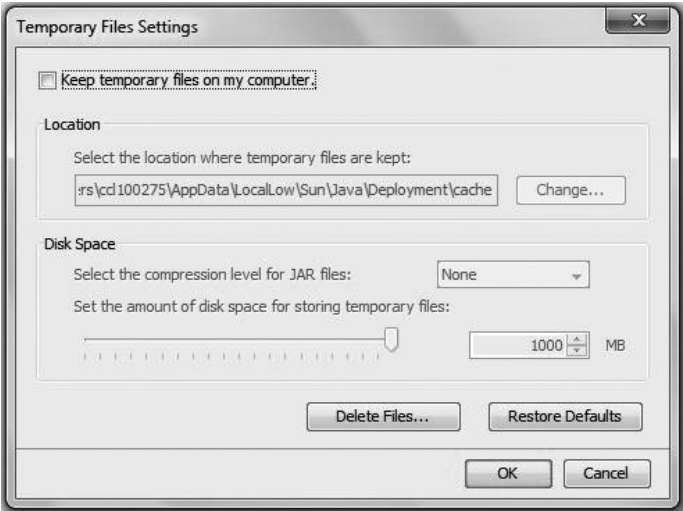
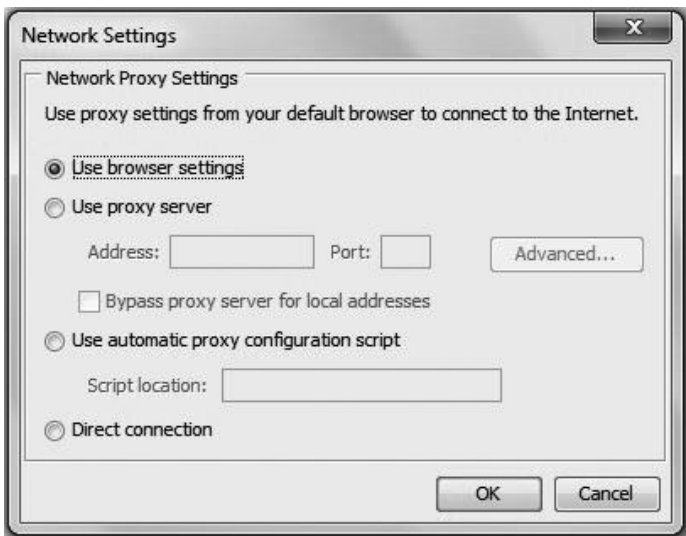
The connection to the local network must be authorized and in the connected status. If this is not the case, check the connections and authorize/repair the network connection.

8.3.4 - Configuration of the Java Application

Open the configuration panel and double-click the Java application icon. If there is no Java installed, free download is available at <http://www.java.com>

If the Java application is there, please make sure that it is not used by other applications. If it is, please check the compatibility of the following configuration with these.

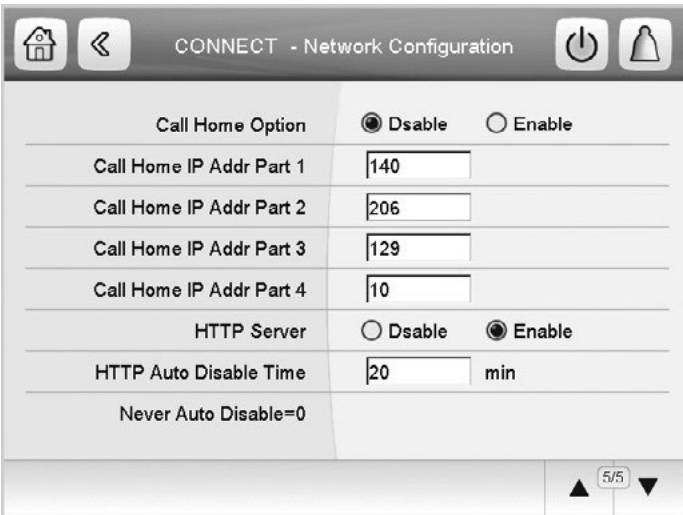
Click on the system parameters, select a direct connection to bypass the proxy server or the automatic configuration script.



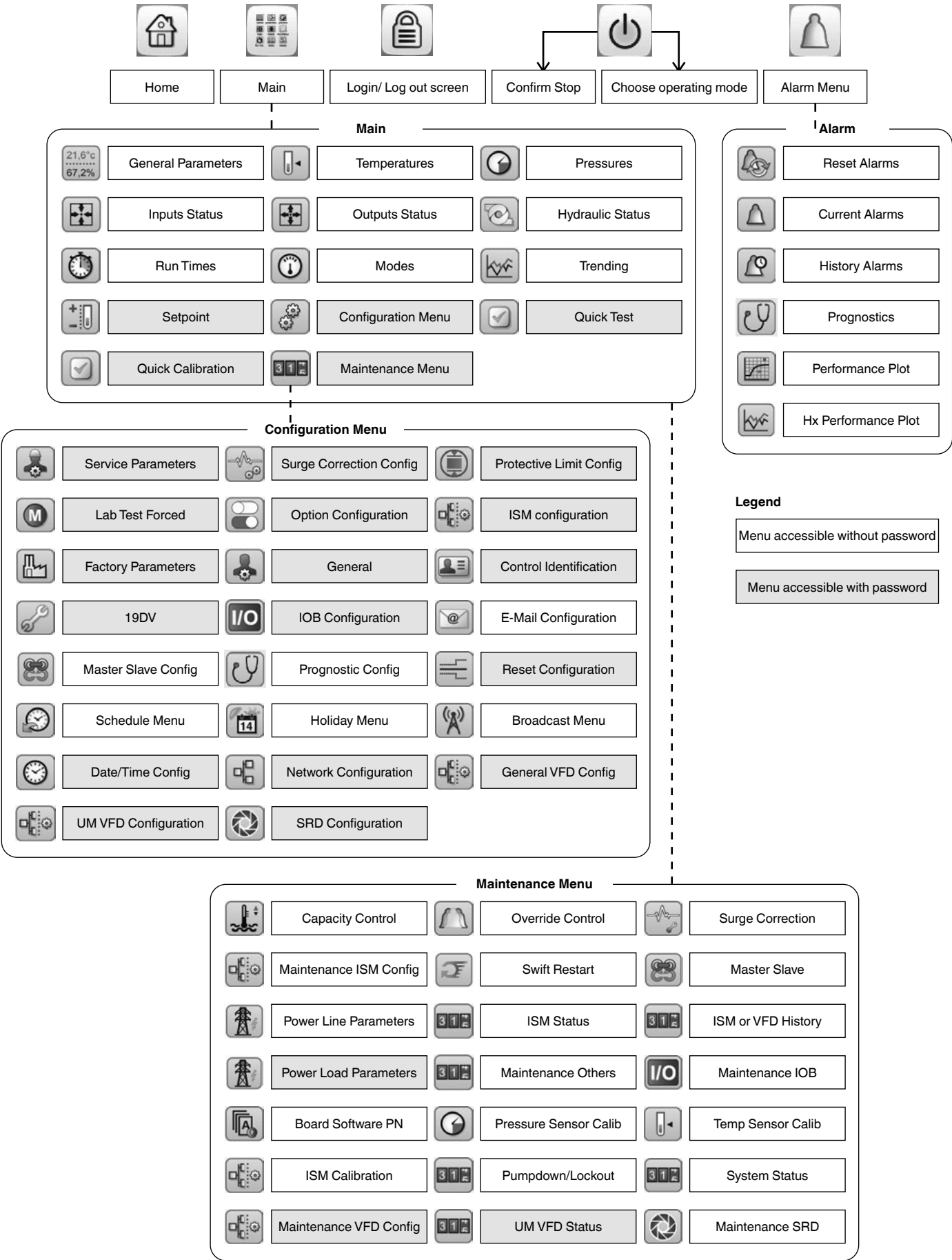
Click on the temporary internet file parameters and do not store these on the PC.

8.3.5 - Enable HTTP Server

If you need to use web server to access chiller page, need to enable the HTTP server. Specific methods, please see below:



9 - SCREEN STRUCTURE



9.1 - Detailed Menu Description

Icon	Displayed text*	Description	Associated table
	General Parameters	General parameters	GENUNIT
	Temperatures	Temperatures	TEMP
	Pressures	Pressures	PRESSURE
	Inputs Status	Inputs status	INPUTS
	Outputs Status	Outputs status	OUTPUTS
	Hydraulic Status	Hydraulic status	HYDRLIC
	Run Times	Run times	RUNTIME
	Modes	Modes	MODES
	Setpoint Table	Setpoint table	SETPOINT
	Configuration Menu	Configuration menu	CONFIG
	Quick Test Table	Quick test table	QCK_TEST
	Maintenance Menu	Maintenance menu	MAINTAIN
	Trending	Trending	TRENDING

* Depends on the selected language (English by default).

Table Name		PIC Table Type		Instance	HMI Menu Path			
GENCONF		10H		1	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	use_pass	1 to 9999	1111	-		User Password	1	9999
2	min_off	1 to 15	2	min		Stop to Start Delay	1	15
3	strt_dly	4 to 45	15	min		Start to Start Delay	4	45
4	dem_sel	0 to 1	0	-		Demand Limit Type	0	1
5				-		Base Demand=0, 4-20mA=1		
6	rampslct	0 to 1	1	-		Pulldown Ramp Type	0	1
7				-		Temp=0, Load=1		
8	DEM_SLCT	0 to 1	0	-		Demand Limit Source	0	1
9				-		Amps=0, KW=1		

Table Name		PIC Table Type		Instance	HMI Menu Path			
RESETCFG		10H		4	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	res_sel	0 to 3	0	-		Temp Reset Type	0	3
2				-		No=0, 4-20mA=1		
3				-		Remote Temp=2, Water DT=3		
4	der_20ma	-30.0 to 30.0	10	^F		Degrees Reset at 20mA	-30	30
5	deg_rset	-30.0 to 30.0	10	^F		Maximum Deg Temp Reset	-30	30
6	remtm_fu	-40.0 to 245.0	65	°F		Remote Temp Full Reset	-40	245
7	remtm_no	-40.0 to 245.0	85	°F		Remote Temp No Reset	-40	245
8	drwdt_fu	-30.0 to 30.0	10	^F		Deg Reset Water DT Full	-30	30
9	ctldt_fu	0.0 to 15.0	0	^F		Controlled DT Full Reset	0	15
10	ctldt_no	0.0 to 15.0	10	^F		Controlled DT No Reset	0	15

Table Name		PIC Table Type		Instance	HMI Menu Path					
GENUNIT		11H		1	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	ctl_mode	0 to 3		-		Control Mode	0	3		
2				-		Local=0, Network=1				
3				-		Remote=2, Local Sched=3				
4	cm_stas1			-	1	Compressor1 Run Status				
5	statstop	stop/start		-		Deter Start Stop Command				

Table Name		PIC Table Type		Instance	HMI Menu Path					
GENUNIT		11H		1	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
6	CHIL_S_S	0 to 1		-		Network:Cmd Start/Stop	0	1	x	
7	CHIL_OCC	0 to 1		-		Network:Cmd Occupied	0	1	x	
8	HC_SEL	0 to 1		-		Cooling/Heating Select	0	1	x	x
9	CTRL_PNT	10.0 to 160.0		°F		Control Point	10	160	x	
10	reset			^F		Control Point Reset				
11	setpoint			°F		Actual Setpoint				
12	AMPS_P			%		Percent Load Current				
13	KW_P			%		Motor Percent Kilowatts				
14	DEM_LIM	10.0 to 100.0		%		Actual Demand Limit	10	100	x	
15	EMSTOP	0 to 1		-		Emergency Stop	0	1	x	
16	ch_state			-		Chiller Status Code				
17	loc_occ	no/yes		-		Local Schedule Occupied				
18	ice_occ	no/yes		-		Ice Schedule Occupied				
19	ms_stsp	stop/start		-		Master Slave Start Stop				
20	REM_RST	0 to 1		-		Remote Reset Alarm	0	1	x	
21	STP_OVER	0 to 1		-		Stop Override	0	1		x
22	FC_START	0 to 1		-		Start Free Cooling	0	1	x	x
23	CF_START	0 to 1		-		Start Condenser Flush	0	1	x	x
24	BAC_OCC	0 to 1		-		BACnet Occupied	0	1		

1 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

Table Name		PIC Table Type		Instance	HMI Menu Path					
TEMP		11H		2	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	ECW			°F		Entering Chilled Water				
2	LCW			°F		Leaving Chilled Water				
3	ECDW			°F		Entering Condenser Water				
4	LCDW			°F		Leaving Condenser Water				
5	EVAP_SAT			°F		Evap Sat Refrig Temp				
6	EVAP_T			°F		Evap Refrig Liquid Temp				
7	evap_app			^F		Evaporator Approach				
8	cond_app			^F		Condenser Approach				
9	COND_SAT			°F		Cond Sat Refrig Temp				
10	DGT			°F		Comp Discharge Temp				
11	DSH			^F		Discharge Superheat				
12	MTRB_OIL			°F		Thrust Bearing Oil Temp				
13	MTRB			°F		Thrust Bearing Temp				
14	MTRB1			°F		Low Speed ME Brg Temp				
15	MTRB2			°F		Low Speed CE Brg Temp				
16	MTRB3			°F		High Speed ME Brg Temp				
17	MTRB4			°F		High Speed CE Brg Temp				
18	MTRW1			°F		Motor Winding 1 Temp				
19	MTRW2			°F		Motor Winding 2 Temp				
20	MTRW3			°F		Motor Winding 3 Temp				
21	OILT_SMP			°F		Oil Sump Temp				
22	OILT_DIS			°F		Oil Supply Temp				
23	LIFT_A			^F		Actual Lift				
24	LIFT_1			^F		VDO High Lift Load Line				
25	LIFT_2			^F		VDO Low Lift Load Line				
26	R_RESET			°F		Remote Reset Temp				
27	CHWS_T			°F		Common CHWS Temp				
28	CHWR_T			°F		Common CHWR Temp				
29	HR_EWT			°F		Heat Recl Entering Temp				
30	HR_LWT			°F		Heat Recl Entering Temp				
31	PGC_SUCT			°F		Purge Comp Suction Temp				
32	CBH1_T			°F		1st Stage Bearing Temp				
33	CBH2_T			°F		2nd Stage Bearing Temp				
34	BRGI_SAT			°F		BRG Ref Supply Sat Temp				
35	BRGI_T			°F		Bearing Ref Supply Temp				
36	PGINTMP			°F		Purge Inlet Temp				

Table Name		PIC Table Type		Instance	HMI Menu Path					
PRESSURE		11H		3	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	EVAP_P			PSIG		Evaporator Pressure				
2	COND_P			PSIG		Condenser Pressure				
3	ECON_P			PSIG		Economizer Pressure				
4	OILP_DIS			PSIG		Oil Supply Pressure				
5	OILP_SMP			PSIG		Oil Sump Pressure				
6	OIL_PD			PSI		Oil Pump Delta P				
7	pd_off	-5.0 to 5.0	0	PSI		Oil/Ref Delta P Offset	-5	5		x
8	DIFF_P			PSIG		Diffuser Pressure				
9	HEAD_P			PSI		Head Pressure Reference				
10	BRGI_P			PSIG		Bearing Inlet Pressure				
11	BRGO_P			PSIG		Bearing Outlet Pressure				
12	REF_PD			PSI		Bearing Delta P				
13	PUMPO_P			PSIG		Pump Outlet Pressure				
14	PUMPI_P			PSIG		Pump Inlet Pressure				
15	PUMP_PD			PSI		Ref Pump Delta P				

Table Name		PIC Table Type		Instance	HMI Menu Path					
INPUTS		11H		4	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	STAR_AUX	open/close		-		Compressor Start Contact				
2	RUN_AUX	open/close		-		Compressor Run Contact				
3	DMP_FC	no/yes		-		Damper Valve Full Closed				
4	DMP_FO	no/yes		-		Damper Valve Full Opened				
5	DMP_ACT			-		Damper Valve Status				
6				-		Cl=0,Inter=1,Op=2,Fail=3				
7	HGBP_FC	no/yes		-		EC Valve Fully Closed				
8	HGBP_FO	no/yes		-		EC Valve Fully Opened				
9	HGBP_ACT			-		EC Valve Status				
10				-		Cl=0,Inter=1,Op=2,Fail=3				
11	HP_SW	open/close		-		High Pressure Switch				
12	REM_CON	open/close		-		Remote Contact				
13	E_STOP	open/close		-		Emergency Stop Contact				
14	ICE_CON	open/close		-		Ice Build Contact				
15	REM_LOCK	open/close		-		Chiller Lockout				
16	SAFETY	open/close		-		Spare Safety Input				
17	STARTFLT	open/close		-		Starter Fault Feedback				
18	FS_LOCK	open/close		-		Fire Security Interlock				
19	GV1_OHMS			-		Guide Vane 1 Actual Ohms				
20	GV1_ACT			%		Guide Vane 1 Actual Pos				
21	VFD_ACT			%		Actual VFD Speed Per				
22	DIFF_ACT			%		Diffuser Actual Pos				
23	AUTO_DEM			mA		Auto Demand Limit Input				
24	AUTO_RES			mA		Auto Water Temp Reset				
25	REF_LEAK			mA		Refrig Leakage Sensor				
26	VFD_IN			Volts		VFD Speed Feedback				
27	GV1_MA			mA		GV1 Pos Feedback				
28	VFDC_MA			mA		VFD Current Input				
29	HGBPACTP			%		Actual ECV Pos Per				
30	HGBP_MA			mA		ECV Current Feedback				
31	TRIPR	open/close		-		ISM Trip Relay Status				
32	bacdongl	no/yes		-		BACnet Dongle				
33	SHAFTDIS	open/close		-		Displacement Switch				
34	POW_FDB	open/close		-		Power Request Feedback				
35	FC_SS	open/close		-		Free Cool Start Switch				
36	CUS_ALE	open/close		-		Customer Alert				
37	FC_SS	off/on		-		Free Cool Start Switch				
38	CUS_ALE	Open/close		-		Customer Alert				
39	PGLE_LO	Open/close		-		Purge Level Switch Low				
40	PGLE_HI	Open/close		-		Purge Level Switch High				
41	HF_LS	Open/close		-		Liquid Level Switch				

Table Name		PIC Table Type		Instance	HMI Menu Path					
OUTPUTS		11H		5	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	DIFF_OUT			mA		Diffuser Output mA				
2	HDPV_OUT			mA		Head Pres Output mA				
3	CHST_OUT			mA		Chiller Stat Output mA				
4	VFD_OUT			mA		VFD Speed Output mA				
5	EXV_OUT			mA		Oil EXV Output mA				
6	exv_tgt			%		Oil EXV Target				
7	LLC_EXVO			mA		Liquid Level EXV Output				
8	llc_exvt			%		Liquid Level EXV Target				
9	OP_VFD			mA		Oil Pump VFD Output mA				
10	op_vfd_t			%		Oil Pump VFD Target				
11	hdpv_tgt			%		Head Pres Valve Tgt Pos				
12	HGBP_OUT			mA		EC Valve Output mA				
13	GV1_OUT			mA		Guide Vane1 Output				
14	GV2_OUT			mA		Guide Vane2 Output				
15	ALM	off/on		-		Alarm Relay				
16	ALE	off/on		-		Alert Relay				
17	COMP_SR	off/on		-		Compressor Start Relay				
18	TRANS	off/on		-		Starter Trans Sw Status				
19	DMP_CL	off/on		-		Damper Valve Close				
20	DMP_OP	off/on		-		Damper Valve Open				
21	GV1_DEC	off/on		-		Guide Vane 1 Decrease				
22	GV1_INC	off/on		-		Guide Vane 1 Increase				
23	HGBP_OFF	off/on		-		EC Valve Close				
24	HGBP_ON	off/on		-		EC Valve Open				
25	OIL_HEAT	off/on		-		Oil Heater Relay				
26	OIL_PUMP	off/on		-		Oil Pump Relay				
27	TFR_HIGH	off/on		-		Tower Fan Relay High				
28	TFR_LOW	off/on		-		Tower Fan Relay Low				
29	dmp_tgt			-		Damper Valve Tgt Pos				
30				-		Close=0, Hold=1, Open=2				
31	hgbp_tgt			-		EC Valve Tgt Pos				
32				-		Close=0, Hold=1, Open=2				
33	POW_REQ	off/on		-		Power Request Output				
34	FC_MODE	no/yes		-		Free Cooling Mode				
35	VFD_SOL	off/on		-		VFD Coolant Solenoid				
36	REF_PUMP	off/on		-		Refrigerant Pump				
37	ECBY_VLV	off/on		-		Economizer Bypass Valve				
38	ECON_IV	off/on		-		Economizer Isolation VLV				
39	COND_CV	off/on		-		Condenser Control Valve				
40	EVAP_CV	off/on		-		Evaporator Control Valve				
41	EVAP_DCV	off/on		-		Evaporator Drain Valve				
42	COND_DCV	off/on		-		Condenser Drain Valve				
43	COND_PSV	off/on		-		Purge Cond Valve				
44	COMP_PSV	off/on		-		Purge Comp Valve				
45	PUMP_PSV	off/on		-		Purge Pumpout Valve				
46	DRASVON	off/on		-		Purge Drainage Valve				
47	REG_PSV	off/on		-		Purge Regeneration Valve				
48	DIS_PSV	off/on		-		Purge Discharge Valve				
49	PGAPUMP	off/on		-		Purge Vaccum Pump				
50	PG_COMP	off/on		-		Purge Compressor				
51	PG_HEAT	off/on		-		Purge Heater				
52	VS_SV	off/on		-		Vapor Source SV				
53	VAPL_SV	off/on		-		Vapor Venting Line SV				
54	COND_FCV	off/on		-		Condenser Filling Valve				

Table Name		PIC Table Type		Instance	HMI Menu Path					
HYDRLIC		11H		6	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	CDWP	off/on		-		Condenser Water Pump			x	
2	CDW_FLOW	no/yes		-		Condenser Water Flow				
3	CDW_FV	0 to 10000		GPS		Cond Water Flow Value	0	10000		
4	COND_EWP			PSIG		Entering Cond Water Pres				
5	COND_LWP			PSIG		Leaving Cond Water Pres				
6	cdw_pd			PSI		Condenser Water Delta P				

Table Name		PIC Table Type		Instance	HMI Menu Path					
HYDRLIC		11H		6	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
7	cdw_off	-10.0 to 10.0	0	PSI		Condenser Delta P Offset	-10	10		x
8	cdw_pull			^F		Cond Water Pulldown/Min				
9	CHWP	off/on		-		Chilled Water Pump			x	
10	CHW_FLOW	no/yes		-		Chilled Water Flow				
11	CHW_FV	0 to 10000		GPS		Chilled Water Flow Value	0	10000		
12	EVAP_EWP			PSIG		Entering Chilled Water P				
13	EVAP_LWP			PSIG		Leaving Chilled Water P				
14	chw_pd			PSI		Chilled Water Delta P				
15	chw_off	-10.0 to 10.0	0	PSI		Chilled Delta P Offset	-10	10		x
16	chw_pull			^F		Chill Water Pulldown/Min				
17	CHWF_IN			mA		Chilled Water Flow Input				
18	CDWF_IN			mA		Cond Water Flow Input				
19	CHW_PDMA			mA		Chilled Water Pres Drop				
20	CDW_PDMA			mA		Cond Water Pres Drop				
21	EVAP_FS	open/close		-		Evap Water Flow Switch				
22	COND_FS	open/close		-		Cond Water Flow Switch				
23	TFR_HI	off/on		-		Tower Fan Relay High			x	
24	TFR_LO	off/on		-		Tower Fan Relay Low			x	
25	ctrlw_dt			^F		Controlled Water DT				
26	cdw_fl_s	0 to 2		-		Cond Flow Status	0	2		
27				-		Fail or Not Started=0				
28				-		Success=1, Verifying=2				
29	chw_fl_s	0 to 2		-		Chilled Flow Status	0	2		
30				-		Fail or Not Started=0				
31				-		Success=1, Verifying=2				
32	pdown_st	0 to 255		-		Pumpdown/Lockout State	0	255		

Table Name		PIC Table Type		Instance	HMI Menu Path					
RUNTIME		11H		7	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	ST_CNT12		0	-		Starts Num In 12 Hours				
2	C_STARTS			-		Compressor Starts Num				
3	COMP_HRS			hours		Compressor Running Hrs				
4	SRV_HRS	0 to 500000	0	hours		After Service Hrs	0	500000		x
5	spst_tim			min		Stop to Start Timer				
6	stst_tim			min		Start to Start Timer				
7	oilb_dur			hours		Oil Lubrication Duration				
8	oils_dur			hours		Oil Storage Duration				
9	RCYSTCNT			-		Recy Startup In 4 Hours				
10	SWIFTCNT			-		Swift Restarts in 1 Hour				
11	PGP_NO			-		Total Pumpout Numbers				
12	PGP_TM			min		Total Pumpout Time				
13	pgp_tm_d			min		Purge Pumpout in 24 Hrs				
14	pgp_tm_w			min		Avg Daily Purge in 7 Day				

Table Name		PIC Table Type		Instance	HMI Menu Path					
MODES		11H		8	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	shut_nor	no/yes		-		Normal Shutdown				
2	shut_rcy	no/yes		-		Recycle Shutdown				
3	shut_alm	no/yes		-		Alarm Shutdown				
4	str_rcy	no/yes		-		Recycle Startup				
5	tmp_ramp	no/yes		-		Temperature Ramping				
6	ld_ramp	no/yes		-		Load Ramping				
7	gv1_inh	no/yes		-		IGV1 Inhibiting				
8	ice_act	no/yes		-		Ice Building				
9	ice_term	no/yes		-		Ice Build Terminated				
10	ice_rcy	no/yes		-		Ice Build Recy Startup				
11	ramp_act	no/yes		-		Ramp Loading				
12	dem_act	no/yes		-		Demand Limit				
13	vfdpact	no/yes		-		VFD Rampdown				
14	dem_inh	no/yes		-		Demand Limit Inhibit				
15	evapfrze	no/yes		-		Evaporator Frozen				

Table Name		PIC Table Type		Instance	HMI Menu Path					
MODES		11H		8	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
16	condfrze	no/yes		-		Condenser Frozen				
17	rcysh_cm	no/yes		-		Recycle Shutdown Done				
18	nrysh_cm	no/yes		-		NonRecycle Shutdown Done				
19	alm_act	no/yes		-		In Alarm				
20	over_act	no/yes		-		In Override				
21	Pg_act	no/yes		-		Purge active				
22	cm_stat1			-		Comp1 Run State Val				

Table Name		PIC Table Type		Instance	HMI Menu Path					
POWER_I		11H		9	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	LN_AMPS1			AMPS		Line Current Phase 1				
2	LN_AMPS2			AMPS		Line Current Phase 2				
3	LN_AMPS3			AMPS		Line Current Phase 3				
4	AMPS_A_I			AMPS		Actual Line Current				
5	AMPS_P_I			%		Percent Line Current				
6	GRFT_1			AMPS		Ground Fault Phase 1				
7	GRFT_2			AMPS		Ground Fault Phase 2				
8	GRFT_3			AMPS		Ground Fault Phase 3				
9	LN_VOLT1			Volts		Line Voltage Phase 1				
10	LN_VOLT2			Volts		Line Voltage Phase 2				
11	LN_VOLT3			Volts		Line Voltage Phase 3				
12	VOLT_A			Volts		Actual Line Voltage				
13	VOLT_P			%		Percent Line Voltage				
14	KW			KW		Motor Kilowatts				
15	KWH			KW		Motor Kilowatts Hours				
16	LN_FREQ			Hz		Line Frequency				
17	POW_FACT			-		Power Factor				
18	In_imb_i		0	%		Line Current Imbalance%				
19	In_imb_v		0	%		Line Voltage Imbalance%				

Table Name		PIC Table Type		Instance	HMI Menu Path					
POWER_O		11H		10	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	VFD_LOAD			AMPS		VFD Load Current				
2	amps_p_o		0	%		Percent VFD Load Current				
3	gf_amps		0	AMPS		Ground Fault Current				
4	mt_imb_i		0	%		Motor Current Imbalance%				
5	MOT_FREQ		0	Hz		Motor Actual Frequency				
6	tgt_freq		0	Hz		Motor Target Frequency				
7	bus_volt		0	Volts		DC Bus Voltage				
8	bus_ref		0	Volts		DC Bus Voltage Reference				
9	ld_amps1		0	AMPS		Load Current Ph 1(U)				
10	ld_amps2		0	AMPS		Load Current Ph 2(V)				
11	ld_amps3		0	AMPS		Load Current Ph 3(W)				
12	vfd_act		0	%		Actual VFD Speed Per				
13	motor_pf		0	-		Motor Power Factor				
14	motor_kw		0	KW		Motor Kilowatts				
15	motor_ov		0	%		Motor Overload				
16	motorkwh		0	-		Motor Kilowatt-Hours				
17	rect_ov		0	%		Rectifier Overload				
18	inv_ov		0	%		Inverter Overload				
19	enc_temp		0	°F		VFD Enclosure Temp				
20	cp_temp		0	°F		VFD Cold Plate Temp				
21	inv_temp		0	°F		Inverter Temperature				
22	rec_temp		0	°F		Rectifier Temperature				
23	tripr	0 to 1	0	-		Shunt Trip Relay Status	0	1		
24	prechar	0 to 1	0	-		Precharge Relay Status	0	1		
25	vfd_run	0 to 1	0	-		VFD Run Relay Status	0	1		
26	prech_fd	0 to 1	0	-		Precharge Feedback	0	1		
27	VFD_FACT			-		VFD Load Factor				
28	lrtem_sw	0 to 1	0	-		LR Temp Switch	0	1		
29	alm_code		0	-		VFD Alarm Code				

Table Name		PIC Table Type		Instance	HMI Menu Path					
POWER_O		11H		10	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
30	stat_wd		0	-		VFD Status Word				
31	cmd_wd		0	-		VFD Command Word				
32	str_inh		0	-		VFD Start Inhibit Status				
33	appl_do		0	-		VFD Appl digital Output				
34	safestop	0 to 1	0	-		Safety Stop Status	0	1		
35	spd_fd	0 to 1	0	-		SPD Feedback	0	1		
36	VFDC_HI	no/yes		-		High VFD Current				

Table Name		PIC Table Type		Instance	HMI Menu Path					
ALARMRST		12H		1	//MAINMENU/ALARM/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	RST_ALM	0 to 1		-		Alarm Reset	0	1		x
2	ALM_STAT			-		Alarm State				
3	alarm_1c			-		Current Alarm 1				
4	alarm_2c			-		Current Alarm 2				
5	alarm_3c			-		Current Alarm 3				
6	alarm_4c			-		Current Alarm 4				
7	alarm_5c			-		Current Alarm 5				
8	alarm_1			-		Jbus Current Alarm 1				
9	alarm_2			-		Jbus Current Alarm 2				
10	alarm_3			-		Jbus Current Alarm 3				
11	alarm_4			-		Jbus Current Alarm 4				
12	alarm_5			-		Jbus Current Alarm 5				

Table Name		PIC Table Type		Instance	HMI Menu Path					
CAPACTRL		12H		2	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	tot_err			^F		Total Error + Resets				
2	ctrl_err			^F		Control Point Error				
3	ctrl_wt			°F		Controlled Water Temp				
4	ctrl_pnt			°F		Control Point				
5	setpoint			°F		Actual Setpoint				
6	ewt_dt			^F		Entering Water Change DT				
7	ewt_res			^F		Enter Water Temp Reset				
8	lwt_res			^F		Leaving Water Temp Reset				
9	dgt_res			^F		Discharge Gas Temp Reset				
10	capa_dlt			%		Capacity Delta				
11	gv1_tgt			%		Target GV1 Pos				
12	gv1delta			%		GV1 Pos Change Delta				
13	gv1_chg			-		GV1 Change Flag				
14				-		Stop=0, Change=1, Cont=2				
15	vfd_chg			-		VFD Speed Change Flag				
16				-		Stop=0, Change=1, Cont=2				
17	vfd_tgt			%		Target VFD Speed Per				
18	vfd_dlt			%		VFD Speed Change Delta				
19	hgbp_tp			%		EC Valve Target Percent				
20	cap_inh	no/yes		-		Capacity Inhibit Flag				
21	cap_dec	no/yes		-		Capacity Decrease Flag				
22	cdw_dt			^F		Condenser Water Delta T				
23	chw_dt			^F		Chilled Water Delta T				
24	pull_set			°F		Pulldown Set Point				
25	deinhclm			%		Demand Limit Inh Clamp				
26	ramp_dem			%		Ramping Demand Limit Val				
27	comp_run	no/yes		-		Compressor is Running				
28	cm_stat1			-		Comp1 Run State Val				

Table Name		PIC Table Type		Instance	HMI Menu Path					
OVERRIDE		12H		3	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	cap_inho	no/yes		-		Capacity Inhibit				
2	cap_deco	no/yes		-		Capacity Decrease				
3	cpov_fl	no/yes		-		High Condenser Pressure				
4	dshov_fl	no/yes		-		Low Discharge Superheat				
5	sstov_fl	no/yes		-		Low Suction Sat Temp				
6	mtov_fl	no/yes		-		High Motor Temp				
7	tbov_fl	no/yes		-		High Bearing Temp				
8	lstov_fl	no/yes		-		Low Source Temp				
9	dgtov_fl	no/yes		-		High Discharge Temp				
10	ampov_fl	no/yes		-		High Motor Current				
11	dsh_req			^F		Required DSH				
12	ert_over			°F		Evap Sat Override Temp				
13	dshinstp			%		IGV Step DSH Increase				
14	dshdestp			%		IGV Step DSH Decrease				
15	cp_trip			PSIG		Cond Press Trip Value				

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAISURGE		12H		4	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	act_reg			-		Surge Region				
2				-		No=0, Low=1, High=2				
3				-		Deadband=3, Noise=4				
4	dts_act			^F		Actual Delta Tsat				
5	dts_cal			^F		Calc Ref Delta Tsat				
6	dts_he			^F		High Eff Ref Delta Tsat				
7	amps_dta			%		Amps Change Surge Prot				
8	amch_max			%		Max Amps Change Value				
9	sc			-		Surge Counts				
10	spc			-		Surge Protection Counts				
11	surg_act	no/yes		-		Surge Prevention Active				
12	surg_pro	no/yes		-		Surge Protection Active				
13	hgbp_chg			-		EC Valve Change Flag				
14				-		Close=0, Hold=1, Open=2				
15	dts_maxc	0.0 to 150.0		^F		Cal Surge Delta Tsmax	0	150		
16	dts_minc	0.0 to 150.0		^F		Cal Surge Delta Tsmin	0	150		
17	dts_medc	0.0 to 150.0		^F		Cal Surge Delta Tsmed	0	150		
18	gv1_sful	0.0 to 100.0		%		IGV1 Full Load Position	0	100		
19	gv1_smin	0.0 to 100.0		%		IGV1 Minimum Position	0	100		
20	gv1_smed	0.0 to 100.0		%		Opti-Sound IGV1 Position	0	100		
21	enlp_opt	0 to 1		-		Envelope Line Optimized	0	1		

Table Name		PIC Table Type		Instance	HMI Menu Path					
QCK_TEST		12H		5	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	QCK_TEST	0 to 1	0	0 to 1		Quick Test Enable	0	1		x
2	Q_OILH	0 to 1	0	0 to 1		Quick Test Oil Heater	0	1		x
3	Q_OILP	0 to 1	0	0 to 1		Quick Test Oil/Ref Pump	0	1		x
4	OP_PASS	0 to 1	0	0 to 1		Oil/Ref Pres Test Passed	0	1		
5	OIL_PDQ					Oil/Ref Pump Delta Press				
6	Q_EXV	0 to 100	0	0 to 100		Quick Test Oil EXV	0	100		x
7	Q_HDP	0 to 100	0	0 to 100		Quick Test Head Val Pos	0	100		x
8	Q_CHST	4 to 20	4	4 to 20		Quick Test Chiller Stat	4	20		x
9	Q_GV1POS	0 to 100	0	0 to 100		Guide Vane 1 Tested Pos	0	100		x
10	Q_GV2POS	0 to 100	0	0 to 100		Guide Vane 2 Tested Pos	0	100		x
11	Q_GV1OP	0 to 1	0	0 to 1		Quick Test GV1 Open	0	1		x
12	Q_GV1CL	0 to 1	0	0 to 1		Quick Test GV1 Close	0	1		x
13	Q_GVSRD	0 to 1	0	0 to 1		GV1/SRD Joint Test	0	1		x
14	Q_SRD	0 to 100	0	0 to 100		Quick Test Diffuser Pos	0	100		x
15	Q_GV1ACT					Guide Vane 1 Actual Pos				
16	Q_DIFTGT					Diffuser Target Pos				
17	Q_HGBPOP	0 to 1	0	0 to 1		Quick Test ECV Open	0	1		x
18	Q_HGBPCL	0 to 1	0	0 to 1		Quick Test ECV Close	0	1		x
19	Q_HGBP_T	0 to 100	0	0 to 100		EC Valve Tested Pos	0	100		x

Table Name		PIC Table Type		Instance	HMI Menu Path					
QCK_TEST		12H		5	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
20	Q_DMPOP	0 to 1	0	0 to 1		Quick Test Damper Open	0	1		x
21	Q_DMPCL	0 to 1	0	0 to 1		Quick Test Damper Close	0	1		x
22	Q_ALM	0 to 1	0	0 to 1		Quick Test Alarm Output	0	1		x
23	Q_ALE	0 to 1	0	0 to 1		Quick Test Alert Output	0	1		x
24	Q_CDWP	0 to 1	0	0 to 1		Quick Test Cond Pump	0	1		x
25	CDW_FLOW	0 to 1	0	0 to 1		Condenser Water Flow	0	1		
26	Q_CHWP	0 to 1	0	0 to 1		Quick Test Chilled Pump	0	1		x
27	CHW_FLOW	0 to 1	0	0 to 1		Chilled Water Flow	0	1		
28	CDW_DT	-22.2 to 136.1	0	-22.2 to 136.1		Condenser Water Delta T	-40	245		
29	CHW_DT	-22.2 to 136.1		-22.2 to 136.1		Chilled Water Delta T	-40	245		
30	Q_LLCXV	0 to 100	0	0 to 100		Quick Test LLC EXV	0	100		x
31	Q_VFDCOL	0 to 1	0	0 to 1		Quick Test VFD Cooling	0	1		x
32	Q_VAPLSV	0 to 1	0	0 to 1		QCK TST Vapor Venting SV	0	1		x
33	Q_VSSV	0 to 1	0	0 to 1		Quick Test Vapor SV	0	1		x
34	Q_CONDSV	0 to 1	0	0 to 1		Quick Test Condenser CV	0	1		x
35	Q_EVAPSV	0 to 1	0	0 to 1		Quick Test Evaporator CV	0	1		x
36	Q_OPRLUB	0 to 1	0	0 to 1		QCK TST Evap Drain CV	0	1		x
37	Q_PRELUB	0 to 1	0	0 to 1		QCK TST Cond Drain CV	0	1		x
38	Q_CDPSV	0 to 1	0	0 to 1		Quick Test Purge Cond SV	0	1		x
39	Q_CMPSV	0 to 1	0	0 to 1		Quick Test Purge Comp SV	0	1		x
40	Q_POPSV	0 to 1	0	0 to 1		Quick Test Pumpout SV	0	1		x
41	Q_DROPR	0 to 1	0	0 to 1		QCK TST PG DrainOpr SV	0	1		x
42	Q_RGPSV	0 to 1	0	0 to 1		Quick Test Rege SV	0	1		x
43	Q_DCPSV	0 to 1	0	0 to 1		Quick Test Discharge SV	0	1		x
44	Q_PVPSV	0 to 1	0	0 to 1		Quick Test Vaccum Pump	0	1		x
45	Q_PCPSV	0 to 1	0	0 to 1		Quick Test Purge Comp	0	1		x
46	Q_PHPSV	0 to 1	0	0 to 1		Quick Test Purge Heater	0	1		x
47	Q_MRC	0 to 1	0	0 to 1		Motor Rotation Check	0	1		x
48	Q_MRC_ST		0			Check State				
49						IDLE=0, PreLub=1				
50						Rotat=2, PosLub=3, End=4				
51	Q_ECBP	0 to 1	0	0 to 1		Quick Test Eco Bypass	0	1		x
52	Q_ECONIV	0 to 1	0	0 to 1		QCK TST Eco Isolation	0	1		x
53	Q_CONDCV	0 to 1	0	0 to 1		QCK TST Cond Filling VLV	0	1		x
54	Q_LOWFAN	0 to 1	0	0 to 1		Quick Test Lo Tower Fan	0	1		x
55	Q_HIFAN	0 to 1	0	0 to 1		Quick Test Hi Tower Fan	0	1		x

Table Name		PIC Table Type		Instance	HMI Menu Path					
QCK_CAL		12H		6	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	QCK_TEST	0 to 1	0	-		Quick Test Enable	0	1		x
2	GV1_CAL	0 to 1	0	-		GV1 Calibration Enable	0	1		x
3	GV1_STAT	0 to 2	0	-		GV1 Calibration Status	0	2		
4				-		No Calib Or Failure=0,				
5				-		Progress=1, Completed=2				
6	GV1_OHM			-		Guide Vane 1 Actual Ohms				
7	GV1_MAXO			-		Guide Vane 1 Ohms 100%				
8	GV1_MINO			-		Guide Vane 1 Ohms 0%				
9	GV1_MAF			mA		Guide Vane 1 Actual mA				
10	GV1_MAXA			mA		Guide Vane 1 mA 100%				
11	GV1_MINA			mA		Guide Vane 1 mA 0%				
12	GV2_CAL	0 to 1	0	-		GV2 Calibration Enable	0	1		x
13	GV2_STAT	0 to 2	0	-		GV2 Calibration Status	0	2		
14				-		No Calib Or Failure=0,				
15				-		Progress=1, Completed=2				
16	GV2_MAF			mA		Guide Vane 2 Actual mA				
17	GV2_MAXA			mA		Guide Vane 2 mA 100%				
18	GV2_MINA			mA		Guide Vane 2 mA 0%				
19	HGBP_CAL	0 to 1	0	-		EC Valve Calib Enable	0	1		x
20	HGBP_ST	0 to 2	0	-		EC Valve Calib Status	0	2		
21				-		No Calib Or Failure=0,				
22				-		Progress=1, Completed=2				
23	HGBP_AMA			mA		EC Valve Actual mA				

Table Name		PIC Table Type		Instance	HMI Menu Path					
QCK_CAL		12H		6	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
24	HBP_MAXA			mA		EC Valve mA 100%				
25	HBP_MINA			mA		EC Valve mA 0%				
26	DMP_CAL	0 to 1	0	-		Damper Calib Enable	0	1		x
27	DMP_ST	0 to 2	0	-		Damper Calib Status	0	2		
28				-		No Calib Or Failure=0,				
29				-		Progress=1, Completed=2				
30	DMP_MAXA			mA		Damper mA 100%				
31	DMP_MINA			mA		Damper mA 0%				

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAIISMC		12H		7	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	cycle_1	no/yes		-		Single Cycle Dropout				
2	ph_loss	no/yes		-		Phase Loss				
3	ov_volt	no/yes		-		Over Voltage				
4	un_volt	no/yes		-		Under Voltage				
5	amp_unb	no/yes		-		Current Imbalance				
6	volt_unb	no/yes		-		Voltage Imbalance				
7	overload	no/yes		-		Overload Trip				
8	lratrip	no/yes		-		Locked Rotor Trip				
9	slratrip	no/yes		-		Starter LRA Trip				
10	grnd_flt	no/yes		-		Ground Fault				
11	ph_rev	no/yes		-		Phase Reversal				
12	freqflt	no/yes		-		Frequency Out of Range				
13	ism_por	no/yes		-		ISM Power On Reset				
14	phase_1	no/yes		-		Phase 1 Fault				
15	phase_2	no/yes		-		Phase 2 Fault				
16	phase_3	no/yes		-		Phase 3 Fault				
17	start_ok	no/yes		-		1CR Start Complete				
18	1m_flt	no/yes		-		1M Start/Run Fault				
19	2m_flt	no/yes		-		2M Start/Run Fault				
20	prs_trip	no/yes		-		Pressure Trip Contact				
21	strt_flt	no/yes		-		Starter Fault				
22	no_amps	no/yes		-		Motor Amps Not Sensed				
23	accelflt	no/yes		-		Starter Accel Fault				
24	highamps	no/yes		-		High Motor Amps				
25	stop_ok	no/yes		-		1CR Stop Complete				
26	1m2mstop	no/yes		-		1M/2M Stop Fault				
27	ampstop	no/yes		-		Motor Amps When Stopped				
28	hardware	no/yes		-		Hardware Failure				
29	calfc_er	no/yes		-		Calibration Factor Error				
30	conf_err	no/yes		-		Invalid Configuration				
31	un_used	no/yes		-		Unused				

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAIISMH		12H		8	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	AMPS_H1			AMPS		Line Current Phase 1				
2	AMPS_H2			AMPS		Line Current Phase 2				
3	AMPS_H3			AMPS		Line Current Phase 3				
4	FREQ_H			Hz		Line Frequency				
5	GRFT_H1			AMPS		Ground Fault Phase 3				
6	GRFT_H2			AMPS		Ground Fault Phase 2				
7	GRFT_H3			AMPS		Ground Fault Phase 1				
8	phase_h1			-		Phase 1 Faulted				
9	phase_h2			-		Phase 2 Faulted				
10	phase_h3			-		Phase 3 Faulted				
11	Alm_code			-		VFD Alarm Code				
12	sum1ht_h			%		I2T Sum Heat Phase 1				
13	sum2ht_h			%		I2T Sum Heat Phase 2				
14	sum3ht_h			%		I2T Sum Heat Phase 3				
15	VOLT_H1			Volts		Line Voltage Phase 1				
16	VOLT_H2			Volts		Line Voltage Phase 2				

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAIISMH		12H		8	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
17	VOLT_H3			Volts		Line Voltage Phase 3				
18	ld_amp1			AMPS		Load Current Phase 1				
19	ld_amp2			AMPS		Load Current Phase 2				
20	ld_amp3			AMPS		Load Current Phase 3				
21	bus_volt			Volts		DC Bus Voltage				

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAIN_SRD		12H		9	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	diff_tgt			%		Diffuser Target Pos				
2	diffault			-		Diffuser Fault				
3	diff_alm			-		SRD Rotating Stall Alarm				
4	srd_a			%		Calculated SRD Position				
5	srd_1			%		Calc High Lift SRD Pos				
6	srd_2			%		Calc Low Lift SRD Pos				
7	lift_a			^F		Actual Lift				
8	lift_1			^F		VDO High Lift Load Line				
9	lift_2			^F		VDO Low Lift Load Line				
10	strt_tmr			min		VDO Logic Start Delay				
11	stalltmr			min		SRD Stall Closure Time				

Table Name		PIC Table Type		Instance	HMI Menu Path					
TEMP_CAL		12H		10	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	ECW			°F		Entering Chilled Water				
2	ECW_RAW			°F		ECW Sensor Raw Temp				
3	ecw_off	-2.0 to 2.0		^F		ECW Temperature Offset	-2	2		x
4	LCW			°F		Leaving Chilled Water				
5	LCW_RAW			°F		LCW Sensor Raw Temp				
6	lcw_off	-2.0 to 2.0		^F		LCW Temperature Offset	-2	2		x
7	ECDW			°F		Entering Condenser Water				
8	ECDW_RAW			°F		ECDW Sensor Raw Temp				
9	ecdw_off	-2.0 to 2.0		^F		ECDW Temperature Offset	-2	2		x
10	LCDW			°F		Leaving Condenser Water				
11	LCDW_RAW			°F		LCDW Sensor Raw Temp				
12	lcdw_off	-2.0 to 2.0		^F		LCDW Temperature Offset	-2	2		x

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAIOTHER		12H		12	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	tran_v			Volts		5V Sensor Power Monitor				
2	evapp_v			Volts		Evap Pres Trans Volts				
3	condp_v			Volts		Cond Pres Trans Volts				
4	econp_v			Volts		Econ Pres Trans Volts				
5	diffp_v			Volts		Diffuser Pres Tran Volts				
6	opsmp_v			Volts		Oil Sump Pres Tran Volts				
7	opdis_v			Volts		Oil Sup Pres Trans Volts				
8	evewp_v			Volts		Evap Enter Water Volts				
9	evlwp_v			Volts		Evap Leave Water Volts				
10	cdewp_v			Volts		Cond Enter Water Volts				
11	cdlwp_v			Volts		Cond Leave Water Volts				
12	brgip_v			Volts		Bearing In Trans Volt				
13	brgop_v			Volts		Bearing Out Trans Volt				
14	pumpo_v			Volts		Pump Output Trans Volt				
15	pumpi_v			Volts		Pump Input Trans Volt				
16	last_cpt			-		Last Cond Pump Run Time				
17	pre_chck	no/yes		-		Prestart Check Status				
18	gypos_ok	no/yes		-		GV1 Pos at Startup OK				
19	pmppd_ok	no/yes		-		Pump PD at Startup OK				
20	hgbp_ok	no/yes		-		ECV Pos at Startup OK				
21	dmp_ok	no/yes		-		Damper Pos at Startup OK				
22	op_heat	no/yes		-		Oil Pump Req Oil Heater				

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAIOTHER		12H		12	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
23	op_prest	no/yes		-		Oil Pump Req Prestart				
24	pump_srt	no/yes		-		Pump Req Startup				
25	pump_sht	no/yes		-		Pump Req Shutdown				
26	pump_rst	no/yes		-		Pump Req Swift Rst				
27	ep_start	no/yes		-		Evap Pump Req Startup				
28	ep_diag	no/yes		-		Evap Pump Req Diagnostic				
29	ep_freze	no/yes		-		Evap Pump Req Frozen				
30	ep_shut	no/yes		-		Evap Pump Req Shutdown				
31	ep_pdown	no/yes		-		Evap Pump Req Pumpdown				
32	cp_prest	no/yes		-		Cond Pump Req Prestart				
33	cp_start	no/yes		-		Cond Pump Req Startup				
34	cp_overr	no/yes		-		Cond Pump Req Override				
35	cp_shut	no/yes		-		Cond Pump Req Shutdown				
36	cp_tower	no/yes		-		Cond Pump Req Tower				
37	co_diag	no/yes		-		Cond Pump Req Diagnostic				
38	cp_freze	no/yes		-		Cond Pump Req Frozen				
39	cp_pdown	no/yes		-		Cond Pump Req Pumpdown				
40	cap_inhr	no/yes		-		Capacity Inhibit Ramping				
41	cap_inhd	no/yes		-		Capacity Inhibit Demand				
42	cap_decd	no/yes		-		Capacity Decrease Demand				
43	gv1_inhs	no/yes		-		Guide Vane Inh Surge				
44	cap_decs	no/yes		-		Capacity Decrease Surge				
45	capinhst	no/yes		-		Capacity Inh Low SST				
46	capdecst	no/yes		-		Capacity Dec Low SST				
47	capinhcp	no/yes		-		Capacity Inh Cond Pres				
48	capdeccp	no/yes		-		Capacity Dec Cond Pres				
49	capinhmt	no/yes		-		Capacity Inh Motor Temp				
50	capdecmt	no/yes		-		Capacity Dec Motor Temp				
51	capinham	no/yes		-		Capacity Inh Hi Current				
52	capdecam	no/yes		-		Capacity Dec Hi Current				
53	capdecls	no/yes		-		Capacity Dec Low Temp				
54	gv2posok	no/yes		-		GV2 Pos at Startup OK				

Table Name		PIC Table Type		Instance	HMI Menu Path					
ISM_MCFG		12H		13	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	ism_cflt	0 to 1	0	-		ISM Config Conflict	0	1		
2	del_ismc	0 to 1	0	-		Delete ISM Config	0	1		x
3	com_tout	0 to 255	60	sec		Communication Timeout	0	255		
4	star_typ	0 to 3	0	-		Starter Type	0	3		
5				-		Full Volt=0, Redu Volt=1				
6				-		Solid State=2, FS VFD=3				
7	scycd_en	0 to 1	0	-		Single Cycle Dropout	0	1		
8	rla	10 to 5000	200	AMPS		Motor Rated Load Amps	10	5000		
9	mot_lra	100 to 65535	1000	AMPS		Motor Locked Rotor Trip	100	65535		
10	lrs_del	1 to 10	5	cycles		Locked Rotor Start Delay	1	10		
11	str_lra	100 to 65535	2000	AMPS		Starter LRA Rating	100	65535		
12	rlv	200 to 13800	460	Volts		Motor Rated Line Voltage	200	13800		
13	cu_th	5 to 100	15	%		Current Imbal Threshold	5	100		
14	vu_th	1 to 10	5	%		Voltage Imbal Threshold	1	10		
15	ct_ratio	3 to 1000	100	-		Motor Current CT Ratio:1	3	1000		
16	vt_rat	1 to 115	1	-		Volt Transformer Ratio:1	1	115		
17	cu_per	1 to 10	5	sec		Current Imbal Persist	1	10		
18	vu_per	1 to 10	5	sec		Voltage Imbal Persist	1	10		
19	lfref_en	0 to 1	0	-		Line Frequency Faulting	0	1		
20	linefreq	0 to 1	0	-		Frequency(N=50Hz Y=60Hz)	0	1		
21	gfp_en	0 to 1	1	-		Ground Fault Protection	0	1		
22	gf_amps	1 to 25	15	AMPS		Ground Fault Current	1	25		
23	gfp_pers	1 to 10	5	cycles		Ground Fault Persistence	1	10		
24	gfs_del	1 to 20	10	cycles		Ground Fault Start Delay	1	20		
25	gfct_rat	150 to 150	150	-		Ground Fault CT Ratio:1	150	150		
26	ovvol_th	105 to 115	115	%		Overvoltage Threshold	105	115		
27	udvol_th	85 to 95	85	%		Undervoltage Threshold	85	95		
28	ovud_per	1 to 10	5	sec		Over Under Volt Persist	1	10		
29	uvs_del	1 to 4	1	sec		Under Volt Start Delay	1	4		

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAIIOB		12H		14	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	vol_iob1		0	Volts		IOB1 Power Supply Volt				
2	nm_peak1		0	-		IOB1 Num Peak Prev Sec				
3	low_vol1	0 to 1	0	-		IOB1 Low Voltage Flag	0	1		
4	fusstat1	0 to 1	1	-		IOB1 24VAC Fuse Status	0	1		
5	vol_iob2		0	Volts		IOB2 Power Supply Volt				
6	nm_peak2		0	-		IOB2 Num Peak Prev Sec				
7	low_vol2	0 to 1	0	-		IOB2 Low Voltage Flag	0	1		
8	fusstat2	0 to 1	1	-		IOB2 24VAC Fuse Status	0	1		
9	vol_iob3		0	Volts		IOB3 Power Supply Volt				
10	nm_peak3		0	-		IOB3 Num Peak Prev Sec				
11	low_vol3	0 to 1	0	-		IOB3 Low Voltage Flag	0	1		
12	fusstat3	0 to 1	1	-		IOB3 24VAC Fuse Status	0	1		
13	vol_iob4		0	Volts		IOB4 Power Supply Volt				
14	nm_peak4		0	-		IOB4 Num Peak Prev Sec				
15	low_vol4	0 to 1	0	-		IOB4 Low Voltage Flag	0	1		
16	fusstat4	0 to 1	1	-		IOB4 24VAC Fuse Status	0	1		
17	vol_iob5		0	Volts		IOB5 Power Supply Volt				
18	nm_peak5		0	-		IOB5 Num Peak Prev Sec				
19	low_vol5	0 to 1	0	-		IOB5 Low Voltage Flag	0	1		
20	fusstat5	0 to 1	1	-		IOB5 24VAC Fuse Status	0	1		
21	vol_iob6		0	Volts		IOB6 Power Supply Volt				
22	nm_peak6		0	-		IOB6 Num Peak Prev Sec				
23	low_vol6	0 to 1	0	-		IOB6 Low Voltage Flag	0	1		
24	fusstat6	0 to 1	1	-		IOB6 24VAC Fuse Status	0	1		

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAI_BDSN		12H		15	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	sn_iob1			-		IOB #1 Soft Part Number				
2	sn_iob2			-		IOB #2 Soft Part Number				
3	sn_iob3			-		IOB #3 Soft Part Number				
4	sn_iob4			-		IOB #4 Soft Part Number				
5	sn_iob5			-		IOB #5 Soft Part Number				
6	sn_iob6			-		IOB #6 Soft Part Number				
7	sn_siob			-		SIOB Soft Part Number				
8	sn_ism			-		ISM Software Part Number				
9	sn_gw			-		Gateway Soft Part Number				
10	sn_dcib			-		DCIB Soft Part Number				
11	svn_rev			-		MBB SVN Revision				

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAISWRST		12H		16	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	srd_shut	0.0 to 100.0		%		SRD Position @Shutdown	0	100		
2	vfd_shut	0.0 to 100.0		%		VFD Speed @Shutdown	0	100		
3	gv1_shut	0.0 to 100.0		%		GV1 Position @Shutdown	0	100		
4	est_shut	-40 to 280		°F		Evap Sat Temp @Shutdown	-40	280		
5	pd_dur	0 to 65535	0	min		Power Recovery Duration	0	65535		
6	power_dn	0 to 1	0	-		Power Down Active	0	1		
7	auto_rst	0 to 1	0	-		Auto Restart Active	0	1		
8	sw_rst	0 to 1	0	-		Swift Restart Active	0	1		

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAIN_MS		12H		17	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	lead_lag	0 to 2		-		Unit is Lead or Lag	0	2		
2				-		Disable=0, Lead=1, Lag=2				
3	ms_ctrl	0 to 3		-		Master Control Type	0	3		
4	sl_ctrl	0 to 3		-		Slave Control Type	0	3		
5				-		Local=0, Network=1				
6				-		Remote=2, Local Sched=3				

Table Name		PIC Table Type		Instance	HMI Menu Path					
MAIN_MS		12H		17	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
7	ll_comm	0 to 1		-		Lead Lag Communication	0	1		
8	ll_fault	0 to 3		-		Master Slave Fault	0	3		
9				-		No Fault=0, Master=1				
10				-		Slave=2, Both=3				
11	lagstat	0 to 14		-		Slave Run Status	0	14		
12	lag_s_s	0 to 1		-		Slave Start/Stop	0	1		
13	CAP_DECL	0 to 1		-		Capacity Decrease	0	1	x	
14	CAP_INHL	0 to 1		-		Capacity Inhibit	0	1	x	
15	MST_RUN	0 to 1		-		Master Chiller Running	0	1	x	
16	LCL_SRG	0 to 3		-		Local Surge Status	0	3	x	
17	RMT_SRG	0 to 3		-		Remote Surge Status	0	3	x	
18	EWT_OPT	0 to 1		-		EWT Control Option	0	1	x	
19	DEM_SLCT	0 to 1		-		Demand Limit Source	0	1	x	
20				-		Amps=0, KW=1				
21	lagstart	0 to 60		min		Lag Start Timer	0	60		
22	lagstop	0 to 60		min		Lag Stop Timer	0	60		
23	preflt	0 to 30		min		Prestart Fault Timer	0	30		
24	pulltime	0 to 30		min		Pulldown Timer	0	30		
25	pull_dt	-100 to 100		^F		Pulldown: Delta T / Min	-100	100		
26	ll_hr_d	-99999 to 99999		hours		Lead/Lag Hours Delta	-99999	99999		
27	ctrpntov	10 to 160		°F		Overrid Control Point	10	160		
28	demlimov	10 to 100		%		Overrid Act Demand Limit	10	100		

Table Name		PIC Table Type		Instance	HMI Menu Path					
PRSCAL01		12H		19	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	cal_en	0 to 1	0	-		Evap Press Calibration	0	1		x
2	cur_pres		0	PSIG		Current Pressure				
3	cal_p1		0	PSIG		Calib Pres1(0 PSIG)				x
4	cal_p2		0	PSIG		Calib Pres2(Unit:PSIG)				x
5				-		DV:10-30, Others:100-250				
6	cal_s		0	-		Calibrated Slope				
7	cal_i		0	-		Calibrated Intercept				
8	cal_st	0 to 1	0	-		Calibration Completed	0	1		

Table Name		PIC Table Type		Instance	HMI Menu Path					
PRSCAL02		12H		20	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	cal_en	0 to 1	0	-		Cond Press Calibration	0	1		x
2	cur_pres		0	PSIG		Current Pressure				
3	cal_p1		0	PSIG		Calib Pres1(0 PSIG)				x
4	cal_p2		0	PSIG		Calib Pres2(Unit:PSIG)				x
5				-		DV:10-30, Others:100-250				
6	cal_s		0	-		Calibrated Slope				
7	cal_i		0	-		Calibrated Intercept				
8	cal_st	0 to 1	0	-		Calibration Completed	0	1		

Table Name		PIC Table Type		Instance	HMI Menu Path					
PRSCAL03		12H		21	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	cal_en	0 to 1	0	-		Econ Press Calibration	0	1		x
2	cur_pres		0	PSIG		Current Pressure				
3	cal_p1		0	PSIG		Calib Pres1(0 PSIG)				x
4	cal_p2		0	PSIG		Calib Pres2(100-250PSIG)				x
5	cal_s		0	-		Calibrated Slope				
6	cal_i		0	-		Calibrated Intercept				
7	cal_st	0 to 1	0	-		Calibration Completed	0	1		

Table Name		PIC Table Type		Instance	HMI Menu Path					
PRSCAL04		12H		22	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	cal_en	0 to 1	0	-		Diff Press Calibration	0	1		x
2	cur_pres		0	PSIG		Current Pressure				
3	cal_p1		0	PSIG		Calib Pres1(0 PSIG)				x
4	cal_p2		0	PSIG		Calib Pres2(100-250PSIG)				x
5	cal_s		0	-		Calibrated Slope				
6	cal_i		0	-		Calibrated Intercept				
7	cal_st	0 to 1	0	-		Calibration Completed	0	1		

Table Name		PIC Table Type		Instance	HMI Menu Path					
PRSCAL05		12H		23	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	cal_en	0 to 1	0	-		Oil Sump Press Cali	0	1		x
2	cur_pres		0	PSIG		Current Pressure				
3	cal_p1		0	PSIG		Calib Pres1(0 PSIG)				x
4	cal_p2		0	PSIG		Calib Pres2(100-250PSIG)				x
5	cal_s		0	-		Calibrated Slope				
6	cal_i		0	-		Calibrated Intercept				
7	cal_st	0 to 1	0	-		Calibration Completed	0	1		

Table Name		PIC Table Type		Instance	HMI Menu Path					
PRSCAL06		12H		24	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	cal_en	0 to 1	0	-		Oil Supply Press Cali	0	1		x
2	cur_pres		0	PSIG		Current Pressure				
3	cal_p1		0	PSIG		Calib Pres1(0 PSIG)				x
4	cal_p2		0	PSIG		Calib Pres2(100-250PSIG)				x
5	cal_s		0	-		Calibrated Slope				
6	cal_i		0	-		Calibrated Intercept				
7	cal_st	0 to 1	0	-		Calibration Completed	0	1		

Table Name		PIC Table Type		Instance	HMI Menu Path					
VFD_OUT		13H		19	//MAINMENU/CONFIG/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit		High Limit	
1	hdpv_out	0 to 22	0	mA		Head Pressure Reference	0		22	
2	vfd_out	0 to 100	0	%		Target VFD Speed	0		100	
3	vfdstart	0 to 1	0	-		VFD Start	0		1	
4	tripr	0 to 1	0	-		Shunt Trip Relay	0		1	
5	ref_cool	0 to 1	0	-		Refrigerant Cool Relay	0		1	
6	fltreset	0 to 1	0	-		VFD Fault Reset	0		1	
7	freezrel	0 to 1	0	-		Freeze Release	0		1	
8	read_cfg	0 to 1	0	-		Read Configuration	0		1	

Table Name		PIC Table Type		Instance	HMI Menu Path					
CFG_19DV		13H		20	//MAINMENU/CONFIG/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	mot_pol	0 to 1	0	-		Motor Pole Pair	0	1		
2				-		Single=0, Double=1				
3	gv2_lim	30 to 100	96	%		IGV2 Travel Limit	30	100		
4	gv2_dmin	0 to 20	2	-		IGV2 Minimum Degree	0	20		
5	gv2_dful	10 to 100	90	-		IGV2 Fully Open Degree	10	100		
6	gv2_dmax	90 to 120	94	-		IGV2 Actuator Max Deg	90	120		
7	gv2_d20	0.0~120.0	28.1	-		IGV2 Deg @IGV1 20 Deg	10	30		
8	gv2_d30	0.0~120.0	37.2	-		IGV2 Deg @IGV1 30 Deg	10	50		
9	gv2_d50	0.0~120.0	71.6	-		IGV2 Deg @IGV1 50 Deg	10	80		
10	vfd_ratf	10 to 200	80	Hz		VFD Rate Speed Hz	10	200		
11	reg_tim		120	min		Purge Regen Lasting Time				
12	pgpumpplm		600	min		Daily PG Pumpout Limit				

Table Name		PIC Table Type		Instance	HMI Menu Path					
SYS_STAT		12H		29	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	sys_ctlm		0	-		System Control Mode				
2	sys_stat		0	-		System Status				
3	mas_stat		0	-		Master Run Status				
4	sla_stat		0	-		Slave Run Status				
5	sys_perl		0	%		System Percent Load				
6	sys_kw		0	KW		System KW				
7	sys_ctlp		0	°F		System Control Point				
8	sys_dem		0	%		System Demand Limit				
9	sys_supt		0			Supply Liquid Temp				
10	sys_rent		0			Return Liquid Temp				

Table Name		PIC Table Type		Instance	HMI Menu Path					
ISM_CAL1		12H		31	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1			0	-		J8B 4-20mA Output				
2	cal_en	0 to 1	0	-		Calibration Enable	0	1		x
3	ism_ma	4 to 20	4	mA		ISM Output mA	4	20		x
4	ismo_per	0 to 100	0	%		ISM Output Percent	0	100		
5	vfd_ma	4 to 20	4	mA		VFD Reading mA	4	20		x
6	vfdi_per	0 to 100	0	%		VFD Reading Percent	0	100		
7	cal_fact	0 to 2000	0	-		Calibration Factor	0	2000		
8	cal_done	0 to 1	0	-		Calibration Completed	0	1		

Table Name		PIC Table Type		Instance	HMI Menu Path					
ISM_CAL2		12H		32	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1			0	-		J6 0-10V Input				
2	cal_en	0 to 1	0	-		Calibration Enable	0	1		x
3	vfd_v	0 to 10	0	Volts		VFD Output Voltage	0	10		x
4	vfd_o_per	0 to 100	0	%		VFD Output Percent	0	100		
5	ism_v	0 to 10	0	Volts		ISM Reading Voltage	0	10		x
6	ismi_per	0 to 100	0	%		ISM Reading Percent	0	100		
7	cal_fact	800 to 1200	1000	-		Calibration Factor	800	1200		
8	cal_done	0 to 1	0	-		Calibration Completed	0	1		

Table Name		PIC Table Type		Instance	HMI Menu Path					
VFD_STAT		12H		34	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	cycle_1	no/yes		-		Single Cycle Dropout				
2	lineim_i	no/yes		-		Line Current Imbalance				
3	hi_volt	no/yes		-		High Line Voltage				
4	low_volt	no/yes		-		Low Line Voltage				
5	lo_dcbus	no/yes		-		Low DC Bus Voltage				
6	hi_dcbus	no/yes		-		High DC Bus Voltage				
7	vfd_por	no/yes		-		VFD Power On Reset				
8	grnd_flt			-		Ground Fault				
9	ph_rev	no/yes		-		Line Phase Reversal				
10	motor_ov	no/yes		-		Motor Overload Trip				
11	start_ok	no/yes		-		Start Complete				
12	rect_pu	no/yes		-		Rectifier Power Fault				
13	inv_pu	no/yes		-		Inverter Power Fault				
14	rect_oi	no/yes		-		Rectifier Overcurrent				
15	inv_oi	no/yes		-		Inverter Overcurrent				
16	prs_trip	no/yes		-		Condenser High Pressure				
17	no_amps	no/yes		-		Motor Amps Not Sensed				
18	accelflt	no/yes		-		Motor Acceleration Fault				
19	stop_ok	no/yes		-		Stop Complete				
20	ampstop	no/yes		-		Stop Fault				
21	rect_ot	no/yes		-		Rectifier Overtemp				
22	inv_ot	no/yes		-		Inverter Overtemp				
23	motim_i	no/yes		-		Motor Current Imbalance				
24	lineim_v	no/yes		-		Line Voltage Imbalance				

Table Name		PIC Table Type		Instance	HMI Menu Path					
VFD_STAT		12H		34	//MAINMENU/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
25	freqflt	no/yes		-		Frequency Fault				
26	vfd_comm	no/yes		-		VFD Comm Fail				
27	vfdfault	no/yes		-		VFD Fault				
28	readone	no/yes		-		Read Config Complete				
29	strt_inh	no/yes		-		VFD Start Inhibit				
30	checksum	no/yes		-		VFD Checksum Error				
31	inot_sw	no/yes		-		Inductor Overtemp Switch				
32	incomp	no/yes		-		Incompatibility Fault				

Table Name		PIC Table Type		Instance	HMI Menu Path					
VFD_MCFG		12H		35	//MAINMENU/MAINTAIN/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit	CCN Force	LEN Force
1	vfd_cflt	0 to 1	0	-		VFD Config Conflict	0	1		
2	del_vfdc	0 to 1	0	-		Delete VFD Config	0	1	x	x
3		0 to 1		-		Delete=Yes, Keep=No				
4	rla_load	0 to 1	200	AMPS		Motor Rated Load Current				
5	rla	0 to 1	200	AMPS		Motor Nameplate Current				
6	rlv	0 to 1	460	Volts		Motor Nameplate Voltage				
7	rpm	0 to 1	3000	rpm		Motor Nameplate RPM				
8	rlkw	0 to 1	1500	KW		Motor Nameplate KW				
9	comp_100	0 to 1	50	Hz		Compressor Speed 100%				
10	skipfrq1	0 to 1	102	Hz		Skip Frequency 1				
11	skipfrq2	0 to 1	102	Hz		Skip Frequency 2				
12	skipfrq3	0 to 1	102	Hz		Skip Frequency 3				
13	skipband	0 to 1	0	Hz		Skip Frequency Band				
14	ramp_inc	0 to 1	30	sec		Increase Ramp Time				
15	ramp_dec	0 to 1	30	sec		Decrease Ramp Time				
16	lvim_th	0 to 1	10	%		Line Voltage Imbalance%				
17	lvim_per	0 to 1	10	sec		Line Volt Imbalance Time				
18	lcim_th	0 to 1	40	%		Line Current Imbalance%				
19	lcim_per	0 to 1	10	sec		Line Current Imbal Time				
20	mcim_th	0 to 1	40	%		Motor Current Imbalance%				
21	mcim_per	0 to 1	10	sec		Motor Current Imbal Time				
22	scycd_en	0 to 1	0	-		Single Cycle Dropout	0	1		
23	pwm_freq	0 to 1	0	-		PWM Switch Frequency	0	1		
24		0 to 1		-		2KHz=0, 4KHz=1				
25	res_def	0 to 1	0	-		Restore Defaults	0	1		
26	com_tout	0 to 1	10	sec		Communication Timeout				

Table Name		PIC Table Type		Instance	HMI Menu Path					
FACTORY		13H		1	//MAINMENU/CONFIG/					
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit		High Limit	
1	fac_pass	0 to 65535	4444	-		Factory Password	0		65535	
2	chil_type	0 to 1	0	-	1	Chiller Type	0		1	
3				-		19XR6/7=0,19XR2-E/D/V=1				
4	unit_type	0 to 1	0	-		Unit Type	0		1	
5				-		Cool Only=0, Heat Mach=1				
6	refg_type	0 to 1	0	-		Refrigerant Type	0		1	
7				-		R134a=0, R1233zd=1				
8	comp_type	0 to 1	1	-		Comp (Single=0, Dual=1)	0		1	
9	cond_type	0 to 1	0	-		Cond Shell Side MAWP	0		1	
10				-		185PSI=0, 300PSI=1				
11	chmedium	0 to 1	0	-		Chilled Medium Type	0		1	
12	coun_cod	0 to 999	86	-		Country Code	0		999	
13	freecool	0 to 1	0	-		Free Cooling Option	0		1	
14	vfd_opt	0 to 4	0	-		VFD Option	0		4	
15				-		No=0,FS VFD=1,Carrier=2				
16				-		Rockwell=3, Eaton=4				
17	iob3_opt	0 to 1	1	-		IOB3 Option(19XR2-E/D/V)	0		1	
18	hyd_opt	0 to 1	0	-		IOB4 Option	0		1	
19	hr_opt	0 to 2	0	-		Heat Reclaim Option	0		2	
20	gv1_type	0 to 1	0	-		Guide Vane1 Type	0		1	
21				-		Digital=0, Analog=1				

Table Name		PIC Table Type		Instance	HMI Menu Path			
FACTORY		13H		1	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
22	vfd_fdv	0 to 1	0	-		VFD Feedback Voltage Sel	0	1
23				-		0-5V=0, 0-10V=1		
24	dmp_auto	0 to 1	0	-		Electrical Damper Valve	0	1
25	mrn_opt	0 to 1	0	-		Marine Option	0	1
26	pr_opt	0 to 1	0	-		Power Request Option	0	1
27	cpr_opt	0 to 1	0	-		Cont. Power Request	0	1
28	Comp_pre	0 to 1	0	-		19DV Comp Design Press	0	1
				-		44PSI=0, 72PSI=1		
29	pg_opt	0 to 1	0	-		Purge System Option	0	1
30	lqby_opt	0 to 2	0	-		Liquid Bypass Option	0	2
31				-		No=0, Full=1, Partial=2		

Table Name		PIC Table Type		Instance	HMI Menu Path			
CFGGEVFD		13H		2	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	vfd_gain	0.10 to 1.50	0.75	-		VFD Gain	0.1	1.5
2	vfd_max	90.0 to 110.0	100	%		VFD Max Speed Per	90	110
3	vfd_min	50.0 to 89.0	70	%		VFD Min Speed Per	50	89
4	vfd_str	65.0 to 100.0	100	%		VFD Start Speed Per	65	100
5	vfdculm	0.0 to 99999.0	250	AMPS		VFD Current Limit	0	99999
6	vfdc20ma	10.0 to 5000.0	200	AMPS		VFD Load Current 20mA	10	5000
7	comp_100	45.0 to 62.0	50	Hz		Comp Frequency 100%	45	62
8	vfd_ldap	0 to 1	1	-		VFD Load Current Input	0	1

Table Name		PIC Table Type		Instance	HMI Menu Path			
SERVICE1		13H		3	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	ser_pass	0 to 65535	2222	-		Service Password	0	65535
2				-				
3	atom_pre	8.000 to 15.000	14.5	PSI		Atmospheric Pressure	8	15
4	gv1_lim	30 to 100	80.7	%		GV1 Travel Limit	30	100
5	gv1stpos	0 to 40	4	%		GV1 Closure at Startup	0	40
6	ctrl_db	0.5 to 2	1	^F		Controlled Fluid DB	0.5	2
7	ewtdgain	1 to 3	2	-		Derivativated EWT Gain	1	3
8	gv1decdb	2 to 10	6	-		Proportional Dec Band	2	10
9	gv1incdb	2 to 10	6.5	-		Proportional Inc Band	2	10
10	max_gv	1.0 to 4.0	2	%		Maximum GV Movement	1	4
11	dem_20ma	10 to 100	40	%		Demand Limit At 20 mA	10	100
12	dem_pdb	3 to 15	10	%		Demand Limit Prop Band	3	15
13	ldramptr	5 to 20	5	%		Amps or KW Ramp per Min	5	20
14	tmramptr	1 to 10	3	^F		Temp Ramp per Min	1	10
15	rcysh_dt	0.5 to 4	1	^F		Recycle Shutdown Delta T	0.5	4
16	rcyst_dt	2 to 10	5	^F		Recycle Restart Delta T	2	10
17	dmp_dly	1 to 5	2	min		Damper Valve Act Delay	1	5
18	dmp_cldb	2 to 10	5	PSI		Damper Valve Close DB	2	10
19	dmp_opdb	10 to 20	13	PSI		Damper Valve Open DB	10	20
20	dmp_dt	4 to 10	7	^F		Damper Action Delta T	4	10
21	oilpvr_t	15 to 300	40	sec		Oil Press Verify Time	15	300
22	sf_st_th	40 to 100	70	%		Soft Stop Amps Threshold	40	100
23	wflow_t	0.5 to 5	5	min		Water Flow Verify Time	0.5	5
24	mbb_pfcl	0.5 to 2	1	-		Power Calibration Factor	0.5	2
25	ex_start	0 to 1	0	-		Enable Excessive Starts	0	1
26	oilstiro	0 to 3	1	-		Oil Stir Cycle(19XR6/7)	0	3
27				-		No Stir=0, 30s/30m=1,		
28		0 to 3		-		1m/4h=2, Comb. 0&1=3		
29	pgt_set	0 to 1	65	-		Purge Active Temp SP	30	90

Table Name		PIC Table Type		Instance	HMI Menu Path			
CONF_ISM		13H		4	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	com_tout	0 to 255	10	sec		Communication Timeout	0	255
2	star_typ	0 to 3	0	-		Starter Type	0	3
3				-		Full Volt=0, Redu Volt=1		
4				-		Solid State=2, FS VFD=3		
5	scycd_en	0 to 1	0	-		Single Cycle Dropout	0	1
6	rla	10 to 5000	200	AMPS		Motor Rated Load Amps	10	5000
7	rkw	50 to 9999	1500	KW		Motor Rated Kilowatts	50	9999
8	mot_lra	100 to 65535	1000	AMPS		Motor Locked Rotor Trip	100	65535
9	lrs_del	1 to 10	5	cycles		Locked Rotor Start Delay	1	10
10	str_lra	100 to 65535	2000	AMPS		Starter LRA Rating	100	65535
11	rlv	200 to 13800	460	Volts		Motor Rated Line Voltage	200	13800
12	cu_th	5 to 100	15	%		Current Imbal Threshold	5	100
13	vu_th	1 to 10	5	%		Voltage Imbal Threshold	1	10
14	ct_ratio	3 to 1000	100	-		Motor Current CT Ratio:1	3	1000
15	vt_rat	1 to 115	1	-		Volt Transformer Ratio:1	1	115
16	cu_per	1 to 10	5	sec		Current Imbal Persist	1	10
17	vu_per	1 to 10	5	sec		Voltage Imbal Persist	1	10
18	lfref_en	0 to 1	0	-		Line Frequency Faulting	0	1
19	linefreq	0 to 1	0	-		Frequency(N=50Hz Y=60Hz)	0	1
20	gfp_en	0 to 1	1	-		Ground Fault Protection	0	1
21	gf_amps	1 to 25	15	AMPS		Ground Fault Current	1	25
22	gfp_pers	1 to 10	5	cycles		Ground Fault Persistence	1	10
23	gfs_del	1 to 20	10	cycles		Ground Fault Start Delay	1	20
24	gfct_rat	150 to 150	150	-		Ground Fault CT Ratio:1	150	150
25	ovvol_th	105 to 115	115	%		Overvoltage Threshold	105	115
26	udvol_th	85 to 95	85	%		Undervoltage Threshold	85	95
27	ovud_per	1 to 10	5	sec		Over Under Volt Persist	1	10
28	uvs_del	1 to 4	1	sec		Under Volt Start Delay	1	4

Table Name		PIC Table Type		Instance	HMI Menu Path			
CFGUMVFD		13H		18	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	comp_hz	47 to 110	50	Hz		Compressor Speed 100%	47	110
2	rlv_i	200 to 13800	460	Volts		Rated Line Voltage	200	13800
3	rla	10 to 2000	200	AMPS		Motor Nameplate Current	10	2000
4	rla_load	10 to 2000	200	AMPS		Motor Rated Load Current	10	2000
5	rlv	200 to 13800	460	Volts		Motor Nameplate Voltage	200	13800
6	rpm	1500 to 3600	3000	rpm		Motor Nameplate RPM	1500	3600
7	rlkw	0 to 5600	1500	KW		Motor Nameplate KW	0	5600
8	skipfrq1	0.0 to 102.0	102	Hz		Skip Frequency 1	0	102
9	skipfrq2	0.0 to 102.0	102	Hz		Skip Frequency 2	0	102
10	skipfrq3	0.0 to 102.0	102	Hz		Skip Frequency 3	0	102
11	skipband	0.0 to 102.0	0	Hz		Skip Frequency Band	0	102
12	ramp_inc	5 to 60	30	sec		Increase Ramp Time	5	60
13	ramp_dec	5 to 60	30	sec		Decrease Ramp Time	5	60
14	lvim_th	1 to 10	10	%		Line Voltage Imbalance%	1	10
15	lvim_per	1 to 10	10	sec		Line Volt Imbalance Time	1	10
16	lcim_th	5 to 40	40	%		Line Current Imbalance%	5	40
17	lcim_per	1 to 10	10	sec		Line Current Imbal Time	1	10
18	mcim_th	5 to 40	40	%		Motor Current Imbalance%	5	40
19	mcim_per	1 to 10	10	sec		Motor Current Imbal Time	1	10
20	scycd_en	0 to 1	0	-		Single Cycle Dropout	0	1
21	pwm_freq	0 to 1	0	-		PWM Switch Frequency	0	1
22				-		2KHz=0, 4KHz=1		
23	res_def	0 to 1	0	-		Restore Defaults	0	1
24	com_tout	0 to 255	10	sec		LEN Comm Timeout	0	255
25	mod_tout	0 to 255	2	sec		Modbus Comm Timeout	0	255
26	gw_baud	1 to 4	2	-		Gateway Modbus Baud Rate	1	4
27				-		4800=1, 9600=2		
28				-		19200=3, 38400=4		

Table Name		PIC Table Type		Instance	HMI Menu Path			
CFGSURGE		13H		7	//MAINMENU/CONFIG			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	sgl_cfg	0 to 1	0	-		Surge Line Configuration	0	1
2				-		PR = 0, Delta T = 1		
3	gv1c_sel	0 to 1	0	-		IGV1 Pos Configuration	0	1
4				-		Degree =0, Percentage =1		
5	dts_max	0.0 to 150.0	70	^F		Surge Delta Tsmax	0	150
6	dts_min	0.0 to 150.0	45	^F		Surge Delta Tsmin	0	150
7	pr_ful	1.0000 to 5.0000	3	-		PR at Full Load Opening	1	5
8	pr_min	1.0000 to 5.0000	1.5	-		PR at Minimum Opening	1	5
9	gv1_dful	80 to 120.0	88	-		IGV1 Full Load Open Deg	80	120
10	gv1_dmed	10.0 to 40.0	27	-		Sound Ctrl IGV1 Open Deg	10	40
11	gv1_dmin	0.0 to 10.0	2	-		IGV1 Minimum Open Deg	0	10
12	gv1_dmax	90 to 120.0	109	-		IGV1 Maximum Open Deg	90	120
13	gv1_pmin	0.0 to 100.0	5	%		IGV1 Minimum Position	0	100
14	gv1_pful	0.0 to 100.0	100	%		IGV1 Full Load Position	0	100
15	sgl_off	1.0 to 3.0	2	^F		Surge Line Offset	1	3
16	sgl_loff	0.5 to 3.0	1.5	^F		Surge Line Lower DB	0.5	3
17	sgl_hoff	0.1 to 3.0	1.5	^F		Surge Line Upper DB	0.1	3
18	sgl_shfh	-1.000 to 0.000	-0.01	-		Surge Line Shape Factor	-1	0
19	sgl_shfl	0.000 to 1.000	0.01	-		Sound Line Shape Factor	0	1
20	sgl_spdf	0.00 to 3.00	2	-		Surge Line Speed Factor	0	3
21	surg_del	0 to 120	15	sec		Surge Delay Time	0	120
22	surge_t	7 to 10	8	min		Surge Time Period	7	10
23	surge_a	5.0 to 40.0	20	%		Surge Delta Amps %	5	40
24	gvstp_sg	1.0 to 3.0	2	%		GV1 Close Step Surge	1	3
25	vfdstpsg	1.0 to 5.0	1.5	%		VFD Speed Step Surge	1	5
26	hgbpstsg	1.0 to 10.0	4	%		EC Valve Step Surge	1	10
27	sgl_pro	0.00 to 5.0	0	^F		Surge Profile Offset	0	5
28	high_eff	0 to 1	1	-		High Efficiency Mode	0	1
29	noi_alt	0 to 1	0	-		High Noise Alert	0	1

Table Name		PIC Table Type		Instance	HMI Menu Path			
CFGLIMIT		13H		8	//MAINMENU/CONFIG			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	evap_al	0.5 to 15.0	5	^F		Evap Approach Alert	0.5	15
2	cond_al	0.5 to 15.0	6	^F		Cond Approach Alert	0.5	15
3	cpov_lo	90.0 to 157.0	140	PSIG		Cond Press Override Low	90	157
4	cpov_hi	200.0 to 265.0	250	PSIG		Cond Press Override High	200	265
5	cpcut_lo	160.0 to 165.0	160	PSIG		Cond Press Cutout Low	160	165
6	cpcut_hi	270.0 to 275.0	275	PSIG		Cond Press Cutout High	270	275
7	ert_ovdt	2 to 5	3	^F		Evap Override Delta T	2	5
8	ert_trip	0 to 40	33	°F		Evap Refrig Trippoint	0	40
9	ep_ov	90 to 157	140	PSIG		High Evap Press Override	90	157
10	ep_cut	160 to 170	165	PSIG		High Evap Press Cutout	160	170
11	cdfreeze	-20.0 to 35.0	34	°F		Condenser Freeze Point	-20	35
12	dgt_alrt	125 to 200	200	°F		Comp Discharge Alert	125	200
13	mt_over	150 to 200	200	°F		Comp Motor Temp Override	150	200
14	tb_alert	155 to 175	175	°F		Comp Bearing Temp Alert	155	175
15	tb_trip	175 to 185	185	°F		Comp Bearing Temp Trip	175	185
16	tb_alt2	185.0 to 210.0	210	°F		Comp Bearing Alert R6&7	185	210
17	tb_trip2	210.0 to 220.0	220	°F		Comp Bearing Trip R6&7	210	220
18	bri_min	10.0 to 34.0	34	°F		Minimum Brine LWT	10	34
19	lwtp_sp	41.0 to 50.0	42.8	°F		Heating LWT Protect Set	41	50
20	evap_cut	0.5 to 50	5	PSI		Evap Flow Delta P Cutout	0.5	50
21	cond_cut	0.5 to 50	5	PSI		Cond Flow Delta P Cutout	0.5	50
22	cond_val	0.5 to 50	50	PSI		Cond Hi Flow DP Limit	0.5	50
23	cond_alm	0 to 1	0	-		Cond Hi Flow Alarm	0	1
24	cpov_dl	18 to 35.6	20	PSIG		Cond Pre Override DV 44*	18	35.6
25	cpcut_dl	30to 38	30	PSIG		Cond Pre Cutout DV 44**	30	38
26	cpov_dh	20 to 56	55	PSIG		Cond Pre Override DV 72	20	56
27	cpcut_dh	59 to 60.3	59	PSIG		Cond Pre Cutout DV 72	59	60.3
28	tb_alt3	90.0 to 120.	104	°F		Comp Bearing Alert DV	90	120
29	tb_trip3	121.0 to 150.0	122	°F		Comp Bearing Trip DV	121	150
30	lwtp_sp	41.0 to 50.0	42.8	°F		Heating LWT Protect Set	41	50
31	ep_ovdv	20 to 56	55	PSIG		Hi Evap Pre Override DV	20	56
32	ep_cutdv	59 to 60.3	59	PSIG		Hi Evap Pre Cutout DV	59	60.3

* NOTE: this value must be setted by service personnel according to the actual pressure switch jump value

** NOTE: this value must be setted by service personnel according to the actual pressure switch priority controlled value, and the given value should be less than the value of * - 2.4 F.

Table Name		PIC Table Type		Instance	HMI Menu Path			
CONF_OPT		13H		10	//MAINMENU/CONFIG			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	astart	0 to 1	0	-		Auto Restart Option	0	1
2	commsens	0 to 1	0	-		Common Sensor Option	0	1
3	hgbp_opt	0 to 3	0	-		EC Valve Option	0	3
4				-		No=0, Cont.=1,		
5				-		ON/OFF=2, mA=3		
6	hgbp_sel	0 to 3	0	-		EC Valve Selection	0	3
7				-		Disable=0, Surge=1		
8				-		Low Load=2, Comb=3		
9	hpop_gv1	0.5 to 10.0	5	%		ECV Open IGV1 Position	0.5	10
10	hgcl_gv1	1.5 to 20.0	10	%		ECV Close IGV1 Position	1.5	20
11	hgb_toff	0.5 to 10	4	^F		ECV Off DT for Low Load	0.5	10
12	hgb_ton	0.5 to 10	2	^F		ECV On DT for Low Load	0.5	10
13	hgbp_ldb	0.5 to 2.0	1	^F		ECV Low Load DB	0.5	2
14	hdpv_opt	0 to 1	0	-		Head Pres Valve Option	0	1
15	hdp_0	20 to 85	25	PSI		Head Pres Delta P 0%	20	85
16	hdp_100	20 to 85	50	PSI		Head Pres Delta P 100%	20	85
17	hdpv_min	0 to 100	0	%		Head Pressure Min Output	0	100
18	ice_opt	0 to 1	0	-		Ice Build Option	0	1
19	ice_recy	0 to 1	0	-		Ice Build Recycle	0	1
20	ice_term	0 to 2	0	-		Ice Build Termin Source	0	2
21				-		Temp=0,Contact=1,Both=2		
22	tth_sp	55 to 105	75	°F		Tower Fan High Setpoint	55	105
23	leak_en	0 to 1	0	-		Refrig Leakage Option	0	1
24	leak_ma	4 to 20	20	mA		Refrig Leakage Alarm mA	4	20
25	exv_opt	0 to 1	0	-		Oil EXV Option	0	1
26	oil_high	100 to 140	122	°F		Oil Temp High Threshold	100	140
27	oil_low	90 to 130	113	°F		Oil Temp Low Threshold	90	130
28	gt_fact	0.25 to 3.00	1	-		Gas Torque Factor	0.25	3
29	gv_srd_f	0.70 to 1.20	0.95	-		Guide Vane/SRD Factor	0.7	1.2
30	pd_tcfg	0 to 60	15	min		Power Recovery Timeout	0	60
31	evap_t_o	0 to 1	1	-		Evap Liquid Temp Opt	0	1
32	evap_ref	0 to 1	1	-		Evap App Calc Selection	0	1
33				-		Sat Temp=0, Ref Temp=1		
34	cfa_opt	0 to 1	0	-		Condenser Flush Alert	0	1
35	cusa_opt	0 to 1	0	-		Customer Alert Option	0	1
36	wp_opt	0 to 2	0	-		Water Pressure Option	0	2
37				-		No=0, Pres.=1, Pres.D=2		
38	wfm_opt		0			Water Flow Measurement	0	3
39				-		No=0, Flow Meter=1,		
40				-		Water Pres. D=2		
41	fs_opt	0 to 1	0	-		Water Flow Determination	0	1
42				-		Sat Temp=0,Flow Switch=1		
43	flow4ma	0 to 200	0	GPS		Water Flow at 4mA	0	200
44	flow20ma	0 to 200	0	GPS		Water Flow at 20mA	0	200
45	chwf_bas	0 to 150	0	GPS		Evap Flow Rate Baseline	0	150
46	evpd_bas	0 to 20	0	PSI		Evap Pres Drop Baseline	0	20
47	cdwf_bas	0 to 150	0	GPS		Cond Flow Rate Baseline	0	150
48	cdpd_bas	0 to 20	0	PSI		Cond Pres Drop Baseline	0	20
49	wpd_20ma	10 to 40	10	PSI		Water Pres Drop @20mA	10	40
50	vssv_dly	0 to 10	5	min		Vapor Source SV Delay	0	10
51	opvfdmax	35 to 60	50	PSI		Max Oil Pressure Diff	35	60
52	opvfdstp	0 to 10	7	%		Oil Pump VFD Max Step	0	10
53		0 to 1	0	-		Vapor Source SV Option	0	1
54	pgon_opt		0	-		Purge On Idle Option	0	1

Table Name		PIC Table Type		Instance	HMI Menu Path			
CONF_IOB		13H		11	//MAINMENU/CONFIG			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	lv_enth	17.0 to 19.0	17	Volts		Low Entered Volt V1 IOB	17	19
2	lv_exth	19.0 to 21.0	19	Volts		Low Exited Volt V2 IOB	19	21
3	typ_ai11	0 to 6	4	-	1	IOB1 AI#1 Type	0	6
4	typ_ai12	0 to 6	4	-		IOB1 AI#2 Type	0	6
5	typ_ai13	0 to 6	4	-		IOB1 AI#3 Type	0	6
6	typ_ai14	0 to 6	4	-		IOB1 AI#4 Type	0	6
7	typ_ai19	0 to 5	2	-		IOB1 AI#9 Type	0	5

Table Name		PIC Table Type		Instance	HMI Menu Path			
CONF_JOB		13H		11	//MAINMENU/CONFIG			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
8	typ_ao11	0 to 2	1	-	2	IOB1 AO#1 Type	0	2
9	typ_ai21	0 to 6	4	-		IOB2 AI#1 Type	0	6
10	typ_ai22	0 to 6	4	-		IOB2 AI#2 Type	0	6
11	typ_ai23	0 to 6	4	-		IOB2 AI#3 Type	0	6
12	typ_ai24	0 to 6	0	-		IOB2 AI#4 Type	0	6
13	typ_ai28	0 to 5	0	-		IOB2 AI#8 Type	0	5
14	typ_ai29	0 to 5	0	-		IOB2 AI#9 Type	0	5
15	typ_ai2a	0 to 5	5	-		IOB2 AI#10 Type	0	5
16	typ_ao21	0 to 2	1	-		IOB2 AO#1 Type	0	2
17	typ_ao22	0 to 2	1	-		IOB2 AO#2 Type	0	2
18	typ_ai31	0 to 6	4	-		IOB3 AI#1 Type	0	6
19	typ_ai32	0 to 6	4	-		IOB3 AI#2 Type	0	6
20	typ_ai33	0 to 6	4	-		IOB3 AI#3 Type	0	6
21	typ_ai34	0 to 6	4	-		IOB3 AI#4 Type	0	6
22	typ_ai35	0 to 5	0	-		IOB3 AI#5 Type	0	5
23	typ_ai36	0 to 5	5	-		IOB3 AI#6 Type	0	5
24	typ_ai38	0 to 5	0	-		IOB3 AI#8 Type	0	5
25	typ_ai39	0 to 5	0	-		IOB3 AI#9 Type	0	5
26	typ_ai3a	0 to 5	0	-		IOB3 AI#10 Type	0	5
27	typ_ao31	0 to 2	1	-		IOB3 AO#1 Type	0	2
28	typ_ao32	0 to 2	1	-		IOB3 AO#2 Type	0	2
29	typ_ai43	0 to 6	0	-		IOB4 AI#3 Type	0	6
30	typ_ai44	0 to 6	0	-		IOB4 AI#4 Type	0	6
31	typ_ai45	0 to 6	0	-		IOB4 AI#5 Type	0	6
32	typ_ai46	0 to 6	0	-		IOB4 AI#6 Type	0	6
33	typ_ai47	0 to 6	0	-		IOB4 AI#7 Type	0	6
34	typ_ai4a	0 to 6	0	-		IOB4 AI#10 Type	0	6

1 disable = 0, 0-5V = 1, 0-20ma = 2, 10K Thermistor = 3, 5K Thermistor = 4, Resistance = 5, RTD = 6

2 disable = 0, 0-20ma = 1, 0-10V = 2

Table Name		PIC Table Type		Instance	HMI Menu Path			
EMAILCFG		13H		12				
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	email_on	0 to 1	0	-		E-Mail Function	0	1
2	senderP1			-		Sender Email Part1		
3				-		@		
4	senderP2			-		Sender Email Part2		
5	recip1P1			-		Recip1 Email Part1		
6				-		@		
7	recip1P2			-		Recip1 Email Part2		
8	recip2P1			-		Recip2 Email Part1		
9				-		@		
10	recip2P2			-		Recip2 Email Part2		
11	smtpP1	0 to 255	0	-		SMTP IP Addr Part 1	0	255
12	smtpP2	0 to 255	0	-		SMTP IP Addr Part 2	0	255
13	smtpP3	0 to 255	0	-		SMTP IP Addr Part 3	0	255
14	smtpP4	0 to 255	0	-		SMTP IP Addr Part 4	0	255
15	accP1			-		Account Email Part1		
16		text 8 char		-		@		
17	accP2			-		Account Email Part2		
18	accPass			-		Account Password		
19	portNbr	0 to 255	25	-		Port Number	0	255
20	srvTim	0 to 255	30	sec		Server Timeout	0	255
21	srvAut	0 to 2	0	-		Server Authentication	0	2
22				-		No Authentication=0		
23				-		Username Only=1		
24				-		Username & Domain Name=2		

Table Name		PIC Table Type		Instance	HMI Menu Path			
LABONLY		13H		13				
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	dmp_fcen	0 to 1	0	-		Damper Valve Force	0	1
2	dmp_fc_t	0 to 2	1	-		Damper Valve Force Tgt	0	2
3				-		Close=0, Hold=1, Open=2		
4	lexv_fc	0 to 1	0	-		LLC EXV Forced	0	1
5	lexv_fv	0 to 100	30	%		LLC EXV Forced Value	0	100
6	hgbp_fen	0 to 1	0	-		EC Valve Forced	0	1
7	hgbp_f_t	0 to 2	1	-		ONOFFHOLD ECV Force Tgt	0	2
8				-		Close=0, Hold=1, Open=2		
9	hgbp_f_p	0 to 100	30	%		Modulated ECV Forced %	0	100
10	gv1_fc	0 to 1	0	-		GV1 Forced	0	1
11	vfd_fc	0 to 1	0	-		VFD Forced	0	1
12	hdpv_fc	0 to 1	0	-		Head Pre Valve Force	0	1
13	exv_fc	0 to 1	0	-		Oil EXV Force	0	1
14	gv1_fv	0 to 100	30	%		GV1 Forced Pos	0	100
15	vfd_fv	0 to 100	70	%		VFD Forced Speed	0	100
16	hdpv_fv	0 to 100	0	%		Head Pre Forced Value	0	100
17	exv_fv	0 to 100	0	%		Oil EXV Forced Value	0	100
18	DSH_EN	0 to 1	1	-		Low DSH Protection	0	1
19	OILT_CHK	0 to 1	1	-		Oil Temp Prestart Check	0	1
20	gv2_fc	0 to 1	0	-		GV2 Forced	0	1
21	gv2_fv	0 to 100	30	%		GV2 Forced Pos	0	100
22	condcvfc	0 to 1	0	-		Condenser CV Force	0	1
23	condcvfv	0 to 1	1	-		Condenser CV Forced Tgt	0	1
24	evapcvfc	0 to 1	0	-		Evaporator CV Force	0	1
25	evapcvfv	0 to 1	0	-		Evaporator CV Forced Tgt	0	1
26	condf_fc	0 to 1	0	-		Cond Filling VLV Force	0	1
27	condf_fv	0 to 1	0	-		Cond Filling VLV Tgt	0	1
28	vssv_fc	0 to 1	0	-		Vapor SV Forced	0	1
29	vssv_fv	0 to 1	0	-		Vapor SV Forced Value	0	1
30	PG_FC	0 to 2	0	-		Purge Forced	0	2
31				-		Disable=0, Sys Force=1		
32				-		Valves Force=2		
33	pg_cdvfc	0 to 1	0	-		PG Cond Valve Force	0	1
34	pg_cdvfv	0 to 1	0	-		PG Cond Valve Force Tgt	0	1
35	pg_covfc	0 to 1	0	-		PG Comp Valve Force	0	1
36	pg_covfv	0 to 1	0	-		PG Comp Valve Force Tgt	0	1
37	pgpumpfc	0 to 1	0	-		PG Pumpout VLV Force	0	1
38	pgpumpfv	0 to 1	0	-		PG Pumpout VLV Force Tgt	0	1
39	pg_drafc	0 to 1	0	-		Purge Drainage Force	0	1
40	pg_regfc	0 to 1	0	-		PG Regen Valve Force	0	1
41	pg_regfv	0 to 1	0	-		PG Regen Valve Force Tgt	0	1
42	pg_disfc	0 to 1	0	-		PG Discharge Valve Force	0	1
43	pg_disfv	0 to 1	0	-		PG Disch VLV Force Tgt	0	1
44	pgvacpfc	0 to 1	0	-		PG Vaccum Pump Force	0	1
45	pgvacpfv	0 to 1	0	-		PG Vaccum Pump Force Tgt	0	1
46	pgcompfc	0 to 1	0	-		PG Compressor Force	0	1
47	pgcompfv	0 to 1	0	-		PG Compressor Force Tgt	0	1
48	pgheatfc	0 to 1	0	-		PG Heater Force	0	1
49	pgheatfv	0 to 1	0	-		PG Heater Force Tgt	0	1
50	vaplsvfc	0 to 1	0	-		Vapor Venting SV Force	0	1
51	vaplsvfv	0 to 1	0	-		Vapor Venting SV Tgt	0	1
52	lubr_fc	0 to 1	0	-		Lube Drain CV Force	0	1
53	evapd_fv	0 to 1	0	-		Evap Drain CV Tgt	0	1
54	conddd_fv	0 to 1	0	-		Cond Drain CV Tgt	0	1

Table Name		PIC Table Type		Instance	HMI Menu Path			
CONF_MS		13H		14	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	slv_addr	1 to 236	2	-		Slave Address	1	236
2	msl_sel	0 to 2	0	-		Master/Slave Select	0	2
3				-		Disable=0		
4				-		Master=1, Slave=2		
5	ms_type	0 to 1	0	-		Chiller Connection Type	0	1
6				-		Parallel=0, Series=1		
7	mids_opt	0 to 1	1	-		Middle Sensor Option	0	1

Table Name		PIC Table Type		Instance	HMI Menu Path			
CONF_MS		13H		14	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
8	lead_sel	0 to 1	0	-		Master Lead Lag Select	0	1
9				-		Lead, Lag Once Failed=0		
10				-		Runtime Balance=1		
11	serct_fl	0 to 1	0	-		Series Counter Flow	0	1
12	toocl	0 to 1	0	-		Take Over On Comm Loss	0	1
13	ms_per	25 to 75	50	%		Master per Capacity	25	75
14	lag_shut	25 to 75	50	%		Lag Shutdown Threshold	25	75
15	pref_tim	2 to 30	5	min		Prestart Fault Time	2	30
16	un_th	50 to 100	100	%		Lead Unload Threshold	50	100
17	ll_bal_d	40 to 400	168	hours		Lead/Lag Balance Delta	40	400
18	lstr_tim	2 to 30	10	min		Lag Start Time	2	30
19	lstp_tim	2 to 30	10	min		Lag Stop Time	2	30
20	lead_pul	0 to 60	0	min		Lead Pulldown Time	0	60
21	lag_mini	0 to 150	0	min		Lag Minimum Running Time	0	150
22	lagrundt	0 to 10	3	^F		Lag Run Delta T	0	10
23	lagoffdt	0 to 10	1.8	^F		Lag Off Delta T	0	10

Table Name		PIC Table Type		Instance	HMI Menu Path			
CONF_PRG		13H		15	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	prog_en	0 to 1	1	-		Prog Function Enable	0	1
2	oilch_cm	0 to 1	1	-		Oil Change Done	0	1
3	oilfc_cm	0 to 1	1	-		Oil Filter Change Done	0	1
4	tracL_cm	0 to 1	1	-		Trans Calibration Done	0	1
5	refch_cm	0 to 1	1	-		Refrigerant Charge Done	0	1
6	oilfl_th	-6.7 to 420.0	10	PSI		Oil Filter PD Threshold	-6.7	420
7	oilch_nt	1000.0 to 8000.0	2000	hours		Oil Lub Expire Time	1000	8000
8	oilst_nt	5000.0 to 15000.0	8640	hours		Oil Storage Expire Time	5000	15000
9	refgc_th	0.0 to 5.0	2	PSI		Trans Calib Threshold	0	5
10	rch_cath	20.0 to 40.0	20	^F		Low Charge Cond Approach	20	40
11	ep_dgap	0.0 to 10.0	3	^F		Evap Design Approach	0	10
12	beart_th	100.0 to 230.0	200	^F		Bearing Degradation	100	230
13	oil_qly	0 to 2	0	-		Oil Quality	0	2
14	oilflt	0 to 2	0	-		Oil Filter Failure	0	2
15	tran_dev	0 to 2	0	-		Transducer Deviation	0	2
16	ref_chg	0 to 2	0	-		Refrig Charge Status	0	2
17	hx_e_ltd	0 to 6	1.5	^F		HxPlot Evap Design LTD	0	6
18	hx_e_l_o	0 to 30	10	%		HxPlot Evap LTD Offset	0	30
19	hx_c_ltd	0 to 6	1.5	^F		HxPlot Cond Design LTD	0	6
20	hx_c_l_o	0 to 30	10	%		HxPlot Cond LTD Offset	0	30
21	hx_igv	0 to 100	10	%		HxPlot IGV Threshold	0	100
22	hx_en	0 to 1	0	-		HxPlot Diagram Enable	0	1

Table Name		PIC Table Type		Instance	HMI Menu Path			
CONNECT		13H		16	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	p0_opt	0 to 2	0	-		RS485 Port0 Option	0	2
2				-		CCN=0, BACnet MS/TP=1		
3				-		Modbus RTU=2		
4	mip_opt	0 to 1	0	-		Modbus TCP Enable	0	1
5	port_nbr	0 to 1024	502	-		Modbus TCP Port Number	0	1024
6	ser_UID	1 to 255	1	-		Modbus Server UID	1	255
7	metric	0 to 1	0	-		Modbus Metric Unit	0	1
8	parity	0 to 4	0	-		Modbus RTU Parity Option	0	4
9				-		No=0, Odd=1, Even=2		
10				-		Low=3, High=4		
11	stop_bit	0 to 1	0	-		Modbus RTU Stop Bit	0	1
12				-		1 Bit=0,2 Bits=1		
13	baudrate	0 to 2	0	-		Modbus RTU Baudrate	0	2
14				-		9600=0,19200=1,38400=2		
15	swap_b	0 to 1	0	-		Modbus Little Endian	0	1
16	real_typ	0 to 1	0	-		Modbus Real Type	0	1

Table Name		PIC Table Type		Instance	HMI Menu Path			
CONNECT		13H		16	//MAINMENU/CONFIG/			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
17				-		BACnet Configuration		
18	bacena	0 to 1	0	-		BACnet/IP Enable	0	1
19	bacunit	0 to 1	0	-		BACnet Metric Unit	0	1
20	network	1 to 9999	1600	-		BACnet Network	1	9999
21	bac_id	0 to 9999999	1600001	-		BACnet Identifier	0	9999999
22	auid	0 to 1	0	-		ALC Auto Id Scheme	0	1
23	balmena	0 to 1	0	-		BACnet Alarms Enable	0	1
24	bacschen	0 to 1	0	-		BACnet Schedule Enable	0	1
25	mstpaddr	1 to 127	1	-		MS/TP Mac address	1	127
26	mstpbaud	0 to 5	2	-		MS/TP Baud rate	0	5
27				-		9600 = 0, 19200 = 1		
28				-		38400 = 2, 57600 = 3		
29				-		76800 = 4, 115200 = 5		
30	maxmastr	1 to 127	3	-		MS/TP Max Master	1	127
31	maxinfof	1 to 255	5	-		MS/TP Max Info Frames	1	255
32				-		Call Home Configuration		
33	ch_opt	0 to 1	0	-		Call Home Option	0	1
34	ch_ip_P1	0 to 255	140	-		Call Home IP Addr Part 1	0	255
35	ch_ip_P2	0 to 255	206	-		Call Home IP Addr Part 2	0	255
36	ch_ip_P3	0 to 255	129	-		Call Home IP Addr Part 3	0	255
37	ch_ip_P4	0 to 255	10	-		Call Home IP Addr Part 4	0	255

Table Name		PIC Table Type		Instance	HMI Menu Path			
SETPOINT		17H		1	//MAINMENU/SETPOINT			
	Menu Name	Status	Default	Unit	Note	Menu text description	Low Limit	High Limit
1	ecw_sp	15.0 to 120.0	60	°F		Cooling ECW Setpoint	15	120
2	lcw_sp	10.0 to 120.0	45	°F		Cooling LCW Setpoint	10	120
3	ecdw_sp	63.0 to 150.0	104	°F		Heating ECDW Setpoint	63	150
4	lcdw_sp	68.0 to 150.0	113	°F		Heating LCDW Setpoint	68	150
5	ice_sp	15.0 to 60.0	40	°F		Ice Build Setpoint	15	60
6	dem_base	10.0 to 100.0	100	%		Base Demand Limit	10	100
7	EWT_OPT	0 to 1	0	-		EWT Control Option	0	1

Table Name		PIC Table Type		Instance			
MAINMENU		A001H		2			
	Menu Name	Type_Instance	Access	PreProc	PostProc	Menu text description	Menu icons
1	GENUNIT	0x0011_i1	ALL	NONE	NONE	General Parameters	
2	TEMP	0x0011_i2	ALL	NONE	NONE	Temperatures	
3	PRESSURE	0x0011_i3	ALL	NONE	NONE	Pressures	
4	INPUTS	0x0011_i4	ALL	NONE	NONE	Inputs Status	
5	OUTPUTS	0x0011_i5	ALL	NONE	NONE	Outputs Status	
6	HYDRLIC	0x0011_i6	ALL	NONE	NONE	Hydraulic Status	
7	RUNTIME	0x0011_i7	ALL	NONE	NONE	Run Times	
8	MODES	0x0011_i8	ALL	NONE	NONE	Modes	
9	SETPOINT	0x0017_i1	USER	NONE	NONE	Setpoint	
10	CONFIG	0xA001_i4	USER	NONE	NONE	Configuration Menu	

Table Name		PIC Table Type		Instance			
MAINMENU		A001H		2			
	Menu Name	Type_Instance	Access	PreProc	PostProc	Menu text description	Menu icons
11	QCK_TEST	0x0012_i5	SERVICE	NONE	NONE	Quick Test	
12	MAINTAIN	0xA001_i5	SERVICE	NONE	NONE	Maintenance Menu	
13	TRENDING	0xA002_i1	ALL	NONE	NONE	Trending	
14	QCK_CALI	0x0012_i6	SERVICE	NONE	NONE	Quick Calibration	

Table Name		PIC Table Type		Instance			
ALARMS		A001H		3			
	Menu Name	Type_Instance	Access	PreProc	PostProc	Menu text description	Menu icons
1	ALARMRST	0x0012_i1	ALL	NONE	NONE	Reset Alarms	
2	CUR_ALM	0x0043_i3	ALL	NONE	NONE	Current Alarms	
3	ALMHIST1	0x0043_i1	ALL	NONE	NONE	History Alarms	
4	HEALTH	0xA003_i2	ALL	NONE	NONE	Prognostics	
5	SURGPLOT	0xA003_i3	ALL	NONE	NONE	Performance Plot	
6	HXPLOT	0xA003_i4	ALL	NONE	NONE	Hx Performance Plot	
7	SERVLOG	0xA003_i5	ALL	NONE	NONE	Service Log	

Table Name		PIC Table Type		Instance			
CONFIG		A001H		4			
	Menu Name	Type_Instance	Access	PreProc	PostProc	Menu text description	Menu icons
1	SERVICE	0x0013_i3	SERVICE	NONE	NONE	Service Parameters	
2	CFGSGURGE	0x0013_i7	SERVICE	NONE	NONE	Surge Correction Config	
3	CFGLIMIT	0x0013_i8	SERVICE	NONE	NONE	Protective Limit Config	
4	LABONLY	0x0013_i13	SERVICE	NONE	NONE	Lab Test Forced	
5	CONF_OPT	0x0013_i10	SERVICE	NONE	NONE	Option Configuration	
6	CONF_ISM	0x0013_i4	SERVICE	NONE	NONE	ISM Configuration	
7	CFGUMVFD	0x0013_i18	SERVICE	NONE	NONE	UM VFD Configuration	
8	FACTORY	0x0013_i1	FACTORY	NONE	NONE	Factory Parameters	
9	GEN_CONF	0x0010_i1	USER	NONE	NONE	General Configuration	

Table Name		PIC Table Type		Instance			
CONFIG		A001H		4			
	Menu Name	Type_Instance	Access	PreProc	PostProc	Menu text description	Menu icons
10	CTRL_ID	0x0020_i1	USER	NONE	NONE	Control Identification	
11	CFG_19DV	0x0013_i20	FACTORY	NONE	NONE	19DV Configuration	
12	CFGGEVFD	0x0013_i2	SERVICE	NONE	NONE	General VFD Config	
13	CONF_SRD	0x0013_i9	SERVICE	NONE	NONE	SRD Configuration	
14	CONF_IOB	0x0013_i11	SERVICE	NONE	NONE	IOB Configuration	
15	EMAILCFG	0x0013_i12	SERVICE	NONE	NONE	E-Mail Configuration	
16	CONF_MS	0x0013_i14	SERVICE	NONE	NONE	Master Slave Config	
17	CONF_PRG	0x0013_i15	SERVICE	NONE	NONE	Prognostics Config	
18	RESETCFG	0x0010_i4	USER	NONE	NONE	Reset Configuration	
19	SCHEDULE	0xA001_i7	USER	NONE	NONE	Schedule Menu	
20	HOLIDAY	0x0014_i3	USER	NONE	NONE	Holiday Menu	
21	BROADCAST	0x0014_i1	USER	NONE	NONE	Broadcast Menu	
22	DATETIME	0x0021_i1	USER	NONE	NONE	Date/Time Configuration	
23	CONNECT	0x0013_i16	SERVICE	NONE	NONE	Network Configuration	

Table Name		PIC Table Type		Instance			
MAINTAIN		A001H		5			
	Menu Name	Type_Instance	Access	PreProc	PostProc	Menu text description	Menu icons
1	CAPACTRL	0x0012_i2	SERVICE	NONE	NONE	Capacity Control	
2	OVERRIDE	0x0012_i3	SERVICE	NONE	NONE	Override Control	
3	MAISURGE	0x0012_i4	SERVICE	NONE	NONE	Surge Correction	
4	ISM_MCFG	0x0012_i13	SERVICE	NONE	NONE	Maintenance ISM Config	
5	VFD_MCFG	0x0012_i35	SERVICE	NONE	NONE	Maintenance VFD Config	
6	MAISWRST	0x0012_i16	SERVICE	NONE	NONE	Swift Restart	
7	MAIN_MS	0x0012_i17	SERVICE	NONE	NONE	Master Slave	
8	POWER_I	0x0011_i9	SERVICE	NONE	NONE	Power Line Parameters	

Table Name		PIC Table Type		Instance			
MAINTAIN		A001H		5			
	Menu Name	Type_Instance	Access	PreProc	PostProc	Menu text description	Menu icons
9	MAIISMCM	0x0012_i7	SERVICE	NONE	NONE	ISM Status	
10	MAIISMH	0x0012_i8	SERVICE	NONE	NONE	ISM or VFD History	
11	POWER_O	0x0011_i10	SERVICE	NONE	NONE	Power Load Parameters	
12	VFD_STAT	0x0012_i34	SERVICE	NONE	NONE	UM VFD Status	
13	MAIN_SRD	0x0012_i9	SERVICE	NONE	NONE	Maintenance SRD	
14	MAIOTHER	0x0012_i12	SERVICE	NONE	NONE	Maintenance Others	
15	MAIOB	0x0012_i14	SERVICE	NONE	NONE	Maintenance IOB	
16	MAI_BDSN	0x0012_i15	SERVICE	NONE	NONE	Board Software PN	
17	PRES_CAL	0xA001_i6	SERVICE	NONE	NONE	Pressure Sensor Calib	
18	TEMP_CAL	0x0012_i10	SERVICE	NONE	NONE	Temp Sensor Calib	
19	ISM_CAL	0xA001_i8	SERVICE	NONE	NONE	ISM Calibration	
20	PUMPDOWN	0xA003_i1	SERVICE	NONE	NONE	Pumpdown/Lockout	
21	SYS_STAT	0x0012_i29	SERVICE	NONE	NONE	System Status	

Table Name		PIC Table Type		Instance			
PRESCAL		A001H		6			
	Menu Name	Type_Instance	Access	PreProc	PostProc	Menu text description	Menu icons
1	PRSCAL01	0x0012_i19	SERVICE	NONE	NONE	Evaporator Pressure	
2	PRSCAL02	0x0012_i20	SERVICE	NONE	NONE	Condenser Pressure	
3	PRSCAL03	0x0012_i21	SERVICE	NONE	NONE	Economizer Pressure	
4	PRSCAL04	0x0012_i22	SERVICE	NONE	NONE	Diffuser Pressure	
5	PRSCAL05	0x0012_i23	SERVICE	NONE	NONE	Oil Sump Pressure	
6	PRSCAL06	0x0012_i24	SERVICE	NONE	NONE	Oil Supply Pressure	
7	PRSCAL07	0x0012_i25	SERVICE	NONE	NONE	Evap Entering Water P	
8	PRSCAL08	0x0012_i26	SERVICE	NONE	NONE	Evap Leaving Water P	
9	PRSCAL09	0x0012_i27	SERVICE	NONE	NONE	Cond Entering Water P	

Table Name		PIC Table Type		Instance			
PRESCAL		A001H		6			
	Menu Name	Type_Instance	Access	PreProc	PostProc	Menu text description	Menu icons
10	PRSCAL10	0x0012_i28	SERVICE	NONE	NONE	Cond Leaving Water P	
11	PRSCAL11	0x0012_i36	SERVICE	NONE	NONE	Pump Input Pressure	
12	PRSCAL12	0x0012_i37	SERVICE	NONE	NONE	Bearing Inlet Pressure	
13	PRSCAL13	0x0012_i38	SERVICE	NONE	NONE	Bearing Outlet Pressure	
14	PRSCAL14	0x0012_i39	SERVICE	NONE	NONE	Pump Output Pressure	
Table Name		PIC Table Type		Instance			
MENUOCC		A001H		7			
	Menu Name	Type_Instance	Access	PreProc	PostProc	Menu text description	Menu icons
1	MENUOCC1	0x0614_i1	USER	NONE	NONE	Local Schedule	
2	MENUOCC2	0x0614_i2	USER	NONE	NONE	Ice Build Schedule	
3	MENUOCC3	0x0614_i3	USER	NONE	NONE	Network Schedule	
Table Name		PIC Table Type		Instance			
ISM_CAL		A001H		8			
	Menu Name	Type_Instance	Access	PreProc	PostProc	Menu text description	Menu icons
1	ISM_CAL1	0x0012_i31	SERVICE	NONE	NONE	ISM Calibration 1	
2	ISM_CAL2	0x0012_i32	SERVICE	NONE	NONE	ISM Calibration 2	



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