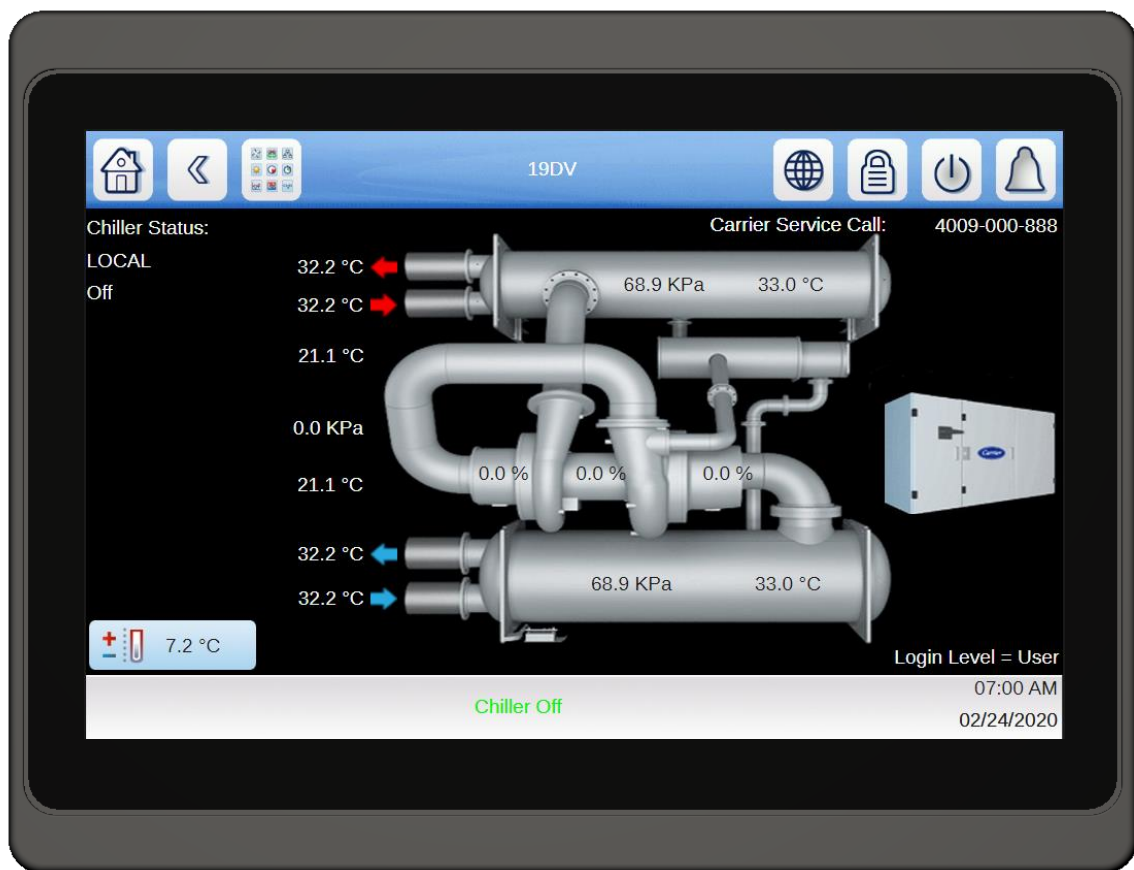


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Control IOM

Carrier® SmartVu™ 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.

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2. GENERAL DESCRIPTION

2.1. General Description

Carrier® SmartVu™ control is a control system for controlling Carrier 19 Series chiller which include both legacy and next generation centrifugal water-cooled chillers. The control system monitors and controls all operations of the chiller. The 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 control system protects the chiller by monitoring the digital and analog inputs and executing capacity overrides or safety shutdowns, if required.

Carrier® SmartVu™ 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/HG	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
IOB	Input/Output Board

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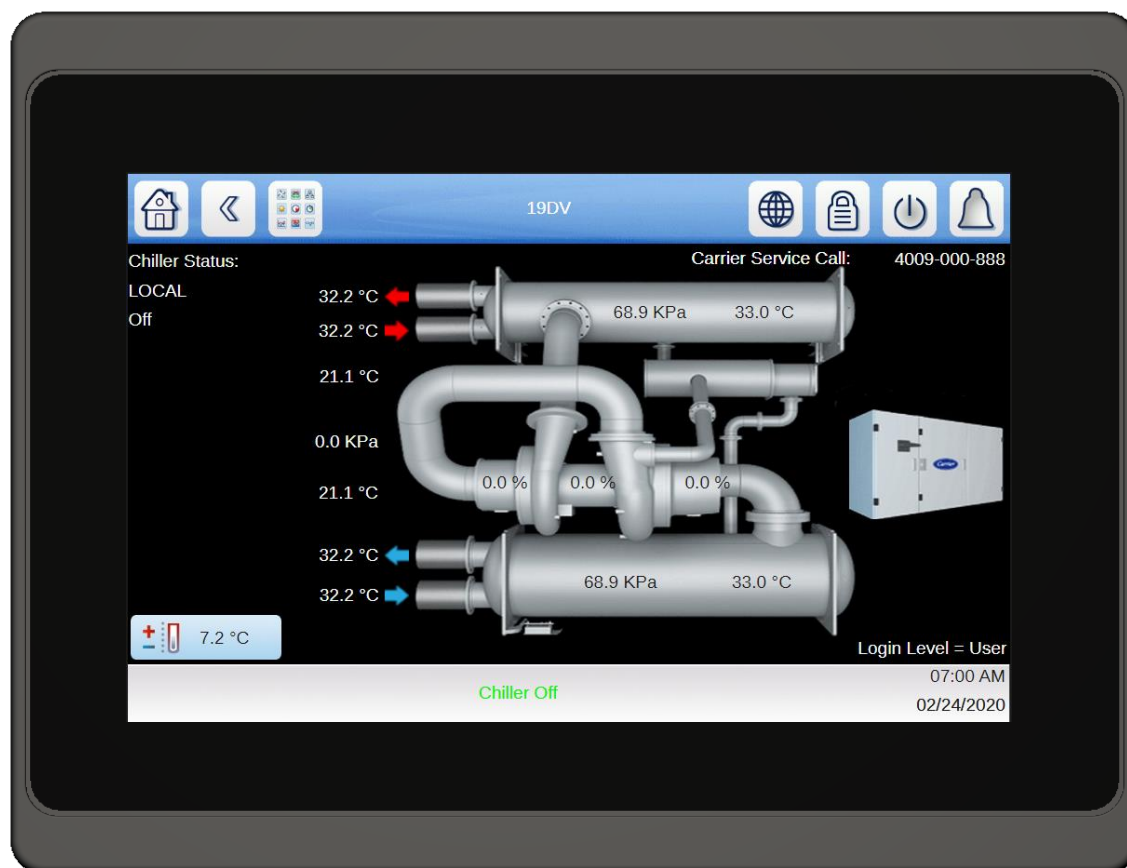
3. HARDWARE DESCRIPTION

3.1. General Description

The 19 Series Carrier® SmartVu™ control system consists of one main control board (Carrier® SmartVu™ board), an ISM (Integrated Starter Module) for fixed speed chiller or freestanding VFD configuration and several IOBs and SIOB per system configuration requirements. All boards communicate via an internal LEN bus. For the drivers (for example Rockwell and Eaton driver) which don't integrate Carrier LEN protocol, the Carrier® SmartVu™ board communicate with the drivers via Modbus.

3.1.1. Main Control Board and Display

Figure 1: 19 Series Carrier® SmartVu™ Control Interface



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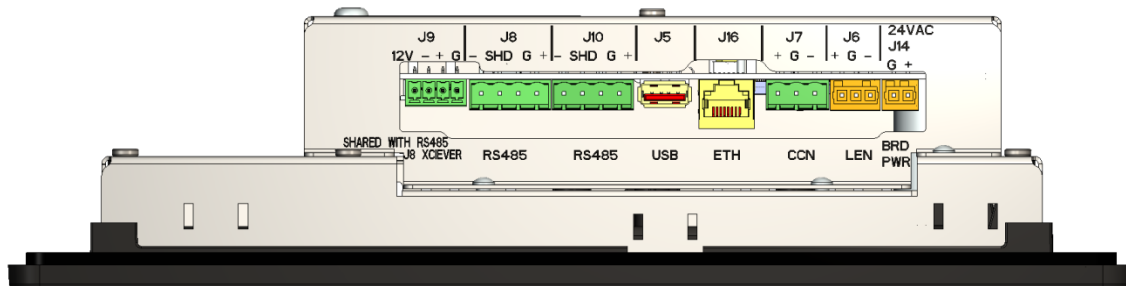


Figure: 19 Series Carrier® SmartVu™ Control - View From Below

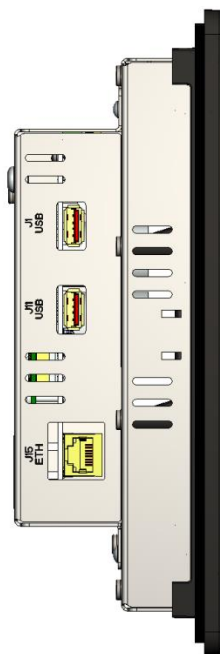


Figure: 19 Series Carrier® SmartVu™ Control - View From Side

Legend:

- J1: Reserved
- J5: Reserved
- J6: LEN connector, LEN/485 - IOB/SIOB, ISM, ...
- J7: CCN connector, CCN/485 - BMS, Network service tool, WebCTRL
- J8: Modbus/RTU Slave*, BACnet/mstp **
- J9: Reserved
- J10: RS485, Modbus/RTU Master
- J11: USB WIFI Dongle - Connectivity
- J14: Power supply connector (24 VAC)
- 15: Ethernet port 0 (Default IP: 169.254.1.1, mask: 255.255.0.0)
 - BACnet/IP
 - Modbus/IP
 - CCN/IP
 - Carrier Proview (firmware upgrade)

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Connectivity

J16: Ethert port 1 (default IP: 192.168.100.100, mask: 255.255.255.0)

Carrier Proview (firmware upgrade)

* Modbus/RTU and Modbus/TCP can only be enabled one instance at same time

** BACNET/IP and BACnet/mstp can only be enabled one instance at same time

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.

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3.1.2 ISM (Integrated Starter Module)

ISM is motor control module for fixed speed or free standing VFD configuration, 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

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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 3.5.

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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.

For 19DV are the following three types of pressure transducers supported: Tianmu, TEXAS, Sensata.

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

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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 refig liquid temperature sensor	measures the temperature of evaporator refrigerant liquid.	Standard for 19XR2~E/V/D, 19XR6/7 and 19DV
Cond refig liquid tempura sensor	measures the temperature of condenser refrigerant liquid.	Standard for 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

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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 1 st stage bearing temperature	Standard for 19DV
2nd Stage Bearing Temp	Measure the 2 nd stage bearing temperature	Standard for 19DV
Bearing Ref Supply Temp	Measure the bearing ref supply temperature	Standard for 19DV
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.

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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. There are two guide vanes (first stage and second stage guide vane) on 19DV chiller.

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/E/F)

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 controller continually monitors many VFD parameters (such as motor current, motor frequency, KW, KWH¹ ...) in order to ensure its protection. If a problem occurs, the frequency controller triggers an alarm and, if necessary, stops the compressor.

Note: KWH may not auucate and can only be a reference.

3.4. Refrigerant Support

For the 19XR2~5/C/D/E/V/F/6/7, the R134a is available and R513a is an option for special products and application.

For the 19DV, the R1233zd is available.

3.5. 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.

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19XR6/7 I/O Mapping:

For 19XR6/7 IOB1/2/3 is standard and IOB4 is optional.

Board #	Channel #	Description	Comments
IOB1	AI1	Entering Chilled Water Temperature	
IOB1	AI2	Leaving Chilled Water Temperature	
IOB1	AI3	Entering Condenser Water Temperature	
IOB1	AI4	Leaving Condenser Water Temperature	
IOB1	AI5	[If Evap Liquid Temp Opt is enable] Evap. Refrigerant Liquid Temperature	
IOB1	AI6	Comp Discharge Temperature	
IOB1	AI7	Condenser Pressure	
IOB1	AI8	Evaporator Pressure	
IOB1	AI9	Economizer Pressure	
IOB1	AI10	FS VFD Load Current	For Freestanding VFD option
IOB1	AI11		
IOB1	AO1	Chiller Status (Analog)	User option, 4~20mA 4mA=OFF 8mA=Tripout 12mA=Shutdown 20mA=Running
IOB1	AO2	Oil EXV Output	
IOB1	AO3		
IOB1	DI1	Evap Water Flow Switch	User option, "Closed" indicates "FLOW"
IOB1	DI2	Cond Water Flow Switch	User option, "Closed" indicates "FLOW"
IOB1	DI3	[If ISM Input is disable] Remote Contact Input	User option, "Closed" indicates Turn ON the chiller
IOB1	DI4	[If ISM Input is disable] Remote Emergency Stop Input	User option, "Closed" indicates chiller emergency stop
IOB1	DO1	Stage 1 IGV Increase	Used for ON/OFF type guide vane actuator
IOB1	DO2	Stage 1 IGV Decrease	Used for ON/OFF type guide vane actuator
IOB1	DO3	Chiller Alarm Relay	User option, 24VAC output, recommend with external power supply

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IOB1	DO4	Chiller Status(Discrete)	user option, 0=chiller off, 1=chiller running
IOB2	AI1	Motor Winding Temperature 1	
IOB2	AI2	Motor Winding Temperature 2	
IOB2	AI3	Motor Winding Temperature 3	
IOB2	AI4	Oil Supply Temperature	
IOB2	AI5	Oil Sump Temperature	
IOB2	AI6	Oil Supply Pressure	
IOB2	AI7	Oil Sump Pressure	
IOB2	AI8	Auto Demand Limit Input	User option
IOB2	AI9	EC Valve Feedback	
IOB2	AI10	Bearing Shaft Displacement Sensor	
IOB2	AI11		
IOB2	AO1	Guide Vane1 Output	Used for Analog type guide vane actuator
IOB2	AO2	Damper Valve Output mA	For analog type damper valve
IOB2	AO3	EC Valve Output mA	
IOB2	DI1	Damper Valve Feedback Fully Open	For digital type damper valve
IOB2	DI2	Damper Valve Feedback Fully Close	For digital type damper valve
IOB2	DI3	High Pressure Switch	0=abnormal ,1=close
IOB2	DI4	[If ISM Input is disable] Ice Build Contact	User option
IOB2	DO1	Oil Heater Relay	
IOB2	DO2	Oil Pump Relay	
IOB2	DO3	[If vapor source valve is disabled] Economizer Damper Valve Open	
IOB2	DO4	[If vapor source valve is disabled] Economizer Damper Valve Close [If vapor source valve is enabled] Vapor Source SV	For digital type damper valve For vapor source valve
IOB3	AI1	Low Speed ME Brg Temp	
IOB3	AI2	Low Speed CE Brg Temp	
IOB3	AI3	High Speed ME Brg Temp	
IOB3	AI4	High Speed CE Brg Temp	
IOB3	AI5	Remote Reset Sensor	User option

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IOB3	AI6	[If guide vane1 Type is Analog] GV1 Pos Feedback [If guide vane1 Type is Digital] Guide Vane 1 Actual Ohms	For analog type guide vane For digital type guide vane
IOB3	AI7	[If Common Sensor Option is enable] Common CHWS Temp	Used for lead lag option
IOB3	AI8	Auto Water Temp Reset	User option
IOB3	AI9	[If Common Sensor Option is enable] Common CHWR Temp	Used for lead lag option
IOB3	AI10	Dample Valve Feedback	For analog type damper valve
IOB3	AI11		
IOB3	AO1	Head Pressure Output	User option
IOB3	AO2	Head Pressure Output 2	User option
IOB3	AO3		
IOB3	DI1	EC Valve Feedback Fully Open	Used for Continues or ON/OFF type HGBP valve
IOB3	DI2	EC Valve Feedback Fully Close	Used for Continues or ON/OFF type HGBP valve
IOB3	DI3	Spare Safety	User option, normal open
IOB3	DI4		
IOB3	DO1	EC Valve Solenoid / Open	Used for Continues or ON/OFF type HGBP valve
IOB3	DO2	EC Valve Close	Used for Continues or ON/OFF type HGBP valve
IOB3	DO3	Chilled Water Pump	User option
IOB3	DO4	Condenser Water Pump	User option
IOB4	AI1	Heat Reclaim Entering Temp	User Option
IOB4	AI2	Heat Reclaim Leaving Temp	User Option
IOB4	AI3	[If Water Pressure Option is PD TRD (transducers)] Evap Enter Water Volts [If Water Pressure Option is PD TRM (transmitter)] Chilled Water Pres Drop	User option, if IOB4 installed, same as follows
IOB4	AI4	[If Water Pressure Option is PD TRD (transducers)] Evap Leave Water Volts	User option

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		[If Water Pressure Option is PD TRM (transmitter)] Cond Water Pres Drop	
IOB4	AI5	[If Water Pressure Option is PD TRD (transducers)] Cond Enter Water Volts	User option
IOB4	AI6	[If Water Pressure Option is PD TRD (transducers)] Leaving Cond Water Pressure	User option
IOB4	AI7	Refrigerant Leak Sensor	User option
IOB4	AI8	Evap Water Flow Measurement	User option
IOB4	AI9	Cond Water Flow Measurement	User option
IOB4	AI10		
IOB4	AI11		
IOB4	AO1		
IOB4	AO2		
IOB4	AO3		
IOB4	DI1		
IOB4	DI2	Power Request Feedback	Marine option
IOB4	DI3	Customer Alert	User option
IOB4	DI4	Free Cooling Start Switch	User option
IOB4	DO1	Free Cooling Mode	User option
IOB4	DO2	Power Request Output	Marine option
IOB4	DO3	Tower Fan High	User option
IOB4	DO4	Tower Fan Low	User option

19XR2~5/C/D/E/V I/O mapping:

For 19XR2~5/C/D/E/V IOB1/2 is standard and IOB3/4 is optional.

Board #	Channel #	Description	Comments
IOB1	AI1	Entering Chilled Water Temperature	
IOB1	AI2	Leaving Chilled Water Temperature	
IOB1	AI3	Entering Condenser Water Temperature	
IOB1	AI4	Leaving Condenser Water Temperature	
IOB1	AI5	[If Evap Liquid Temp Opt is enable] Evap. Refrigerant Liquid Temperature	
IOB1	AI6	Comp Discharge Temperature	
IOB1	AI7	Condenser Pressure	
IOB1	AI8	Evaporator Pressure	
IOB1	AI9	Economizer Pressure	

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IOB1	AI10	FS VFD Load Current	For free standing VFD
IOB1	AI11		
IOB1	AO1	Head Pressure Output 2	User option
IOB1	AO2	Oil EXV Output	
IOB1	AO3	EC Valve Output mA	
IOB1	DI1	Chiller Lockout Input	User option, normal open
IOB1	DI2	Spare Safety	User option, normal open
IOB1	DI3	[If ISM Input is disable] Remote Contact Input	User option, “Closed” indicates Turn ON the chiller
IOB1	DI4	[If ISM Input is disable] Remote Emergency Stop Input	User option, “Closed” indicates chiller emergency stop
IOB1	DO1	Stage 1 IGV Increase	Used for ON/OFF type guide vane actuator
IOB1	DO2	Stage 1 IGV Decrease	Used for ON/OFF type guide vane actuator
IOB1	DO3	Chiller Alarm Relay	User option, 24VAC output, recommend with external power supply
IOB1	DO4	Danfoss VFD Interlock	
IOB2	AI1	Motor Winding Temperature 1	
IOB2	AI2	Thrust Bearing Oil Temperature	
IOB2	AI3	Oil Sump Temperature	
IOB2	AI4	Oil Supply Temperature	
IOB2	AI5	[If guide vane1 Type is Analog] GV1 Pos Feedback	For analog type guide vane
		[If guide vane1 Type is Digital] Guide Vane 1 Actual Ohms	For digital type guide vane
IOB2	AI6	Oil Supply Pressure	
IOB2	AI7	Oil Sump Pressure	
IOB2	AI8	EC Valve Feedback	Used for mA type HGBP valve
IOB2	AI9	Motor Winding Temperature 2	
IOB2	AI10	Motor Winding Temperature 3	
IOB2	AI11	Diffuser Pressure	
IOB2	AO1	Guide Vane1 Output	Used for Analog type guide vane actuator
IOB2	AO2	[If economizer liquid bypass option is disabled] Diffuser Output	For digital type damper valve

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		[If economizer liquid bypass option is enable] Liquid Bypass Valve	For vapor source valve
IOB2	AO3	Head Pressure Output	User option
IOB2	DI1	Evap Water Flow Switch	User option, dry contact, "Closed" indicates "FLOW"
IOB2	DI2	Cond Water Flow Switch	User option, dry contact, "Closed" indicates "FLOW"
IOB2	DI3		
IOB2	DI4	[If ISM Input is disable] Ice Build Contact	User option
IOB2	DO1	Oil Heater Relay	
IOB2	DO2	Oil Pump Relay	
IOB2	DO3	EC Valve Solenoid / Open	Used for Continues or ON/OFF type HGBP valve
IOB2	DO4	Vapor Source SV	standard for 19XRC/E
IOB3	AI1		
IOB3	AI2		
IOB3	AI3	Heat Reclaim Entering Temp	User Option
IOB3	AI4	Heat Reclaim Leaving Temp	User Option
IOB3	AI5	Remote Reset Sensor	User option
IOB3	AI6	Auto Water Temp Reset	User option, 4~20mA
IOB3	AI7	[If Common Sensor Option is enable] Common CHWS Temp	Used for lead lag option
IOB3	AI8	Auto Demand Limit Input	User option
IOB3	AI9	[If Common Sensor Option is enable] Common CHWR Temp	Used for lead lag option
IOB3	AI10	Refrigerant Leak Sensor	User option
IOB3	AI11		
IOB3	AO1	Chiller Status (Analog)	User option, 4~20mA 4mA=OFF 8mA=Tripout 12mA=Shutdown 20mA=Running
IOB3	AO2	Variable Speed Oil Pump	User option
IOB3	AO3		
IOB3	DI1	Fire Security Interlock	User option, normal open
IOB3	DI2		
IOB3	DI3		
IOB3	DI4		

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IOB3	DO1	Chiller Status(Discrete)	User option
IOB3	DO2	Chiller Alert Relay	User option, 24VAC output, recommend with external power supply
IOB3	DO3	Chilled Water Pump	User option
IOB3	DO4	Condenser Water Pump	User option
IOB4	AI1		
IOB4	AI2		
IOB4	AI3	[If Water Pressure Option is PD TRD (transducers)] Evap Enter Water Volts [If Water Pressure Option is PD TRM (transmitter)] Chilled Water Pres Drop	User option
IOB4	AI4	[If Water Pressure Option is PD TRD (transducers)] Evap Leave Water Volts [If Water Pressure Option is PD TRM (transmitter)] Cond Water Pres Drop	User option
IOB4	AI5	[If Water Pressure Option is PD TRD (transducers)] Cond Enter Water Volts	User option
IOB4	AI6	[If Water Pressure Option is PD TRD (transducers)] Leaving Cond Water Pressure	User option
IOB4	AI7		
IOB4	AI8	Evap Water Flow Measurement	User option, 4~20mA
IOB4	AI9	Cond Water Flow Measurement	User option, 4~20mA
IOB4	AI10		
IOB4	AI11		
IOB4	AO1	Chilled Water Pump (Variable)	
IOB4	AO2	Condenser Water Pump (Variable)	
IOB4	AO3	Tower Fan (Variable)	
IOB4	DI1		
IOB4	DI2	Power Request Feedback	Marine option
IOB4	DI3	Customer Alert	User option
IOB4	DI4	Free Cooling Start Switch	User option
IOB4	DO1	Free Cooling Mode	User option
IOB4	DO2	Power Request Output	Marine option
IOB4	DO3	Tower Fan High	User option
IOB4	DO4	Tower Fan Low	User option

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19DV I/O mapping:

For 19DV IOB1/2/3 is standard and IOB4 is optional.

Board #	Channel #	Description	Comments
IOB1	AI1	Entering Chilled Water Temperature	
IOB1	AI2	Leaving Chilled Water Temperature	
IOB1	AI3	Entering Condenser Water Temperature	
IOB1	AI4	Leaving Condenser Water Temperature	
IOB1	AI5	[If Evap Liquid Temp Opt is enable] Evap. Refrigerant Liquid Temperature	
IOB1	AI6	Comp Discharge Temperature	
IOB1	AI7	Condenser Pressure	
IOB1	AI8	Evaporator Pressure	
IOB1	AI9	Economizer Pressure	for trouble shooting
IOB1	AI10	FS VFD Load Current	For free standing VFD
IOB1	AI11		
IOB1	AO1	Chiller Status (Analog)	User option, 4~20mA 4mA=OFF 8mA=Tripout 12mA=Shutdown 20mA=Running
IOB1	AO2		
IOB1	AO3		
IOB1	DI1	Evap Water Flow Switch	User option, "Closed" indicates "FLOW"
IOB1	DI2	Cond Water Flow Switch	User option, "Closed" indicates "FLOW"
IOB1	DI3	[If ISM Input is disable] Remote Contact Input	User option, "Closed" indicates Turn ON the chiller
IOB1	DI4	[If ISM Input is disable] Remote Emergency Stop Input	User option, "Closed" indicates chiller emergency stop
IOB1	DO1	Liquid Bypass Valve	
IOB1	DO2	Refrigerant Pump	
IOB1	DO3	Chiller Alarm Relay	User option
IOB1	DO4	Free Cooling Valve	User option
IOB2	AI1	Motor Winding Temperature 1	

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IOB2	AI2	Condenser Refrigerant Vapor Temperature	Standard for DV5
IOB2	AI3	EC Valve Feedback	Used for mA type HGBP valve
IOB2	AI4		
IOB2	AI5	Pump Outlet Pressure	
IOB2	AI6	Bearing Outlet Pressure	
IOB2	AI7	Bearing Inlet Pressure	
IOB2	AI8	Auto Demand Limit Input	User option
IOB2	AI9	Refrigerant Leak Sensor	User option
IOB2	AI10	Pump Inlet Pressure	
IOB2	AI11		
IOB2	AO1	Guide Vane1 Output	
IOB2	AO2		
IOB2	AO3	EC Valve Output mA	
IOB2	DI1		
IOB2	DI2	Liquid Level Switch	0=low liquid level, 1=high liquid level
IOB2	DI3	High Pressure Switch	0=abnormal ,1=close
IOB2	DI4	[If ISM Input is disable] Ice Build Contact	User option, dry contact
IOB2	DO1	Condenser Control Valve	
IOB2	DO2	Evaporator Control Valve	
IOB2	DO3	Danfoss VFD Interlock	Standard for Dnfoss VFD,0=VFD Operation forbidden,1=Operation enabled
IOB2	DO4	Economizer Isolation Valve	
IOB3	AI1	1st Stage Bearing Temp	
IOB3	AI2	2nd Stage Bearing Temp	
IOB3	AI3	-	-
IOB3	AI4	Guide Vane 2 Actual Pos	
IOB3	AI5	Remote Reset Sensor	User option
IOB3	AI6	Guide Vane 1 Actual Pos	
IOB3	AI7	[If Common Sensor Option is enable] Common CHWS Temp	Used for lead lag option
IOB3	AI8	Auto Water Temp Reset	User option
IOB3	AI9	[If Common Sensor Option is enable] Common CHWR Temp	Used for lead lag option
IOB3	AI10		
IOB3	AI11		

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IOB3	AO1	Head Pressure Output	User option
IOB3	AO2	Head Pressure Output 2	User option
IOB3	AO3	Guide Vane 2 Output	
IOB3	DI1		
IOB3	DI2		
IOB3	DI3	Spare Safety	User option, normal open
IOB3	DI4		
IOB3	DO1	[If 4-valve lub (legacy DV4) is enabled] Evaporator Drain Valve [If 4-valve lub (legacy DV4) is disabled] Chiller Status(Discrete)	
IOB3	DO2	Condenser Drain Valve	Standard for 4 valve lub
IOB3	DO3	Chilled Water Pump	User option
IOB3	DO4	Condenser Water Pump	User option
IOB4	AI1		
IOB4	AI2		
IOB4	AI3	[If Water Pressure Option is PD TRD (transducers)] Evap Enter Water Volts [If Water Pressure Option is PD TRM (transmitter)] Chilled Water Pres Drop	User option
IOB4	AI4	[If Water Pressure Option is PD TRD (transducers)] Evap Leave Water Volts [If Water Pressure Option is PD TRM (transmitter)] Cond Water Pres Drop	User option
IOB4	AI5	[If Water Pressure Option is PD TRD (transducers)] Cond Enter Water Volts	User option
IOB4	AI6	[If Water Pressure Option is PD TRD (transducers)] Leaving Cond Water Pressure	User option
IOB4	AI7		
IOB4	AI8	Evap Water Flow Measurement	User option
IOB4	AI9	Cond Water Flow Measurement	User option
IOB4	AI10		

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IOB4	AI11		
IOB4	AO1		
IOB4	AO2		
IOB4	AO3		
IOB4	DI1		
IOB4	DI2	Power Request Feedback	Marine option
IOB4	DI3	Customer Alert	User option
IOB4	DI4	Free Cooling Start Switch	User option
IOB4	DO1	Free Cooling Mode	User option
IOB4	DO2	Power Request Output	Marine option
IOB4	DO3	Tower Fan High	User option
IOB4	DO4	Tower Fan Low	User option
SIOB	cDI-01	Purge Level Switch Low	0= lower than low level, 1=higher than low level
SIOB	cDI-02	Purge Level Switch High	0= lower than high level, 1=higher than high level
SIOB	AI-01	Purge Comp Suction Temp	
SIOB	DO-01	Purge Cond Valve	
SIOB	DO-02	Purge Comp Valve	
SIOB	DO-03	Purge Pumpout Valve	
SIOB	DO-04	Purge Drainage Valve	
SIOB	cDO-05	Purge Regeneration Valve	
SIOB	cDO-06	Purge Discharge Valve	
SIOB	DO-07	Purge Vacuum Pump	
SIOB	DO-08	Purge Compressor	
SIOB	DO-09	Purge Drainage Idle VLV	
SIOB	DO-10	Purge Heater	

19XRF I/O mapping:

For 19XRF IOB1/2 is standard and IOB3/4 is optional.

Board #	Channel #	Description	Comments
IOB1	AI1	Entering Chilled Water Temperature	
IOB1	AI2	Leaving Chilled Water Temperature	
IOB1	AI3	Entering Condenser Water Temperature	
IOB1	AI4	Leaving Condenser Water Temperature	

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IOB1	AI5	[If Evap Liquid Temp Opt is enable] Evap. Refrigerant Liquid Temperature	
IOB1	AI6	Comp Discharge Temperature	
IOB1	AI7	Condenser Pressure	
IOB1	AI8	Evaporator Pressure	
IOB1	AI9	EC Valve Feedback	
IOB1	AI10	FS VFD Load Current	For free standing VFD
IOB1	AI11		
IOB1	AO1	Chiller Status (Analog)	User option, 4~20mA 4mA=OFF 8mA=Tripout 12mA=Shutdown 20mA=Running
IOB1	AO2	Oil EXV Output	
IOB1	AO3	EC Valve Output mA	
IOB1	DI1	Chiller Lockout Input	User option,normal open
IOB1	DI2	Spare Safety	User option,normal open
IOB1	DI3	[If ISM Input is disable] Remote Contact Input	User option, “Closed” indicates Turn ON the chiller
IOB1	DI4	[If ISM Input is disable] Remote Emergency Stop Input	User option, “Closed” indicates chiller emergency stop
IOB1	DO1	Chilled Water Pump	User option
IOB1	DO2	Condenser Water Pump	User option
IOB1	DO3	Chiller Alarm Relay	User option, 24VAC output, recommend with external power supply
IOB1	DO4	Danfoss VFD Interlock	
IOB2	AI1	Economizer Pressure	
IOB2	AI2	High Speed CE Brg Temp	
IOB2	AI3	Oil Sump Temperature	
IOB2	AI4	Oil Supply Temperature	
IOB2	AI5	[If guide vane1 Type is Analog] GV1 Pos Feedback [If guide vane1 Type is Digital] Guide Vane 1 Actual Ohms	For analog type guide vane For digital type guide vane
IOB2	AI6	Oil Supply Pressure	
IOB2	AI7	Oil Sump Pressure	
IOB2	AI8	Motor Winding Temperature 1	
IOB2	AI9	Motor Winding Temperature 2	

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IOB2	AI10	Motor Winding Temperature 3	
IOB2	AI11		
IOB2	AO1	Guide Vane1 Output	Used for Analog type guide vane actuator
IOB2	AO2	Head Pressure Output 2	User option
IOB2	AO3	Head Pressure Output	User option
IOB2	DI1	Evap Water Flow Switch	User option, “Closed” indicates “FLOW”
IOB2	DI2	Cond Water Flow Switch	User option, “Closed” indicates “FLOW”
IOB2	DI3	High Pressure Switch	
IOB2	DI4		
IOB2	DO1	Oil Heater Relay	
IOB2	DO2	Oil Pump Relay	
IOB2	DO3	Chiller Status(Discrete)	user option, 0=chiller off, 1=chiller running
IOB2	DO4	Vapor Source SV	
IOB3	AI1		
IOB3	AI2		
IOB3	AI3	Heat Reclaim Entering Temp	
IOB3	AI4	Heat Reclaim Leaving Temp	
IOB3	AI5	Remote Reset Sensor	User option
IOB3	AI6	Auto Water Temp Reset	User option
IOB3	AI7	[If Common Sensor Option is enable] Common CHWS Temp	Used for lead lag option
IOB3	AI8	Auto Demand Limit Input	User option
IOB3	AI9	[If Common Sensor Option is enable] Common CHWR Temp	Used for lead lag option
IOB3	AI10	Refrigerant Leak Sensor	User option
IOB3	AI11		
IOB3	AO1		
IOB3	AO2		
IOB3	AO3		
IOB3	DI1	Fire Security Interlock	User option,normal open
IOB3	DI2	[If ISM Input is disable] Ice Build Contact	User option
IOB3	DI3		
IOB3	DI4		
IOB3	DO1		
IOB3	DO2	Chiller Alert Relay	User option, 24VAC output, recommend with external power supply

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IOB3	DO3		
IOB3	DO4		
IOB4	AI1		
IOB4	AI2		
IOB4	AI3	[If Water Pressure Option is PD TRD (transducers)] Evap Enter Water Volts [If Water Pressure Option is PD TRM (transmitter)] Chilled Water Pres Drop	User option, if IOB4 installed, same as follows
IOB4	AI4	[If Water Pressure Option is PD TRD (transducers)] Evap Leave Water Volts [If Water Pressure Option is PD TRM (transmitter)] Cond Water Pres Drop	User option
IOB4	AI5	[If Water Pressure Option is PD TRD (transducers)] Cond Enter Water Volts	User option
IOB4	AI6	[If Water Pressure Option is PD TRD (transducers)] Leaving Cond Water Pressure	User option
IOB4	AI7		
IOB4	AI8	Evap Water Flow Measurement	User option
IOB4	AI9	Cond Water Flow Measurement	User option
IOB4	AI10		
IOB4	AI11		
IOB4	AO1	Chilled Water Pump (Variable)	
IOB4	AO2	Condenser Water Pump (Variable)	
IOB4	AO3	Tower Fan (Variable)	
IOB4	DI1		
IOB4	DI2	Power Request Feedback	Marine option
IOB4	DI3	Customer Alert	User option
IOB4	DI4	Free Cooling Start Switch	User option
IOB4	DO1	Free Cooling Mode	User option
IOB4	DO2	Power Request Output	Marine option
IOB4	DO3	Tower Fan High	User option
IOB4	DO4	Tower Fan Low	User option

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3.6. Connections at the Field terminal block

Field terminal blocks are mainly used for option access at the customer site. Some interfaces are provided on IOB, ISM, and VFD. Customers can choose flexibly. The specific interface information refers to the following table:.

	IOB	ISM	Benshaw	Rockwell LF2	Rockwell Stand Tier	Eaton	Danfoss	32VS	STEP
Inputs									
Spare safety	Yes ^{*1}	Yes ^{*2}	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ice build	Yes ^{*1}	Yes ^{*2}	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Remote start contactor	Yes ^{*1}	Yes ^{*2}	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Outputs									
Condenser water pump	Yes ^{*3}	Yes	Yes	Yes	Yes ^{*5}	Yes	N/A	N/A	Yes
Chilled water pump	Yes ^{*3}	Yes	Yes	Yes	Yes ^{*5}	Yes	N/A	N/A	Yes
Tower fan low	Yes ^{*4}	Yes	Yes	Yes	Yes ^{*5}	Yes	N/A	N/A	Yes
Tower fan High	Yes ^{*4}	Yes	Yes	Yes	Yes ^{*5}	Yes	N/A	N/A	Yes
Alarm relay	Yes	Yes	Yes	N/A	Yes ^{*5}	N/A	N/A	N/A	Yes
Compressor Start Relay	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	Yes

*1: if ISM Input enable = Disable

*2: if ISM Input enable = Enable

*3: If IOB3 is enabled

*4: If IOB4 is enabled

*5: Channel need to be configured by VFD Explorer

3.7. LEN/CCN/MODBUS Communication Cable Requirements

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 for the retrofit, 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

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be separated from other cables. Making the communication cable go through metal shield conduct is preferred.

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4. USER INTERFACE SETTING

4.1. User Interface

The user interface is a colorful 10.1” 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. General Features

4.2.1 Buttons

	Unit is running		Unit is off		Home
	Main menu		Logged off		Logged in
	No alarms				Alarm/ Alert
	Back*		1/2		Up & Down

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

4.2.2 Screens

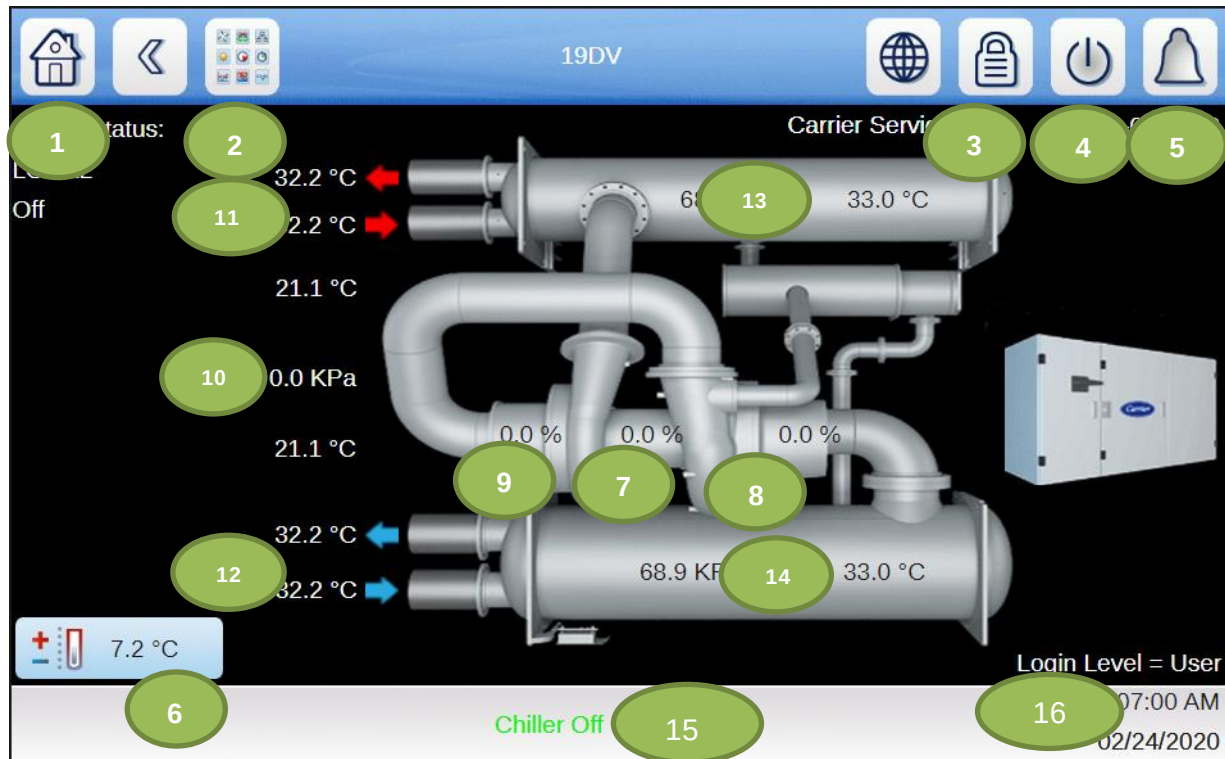
The interface includes the following screens:

- Synoptic screen
- Language & Units Selection screen
- Login screen
- Chiller Start/Stop screen
- Alarm screen
- Menu screens
- Setpoint screens
- Configuration screen
- Time schedule screen
- Trending screen
- Device Status Display 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.

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4.3. Synoptic Screen

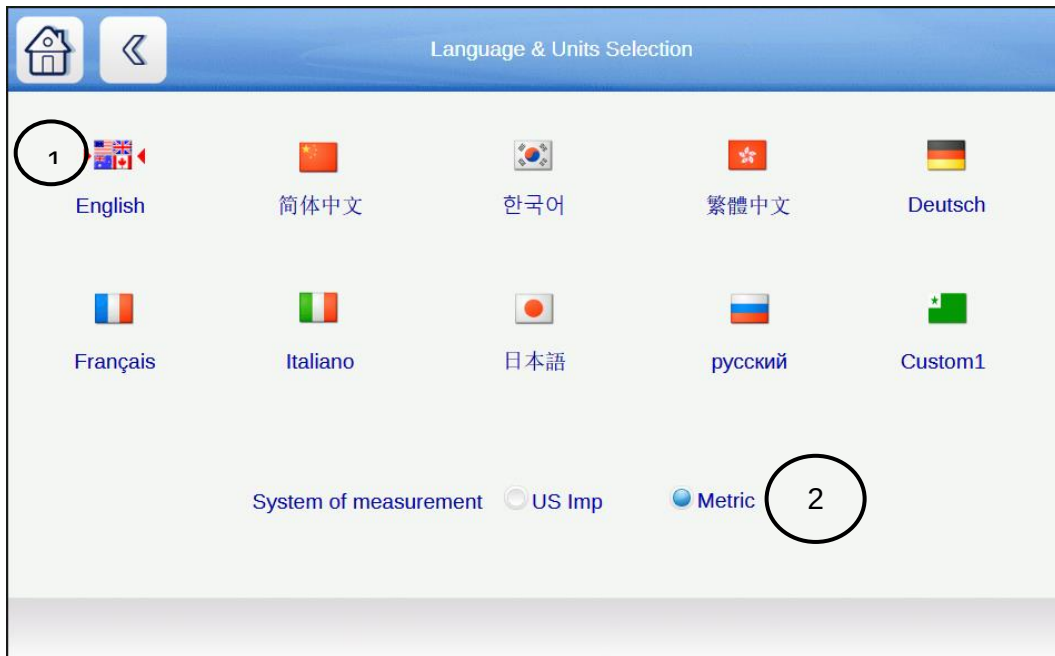


1	Synoptic screen access button
2	Main Menu access button
3	User Login screen access button
4	Unit Start/Stop access button
5	Alarm menu access button
6	Setpoint, click to enter setpoint screen if logged in
7	Unit capacity percentage (motor load current percentage)
8	Guide Vane1 Position percentage
9	Guide Vane2 Position percentage
10	Refrigerant pressure delta
11	Condenser water inlet and outlet temperature
12	Evaporator water inlet and outlet temperature
13	Condenser saturated temperature and pressure
14	Evaporator saturated temperature and pressure
15	Chiller status display
16	Date display

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

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4.4. Language & Units Selection Screen

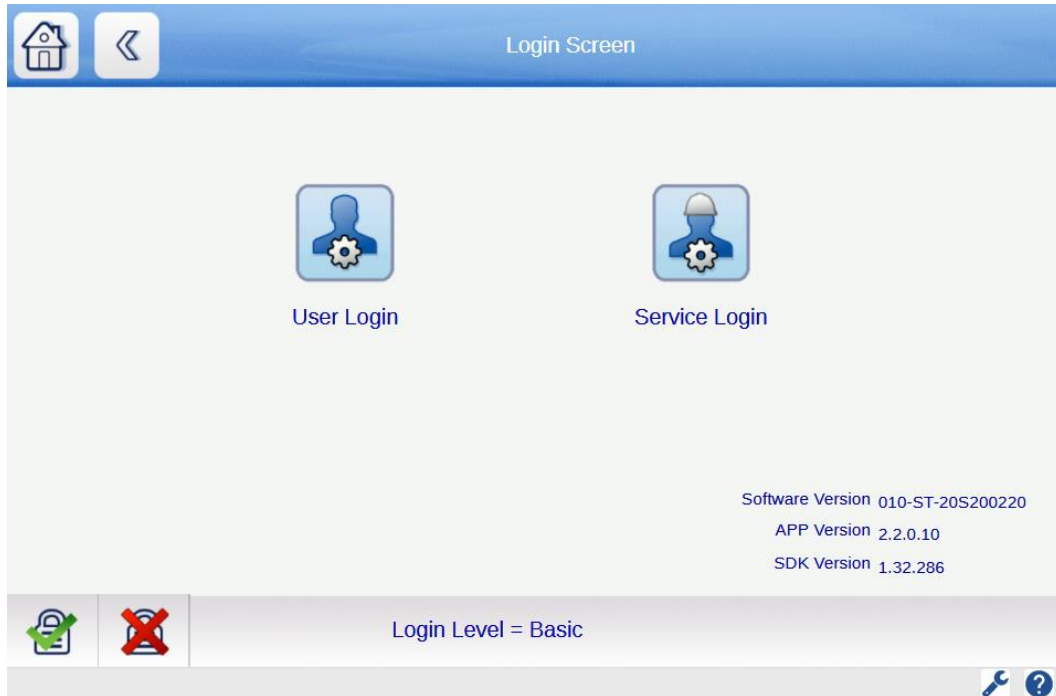


- | | |
|---|--|
| 1 | Cursor showing the activated language |
| 2 | Unit of measurement selection: Metric/Imperial |

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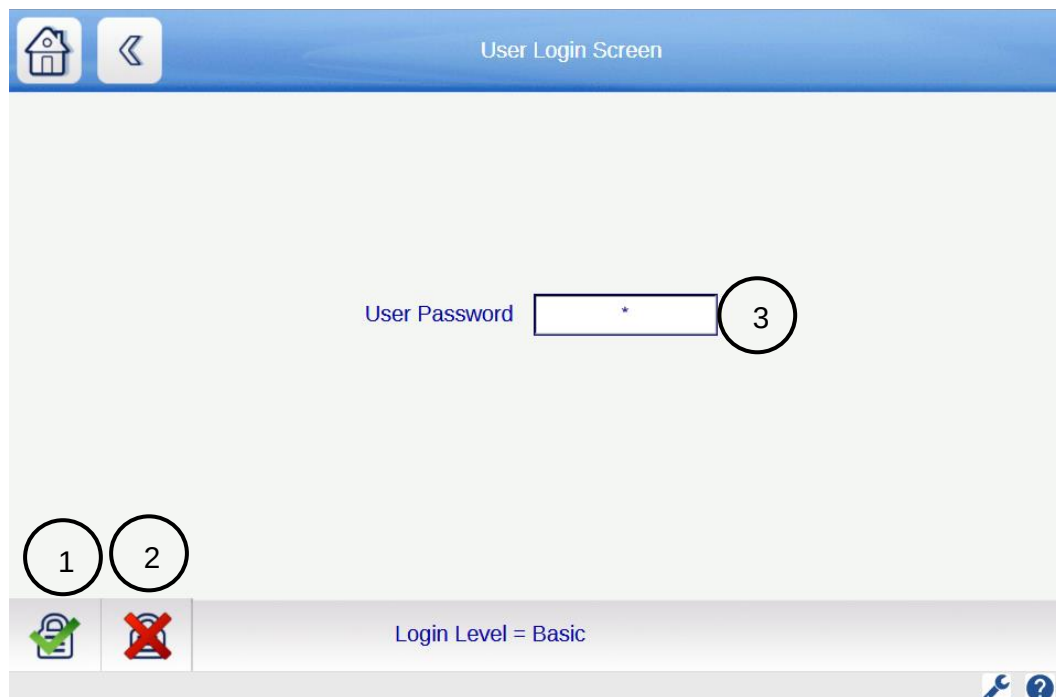
4.5. Login Screen

Currently, the controller supports user login and service login.



The default password for user login is “1111”, and it can be configured in local user login page.

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The screenshot shows the 'User Login Screen' with a blue header bar containing a home icon, a back arrow, and the title 'User Login Screen'. The main area is light gray. In the center, the text 'User Password' is followed by a password input field containing an asterisk. A circled number '3' points to this input field. At the bottom left, there are two buttons: one with a green checkmark and a lock icon (labeled with a circled '1') and another with a red X and a lock icon (labeled with a circled '2'). Below these buttons, the text 'Login Level = Basic' is displayed. At the bottom right, there are icons for a wrench and a question mark.

1	Log in
2	Log off
3	Enter the password

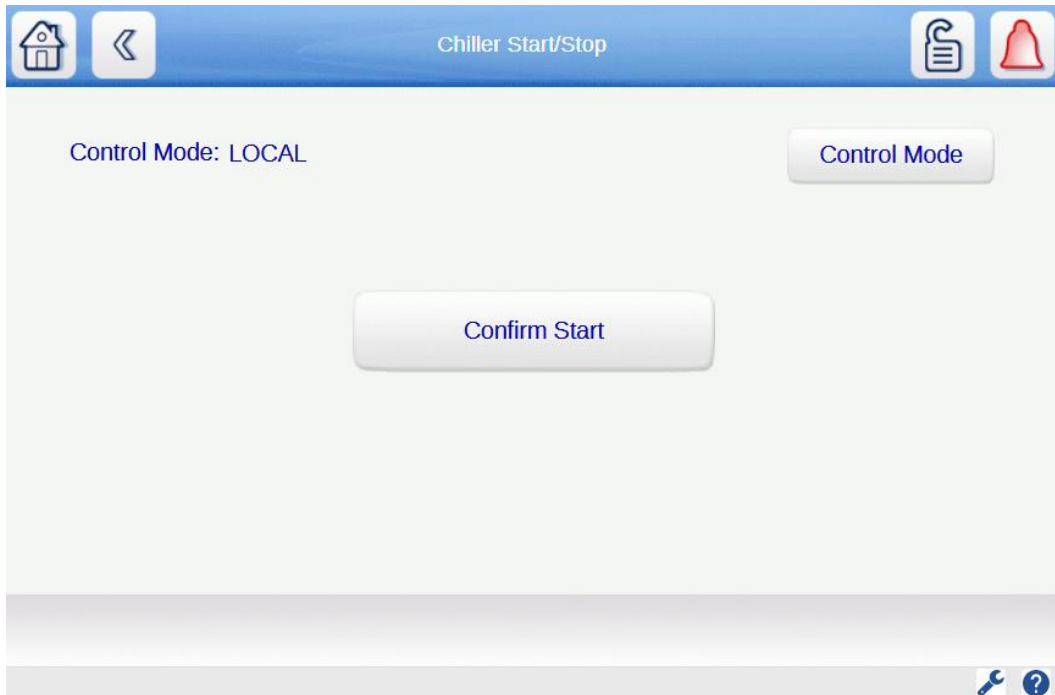
4.6. Chiller Start/Stop Screen

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

4.6.1. Chiller Start-up

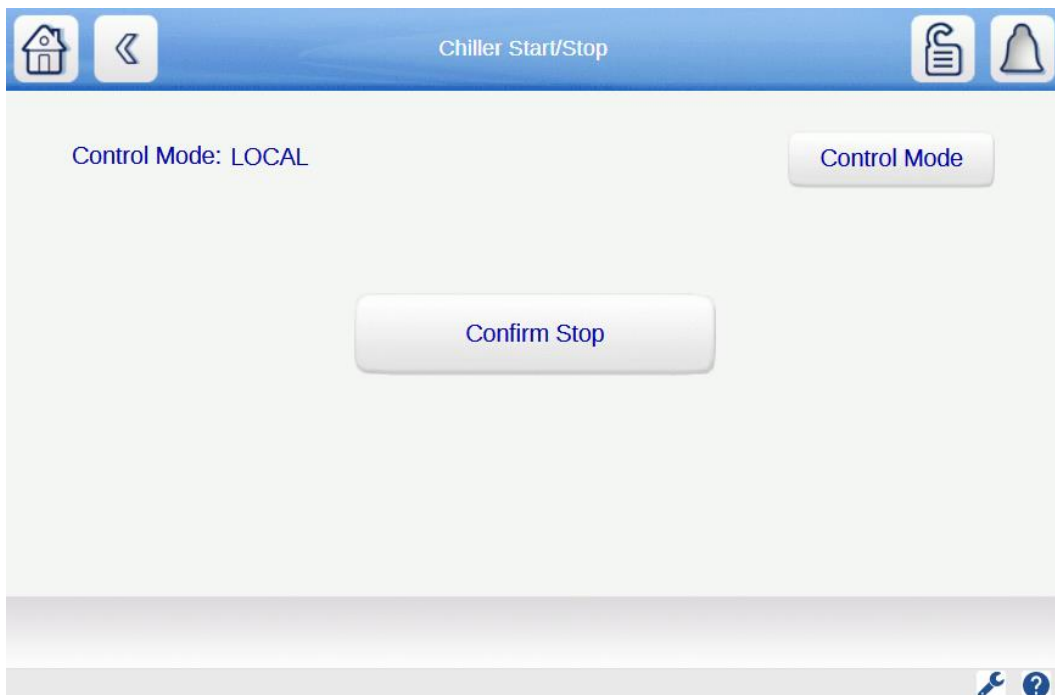
With the unit in the Local Off mode, press the button  to display chiller Start/Stop page. Click the "Confirm Start" to startup the chiller.

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4.6.2. Chiller Stop

To Stop the unit - press the following button:



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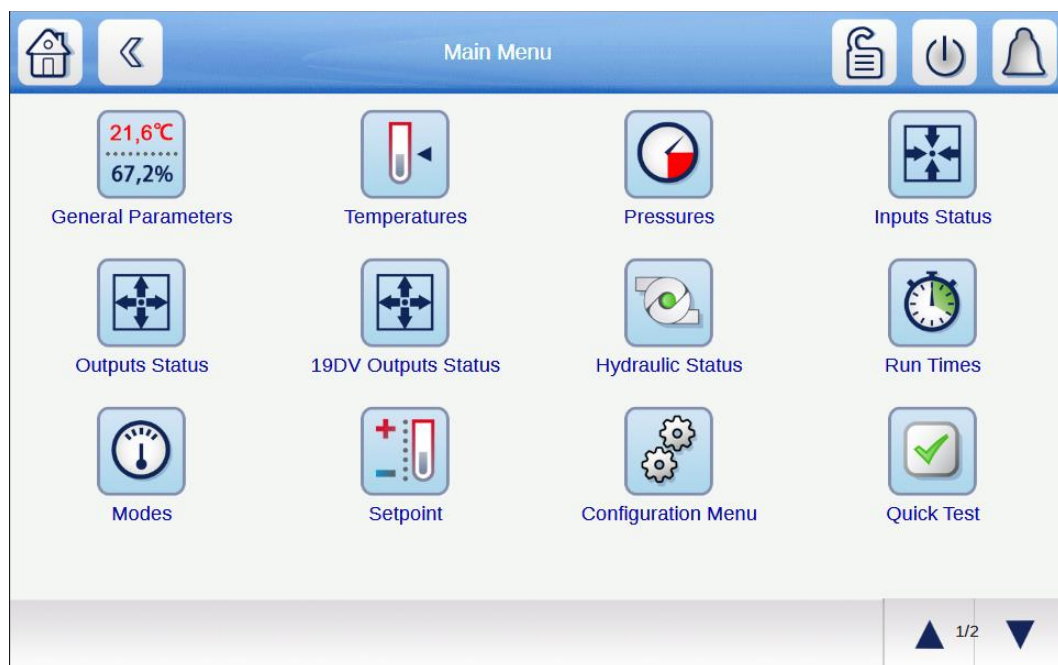
Confirm the unit shut-down or return to the previous screen.

4.7. Alarm Screen

To access **Alarm screen**, press the following button: . More detailed contents please refer to chapter 6.

4.8. Menu Screen

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

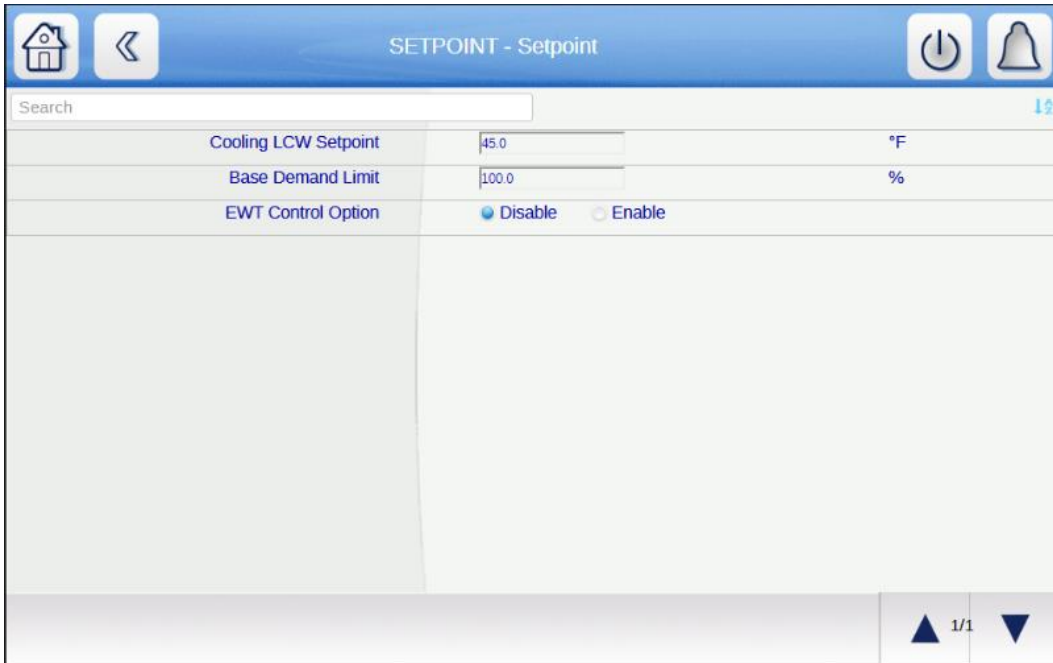


Touch the items to access the corresponding table/menu.

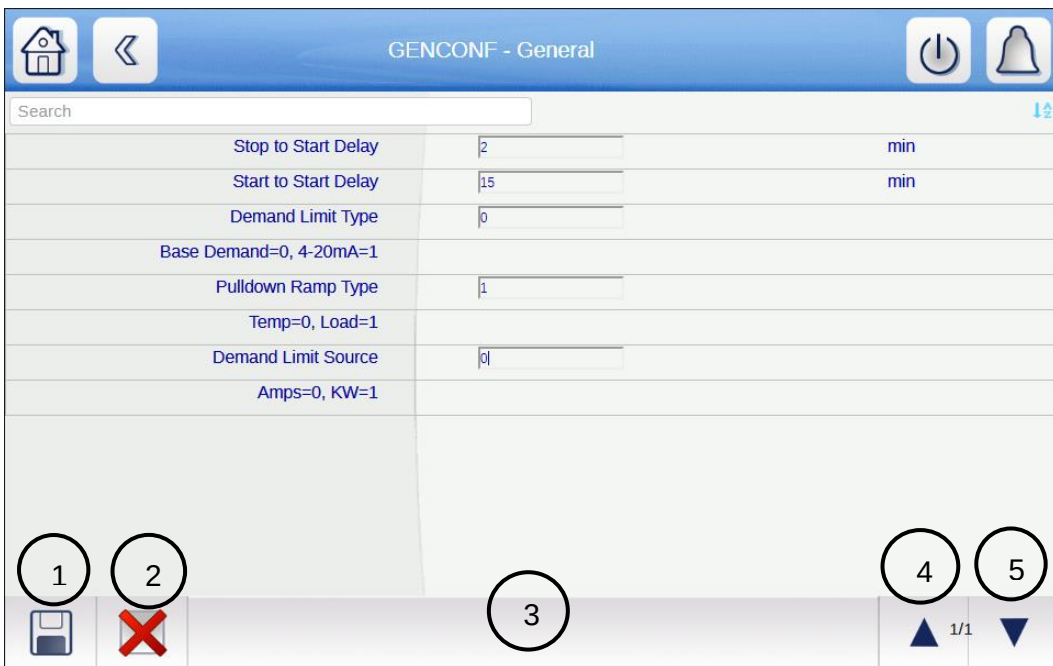
Navigation through tables

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4.9. Setpoint Screen



4.10. Configuration Screen



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

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

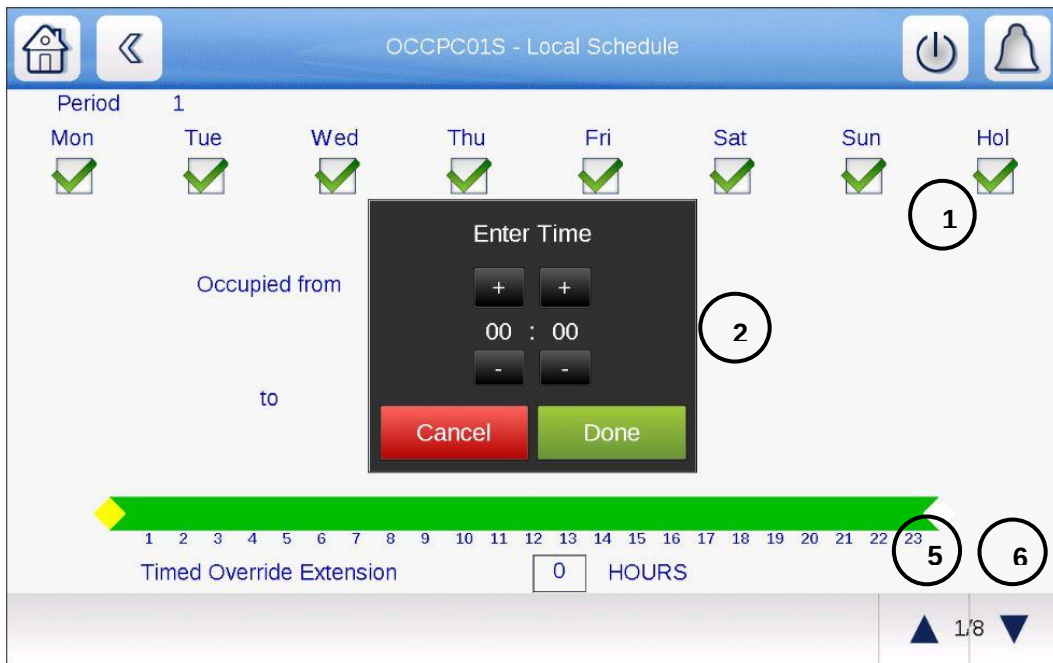
1	Forcible point
---	----------------

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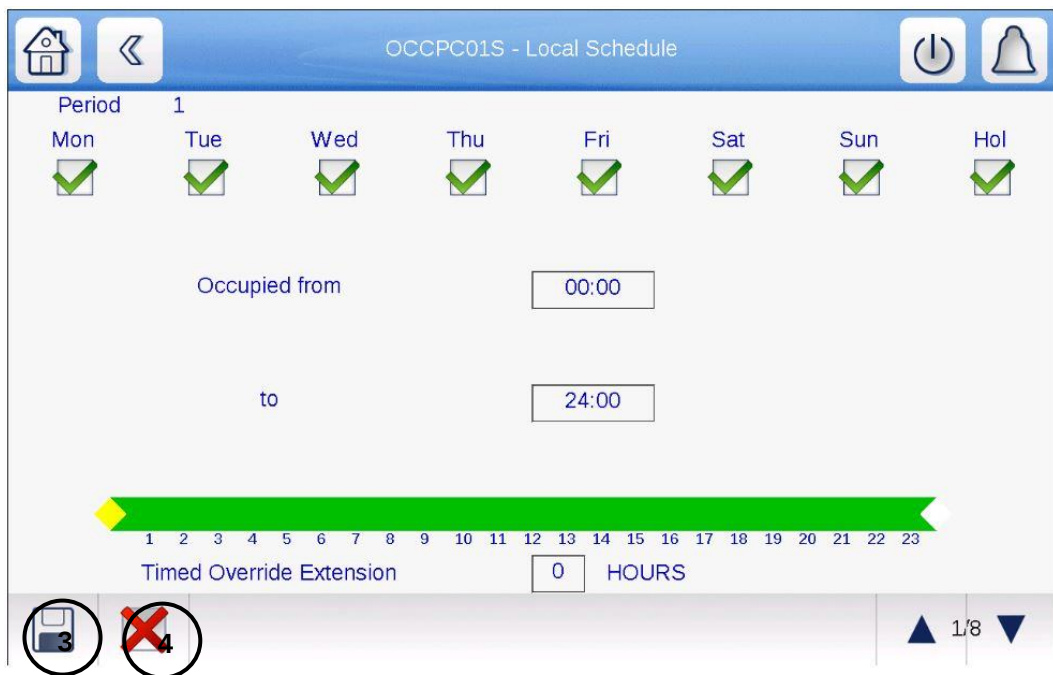
The Auto button cancels the force action on the point.

4.11. Time Schedule Screen

Detailed information please refer to section 5.24.



The screenshot shows the 'OCCPC01S - Local Schedule' screen. At the top, there are navigation icons (home, back) and status icons (power, bell). Below the title bar, a row of days (Mon, Tue, Wed, Thu, Fri, Sat, Sun, Hol) is displayed, each with a green checkmark icon. A modal dialog box titled 'Enter Time' is centered on the screen, featuring a numeric keypad with '+' and '-' buttons, a colon separator, and 'Cancel' and 'Done' buttons. Below the dialog, a horizontal timeline labeled 'Timed Override Extension' shows a green bar extending from 1 to 23 hours. A dropdown menu is set to '0 HOURS'. On the right side, there are two circular callouts: '1' pointing to the 'Hol' day and '2' pointing to the 'Enter Time' dialog box. At the bottom right, there are two more circular callouts: '5' pointing to the '23' on the timeline and '6' pointing to the '1/8' dropdown menu.



The screenshot shows the 'OCCPC01S - Local Schedule' screen. The 'Enter Time' dialog box is no longer present. Instead, the 'Occupied from' field is set to '00:00' and the 'to' field is set to '24:00'. The 'Timed Override Extension' bar is still visible, extending from 1 to 23 hours, with the dropdown menu set to '0 HOURS'. At the bottom left, there are two circular callouts: '3' pointing to a save icon and '4' pointing to a red 'X' icon. At the bottom right, there is a circular callout '1/8' pointing to the dropdown menu.

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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. Trending screen

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

Just browse to Main Menu -> Trending



Configuration is saved clicking “Save Trend” the button



	NAME	UNITS	Min Range	Max Range	
☒	TEMP_ECW	°F	32.0	90.0	●
☒	TEMP_LCW	°F	32.0	78.0	●
☐	TEMP_ECDW	°F	32.0	60.0	●
☒	TEMP_LCDW	°F	32.0	69.0	●
☒	TEMP_DGT	°F	32.0	69.0	●
☐	TEMP_DSH	°F	0.0	36.0	●
☒	PRESSURE_EVAP_P	PSIG	0.0	50.0	●
☐	PRESSURE_COND_P	PSIG	0.0	150.0	●

Save Trend View Trend

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

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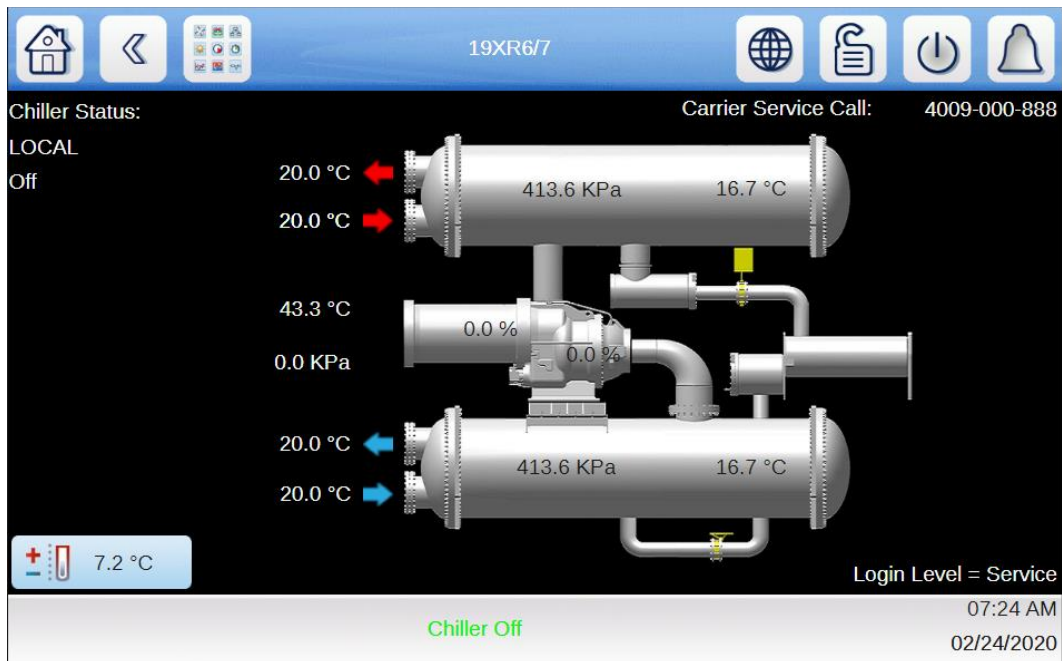
4.13. 19XR6/7/F Device Status Display Screens

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, or clicking the bottom in home page.

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4.13.2. Condenser Status



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4.13.3. Evaporator Status



Evaporator Status




Entering Chilled Water

68.0 °F

Leaving Chilled Water

68.0 °F

Evaporator Approach

6.0 ^F

Evaporator Pressure

60.0 PSIG

Evap Sat Refrig Temp

62.0 °F

Evap Refrig Liquid Temp

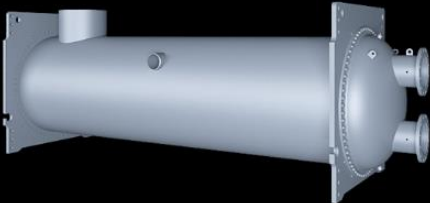
62.0 °F

Chilled Water Pump

OFF

Chilled Water Delta P

NA






4.13.4. Compressor Status



Compressor Status





Compressor Running

OFF

Compressor Running Hours

26.1

Compressor Starts Number

55

Target GV1 Pos

0.0 %

Comp Discharge Temp

68.0 °F

Discharge Superheat

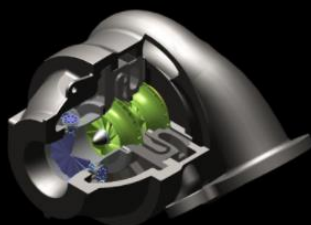
6.0 ^F

GV1 Control Type

Auto

Actual GV1 Pos

0.0 %



Chiller Off






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4.13.5. Motor Status



Motor Status




Motor Kilowatts	Actual Line Voltage	Actual Line Current
0.00 KW	0.0 Volts	0.0 AMPS

Motor Winding 1 Temp	Percent Line Voltage	Percent Current
100.0 °F	0.0 %	0.0 %

Motor Winding 2 Temp		
100.0 °F		

Motor Winding 3 Temp		
100.0 °F		






4.13.6. Economizer Status

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



Economizer Status





Economizer Pressure	Evaporator Pressure	Pressure Difference
413.6 KPa	413.6 KPa	0.0 KPa

Economizer Valve Type	Valve Control Mode
ON/OFF Damper	Auto

Target Valve Position	Damper Valve Status
HOLD	CLOSE



Chiller Off



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4.13.7. Transmission Status



Transmission Status_N




Oil Heater ON	Low Speed ME Brg Temp 100.0 °F	Low Speed CE Brg Temp 100.0 °F
Oil Pump OFF	High Speed ME Brg Temp 100.0 °F	High Speed CE Brg Temp 100.0 °F
Oil Sump Temperature 110.0 °F		




4.13.8. Envelope Control Status



Envelope Control Status

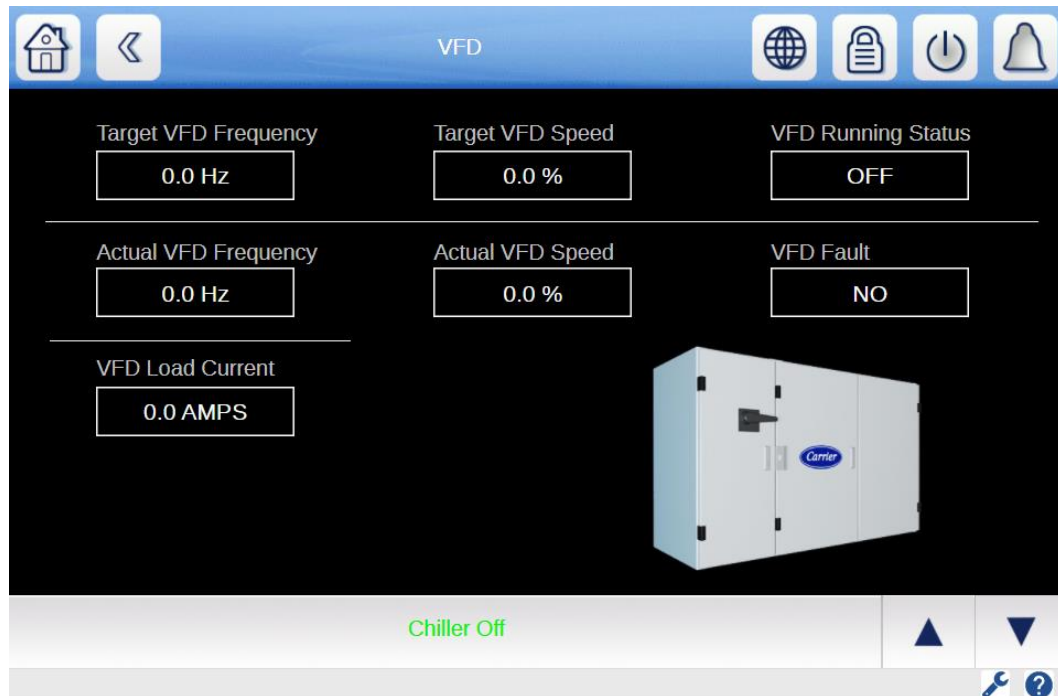



EC Valve Option NA	Envelope Control Mode Disable	Envelope Control Status NA
Envelope Control Type Auto	Availiable Lift 22.6 ^F	Actual Lift 0.0 ^F
Surge Region NO	Guide Vane Position 0.0 %	
Surge Protection NO		




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4.13.9. VFD Status



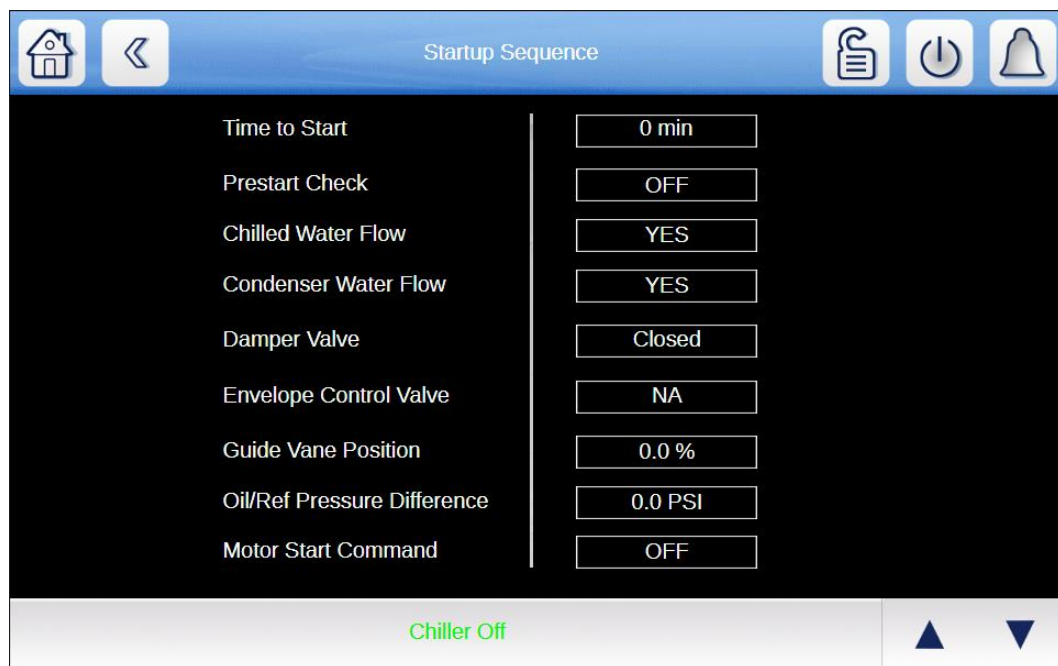
The VFD Status screen displays real-time operational data for the Variable Frequency Drive. It features a top navigation bar with icons for Home, Back, VFD, Settings, Lock, Power, and Alarm. The main content area is divided into sections for Target and Actual VFD Frequency and Speed, VFD Running Status, VFD Fault, and VFD Load Current. A 3D model of the Carrier VFD unit is shown on the right. The status bar at the bottom indicates 'Chiller Off' and includes up/down arrow controls and a settings/help icon.

Parameter	Value
Target VFD Frequency	0.0 Hz
Target VFD Speed	0.0 %
VFD Running Status	OFF
Actual VFD Frequency	0.0 Hz
Actual VFD Speed	0.0 %
VFD Fault	NO
VFD Load Current	0.0 AMPS

Chiller Off

4.13.10. 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.



The Startup Sequence screen displays a list of pre-startup checks and their current status. The top navigation bar includes icons for Home, Back, Startup Sequence, Power, and Alarm. The main content area lists various checks such as Time to Start, Prestart Check, Chilled Water Flow, Condenser Water Flow, Damper Valve, Envelope Control Valve, Guide Vane Position, Oil/Ref Pressure Difference, and Motor Start Command. The status bar at the bottom indicates 'Chiller Off' and includes up/down arrow controls.

Check Item	Status
Time to Start	0 min
Prestart Check	OFF
Chilled Water Flow	YES
Condenser Water Flow	YES
Damper Valve	Closed
Envelope Control Valve	NA
Guide Vane Position	0.0 %
Oil/Ref Pressure Difference	0.0 PSI
Motor Start Command	OFF

Chiller Off

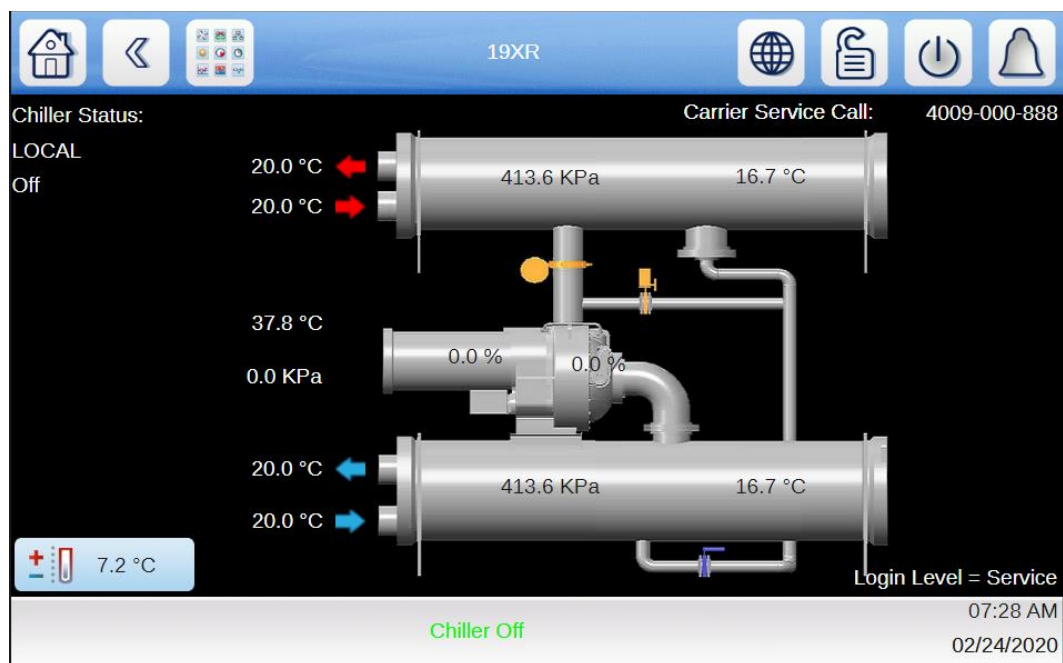
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4.14. 19XR2~5/C/D/E/V Device Status Display Screens

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

4.14.1. 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, or clicking the bottom in home page.



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4.14.2. Condenser Status



Condenser Status

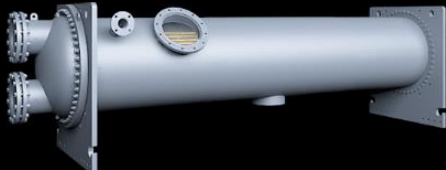



Entering Condenser Water	Leaving Condenser Water	Condenser Approach
68.0 °F	68.0 °F	0.2 ^F

Condenser Pressure	Cond Sat Refrig Temp	Condenser Water Delta P
60.0 PSIG	62.0 °F	NA

Condenser Water Pump

OFF






4.14.3. Evaporator Status



Evaporator Status




Entering Chilled Water	Leaving Chilled Water	Evaporator Approach
68.0 °F	68.0 °F	6.0 ^F

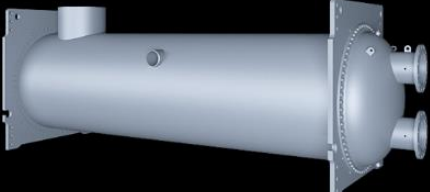
Evaporator Pressure	Evap Sat Refrig Temp	Evap Refrig Liquid Temp
60.0 PSIG	62.0 °F	62.0 °F

Chilled Water Pump

OFF

Chilled Water Delta P

NA






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4.14.5. Compressor Status – Single Stage



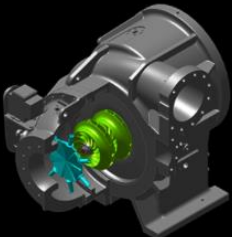
Compressor Status





Compressor Running	Compressor Running Hours	Compressor Starts Number
OFF	26.1	55

Target GV1 Pos	Comp Discharge Temp	Discharge Superheat
0.0 %	100.0 °F	5.0 ^F

GV1 Control Type		
Auto		

Actual GV1 Pos		
0.0 %		

Chiller Off

▲ ▼

⚙️ ?

4.14.6. Compressor Status – Dual Stage

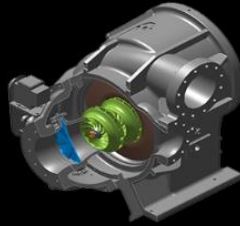


Compressor Status




Compressor Running	Compressor Running Hours	Compressor Starts Number
OFF	0.1	1

GV1 Control Type	Comp Discharge Temp	Discharge Superheat
Auto	0.0 °F	40.0 ^F

Actual GV1 Pos		
-25.0 %		

▲ ▼

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4.14.7. Motor Status



Motor Status




Motor Kilowatts 0.00 KW	Actual Line Voltage 0.0 Volts	Actual Line Current 0.0 AMPS
Motor Winding 1 Temp 100.0 °F	Percent Line Voltage 0.0 %	Percent Current 0.0 %
Motor Winding 2 Temp 100.0 °F		
Motor Winding 3 Temp 100.0 °F		




4.14.8. Transmission Status



Economizer Status





Economizer Pressure 413.6 KPa	Evaporator Pressure 413.6 KPa	Pressure Difference 0.0 KPa
Economizer Valve Type ON/OFF Damper	Valve Control Mode Auto	
Target Valve Position HOLD	Damper Valve Status HOLD	

Chiller Off



4.14.9. Transmission Status

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Transmission Status_L




Oil Heater
ON

Thrust Bearing Oil Temp
100.0 °F

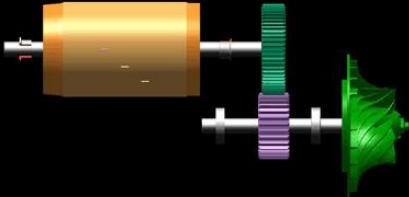
Thrust Bearing Temp
100.0 °F

Oil Pump
OFF

Oil Supply Temperature
120.0 °F

Oil Sump Temperature
100.0 °F

Oil Pressure Difference
0.0 PSI






4.14.10. Envelope Control Status



Envelope Control Status




EC Valve Option
NA

Envelope Control Mode
Disable

Envelope Control Status
NA

Envelope Control Type
Auto

Available Lift
22.6 ^F

Actual Lift
0.0 ^F

Surge Region
NO

Guide Vane Position
0.0 %



Surge Protection
NO




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4.14.11. VFD Status



The VFD Status screen displays the following information:

Target VFD Frequency	Target VFD Speed	VFD Running Status
0.0 Hz	0.0 %	OFF

Actual VFD Frequency	Actual VFD Speed	VFD Fault
47.5 Hz	95.0 %	NO

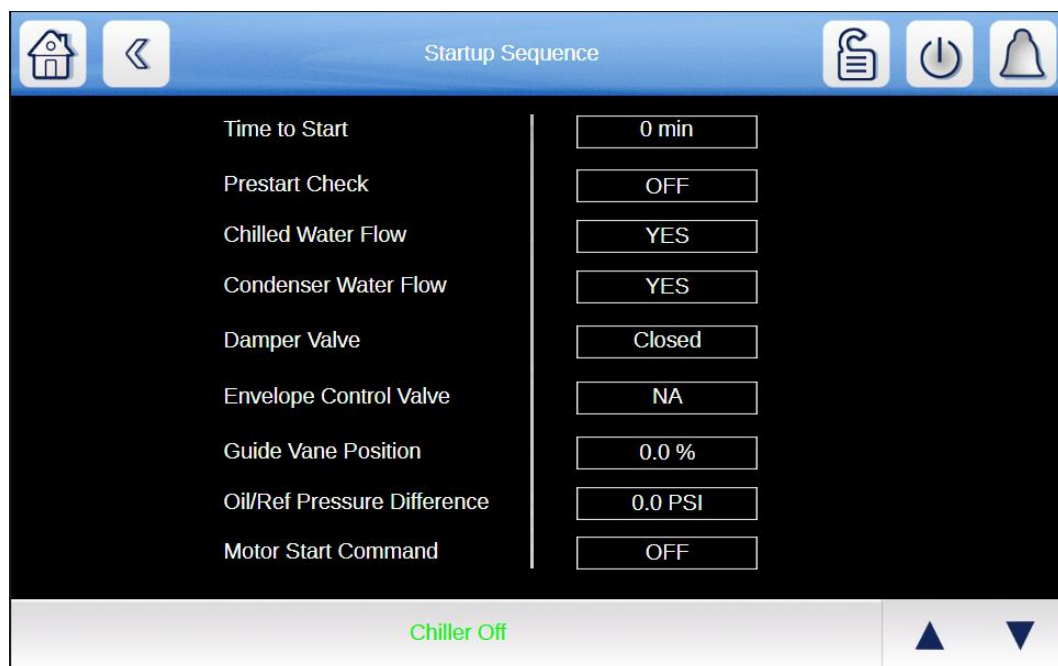
VFD Load Current
0.0 AMPS

VFD Alarm Code
0

Below the data fields is an image of a Carrier VFD unit. At the bottom of the screen, it displays "Chiller Off" in green text, along with navigation arrows and a help icon.

4.14.12. 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.



The Startup Sequence screen displays the following information:

Parameter	Value
Time to Start	0 min
Prestart Check	OFF
Chilled Water Flow	YES
Condenser Water Flow	YES
Damper Valve	Closed
Envelope Control Valve	NA
Guide Vane Position	0.0 %
Oil/Ref Pressure Difference	0.0 PSI
Motor Start Command	OFF

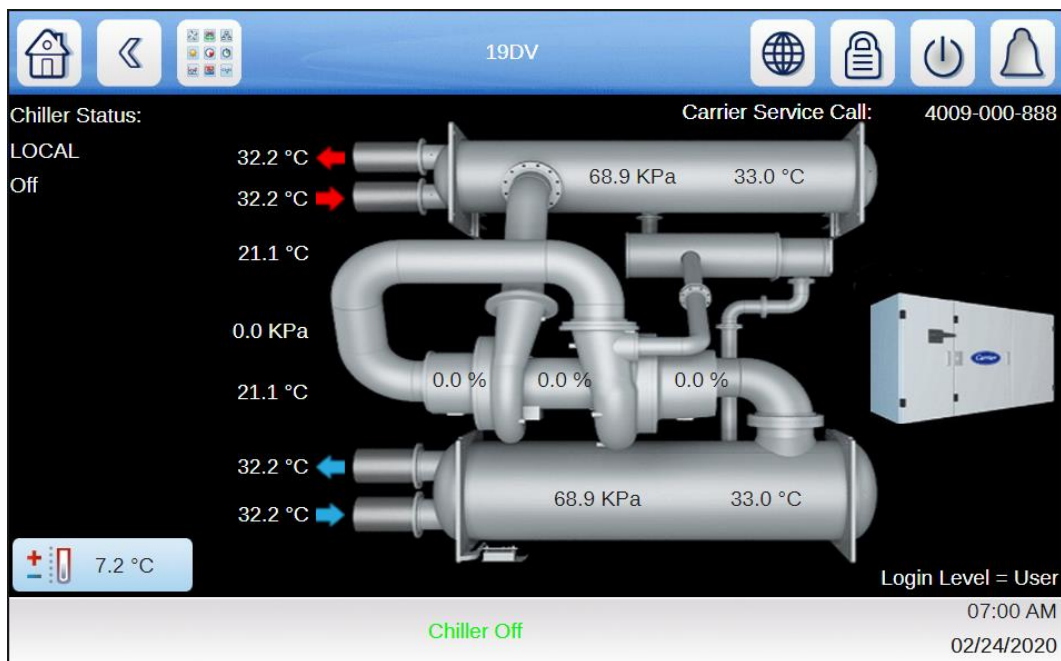
At the bottom of the screen, it displays "Chiller Off" in green text, along with navigation arrows.

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4.15. 19DV Device Status Display Screens

4.15.1 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, or clicking the bottom in home page.



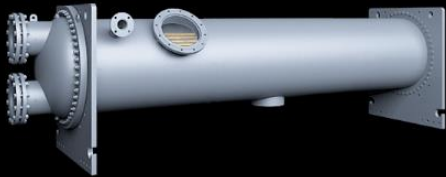
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4.15.2 Condenser Status



Condenser Status




Entering Condenser Water 90.0 °F	Leaving Condenser Water 90.0 °F	Condenser Approach 11.8 ^F
Condenser Pressure 15.1 PSIG	Cond Sat Refrig Temp 101.8 °F	Condenser Water Delta P NA
Condenser Water Pump OFF		

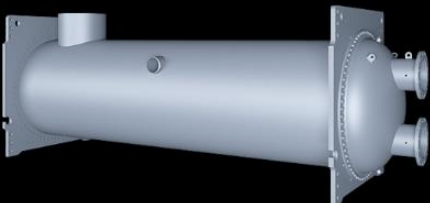



4.15.3 Evaporator Status



Evaporator Status




Entering Chilled Water 90.0 °F	Leaving Chilled Water 90.0 °F	Evaporator Approach 0.2 ^F
Evaporator Pressure 15.1 PSIG	Evap Sat Refrig Temp 101.8 °F	Evap Refrig Liquid Temp 101.8 °F
Chilled Water Pump OFF		
Chilled Water Delta P NA		




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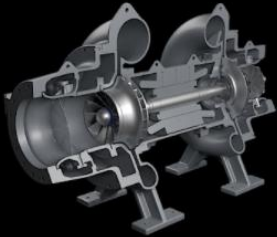
4.15.4. Compressor Status



Compressor Status





Compressor Running OFF	Compressor Running Hours 26.1	Compressor Starts Number 55
Target GV1 Pos 0.0 %	Comp Discharge Temp 100.0 °F	Discharge Superheat 8.5 ^F
GV1 Control Type Auto	GV2 Control Type Auto	
Actual GV1 Pos 0.0 %	Actual GV2 Pos 0.0 %	

Chiller Off





4.15.5. Motor Status



Motor Status




Motor Kilowatts 0.0 KW	Actual Line Voltage 460.0 Volts	Actual Line Current 0.0 AMPS
Motor Winding 1 Temp 100.0 °F	Percent Line Voltage 100.0 %	Percent Current 0.0 %





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4.15.6. Envelope Control Status



Envelope Control Status




EC Valve Option	Envelope Control Mode	Envelope Control Status
NA	Disable	NA

Envelope Control Type	Available Lift	Actual Lift
Auto	0.0 ^F	0.0 ^F

Surge Region	Guide Vane Position
NO	0.0 %

Surge Protection
NO






4.15.7. VFD Status



VFD




Target VFD Frequency	Target VFD Speed	VFD Running Status
0.0 Hz	0.0 %	OFF

Actual VFD Frequency	Actual VFD Speed	VFD Fault
0.0 Hz	0.0 %	NO

VFD Load Current
0.0 AMPS

VFD Alarm Code
0






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4.15.8. Startup Sequence



Startup Sequence




Time to Start	0 min
Prestart Check	OFF
Chilled Water Flow	YES
Condenser Water Flow	YES
Damper Valve	NA
Envelope Control Valve	NA
Guide Vane Position	0.0 %
Oil/Ref Pressure Difference	0.0 KPa
Motor Start Command	OFF

Chiller Off



4.15.9. Purge System Status



Purge System




Total Pumpout Count	Total Pumpout Time	Pumpout in 24 Hrs
0	0 min	0 min

Regeneration Countdown	Daily Pumpout in 7 Days	Daily Pumpout Limit
0 min	0 min	50 min

Purge Comp Suction Temp
0.0 °F

Purge Inlet Temp
0.0 °F

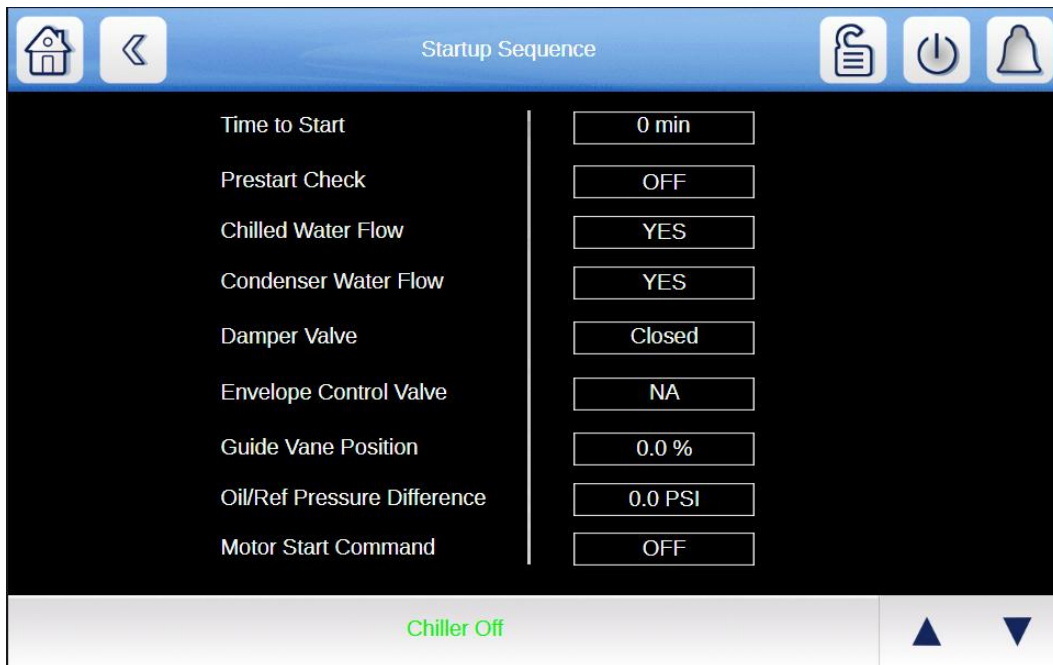





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4.15.10.Startup Sequence

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



Startup Sequence	
Time to Start	0 min
Prestart Check	OFF
Chilled Water Flow	YES
Condenser Water Flow	YES
Damper Valve	Closed
Envelope Control Valve	NA
Guide Vane Position	0.0 %
Oil/Ref Pressure Difference	0.0 PSI
Motor Start Command	OFF

Chiller Off

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5. 19 SERIES CARRIER® SMARTVU™ 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. In non local mode, if you want to shut down in local mode after the unit is started, you need to firstly switch to local mode.

Local

When control mode is LOCAL, the chiller can be started by “Local ON” button on Control Mode screen and be shut down by “Confirm Stop” buttons on screen or 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. Chiller Run Status

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

STATUS VALUE	STATUS	DESCRIPTION	RUN_STAT (discrete output)	RUN_STAT (mA output)
0	“OFF”	Chiller is STOP, no alarm.	OFF	4mA
1	“CTLTEST”	Controls Test is active	OFF/ON (determined by control test)	4mA
2	“PUMPDOWN”	Pump down in Controls Test is active	OFF	4mA

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3	"LOCKOUT "	Lockout in Controls Test is active	OFF	4mA
4	"RECYCLE "	Recycle shutdown completed on low load in effect; non-fault condition	ON	12mA
5	"TRIPOUT"	Shutdown completed due to alarm fault condition.	OFF	8mA
6	"TIMEOUT"	Start-to-start or stop-to-start timer is actively counting down; non-fault condition	ON	12mA
7	"PRESTAR T"	Prestart check is active	ON	12mA
8	"STARTUP "	Normal Startup in progress	ON	12mA
9	"AUTORST "	Auto Rapid pending in progress	ON	12mA
10	"RAMPING "	Ramp loading in progress	ON	20mA
11	"RUNNING "	Normal running mode, no override and not in demand	ON	20mA
12	"OVERRIDE E"	Running with Override active	ON	20mA
13	"DEMAND"	Running with Demand Limit Active;	ON	20mA
14	"SHUTDO WN"	Shutdown compressor in progress	ON	12mA
15	"FREECOO L"	Free cooling in progress	OFF	4mA
16	"CONDFLS H"	Condenser Flush in progress	OFF	4mA

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 ALERTCONDITION	State Number	Alarm or Alert
STARTS IN 12 HOURS ≥ 8	100	Alert
OIL SUMP TEMP $\leq 140F$ AND OIL SUMP TEMP $\leq$ EVAP_SAT + 50F	101	Alert
CONDENSER PRESSURE $\geq$ COND PRESS OVERRIDE - 20 PSI	102	Alert
Number of recycle restart in the last 4 hours is greater than 5	103	Alert

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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.

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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 8 psi .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:

- In local mode, Local OFF button is pressed
- In any mode, A recycle condition is present (see Recycle Mode section)
- In Network or local schedule mode, the time schedule has gone into unoccupied mode when in Network or Local Schedule control mode
- In any mode, The chiller protective limit has been reached and chiller is in alarm
- In network mode, The start/stop status (CHIL_S_S) is overridden to stop from the network when in Network mode
- In remote mode, Remote Start/Stop contact is closed.

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 19XR2~5/C/D/E/V/F, 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.

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When chiller type is 19DV, the refrigerant pump relay will be Turne OFF after 30 seconds post lube.

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

5.5. Oil Lubrication Control

This section is only available for oil lubrication chillers.

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 19XR2~5/C/D/E/V/F, 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.

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

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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, two control valves, evaporator and condenser filter, moisture removal desiccant, bearing filter, liquid level switch and additive reclaim system.

Once chiller startup, the system will go into prestart check process. After prestart check ok, control will check whether bearing pressure difference is less than 5psi before turn on refrigerant pump. This is to prevent pressure transducer abnormal reading. Then, refrigerant pump will be turned on and control will check whether Liquid Level switch is closed. If the Liquid Level switch is open which means low liquid level, then pump refrigerant from evaporator to condenser until Liquid Level is satisfied. Then, control will continue to pump refrigerant from evaporator to condenser, after bearing pressure difference reaches 8psi, keep lasting for 20s until compressor is on.

During pre-lubrication, if the bearing pressure difference is less than 8 psi for continuously 8 seconds more than 4 retry times, 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.

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.		

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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).

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:

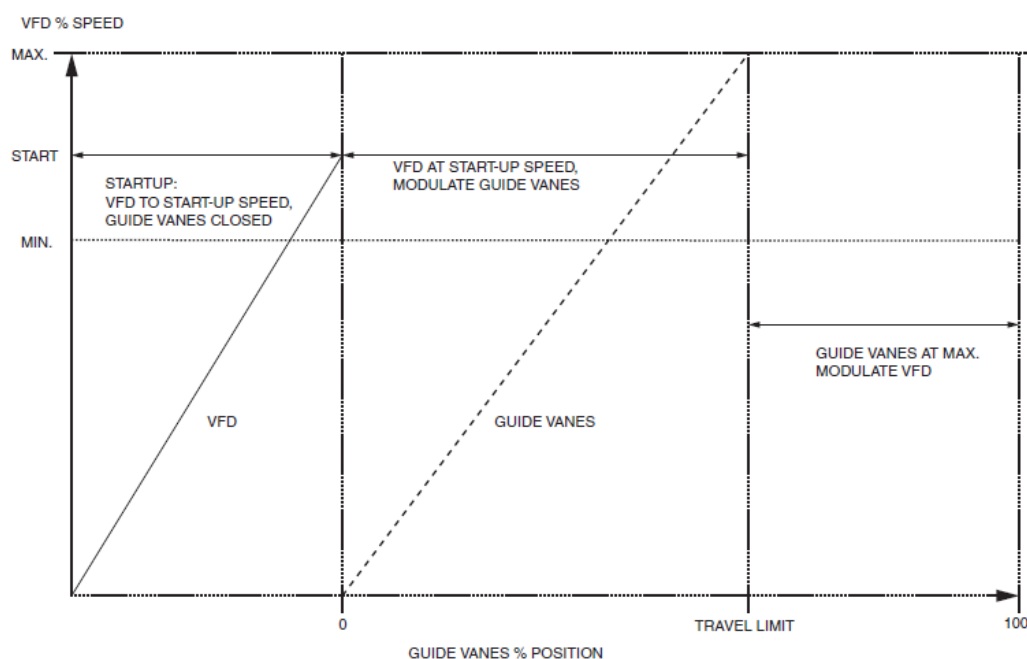
- Configure the Controlled water temperature delta T at no reset occurs (Controlled Water DELTA T NO RESET).
- Configure the Controlled water temperature delta T at full reset occurs (Controlled Water DELTA T FULL RESET).
- Finally, enter the amount of reset (Deg reset water DT full).

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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.

– 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.

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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°F/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.

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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:

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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 contactors 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.

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If this kind of control valve is not equipped in the chiller, this function shall be bypassed. And the economizer pressure shall display the minimum value of hardcoded.

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 DMP_ACT is Fail, then control system should declare an alert 154.

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 declare 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 declare an alert 154.

5.13. Damper Vapor Source

For 19XRC/E/F 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 Carrier® SmartVu™ 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.

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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.

- 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 Carrier® SmartVu™ 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.
- 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 Carrier® SmartVu™ 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 19XR2~5/C/D/E/V/F 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/F/C 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

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closed for a consecutive 20 seconds; for 19DV, ignore low discharge superheat override during first 5 minutes after chiller startup completed.

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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 LOW + 2.4 psi	< COND PRESS OVERRIDE LOW - 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 HIGH + 2.4 psi	< COND PRESS OVERRIDE HIGH - 1 psi
High Condenser Pressure OVERRIDE (19DV 44Psi condenser)	CONDENSER PRESSURE	> COND PRESS OVERRIDE DV 44	For low condenser type 20psig (18 - 25psig)	> COND PRESS OVERRIDE DV 44 + 2.4 psi	< COND PRESS OVERRIDE DV44 - 1 psi
High Condenser Pressure OVERRIDE (19DV 72Psi Condenser)	CONDENSER PRESSURE	> COND PRESS OVERRIDE DV 72	For high condenser type 55 psig (20 – 56 psig)	> COND PRESS OVERRIDE DV 72 + 2.4 psi	< COND PRESS OVERRIDE DV 72 - 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)

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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

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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 Carrier® SmartVu™ control maintains three run time clocks: COMPRESSOR ONTIME, COMPRESSOR CONTINUOUS 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. COMPRESSOR CONTINUOUS ONTIME shall start from start complete and cleared after stop complete. All of these can be viewed on the RUN TIMES screen on

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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 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.
- Evaporator refrigerant temperature is equal to or less than the EVAP REFRIG TRIPPOINT. (If chiller is startup with high lift, High Lift Startup Flag is on, this condition will be ignored)
- 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

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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 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 19DV 44PSI condenser and 55 psig (379.2 kPa) for 19DV 72PSI condenser.

Condenser Freeze Prevention — This control helps prevent condenser tube freeze-up by energizing the condenser pump relay. The 19 Series Carrier® SmartVu™ 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. Quick 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 quick 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 quick 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

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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 quick 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” and “Swift Restart Option” points 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 Carrier® SmartVu™ control system to allow Carrier® SmartVu™ 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.

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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 Carrier® SmartVu™ 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.

If the chiller system is equipped with a three way head pressure control valve, there will be another head pressure control valve output 2. The two outputs control the three way valve at the same time. The output of the head pressure valve 2 is equal to 20mA minus the mA value of head pressure control output. The output of the head pressure valve is also 20-4mA type.

5.23. Ice Build Option

Carrier® SmartVu™ 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

Carrier® SmartVu™ 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.

Carrier® SmartVu™ 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

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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-Proview. 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) for XR, 10-30 PSI (70-200 kPa) for DV) via Gauge 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.

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- 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 = $1000 * (\text{Actual Reading mA} - \text{output mA})$

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 = $1000 * (\text{VFD feedback voltage} / \text{ISM actual reading voltage})$

Range: 800-1200

5.29. Alarm email function

Carrier® SmartVu™ provides alarm email function.

Once activate this function (in E-mail configuration menu) and set a valid E-mail address, and when any alarm occurs, Carrier® SmartVu™ will automatically send an E-mail to the mail address to inform the corresponding alarm information.

The corresponding unit information will be included in the E-mail, which should be input in the controller information menu "position description" in advance.

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The screenshot shows a 'Control Identification' screen with a blue header bar containing icons for home, back, globe, power, and alarm. The main area has a light gray background with the following fields:

- CCN Element Number:
- CCN Bus Number:
- CCN Baud Rate:
- Device Description: Carrier SmartVu
- Location Description:
- Software Part Number: 014-ST-20S200220
- Serial Number:

A footer bar at the bottom contains a wrench icon and a question mark icon.

5.30. Prognostic

This prognostic function is designed for service trouble shooting. 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.

This function is only available for R134a refrigerant type chiller.

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CONF_PRG - Prognostics




Search

Prog Function Enable	☐ No	☒ Yes	
Oil Change Done	☐ No	☒ Yes	
Oil Filter Change Done	☐ No	☒ Yes	
Trans Calibration Done	☐ No	☒ Yes	
Refrigerant Charge Done	☐ No	☒ Yes	
Oil Filter PD Threshold	68.9		KPa
Oil Lub Expire Time	2000.0		hours
Oil Storage Expire Time	8640.0		hours
Trans Calib Threshold	27.6		KPa
Low Charge Cond Approach	11.1		°C
Evap Design Approach	1.7		°C
Bearing Degradation	93.3		°C
Oil Quality	0		

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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 controller can decide the lead/leg chiller according to Master Lead Lag Select. 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 Carrier® SmartVu™ 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.

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

5.33. Hydraulic Option Control

5.33.1 Water Flow Measurement

Carrier® SmartVu™ 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 "Option 2" -> "IOB4 Option" as "Yes".

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Step 2: Set "Option 2" -> "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 "Option 2" -> "IOB4 Option" as "Yes".

Step 2: Set "Option 2" -> "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 "Option 2" -> "IOB4 Option" as "Yes".

Step 2: Set "Option 2" -> "Water Flow Determination" as "Flow Switch"

Step 3: In "Hydraulic Status" menu, check evaporator/condenser water flow.

5.33.2 Water Pressure Difference Measurement

Carrier® SmartVu™ 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, Carrier® SmartVu™ 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 "Option 2" -> "IOB4 Option" as "Yes".

Step 2: Set "Option 2" -> "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 "Option 2" -> "IOB4 Option" as "Yes".

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Step 2: Set "Option 2" -> "Water Pressure Option" as "Pressure Drop".

Step 3: Set "Option 2" -> "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

5.34. Free Cooling

For 19XR3/4/5/C/E/F/6/7,

If "Option2 -> "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:

Condenser water pump output forced to ON

Evaporator water pump output forced to ON

Head Pressure valve is forced to the fully open position.

The IGV1 will be opened in the maximum open position

The envelope stability control valve is forced to the fully open position

A Digital Output "free cooling active" will be energized

A message (event 9) will be displayed on the chiller control display

Chiller status shall be "FREECOOL"

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.

For 19DV, The "Free Cooling Option" shall be configurable by the user.

If the free cooling option is set to yes, then:

Either one of the following shall be able to put the unit into the free cooling::

- From the chiller interface (display)
- From a CCN / BACnet force
- From a remote dry contact

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If the free cooling is activated the control shall take the following measure:

If chiller is in not in OFF status, ignore the free cooling request (chiller will continue to run) until chiller shut down.

Else

Unit will be locked so the compressor cannot run

Condenser water pump output forced to ON

Evaporator water pump output forced to ON

Head Pressure valve is forced to the fully open position.

The 1st & 2nd IGV will be opened in the maximum open position

The liquid bypass valve is forced to the fully open position

The envelope stability control valve is forced to the fully open position

The economizer isolation valve is forced to be fully open position

A Digital Output “free cooling active” will be energized

The free cooling valve is forced to the fully open position (19DV only)

A message (event 9) will be displayed on the chiller control display

Chiller status shall be “FREECOOL”

5.35. Marine Option

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

5.35.1. Oil Stir Function

If “Option 2” -> “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.

5.35.2. Power Request

If “Option 2” -> “Marine Pwr Req 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.

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If "Option 2" -> " Marine Cont. Pwr Req" 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.

5.35.3. 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.

5.35.4. 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 Disable, evaporator liquid temperature will be calculated from evaporator pressure transducer.

5.35.5. 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.

5.36. Open Protocol Support

Modbus/TCP on Carrier® SmartVu™ controller can be configured with the following steps:

Step 1: Configuration Menu ->Network Configuration

Step 2: Enable the Modbus/TCP, ethernet port 0 will be configured as Modbus/TCP or BACnet/IP

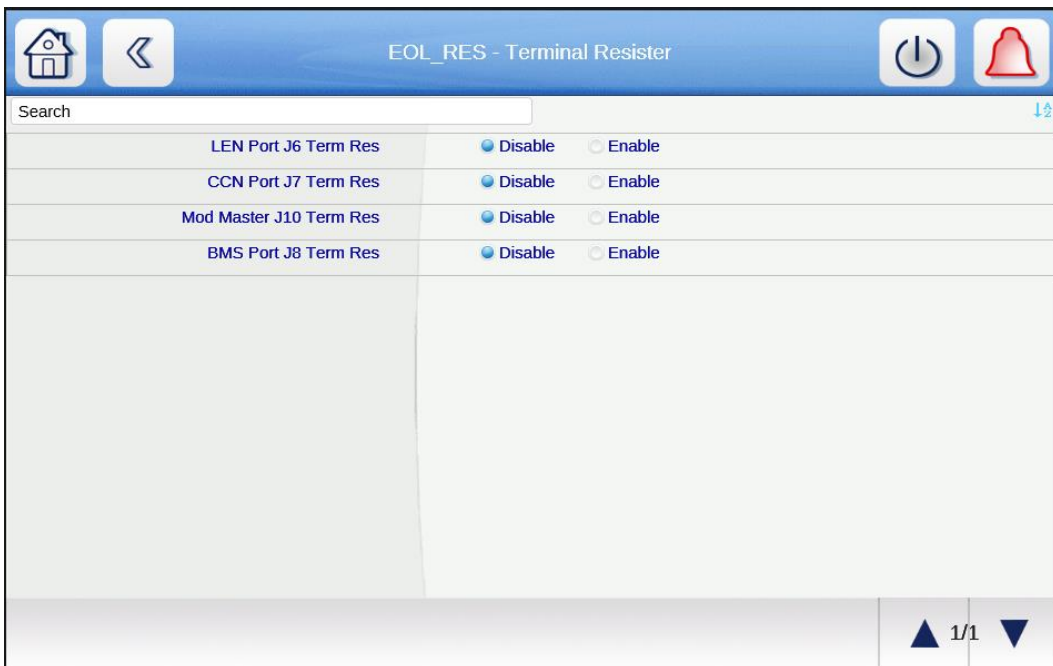
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Step 3: Controller will reboot automatically to save the configuration

Note:

Enable Modbus TCP, the Ethernet port will be used as Modbus / TCP interface, otherwise J8 port is Modbus / RTU; if BACnet / IP is enabled, the Ethernet port 0 will be used as BACnet / IP interface, otherwise J8 port is BACnet / mstp port.

The PIC6 has the capability for field enabled termination on the RS485 ports. The function is enabled through software. The termination resistance is 120 ohms.



Search	LEN Port J6 Term Res	CCN Port J7 Term Res	Mod Master J10 Term Res	BMS Port J8 Term Res
	☒ Disable ☐ Enable	☒ Disable ☐ Enable	☒ Disable ☐ Enable	☒ Disable ☐ Enable

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Modbus R/W points information as following:

ITEM	TagName (EnglishName)	Description	Data type	R/W	Modbus address	Mode
1	ecdw_sp	Heating ECDW Setpoint	Analog	R/W	3000	Both
2	ecw_sp	Cooling ECW Setpoint	Analog	R/W	3002	Both
3	ice_sp	Ice Build Setpoint	Analog	R/W	3004	Both
4	lcdw_sp	Heating LCDW Setpoint	Analog	R/W	3006	Both
5	lcw_sp	Cooling LCW Setpoint	Analog	R/W	3008	Both
6	dem_base	Base Demand Limit	Analog	R/W	3010	Network
7	EWT_OPT	EWT Control Option	Switch	R/W	3012	Network
8	CHIL_S_S	Network:Cmd Start/Stop	Switch	R/W	3014	Network
9	CTRL_PNT	Control Point	Analog	R/W	3016	Network

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10	DEM_LIM	Actual Demand Limit	Analog	R/W	3018	Network
11	EMSTOP	Emergency Stop	Switch	R/W	3020	Network
12	HC_SEL	Cooling/Heating Select	Switch	R/W	3022	Network
13	CHIL_OCC	Network:Cmd Occupied	Switch	R/W	3024	Network
14	REM_RST	Remote Reset Alarm	Switch	R/W	3026	Network
15	FC_START	Start Free Cooling	Switch	R/W	3028	Network

5.37. Purge Control

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

Purge control can be active whenever chiller compressor is ON or OFF with 'Purge on Idle Option' enabled.

Purge control can be forced to be active whenever chiller compressor is ON or OFF with 'Purge on Idle Option' enabled. When purge control is forced to be 1 (1 stands for 'purge system force active') or 2 (2 stands for 'purge valves force enable'), event 82 should be reported.

When purge system is not forced to be active, purge control should be active when purge inlet temperature (evap refig liquid temp when chiller compressor OFF or condenser saturated temperature when chiller compressor ON) is greater than purge active temperature setpoint.

There will be 3 minutes delay after purge control is active under purge control not forced condition for this module to do the following actions.

If purge control is forced OR 3 minutes delay is expired for not forced condition then

Purge compressor and purge fan should run at this time.

If chiller compressor is running, condenser solenoid valve should be opened and purge refrigerant from condenser.

If chiller compressor is not running, compressor solenoid valve shall be opened and purge refrigerant from compressor.

And if Purge Comp Suction Temp is less than purge compressor off temp and the refrigerant level flag is ON, close compressor solenoid valve and condenser solenoid valve, pump out solenoid valve, purge discharge valve and purge vacuum pump shall be kept ON for about 5s. After 5s discharge, pump out solenoid valve, purge discharge valve and purge vacuum pump shall be kept OFF, condenser solenoid valve shall be opened if chiller compressor is running or compressor solenoid valve shall be opened if chiller compressor is not running. After 5s discharge, it will start 30s delay. Then, check Purge Comp Suction Temp again, if it is less than 4 degree F, it will continue cycle of before.

If refrigerant level in the purge tank is high , or Purge Comp Suction Temp is less than 12F and Purge Level Switch Low is ON, then drainage solenoid valve should be opened to drain refrigerant from purge tank to evaporator. After Purge Level Switch Low is OFF, keep lasting this drain process for another 5s,

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then set the refrigerant level flag to ON. And if purge level in the purge tank is low, drainage solenoid valve should be closed.

If pump out solenoid valve is accumulated ON for 30 minutes, purge system should do regeneration process for Regeneration Lasting Time minutes, regardless purge active or not. When regeneration process active, the Purge Regeneration Valve and Purge Heater should be on for Regeneration Lasting Time minutes, purge vacuum pump should be on for 3mins and then 10mins off, alternating during Regeneration Lasting Time 120 minutes.

5.38. Motor Rotation Check Option

19DV provides Motor Rotation check function. In 19DV 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.

5.39. Heat Reclaim Option

When chiller type is 19XR2~E/V/D, 19XR6&7 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 (19XR2~5/C/D/EV) ; IOB4 AI1 & AI2 (19XR6&7))

Manually switch the heat recovery mode and cooling mode without stopping the machine. The heat recovery mode participates in the unit control logic. When switching to the heat recovery mode, the calculation logic of the COND_APP is: $COND_APP = CALC\ COND\ SAT\ TEMP - Max\ (HEAT\ RECOVERY\ WATER\ TEMP, LEAVING\ CONDENSER\ WATER\ TEMP)$.

5.40. Liquid Bypass Control

5.41.1 Liquid Bypass Control for 19DV

In order to enable a two stage economized 1233zd chiller to provide full load cooling capacity at lowered lift, system liquid piping needs to be adjusted to increase its flow capacity.

The liquid bypass (LBP) system will be an option for customer when the chiller operation envelope has lower profile .

At very low ECWT, the pressure difference between condenser and evaporator is reduced. At bigger system flow rate, the piping resistance may get higher than system pressure difference. In this case, the liquid may stack in the condenser or the economizer, and cause evaporator lack of refrigerant. Therefore, the chiller will easily get tripped out due to low evaporating temperature alarm.

The LBP system is designed to avoid above operation failure. It includes an "ON/OFF" valve installed between condenser float chamber and evaporator inlet piping, an "ON/OFF" valve installed on the vapor piping between economizer and compressor interstage.

When the LBP is activated, the chiller will operate as a single stage system. The condenser float valve will still control the system flow rate according to the chamber liquid level.

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5.41.2 Liquid Bypass Control for 19XRC

In order to enable a two stage economized R134a chiller to provide a high cooling capacity at low lift condition, especially in data center application, system needs liquid bypass piping to increase its flow capability.

The liquid bypass (LBP) will be a standard option of 19XRC for customer when the chiller operation region has a lower profile than conventional cooling application.

At winter when condenser entering water temperature is very low, the pressure difference between condenser and evaporator will decrease, which leads to piping flow capacity decrease. In this case, the liquid may stack in the condenser or the economizer, and it will cause the lack of refrigerant in evaporator. Subsequently, the evaporator LTD will increase obviously and the chiller may even trip out due to low evaporator pressure.

The LBP function is designed to avoid above operation failure. It has an electrical modulate (4-20mA) valve installed in piping proceeding from condenser liquid sump to evaporator inlet.

When chiller equipped with LBP option, should enable LBP function and disable dynamic control function. When LBP function is activated, closing economizer damper solenoid valve and opening liquid bypass valve, then chiller will work as a single stage system without vapor supplement at intermedia stage.

5.41. Dynamic Demand Limit Control

Some 19XRC/F two-stage chiller uses a fixed orifice as high side throttling device. For a fixed orifice, its flow ability is limited compared with a variable area throttling device such as float ball valve and linear float valve. Especially when pressure drop between upstream and downstream is lower than design point, or the chiller operating capacity over the limitation, the flow ability of a fixed orifice will be de-rated. So if the chiller operates at a low lift, Carrier® SmartVu™ needs to limit the cooling capacity by inhibiting motor run at a high current or limiting input power to prevent liquid choke at high side orifice.

Carrier® SmartVu™ have a capacity override limit option in configure menu, available or not available.

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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 Carrier® SmartVu™ 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 5 current alarms and alerts.

6.2. Displaying Alarms

The alarm icon on the interface allows the quick display of the unit status.

The yellow alarm icon indicates that the unit is still operational, but there is a warning.

The red alarm icon indicates that the unit has stopped due to an alarm.

The “Reset Alarm” menu on the display panel can display the current alarm / warning codes of up to 5 units.

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 alarm information will be saved in the alarm history menu. A maximum of 50 alarms can be saved. After more than 50 alarms, the alarm information that is saved first will be overwritten by subsequent information (following the FIFO) the rules).

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6.4. Alarm / Alert 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	When exv_opt is enabled and if oil discharge temperature is outside the range of -39.5 to 244.5°F
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.

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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 - Compressor Thrust Bearing Oil Temp	As above	As above	Check sensor resistance. Check for proper wiring between Compressor 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-227	ALM-227 Sensor Fault - Bearing Outlet Pressure			
Alm-228	ALM-228 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.
Alm-229	ALM-229 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.
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.

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					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.
Prestart failure					
	Alm-230	ALM-230 Prestart Failure - High Bearing Temperature	Manual	Unit shuts down. Compressor is not allowed to start	During prestart process, if all of the bearing temperature sensors are in the range AND { For 19XR6&7 and 19XRF chiller, if MTRB1 or MTRB2 or MTRB3 or MTRB4 is larger than tb_alt2 minus 10F OR For 19XR2~5/C/D/E/V chiller, if MTRB is larger than tb_alert minus 10F OR For 19DV chiller, if CBH1 or CBH2 is larger than tb_alt3 minus 10F }
	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.

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					Check compressor discharge temperature sensor wiring and accuracy to IOB connector. Check for excessive starts. Check COMP DISCHARGE ALERT setting.
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.
Alm-240	Alm-240 Damper Valve Calibration Not Completed				Tested on control test mode or prestart check, if Damper calibration is failed
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,

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					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-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.
	Alm-256	ALM-256 Protective Limit - High Bearing Temperature	As above	As above	if all of the bearing temperature sensors are in the range AND { For Legacy chiller, If MTRB is larger than tb_trip. For 19XR6&7 chiller, If MTRB1 or MTRB2 or MTRB3 or MTRB4 is larger than tb_trip2 For 19XRF chiller, If MTRB2 or MTRB3 or MTRB4 is larger than tb_trip2 For 19DV chiller, If CHB1 or CHB2 is larger than tb_trip3

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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 Potential Evaporator Freeze-up	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-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.

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					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.
	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 form 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 GENUNIT table

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Alm-277	ALM-277 Protective Limit - UI Freeze Reboot	Manual	Same as above	Power on reset Carrier® SmartVu™ controller
Alm-278	ALM-278 Protective Limit - VFD Config Conflict	Manual	Same as above	Reset shall be automatic when the communication comes back to normal
Alm-279	ALM-279 Protective Limit - VFD Config Failure	Manual	Same as above	Check VFD Configurations and save it again
Alm-280	ALM-280 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-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-286	ALM-286 Protective Limit - Economizer Pressure Low	Manual	As above	For 19XR6/7 chiller AND DMP_ACT is not Fail, AND If Damper Valve delay is more than dmp_dly seconds, AND If economizer pressure is less than evaporator pressure and DSH is less than 0 ^F for continuous dmp_alm (default 180) seconds
Alm-287	ALM-287 Protective Limit - Oil Pressure Transducer Abnormal	Manual	As above	For 19XR6/7, 19XR2-5/C/D/EN and 19XRF chiller, AND If oil sump pressure and oil discharge pressure are in the range, AND If chiller is in startup ("oil pressure check" before pump on) progress and not in swift startup and OIL_PUMP1 is off, If OIL_PD2 is over 6 psi
Alm-296	ALM-296 Protective Limit - High Evaporator Pressure	Manual	As above	Check evaporator pressure sensor input And check evaporator pressure cutout configurations

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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-311	ALM-311 Loss Communication With Danfoss VFD	As above	As above	If (vfd_opt = 7) AND {LEN side Communication error with VFD lost for 14 [default, can be configurable] consecutive seconds}	
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	
Alm-353	Sensor Fault - Heat Reclaim Entering 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 heat water entering temperature is outside the range of -39.5 to 244.5°F	

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Alm-354	Sensor Fault - Heat Reclaim Leaving 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 heat water entering temperature is outside the range of -39.5 to 244.5°F
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.
Alm-404	ALM-404 ISM Fault - Line Current Imbalance	As above	As above	Current imbalance > CURRENT % IMBALANCE for greater than the

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					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

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					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
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 $\geq$ 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

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					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

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					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.
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.

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					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
Alm-454	VFD Fault - Main Power Failure	As above	As above		Check the main power to VFD
Alm-500	VFD Fault - Brake Check	As above	As above		Refer to Danfoss VFD trouble shooting manual
Alm-501	VFD Fault - Power Card Over Temperature	As above	As above		As above
Alm-502	VFD Fault - Earth Fault	As above	As above		As above
Alm-503	VFD Fault - Ctrl Card Over Temperature	As above	As above		As above
Alm-504	VFD Fault - Control Word Timeout	As above	As above		As above
Alm-505	VFD Fault - Over Current	As above	As above		As above
Alm-506	VFD Fault - Torque Limit	As above	As above		As above
Alm-507	VFD Fault - Motor Thermistor Over Temp	As above	As above		As above
Alm-508	VFD Fault - Motor Etr Over Temperature	As above	As above		As above
Alm-509	VFD Fault - Inverter Overload	As above	As above		As above
Alm-510	VFD Fault - DC Link Under Voltage	As above	As above		As above
Alm-511	VFD Fault - DC Link Over Voltage	As above	As above		As above

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Alm-512	VFD Fault - Short Circuit	As above	As above	As above
Alm-513	VFD Fault - Inrush Fault	As above	As above	As above
Alm-514	VFD Fault - Mains Phase Loss	As above	As above	As above
Alm-515	VFD Fault - AMA Not OK	As above	As above	As above
Alm-516	VFD Fault - Live Zero Error	As above	As above	As above
Alm-517	VFD Fault - Internal Fault	As above	As above	As above
Alm-518	VFD Fault - Brake OverLoad	As above	As above	As above
Alm-519	VFD Fault - Motor Phase U Is Missing	As above	As above	As above
Alm-520	VFD Fault - Motor Phase V Is Missing	As above	As above	As above
Alm-521	VFD Fault - Motor Phase W Is Missing	As above	As above	As above
Alm-522	VFD Fault - Field Bus Fault	As above	As above	As above
Alm-523	VFD Fault - 24V Supply Fault	As above	As above	As above
Alm-524	VFD Fault - Mains Failure	As above	As above	As above
Alm-525	VFD Fault - 1.8V Supply Fault	As above	As above	As above
Alm-526	VFD Fault - Brake Resistor Short Circuit	As above	As above	As above
Alm-527	VFD Fault - Brake IGBT Fault	As above	As above	As above
Alm-528	VFD Fault - Option Change	As above	As above	As above
Alm-529	VFD Fault - Drive Initialized	As above	As above	As above
Alm-530	VFD Fault - Safe Stop	As above	As above	As above
Alm-531	VFD Fault - Service Trip,Read/Write	As above	As above	As above
Alm-532	VFD Fault - End Of Curve	As above	As above	As above
Alm-533	VFD Fault - Broken Belt	As above	As above	As above
Alm-534	VFD Fault - Fans Error	As above	As above	As above
Alm-535	VFD Fault - PTC1 Safe Stop	As above	As above	As above
Alm-536	VFD Fault - Dangerous Failure	As above	As above	As above

* Alarm code in ALARMRST table

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6.4.2 General Alert Codes

	ALARM RST 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	When in prestart process and if lubrication type is oil, Case 1: if swift restart is active and, if OILT_SMP is less than 120F and OILT_SMP is less than EVAP_SAT plus 40F. Case 2: if swift restart isn't active and if OILT_CHK is disabled and, if OILT_SMP is less than 122F and OILT_SMP is less than EVAP_SAT plus 40F. Case 3: if swift restart isn't active and if OILT_CHK is enabled and, if OILT_SMP is less than 140F and OILT_SMP is less than EVAP_SAT plus 50F.
	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_CNTRL screen. Check Remote

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					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

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	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
	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-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

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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-163	Process Alert - Low Liquid Level in High Float VLV			
Alt-164	ALT-164 Process Alert – Displacement Switch	Manual	As above	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 Protective Limit - Potential Condenser Freeze-up	Automatic	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.
Alt-169	ALT-169 Process Alert - High Evaporator Pressure	Automatic	As above	Check evaporator pressure sensor input And check evaporator pressure override configurations
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

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Alt-175	ALT-175 Master Slave Alert - ncorrect 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
ALT-181	ALT-181 Loss Communication with AHF GDCB 1	Manual	As above	Check the communication configurations between the main control board and GDCB1 board, and the cables, etc.
ALT-182	ALT-182 Loss Communication with AHF GDCB 2	Manual	As above	Check the communication configurations between the main control board and GDCB2 board, and the cables, etc.
ALT-183	ALT-183 Loss Communication with AHF GDCB 3	Manual	As above	Check the communication configurations between the main control board and GDCB3 board, and the cables, etc.
ALT-184	ALT-184 Loss Communication with AHF GDCB 4	Manual	As above	Check the communication configurations between the main control board and GDCB4 board, and the cables, etc.
ALT-185	ALT-185 AHF GDCB 1 Start Failure	Manual	As above	Check AHF GDCB board 1 and the related configurations
ALT-186	ALT-186 AHF GDCB 2 Start Failure	Manual	As above	Check AHF GDCB board 2 and the related configurations
ALT-187	ALT-187 AHF GDCB 3 Start Failure	Manual	As above	Check AHF GDCB board 3 and the related configurations
ALT-188	ALT-188 AHF GDCB 4 Start Failure	Manual	As above	Check AHF GDCB board 4 and the related configurations
ALT-189	Process Alert - Low Oil Supply Temperature	Manual	As above	If oil supply temperature is less than the 95 F during chiller is running and oil exv is enabled
ALT-190	AHF FAULT	Manual	As above	Receive the fault state
ALT-191	Loss Communication with AHF	Manual	As above	Check the communication with AHF every 1s, if no response, it will alert

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

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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
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

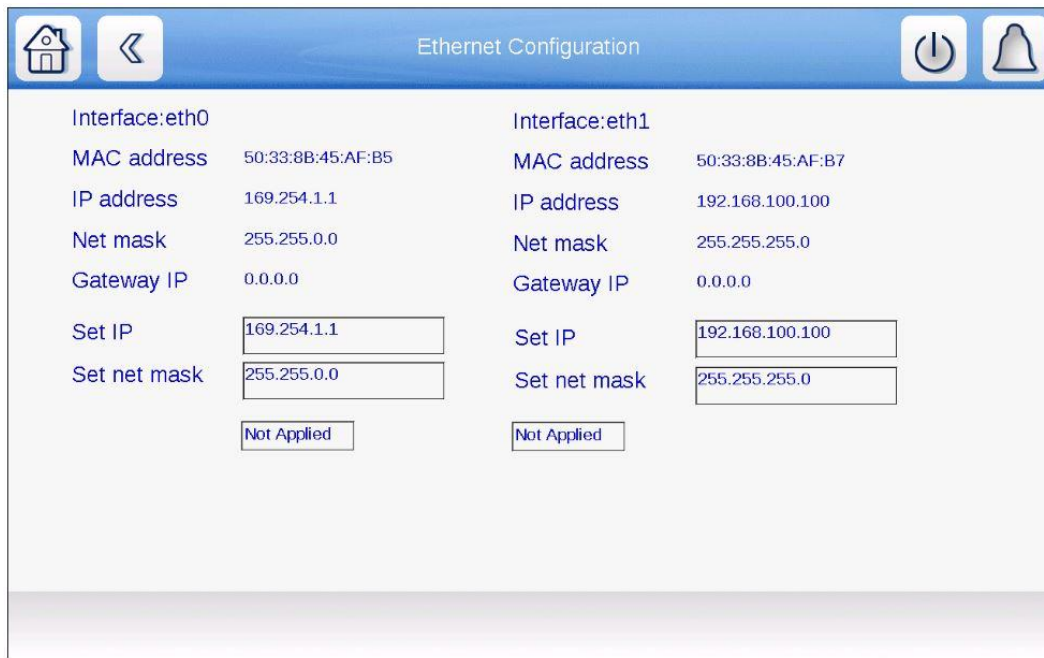
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83	Running - Guide Vane 2 Position Forced
84	Operation - Refrigerant Lub Forced
85	Running - Vapor Source Valve Forced
87	Purge - Regeneration Forced
90	Shutdown - Normal
91	Shutdown - Alarm
93	Shutdown - Recycle
94	Shutdown - Recycle Ice Build
95	Shutdown - Compressor Deenergized
96	Shutdown - Emergency Stop
97	Transducer Calibration In Effect
98	ISM Calibration in Effect

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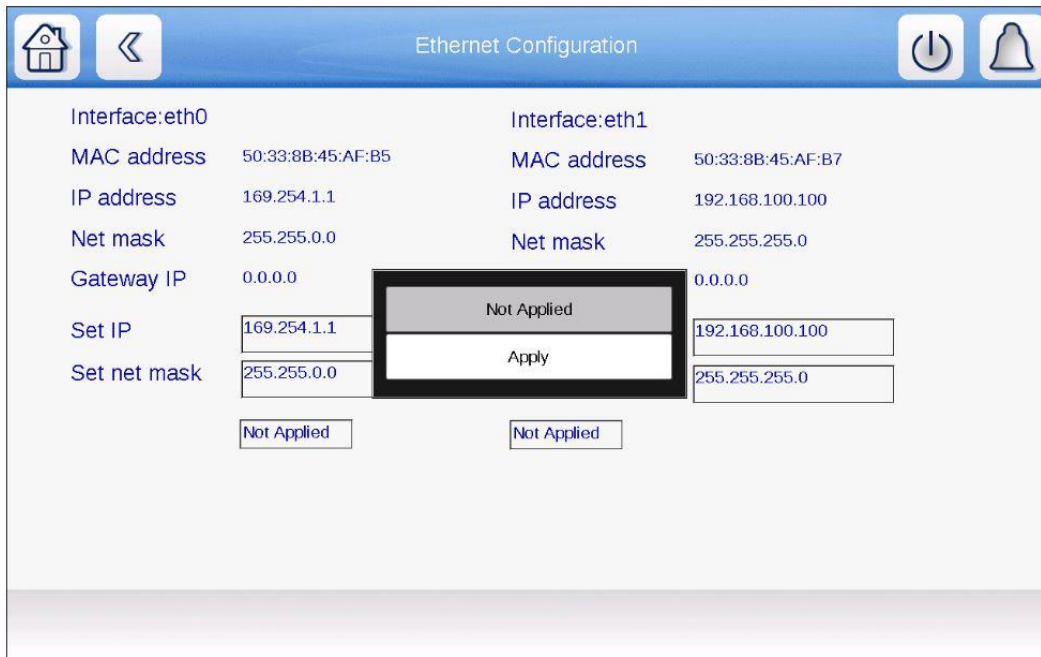
7 CONTROLLER IP ADDRESS SETTING

The user can go to the Ethernet configuration in the configuration menu to check and modify the IP address.



Ethernet Configuration			
Interface:eth0		Interface:eth1	
MAC address	50:33:8B:45:AF:B5	MAC address	50:33:8B:45:AF:B7
IP address	169.254.1.1	IP address	192.168.100.100
Net mask	255.255.0.0	Net mask	255.255.255.0
Gateway IP	0.0.0.0	Gateway IP	0.0.0.0
Set IP	169.254.1.1	Set IP	192.168.100.100
Set net mask	255.255.0.0	Set net mask	255.255.255.0
	Not Applied		Not Applied

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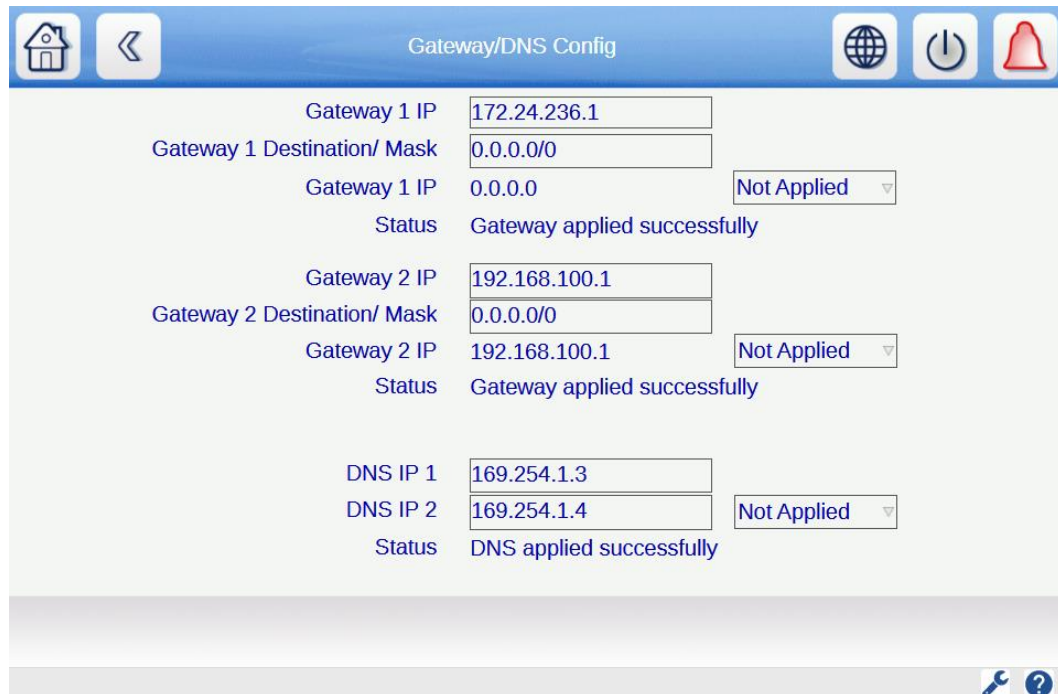
The screenshot shows the 'Ethernet Configuration' interface. It has a top navigation bar with a home icon, a back arrow, the title 'Ethernet Configuration', a power icon, and a bell icon. Below the navigation bar, there are two columns of configuration options for 'Interface:eth0' and 'Interface:eth1'. For 'Interface:eth0', the MAC address is 50:33:8B:45:AF:B5, IP address is 169.254.1.1, Net mask is 255.255.0.0, and Gateway IP is 0.0.0.0. For 'Interface:eth1', the MAC address is 50:33:8B:45:AF:B7, IP address is 192.168.100.100, Net mask is 255.255.255.0, and Gateway IP is 0.0.0.0. Below these settings, there are input fields for 'Set IP' and 'Set net mask'. A modal dialog is open in the center, containing a 'Not Applied' button and an 'Apply' button. The 'Set IP' and 'Set net mask' fields for both interfaces are currently set to 'Not Applied'.

Note:

The IP addresses of J15 and J16 shall NOT be in the same sub network, for example , if J15 is configured as 169.254.1.1/255.255.0.0, then J16's IP address can't be configured as 169.254.x.x.

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Click the Gateway/DNS Config in System Configuration page, will display the below page:



Gateway/DNS Config

Gateway 1 IP: 172.24.236.1
Gateway 1 Destination/ Mask: 0.0.0.0/0
Gateway 1 IP: 0.0.0.0 Not Applied
Status: Gateway applied successfully

Gateway 2 IP: 192.168.100.1
Gateway 2 Destination/ Mask: 0.0.0.0/0
Gateway 2 IP: 192.168.100.1 Not Applied
Status: Gateway applied successfully

DNS IP 1: 169.254.1.3
DNS IP 2: 169.254.1.4 Not Applied
Status: DNS applied successfully

Note:

The Gateway 1 Destination/Mask of Gateway 1 IP and Gateway 2 IP can't be set as 0.0.0.0/0 at the same time.

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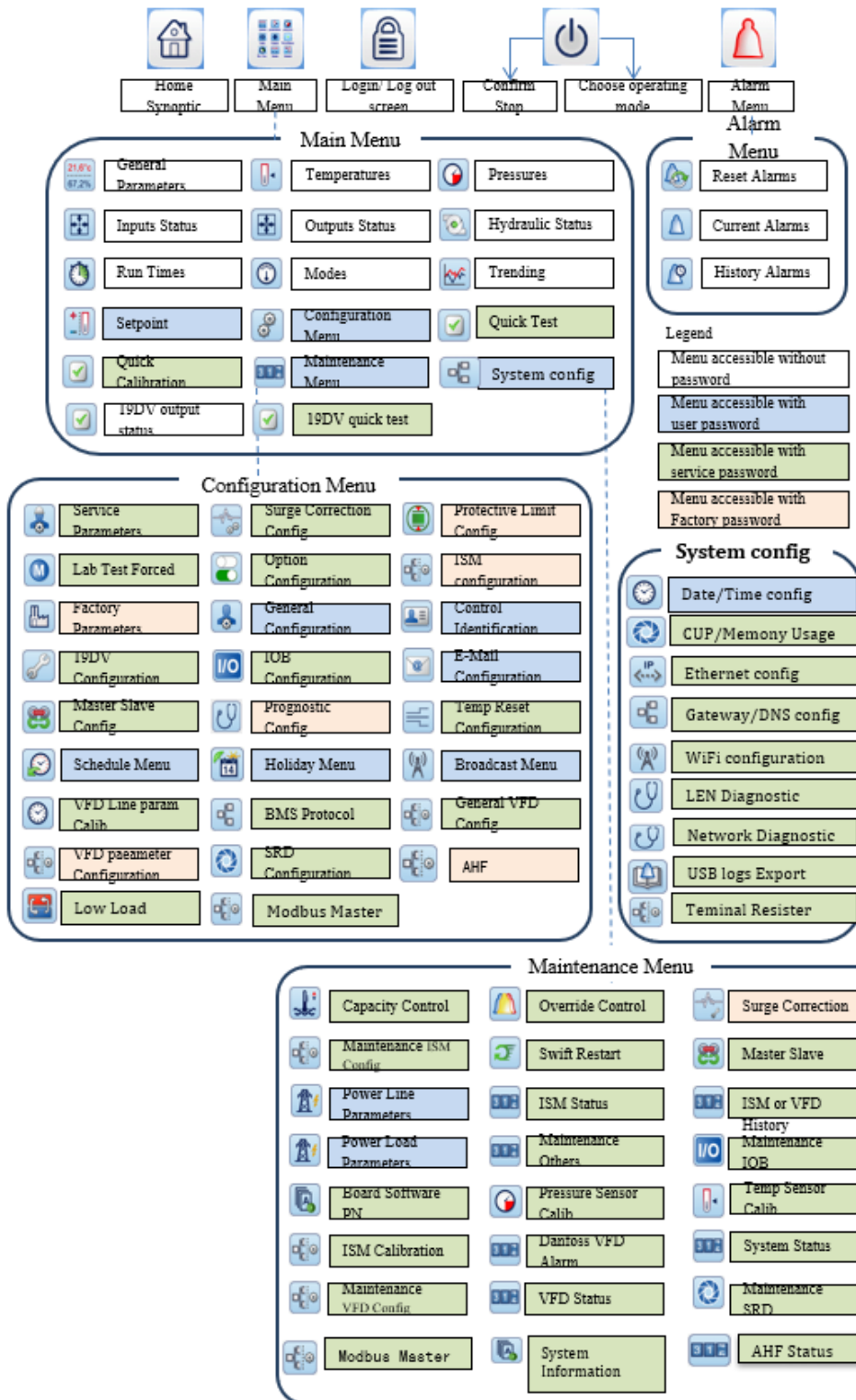
8 WEB UI

Access the SmartView™ control by entering the IP address in the web browser. Set the IP address of the component: 169.254.1.1, then the address accessed by the web browser address bar is <https://169.254.1.1>. This IP address can be modified in the web interface, and the access address in the address bar of the web browser must be changed accordingly.



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9 SCREEN STRUCTURE



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9.1. Detailed Menu Description

Icon	Displayed text*	Description	Access	Associated table
	General Parameters		ALL	GENUNIT
	Temperatures		ALL	TEMP
	Pressures		ALL	PRESSURE
	Inputs Status		ALL	INPUTS
	Outputs Status		ALL	OUTPUTS
	19DV Outputs Status		ALL	DV_OUT
	Hydraulic Status		ALL	HYDRLIC
	Run Times		ALL	RUNTIME
	Modes		ALL	MODES
	Setpoint		USER	SETPOINT
	Configuration Menu		USER	CONFIG
	Quick Test		SERVICE	QCK_TEST
	19DV Quick Test		SERVICE	QCK_DV

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	Maintenance Menu	USER	MAINTAIN
	Trending	ALL	
	Quick Calibration	SERVICE	QCK_CAL
	System Configuration	USER	SYSCONF

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



GENUNIT - General Parameters

	Name	Range	Default	Unit	Displayed text*
1	ctl_mode	0 to 3	0	-	Control Mode
2	blank	-	-	-	Local=0, Network=1
3	blank	-	-	-	Remote=2, Local Sched=3
4	cm_stas1	-	0	-	Compressor1 Run Status
5	statstop	STOP_START	STOP	-	Deter Start Stop Command
6	CHIL_S_S	DSABLE_ENABLE	DSABLE	-	Network:Cmd Start/Stop
7	CHIL_OCC	NO_YES	NO	-	Network:Cmd Occupied
8	HC_SEL	COOL_HEAT	COOL	-	Cooling/Heating Select
9	CTRL_PNT	-12.22 to 71.11	-12.22	° C	Control Point
		10 to 160	10	° F	
10	reset	-	0.00	^C	Control Point Reset
			0	^F	
11	setpoint	-	-17.78	° C	Actual Setpoint
			0		

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° F					
12	AMPS_P	-	0	%	Percent Current
13	KW_P	-	0	%	Motor Percent Kilowatts
14	cal_capa	-	0	%	Calculated Capacity
15	DEM_LIM	10 to 100	10	%	Actual Demand Limit
16	EMSTOP	DSABLE_ENABLE	DSABLE	-	BMS Emergency Stop
17	ch_state	-	0	-	Chiller Status Code
18	loc_occ	NO_YES	NO	-	Local Schedule Occupied
19	ice_occ	NO_YES	NO	-	Ice Schedule Occupied
20	ms_stsp	STOP_START	STOP	-	Master Slave Start Stop
21	REM_RST	NO_YES	NO	-	Remote Reset Alarm
22	STP_OVER	NO_YES	NO	-	Stop Override
23	FC_START	NO_YES	NO	-	Start Free Cooling
24	CF_START	NO_YES	NO	-	Start Condenser Flush
25	BAC_OCC	NO_YES	NO	-	BACnet Occupied

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



TEMP - Temperatures

	Name	Range	Default	Unit	Displayed text*
1	ECW	-	-17.78	° C	Entering Chilled Water
			0	° F	
2	LCW	-	-17.78	° C	Leaving Chilled Water
			0	° F	
3	ECDW	-	-17.78	° C	Entering Condenser Water
			0	° F	

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4	LCDW	-	-17.78	° C	Leaving Condenser Water
			0	° F	
5	HR_EWT	-	-17.78	° C	Heat Recl Entering Temp
			0	° F	
6	HR_LWT	-	-17.78	° C	Heat Recl Leaving Temp
			0	° F	
7	EVAP_SAT	-	-17.78	° C	Evap Sat Refrig Temp
			0	° F	
8	EVAP_T	-	-17.78	° C	Evap Refrig Liquid Temp
			0	° F	
9	evap_app	-	0.00	^C	Evaporator Approach
			0	^F	
10	cond_app	-	0.00	^C	Condenser Approach
			0	^F	
11	COND_SAT	-	-17.78	° C	Cond Sat Refrig Temp
			0	° F	
12	COND_T	-	-17.78	° C	Cond Refrig Vapor Temp
			0	° F	
13	PGC_SUCT	-	-17.78	° C	Purge Comp Suction Temp
			0	° F	
14	BRGI_SAT	-	-17.78	° C	BRG Ref Supply Sat Temp
			0	° F	
15	PGINTMP	-	-17.78	° C	Purge Inlet Temp
			0	° F	
16	DGT	-	-17.78	° C	Comp Discharge Temp

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			0	° F	
17	DSH	-	0.00	°C	Discharge Superheat
			0	°F	
18	MTRB_OIL	-	-17.78	° C	Thrust Bearing Oil Temp
			0	° F	
19	MTRB	-	-17.78	° C	Thrust Bearing Temp
			0	° F	
20	MTRB1	-	-17.78	° C	Low Speed ME Brg Temp
			0	° F	
21	MTRB2	-	-17.78	° C	Low Speed CE Brg Temp
			0	° F	
22	MTRB3	-	-17.78	° C	High Speed ME Brg Temp
			0	° F	
23	MTRB4	-	-17.78	° C	High Speed CE Brg Temp
			0	° F	
24	MTRW1	-	-17.78	° C	Motor Winding 1 Temp
			0	° F	
25	MTRW2	-	-17.78	° C	Motor Winding 2 Temp
			0	° F	
26	MTRW3	-	-17.78	° C	Motor Winding 3 Temp
			0	° F	
27	OILT_SMP	-	-17.78	° C	Oil Sump Temp
			0	° F	
28	OILT_DIS	-	-17.78	° C	Oil Supply Temp
			0	° F	

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29	LIFT_A	-	0.00	^C	Actual Lift
			0	^F	
30	LIFT_1	-	0.00	^C	VDO High Lift Load Line
			0	^F	
31	LIFT_2	-	0.00	^C	VDO Low Lift Load Line
			0	^F	
32	R_RESET	-	-17.78	° C	Remote Reset Temp
			0	° F	
33	CBH1_T	-	-17.78	° C	1st Stage Bearing Temp
			0	° F	
34	CBH2_T	-	-17.78	° C	2nd Stage Bearing Temp
			0	° F	
35	CHWS_T	-	-17.78	° C	Common CHWS Temp
			0	° F	
36	CHWR_T	-	-17.78	° C	Common CHWR Temp
			0	° F	

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



PRESSURE - Pressures

	Name	Range	Default	Unit	Displayed text*
1	EVAP_P	-	0.00	kPa	Evaporator Pressure
			0	PSIG	
2	COND_P	-	0.00	kPa	Condenser Pressure
			0	PSIG	
3	ECON_P	-	0.00	kPa	Economizer Pressure

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			0	PSIG	
4	OILP_DIS	-	0.00	kPa	Oil Supply Pressure
			0	PSIG	
5	OILP_SMP	-	0.00	kPa	Oil Sump Pressure
			0	PSIG	
6	OIL_PD	-	0.00	kPa	Oil Pump Delta P
			0	PSI	
7	pd_off	-34.48 to 20.69	0.00	kPa	Oil/Ref Delta P Offset
		-5 to 3	0	PSI	
8	DIFF_P	-	0.00	kPa	Diffuser Pressure
			0	PSIG	
9	HEAD_P	-	0.00	kPa	Head Pressure Reference
			0	PSI	
10	BRGI_P	-	0.00	kPa	Bearing Inlet Pressure
			0	PSIG	
11	BRGO_P	-	0.00	kPa	Bearing Outlet Pressure
			0	PSIG	
12	REF_PD	-	0.00	kPa	Bearing Delta P
			0	PSI	
13	PUMPO_P	-	0.00	kPa	Pump Outlet Pressure
			0	PSIG	
14	PUMPI_P	-	0.00	kPa	Pump Inlet Pressure
			0	PSIG	
15	PUMP_PD	-	0.00	kPa	Ref Pump Delta P
			0	PSI	

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

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INPUTS - Inputs Status

	Name	Range	Default	Unit	Displayed text*
1	STAR_AUX	OPEN_CLOSE	OPEN	-	Compressor Start Contact
2	RUN_AUX	OPEN_CLOSE	OPEN	-	Compressor Run Contact
3	DMP_FC	NO_YES	NO	-	ECO DMP VLV Full Close
4	DMP_FO	NO_YES	NO	-	ECO DMP VLV Full Open
5	DMP_ACT	-	0	-	ECO DMP VLV Status
6	blank	-	-	-	CI=0,Inter=1,Op=2,Fail=3
7	HGBP_FC	NO_YES	NO	-	EC/HG VLV Fully Close
8	HGBP_FO	NO_YES	NO	-	EC/HG VLV Fully Open
9	HGBP_ACT	-	0	-	EC/HG VLV Status
10	blank	-	-	-	CI=0,Inter=1,Op=2,Fail=3
11	HP_SW	OPEN_CLOSE	OPEN	-	High Pressure Switch
12	REM_CON	OPEN_CLOSE	OPEN	-	Remote Start/Stop
13	E_STOP	OPEN_CLOSE	OPEN	-	Emergency Stop Contact
14	ICE_CON	OPEN_CLOSE	OPEN	-	Ice Build Contact
15	REM_LOCK	OPEN_CLOSE	OPEN	-	Chiller Lockout
16	SAFETY	OPEN_CLOSE	OPEN	-	Spare Safety Input
17	STARTFLT	OPEN_CLOSE	OPEN	-	Starter Fault Feedback
18	FS_LOCK	OPEN_CLOSE	OPEN	-	Fire Security Interlock
19	GV1_OHMS	-	0	-	Guide Vane 1 Actual Ohms
20	GV1_ACT	-	0	%	Guide Vane 1 Actual Pos
21	GV2_ACT	-	0	%	Guide Vane 2 Actual Pos
22	VFD_ACT	-	0	%	Actual VFD Speed Per
23	DIFF_ACT	-	0	%	Diffuser Actual Pos

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24	AUTO_DEM	-	0	mA	Auto Demand Limit Input
25	AUTO_RES	-	0	mA	Auto Water Temp Reset
26	REF_LEAK	-	0	mA	Refrig Leakage Sensor
27	VFD_IN	-	0	V	VFD Speed Feedback
28	GV1_MA	-	0	mA	GV1 Pos Feedback
29	GV2_MA	-	0	mA	GV2 Pos Feedback
30	VFDC_MA	-	0	mA	VFD Current Input
31	DMP_ACTP	-	0	%	ECO DMP VLV Actual Pos
32	DMP_MA	-	0	mA	ECO DMP VLV Current FB
33	HGBPACTP	-	0	%	EC/HG VLV Actual Pos Per
34	HGBP_MA	-	0	mA	EC/HG VLV Current FB
35	TRIPR	OPEN_CLOSE	OPEN	-	ISM Trip Relay Status
36	SHAFTDIS	OPEN_CLOSE	OPEN	-	Displacement Switch
37	POW_FDB	NO_YES	NO	-	Marine Pwr Req Feedback
38	FC_SS	OFF_ON	OFF	-	Free Cool Start Switch
39	CUS_ALE	OPEN_CLOSE	OPEN	-	Customer Alert
40	PGLE_LO	OPEN_CLOSE	OPEN	-	Purge Level Switch Low
41	PGLE_HI	OPEN_CLOSE	OPEN	-	Purge Level Switch High
42	HF_LS	OPEN_CLOSE	OPEN	-	Liquid Level Switch

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



OUTPUTS - Outputs Status

	Name	Range	Default	Unit	Displayed text*
1	GV1_OUT	-	0	mA	Guide Vane1 Output
2	GV1_DEC	OFF_ON	OFF	-	Guide Vane 1 Decrease

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3	GV1_INC	OFF_ON	OFF	-	Guide Vane 1 Increase
4	VFD_OUT	-	0	mA	VFD Speed Output mA
5	OIL_HEAT	OFF_ON	OFF	-	Oil Heater Relay
6	OIL_PUMP	OFF_ON	OFF	-	Oil Pump Relay
7	CHST_OUT	-	0	mA	Chiller Status (Analog)
8	RUN_STAT	OFF_ON	OFF	-	Chiller Status(Discrete)
9	ALM	OFF_ON	OFF	-	Alarm Relay
10	ALE	OFF_ON	OFF	-	Alert Relay
11	COMP_SR	OFF_ON	OFF	-	Compressor Start Relay
12	vfd_lock	OFF_ON	OFF	-	Danfoss VFD Interlock
13	TRANS	OFF_ON	OFF	-	Starter Trans Sw Status
14	EXV_OUT	-	0	mA	Oil Cooler EXV mA
15	exv_tgt	-	0	%	Oil Cooler EXV Target
16	dmp_tgt	-	0	-	ECO DMP VLV Tgt Pos
17	blank	-	-	-	Close=0, Hold=1, Open=2
18	DMP_OUT	-	0	mA	ECO DMP VLV Output mA
19	DMP_CL	OFF_ON	OFF	-	ECO DMP VLV Close
20	DMP_OP	OFF_ON	OFF	-	ECO DMP VLV Open
21	VS_SV	OFF_ON	OFF	-	Vapor Source SV
22	LQBP_TGT	-	0	%	ECO LBP VLV Target
23	LQBP_VLV	-	0	mA	ECO LBP VLV mA
24	hgbp_tgt	-	0	-	EC/HG VLV Target Pos
25	blank	-	-	-	Close=0, Hold=1, Open=2
26	HGBP_OUT	-	0	mA	EC/HG VLV Output mA
27	HGBP_OFF	OFF_ON	OFF	-	EC/HG VLV Close
28	HGBP_ON	OFF_ON	OFF	-	EC/HG VLV Open

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29	hdpv_tgt	-	0	%	Head Pres Valve Tgt Pos
30	HDPV_OUT	-	0	mA	Head Pres Output mA
31	HDPV_OU2	-	0	mA	Head Pres2 Output mA
32	TFR_HIGH	OFF_ON	OFF	-	Tower Fan Relay High
33	TFR_LOW	OFF_ON	OFF	-	Tower Fan Relay Low
34	DIFF_OUT	-	0	mA	Diffuser Output mA
35	LLC_EXVO	-	0	mA	Liquid Level EXV Output
36	llc_exvt	-	0	%	Liquid Level EXV Target
37	OP_VFD	-	0	mA	Oil Pump VFD Output mA
38	op_vfd_t	-	0	%	Oil Pump VFD Target
39	POW_REQ	OFF_ON	OFF	-	Marine Pwr Req Output
40	FC_MODE	NO_YES	NO	-	Free Cooling Mode

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



DV_OUT - 19DV Outputs Status

	Name	Range	Default	Unit	Displayed text*
1	REF_PUMP	OFF_ON	OFF	-	Refrigerant Pump
2	GV2_OUT	-	0	mA	Guide Vane2 Output
3	ECBY_VLV	OFF_ON	OFF	-	ECO Liquid Bypass Valve
4	ECON_IV	OFF_ON	OFF	-	ECO Isolation VLV
5	COND_CV	OFF_ON	OFF	-	Cond Valve (Ref Lube)
6	EVAP_CV	OFF_ON	OFF	-	Evap Valve (Ref Lube)
7	EVAP_DCV	OFF_ON	OFF	-	Evaporator Drain Valve
8	COND_DCV	OFF_ON	OFF	-	Condenser Drain Valve
9	COND_PSV	OFF_ON	OFF	-	Purge Cond Valve

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10	COMP_PSV	OFF_ON	OFF	-	Purge Comp Valve
11	PUMP_PSV	OFF_ON	OFF	-	Purge Pumpout Valve
12	DRASVON	OFF_ON	OFF	-	Purge Drainage Valve
13	REG_PSV	OFF_ON	OFF	-	Purge Regeneration Valve
14	DIS_PSV	OFF_ON	OFF	-	Purge Discharge Valve
15	PGAPUMP	OFF_ON	OFF	-	Purge Vacuum Pump
16	PG_COMP	OFF_ON	OFF	-	Purge Compressor
17	PG_HEAT	OFF_ON	OFF	-	Purge Heater
18	DRA_IDLE	OFF_ON	OFF	-	Purge Idle Drainage VLV
19	FC_VALVE	OFF_ON	OFF	-	Free Cooling Valve
20	COND_FCV	OFF_ON	OFF	-	Cond Charging (Ref Lube)

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



HYDRLIC - Hydraulic Status

	Name	Range	Default	Unit	Displayed text*
1	CDWP	OFF_ON	OFF	-	Condenser Water Pump
2	CDW_FLOW	NO_YES	NO	-	Condenser Water Flow
3	CDW_FV	-	0.00	l/min	Cond Water Flow Value
			0	GPM	
4	COND_EWP	-	0.00	kPa	Entering Cond Water Pres
			0	PSIG	
5	COND_LWP	-	0.00	kPa	Leaving Cond Water Pres
			0	PSIG	
6	cdw_pd	-	0.00	kPa	Condenser Water Delta P
			0	PSI	

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7	cdw_off	-68.95 to 68.95 -10 to 10	0.00 0	kPa PSI	Condenser Delta P Offset
8	cdw_pull	-	0.00 0	^C ^F	Cond Water Pulldown/Min
9	CHWP	OFF_ON	OFF	-	Chilled Water Pump
10	CHW_FLOW	NO_YES	NO	-	Chilled Water Flow
11	CHW_FV	-	0.00 0	l/min GPM	Chilled Water Flow Value
12	EVAP_EWP	-	0.00 0	kPa PSIG	Entering Chilled Water P
13	EVAP_LWP	-	0.00 0	kPa PSIG	Leaving Chilled Water P
14	chw_pd	-	0.00 0	kPa PSI	Chilled Water Delta P
15	chw_off	-68.95 to 68.95 -10 to 10	0.00 0	kPa PSI	Chilled Delta P Offset
16	chw_pull	-	0.00 0	^C ^F	Chill Water Pulldown/Min
17	CHWF_IN	-	0	mA	Chilled Water Flow Input
18	CDWF_IN	-	0	mA	Cond Water Flow Input
19	CHW_PDMA	-	0	mA	Chilled Water Pres Drop
20	CDW_PDMA	-	0	mA	Cond Water Pres Drop
21	EVAP_FS	OPEN_CLOSE	OPEN	-	Evap Water Flow Switch
22	COND_FS	OPEN_CLOSE	OPEN	-	Cond Water Flow Switch
23	TFR_HI	OFF_ON	OFF	-	Tower Fan Relay High
24	TFR_LO	OFF_ON	OFF	-	Tower Fan Relay Low

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25	ctrlw_dt	-	0.00	^C	Controlled Water DT
			0	^F	
26	cdw_fl_s	0 to 2	0	-	Cond Flow Status
27	blank	-	-	-	Failed or Not Started=0
28	blank	-	-	-	Success=1, Verifying=2
29	chw_fl_s	0 to 2	0	-	Chilled Flow Status
30	blank	-	-	-	Failed or Not Started=0
31	blank	-	-	-	Success=1, Verifying=2
32	pdown_st	0 to 255	0	-	Pumpdown/Lockout State

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



RUNTIME - Run Times

	Name	Range	Default	Unit	Displayed text*
1	ST_CNT12	-	0	-	Starts Num in 12 Hours
2	C_STARTS	0 to 65535	0	-	Compressor Starts Num
3	COMP_MIN	0 to 99999999	0	min	Comp Running Time
4	COMP_HRS	0 to 500000	0	hours	Comp Total Running Hrs
5	SRV_HRS	0 to 500000	0	hours	After Service Hrs
6	spst_tim	-	0	min	Stop to Start Timer
7	stst_tim	-	0	min	Start to Start Timer
8	oilb_dur	-	0	hours	Oil Lubrication Duration
9	oilstdur	-	0	hours	Oil Storage Duration
10	RCYSTCNT	-	0	-	Recy Startup in 4 Hours
11	SWIFTCNT	-	0	-	Swift Restarts in 1 Hour
12	PGP_NO	-	0	-	Total Pumpout Numbers

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13	PGP_TM	-	0	min	Total Pumpout Time
14	pgp_tm_d	-	0	min	Purge Pumpout in 24 Hrs
15	pgp_tm_w	-	0	min	Avg Daily Purge in 7 Day
16	uptime	-	0	-	Controller Uptime
17	blank	-	-	-	day - hour : minute
18	last_rr	0 to 4	0	-	Last Reboot Reason

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



MODES - Modes

	Name	Range	Default	Unit	Displayed text*
1	shut_nor	NO_YES	NO	-	Normal Shutdown
2	shut_rcy	NO_YES	NO	-	Recycle Shutdown
3	shut_alm	NO_YES	NO	-	Alarm Shutdown
4	str_rcy	NO_YES	NO	-	Recycle Startup
5	tmp_ramp	NO_YES	NO	-	Temperature Ramping
6	ld_ramp	NO_YES	NO	-	Load Ramping
7	gv1_inh	NO_YES	NO	-	IGV1 Inhibiting
8	ice_act	NO_YES	NO	-	Ice Building
9	ice_term	NO_YES	NO	-	Ice Build Terminated
10	ice_rcy	NO_YES	NO	-	Ice Build Recy Startup
11	ramp_act	NO_YES	NO	-	Ramp Loading
12	dem_act	NO_YES	NO	-	Demand Limit
13	vfdrpact	NO_YES	NO	-	VFD Rampdown
14	dem_inh	NO_YES	NO	-	Demand Limit Inhibit
15	evapfrze	NO_YES	NO	-	Evaporator Frozen

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16	condfrze	NO_YES	NO	-	Condenser Frozen
17	rcysh_cm	NO_YES	NO	-	Recycle Shutdown Done
18	nrysh_cm	NO_YES	NO	-	NonRecycle Shutdown Done
19	alm_act	NO_YES	NO	-	In Alarm
20	over_act	NO_YES	NO	-	In Override
21	pg_act	NO_YES	NO	-	Purge Active
22	cm_stat1	-	0	-	Comp1 Run State Val

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



SETPOINT - Setpoint

	Name	Range	Default	Unit	Displayed text*
1	ecw_sp	-9.44 to 48.89	15.56	° C	Cooling ECW Setpoint
		15 to 120	60	° F	
2	lcw_sp	-12.22 to 48.89	7.22	° C	Cooling LCW Setpoint
		10 to 120	45	° F	
3	ecdw_sp	17.22 to 65.56	40.00	° C	Heating ECDW Setpoint
		63 to 150	104	° F	
4	lcdw_sp	20.00 to 65.56	45.00	° C	Heating LCDW Setpoint
		68 to 150	113	° F	
5	ice_sp	-9.44 to 15.56	4.44	° C	Ice Build Setpoint
		15 to 60	40	° F	
6	dem_base	10 to 100	100	%	Base Demand Limit
7	EWT_OPT	DSABLE_ENABLE	DSABLE	-	EWT Control Option

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9.2. Configuration Menu

Icon	Displayed text*	Description	Access	Associated table
	Factory		FACTORY	FACTORY
	Service Parameters		SERVICE	SERVICE1
	Surge Correction		SERVICE	CFGSURGE
	Protective Limit		FACTORY	CFGLIMIT
	Option		SERVICE	CONF_OPT
	Option 2		SERVICE	CONFOPT2
	VFD Parameters		FACTORY	CFGUMVFD
	General		USER	GENCONF
	Control Identification		USER	
	19DV		SERVICE	CFG_19DV
	General VFD		SERVICE	CFGGEVFD

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



FACTORY - Factory

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	Name	Range	Default	Unit	Displayed text*
1	chil_typ	0 to 3	0	-	Chiller Type
2	blank	-	-	-	19XR6/7=0
3	blank	-	-	-	19XR2~5/C/D/E/V=1
4	blank	-	-	-	19DV=2
5	blank	-	-	-	19XRF=3
6	vfd_opt	0 to 9	0	-	VFD/Starter Option
7	blank	-	-	-	Starter with ISM = 0
8	blank	-	-	-	FS VFD with ISM = 1
9	blank	-	-	-	Carrier 32VS VFD = 2
10	blank	-	-	-	Rockwell LF2 VFD = 3
11	blank	-	-	-	Eaton VFD = 4
12	blank	-	-	-	Rockwell STD VFD = 5
13	blank	-	-	-	Danfoss VFD = 7
14	blank	-	-	-	Benshaw Starter = 8
15	blank	-	-	-	STEP HV VFD = 9
16	unit_typ	0 to 1	0	-	Unit Type
17	blank	-	-	-	Cool Only=0, Heat Mach=1
18	ref_typ	0 to 2	0	-	Refrigerant Type
19	blank	-	-	-	R134a=0,R513A=1,R515A=2
20	comp_typ	0 to 1	1	-	Comp(1Stage=0, 2Stage=1)
21	chmedium	WATER_BRINE	WATER	-	Chilled Medium Type
22	cond_typ	0 to 1	0	-	Cond Refrig Shell MAWP
23	blank	-	-	-	185PSI=0, 300PSI=1
24	comp_pre	0 to 1	0	-	Comp Refrig Press
25	blank	-	-	-	44PSI=0, 72PSI=1

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26	coun_cod	0 to 999	86	-	Country Code
27	gv1_type	0 to 1	0	-	Guide Vane1 Type
28	blank	-	-	-	Digital=0, Analog=1
29	dmp_type	0 to 1	0	-	ECO DMP VLV Type
30	blank	-	-	-	Op/Cl=0, Analog=1
31	vfd_fdv	0 to 1	0	-	VFD Feedback Voltage Sel
32	blank	-	-	-	0-5V=0, 0-10V=1
33	hr_opt	0 to 2	0	-	Heat Reclaim Option
34	blank	-	-	-	No=0, Full=1, Partial=2

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



SERVICE1 - Service Parameters

	Name	Range	Default	Unit	Displayed text*
1	atom_pre	55.16 to 103.43	99.98	kPa	Atmospheric Pressure
		8 to 15	14.5	PSI	
2	gv1_lim	30 to 100	80.7	%	GV1 Travel Limit
3	gv1stpos	0 to 40	4	%	GV1 Closure at Startup
4	max_gv	1 to 4	2	%	Maximum GV Movement
5	ctrl_db	0.28 to 1.11	0.56	^C	Controlled Fluid DB
		0.5 to 2	1	^F	
6	ewtdgain	1 to 3	2	-	Derivated EWT Gain
7	gv1decdb	2 to 10	6	-	Proportional Dec Band
8	gv1incdb	2 to 10	6.5	-	Proportional Inc Band
9	dem_20ma	10 to 100	40	%	Demand Limit at 20 mA
10	dem_pdb	3 to 15	10	%	Demand Limit Prop Band
11	ldramprt	5 to 20	5	%	Amps or KW Ramp per Min

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12	tmramp	0.56 to 5.56 1 to 10	1.67 3	^C ^F	Temp Ramp per Min
13	rcysh_dt	0.28 to 2.22 0.5 to 4	0.56 1	^C ^F	Recycle Shutdown Delta T
14	rcyst_dt	1.11 to 5.56 2 to 10	5.56 10	^C ^F	Recycle Restart Delta T
15	dmp_min	0 to 30	2	%	ECO DMP VLV Min Pos
16	dmp_max	60 to 100	85	%	ECO DMP VLV Max Pos
17	dmp_step	1.5 to 20	5	%	ECO DMP VLV Speed Step
18	dmp_intv	5 to 30	10	sec	ECO DMP VLV Out Interval
19	dmp_alm	60 to 600	180	sec	ECO DMP VLV Fault Time
20	dmp_dly	1 to 5	2	min	ECO DMP VLV Act Delay
21	dmp_cldb	13.79 to 68.95 2 to 10	34.48 5	kPa PSI	ECO DMP VLV Close DB
22	dmp_opdb	68.95 to 137.90 10 to 20	89.64 13	kPa PSI	ECO DMP VLV Open DB
23	dmp_gain	0 to 10	1	-	ECO DMP VLV Gain
24	dmp_dt	2.22 to 5.56 4 to 10	3.89 7	^C ^F	ECO DMP VLV Act Delta T
25	oilpvr_t	15 to 300	180	sec	Lub Press Verify Time
26	wflow_t	0.5 to 5	5	min	Water Flow Verify Time
27	sf_st_th	40 to 100	100	%	Soft Stop Amps Threshold
28	mbb_pfcl	0.5 to 2	1	-	Power Calibration Factor
29	ex_start	NO_YES	NO	-	Enable Excessive Starts
30	oilstiro	0 to 3	1	-	Oil Stir Cycle(19XR6/7)
31	blank	-	-	-	No Stir=0, 30s/30m=1,

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32	blank	-	-	-	1m/4h=2, Comb. 0&1=3
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*Depends on the selected language (English by default).



CFGSURGE - Surge Correction

	Name	Range	Default	Unit	Displayed text*
1	sgl_cfg	0 to 1	0	-	Surge Line Configuration
2	blank	-	-	-	PR = 0, Delta T = 1
3	gv1c_sel	0 to 1	0	-	IGV1 Pos Configuration
4	blank	-	-	-	Degree =0, Percentage =1
5	dts_max	0.00 to 83.33	38.89	^C	Surge Delta Tmax
		0 to 150	70	^F	
6	dts_min	0.00 to 83.33	25.00	^C	Surge Delta Tmin
		0 to 150	45	^F	
7	pr_ful	1 to 5	3	-	PR at Full Load Opening
8	pr_min	1 to 5	1.5	-	PR at Minimum Opening
9	gv1_dful	80 to 120	88	-	IGV1 Full Load Open Deg
10	gv1_dmed	10 to 40	27	-	Sound Ctrl IGV1 Open Deg
11	gv1_dmin	0 to 10	2	-	IGV1 Minimum Open Deg
12	gv1_dmax	90 to 120	109	-	IGV1 Actuator Max Deg
13	gv1_pmin	0 to 100	5	%	IGV1 Minimum Position
14	gv1_pful	0 to 100	100	%	IGV1 Full Load Position
15	sgl_off	0.56 to 1.67	0.83	^C	Surge Line Offset
		1 to 3	1.5	^F	
16	sgl_loff	0.28 to 1.67	0.56	^C	Surge Line Lower DB
		0.5 to 3	1	^F	
17	sgl_hoff	0.06 to 1.67	0.56	^C	Surge Line Upper DB

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		0.1 to 3	1	^F	
18	sgl_shfh	-0.06 to 0	-0.01	-	Surge Line Shape Factor
19	sgl_shfl	0 to 0.2	0.06	-	Sound Line Shape Factor
20	sgl_dmin	1.2 to 5	1.6	-	Sound DTSmin Factor
21	sgl_spdf	0 to 3	2	-	Surge Line Speed Factor
22	surg_del	0 to 120	45	sec	Surge Delay Time
23	surge_t	7 to 10	8	min	Surge Time Period
24	surge_a	5 to 40	10	%	Surge Delta Amps %
25	rd_fact	0 to 1	0.1	-	Rampdown Factor
26	gvstp_sg	1 to 3	2	%	GV1 Close Step Surge
27	vfdstpsg	1 to 5	1.5	%	VFD Speed Step Surge
28	hgbpstsg	1 to 10	4	%	EC/HG VLV Step Surge
29	sgl_step	0.00 to 1.11	0.56	^C	Surge Profile Step
		0 to 2	1	^F	
30	sgl_pro	0.00 to 2.78	0.00	^C	Surge Profile Offset
		0 to 5	0	^F	
31	high_eff	DSABLE_ENABLE	ENABLE	-	High Efficiency Mode
32	noi_alt	DSABLE_ENABLE	DSABLE	-	High Noise Alert
33	sal_enb	DSABLE_ENABLE	DSABLE	-	Surge AI Enable
34	sal_sw	0 to 0	0	-	Surge AI Act Sw
35	ret_sw	0 to 10000	0	-	Surge AI Reset Sw
36	cor_sw	0 to 10000	0	-	Surge AI Correct Sw
37	t_surge	0 to 100	1.05	-	AI Surge Threshold
38	count_sg	0 to 200	30	-	AI Counts Bf Shutd
39	gv_skip	DSABLE_ENABLE	DSABLE	-	GV Jumpover Option
40	gvstall1	-	13.5	%	GV Opening 1

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41	gvliftm1	-	19.50	^C	DTS@GV Opening 1
			35.1	^F	
42	gvstall2	-	15.5	%	GV Opening 2
43	gvliftm2	-	30.50	^C	DTS@GV Opening 2
			54.9	^F	
44	gv_db	-	2.5	%	GV Jumpover Range
45	gv_delay	-	5	%	GV Jumpover Delay
46	gv_sk_th	-	0.50	^C	Max Temp Deviation -
			0.9	^F	
47	gv_sk_tl	-	0.61	^C	Max Temp Deviation +
			1.1	^F	

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



CFGLIMIT - Protective Limit

	Name	Range	Default	Unit	Displayed text*
1	evap_al	0.28 to 8.33	2.78	^C	Evap Approach Alert
		0.5 to 15	5	^F	
2	cond_al	0.28 to 8.33	3.33	^C	Cond Approach Alert
		0.5 to 15	6	^F	
3	cpov_lo	620.55 to 1,082.52	965.30	kPa	Cond Press Override Low
		90 to 157	140	PSIG	
4	cpov_hi	1,379.00 to 1,827.18	1,723.75	kPa	Cond Press Override High
		200 to 265	250	PSIG	
5	cpcut_lo	1,103.20 to 1,137.68	1,103.20	kPa	Cond Press Cutout Low
		160 to 165	160	PSIG	

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6	cpcut_hi	1,861.65 to 1,896.13 270 to 275	1,896.13 275	kPa PSIG	Cond Press Cutout High
7	ert_ovdt	1.11 to 2.78 2 to 5	1.67 3	^C ^F	Evap Override Delta T
8	ert_trip	-17.78 to 4.44 0 to 40	0.56 33	° C ° F	Evap Refrig Trippoint
9	high_lfp	DSABLE_ENABLE	DSABLE	-	High Lift Freeze Protect
10	ep_ov	620.55 to 1,082.52 90 to 157	965.30 140	kPa PSIG	High Evap Press Override
11	ep_cut	1,103.20 to 1,172.15 160 to 170	1,137.68 165	kPa PSIG	High Evap Press Cutout
12	ep_ovdv	137.90 to 386.12 20 to 56	379.23 55	kPa PSIG	Hi Evap Pre Override DV
13	ep_cutdv	406.81 to 415.77 59 to 60.3	406.81 59	kPa PSIG	Hi Evap Pre Cutout DV
14	cpov_dl	124.11 to 399.22 18 to 57.9	186.17 27	kPa PSIG	Cond Pre Override DV 44
15	cpcut_dl	206.85 to 415.77 30 to 60.3	206.85 30	kPa PSIG	Cond Pre Cutout DV 44
16	cpov_dh	137.90 to 386.12 20 to 56	379.23 55	kPa PSIG	Cond Pre Override DV 72
17	cpcut_dh	406.81 to 415.77 59 to 60.3	406.81 59	kPa PSIG	Cond Pre Cutout DV 72
18	cdfreeze	-28.89 to 1.67 -20 to 35	1.11 34	° C ° F	Condenser Freeze Point

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19	dgt_alrt	51.67 to 93.33	93.33	° C	Comp Discharge Alert
		125 to 200	200	° F	
20	mt_over	65.56 to 93.33	93.33	° C	Comp Motor Temp Override
		150 to 200	200	° F	
21	tb_alert	68.33 to 79.44	79.44	° C	Comp Bearing Temp Alert
		155 to 175	175	° F	
22	tb_trip	79.44 to 85.00	85.00	° C	Comp Bearing Temp Trip
		175 to 185	185	° F	
23	brg_fact	1 to 3	1	-	Comp Bearing Factor
24	tb_alt2	85.00 to 98.89	98.89	° C	Comp Bearing Alert R6/7
		185 to 210	210	° F	
25	tb_trip2	98.89 to 104.44	104.44	° C	Comp Bearing Trip R6/7
		210 to 220	220	° F	
26	tb_alt3	32.22 to 48.89	40.00	° C	Comp Bearing Alert DV
		90 to 120	104	° F	
27	tb_trip3	49.44 to 65.56	50.00	° C	Comp Bearing Trip DV
		121 to 150	122	° F	
28	bri_min	-12.22 to 1.11	1.11	° C	Minimum Brine LWT
		10 to 34	34	° F	
29	lwtp_sp	5.00 to 10.00	6.00	° C	Heating LWT Protect Set
		41 to 50	42.8	° F	
30	evap_cut	3.45 to 344.75	34.48	kPa	Evap Flow Delta P Cutout
		0.5 to 50	5	PSI	
31	cond_cut	3.45 to 344.75	34.48	kPa	Cond Flow Delta P Cutout
		0.5 to 50	5	PSI	

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32	cond_val	3.45 to 344.75	344.75	kPa	Cond Hi Flow DP Limit
		0.5 to 50	50	PSI	
33	cond_alm	DSABLE_ENABLE	DSABLE	-	Cond Hi Flow Alarm
34	inv_ov	37.78 to 204.44	93.33	° C	Inverter Temp Override
		100 to 400	200	° F	

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



CONF_OPT - Option

	Name	Range	Default	Unit	Displayed text*
1	astart	DSABLE_ENABLE	ENABLE	-	Auto Restart Option
2	blank	-	-	-	
3	swistart	DSABLE_ENABLE	DSABLE	-	Swift Restart Option
4	gt_fact	0.25 to 3	1	-	Gas Torque Factor
5	gv_srd_f	0.7 to 1.2	0.95	-	Guide Vane/SRD Factor
6	pd_tcfg	0 to 60	15	min	Power Recovery Timeout
7	commsens	DSABLE_ENABLE	DSABLE	-	Common Sensor Option
8	hgbp_opt	0 to 3	0	-	EC/HG Valve Option
9	blank	-	-	-	No=0, Cont.=1,
10	blank	-	-	-	ON/OFF=2, mA=3
11	hgbp_sel	0 to 3	0	-	EC/HG Valve Selection
12	blank	-	-	-	Disable=0, Surge=1
13	blank	-	-	-	Low Load=2, Comb=3
14	hpop_gv1	0.5 to 10	5	%	EC/HG VLV Open IGV1 Pos
15	hgcl_gv1	1.5 to 35	10	%	EC/HG VLV Close IGV1 Pos
16	hgbp_ldb	0.28 to 1.11	0.56	^C	EC/HG VLV Low Load DB
		0.5 to 2	1	^F	

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17	hdpv_opt	DSABLE_ENABLE	DSABLE	-	HPR VLV Option
18	hdp_0	0.00 to 586.08	172.38	kPa	HPR VLV Delta Pos 0%
		0 to 85	25	PSI	
19	hdp_100	0.00 to 586.08	344.75	kPa	HPR VLV Delta Pos 100%
		0 to 85	50	PSI	
20	hdpv_min	0 to 100	0	%	HPR VLV Min Output
21	hdpv_db	0.00 to 68.95	6.90	kPa	HPR VLV Deadband
		0 to 10	1	PSIG	
22	tfh_sp	12.78 to 40.56	23.89	° C	Tower Fan High Setpoint
		55 to 105	75	° F	
23	leak_en	DSABLE_ENABLE	DSABLE	-	Refrig Leakage Option
24	leak_ma	4 to 20	20	mA	Refrig Leakage Alarm mA
25	exv_opt	DSABLE_ENABLE	DSABLE	-	Oil Cooler EXV Option
26	oil_high	37.78 to 60.00	50.00	° C	Oil Temp High Threshold
		100 to 140	122	° F	
27	oil_low	32.22 to 54.44	45.00	° C	Oil Temp Low Threshold
		90 to 130	113	° F	
28	cusa_opt	DSABLE_ENABLE	DSABLE	-	Customer Alert Option
29	ice_opt	DSABLE_ENABLE	DSABLE	-	Ice Build Option
30	ice_recy	DSABLE_ENABLE	DSABLE	-	Ice Build Recycle
31	ice_term	0 to 2	0	-	Ice Build Termin Source
32	blank	-	-	-	Temp=0,Contact=1,Both=2
33	opvfdmax	241.33 to 413.70	344.75	kPa	Oil Pump VFD Max PD
		35 to 60	50	PSI	
34	opvfdstp	0 to 10	7	%	Oil Pump VFD Max Step
35	vssv_opt	DSABLE_ENABLE	DSABLE	-	Vapor Source SV Option

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36	vssv_dly	0 to 10	5	min	Vapor Source SV Delay
37	evap_t_o	DSABLE_ENABLE	ENABLE	-	Evap Liquid Temp Opt
38	evap_ref	0 to 1	1	-	Evap App Calc Selection
39	blank	-	-	-	Sat Temp=0, Ref Temp=1

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



CONFOT2 - Option 2

	Name	Range	Default	Unit	Displayed text*
1	iob3_opt	NO_YES	NO	-	IOB3 Option
2	iob4_opt	NO_YES	NO	-	IOB4 Option
3	freecool	NO_YES	NO	-	Free Cooling Option
4	blank	-	-	-	
5	wp_opt	0 to 2	0	-	Water Pressure Option
6	blank	-	-	-	No=0,
7	blank	-	-	-	WTR Flow PD TRD=1,
8	blank	-	-	-	WTR Flow PD TRM=2
9	wfm_opt	0 to 3	0	-	Water Flow Measurement
10	blank	-	-	-	No=0,
11	blank	-	-	-	WTR Flow MTR=1,
12	blank	-	-	-	WTR Flow PD=2
13	fs_opt	0 to 2	0	-	Water Flow Determination
14	blank	-	-	-	Sat Temp=0,Flow Switch=1
15	blank	-	-	-	WTR Flow PD=2
16	flow4ma	0.00 to 45,420.00	0.00	l/min	Water Flow at 4mA
		0 to 12000	0	GPM	
17	flow20ma	0.00 to 45,420.00	0.00	l/min	Water Flow at 20mA

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		0 to 12000	0	GPM	
18	chwf_bas	0.00 to 34,065.00	0.00	l/min	Evap Flow Rate Baseline
		0 to 9000	0	GPM	
19	evpd_bas	0.00 to 137.90	0.00	kPa	Evap Pres Drop Baseline
		0 to 20	0	PSI	
20	cdwf_bas	0.00 to 34,065.00	0.00	l/min	Cond Flow Rate Baseline
		0 to 9000	0	GPM	
21	cdpd_bas	0.00 to 137.90	0.00	kPa	Cond Pres Drop Baseline
		0 to 20	0	PSI	
22	wpd_20ma	68.95 to 275.80	68.95	kPa	Water Pres Drop @20mA
		10 to 40	10	PSI	
23	blank	-	-	-	
24	mrn_opt	DSABLE_ENABLE	DSABLE	-	Marine Option
25	mrn_pt	DSABLE_ENABLE	DSABLE	-	Marine Transducer Option
26	pr_opt	DSABLE_ENABLE	DSABLE	-	Marine Pwr Req Option
27	cpr_opt	DSABLE_ENABLE	DSABLE	-	Marine Cont. Pwr Req
28	cfa_opt	DSABLE_ENABLE	DSABLE	-	Condenser Flush Alert

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



CFGUMVFD - VFD Parameters

	Name	Range	Default	Unit	Displayed text*
1	comp_hz	47 to 200	50	Hz	Compressor Speed 100%
2	rlv_i	200 to 13800	460	V	Rated Line Voltage
3	rla	10 to 2000	200	A	Motor Nameplate Current
4	rla_load	10 to 2000	200	A	Motor Rated Load Current
5	rlv	200 to 13800	460	V	Motor Nameplate Voltage

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6	rpm	0 to 8000	3000	rpm	Motor Nameplate RPM
7	rlkw	0 to 5600	1500	kW	Motor Nameplate KW
8	skipfrq1	0 to 102	30	Hz	Skip Frequency 1
9	skipfrq2	0 to 102	30	Hz	Skip Frequency 2
10	skipfrq3	0 to 102	30	Hz	Skip Frequency 3
11	skipband	0 to 102	0	Hz	Skip Frequency Band
12	ramp_inc	5 to 60	30	sec	Increase Ramp Time
13	ramp_dec	5 to 60	30	sec	Decrease Ramp Time
14	lvim_th	1 to 10	10	%	Line Voltage Imbalance%
15	lvim_per	1 to 10	10	sec	Line Volt Imbalance Time
16	lcim_th	5 to 40	40	%	Line Current Imbalance%
17	lcim_per	1 to 10	10	sec	Line Current Imbal Time
18	mcim_th	5 to 40	40	%	Motor Current Imbalance
19	mcim_per	1 to 10	10	sec	Motor Current Imbal Time
20	scycd_en	DSABLE_ENABLE	DSABLE	-	Single Cycle Dropout
21	pwm_freq	0 to 1	0	-	PWM Switch Frequency
22	blank	-	-	-	2KHz=0, 4KHz=1
23	unit_byp	DSABLE_ENABLE	DSABLE	-	Unit Bypass Option
24	syst_byp	DSABLE_ENABLE	DSABLE	-	System Bypass Option
25	com_tout	0 to 255	10	sec	Communication Timeout
26	res_def	NO_YES	NO	-	Restore Defaults

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



GENCONF - General

	Name	Range	Default	Unit	Displayed text*
1	min_off	1 to 15	3	min	Stop to Start Delay

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2	strt_dly	4 to 45	15	min	Start to Start Delay
3	dem_sel	0 to 1	0	-	Demand Limit Type
4	blank	-	-	-	Base Demand=0, 4-20mA=1
5	rampslect	0 to 1	1	-	Pulldown Ramp Type
6	blank	-	-	-	Temp=0, Load=1
7	DEM_SLCT	0 to 1	0	-	Demand Limit Source
8	blank	-	-	-	Amps=0, KW=1

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



CFG_19DV - 19DV

	Name	Range	Default	Unit	Displayed text*
1	sen_opt	0 to 3	0	-	Pressure Sensor Type
2	blank	-	-	-	Tianmu=0, Texas=1
3	blank	-	-	-	Sensata=2
4	pg_opt	DSABLE_ENABLE	DSABLE	-	Purge System Option
5	pgt_set	-1.11 to 148.89	18.33	° C	Purge Active Temp SP
		30 to 300	65	° F	
6	pgon_opt	DSABLE_ENABLE	DSABLE	-	Purge on Idle Option
7	reg_tim	-	120	min	Purge Regen Lasting Time
8	dis_temp	-17.78 to -9.44	-15.56	° C	Purge Discharge Temp
		0 to 15	4	° F	
9	dra_temp	-15.00 to -6.67	-11.11	° C	Purge Drainage Temp
		5 to 20	12	° F	
10	dis_time	5 to 20	5	sec	Purge Discharge Time
11	dly_time	10 to 40	30	sec	PG Discharge Delay Time

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12	dis_wt	0 to 40	1	min	PG Discharge Wait Time
13	pgpump1m	20 to 200	50	min	Daily PG Pumpout Limit
14	mot_pol	1 to 2	1	-	Motor Pole Pair
15	blank	-	-	-	Single=1, Double=2
16	gv2_lim	30 to 100	96	%	IGV2 Travel Limit
17	gv2_dmin	0 to 20	2	-	IGV2 Minimum Degree
18	gv2_dful	10 to 100	90	-	IGV2 Full Load Open Deg
19	gv2_dmax	90 to 120	94	-	IGV2 Actuator Max Deg
20	gv2_d20	10 to 30	28.1	-	IGV2 Deg @IGV1 20 Deg
21	gv2_d30	10 to 50	37.2	-	IGV2 Deg @IGV1 30 Deg
22	gv2_d50	10 to 80	71.6	-	IGV2 Deg @IGV1 50 Deg
23	vfd_ratf	10 to 200	80.5	Hz	Comp Based Speed Hz
24	lega_lub	DSABLE_ENABLE	DSABLE	-	4-valve Lube(Legacy DV4)
25	opt_7	DSABLE_ENABLE	DSABLE	-	Pre Lube from Colder HX
26	brg_th	0.00 to 206.85	55.16	kPa	Bearing Press Thresholds
		0 to 30	8	PSI	
27	blank	-	-	-	(Only for Legacy DV4)

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



CFGGEVFD - General VFD

	Name	Range	Default	Unit	Displayed text*
1	comp_100	45 to 500	50	Hz	Comp Frequency 100%
2	vfd_gain	0.1 to 1.5	0.75	-	VFD Gain
3	vfd_max	90 to 110	100	%	VFD Max Speed Per
4	vfd_min	45 to 100	70	%	VFD Min Speed Per
5	vfd_str	65 to 100	100	%	VFD Startup Speed Per

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6	vfdculm	0 to 99999	250	A	VFD Current Limit
7	vfd_ldap	DSABLE_ENABLE	ENABLE	-	VFD Load Current Input
8	vfdc20ma	10 to 5000	200	A	VFD Load Current 20mA

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

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9.3. Quick Test Menu



QCK_TEST - Quick Test

	Name	Range	Default	Unit	Displayed text*
1	QCK_TEST	DSABLE_ENABLE	DSABLE	-	Quick Test Enable
2	Q_OILH	OFF_ON	OFF	-	Oil Heater
3	Q_OILP	OFF_ON	OFF	-	Oil/Ref Pump
4	OP_PASS	NO_YES	NO	-	Oil/Ref Pres Test Passed
5	OIL_PDQ	-	0.00	kPa	Oil/Ref Pump Delta Press
			0	PSI	
6	Q_EXV	0 to 100	0	%	Oil Cooler EXV
7	Q_HDP	0 to 100	0	%	HPR VLV Position
8	Q_CHST	4 to 20	4	mA	Chiller Status (Analog)
9	Q_RUN_ST	OFF_ON	OFF	-	Chiller Status(Discrete)
10	Q_GV1POS	0 to 100	0	%	Guide Vane 1 Pos
11	Q_GV1OP	OFF_ON	OFF	-	Guide Vane 1 Open
12	Q_GV1CL	OFF_ON	OFF	-	Guide Vane 1 Close
13	Q_GV1ACT	-	0	%	Guide Vane 1 Actual Pos
14	Q_GVSRD	DSABLE_ENABLE	DSABLE	-	GV1/SRD Joint Test
15	Q_SRD	0 to 100	0	%	Diffuser Pos
16	Q_DIFTGT	-	0	%	Diffuser Target Pos
17	Q_HGBPOP	OFF_ON	OFF	-	EC/HG VLV Open
18	Q_HGBPCL	OFF_ON	OFF	-	EC/HG VLV Close
19	Q_HGBP_T	0 to 100	0	%	EC/HG VLV Position
20	Q_DMP_T	0 to 100	0	%	ECO DMP VLV Pos
21	Q_DMPOP	OFF_ON	OFF	-	ECO DMP VLV Open

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22	Q_DMPCL	OFF_ON	OFF	-	ECO DMP VLV Close
23	Q_ALM	OFF_ON	OFF	-	Alarm Output
24	Q_ALE	OFF_ON	OFF	-	Alert Output
25	Q_CDWP	OFF_ON	OFF	-	Condenser Water Pump
26	CDW_FLOW	NO_YES	NO	-	Condenser Water Flow
27	CDW_DT	-22.22 to 136.11	0.00	^C	Condenser Water Delta T
		-40 to 245	0	^F	
28	Q_CHWP	OFF_ON	OFF	-	Chilled Water Pump
29	CHW_FLOW	NO_YES	NO	-	Chilled Water Flow
30	CHW_DT	-22.22 to 136.11	0.00	^C	Chilled Water Delta T
		-40 to 245	0	^F	
31	Q_LLCEXV	0 to 100	0	%	Liquid Level EXV
32	Q_VSSV	OFF_ON	OFF	-	ECO Vapor SV
33	Q_LQBP	4 to 20	4	mA	ECO LBP VLV mA
34	Q_FCMODE	OFF_ON	OFF	-	Free Cooling Mode
35	Q_LOWFAN	OFF_ON	OFF	-	Low Speed Tower Fan
36	Q_HIFAN	OFF_ON	OFF	-	High Speed Tower Fan
37	Q_TRIPR	OFF_ON	OFF	-	Shunt Trip Relay
38	QVFDLOCK	OFF_ON	OFF	-	Danfoss VFD Interlock

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



QCK_DV - 19DV Quick Test

	Name	Range	Default	Unit	Displayed text*
1	QCK_TEST	DSABLE_ENABLE	DSABLE	-	Quick Test Enable
2	Q_GV2POS	0 to 100	0	%	Guide Vane 2 Pos
3	Q_CONDSV	OFF_ON	OFF	-	Cond CV (DV Lube Sled)

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4	Q_EVAPSV	OFF_ON	OFF	-	Evap CV (DV Lube Sled)
5	Q_OPRLUB	OFF_ON	OFF	-	Evap Drain CV
6	Q_PRELUB	OFF_ON	OFF	-	Cond Drain CV
7	Q_CDPSV	OFF_ON	OFF	-	Purge Cond SV
8	Q_CMPSV	OFF_ON	OFF	-	Purge Comp SV
9	Q_POPSV	OFF_ON	OFF	-	Purge Pumpout SV
10	Q_DROPR	OFF_ON	OFF	-	Purge Drainage SV
11	Q_RGPSV	OFF_ON	OFF	-	Purge Rege SV
12	Q_DCPSV	OFF_ON	OFF	-	Purge Discharge SV
13	Q_PVPSV	OFF_ON	OFF	-	Purge Vacuum Pump
14	Q_PCPSV	OFF_ON	OFF	-	Purge Compressor
15	Q_PHPSV	OFF_ON	OFF	-	Purge Heater
16	Q_IDLE	OFF_ON	OFF	-	Purge Idle Drain SV
17	Q_ECBP	OFF_ON	OFF	-	ECO Liquid Bypass VLV
18	Q_ECONIV	OFF_ON	OFF	-	ECO Isolation VLV
19	Q_CONDCV	OFF_ON	OFF	-	Condenser Charging VLV
20	Q_FC_VLV	OFF_ON	OFF	-	Free Cooling VLV
21	Q_MRC	DSABLE_ENABLE	DSABLE	-	Motor Rotation Check
22	Q_MRC_ST	-	0	-	Check State
23	blank	-	-	-	IDLE=0, PreLub=1
24	blank	-	-	-	Rotat=2, PosLub=3, End=4

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



QCK_CAL - Quick Calibration

Name	Range	Default	Unit	Displayed text*
1 QCK_TEST	DSABLE_ENABLE	DSABLE	-	Quick Test Enable

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2	GV1_CAL	DSABLE_ENABLE	DSABLE	-	GV1 Calibration Enable
3	GV1_STAT	0 to 2	0	-	GV1 Calibration Status
4	blank	-	-	-	No Calib Or Failure=0,
5	blank	-	-	-	Progress=1, Completed=2
6	GV1_OHM	-	0	-	Guide Vane 1 Actual Ohms
7	GV1_MAXO	-	0	-	Guide Vane 1 Ohms 100%
8	GV1_MINO	-	0	-	Guide Vane 1 Ohms 0%
9	GV1_MAF	-	0	mA	Guide Vane 1 Actual mA
10	GV1_MAXA	-	0	mA	Guide Vane 1 mA 100%
11	GV1_MINA	-	0	mA	Guide Vane 1 mA 0%
12	GV2_CAL	DSABLE_ENABLE	DSABLE	-	GV2 Calibration Enable
13	GV2_STAT	0 to 2	0	-	GV2 Calibration Status
14	blank	-	-	-	No Calib Or Failure=0,
15	blank	-	-	-	Progress=1, Completed=2
16	GV2_MAF	-	0	mA	Guide Vane 2 Actual mA
17	GV2_MAXA	-	0	mA	Guide Vane 2 mA 100%
18	GV2_MINA	-	0	mA	Guide Vane 2 mA 0%
19	HGBP_CAL	DSABLE_ENABLE	DSABLE	-	EC/HG VLV Calib Enable
20	HGBP_ST	0 to 2	0	-	EC/HG VLV Calib Status
21	blank	-	-	-	No Calib Or Failure=0,
22	blank	-	-	-	Progress=1, Completed=2
23	HGBP_AMA	-	0	mA	EC/HG VLV Actual mA
24	HBP_MAXA	-	0	mA	EC/HG VLV mA 100%
25	HBP_MINA	-	0	mA	EC/HG VLV mA 0%
26	DMP_CAL	DSABLE_ENABLE	DSABLE	-	ECO DMP VLV Calib Enable
27	DMP_ST	0 to 2	0	-	ECO DMP VLV Calib Status

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28	blank	-	-	-	No Calib Or Failure=0,
29	blank	-	-	-	Progress=1, Completed=2
30	DMP_AMA	-	0	mA	ECO DMP VLV Actual mA
31	DMP_MAXA	-	0	mA	ECO DMP VLV mA 100%
32	DMP_MINA	-	0	mA	ECO DMP VLV mA 0%
33	RL1TIME	-	0	min	Ref Lub 1st Test Time
34	RL1STAT	NO_YES	NO	-	Ref Lub 1st Test Status

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

9.4. Alarms Menu

Icon	Displayed text*	Description	Access	Associated table
	Reset Alarms		ALL	ALARMRST
	Current Alarms		ALL	
	History Alarms		ALL	

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



ALARMRST - Reset Alarms

	Name	Range	Default	Unit	Displayed text*
1	RST_ALM	NO_YES	NO	-	Alarm Reset
2	ALM_STAT	-	0	-	Alarm State
3	alarm_1c	-	0	-	Current Alarm 1
4	alarm_2c	-	0	-	Current Alarm 2
5	alarm_3c	-	0	-	Current Alarm 3
6	alarm_4c	-	0	-	Current Alarm 4

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7	alarm_5c	-	0	-	Current Alarm 5
8	alarm_1	-	0	-	Jbus Current Alarm 1
9	alarm_2	-	0	-	Jbus Current Alarm 2
10	alarm_3	-	0	-	Jbus Current Alarm 3
11	alarm_4	-	0	-	Jbus Current Alarm 4
12	alarm_5	-	0	-	Jbus Current Alarm 5

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