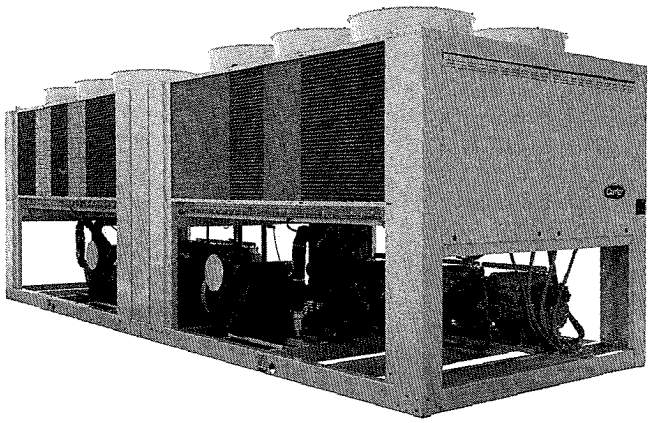
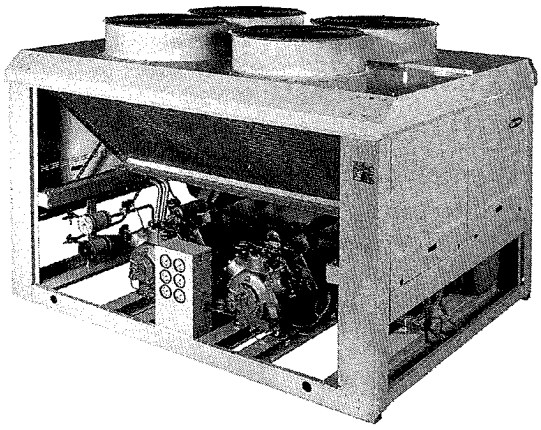
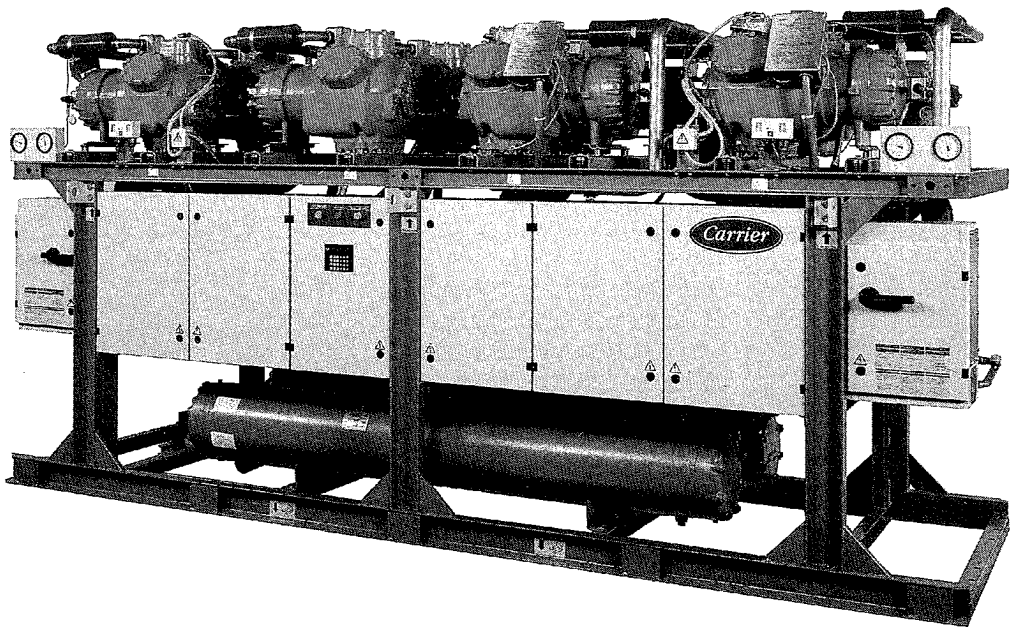
30G and 30H Series

Flotronic II® phase 3, control for reciprocating liquid chillers

Operation, Maintenance
and troubleshooting Instructions







QUALITY ASSURANCE

APPROVALS
BS 5750 Part 1
NF EN 29001
ISO 9001

CONTENTS

CONTENTS

1 - SAFETY CONSIDERATIONS

Only authorized personnel qualified according to IEC recommandations should have access to the electrical equipment of Flotronic II Phase 3 units.

Disconnect all electrical power before servicing this equipment.

IMPORTANT
A sticker indicates the location and circuit reference of the main disconnect switch. It is on the electrical box and must be completed fully using indelible ink. Tag all disconnect switch locations to warn others not to restore power until work is completed.

CAUTION
Electrical shock **The main disconnect switch in its OFF position does not necessarily cut off all power supply to the unit. For example compressor crankcase heaters have a separate power supply and will remain energised when the main disconnect is switched off.** **Burns** **Electrical components tend to get hot when they are energised. Wear gloves for protection when handling electrical cables, the lids of distribution boxes and motor terminal boxes and motor frames.**

2 - GENERAL DESCRIPTION

2.1 - GENERAL

The Flotronic II Phase 3 system is used to control dual circuit units of the following types : Water Cooled, Air Cooled, Split Systems and non reversible Heat Machines.

The Flotronic II Phase 3 control system cycles compressors and compressor unloaders to maintain the selected leaving water temperature setpoint. It automatically positions the EXV of each circuit to maintain the specified refrigerant superheat entering the compressor cylinders. On Air Cooled units it cycles condenser fans on and off to maintain suitable head pressure for each circuit. On water cooled units it positions water valves to maintain suitable head pressure for each circuit. In addition, a scheduling function, programmed by the user, controls the unit occupied/unoccupied schedule. Safeties are continuously monitored to prevent the unit from operating under unsafe conditions. The control also provides a diagnostic programme enabling the operator to check output signals and ensure components are operable.

All Flotronic II Phase 3 units can operate as stand alone unit. They can be interfaced with the Carrier Confort Network (CCN) if desired. When a Flotronic II Phase 3 unit is a part of a CCN network, a field-installed communication cable must be used to connect the unit to the CCN communication bus. If operating as a standalone unit, the Flotronic II Phase 3 retains all of its controlling capabilities but will not be able to support any network functions.

Flotronic II Phase 3 is fully compatible with the Flotronic System Manager (FSM). Up to eight air cooled or water cooled units can be controlled by the same FSM.

The control system consists of a processor module (PSIO), a low voltage relay module (DSIO-LV), two electronic expansion valves (EXV), an EXV driver module (DSIO-EXV), a keyboard and display module (HSIO), and transducers plus thermistors to provide inputs to the microprocessor. On heat machines an additional module is used (8-IN). Options module (SIO) provides additional functions.

2.2 - MANUAL APPLICATION

This manual apply **only** to the **FLOTRONIC II phase 3** control. This software is referenced under the 6 digits part number : 500062 (see section 4.5.2 for additional informations on the software version).

2.3 - ABBREVIATIONS USED IN THIS MANUAL

In this document, circuits are identified as circuit A and B. Compressors are identified as A1, A2, A3, A4 in circuit A and B1, B2, B3, B4 in circuit B. Unloaders are identified as UNL_A1, UNL_A2 for compressor A and UNL_B1, UNL_B2 for compressor B.

Frequently used abbreviations in this manual include :

CCN	:	Carrier Comfort Network
CFG	:	Configuration
CHW	:	Chilled water
COMM	:	Communication Bus
CPC	:	Cooler Water Pump
CWP	:	Condenser Water pump
DSIO	:	Digital Input/Output module
EXV	:	Electronic Expansion valve
HSIO	:	Human Interface Module
HTW	:	Heated water
KP	:	Relay
LCW	:	Leaving chilled water
LED	:	Light Emitting Diode
LV	:	Low Voltage
NC	:	Normally Closed
NO	:	Normally Open
PIC	:	Product integrated Control
PSIO	:	Processor Sensor input/ouput Module
PWR	:	Power
SCT	:	Saturated Condensing Temperature
SIO Bus	:	Sensor Bus (Internal Bus)
SST	:	Saturated Suction Temperature
TXV	:	Thermal expansion Valve

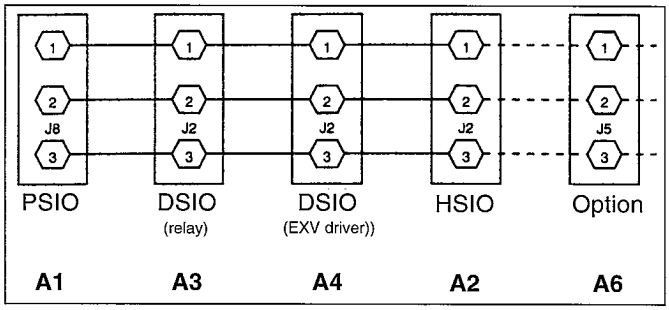
3 - HARDWARE DESCRIPTION

3.1 - GENERAL

All system operating intelligence rests in PSIO module (processor module), the module that control unit. This module monitors conditions through input and output ports and through slave modules like DSIO, 4x4 and 8 IN.

3.2 - CONNECTIONS BETWEEN MODULES

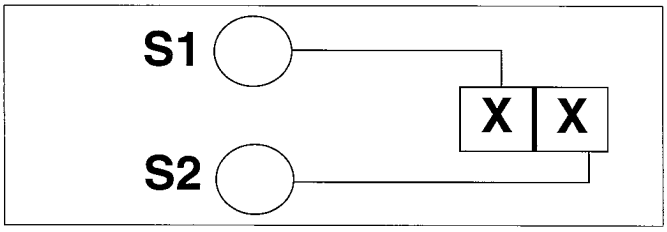
The PSIO communicates with other modules through a 3-wire sensor bus. On sensor bus terminal strips, terminal 1 of the PSIO module is connected to terminal 1 of each of the other modules. Terminals 2 and 3 are connected in the same manner. If a terminal 2 wire is connected to terminal 1, the system does not work.



Sensor bus wiring

3.3 - MODULES ADDRESSES

Each module have it's proper address that can be adjusted through two rotary switches S1 (upper) and S2 (lower). On DSIO modules, these switches are located on the underside of the module. On others modules, these switches are located on the side of the module.



Address selector

To modify the address of the module : use a small straight edge screwdriver to turn the rotary switches until the arrows point to the appropriate switch setting.

MODULE	SWITCHES	
	S1(UPPER)	S2 (LOWER)
PSIO	-	-
DSIO-LV # 1 (Relay Module)	1	9
DSIO-LV # 2 (Optional Remote Alarm Module 1)	6	9
DSIO-LV # 3 (Optional Remote Alarm Module 2)	8	1
DSIO-EXV (EXV Driver Module)	3	1
4 x 4 (Optional Module)	5	9
8 IN (Optional module)	5	1

- : Means doesn't matter

3.4 - POWER SUPPLY

In Flotronic II chillers, the processor module, low-voltage relay module, and keyboard and display module are all powered from a common 21 V a.c power source which connects to terminals 1 and 2 on the power input strip on each module.

A separate source of 12.5 Va.c is used to power the EXV driver module through terminals 1 and 2 on the power input strip.

3.5 - MODULE LEDS

The PSIO, DSIO and Option modules all perform continuous tests on the hardware. Proper operation of these modules is indicated by LED's (light emitting diodes) on the front surface of the DSIO's and on the top horizontal surface of the PSIO and optional modules.

Red led :

Blinking continuously at one second rate indicates proper operation.

Lit continuously indicates a problem requiring replacement of the module.

Off continuously indicates the power should be checked. If there is no input power, check fuses. If the fuse is blown check for a faulty module or a short circuited secondary on the transformer.

Green led :

On PSIO, 4x4 and 8 In modules this is the LED closest to the COMM connectors. On DSIO's it is the green LED in front of the module.
On the PSIO module it should always be blinking whenever it is not connected to SIO modules. It indicates that the module is working properly. If it is not blinking it indicates a problem requiring replacement of the module.

On other modules (slaves modules) it should always be blinking when the power is on indicating that modules are communicating properly. If green LED is not blinking, check red LED. If red LED is normal, check module address switches.

If all slave modules indicate communication failure, check COMM plug wiring on PSIO module for proper seating. If the connection is good and the condition persists, replace the PSIO module.

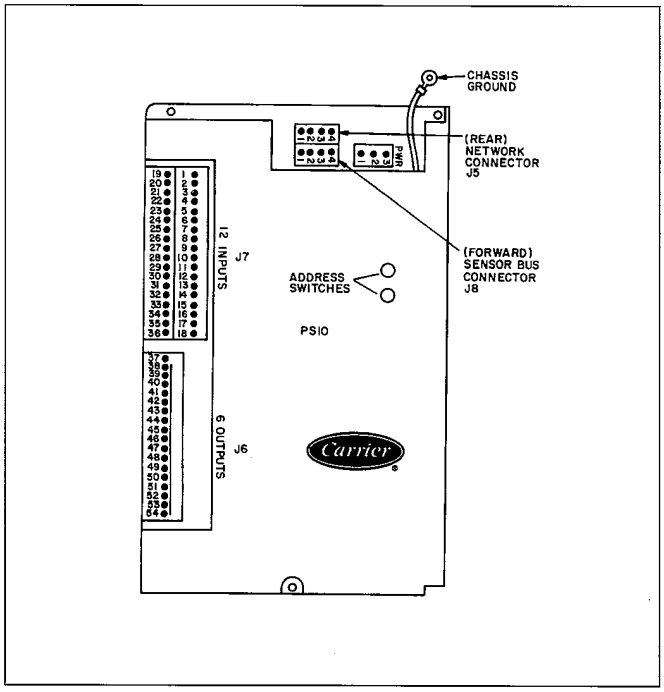
If only one slave module indicates communication failure, check COMM plug on that module for proper seating. If the connection is good and the conditions persist, replace the slave module.

3.6 - PROCESSOR MODULE

This module contains the operating software, and controls the operation of the machine. It continuously monitors informations received from the various transducers and thermistors and communicates with the low voltage relay module (DSIO-LV) and 8 interface relays to increase or decrease the active stages of capacity. The processor module also controls the EXV driver module, commanding it to open or close each EXV in order to maintain the proper superheat entering the cylinder of each lead compressor.

PSIO Inputs
Each input channel has 3 terminals ; only 2 of the terminals are used. The application of the machine determines which terminals are used. Always refer to individual unit wiring for terminal numbers.

PSIO Outputs
Output is 20 Vd.c. . There are 3 terminals, only 2 of which are used, depending on the application. Refer to unit wiring diagram.

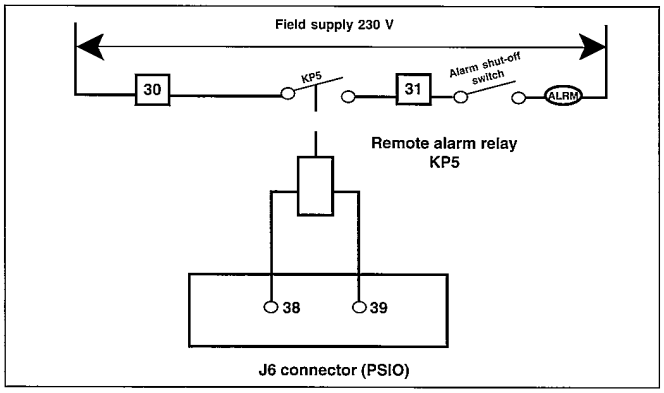


Processor module (PSIO) A1

This module allows the use of the following Flotronic II optional features.

3.6.1 - General remote alarm

The following contacts are available for general remote alarm indication.



General remote alarm relay KP5

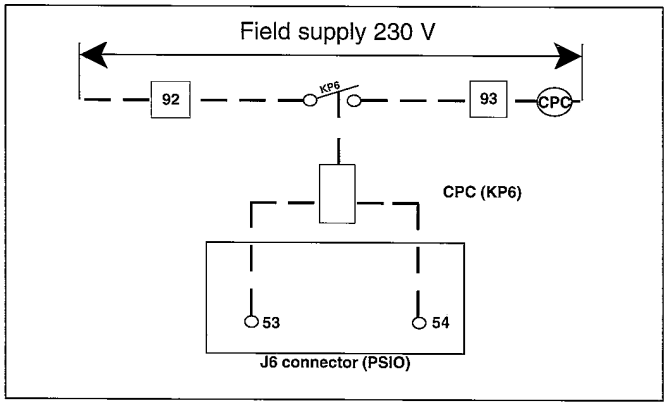
NOTE :

Terminals 30 31 are used for remote alarm control functions.

The maximum load allowed for the alarm circuit is 125 VA sealed, 1250 VA inrush at 230 Volts.

3.6.2 - Chilled water pump control

PSIO module A1



Cooler water pump connections

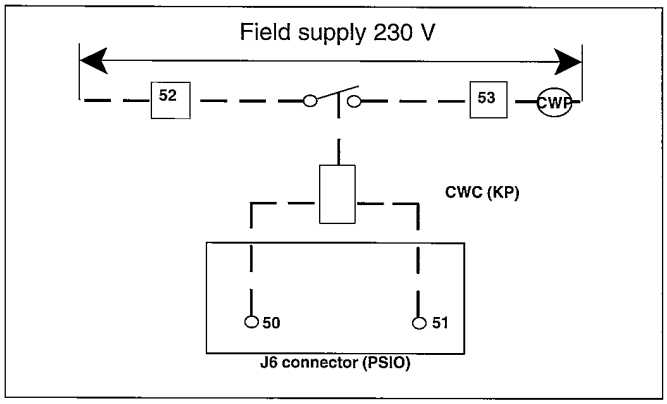
CPC : Chilled water pump relay (kP6).

NOTE : Terminals 92 93 are for chiller water pump functions.

The maximum load allowed for the chilled water pump circuit is 125 VA, 1250 VA inrush at 230 Volts.

3.6.3 - Condenser water pump control

PSIO module A1



Condenser water pump connections

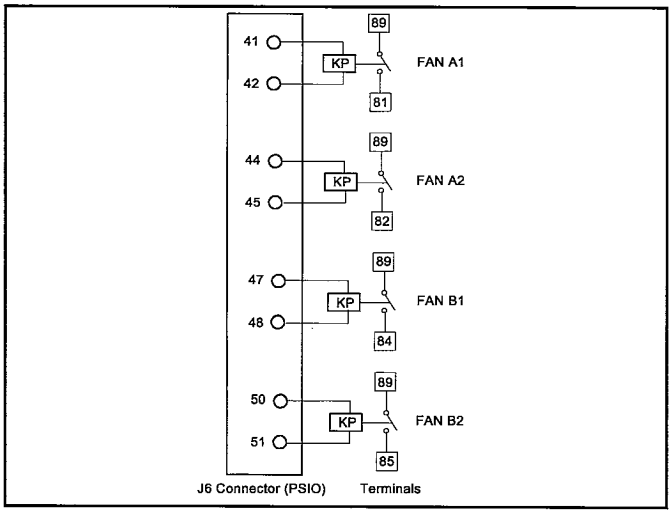
CWC : Condenser water pump relay.

NOTE : Terminals 52 53 are used for condenser water pump functions.

The maximum load allowed for the condenser water pump circuit is 125 VA, 1250 VA inrush at 230 Volts.

3.6.4 - Fan Control on split Systems

On split System units, relays are provided for fan contactors control.



Fan control connections

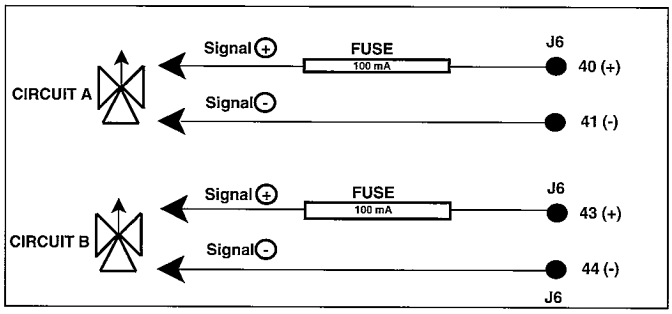
Terminal 89 is common for all fan relays. Relay reference is OK12AC 025E (20 Vd.c coil).

3.6.5 - Condenser water valves control

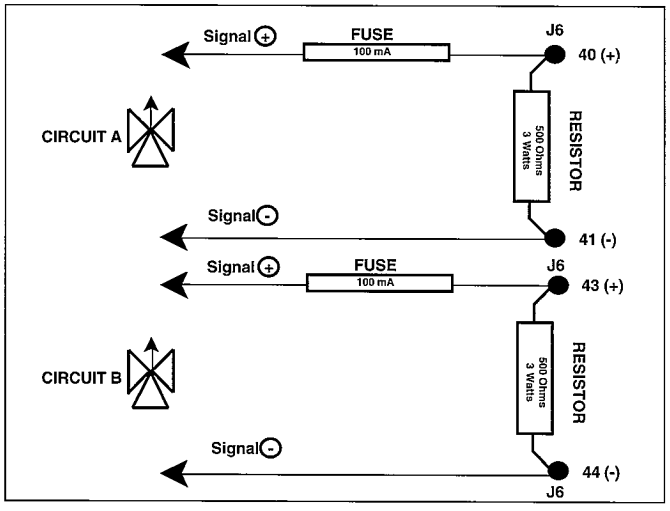
Two PSIO outputs are available on water cooled units to drive one water valve actuator per circuit (option 139).

This control can be made through a 4-20 mA signal or a 0-10 Vdc signal. Chiller must be configured for the selected feature (see Field adjustable configurations).

PSIO module A1



4-20 mA Signal Condenser water valves control



0-10 V Condenser water valve control

3.7 - LOW VOLTAGE COMPRESSOR RELAY MODULE (DSIO-LV) A3

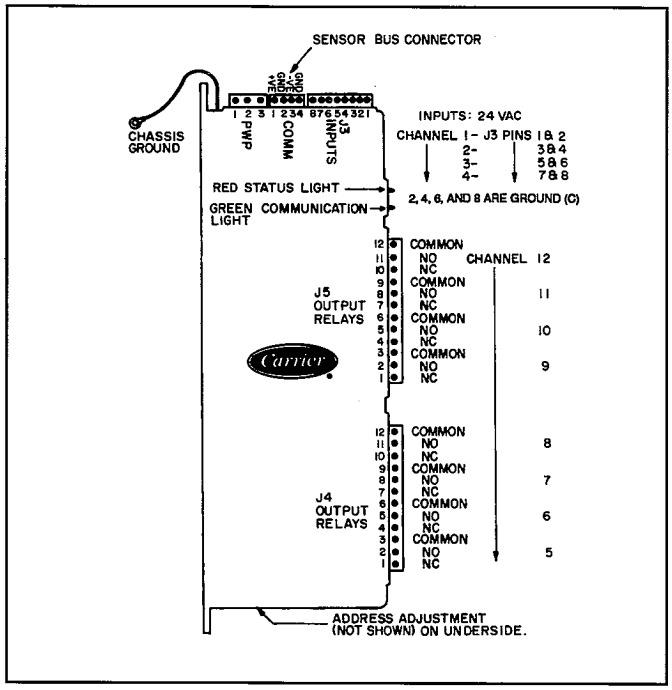
This module closes contacts to energize compressor unloaders and/or compressors. It also senses the status of the safeties for compressors A1, A2, B1, B2 and transmits this information to the processor.

Inputs

Inputs on strip J3 are discrete inputs (ON-OFF). When 24 Va.c is applied across the 2 terminals in a channel it is read as an ON signal. Zero volts is read as an OFF signal.

Outputs

Terminal strips J4 and J5 are internal relays whose coils are powered-up and powered-off by a signal from the microprocessor. The relays switch the circuit to which they are connected. No power is supplied to these connections by the DSIO module.



Low-voltage relay module DSIO (A3)

3.8 - ELECTRONIC EXPANSION VALVE MODULE (DSIO-EXV) A4

This module receives signals from the processor and operates the electronic expansion valves. It also monitors the status of the safeties for compressors A3, A4, B3, B4 and transmits this information to the processor.

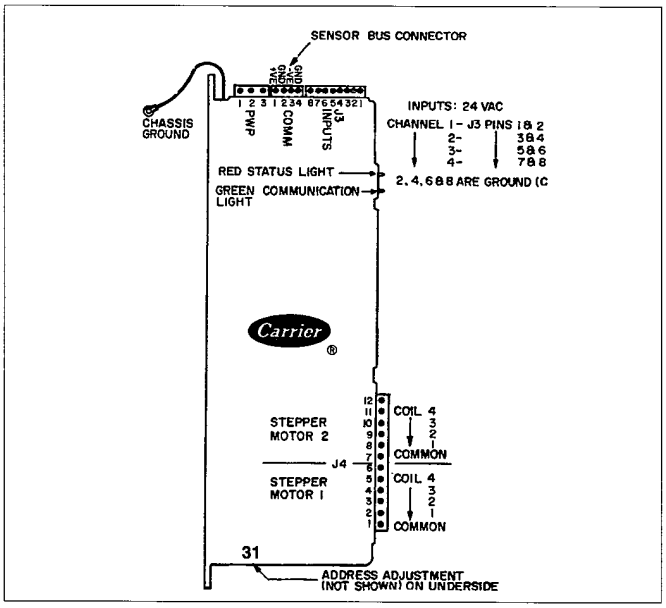
WARNING
The EXV driver module requires 12.5 Va.c on its power terminals.

Inputs

Inputs on strip J3 are discrete inputs (ON-OFF). When 24 Va.c is applied across the two terminals in a channel it is read as an ON signal. Zero volts is read as an OFF signal.

Outputs

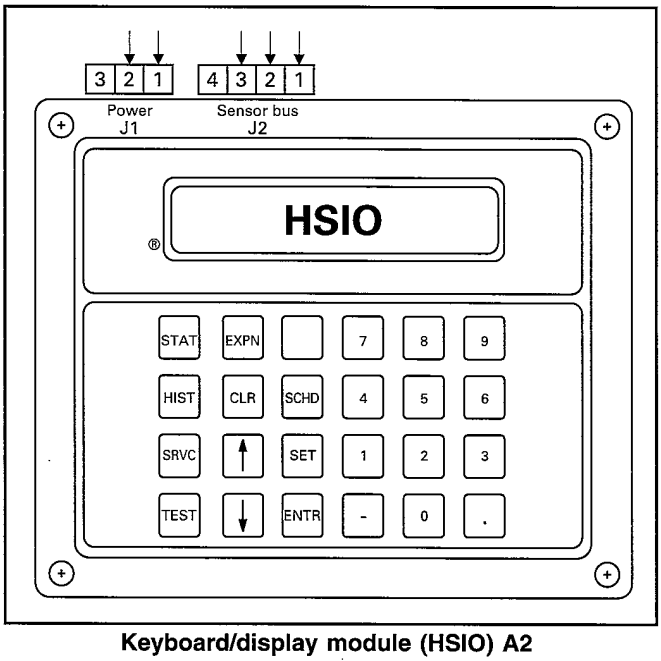
Two stepper motor driver outputs are used to drive the electronic expansion valves. Terminals 1 and 7 supply voltage to the valves. Terminals 2 through 5 and 8 through 11 connect the individual coils (4 per valve) to neutral in a repeating sequence to drive the valves in incremental steps.



EXV driver module (DSIO) A4

3.9 - KEYBOARD/DISPLAY MODULE (HSIO)

This device consists of a keyboard with 6 functions keys, 5 operative keys, 12 numeric keys and an alphanumeric 8-characters LCD. It allows the operator to communicate with the processor. It is used to enter configurations and setpoints and to read data, perform tests and set schedules.



Keyboard/display module (HSIO) A2

3.10 - OPTION MODULE (4 IN X 4 OUT) A6

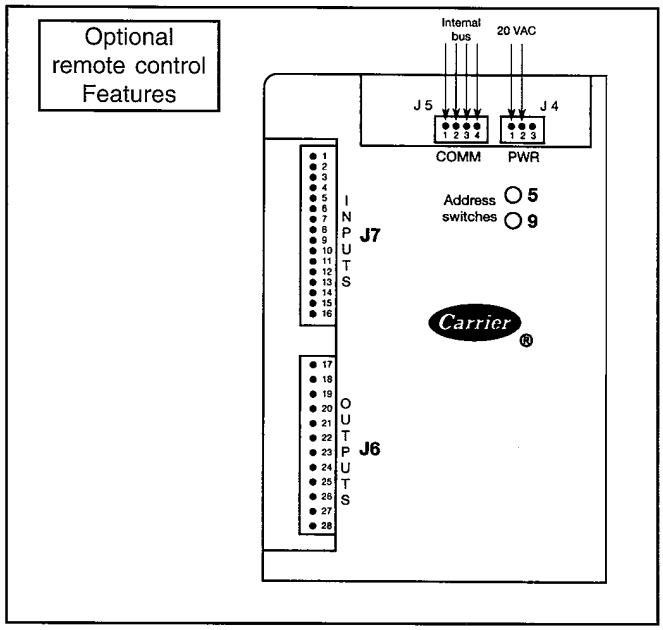
The microprocessor can be programmed for different leaving water temperature reset modes based on return water temperature, outdoor or space temperature or analog 4-20 mA signal. Option module 4 IN x 4 OUT is required if either reset outdoor temperature or space temperature or analog signal are selected.
Electrical power can be limited by using the demand limit control option. Actual demand limit is controlled either by the closure of two external switches or by an analog 4-20 mA signal input to the 4 IN x 4 OUT option module.

Inputs

Each input channel has 4 terminals, only 2 terminals are used. The application determines which terminals are used. Always refer to individual unit wiring for terminal numbers.

Outputs

Each output channel has 4 terminals, only 2 of which are used, depending on application. Refer to unit wiring diagram.



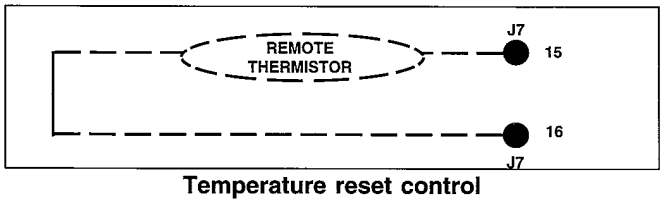
4 IN x 4 OUT option module A6

This module gives access (if configured in the field adjustable configuration) to the Flotronic II features described below.

3.10.1 - Temperature reset control from space or outdoor air temperature

A remote thermistor (part # 30GB660002) is required.

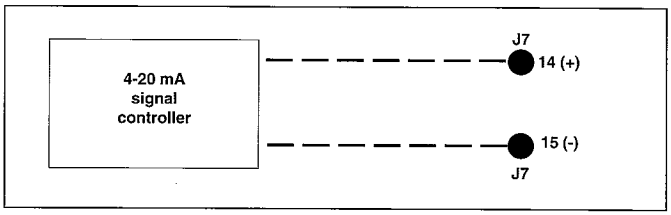
Option module (4 IN x 4 OUT) A6



Temperature reset control from space or outdoor air temperature

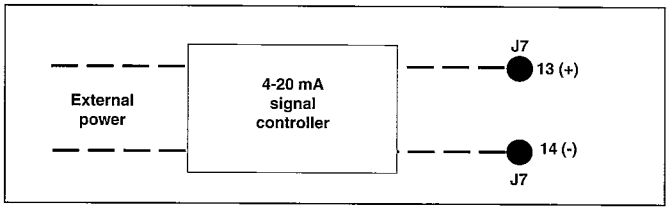
3.10.2 - Temperature reset by 4-20 mA signal

Option module (4 IN x 4 OUT) A6



Temperature reset 4-20 mA signal control internally powered

Option module (4 IN x 4 OUT) A6

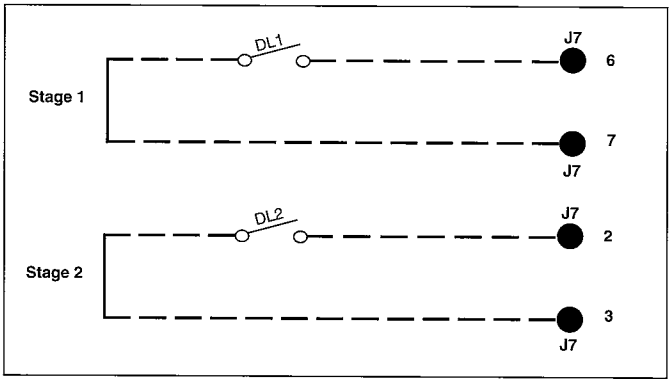


Temperature reset 4-20 mA signal control externally powered

3.10.3 - Demand limit by remote 2-stage switch

Contacts must be rated for dry circuit application, capable of reliably switching a 5 Vd.c, 1 mA to 20 mA load (relay HN61KK025C is recommended).

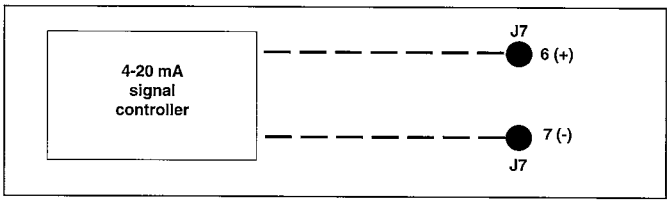
Option module (4 IN x 4 OUT) A6



Demand limit 2-stage switch control

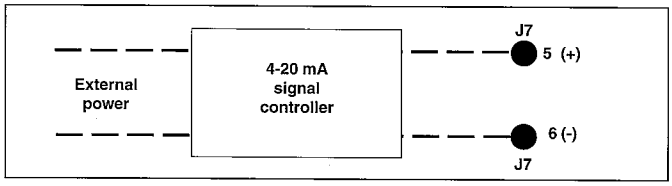
3.10.4 - Demand limit by remote 4-20 mA signal

Option module (4IN x 4 OUT) A6



Demand limit 4-20 mA signal control internally powered

Option module (4 IN x 4 OUT) A6

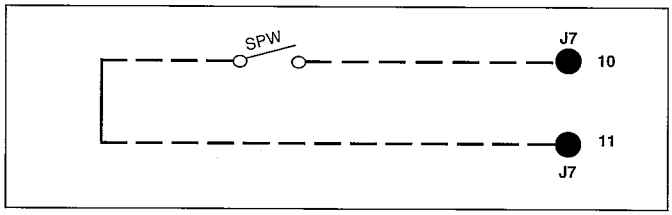


Demand limit 4-20 mA signal control externally powered

3.10.5 - Dual setpoint by remote switch

Contacts must be rated for dry circuit application, capable of reliably switching a 5 Vd.c, 1 mA to 20 mA load (relay HN61KK025C is recommended).

Option module (4 IN x 4 OUT) A6



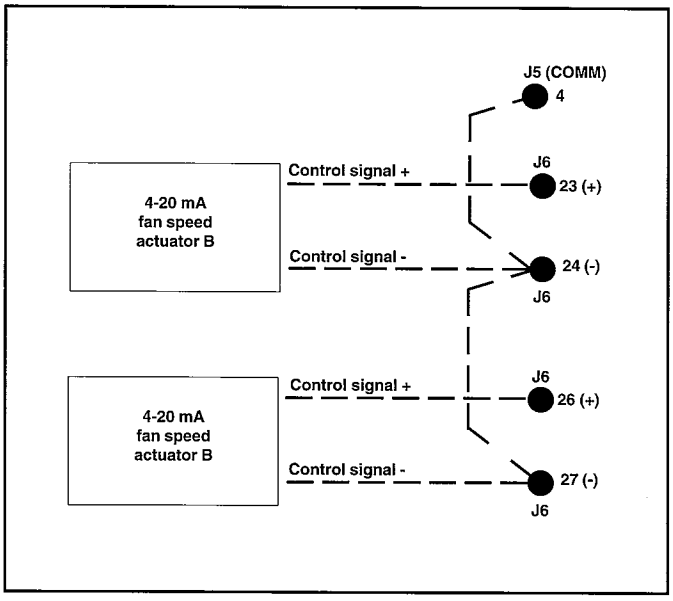
Remote dual setpoint control wiring

3.10.6 - Motormaster control

4 IN x 4 OUT option module provides two 4-20 mA signals for speed fan control : one for each circuit. The variable speed controller must be connected to the first fan in each circuit that is not controlled by the PSIO outputs. This is the fan that is controlled by the lead compressor relay.

For units with common fan staging, the control signal provided for both circuits is the same. Thus, only one fan speed actuator can be used. It shall be connected on either 4 IN x 4 OUT option module fan speed outputs.

Option module (4 IN x 4 OUT) A6



Fan speed control

3.11 - OPTIONS MODULE (8 IN) A5

This module is standard for heat machine applications. For other application it is optional.

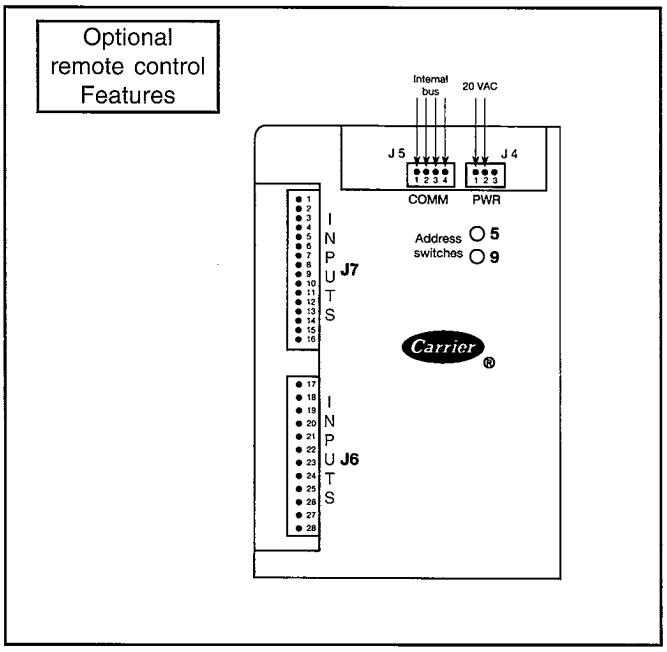
It is used to read condenser, reclaim or spare sensors.

On heat machines the Heat/Cool switch is also connected to this board.

Inputs

Each input channel has 4 terminals; only 2 of the terminals are used. The application of the machine determines which terminal are used. Always refer to individual unit wiring for terminal numbers.

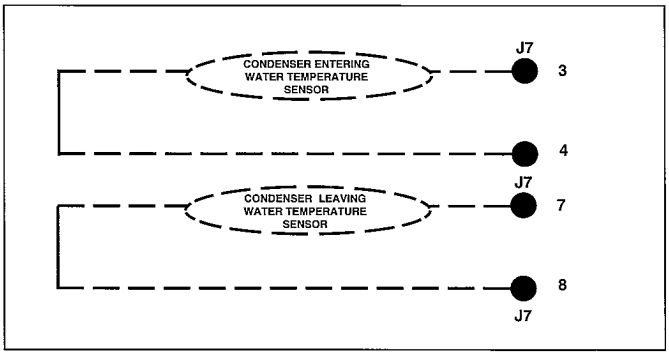
The chiller must be configured for the selected feature (see field adjustable configuration).



8 IN option module A5

3.11.1 - Condenser sensors

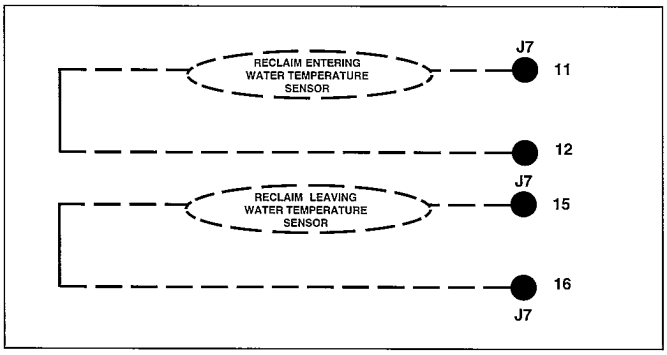
Option module (8 IN) A5



Condenser sensors wiring

3.11.2 - Reclaim sensors

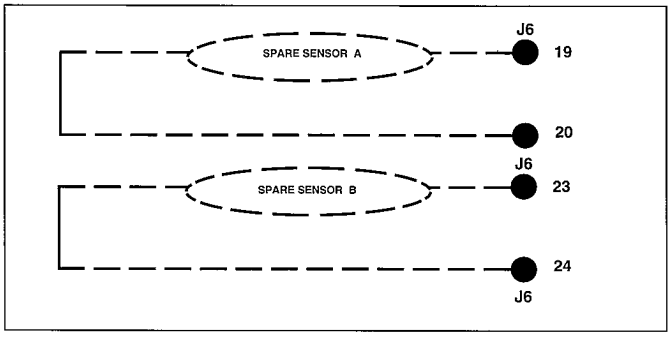
Option module (8 IN) A5



Reclaim sensors wiring

3.11.3 - Spare sensors

Option module (8 IN) A5



Spare sensors wiring

These sensors can be used for information purpose only. Configuration of these sensors can only be made through the CCN network (Network Service Tool or Buidling Supervisor) in the FLOTRONIC II Phase 3 CCN table OPTIONS 1.

3.12 - LOW VOLTAGE REMOTE ALARM INDICATOR MODULE (DSIO-LV) A3

One or two option DSIO-LV modules can be used for remote alarm indication.

Inputs

Inputs on strip J3 are not used on this module.

Outputs

Terminal strips J4 and J5 are internal relays whose coils are powered-up and powered-off by a signal from the microprocessor.

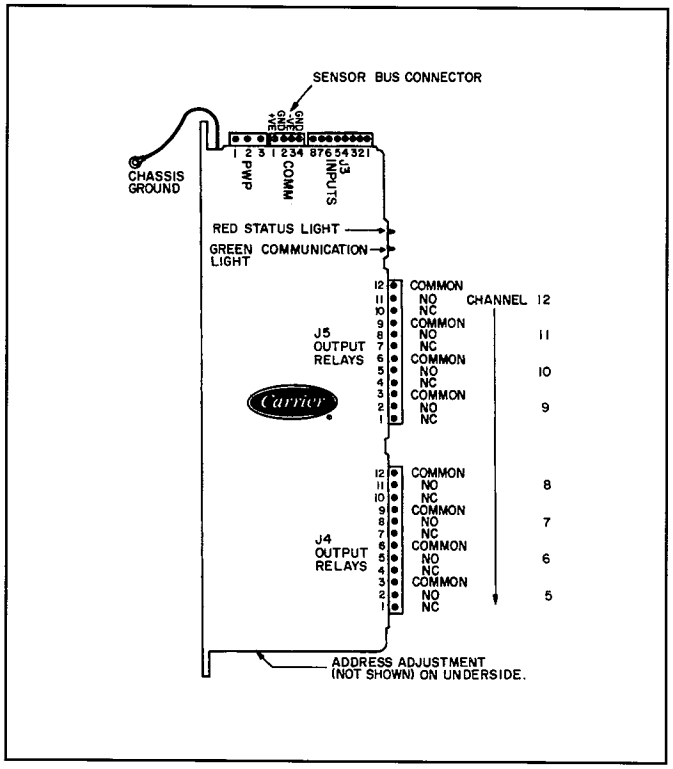
The relays switch the circuit to which they are connected. No power is supplied to these connections by the DSIO module.

Connector	Pin	Alarm description
J4	2/3	Freeze protection + cooler flow (42/43)
J4	5/6	Unit shut down
J4	8/9	Circuit A shut down
J4	11/12	Circuit B shut down
J5	2/3	Lead compressor failure (1/5)
J5	5/6	Lag compressor failure (2/3/4/5/6/7/8)
J5	8/9	Thermistor or transducer failure (9 to 27)
J5	11/12	High LCW temperature failure (70)

DSIO-LV # 2 (address switches : 69)

Connector	Pin	Alarm description
J4	2/3	Circuit low refrigerant pressure (36/37)
J4	5/6	Circuit low oil pressure (40/41)
J4	8/9	Circuit failure to pumpdown (38/39)
J4	11/12	Circuit high suction superheat (46/47)
J5	2/3	Circuit low suction superheat (48/48)
J5	5/6	Circuit low cooler suction (44/45)
J5	8/9	4-20 mA default (30/31)
J5	11/12	Cooler pump interlock failure (53/54/55)

DSIO-LV #3 (address switches : 81)



Low-voltage relay module

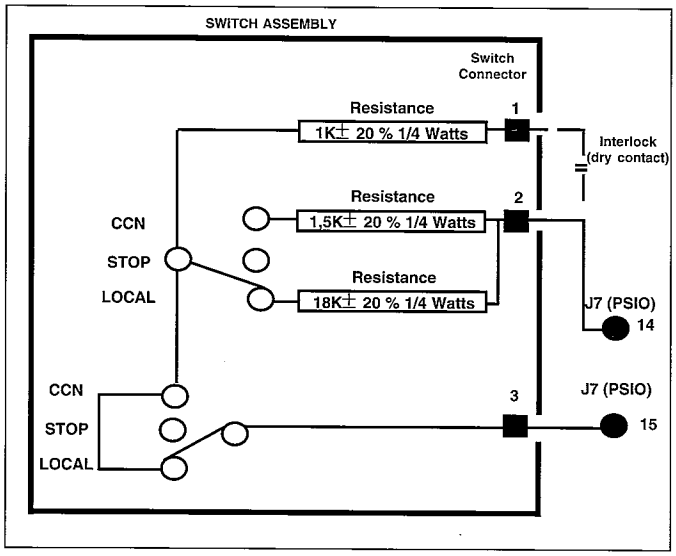
NOTE : Contacts are open when the alarm is not active. These contacts have only low voltage capabilities (24 Va.c).

3.13 - CONTROL SWITCH

Unit is controlled by a 3 -position switch :

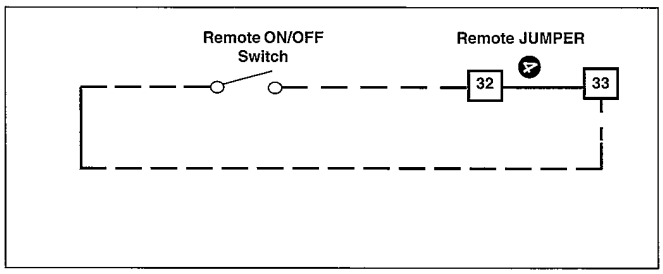
- STOP : Unit cannot start
- LOCAL ON : Unit is allowed to start in standalone mode.
- CCN : Unit is allowed to start controlled by CCN Network. In this case, it responds only to CCN commands.

The device is a double pole-double throw switch with a central OFF position. It is equipped with fixed resistors to allow for all the ON-OFF, interlock and remote ON-OFF to use only one channel on the PSIO.



Control Switch schematic diagram

3.13.1 - Remote ON-OFF

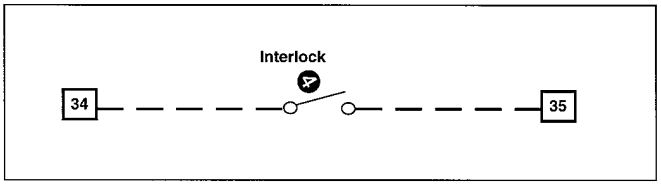


Control box remote ON-OFF connections

NOTE :

Terminals 32 and 33 are for field external interlock connection for remote ON-OFF. The contacts must be rated for volt-free circuit application, capable of switching reliably a 5 Vd.c, 1 mA to 20 mA load (relay HN 61KK 025 C is recommended).

3.13.2 - Interlocks



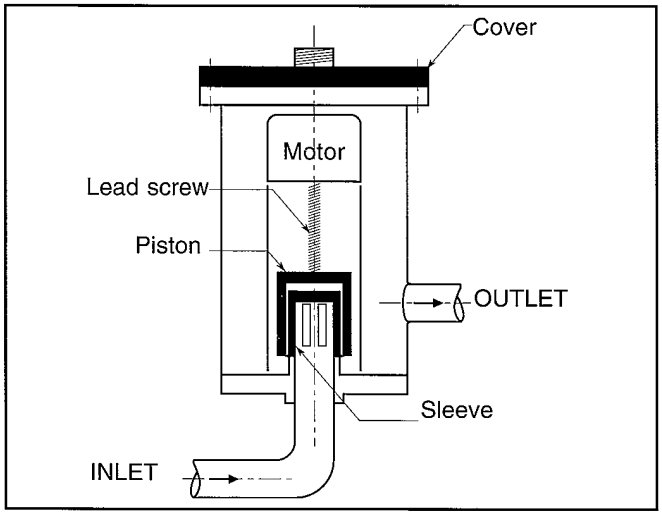
Control box Interlocks connections

NOTE :

Terminals 34 and 35 are for field external interlock connection. The contacts must be rated for dry circuit application, capable of reliability switching a 5 VDC, 1 mA to 20 mA load (relay HN 61KK 025 C is recommended).

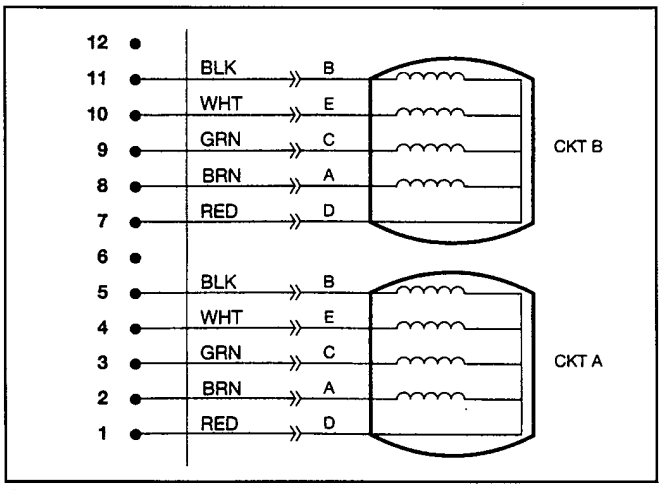
3.14 - ELECTRONIC EXPANSION VALVES

The EXV is used to control superheat in the compressor. One pressure transducer and one thermistor, located in the lead compressor of each circuit are used to directly determine superheat. The EXV is controlled to maintain superheat entering the cylinders at approximately 8.3°C (15°F) to 13.9°C (20°F), which results in refrigerant with minimal superheat leaving the cooler.



Electronic expansion valve (EXV)

A series of calibrated slots are machined inside the orifice assembly. As refrigerant passes through the orifice, pressure drops and refrigerant changes to a 2-phase condition (liquid and vapor). To control refrigerant flow for different operating conditions, piston moves up and down over the orifice and modulates orifice size. Piston is moved by a linear stepper motor. Stepper motor moves in increments and is controlled directly by EXV module. The rotary motion of the stepper motor is converted into linear motion by a lead screw to create many hundreds of discrete positions of the piston. The large number of steps and long piston stroke together result in very accurate control of refrigerant flow.



EXV cable connection to EXV driver module, DSIO (EXV)

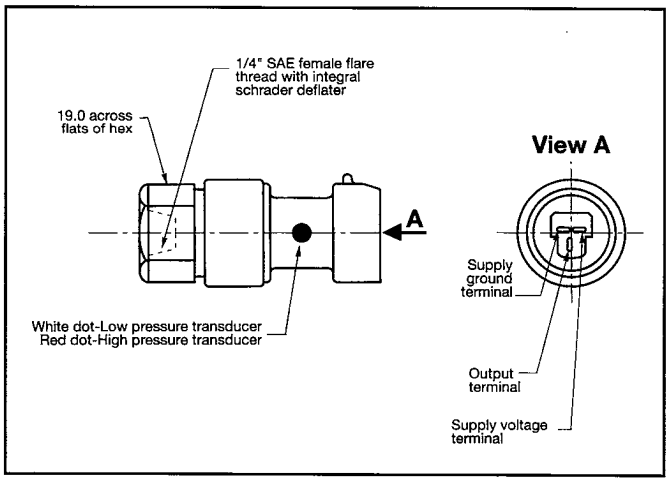
The external connector should be properly greased with CARRIER silicone grease (reference 397 EE) to avoid condensation and corrosion.

3.15 - TRANSDUCERS

Pressure transducers are used to measure the following pressures in each circuit :

- Discharge pressure
- Suction pressure
- Oil pressure

These are smart sensors with on-board electronics which generate a linear 0-5 Vd.c signal to the PSIO module. These transducers give gauge readings in kPa or psig. Two versions are used. One version is calibrated for the low pressure and the oil pressure and the other for the high pressure. The low pressure transducer is identified by a white dot on the body of the transducer, the high pressure transducer has a red dot.
Each transducer is supplied with 5 Vd.c power from a rectifier which changes 24 Va.c to 5 Vd.c.
Figures page 16 plot transducer output voltage (d.c) against pressure (psig).



Compressor transducer

3.15.1 - Discharge pressure transducers (BP1, BP2)

These transducers are located in the high side of each circuit at each lead compressor. They replace the discharge pressure gauges. They control the head pressure.

3.15.2 - Suction pressure transducers (BP3, BP4)

These measure the pressure on the low side of the unit. They are connected to the lead compressor in each refrigeration circuit in the crankcase oil filter port. Their readings are used to control the electronic expansion valves (EXV). They replace the low pressure switch and the oil switch.

3.15.3 - Oil pressure transducers (BP5, BP6)

These measure the oil pressure in the lead compressor of each refrigeration circuit. The suction pressure is subtracted from the oil pressure to arrive at the differential oil pressure.

3.16 - THERMISTORS

All thermistors are identical in their temperature/resistance characteristics. Resistances at various temperature are listed in table page 17.

General locations of thermistor sensors are shown in Fig. page 15.

3.16.1 - Cooler leaving water sensor (R1)

This is located in the cooler leaving water nozzle. The probe is immersed directly in the water. All thermistor connections are made through a 1/4" SAE, coupling.

3.16.2 - Cooler entering water sensor (R2)

This is located in the first inter-baffle space in the cooler, close to the tube bundle.

3.16.3 - Compressor suction gas sensors (R3, R4)

They are in the lead compressor in each circuit positioned in the suction gas path between the drive motor and cylinders above the oil pump.

3.16.4 - Condenser water sensors

These are used for capacity control in the heating mode. They have no control function in the cooling mode and the readings from them are for information purposes only.

The sensors, in both condensers, are located in the entering and leaving water lines. Figure section 3.11.1 shows the connections on the 8IN option module.

3.16.5 - Reclaim water sensors

This optional sensor measures the heat reclaim condenser entering and leaving fluid temperature. Their outputs have no control function. The readings from them are for information purposes only. Figure section 3.11.2 shows the connections on the 8IN option module.

3.16.6 - Spare sensors

These two-temperature sensors can be used for additional temperature measure on the chiller. See section 3.11.3 for connection on 8IN option module.

3.16.7 - Reset sensor (R10)

This is remotely mounted sensor. It is used for outside air or space temperature reset. CARRIER part N° HH 79NZ 014 should be used for this pupose. It is included in Service Parts package N° 30GB660002. The thermistor should be connected to the 4 x 4 module as shown in figure section 3.10.1.

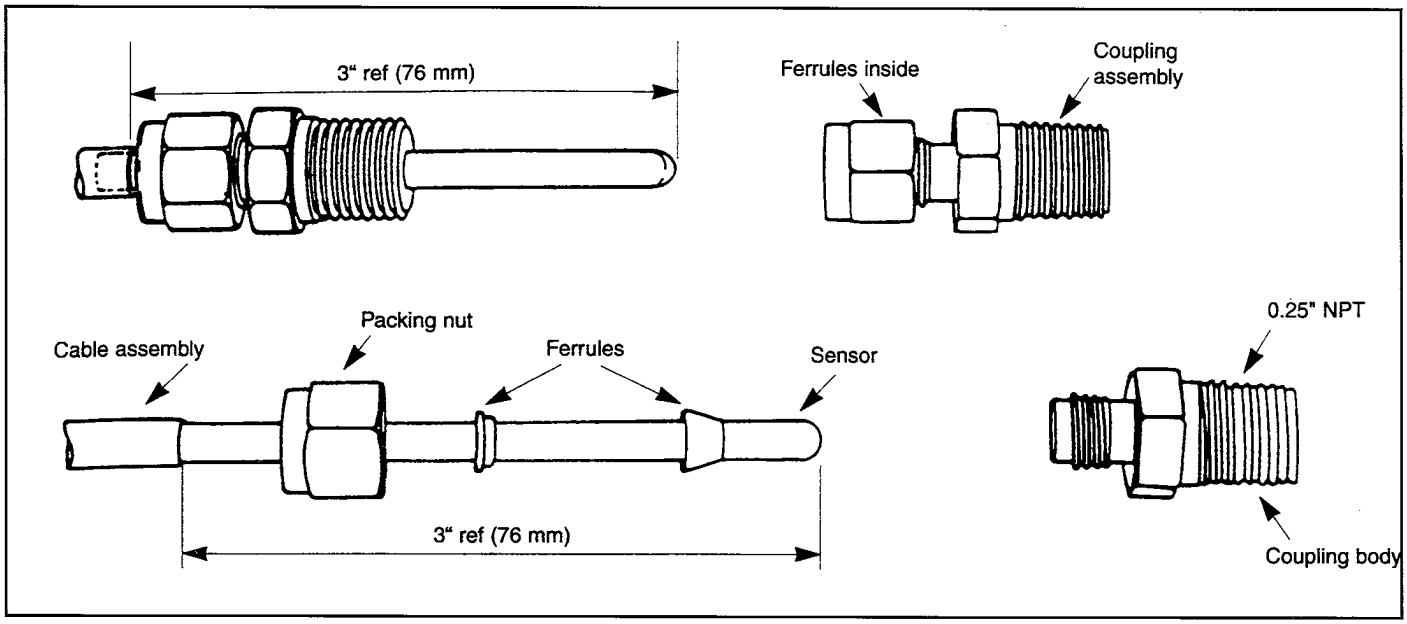
IMPORTANT

To avoid electrical interference, do not install the thermistor wire near line voltage wiring, electrical machinery, near contactors or other devices. Wire lengths up to 300 m may be used with 22-gauge wire.

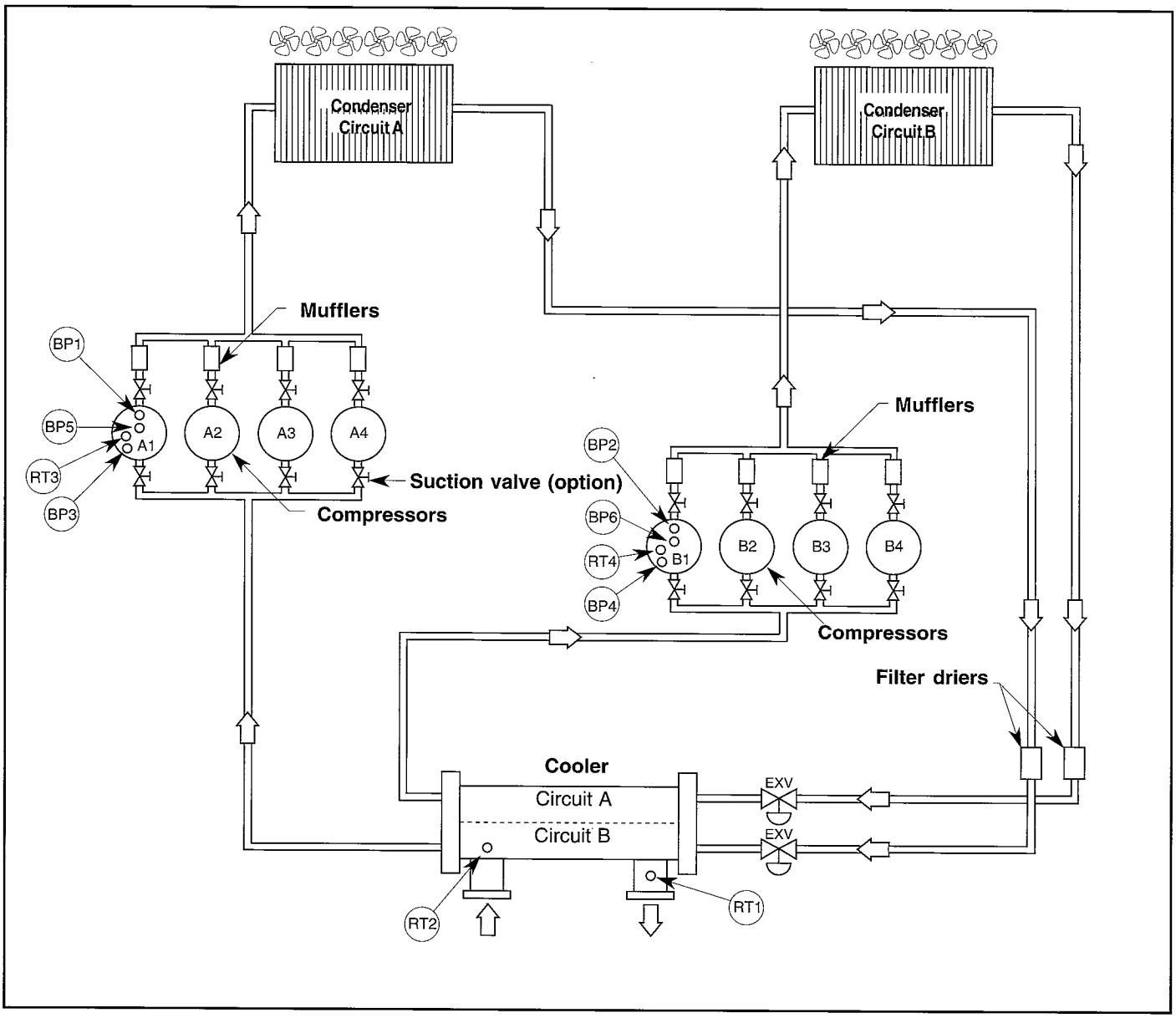
The accessory thermistor is equipped with 9.21 m 22-gauge twisted-pair cable. If additional length is required, use twisted-pair wire with a minimum of one twist per inch. The additional wire should be spliced onto the end of the 9.1 m wire. All connections should be soldered.

When outside air is used, the thermistor should be mounted in a location that is shielded from the sun.

When using space temperature reset, the thermistor should be mounted in an area within the space where it will sense freely circulating air.



Thermistor (compressor and cooler)



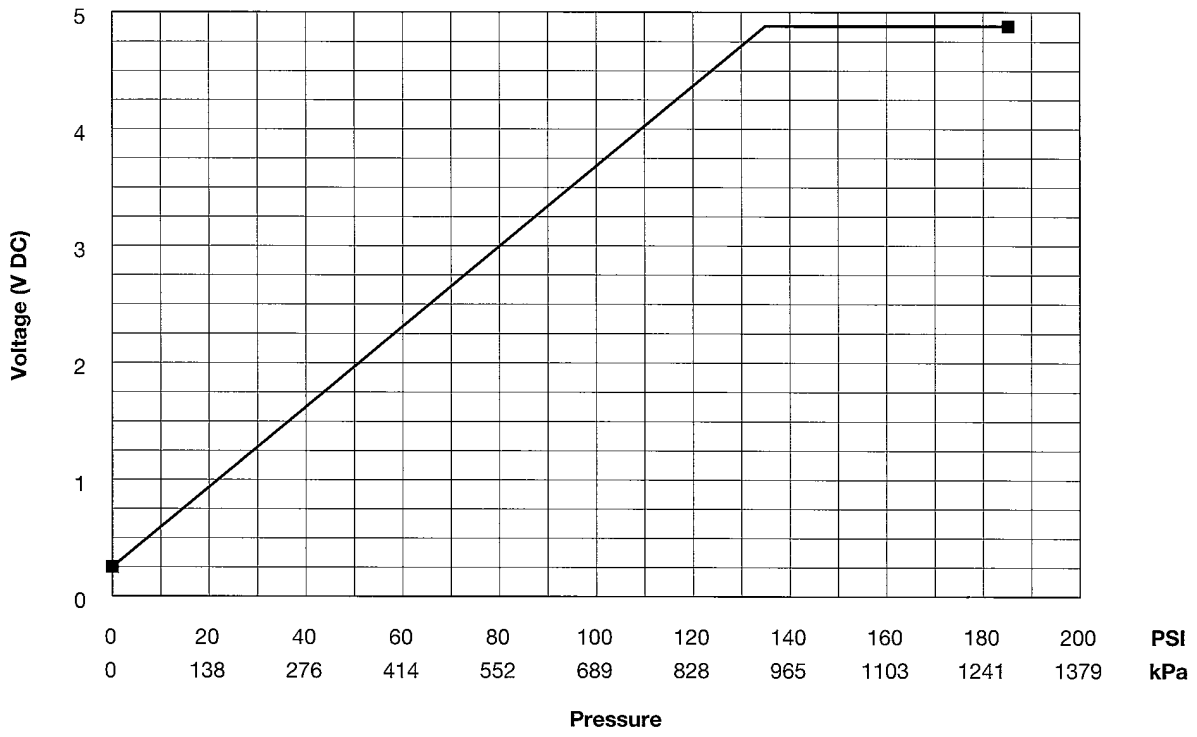
Thermistor and pressure transducer locations - ex : 30GF 220

Legend :

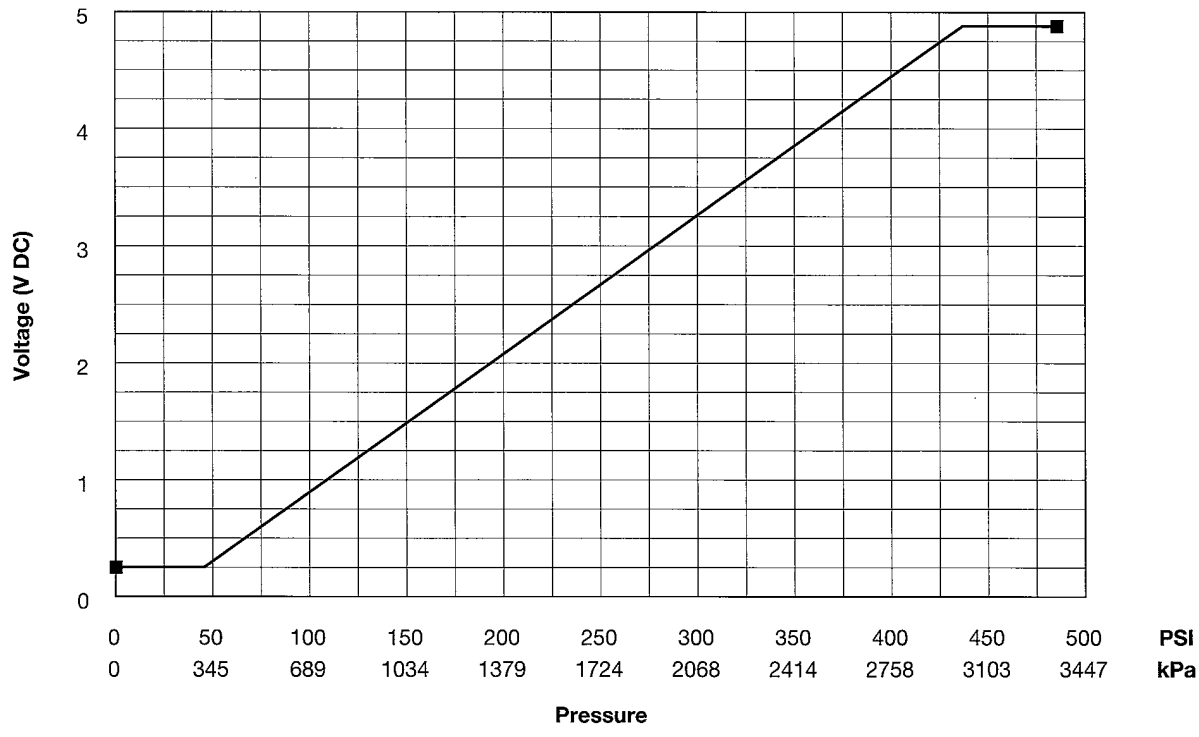
R1	*Cooler leaving chilled water temperature*
R2	*Cooler entering water (return temperature)*
R3	*Suction gas temperature - Circuit A*
R4	*Suction gas temperature - Circuit B*
R10	*Remote temperature sensor (accessory)*

BP1	*Discharge pressure Comp 1 Circuit A*
BP2	*Discharge pressure Comp 1 Circuit B*
BP3	*Suction pressure Comp 1 Circuit A*
BP4	*Suction pressure Comp 1 Circuit B*
BP5	*Oil pressure Comp 1 Circuit A*
BP6	*Oil pressure Comp 1 Circuit B*

Note :
Schematic wiring diagram is only for information. It is not intended to be used as an installation guide.



Low pressure transducer, voltage vs pressure 5 VDC supply



High pressure transducer, voltage vs pressure 5 VDC supply

Temp. (°C)	Resistance (OHMS)	Temp. (°C)	Resistance (OHMS)	Temp. (°C)	Resistance (OHMS)	Temp. (°C)	Resistance (OHMS)	Temp. (°C)	Resistance (OHMS)
-32.0	100049.0	-3.5	20075.9	24.0	5203.2	52.0	1694.0	80.0	602.4
-31.5	97006.4	-3.5	19560.8	24.5	5088.1	52.5	1663.5	80.5	592.4
-31.0	94060.8	-3.0	19060.6	25.0	4976.0	53.0	1633.5	81.0	582.8
-30.5	91209.3	-2.5	18574.8	25.5	4866.8	53.5	1604.1	81.5	573.4
-30.0	88449.0	-2.0	18102.9	26.0	4760.2	54.0	1575.2	82.0	564.4
-29.5	85777.0	-1.5	17644.5	26.5	4656.4	54.5	1546.9	82.5	555.7
-29.0	83190.7	-1.0	17199.1	27.0	4555.2	55.0	1519.0	83.0	547.2
-28.5	80687.1	-0.5	16766.3	27.5	4456.6	55.5	1491.6	83.5	539.1
-28.0	78263.9	-0.0	16345.7	28.0	4630.4	56.0	1464.7	84.0	531.2
-27.5	75918.3	0.5	15936.9	28.5	4266.7	56.5	1438.3	84.5	523.6
-27.0	73648.0	1.0	15539.5	29.0	4175.4	57.0	1412.3	85.0	516.2
-26.5	71450.6	1.5	15153.1	29.5	4086.3	57.5	1386.8	85.5	509.2
-26.0	69323.7	2.0	14777.5	30.0	3999.6	58.0	1361.6	86.0	502.3
-25.5	67265.0	2.5	14412.2	30.5	3915.0	58.5	1336.9	86.5	495.7
-25.0	65272.4	3.0	14056.9	31.0	3832.5	59.0	1312.6	87.0	489.4
-24.5	63343.7	3.5	13711.4	31.5	3752.1	59.5	1288.7	87.5	483.2
-24.0	61476.9	4.0	13375.3	32.0	3673.7	60.0	1265.2	88.0	477.4
-23.5	59670.0	4.5	13048.3	32.5	3597.3	60.5	1242.1	88.5	571.6
-23.0	57920.9	5.0	12730.1	33.0	3522.9	61.0	1219.3	89.0	466.1
-22.5	56227.9	5.5	12420.5	33.5	3450.2	61.5	1196.9	89.5	460.8
-22.0	54589.1	6.0	12119.2	34.0	3379.4	62.0	1174.8	90.0	455.6
-21.5	53002.7	6.5	11826.0	34.5	3310.4	62.5	1153.2	90.5	450.6
-21.0	51467.0	7.0	11540.5	35.0	3243.1	63.0	1131.8	91.0	445.7
-20.5	49980.4	7.5	11262.7	35.5	3177.5	63.5	1110.9	91.5	440.9
-20.0	48541.1	8.0	10992.1	36.0	3113.4	64.0	1090.2	92.0	436.3
-19.5	47147.7	8.5	10728.8	36.5	3051.0	64.5	1069.9	92.5	431.8
-19.0	45798.6	9.0	10472.3	37.0	2990.1	65.0	1050.0	93.0	427.4
-18.5	44492.4	9.5	10222.6	37.5	2930.7	65.5	1030.3	93.5	423.0
-18.0	43227.6	10.0	9979.3	38.0	2872.8	66.0	1011.0	94.0	418.8
-17.5	42002.9	10.5	9742.5	38.5	2816.2	66.5	992.1	94.5	414.5
-17.0	40816.9	11.0	9511.7	39.0	2761.1	67.0	973.4	95.0	410.3
-16.5	39668.3	11.5	9287.0	39.5	2707.2	67.5	955.1	95.5	406.0
-16.0	38555.9	12.0	9068.0	40.0	2654.7	68.0	937.1	96.0	401.8
-15.5	37478.4	12.5	8854.7	40.5	2603.4	68.5	919.4	96.5	397.6
-15.0	36434.7	13.0	8469.9	41.0	2553.3	69.0	902.1	97.0	393.3
-14.5	35423.7	13.5	8444.5	41.5	2504.4	69.5	885.1	97.5	389.0
-14.0	34444.2	14.0	8247.2	42.0	2456.6	70.0	868.4	98.0	384.7
-13.5	33495.2	14.5	8055.0	42.5	2410.0	70.5	952.0	98.5	380.3
-13.0	32575.6	15.0	7867.7	43.0	2364.4	71.0	836.0	99.0	375.8
-12.5	31684.6	15.5	7685.1	43.5	2319.9	71.5	820.2	99.5	371.1
-12.0	30821.0	16.0	7507.2	44.0	2276.3	72.0	804.8	100.0	366.5
-11.5	29984.0	16.5	7333.9	44.5	2233.8	72.5	789.8	100.5	361.6
-11.0	29172.7	17.0	7164.9	45.0	2192.2	73.0	775.0	101.0	356.7
-10.5	28386.3	17.5	7000.3	45.5	2151.5	73.5	760.6	101.5	351.5
-10.0	27623.8	18.0	6839.8	46.0	2111.7	74.0	746.5	102.0	346.3
-9.5	26884.4	18.5	6683.4	46.5	2072.8	74.5	732.6	102.5	341.1
-9.0	26167.5	19.0	6530.9	47.0	2034.7	75.0	719.2	103.0	335.3
-8.5	25472.2	19.5	6382.3	47.5	1997.4	75.5	706.1	103.5	329.7
-8.0	24797.8	20.0	6237.5	48.0	1960.9	76.0	693.3	104.0	323.8
-7.5	24143.6	20.5	6096.3	48.5	1925.1	76.5	680.8	104.5	317.9
-7.0	23509.0	21.0	5958.7	49.0	1890.1	77.0	668.6	105.0	311.6
-6.5	22893.2	21.5	5824.6	49.5	1855.7	77.5	656.8	105.5	305.3
-6.0	22295.6	22.0	5693.9	50.0	1822.1	78.0	645.2	106.0	298.6
-5.5	21715.7	22.5	5566.4	50.5	1789.1	78.5	634.0	106.5	292.1
-5.0	21152.68	23.0	5442.2	51.0	1756.8	79.0	623.2	107.0	285.2
-4.5	20606.4	23.5	5321.2	51.5	1725.1	79.5	612.6		
-4.0	20075.9	24.0	5203.2	52.0	1694.0	80.0	602.4		

Thermistor resistance characteristics (°C)

4 - USING FLOTRONIC II CONTROL

4.1 - GENERAL

Communication with the Flotronic II phase 3 control is made through keypad and display module also called HSIO. This device allows to enter configurations and setpoints and to read data, perform tests, and set schedules.

Communication with the control can also be made through the CCN communication port with a Building Supervisor, a Network Service Tool or a SAM.

4.2 - HSIO OPERATING INSTRUCTIONS

This device consits of a keypad with 6 function keys, 5 operative keys, 12 numeric keys (0 to 9, ., and -), and an alphanumeric 8-character LCD (liquid crystal display).

Key usage is decribed in the following table named keyboard and display module key usage.

IMPORTANT
When entering multiple characters inputs beginning with a zero, a decimal point must be entered in place of the first zero. When entering an input of zero, only the decimal point need be entered.

Function keys	Use
STAT	***Status*** - Displaying diagnostic codes and current operating information about the machine
TEST	***Quick test*** - For checking inputs and outputs for proper operation
HIST	***History*** - For displaying run time, cycles and previous alarms
SRVC	***Service*** - For entering specific unit configuration information
SET	***SetPoint*** - For entering operating setpoints and day/time information
SCHD	***Schedule*** - For entering occupied/unoccupied schedules for unit operation
Operative keys	**Use**
EXPN	***Expand Display*** - For displaying a non-abbreviated expansion of the display
CLR	***Clear*** - For clearing the screen of all displays
↑	***Up Arrow*** - For returning to previous display position
↓	***Down Arrow*** - For advancing to next display position
ENTR	***Enter*** - For entering data

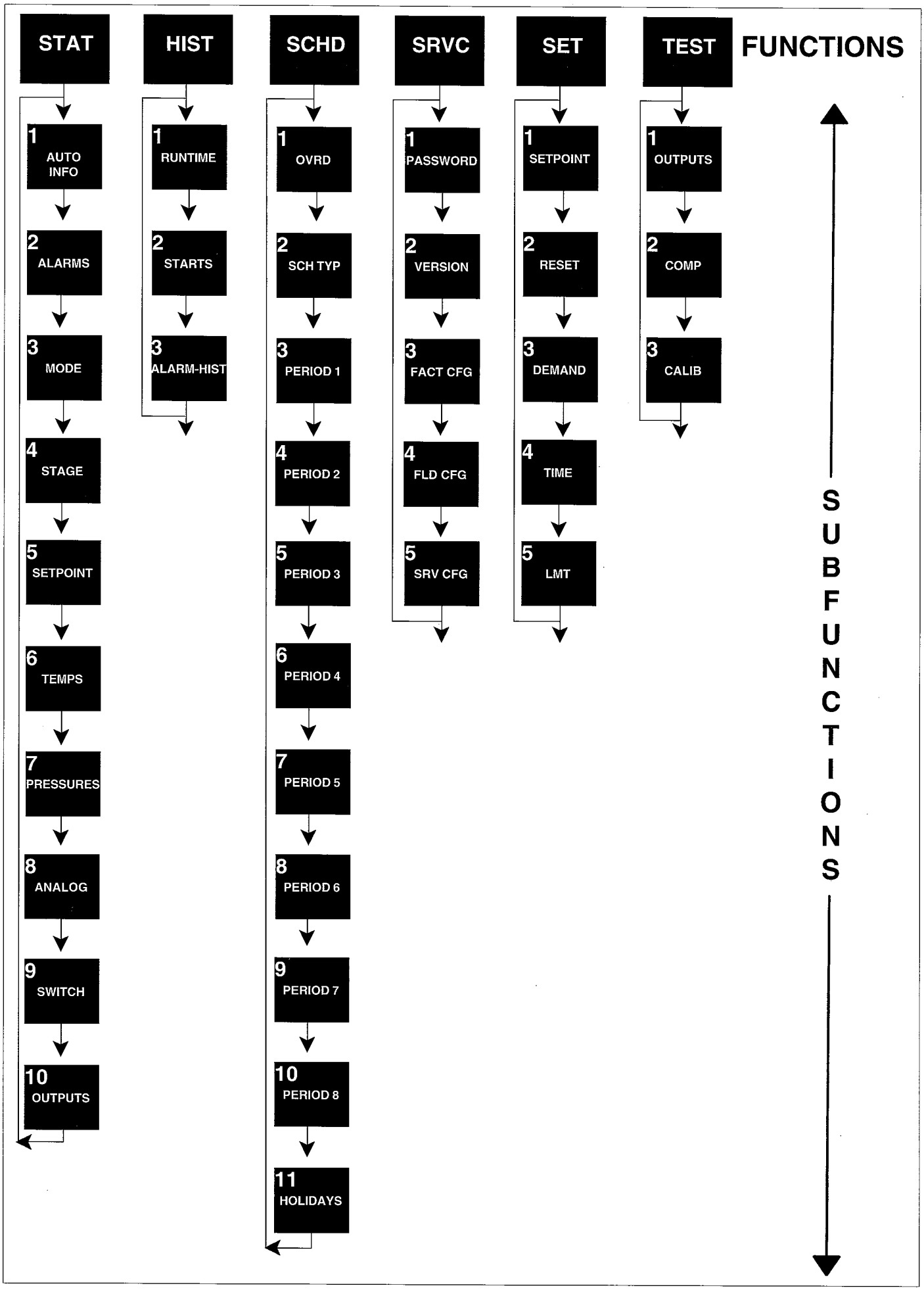
keyboard and display module key usage

The following table gives an example of keyboard operations

Operation	Keyboard entry	Display	Description
To access a function, press the subfunction number and the function name key. The display shows the subfunction group. To move to the other elements, scroll up or down using the arrow keys.	1 SET	SETPOINT	Unit setpoint
	↓	CSP1	Cold setpoint 1
	↓	CSP2	Cold setpoint 2
	↓	HSPA	Head pressure set point circuit A
When the last element in a subfunction has been displayed, the first element is repeated.	↓	CSP1	Cold setpoint 1
To move to the next subfunction, it is not necessary to use the subfunction number ; press the function name key to advance the display through all subfunctions within a function and then back to the first.	SET	RESET	Reset setpoints
	SET	DEMAND	Demand limit setpoints
	SET	TIME	Day of week and time of day Date
	SET	SET POINT	Unit setpoints
To move to another function, either depress the function name key for the desired function (display shows the first subfunction) or access a particular subfunction by using the subfunction number and the function name key.	STAT	AUTO INFO	Summary display
	4 STAT	STAGES	Capacity stages

Accessing functions and subfunctions

4.3 - FUNCTIONS AND SUBFUNCTIONS GENERAL STRUCTURE



STAT

1 AUTO

dow hh.mmS	Day and Time
LOCAL ON or LOCAL OFF or CCN ON or CCN OFF	Unit in LOCAL ON mode Unit in LOCAL OFF mode Unit in CCN ON mode Unit in CCN OFF mode
CLOCK ON or CLOCK OFF	Unit in Occupied clock mode Unit in Unoccupied clock mode
MODE nn	Modes 7 to 18 (if in effet)
COOL nn or HEAT nn	Number of Cool stages Number of Heat stages
nn ALRMS	Number of alarms in effect
nn MINS	Delay at startup

THIS DEFAULT DISPLAY IS DISPLAYED IF THERE HAS BEEN NO MANUAL INPUT FROM THE KEYPAD FOR 10 MINUTES.
EACH ITEM IS DISPLAYED FOR APPROXIMATELY 2-3 SECONDS, THEN THE NEXT ITEM IS DISPLAYED.
TO RETURN TO AUTOMATIC DISPLAY ENTER 1 <STAT> AT ANY TIME.

2 ALARMS

nn ALRMS	Number of alarms
RSAL DSB	Reset all alarms **
ALARM nn	Description of alarm 1 **
. . .	. . .
ALRMS nn	Description of alarm 10 **

PRESSING THE<EXP> KEY GIVES ALARM DECRIPTION PLUS THE TIME AND DATE AT WHICH SAFETY TRIPPED

3 MODES

MODES nn	Number of modes in effect
MODE nn	Description of mode 1
MODE nn	Description of last mode

MODES OF OPERATION

MODE 01	UNIT IS IN STOP MODE
MODE 02	UNIT IS OFF BY CCN COMMAND
MODE 03	UNIT IS OFF BY TIMECLOCK
MODE 04	UNIT IS IN LOCAL MODE
MODE 05	UNIT IS ON BY CCN COMMAND
MODE 06	UNIT IS ON BY TIME CLOCK
MODE 07	DUAL SETPOINT CONFIGURED
MODE 08	TEMPERATURE RESET IN EFFECT
MODE 09	DEMAND LIMIT IN EFFECT
MODE 10	FSM CONTROLLING CHILLER
MODE 11	LOW SOURCE PROTECTION
MODE 12	RAMP LOAD LIMITED
MODE 13	n HR TMED OVERRIDE
MODE 14	LOW COOLER SUCTION TEMPERATURE WARNING
MODE 15	WSM CONTROLLING CHILLER
MODE 16	SLOW CHANGE OVERRIDE IN EFFECT
MODE 17	n MINUTES OFF TO ON DELAY IN EFFECT
MODE 18	LOW SUCTION SUPERHEAT PROTECTION

4 STAGES

COOL nn or HEAT nn	Number of cooling stages * Number of heating stages *
CAPT nnn	Unit total capacity being utilized in %
CAPA nnn	Cir A total capacity being utilized in %
CAPB nnn	Circuit B total capacity being utilized in %
AVAIL nnn	Unit available capacity being utilized in %
AV A nnn	Circuit A available capacity being utilized in %
AV B nnn	Circuit B available capacity being utilized in %
DMD_LMT nnn	Demand limit setpoint in % *
CIRCA nnnn	Circuit A compressors status
CIRC B nnnn	Circuit B compressor status
SMZ±nnn.n	Load unload compressor factor %

n : Numeric display
* : Displayed upon configuration
** : Displayed if alarm exists

Status Subfunctions

STAT

5 FLUID SETPOINT

SET ±nnn.n	Setpoint in effect
MSP ±nnn.n	Setpoint in effect + reset
TW ±nnn.n	Actual control temperature

6 TEMPERATURES

EWT ±nnn.n	Cooler entering water temperature
LWT ±nnn.n	Cooler leaving water temperature
CEWT ±nnn.n	Condenser entering water temp*
CLWT ±nnn.n	Condenser leaving water temp*
HEWT ±nnn.n	Reclaim entering water temp*
HLWT ±nnn.n	Reclaim leaving water temp*
SCTA nnn.n	Circuit A sat condensing temperature
SSTA ±nn.n	Circuit B saturated suction temperature
CTA ±nn.n	Comp A1 suction temperature*
SHA ±nn.n	Circuit A suction superheat*
SBCA ±nnn.n	Circuit A spare sensor temperature*
SCTB nnn.n	Circuit B sat condensing temp*
SSTB ±nn.n	Circuit B saturated suction temperature
CTB ±nn.n	Comp B1 suction temperature*
SHB ±nn.n	Circuit A suction superheat*
SBCB ±nnn.n	Circuit B spare sensor temp*
SPC ±nn.n	Space temperature*
OAT ±nnn.n	Outdoor air temperature*

7 PRESSURES

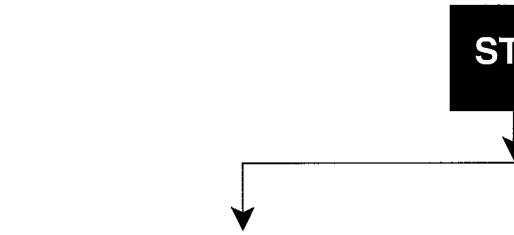
mm.dd.yy	Date of last calibration*
NONE	None avallable*
DPA nnnn	Circuit A discharge pressure
SPA nnnn	Circuit A suction pressure
nnnn nnn	Cir A discharge/Suction pressure
OPA ±nnn	Circuit A oil press differential*
DPB nnnn	Circuit B discharge pressure
SPB nnnn	Circuit B suction pressure
nnnn nnn	Cir B discharge/Suction pressure
OPB ±nnn	Circuit B oil press differential*

8 ANALOG INPUTS

NONE	None avallable
REF n.n	Transducer supply voltage
LMT nn.n	4-20 mA demand signal*
RST nn.n	4-20 mA reset signal*

n : Numeric display
* : Displayed upon configuration

Status Subfunctions



9 STATUS OF SWITCH INPUTS	
NONE	None available*
HCS f	Heat/Cool switch*
SPW c	Dual setpoint switch*
OPSA c	Circ A oil pressure switch*
OPSB c	Circ B oil pressure switch*
DL1 c	Demand switch 1*
DL2 c	Demand switch 2*

10 STATUS OF OUTPUTS	
ALRM b	Alarm relay
FRA1 b	Fan relay A1*
FRA2 b	Fan relay A2*
FRB1 b	Fan relay B1*
FRB2 b	Fan relay B2*
CHWP b	Cooler pump relay*
CWP b	Condenser pump relay*
ULA1 b	Unloader A1*
ULA2 b	Unloader A2*
ULB1 b	Unloader B1*
ULB2 b	Unloader B2*
LLSA b	Liquid line solenoid A*
LLSB b	Liquid line solenoid B*
EXVA nnn	EXV A position *
EXVB nnn	EXV B position *
HGBA b	Hot gas bypass valve A *
HGBB b	Hot gas bypass valve B *
MMA nnn	Motormaster A speed *
MMB nnn	Motormaster B speed *
WVA nnn	Water valve A position *
WVB nnn	Water valve B position *

f : HEAT/COOL
b : ON/OFF
c : OPN/CLS
n : Numeric display
* : Displayed it configured

Status Subfunctions

4.4 - STATUS FUNCTION

The status function shows the rotating display, current status of alarm (diagnostic) codes, capacity stages, operating modes, chilled water setpoint, all measured system temperatures, superheat values, pressure switch positions and expansion valves positions. These subfunctions are defined below.

4.4.1 - [1] [STAT] Auto info (information)

The display will automatically switch on an alternating summary display. This default screen is displayed if there has been no manual input from the keypad for 10 minutes.

4.4.2 - [2] [STAT] Alarms

Alarms are messages that one or more faults have been detected. Each fault is assigned a code number which is reported with the alarm. (See section 6 for code description). The codes indicate failures that cause the unit to be in alarm. Up to 10 alarm codes can be stored at once. To view them in sequence, press [2] [STAT] to enter the alarm displays and then press [↓] to move to the individual alarm diplays.
The alarm major display type gives the number of active alarms. (an alarm is active if it has been tripped and has not been reset). It is of the form of "nn ALRMS" where nn is the number of active alarms.
The first minor diplay is used for the reset of all active alarms. This display is of the form of "RSAL DSB". Pressing the ENTR key causes the display to read "RSAL ENB" and causes the reset of all active alarms. The format of the rest of the minor display types is "ALARM nn" where "nn" is the alarm code for the active alarm.
When the EXPN key is pressed, a full description of the alarm is displayed with its time and date.
When a diagnostic (alarm) code is stored in the display and the unit automatically resets, the code is deleted. Codes for safeties which do not automatically reset are not deleted until the problem is corrected and alarms are reset through the keyboard.

Keyboard Entry	Display Response	Comment
[2] [STAT]	2 ALARMS	2 alarms detected
[↓]	RSAL DSB	ALARM reset
[↓]	ALARM 9	First alarm code
[EXPN]	COOLER LEAVING FLUIDE THERMISTOR FAILURE TIME APR/18 10:02	Explanation of alarm code with the time and date of the alarm
[↓]	ALARM 42	Second alarm code Cooler freeze protection
[EXPN]	COOLER FREEZE PROTECTION TIME APR/18 10:40	Explanation of alarm code with the time and date of the alarm

Example : Reading alarm codes

Keyboard Entry	Display Response	Comment
[2] [STAT]	2 ALARMS	2 alarms detected
[↓]	RSAL DSB	Allows alarm reset
[1] [ENTR]	RSAL ENB	All alarms are reset

Alarm reset

4.4.3 - [3] [STAT] Operating modes

The operating modes are displayed to indicate the current operation status of the unit. They are displayed by name or code number. The modes are :

	Code	Description
1	LOCAL # OFF	Unit is off. Local/Stop/Network switch is in Off position, or Local/Stop/Network switch may be in Local position with an external On/Off switch in Off position.
2	NETWORK OFF (CCN)	Unit is off due to NETWORK command. Local/Stop/Network switch is in Network position.
3	CLOCK # OFF	Unit is off due to internal clock schedule.
4	LOCAL ON	Unit is on. Local/Stop/Network switch is in Local position. If an external On/Off switch is used, it is in On position.
5	NETWORK ON	Unit is on due to Network command. Local/Stop/Network switch is in Network position.
6	CLOCK ON	Unit is on due to internal clock schedule or occupied override function. Local/Stop/Network switch is in Local position.
7	MODE 7 DUAL SET POINT	Dual setpoint is in effect. In this mode, unit continues to run in unoccupied condition, but uses the second setpoint (CSP2 setpoint).
8	MODE 8 TEMPERATURE RESET	Temperature reset is in effect. In this mode, unit is using temperature reset to adjust leaving water setpoint, and unit is currently controlling to the modified setpoint. The setpoint can be modified based on return water, outside air temperature or space temperature.
9	MODE 9 DEMAND LIMIT ACTIVE	Demand Limit is in effect. This indicates that capacity of unit is being limited by Demand Limit control option. Because of this limitation, unit may not be able to produce the desired leaving water temperature.
10	MODE 10 FSM CONTROL	Chiller is under FSM Control.
11	Mode 11 LOW SOURCE PROTECTION	The unit is in heating mode and the cooler leaving water temperature is less than the smaller of the two cooling setpoints. One stage of capacity is removed.

12	MODE 12 RAMP LOAD LIMITEDMODE	Ramp load (pulldown) limiting is in effect. In this mode, the rate at which leaving water temperature is dropped is limited to a predetimined value to prevent compressor overloading. See CRAMP or HRAPM set point in the SET function. The pulldown limit can be modified, if desired, to any rate from 0.1 to 1°C (0.2 to 2°F)/minute.
13	13 TIMED OVERRIDE (HOURS)	Time override is in effect. This is a 1 to 4 hour temporary override of the programmed schedule, forcing unit to occupied mode. Override can be implemented with unit under Local or Network control. Override expires after each use.
14	MODE 14 LOW COOLER SUCTION	Low cooler suction protection is in effect. In this mode, circuit capacity is not allowed to increase if cooler saturated suction temperature is 13°C (24°F) degrees or more below leaving water temperature, and leaving water temperature is less than freeze point - 1.1°C.
15	MODE 15 WSM CONTROL	Chiller under Water System Manager (WSM) control.
16	MODE 16 SLOW CHANGE OVERRIDE	Slow change override in effect. In this mode, compressor stage change is not allowed because leaving water temperature is close to the control point.
17	MODE 17 n MINUTES DELAY	Delay at unit startup is in effect. This is the delay upon a power up condition or after both circuits shut off due to a manual switch change to off or a CCN disable.
18	MODE 18 LOW SUPERHEAT PROTECTION	Low suction super heat protection is in effect. In this mode, circuit is stopped after going through pumpdown and then restart without pumpdown because of low suction superheat alarm conditions. During the stop-restart period, mode 18 is displayed. See alarm 48 and 49 description.

To enter the **MODES** subfunction, depress [3] [STAT] and use the [↓] key to determine if more than one mode applies.

Keyboard Entry	Display Response	Comment
[3] [STAT]	2 MODES	There are 2 modes currently in effect
[↓]	LOCAL ON	Mode 1 : Units is on by chiller on/off switch
[↓]	MODE 8	Mode 2 : Temperature reset is in effect

Reading current operating modes

4.4.4 - [4] [STAT] Stages

This subfunction displays the capacity stage number.

To enter the **STAGES** subfunction, depress [4] [STAT] and use the [↓] to display the stage number. Additional [↓] provides the following information :

- Percent of total unit capacity being utilized.
- Percent of each circuit capacity being utilized.
- Percent of unit available capacity being utilized.
- Percent of each circuit available capacity being utilized.
- Demand limit setpoint in effect (can be any value between 0 % and 100 %).
- Status of each compressor relay. When a compressor is on, the number of this compressor is displayed. If a compressor is off, a 0 is displayed. Example : In a given circuit, if compressors 1 and 3 are running, and 2 and 4 are not running, 0301 is displayed for that circuit.
- Load/Unload percent factor for compressors. For Carrier Service only.

4.4.5 - [5] [STAT] Current operating setpoint

To enter the setpoint subfunction, depress [5] [STAT] and use the [↓] to access to the following informations :

- Current Setpoint (SP). It is the cool or hot water setpoint in effect.
- Control Point (MSP). It is the setpoint used by the microprocessor to control the leaving water temperature.
- Current cooler leaving water temperature if the unit is in cooling mode or current condenser leaving water tempera ture if the unit is in heating mode.

See section 5.6 for additional informations on setpoints.

Keyboard Entry	Display Response	Comment
[5] [STAT]	SETPOINT	Fluid setpoint information
[↓]	SET X	Setpoint
[↓]	MSP X	Modified setpoint = setpoint + reset
[↓]	TW X	Actual leaving fluid temperature

Reading current setpoints

4.4.6 - [6] [STAT] System temperatures

The temperatures subfunction displays the unit operating temperatures.

To read a temperature, enter [6] [STAT], then scroll to the desired temperature using the [↓] key.

Note : All temperatures can be displayed either in metric unit or in imperial units. See section 4.5.4 for the unit configuration.

4.4.7 - [7] [STAT] System pressures

The system pressures subfunction displays unit operating pressures. Note that all pressures are displayed in gauge units.

Note : All temperatures can be displayed either in metric unit or in imperial units. See section 4.5.4 for the unit configuration.

4.4.8 - [8] [STAT] Analog inputs

This subfunction displays analog inputs used by the control if any.

Enter [8] [STAT] then use the [↓] to access the following informations :

- The transducer supply voltage if unit uses pressure transducer.
- The 4-20 mA demand signal if it is used by the unit.
- The 4-20 mA reset signal if it is used by the unit.

4.4.9 - [9] [STAT] Switch inputs

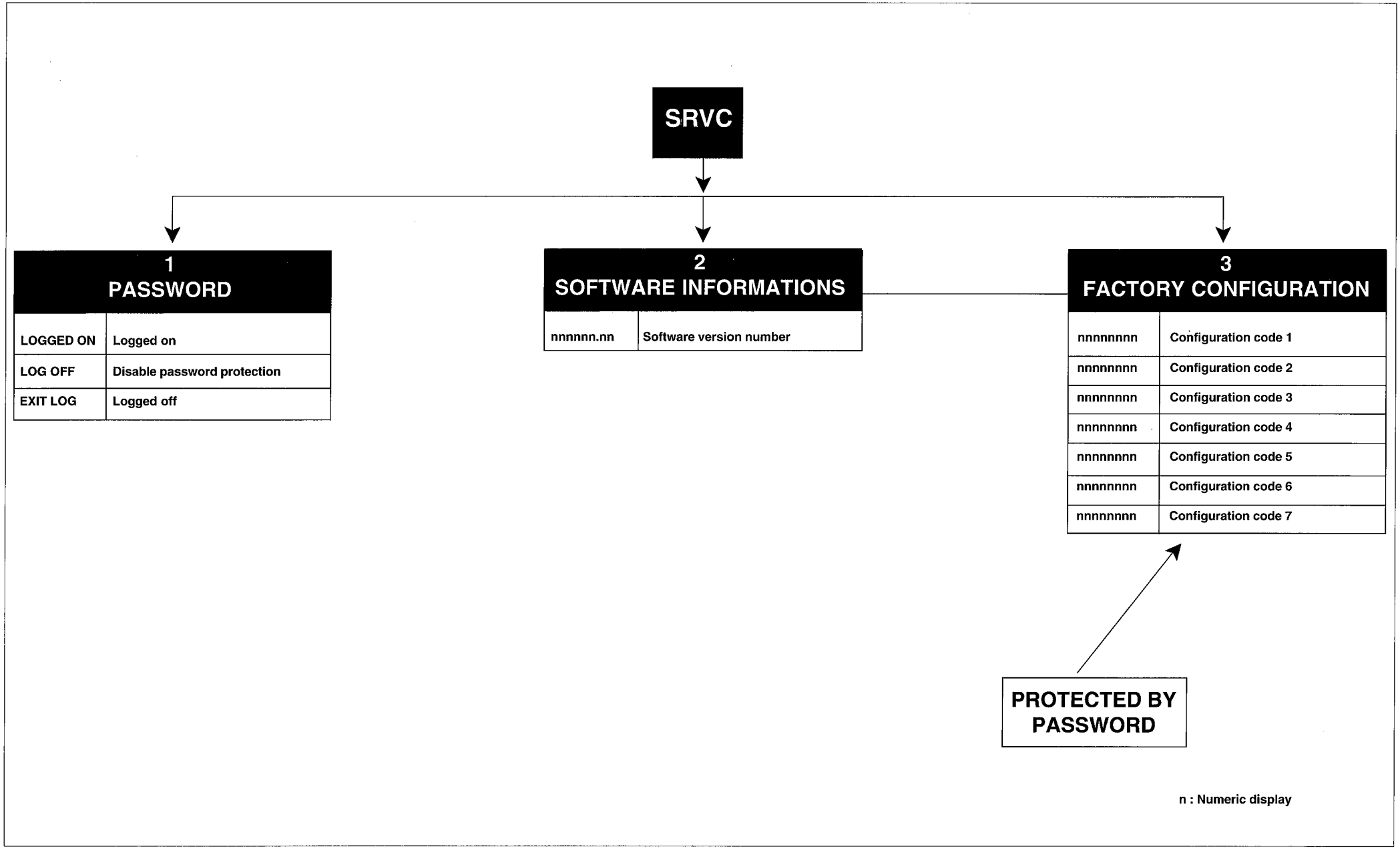
This subfunction displays the status (ON/OFF) of input switch when applicable :

- Heat / Cool switch for heat machine.
- Dual setpoint switch, if used.
- Oil pressure switches for circuit lead compressors, when used.
- Demand switches, if used.

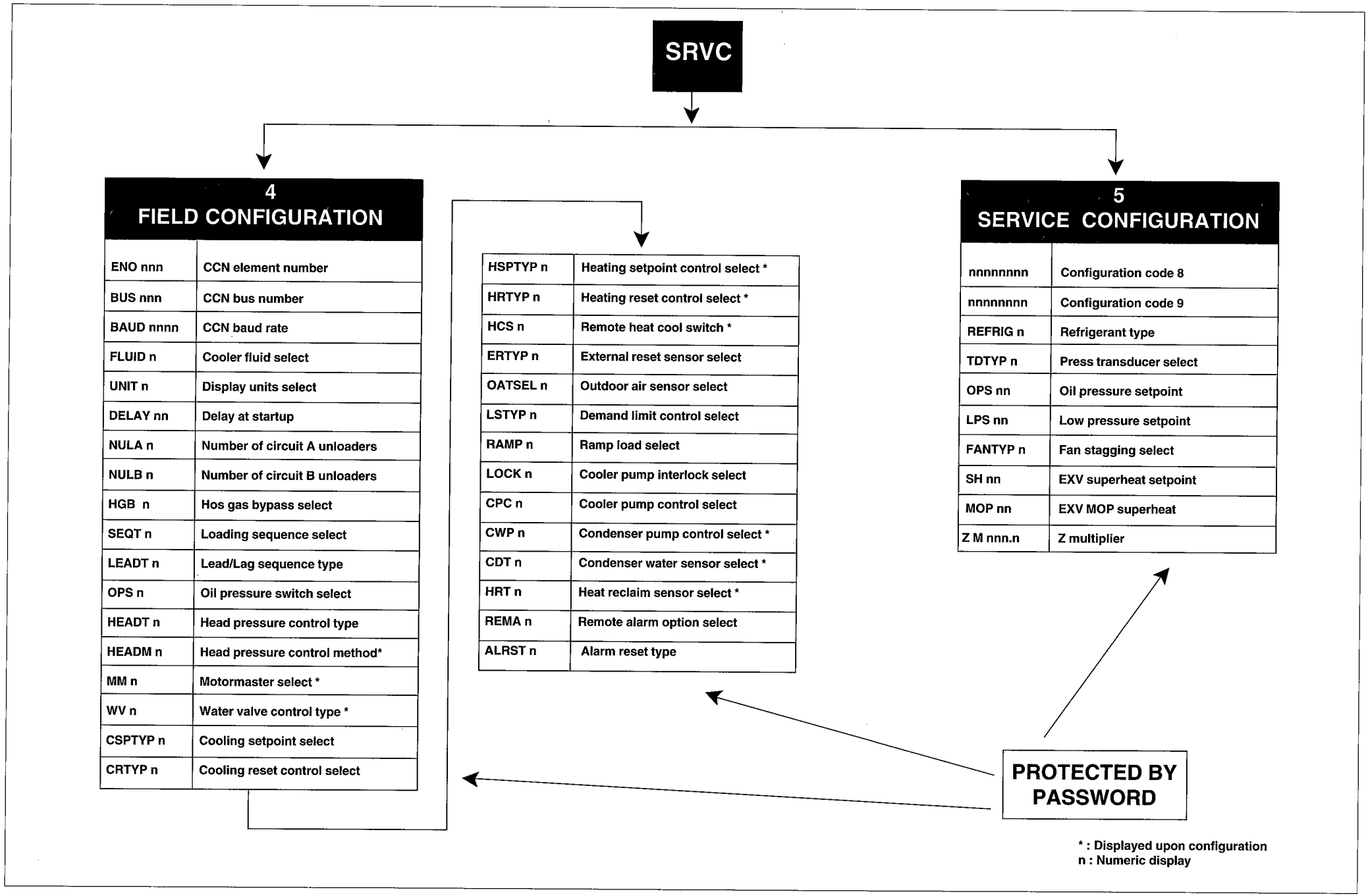
4.4.10 - [10] [STAT] Outputs

This function displays status of the following output :

- Alarm relay.
- Circuits fan relays (for air cooled units).
- Cooler and condenser relay (if used).
- Unloader status (if used).
- Liquid line solenoid (for units using TXV's).
- EXV position in percent (for units using EXV's).
- Hot gaz bypass (if used).
- Motormaster speed in percent (if configured for air cooled units).
- Water valve position in percent (if configured for water cooled units).



Service Subfunctions



Service Subfunctions

4.5 - SERVICE FUNCTION

The service function allows the operator to verify factory configurations and read or change field configurations. Configuration modification through HSIO can be performed only when the Local/Stop/CCN switch is in the STOP position and when the unit is completely stopped (all compressor and fans outputs off). The service subfunctions are listed below.

Note : Every time the PSIO configuration is modified, the PSIO is automatically reset. However, once this reset is completed (HSIO operate normally) a hard reset (control power-off) must be performed.

4.5.1 - [1] [SRVC] Log on

The operator must use this subfunction to log on before performing any other subfunctions, and to log off after completing service subfunctions. System will log out if there is no key stroke for 10 minutes. Password is required for all write command except for Z Multiplier modification. Password is 1111 for all units. The password is changeable through the CCN Network by writing to the PASSWORD configuration table.

Pressing [1] [1] [1] [1] [ENTR] allows the technician to log on. LOGGEDON is then displayed. Pressing [↓] when LOGGEDON is displayed allows to log off. LOGOFF is then displayed. After using SRVC function, it is recommended to log off.

Keyboard Entry	Display Response	Comment
[1] [SRVC]	PASSWORD	Enter password
[1] [1] [1] [1] [ENTR]	LOGGED ON	Connection approved
At this time, configurations may be modified, when finished modifying configurations, log out as follows :		
[↓]	LOG OFF	Disable protection
[ENTR]	EXIT LOG	Exit from logging

Logging on and logging off-service function

4.5.2 - [2] [SRVC] Software version

Pressing the [↓] key displays the version number of the software that resides in the processor module.

Keyboard Entry	Display Response	Comment
[2] [SRVC]	VERSION	Software information
[↓]	500062.xx	Software part number

Reading software version

The 6 first digits (500062) provide the control part number and means that it is a Flotronic II Phase 3 software. The 2 last digits (xx) provide the current release level.

4.5.3 - [3] [SRVC] Factory configuration codes

Allows entry into the factory configuration subfunction. Under this subfunction, there are seven groups of configuration codes that are downloaded at factory. Each group is made up of eight digits. If processor module is replaced in the field, these seven groups of configuration codes must be entered through the keyboard and display module or through CCN network. Factory configuration codes (groups 1 through 7) that apply to the particular Flotronic II chiller being serviced are found on label located inside the control box cover. Factory configuration codes can be modified by Carrier Service only.

To change a configuration enter the new configuration and press [ENTR] while on the correct configuration.

Sub-function	Keyboard Entry	Display	Comments
3 Factory CFG	[3] [SRVC]	**Fact CFG**	**Factory configuration codes**
	[↓]	XXXXXXXX	Configuration Code 1
	[↓]	XXXXXXXX	Configuration Code 2
	[↓]	XXXXXXXX	Configuration Code 3
	[↓]	XXXXXXXX	Configuration Code 4
	[↓]	XXXXXXXX	Configuration Code 5
	[↓]	XXXXXXXX	Configuration Code 6
	[↓]	XXXXXXXX	Configuration Code 7
5 Service CFG	[5] [SRVC]	**SRV CFG**	**Service configuration codes**
	[↓]	XXXXXXXX	Configuration Code 8
	[↓]	XXXXXXXX	Configuration Code 9

Factory configuration keystrokes and Service

4.5.4 - [4] [SRVC] Adjustable field configurations

After logging on, keystrokes allow entry into this subfunction. The subfunction allows operation of the chiller to be customised to meet the particular needs of the application. The chiller comes from the factory preconfigured to meet needs of most applications. Each item should be checked to determine which configuration alternative best meets the needs of a particular application.

If the processor module is replaced, the service replacement module is preloaded with the software. Each configuration code must be checked and, if necessary, reconfigured to meet needs

of the application. Modifications take effect **only** when this subfunction is exited. The PSIO is then **automatically reset** and HSIO is unavailable for about 20 seconds. Remember that this reset must be completed by a hard reset (control power off).

Field adjustment values description :

ENO CCN Element address

Default value : 1

Range : 1 - 239

Two elements on the same network cannot have both the same element number and the same bus number.

BUS CCN Bus number

Default value : 0

Range : 0 - 239

Note : Two elements on the same network cannot have both the same element number and the same bus number.

BAUD CCN Baud rate

Default value : 9600

Range : 1200 or 2400 or 4800 or 9600

Note : To communicate between each other two network elements must have the same baud rate. 9600 is used in most cases.

FLUID Cooler fluid select

Default value : Water

Range : 1, 2, 3

Configuration : 1 = Water
2 = Brine
3 = Low brine

Note : Low brine is not available with air cooled units.

UNIT HSIO display units

Default value : 0

Range : 0, 1

Configuration : 0 = English units
1 = Metric units

Note : This value can be modified at any time even if the unit is running. This modification does not cause a PSIO reset.

DELAY Delay at startup

Default value : 0

Range : 0 - 15 minutes

Note : This value is initialized after power up or when both circuits are shut off due to a manual switch change to off or CCN disable.

If the cooler pump is configured it will not be started until the delay has elapsed.

NULA Number of unloaders circuit A

Default value : 0

Range : 0, 1 or 2

Configuration : 0 = No unloader
1 = One unloader on compressor A1
2 = Two unloaders on compressor A1

Note : To be valid, the unloader capacity in tons must be defined in the ***Factory*** configuration. Otherwise an illegal configuration will be detected.
Unloaders must be on the lead compressors.
More than one unloader on circuits with 4 compressors is illegal.

NULB Number of unloaders circuit B

Default value : 0

Range : 0, 1 or 2

Configuration : 0 = No unloader
1 = One unloader on compressor B1
2 = Two unloaders on compressor B1

Note : To be valid, the unloader capacity in tons must be defined in the ***Factory*** configuration. Otherwise an illegal configuration will be detected.
Unloaders must be on the lead compressors.
More than one unloader on circuits with 4 compressors is illegal.

HGB Hot Gas Bypass

Default value : 0

Range : 0 or 1

Configuration : 0 = No hot gas bypass
1 = Hot gas bypass on both circuits

Note : 2 Unloaders and hot gas bypass in a circuit is an illegal configuration.

SEQT Loading Sequence Type

Default value : 1

Range : 1 or 2

Configuration : 1 = Equal circuit
2 = Staged circuit

Note : If the unit is an air cooled unit, a split system with air cooled head pressure control or an air cooled heat reclaim unit and the SCT of either circuit is less than 0°C at startup, staged circuit loading sequence is used even if equal circuit loading has been selected.

LEADT Lead-Lag Sequence Control

Default value : 1

Range : 1, 2 or 3

Configuration : 1 = Auto
2 = Manual ; Circuit A leads
3 = Manual ; Circuit B leads

Note : The circuit with the most unloaders configured is always the lead circuit whatever the configuration.

OPS Oil Pressure Switch

Default value : 0

Range : 0 or 1

Configuration : 0 = Not used
1 = Used

Note : Cannot be used with oil pressure transducers.

HEADT Head Pressure Control Type

Default Value : 1 on air cooled units, otherwise 0

Range : 0, 1 or 2

Configuration : 0 = No control
1 = Air cooled
2 = Water cooled

Note : Automatically defaults to 1 for air cooled chillers and air cooled heat reclaim units. No other value is allowed for air cooled units.

HEADM Head Press Control Method

Default value : 2

Range : 1, 2, 3 or 4

Configuration : 1 = EXV controlled
2 = Setpoint control
3 = Setpoint circuit A, EXV circuit B
4 = EXV circuit A, setpoint circuit B

Note : Configurations 3 and 4 are not allowed for units with air cooled head pressure control and common fan circuits.
Only configuration 2 is allowed for units using TXV's.

MM Motormaster Select

Default value : 0

Range : 0, 1 or 2

Configuration : 0 = None
1 = Motormaster (Direct control)
2 = Motormaster (Indirect control)

Note : This configuration item is available only when HEADT = 1.
In the indirect control the PSIO does not control the fan speed.

WV Water Valve Type

Default value : 0

Range : 0, 1, 2, 3 or 4

Configuration : 0 = None
1 = 4-20 mA valve
2 = 0-10 Volts valve
3 = 20-4 mA valves
4 = 10-0 Volts valve

Note : This configuration item is available only when HEADT has been configured at 2 :
- Configure HEADT = 2, exit 4 <SRVC> and wait for the PSIO reset.
- Return in 4<SRVC> HSIO subfunction : WV is then available. It is also possible to use the Network Service Tool for this configuration. HEAT and WV are in that case both configurable at the same time.

CSPTYP Cooling Setpoint Select

Default value : 0

Range : 0, 1 or 2

Configuration : 0 = Single setpoint
1 = Dual setpoint ; switch controlled
2 = Dual setpoint ; clock controlled

Note : For configuration 1 the 4 x 4 module option must be available.

CRTYP Cooling Reset Select

Default value : 0

Range : 0, 1, 2, 3, or 4

Configuration : 0 = No reset
1 = Internal powered 4-20 mA reset
2 = External reset
3 = Return fluid reset
4 = External powered 4-20 mA

Note : For configurations 1, 2 and 4 the 4 x 4 module option must be available.

HSPTYP Heating Setpoint Select

Default value : 0

Range : 0, 1 or 2

Configuration : 0 = Single setpoint
1 = Dual setpoint ; switch controlled
2 = Dual setpoint ; clock controlled

Note : Only for heat machine.
For configurations 1 the 4 x 4 module option must be available.

HRTYP Heating Reset Control

Default value : 0

Range : 0, 1, 2, 3 or 4

Configuration : 0 = No reset
1 = Internal powered 4-20 mA reset
2 = External reset
3 = Return fluid reset
4 = External powered 4-20 mA

Note : Only for heat machine.
For configurations 1, 2 and 4 the 4 x 4 module option must be available.

HCS Heat Cool Select

Default value : 0

Range : 0 or 1

Configuration : 0 = Selection based on Heat/Cool variable HC in 1<SET> HSIO subfunction when the unit is in local mode and based on HEATCOOL variable if the unit is in CCN MODE (HEATCOOL is forced via the CCN network).
1 = Heat/Cool selection based on the switch input HC_SW (module 8 IN).

Note : Only available on Heat Machine.
In heat mode, the 8 IN module is necessary (Condenser sensors and possibly Heat/Cool switch).

ERTYP External Reset Sensor Select

Default value : 0

Range : 0 or 1

Configuration : 0 = Space thermistor
1 = OAT sensor

Note : Needs the 4x4 option module.

OATSEL OAT Sensor Select

Default value : 0

Range : 0 or 1

Configuration : 0 = Not selected
1 = Selected

Note : OAT sensor can be chosen even when reset is not in use.

LSTYP Demand Limit Control

Default value : 0

Range : 0, 1, 2, 3 or 4

Configuration : 0 = None
1 = 2 step switch demand limit
2 = Internal powered 4-20 mA demand limit
3 = CCN LOADSHED
4 = External powered 4-20 mA demand limit

Note : For configurations 1, 2 and 4 the 4 x 4 module option must be available.

RAMP Ramp Load

Default value : 0

Range : 0 or 1

Configuration : 0 = Disable
1 = Enable

Note : This configuration activates both cooling and heating ramp loading. However, each mode has its own ramp setpoint. These setpoints can be configured in HSIO subfunction 1<SET>.

LOCK Cooler Pump Interlock

Default value : 0

Range : 0 or 1

Configuration : 0 = No interlock
1 = Interlock

Note : The interlock configuration (1) can be done if the cooler pump is used or not used. If the interlock is configured and the cooler pump is not configured then only alarms 53 and 54 will be tripped if alarm conditions are satisfied (alarm 55 is not activated in this case). If the cooler pump and interlock are both configured alarms 53, 54, 55 will be tripped if alarm conditions are satisfied.

CPC Cooler Pump Control

Default value : 0

Range : 0 or 1

Configuration : 0 = Not controlled
1 = ON/OFF control

CWP Condenser Pump Control

Default value : 0

Range : 0, 1 or 2

Configuration : 0 = Not controlled
1 = ON/OFF control
2 = OFF when stage = 0

Note : Available on water cooled units only.

CDT Condenser Sensors Select

Default value : 0

Range : 0 or 1

Configuration : 0 = Not used
1 = Used

Note : The 8 IN module is necessary for this configuration.
Except on heat machine, these sensors are used for information only and have no control function.

HRT Heat Reclaim Sensors

Default value : 0

Range : 0 or 1

Configuration : 0 = Not used
1 = Used

Note : The 8 IN module is necessary for this configuration.
These sensors are used for information only and have no control function.

REMA Remote Alarm Annunciation

Default value : 0

Range : 0 or 1

Configuration : 0 = Not used
1 = Used

Note : 1 or 2 DSIO-LV modules are necessary to use this function. The configuration is the same either if 1 or 2 modules are used (Software detects automatically the number of modules connected when power is switched on).

Keyboard Entry	Display Response	Comment
4 SRVC	FLD CFG	Field configuration subfunction of service function
↓	CSPTYP 0	Scroll past single cooling set point
↓	CRTYP 0	No reset has been selected
3 ENTR	CRTYP 3	Return water temperature reset is selected and actived
1 STAT	"AUTO"	Field configuration subfunction is exited PSIO is automatically reset. HSIO is unavailable (Becomes thank if key is pressed) for about 20 seconds.

Example : Changing reset type

Keyboard Entry	Display Response	Comment
4 SRVC	FLD CFG	Adjust. field configuration
↓	ENO1	Network element address
↓	NULA Ø	No. cir A unloaders
1 ENTR	NULA 1	1 unloaders, cir A
1 STAT	"AUTO"	Field configuration subfunction is exited PSIO is automatically reset. HSIO is unavailable (Becomes thank if key is pressed) for about 20 seconds.

Example : Changing unloader count

4.5.6 - 5 SRVC Service configuration codes

These codes allow access to the service configuration subfunction.
The first two items under this subfunction are two groups of eight-digit configuration codes which are downloaded at the factory.
If the processor module is replaced, these codes must be entered through the keyboard and display module.
The configuration codes (group 7 and 8) applicable to the unit appear on a label inside the control box cover.
See section 4.5.3 for the keystrokes to be used.

4.6 - SET FUNCTION

4.6.1 - General

Setpoints are entered through the keyboard. Set points can be changed within the upper and lower limits, which are fixed. Modifications can be made only when the **Local/Stop/CCN** switch is in **Local** or **Stop** position.

4.6.2 - [1] [SET] Setpoints

Displays chilled water set points.
HC is the Heat/Cool select variable. Unit is in the cooling mode when HC = 0 and in heating when HC = 1. This item is only displayed for heat machines and when the Heat /Cool select HCS = 0. See field configuration section.

CSP1 is the occupied cooling setpoint. It is used when :

- The Cooling Setpoint Select = 0 (single setpoint. See field configuration section).
- The Cooling Setpoint Select = 1 (dual setpoint ; switch controlled. See field configuration section) and the dual setpoint switch is opened.
- The Cooling Setpoint Select = 2 (dual setpoint ; clock controlled. See field configuration section) and the period is occupied.

CSP2 is the unoccupied cooling setpoint. It is used when :

- The Cooling Setpoint Select = 1 (dual setpoint ; switch controlled. See field configuration section) and the dual setpoint switch is closed.
- The Cooling Setpoint Select = 2 (dual setpoint ; clock controlled. See field configuration section) and the period is unoccupied.

HSP1 is the occupied heating setpoint. It is displayed only when the unit is a heat machine which is in heat mode.
It is used when :

- The Heating Setpoint Select = 0 (single setpoint. See field configuration section).
- The Heating Setpoint Select = 1 (dual setpoint ; switch controlled. See field configuration section) and the dual setpoint switch is opened.
- The Heating Setpoint Select = 2 (dual setpoint ; clock controlled. See field configuration section) and the period is occupied.

HSP2 is the unoccupied heating setpoint. It is displayed only when the unit is a heat machine which is in heat mode.
It is used when :

- The Heating Setpoint Select = 1 (dual setpoint ; switch controlled. See field configuration section) and the dual setpoint switch is closed.
- The Heating Setpoint Select = 2 (dual setpoint ; clock controlled. See field configuration section) and the period is unoccupied.

Setpoint	R407C	R22	R500	R502	R134A
Cooling max.	30.0	30.0	38.3	21.1	38.3
Cooling min.					
fiWater	3.3	3.3	3.3	3.3	3.3
fiMedium brine	-10	-10	-10	-10	-10
fiLow brine	- 28.8	-28.8	-28.8	-28.8	-28.8
Heating max.	56.1	56.1	66.1	50	80
Heating min.	26.6	26.6	26.6	26.6	26.6

Setpoint range in °C

HSPA/HSPB are the head pressure setpoints for circuits A/B. They are displayed only when the unit is configured for head pressure control (see field configuration section).

	R22	R502	R500	R407C	R134
Minimum	35.0	35.0	35.0	35.0	26.6
Maximum	57.2	57.2	60.0	57.2	75.0

Head pressure setpoint range for air cooled units in °C

	R22	R502	R500	R407C	R134
Minimum	26.6	37.7	26.6	26.6	26.6
Maximum	54.4	54.4	60.0	54.4	75.0

Head pressure setpoint range for water cooled Units in°C.

CRAMP/HRAMP are the cooling or heating ramp loading rates. This is the maximum rate at which the leaving chilled water is allowed to drop, and can be field set from 0.1°C to 1.1°C/minute. This value is not displayed until the function is enabled (see adjustable field configuration section).

Keyboard Entry	Display Response	Comment
[1] [SET]	SETPOINT	System setpoints
[↓]	HC 0	Unit operates in cooling mode
[1] [ENTR]	HC 1	Unit operates in heating mode

Switching from cooling to heating mode

Note : Only heat machine and if HCS = 0 (field configuration)

SET

1 SETPOINT

HC f	Heat Cool select *
CSP1 ±nn.n	Cold fluid setpoint 1
CSP2 ±nn.n	Cold fluid setpoint 2
HSP1 nn.n	Hot fluid setpoint 1 *
HSP2 nn.n	Hot fluid setpoint 2 *
HSPA nnn.n	Head pressure setpoint circuit A *
HSPB nnn.n	Head pressure setpoint circuit B *
CRAMP n.n	Cooling ramp loading rate *
HRAMP n.n	Heating ramp loading rate *

2 RESET SETPOINTS

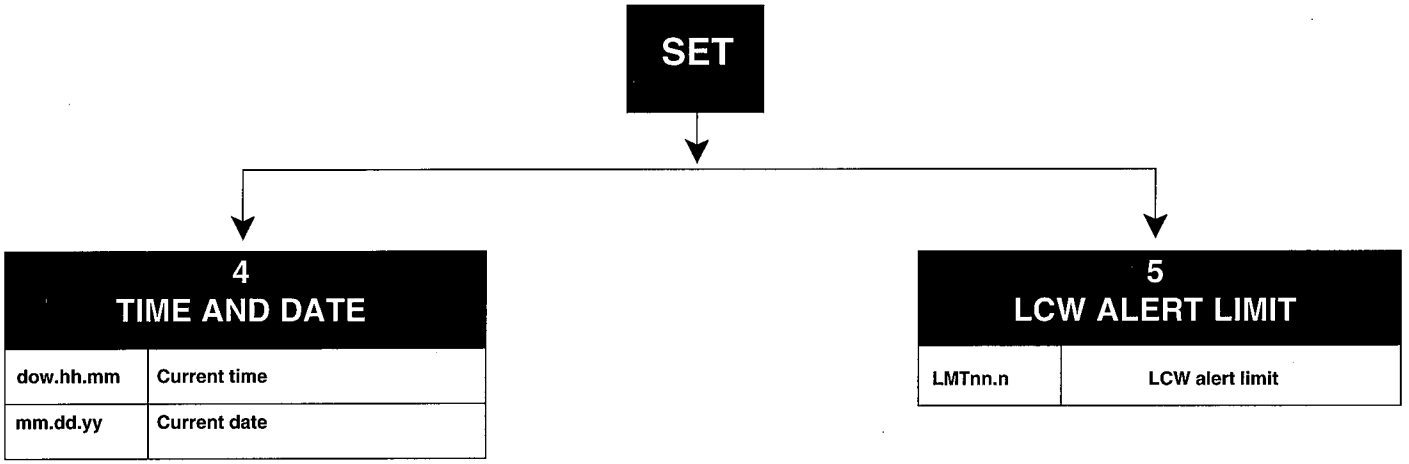
CRT1 nn	Cool reset at 20 mA *
CRT2N nn	Cool Remote Temp (no reset) *
CRT2F nn	Cool Remote Temp (full reset) *
CRT2D nn	Cool Remote Temp degrees reset *
CRT3N nn	CHW delta Temperature (no reset) *
CRT3F nn	CHW delta Temperature (full reset) *
CRT3D nn	Cool delta T degrees reset *
HRT1 nn	Heat reset at 20 mA *
HRT2N nn	Heat Remote Temp (no reset) *
HRT2F nn	Heat Remote Temp (full reset) *
HRT2D nn	Heat Remote Temp degrees reset *
HRT3N nn	HTW delta Temperature (no reset) *
HRT3F nn	HTW delta Temperature (full reset) *
HRT3D nn	Heat delta T degrees reset *

3 DEMAND LIMIT SETPOINTS

DLS1 nnn	Demand switch 1 setpoint *
DLS2 nnn	Demand switch 2 setpoint *
DL20 nnn	Demand limit at 20 mA*
DLGN nnn	Loadshed group number *
LSDD nnn	Loadshed demand delta *
TIME nnn	Maximum loadshed time *

f : HEAT/COOL
n : Numeric display
* : Displayed upon configuration

Set Subfunctions



mm : MINUTE (0-59)
dow : MON, TUE, WED, THU, FRI, SAT, SUN
hh : HOUR (1 -24)
n : Numeric display

Set Subfunctions

Keyboard Entry	Display Response	Comment
First, log on to the keyboard and display module		
1 SRVC	PASSWORD	Enter password/disable password protection
1 1 1 1 ENTR	LOGGED ON	Logged ON
Now, enter field configurations on the keyboard and display module		
4 SRVC	FLD CFG	Adjustable field config.
Scroll to cooling set point control selection "CSTYP" and enter appropriateconfiguration		
↓	CSTYP 0	Cooling setpoint control selection is currently set for single setpoint control
1 ENTR	CSTYP 1	Cooling setpoint control selection is set for external switch controlled set point
1 STAT	AUTO	PSIO will reset. Wait for about 20 seconds
Now, set the desired cooling setpoints. Note, when switch is open, cooling setpoint 1 (CSP1) is in effect, and when switch is closed, cooling setpoint 2 (CSP2) is in effect		
1 SET	SETPOINT	Unit setpoint
↓	CSP1 6.6	Leaving chilled water temperature setpoint n° 1 currently 6.6 ° C
6 . 0 ENTR	CSP1 6.0	Leaving chilled water temperature setpoint n° 1 set to 6.0° C as an example
↓	CSP2 6.6	Leaving chilled water temperature setpoint n° 2 currently 6.6° C
8 . 0 ENTR	CSP1 8.0	Leaving chilled water temperature setpoint n° 2 set to 8.0 ° C as an example
Finally, log off		
1 SRVC	LOGGED ON	Logged on
↓	LOG OFF	Disable password protection
STAT	EXIT LOG	Logged off password protection

Example : Dual Setpoint configuration

4.6.3 - 2 SET Reset

Displays the reset, reset limit and reset ratio setpoints. These setpoints are not accessible when reset type has been configured for none. (See field configuration section).

Reset adjusts the controlled leaving temperature closed on type of reset selected. Display will depend of the reset type.

4.6.3. 1 - Temperature reset based on return water temperature

This option is used when CRTYP (Cooling)/ HRTYP (Heating) equal 3 (See field configuration section).
The control system is capable of providing leaving water temperature reset based on return water temperature.
Because the temperature difference between leaving water temperature and return water temperature is a measure of the building load, return water temperature reset is essentially an average building load reset method.

Under normal operation, the chiller maintains a constant leaving water temperature approximately equal to chilled water set point. As building load drops from 100 % down to 0 %, entering cooler water temperature drops in proportion to load. Thus, temperature drop across the cooler drops from a typical (5.5 °C) at full load to a theoretical (0°C) at no load.

The amount of reset is defined as a function of temperature drop through the heat exchanger. The simple linear function requires three items of input data :

- A not reset temperature difference. The temperature difference between entering and leaving water temperature requires no reset.
- A maximum reset temperature difference. The temperature difference between entering and leaving water temperature requires maximum reset.
- The maximum reset value.

In the cooling mode, the reset is 0°C when the temperature difference through the cooler is greater than the no reset temperature difference.

When the temperature difference is between the full reset and no reset values, the amount of reset is determined by a linear interpolation between the maximum and no reset values.

Below the full reset temperature difference, reset is fixed at the maximum reset value.

The process is the same for heating reset except that the condenser tempererature is used instead of the cooler temperature difference.

CRT3N (cooling) / HRT3N (heating)

- Delta T, no reset reference.
- Allowable range : 0°C to 11.1°C.

Δt is the temperature drop through the heat exchanger at which reset is nul.

CRT3F (cooling) / HRT3F (heating)

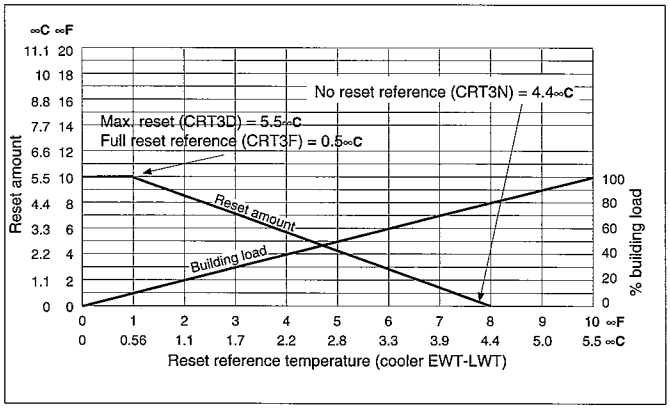
- Delta T, full reset reference.
- Allowable range : 0°C to 11.1°C.

Δt is the temperature drop through the heat exchanger at which reset is at its maximum.

CRT3D (Cooling) / HRT3D (heating)

- Maximum reset amount.
- Allowable range : -16.6°C to 16.6°C.

It is the maximum setpoint increase.



Example : Cooling return water reset

Keyboard Entry	Display Response	Comment
First, log on to the keyboard and display module		
1 SRVC	PASSWORD	Enterpassword/disable password protection
1 1 1 1 ENTR	LOGGED ON	Logged ON
Now, enter field configurations on the keyboard and display module		
4 SRVC	FLD CFG	Adjustable field configuration
↓		
.		
.		
.		
↓	CSTYP X	Scroll past single/dual
↓	CRTYP 0	Display shows no reset type has been selected
3 ENTR	CRTYP 3	Return water temperature reset is selected and activated
1 STAT	AUTO	PSIO reset. Wait for about 20 seconds
1 SET	SETPOINT	System setpoints
↓	CPS1 6.0	Present occupied chilled water setpoint (6° C)
7 . 0 ENTR	CPS1 7.0	Enter new chilled water set point (7.0° C)
2 SET	RESET	Reset setpoints
↓	CRT3N 0.0	Current cooler delta T no reset reference is 0°C.
4 . 4 ENTR	CRT3N 4.4	New cooler delta T no reset reference is 4.4 °C
↓	CRT3F 0.0	Current cooling delta T full reset reference is 0° C
0 . 5 ENTR	CRT3F 0.5	New cooling delta T full reset reference is 0.5° C
ENTR	CRT3F 0.0	Current cooling maximum reset amount is 0° C
5 . 5 ENTR	CRT3D 5.5	New cooling maximum reset amount is 5.5° C

Example : Using return water temperature reset

4.6.3. 2 - Temperature reset based on external temperature

This option is used when CRTYP (cooling) or HRTYP (heating) equal 2. See field configuration section.
Under normal operation, the chiller will maintain a constant leaving water temperature approximately equal to the chilled water temperature setpoint. This temperature is usually selected based on full-load conditions. At part-load conditions, it may be desirable to reset the leaving water setpoint higher to improve the efficiency of the chiller.
The control is capable of resetting automatically the chilled water setpoint higher in response to an external temperature. This external temperature can be outside air or an internal building temperature (space temperature).
The external temperature, either outdoor air or space temperature, is obtained through a thermistor connected to the 4 IN x 4 OUT accessory options module. (See section 3.10.1).

External temperature reset is a simple linear function requiring three items of input data to be configured :

- A no reset reference of external temperature at which there is no reset.
- A maximum reset reference at which reset is maximum.
- the maximum reset value.

The reset is nil when the external temperature is greater than the no reset external temperature.

When the external temperature is between the full reset and no reset external temperature reference values, the amount of reset is determined by a linear interpolation between the maximum and no reset values.

Below the full reset external temperature reference, reset is fixed at the maximum reset value.

CRT2N (cooling) / HRT2N (heating)

- External temperature, no reset reference.
- Allowable range : -6.6°C to 51.6°C.

It is the external temperature at which reset is null.

CRT2F (cooling) / HRT2F (heating)

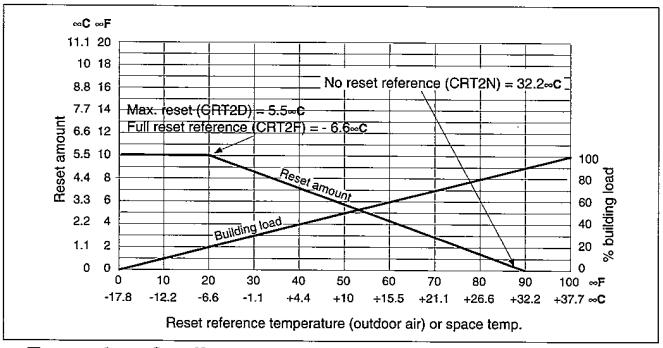
- External temperature, full reset reference.
- Allowable range : -6.6°C to 51.6°C.

It is the external temperature at which reset is at its maximum.

CRT2D (cooling) / HRT2D (heating)

- Maximum reset amount.
- Allowable range : -16.6°C to 16.6°C

It is the maximum setpoint increase.



Example : Cooling external temperature reset control

Keyboard Entry	Display Response	Comment
First, log on to the keyboard and display module		
1 SRVC	PASSWORD	Enter password/disable password protection
1 1 1 1 ENTR	LOGGED ON	Logged ON
Now, enter field configurations on the keyboard and display module		
4 SRVC	FLD CFG	Adjustable field config.
Scroll to cooling reset control selection, "CRTYP" and enter appropriate configurations		
↓	CRTYP 0	Cooling reset control selection currently set for no temperature reset
2 ENTR	CRTYP 2	Colling reset control selection reset for external temperature reset
4 STAT	AUTO	PSIO reset - Wait for about 20 secondes
Log again on to the keyboard and display module		
1 SRVC	PASSWORD	Enter password/disable password protection
1 1 1 1 ENTR	LOGGED ON	Logged ON
Enter again field configurations on the keyboard and display module		
4 SRVC	FLD CFG	Adjustable field config.
Scroll to external reset sensor select "ERTYP" and enter appropriate configurations		
↓	ERTYP 0	External reset currently set for a space thermistor connected to options module
1 ENTR	ERTYP 1	External reset sensor set for an outside air sensor.
1 STAT	AUTO	PSIO reset - Wait for about 20 secondes
Scroll to no reset reference value "CRT2N" and full reset reference external temperature "CRT2F" and maximum reset value "CRT2D"		
↓	CRT2N 0	No reset reference external temperature currently set for 0° C
3 2 . 2 ENTR	CRTN 32.2	External temperature no reset reference reset for 32.2° C as example
↓	CRT2F 0	External temperature full reset reference currently set for 0° F
- 6 . 6 ENTR	CRT2F -6.6	External temperature full reset reference for -6.6°C as example
↓	CRT2D 0	Maximum reset value currently set for 0° F
5 . 5 ENTR	CRST2 5.5	Maximum reset value currently set for 5.5° C as an example

Example : Using external temperature reset

4.6.3. 3 - Temperature reset based on a 4-20 mA signal control

This option is used when CRTYP (cooling) or HRTYP(heating) equal 1 for internal powered 4-20 mA signal or equal 4 for external powered 4-20 mA signal. See field configuration section.

4-20 mA reset is based on the value of a 4-20 mA external input signal connected to the accessory options module (4IN x 4 OUT).

4-20 mA reset is a simple linear function that requires 1 piece of input data to be configured :

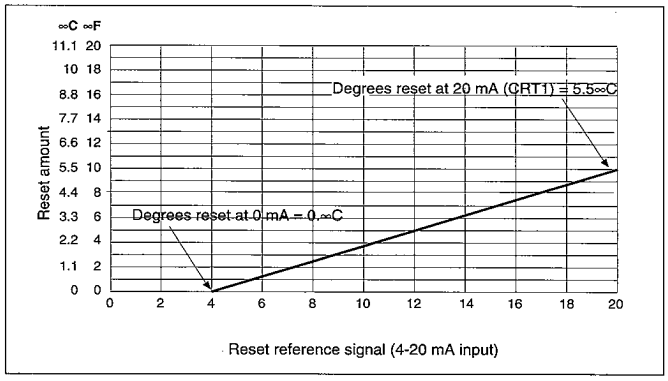
- This data represents the value of the reset when the input signal is at 20 mA.

If the input signal is at 4 mA then the reset is equal to 0.

When the input signal is between 4 and 20 mA then the reset is to be determined by a linear interpolation between the 20 mA reset and 0.

CRT1 (cooling) / HRT1 (heating)

- Degrees reset at 20 mA.
- Allowable range : -16.6 to 16.6°C.



Example : Temperature reset using 4-20 mA signal control

Keyboard Entry	Display Response	Comment
First, log on to the keyboard and display module		
1 SRVC	PASSWORD	Enter password/disable password protection
1 1 1 1 ENTR	LOGGED ON	Logged ON
Now, enter field configurations on the keyboard and display module		
4 SRVC	FLD CFG	Adjustable field config.
Scroll to cooling reset control selection, "CRTYP" and enter appropriate configurations		
↓	CRTYP 0	Cooling reset control selection currently set for no temperature reset
4 ENTR	CRTYP 4	Colling reset control selection reset for external powered 4-20 mA controlled reset
1 STAT	AUTO	PSIO reset - Wait for about 20 secondes
Enter temperature reset setpoint		
2 SET	RESET	Temperature reset set points
↓	CRT1 0	Demand limit at 20 mA currently set to 0°C.
5 . 5 ENTR	CRT1 5.5	Degress reset at 20 mA set to 5.5°C as an example

Example : Using 4-20 mA reset signal control

4.6.4 - [3] [SET] Demand limit

Displays the demand limit set points. These setpoints are not accessible when demand limit type has been configured for none (See section 4.5.4).

Demand limit control refers to the restriction of the unit capacity to control the amount of power the units draws.

The accessory options module has been designed to accept demand limit signals from a building-load shedding control.

The keyboard and display module (HSIO) is used to set the demand limit setpoints which can range from 0 to 100 % of capacity. The capacity steps can be controlled by 2 field supplied switches/relay contacts, or by a 4-20 mA signal, either externally or internally powered.

4.6.4.1 - Demand limit, 2 stage switch control

This option is used when LSTYP = 1 and switches are connected to the accessory options board module (4IN x 4 OUT). See field configuration section.

- For 2-stage switch control, closing the first stage demand limit prevents the unit from exceeding the percentage of capacity entered as the demand limit stage 1 (DLS1).
- Closing the contacts on the second stage demand limit relay prevents the unit from exceeding the percentage capacity entered as demand limit stage 2 (DLS2).
- When both demand limit inputs are closed then demand limit stage 2 (DLS2) is used.
- When both demand limit inputs are open then no demand limit is applied to the system.

Keyboard Entry	Display Response	Comment
First, log on to the keyboard and display module		
[1] [SRVC]	PASSWORD	Enter password/disable password protection
[1] [1] [1] [1] [ENTR]	LOGGED ON	Logged ON
Now, enter field configurations on the keyboard and display module		
[4] [SRVC]	FLD CFG	Adjustable field config.
Scroll to "LSTYP" by using up arrow, and enter appropriate configuration type		
[↓]	LSTYP 0	Demand limit control selection currently set for no demand limit control
[1] [ENTR]	LSTYP 1	Demand limit control configured for 2 stages switch control
[1] [↓]	AUTO	PSIO reset - Wait for about 20 secondes
Enter demand limit switch set points		
[3] [SET]	DEMAND	Demand set points
Scroll to demand limit switch 1 set point "DLS1" by using dow arrow		
[↓]	DLS1 80	Demand limit switch 1 set point is currently 80 %
Enter step 1 capacity reduction in percent ranging from 0 to 100		
[6] [0] [ENTR]	DLS1 60	Demand limit switch 1 reset to 60 % as an example
Scroll to demand limit switch 2 set point "DLS2" by using dow arrow		
[↓]	DLS2 50	Demand limit switch 2 set point is currently 50 %
Enter step 2 capacity reduction in percent ranging from 0 to 100		
[4] [0] [ENTR]	DLS2 40	Demand limit switch 2 reset to 40 % as an example

Example : Using demand limit 2 - stage switch control

4.6.4.2 Demand limit, 4-20 mA signal control

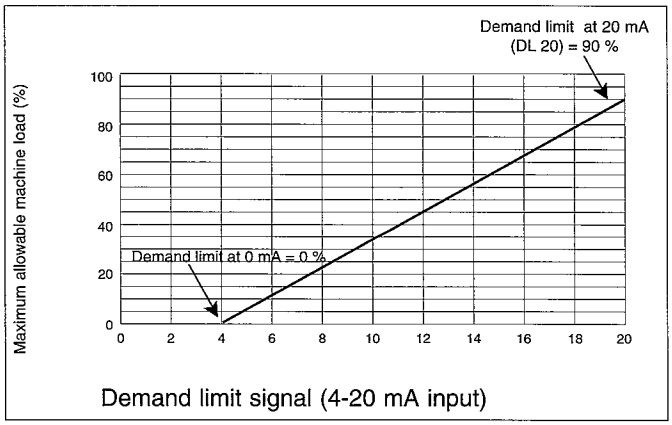
This option is used when LSTYP = 2 or 4 and a 4-20 mA signal is available on the accessory options board module. See field configuration section.

4-20 mA demand limit is a simple linear function that requires 1 piece of input data to be configured.

- DL20 represents the value of the demand limit when the input signal is at 20 mA.

If the input signal is at 4 mA the demand limit is equal to 0 and the unit is not allowed to run.

When the input signal is between 4 and 20 mA then the demand limit is to be determined by a linear interpolation between the 20 mA demand limit and 0 %.



Example : Demand limit 4-20 mA signal control

Keyboard Entry	Display Response	Comment
First, log on to the keyboard and display module		
1 SRVC	PASSWORD	Enter password/disable password protection
1 1 1 1 ENTR	LOGGED ON	Logged ON
Now, enter field configurations on the keyboard and display module		
4 SRVC	FLD CFG	Adjustable field config.
Scroll to "LSTYP" by using up arrow, and enter apprtopriate configuration type		
↓	LSTYP 0	Demand limit control selection currently set for no demand limit control
4 ENTR	LSTYP 4	Demand limit control configured for external powered 4-20 mA signal control
1 STAT	AUTO	PSIO reset - Wait for about 20 secondes
Enter demand limit switch set points		
3 SET	DEMAND	Demand set points
↓	DL 20 100	Demand limit at 20 mA currently set to 100 %
9 0 ENTR	DL 20 90	Demand limit at 20 mA set to 90 %

Example : Using demand limit 4-20 mA signal control

4.6.5 - 4 SET Time

Displays time of day and day of week.

Reading and changing time display

Time is entered and displayed in 24-hour time. The day of the week is entered as a number :
1 = MON, 2 = TUE, ..., 7 = SUN.

The . key is used as the colon when entering time.

Keyboard Entry	Display Response	Comment
4 SET	Time	Present time and day of week
↓	TUE 11.25	Present day and time
3 . 9 . 4 5	3.9.45	Type new day and time (day of week, hour, minutes)
ENTR	WED 9.45	New day and time
↓	JAN.30.90	Present date
2 . 1 . 9 4	2.1.94	Type new date (month, day, year)*
ENTR	FEB.1.94	New current date

Example : Setting time of day and day of week

Legend

Code	Month	Code	Day
1	January	1	Monday
2	February	2	Tuesday
3	March	3	Wednesday
4	April	4	Thursday
5	May	5	Friday
6	June	6	Saturday
7	July	7	Sunday
8	August		
9	September		
10	October		
11	November		
12	December		

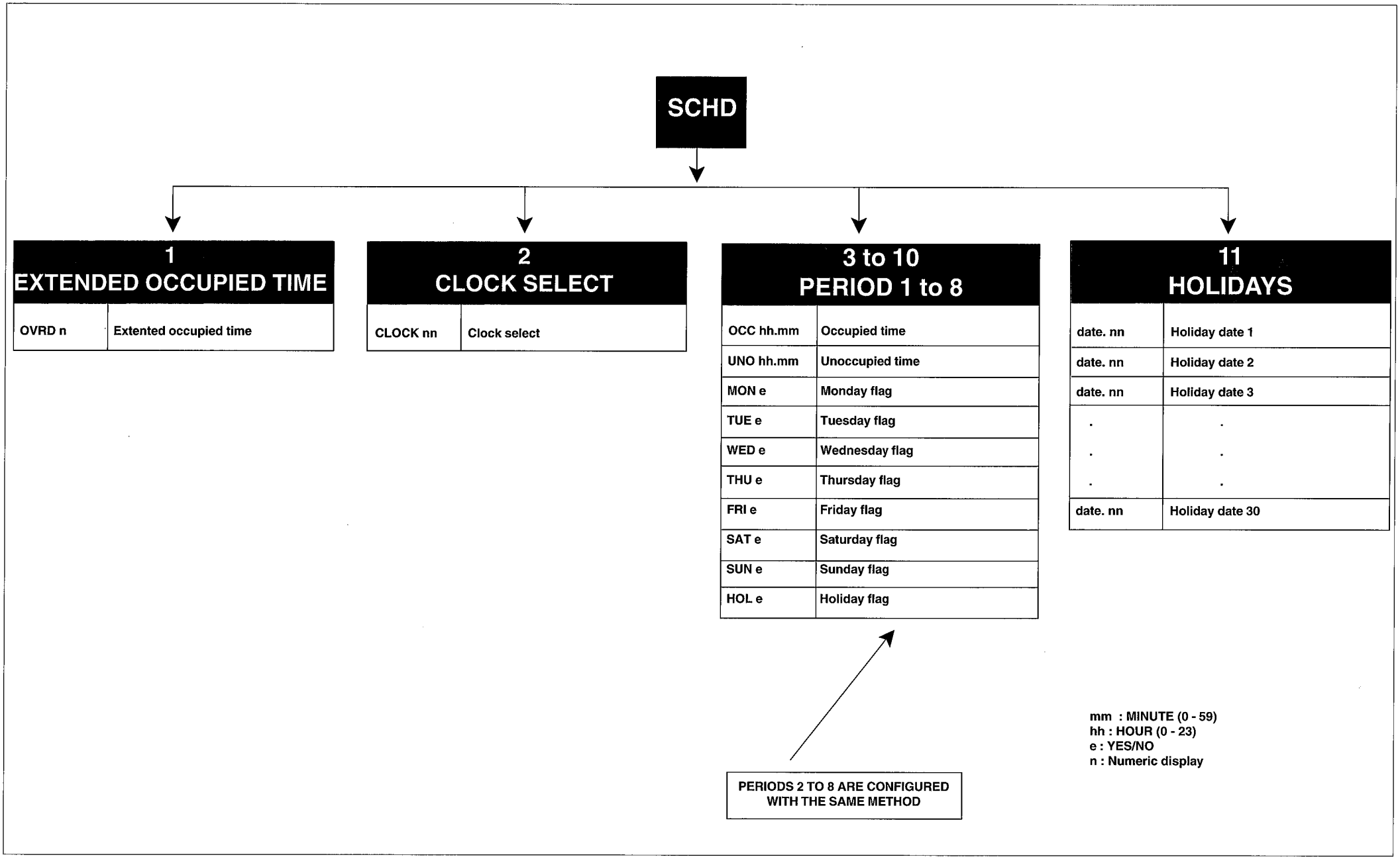
4.6.6 - [5] [SET] LCW alert limit (LMT)

The leaving chilled water alert limit is used for alert 70 detection (see Alarm codes description section for more informations).

- Allowable range for LMT : 1.1°C to 33.3°C.

Keyboard Entry	Display Response	Comment
[5] [SET]	LMT 33.3	LCW limit currently 33.3° C
[1] [0] [ENTR]	LMT 10	LCW limit is set to 10° C

Example : Modification of LMT



Schedule Subfunctions

4.7- SCHEDULE FUNCTION

This general function provides a means to automatically switch chiller from an Occupied mode to an Unoccupied mode.

The schedule function can be programmed for inactive, single setpoint, or dual setpoint operation :

- When schedule is configured for inactive, the chiller is controlled by **Local/Stop/CCN** control switch.
- When unit is configured for single setpoint operation, chiller is started during occupied periods and stopped during unoccupied periods.
- When unit is configured for dual set point, clock controlled. Occupied mode places Occupied chilled water setpoint into effect. Unoccupied mode places Unoccupied chilled water setpoint into effect.

The schedule function allows configuration of a timed override, up to 8 occupied/unoccupied periods and up to 30 holidays.

4.7.1 - [1] [SCHD] OVRD nHRS

This subfunction allows to extend an occupied mode beyond its normal termination for a one-time schedule override. The display is "OVRD n" where n is the number of hours for the override (or remaining). Up to 4 hours of override may be extend.

- Timed Override - Early start
  When a unit is in an unoccupied period, entering an override causes the unit to immediately go occupied and run for the specified number of hours. If the time override period overlaps into a scheduled occupied period, the unit will continue running until the next scheduled unoccupied period.
- Timed Override - Extended runtime
  When the unit is in an occupied period, entering an override causes the unit to continue to run through the present occupied period, then continue to run at the end of the occupied period for the specified number of override hours. If the time override period overlaps into a scheduled occupied period, the unit will continue run until the next scheduled unoccupied period.
- To cancel a timed override period
  Set the override to 0 will cancel the timed override.

Keyboard Entry	Display Response	Comment
Programming Override		
For this example, unit will run 3 hours during unoccupied time.		
[2] [SCHD]	OVRD 0	Override is set for 0 ; enter the number of hours of override desired.
[3] [ENTR]	OVRD 3	Unit will now remain in occupied mode for 3 additional hours.
To extend an occupied mode beyond its normal termination for a one-time schedule override, program as shown above		

Example : Using the override function

4.7.2 - [2] [SCHD] Clock

This subfunction allows the selection of the type of clock control. Three types are available :

0 : No clock control (Unit always in occupied mode).
1 : Local clock control (clock 1)
66-99 : Network clock control.

Keyboard Entry	Display Response	Comment
[2] [SCHD]	CLOCK 0	No clock selected
[1] [ENTR]	CLOCK 1	Internal clock selected

Example : Using the clock function

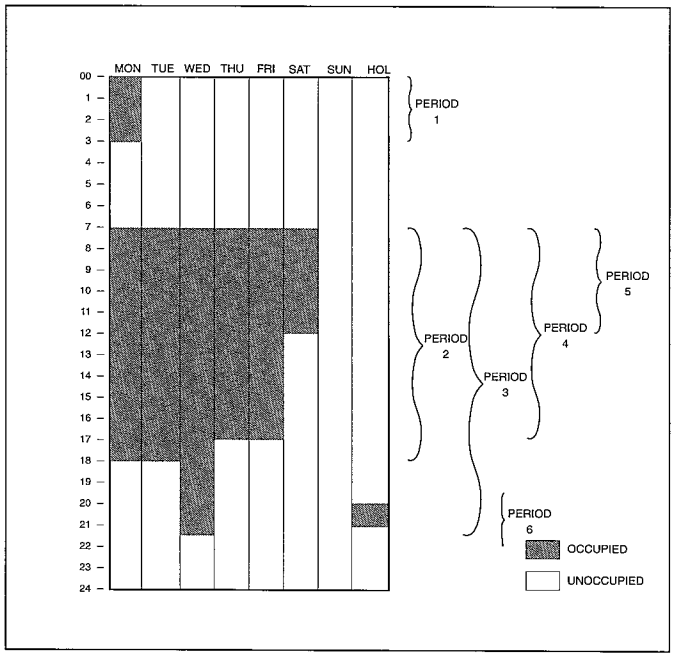
4.7.3 - [1] [SCHD] - [10] [SCHD] Period 1 to period 8

This function provides a means to automatically switch the chiller from an occupied mode to an unoccupied mode. The schedule key is used to configure the occupancy schedules.

- Each schedule consits of from 1 to 8 occupied time periods set by the operator.
- These time period can be flagged to be in effect or not in effect on each day of the week.
- The day begins at 00.00 and ends at 24:00. The unit will be in unoccupied mode unless a scheduled time period is in effect.
- An occupied time of 00:00 and unoccupied time of 24:00 provide operation for a full 24 hour day.
- An occupied time 00:00 and an unoccupied time of 00:00 provide for a 24 hour unoccupied time.
- An occupied time of 24:00 provides a 24 hours unoccupied time.
- Each period time has to be selected to be in effect on Monday, Tuesday Wednesday, Thursday, Friday, Saturday, Sunday and holidays.

The following figure shows a schedule for an office building with the chiller operating on a single set point schedule. The schedule is based on building occupancy with 3-hour off-peak cool down period from midnight to 3 am following the weekend shut-down. To learn how this sample schedule should be programmed, see the following example.

NOTE :
This schedule illustrates the programming of the schedule function and is not intended as a recommended schedule for chiller operation.



Example : Sample time schedule

Keyboard Entry	Display Response	Comment
Programming period 1 :		
3 SCHD	PERIOD 1	Define schedule period 1
↓	OCC 00.00	Start of occupied time. For this example, first period should start here (at midnight) so no entry is neeeded.
↓	UNO 00.00	Start of unoccupied time (end of period. For this example, period 1 should end at 3:00 am.
3 . 0 0 ENTR	UNO 3.00	Period 1 ends at 3:00
↓	MON NO	Monday is not flagged for period 1. To put period 1 into effect on Monday, Monday must be flagged yes
1 ENTR	MON YES	Monday is now flagged for period to be in effect.
↓	TUE YES	For this example, period 1 is to be in effect on Monday only. All other days must be checked to be sure that they are flagged no. If any day is flagged yes, change to no.
. ENTR	TUE NO	Tuesday is now flagged no for period 1.

Example : Using the schedule function

Keyboard Entry	Display Response	Comment
Programming period 2 :		
4 SCHD	PERIOD 2	Define schedule period 2.
↓	OCC 00.00	Start of occupied time.
7 . 0 0 ENTR	OCC 7.00	Occupied time will start at 7: am.
↓	UNO 00.00	Start of unoccupied time (end of period. For this example, period 2 should end at 18:00 (6:00 pm).
1 8 . 0 0 ENTR	UNO 18.00	Period 2 ends at 18:00 (6:00 pm).
↓	MON NO	Monday is not flagged for period 2. To put period 2 into effect on Monday, Monday must be flagged yes.
1 ENTR	MON YES	Monday is now flagged for period 2 to be in effect.
↓	TUE NO	Tuesday is not flagged for period 2. To put period 2 into effect on Tuesday, Tuesday must be flagged yes.
1 ENTR	TUE YES	Tuesday is now flagged no for period 2 to be in effect.
↓	WED YES	For this example, period 2 is to be in effect on Monday and Tuesday. All other days must be checked to be sure that they are flagged no. If any day is flagged yes, change to no.
. ENTR	WED NO	Wednesday is now flagged no for period 2 .

Example : Using the schedule function (cont)

Keyboard Entry	Display Response	Comment
Programming period 6 :		
8 SCHD	PERIOD 6	
↓	OCC 00.00	Start of occupied time.
2 0 . 0 0 ENTR	OCC 20.00	Occupied time will start at 20:00 (8 : pm)
↓	UNO 00.00	Start of unoccupied time (end of period. For this example, period 6 schould end at 21:00 (9 : pm)
2 1 . 0 0 ENTR	UNO 21:00	Period 6 ends at 21:00.
↓		
.		
.		
.		
↓	HOL NO	Holiday is not flagged for period 6. To put period 6 into effect on holiday, holiday must be flagged yes.
1 ENTR	HOL YES	Holiday is now flagged for period 6 to be in effect.

Example : Using the schedule function (cont)

Periods 3, 4 and 5 can be programmed in the same manner, flagging Wednesday yes for period 3, Thursday and Friday yes for period 4, and saturday yes for period 5. For this example, periods 6, 7 and 8 are not used ; they should be programmed OCC 00.00, UNO 00.00.

NOTE : When a day is flagged yes for 2 overlapping periods, occupied time will take precedence over unoccupied time. Occupied times can overlap in the schedule with no consequence.

4.7.4 - [1] [1] [SCHD] Holiday Schedule

Up to 30 holiday periods can be scheduled. All holidays are entered with the following numerical values :

- The month (01 to 12)
- The day (01 to 31)
- Then the duration of the holiday period in days.

Examples : July 24 is 07.24.01
Dec. 25 - 26 is 12.25.02

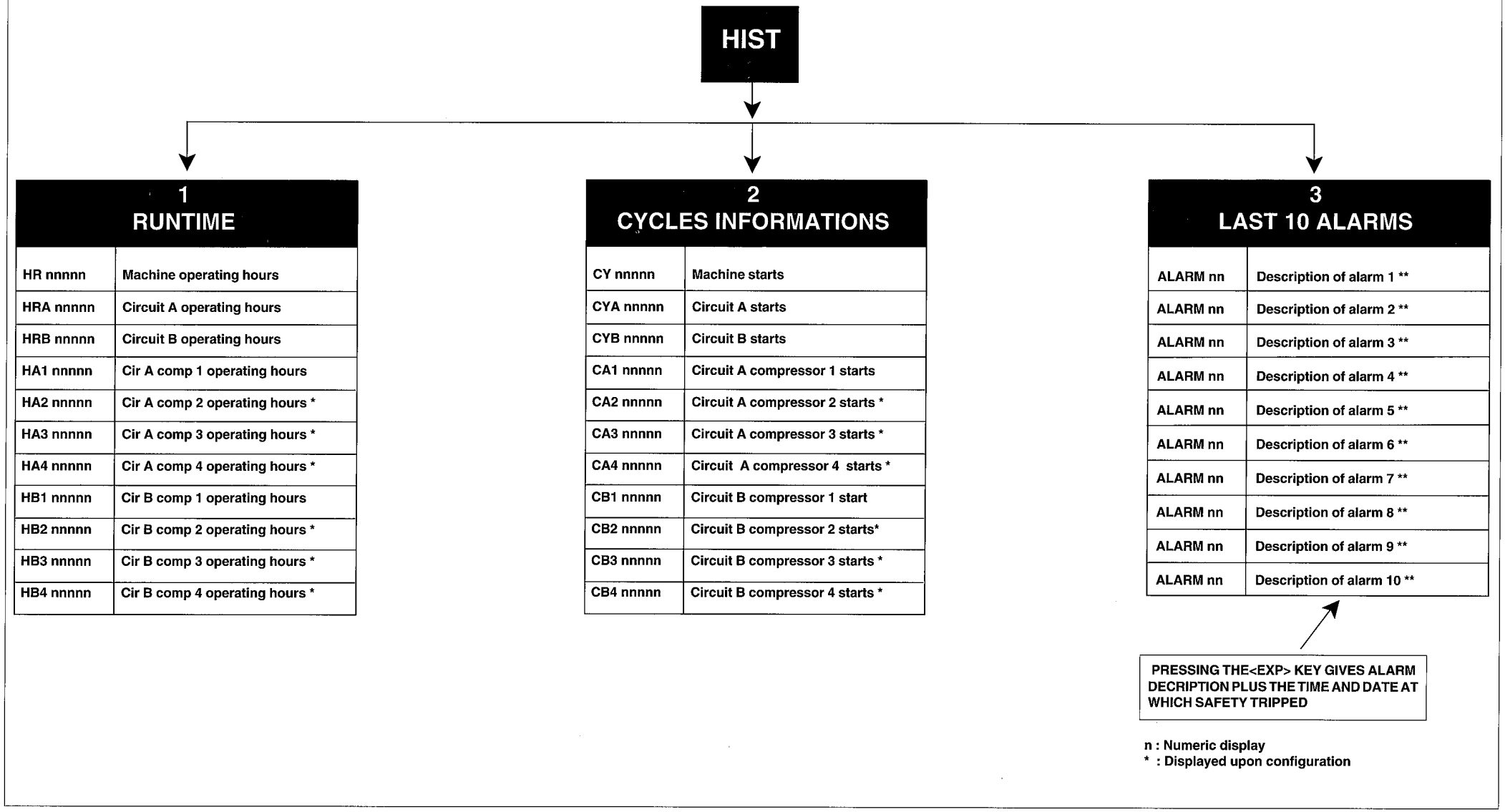
If any of the 30 holiday periods are not used, the display shows NEW.

NOTE
In stand-alone mode broadcast must be activated to utilize holiday schedules. This can only be made through network configuration. See Flotronic II, phase 3 PIC CCN supplement for more informations.

ENTER	DISPLAY
11 SCHD	HOLIDAY
↓	JAN01 02 (includes Jan 1st and 2nd)
↓	APR17 01 (includes April 17th)
↓	MAY21 01 (includes May 21st)
↓	JUL03 01 (includes July 3rd)
7 . 0 4 . 0 1 ENTR	JUL04 01 (includes July 4th)
↓	SEP07 01 (includes Sep.7th)
↓	NOV26 02 (includes Nov. 26th and 27th)
↓	DEC24 02 (includes Dec. 24th and 25th)
↓	DEC30 02 (includes Dec. 30th and 31st)
↓	NEW
5 . 2 5 . 0 1 ENTR	MAY25 01 (includes May 25th)
↓	NEW
↓	NEW
↓	NEW
↓	NEW
↓	NEW (30th HOLIDAY)

NEW indicates a holiday that has not been assigned yet.

Example : Programming holidays



Historic Subfunctions

4.8 - HISTORIC FUNCTION

The HIST function is used to display historic operating data such as chiller, refrigeration circuit or compressor run times, machine operating cycles, circuit and compressor operating cycles.

4.8.1 - [1] [HIST] Runtimes

In this subfunction the machine, circuit or compressors, operating hours are displayed. The operating hours is the number of hours that compressor was running. Minor display is the hour.

4.8.2 - [2] [HIST] Starts

In this mode the number of machine, circuits or compressors starts is displayed. The number of device starts is the number of times this device cycles from stage 0 to stage 1. This does not include quick test cycles.

4.8.3 - [3] [HIST] Alarms

In this mode the last ten alarms trips are displayed.
When the EXPN key is pushed the display shows an expanded explanation of the alarm, with the date and time at which the safety tripped. Alarms are sent to History whenever they are reset. Reset could be automatic or manual (See section 6.3).

TEST

1 OUTPUTS

8.8.8.8.8.8.8.8.8	Test display
ALRM b	Test alarm relay
FRA1 b	Test fan relay A1 *
FRA2 b	Test fan relay A2 *
FRB1 b	Test fan relay B1 *
FRB2 b	Test fan relay B2 *
CHWP b	Test cooler pump output *
CDWP b	Test condenser pump output *
LSVA b	Test liquid line line solenoid A *
LSVB b	Test liquid line line solenoid B *
EXVA nnn	Test EXV A in %*
EXVB nnn	Test EXV B in %*
HGBA b	Test hot gas bypass valve A *
HGBB b	Test hot gas bypass valve B *
MMA nnn	Test motomaster A in %*
MMB nnn	Test motomaster B in %*
WVA nnn	Test water valve A in %*
WVB nnn	Test water valve B in %*

RALARM1 b	Test remote alarm 1 *
RALARM2 b	Test remote alarm 2 *
RALARM3 b	Test remote alarm 3 *
RALARM4 b	Test remote alarm 4 *
RALARM5 b	Test remote alarm 5 *
RALARM6 b	Test remote alarm 6 *
RALARM7 b	Test remote alarm 7 *
RALARM8 b	Test remote alarm 8 *
RALARM9 b	Test remote alarm 9 *
RALARM10 b	Test remote alarm 10 *
RALARM11 b	Test remote alarm 11 *
RALARM12 b	Test remote alarm 12 *
RALARM13 b	Test remote alarm 13 *
RALARM14 b	Test remote alarm 14 *
RALARM15 b	Test remote alarm 15 *
RALARM16 b	Test remote alarm 16 *

2 COMPRESSORS

CPA 1 b	Test compressor A1
CPA 2 b	Test compressor A2 *
CPA 3 b	Test compressor A3 *
CPA 4 b	Test compressor A4 *
CPB1 b	Test compressor B1
CPB2 b	Test compressor B2 *
CPB3 b	Test compressor B3 *
CPB4 b	Test compressor B4 *
UNLA 1 b	Test unloader A1 *
UNLA 2 b	Test unloader A2 *
UNLB 1 b	Test unloader B1 *
UNLB 2 b	Test unloader B2 *

3 CALIBRATE TRANSDUCERS

CDPA nn.n	Circuit A discharge *
CSPA nn.n	Circuit A suction *
COPA nn.n	Circuit A oil *
CDPB nn.n	Circuit B discharge *
CSPB nn.n	Circuit B suction *
COPB nn.n	Circuit B oil *

b : ON/OFF
n : Numeric display
* : Displayed upon configuration

Test Subfunctions

4.9 - TEST FUNCTION

The test function operates the Quick Test diagnostic program. It exercises the unit outputs under manual control.

To use the test function, The Local/Stop/Network switch must be in the stop position.

4.9.1 - [1] [TEST] Outputs

Tests all the outputs from the processor except for compressors.

To operate a test, scroll to desired test. Then press [ENTR] to start test. Press [↓] to stop test.

The following tests available :

- **Test display :** Display will show 8.8.8.8.8.8.8.8.
- **Alarm output :** Energize alarm relay.
- **Fan relay A1**
- **Fan relay A2**
- **Fan relay B1**
- **Fan relay B2**

  } Energize fan relay on air cooled units

- **Cooler pump :** Energize cooler water pump if configured.
- **Test condenser pump :** Energize condenser water pump if configured.
- **Liquid line solenoïd A**
- **Liquid line solenoïd B**

  } Energize liquid line solenoïd relay A or B on units using TXVs.

- **EXV valve A test**
- **EXV valve B test**

  } Open the EXV to the percent entered position, on units using EXVs.

- **Test hot gas bypass A**
- **Test hot gas bypass B**

  } Energize hot gas bypass relay A or B if configured.

- **Test motormaster A**
- **Test motormaster B**

  } Energize motormaster A or B to the percent entered value, if configured on Air cooled units.

- **Test condenser water valve A**
- **Test condenser water valve B**

  } Open water valve A or B to the percent entered value, if configured on water cooled units.

- **Test remote alarm # X (1to 16) :** Energize remote alarm relay # X

4.9.2 - [1] [TEST] Compressors tests

This function is used to turn on the compressors and the unloaders. The compressors will be limited to be on for 10 seconds. If the unit uses EXV's, it will be opened to 20%. If the unit uses TXV's, the liquid line solenoid will be opened. The valves or solenoids remain opened until the test compressor function is exited.

It is not possible to retest a compressor within 30 seconds of the end of the prior test on that compressor.

To operate a test, scroll to desired test. Then press [ENTR] to start test. Press [↓] to stop test.

Keyboard Entry	Display Response	Comment
[1] [TEST]	OUTPUTS	Test of outputs
[↓]	8.8.8.8.8.8.8.8.	Test of display
[↓]	EXVA 0	Test EXVA
[2] [3]	23	Position 23 % called
[ENTR]	EXVA 23	Valve open 23 %
[↓]	EXVB O	EXVA is closed. Test EXVB

Example : Testing EXV

Keyboard Entry	Display Response	Comment
[2] [TEST]	COMP	
[↓]	CPA1 OFF	Test cir. A compressor 1
[↓]	CPA3 OFF	Test cir. A compressor 3
[ENTR]	CPA3 ON	Pressing ENTR starts the compressor.
	CPA3 OFF	After 10 seconds the compressor is turned off.

Example : Testing Compressor A3

WARNING

During compressor test, compressors start and run for 10 seconds. Compressor service valves and liquid line valves must be open. Energize crankcase heaters 24 hours prior to performing compressor tests.

5 - FLOTRONIC II, PHASE 3 : CONTROLS OPERATION

5.1 - MACHINE ON/OFF CONTROL

The unit is in off state (and is not allowed to start) or is stopping when one of the following conditions is satisfied:

- The Local/Stop/CCN control switch is in the Stop position. Mode LOCAL OFF is active.
- The Local/Stop/CCN control switch is in the CCN position **and** the control has received a stop command from the CCN Network. Mode CCN OFF is active.
- The Local/Stop/CCN control switch is in the Local position **and** a local time schedule is configured **and** the period is unoccupied **and** a the unit uses a single setpoint. Modes LOCAL ON, and CLOCK OFF are active.
- The Local/Stop/CCN control switch is in the CCN position **and** the control has received a start command from the CCN Network **and** a network time schedule is configured **and** the period is unoccupied **and** a the unit uses a single setpoint. Modes CCN ON and CLOCK OFF are active.
- The delay at startup is not elapsed: mode 17 is active. Delay is initialized upon a power up condition, or after both circuits are shut off due to manual switch change to off or a CCN disable. See field configuration section.
- The Emergency Stop variable (EMSTOP) is enabled (see Flotronic II Phase 3 PIC CCN Supplement).
- Entire unit is down due to failure.

The unit is in on state and is allowed to start compressors when it is not in off state and if one of the following conditions is satisfied.

- The Local/Stop/CCN control switch is in the Local position: LOCAL ON mode is active.
- The Local/Stop/CCN control switch is in the CCN position **and** the control has received a start command from the CCN Network. Mode CCN ON is active.
- The Local/Stop/CCN control switch is in the Local position **and** a local time schedule is configured **and** the period is occupied. Modes: LOCAL ON and CLOCK ON are active.
- The Local/Stop/CCN control switch is in the CCN position **and** the control has received a start command from the CCN Network **and** a network time schedule is configured **and** the period is occupied. Modes: CCN ON and CLOCK ON are active.
- The Local/Stop/CCN control switch is in the Local position **and** a local time schedule is configured **and** the period is unoccupied **and** a the unit uses dual setpoints. Modes: LOCAL ON, CLOCK OFF and 7 are active.
- The Local/Stop/CCN control switch is in the CCN position **and** the control has received a start command from the CCN Network **and** a network time schedule is configured **and** the period is unoccupied **and** a the unit uses dual setpoints. Modes: CCN ON, CLOCK OFF and 7 are active.

5.2 - COOLER PUMP CONTROL

The cooler pump is turned on when it is configured (see field configuration) and when the unit is in one of the ON state described above (see machine ON/OFF control). Cooler pump is still on during pumpdown.

There is one minute delay after the cooler pump is turned on, before a compressor can be started.

5.3 - INTERLOCK

The interlock can be used if the cooler pump is used or not used. If the unit is in the On state and is configured for interlock and interlock transitions from closed to open, then the unit is stopped immediately.

No lock control is made for about 70 seconds after the cooler pump is started.

5.4 - CONDENSER PUMP CONTROL

The condenser pump control can be used on water cooled or split water cooled units.

Two controls are available :

- ON/OFF control : The condenser pump is ON when it is configured (see field configuration) and when the unit is in one of the ON state described above (see machine ON/OFF control).
- ON when stage >O : The condenser pump is ON when it is configured (see field configuration) and when one compressor at least is on.

5.5 - HEAT/COOL SELECT

On heat machines, the heat/cool mode of the unit can be controlled by two methods (see field configuration) :

- Heat/Cool controlled by the variable HC in the HSIO subfunction SETPOINTS. If HC = 0 then the unit is in the cooling mode. If HC = 1 then the unit is in heating mode.Heat/Cool mode can also be controlled through network when unit is in CCN mode.
- Heat/Cool controlled through a switch connected to the 8 IN module. If the switch is opened then the unit is in cooling mode. If the switch is closed then the unit is in heating mode.

5.6 - CONTROL POINT

The control point (called MSP in HSIO subfunction 5<STAT>) represents the water leaving temperature that the chiller attempts to produce.

- In cooling mode: control point = active setpoint + reset
- In heating mode: control point = active setpoint - reset

The active setpoint could be either CSP1 or CSP2 in cooling mode or HSP1 or HSP2 in heating mode (see section 4.6.2 for the setpoint selection).

Reset value could be provided based on an external temperature sensor or the return water temperature or a 4-20 mA input signal. Cooling and heating reset values can be configured independently (see section 4.6.3).

Setpoint control and reset control can operate at the same time or independently. Besides, the type of setpoint control can be selected for either cooling or heating operation and can be different for heating and cooling operations.

5.7 - DEMAND LIMIT

The Demand Limit is the maximum percent unit capacity at which a chiller is allowed to run.

Two methods of Demand Limits can be used :

- External switch inputs demand limiting ;
- External 4-20 mA demand limiting.

Demand limit is in effect when the current capacity of the unit is above the maximum capacity allowed by the Demand Limit function or if there is a cooling or heating demand which try to increase the unit capacity to a value exceeding the maximum capacity allowed by the Demand Limit function. When the Demand Limit is in effect, the mode 9 is displayed
See Section 4.6.4 for Demand Limit configuration.

5.8 - CAPACITY CONTROL

The control cycles compressors and unloaders to maintain the leaving water temperature fluid at the setpoint. The accuracy of the control depends of the water loop size, of the water loop flow, of the load and of the number of unit available steps. The control takes permanently in account the error between the leaving fluid temperature and the control point, the rate of change of the leaving fluid temperature and the delta of temperature between the entering and the leaving fluid in order to determine the optimum time to add or subtract steps of capacity.

5.9 - CIRCUIT LEAD-LAG DETERMINATION

This function controls the sequence of the two circuits. Each machine always have two independent refrigerant circuits labeled "A" and "B". The Lead-Lag sequence control determines the order or sequence in which these two circuits should be used. Lead Circuit means the circuit (A or B) that will be used first for capacity changes. For example when a machine is starting and the first stage of compression is being added then the circuit that will be started first will be the Lead Circuit.
The following configurations are available :

- ***Automatic mode :*** When this configuration has been selected, the control try to equalize the circuit number of starts (however, this value is balanced with the circuit runhours).

- ***Circuit A lead :*** When this configuration option has been selected the lead circuit is always be circuit A and will not change : Circuit A is always the first started and always the last stopped.

- ***Circuit B lead :*** When this configuration option has been selected the lead circuit is always be circuit B and will not change : Circuit B is always the first started and always the last stopped;

NOTE
The circuit with the most unloaders configured is always the lead circuit whatever the configuration.

5.10 - CIRCUIT LOADING SEQUENCE

This function determines the order in which capacity for each circuit is changed. Two configurations are availabe (see field configuration).

Equal circuit loading : In this sequence the control logic will attempt to maintain equal capacity between circuit A and circuit B as the machine loads and unloads.

Staged circuit loading : In this sequence the logic will load the lead circuit completely before the lag circuit is started. When the load is decreasing the lag circuit is unloaded first.

NOTE
If the unit has been configured for Air Cooled head pressure control and if the Saturated condensing temperature of either circuit is less than 0°C prior to starting the circuit, then the staged circuit loading sequence will be used whatever the configuration.

5.11 - LAG COMPRESSORS LOADING SEQUENCE

The control follows the following sequence:

- When increasing capacity, the circuit lead compressor is always the first started.
- When decreasing capacity, the circuit lead compressor is always the last stopped.
- Determination of the lag compressor to start (or to stop) is based on the compressor number of starts balanced by the compressor run hours.

5.12 - CIRCUITS LOADIND SEQUENCE EXAMPLES

The following tables give loading sequence examples for circuits A and B. Loading sequence A assumes that circuit A is the lead circuit. Loading sequence B assumes that circuit B is the lead circuit. These sequences assume that slave compressors are always started in the sequence A2, A3, A4, and B2, B3, B4. The actual starting sequence depends upon the number of starts of each compressor since the control try to equalise the number of starts for all slave compressors (balanced by the compressor runhours).
(*) means that the compressor is equiped with an unloader
* means that the compressor is unloaded

UNIT SIZE	STAGES	LOADING SEQUENCE A	LOADING SEQUENCE B
A1 B1	1 2	A1 A1 - B1	B1 A1 - B1
A1 (*) B1	1 2 3 4	A1* A1 A1* - B1 A1 - B1	- - - -
A1 (*) B1 (*)	1 2 3 4 5	A1* A1 A1* - B1* A1 - B1* A1 - B1	B1* B1 A1* - B1* A1* - B1 A1 - B1
A1, A2 B1	1 2 3	A1 A1 - B1 A1 A2 - B1	B1 A1 - B1 A1 A2 - B1
A1 (*), A2 B1	1 2 3 4 5 6	A1* A1 A1* - B1 A1 - B1 A1* A2 - B1 A1 A2 - B1	B1* B1 A1* - B1* A1 - B1 A1* A2 - B1* A1 A2 - B1
A1, A2 B1(*)	1 2 3 4 5 6	- - - - - -	B1* B1 A1 - B1* A1 - B1 A1 A2 - B1* A1 A2 - B1
A1(*), A2 B1 (*)	1 2 3 4 5 6 7 8	A1* A1 A1* - B1* A1 - B1* A1 - B1 A1* A2 - B1* A1* A2 - B1 A1 A2 - B1	B1* B1 A1* - B1* A1* - B1 A1 - B1 A1* A2 - B1* A1* A2 - B1 A1 A2 - B1
A1, A2 B1, B2	1 2 3 4	A1 A1 - B1 A1 A2 - B1 A1 A2 - B1 B2	B1 A1 - B1 A1 - B1 B2 A1 A2 - B1 B2
A1 (*), A2 B1, B2	1 2 3 4 5 6 7 8	A1* A1 A1* - B1 A1 - B1 A1* A2 - B1 A1 A2 - B1 A1* A2 - B1 B2 A1 A2 - B1 B2	- - - - - - - -
A1 (*), A2 B1 (*), B2	1 2 3 4 5 6 7 8 9 10 11	A1* A1 A1* - B1* A1 - B1* A1 - B1 A1* A2 - B1* A1* A2 - B1 A1 A2 - B1 A1* A2 - B1* B2 A1 A2 - B1* B2 A1 A2 - B1 B2	B1* B1 A1* - B1* A1* - B1 A1 - B1 A1* - B1* B2 A1- B1* B2 A1- B1 B2 A1* A2 - B1* B2 A1* A2 - B1 B2 A1 A2 - B1 B2

UNIT SIZE	STAGES	LOADING SEQUENCE A	LOADING SEQUENCE B
A1, A2, A3 B1, B2	1 2 3 4 5	A1 A1 - B1 A1 A2 - B1 A1 A2 - B1 B2 A1 A2 A3 - B1 B2	B1 A1 - B1 A1 - B1 B2 A1 A2 - B1 B2 A1 A2 A3 - B1 B2
A1(*), A2, A3 B1, B2	1 2 3 4 5 6 7 8 9 10	A1* A1 A1* - B1 A1 - B1 A1* A2 - B1 A1 A2 - B1 A1* A2 - B1 B2 A1 A2 - B1 B2 A1* A2 A3 - B1 B2 A1 A2 A3 - B1 B2	- - - - - - - - - -
A1, A2, A3 B1 (*), B2	1 2 3 4 5 6 7 8 9 10	- - - - - - - - - -	B1 * B1 A1 - B1* A1 - B1 A1 - B1* B2 A1 - B1 B2 A1 A2 - B1* B2 A1 A2 - B1 B2 A1 A2 A3 - B1* B2 A1 A2 A3 - B1 B2
A1(*), A2, A3 B1(*), B2	1 2 3 4 5 6 7 8 9 10 11 12 13 14	A1* A1 A1* - B1* A1 - B1* A1 - B1 A1* A2 - B1* A1* A2 - B1 A1 A2 - B1 A1* A2 - B1* B2 A1 A2 - B1* B2 A1 A2 - B1 B2 A1* A2 A3 - B1* B2 A1* A2 A3 - B1 B2 A1 A2 A3 - B1 B2	B1* B1 A1* - B1* A1*- B1 A1 - B1 A1* - B1* B2 A1 - B1* B2 A1 - B1 B2 A1* A2 - B1* B2 A1* A2 - B1 B2 A1 A2 - B1 B2 A1* A2 A3 - B1* B2 A1 A2 A3 - B1* B2 A1 A2 A3 - B1 B2
A1, A2, A3 B1, B2, B3	1 2 3 4 5 6	A1 A1 - B1 A1 A2 - B1 A1 A2 - B1 B2 A1 A2 A3 - B1 B2 A1 A2 A3 - B1 B2 B3	B1 A1 - B1 A1 - B1 B2 A1 A2 - B1 B2 A1 A2 - B1 B2 B3 A1 A2 A3 - B1 B2 B3
A1(*), A2, A3 B1, B2, B3	1 2 3 4 5 6 7 8 9 10 11 12	A1* A1 A1* - B1 A1 - B1 A1* A2 - B1 A1 A2 - B1 A1* A2 - B1 B2 A1 A2 - B1 B2 A1* A2 A3 - B1 B2 A1 A2 A3 - B1 B2 A1* A2 A3 - B1 B2 B3 A1 A2 A3 - B1 B2 B3	- - - - - - - - - - - -

UNIT SIZE	STAGES	LOADING SEQUENCE A	LOADING SEQUENCE B
A1(*), A2, A3 B1 (*), B2, B3	1	A1*	B1*
	2	A1	B1
	3	A1* - B1*	A1* - B1*
	4	A1 - B1*	A1*- B1
	5	A1 - B1	A1 - B1
	6	A1* A2 - B1*	A1* - B1* B2
	7	A1* A2 - B1	A1 - B1* B2
	8	A1 A2 - B1	A1 - B1 B2
	9	A1* A2 - B1* B2	A1* A2 - B1* B2
	10	A1 A2 - B1* B2	A1* A2 - B1 B2
	11	A1 A2 - B1 B2	A1 A2 - B1 B2
	12	A1* A2 A3 - B1* B2	A1* A2 - B1* B2 B3
	13	A1* A2 A3 - B1 B2	A1 A2 - B1* B2 B3
	14	A1 A2 A3 - B1 B2	A1 A2 - B1 B2 B3
	15	A1* A2 A3 - B1* B2 B3	A1* A2 A3 - B1* B2 B3
	16	A1 A2 A3 - B1* B2 B3	A1* A2 A3 - B1* B2 B3
	17	A1 A2 A3 - B1 B2 B3	A1 A2 A3 - B1 B2 B3
A1, A2, A3, A4 B1, B2, B3	1	A1	B1
	2	A1 - B1	A1 - B1
	3	A1 A2 - B1	A1 - B1 B2
	4	A1 A2 - B1 B2	A1 A2 - B1 B2
	5	A1 A2 A3 - B1 B2	A1 A2 - B1 B2 B3
	6	A1 A2 A3 - B1 B2 B3	A1 A2 A3 - B1 B2 B3
	7	A1 A2 A3 A4 - B1 B2 B3	A1 A2 A3 A4 - B1 B2 B3
A1(*), A2, A3, A4 B1, B2, B3	1	A1*	-
	2	A1	-
	3	A1* - B1	-
	4	A1 - B1	-
	5	A1* A2 - B1	-
	6	A1 A2 - B1	-
	7	A1* A2 - B1 B2	-
	8	A1 A2 - B1 B2	-
	9	A1* A2 A3 - B1 B2	-
	10	A1 A2 A3 - B1 B2	-
	11	A1* A2 A3 - B1 B2 B3	-
	12	A1 A2 A3 - B1 B2 B3	-
	13	A1* A2 A3 A4 - B1 B2 B3	-
	14	A1 A2 A3 A4 - B1 B2 B3	-
A1, A2, A3, A4 B1 (*), B2,B3	1	-	B1*
	2	-	B1
	3	-	A1 - B1*
	4	-	A1- B1
	5	-	A1 - B1* B2
	6	-	A1 - B1 B2
	7	-	A1 A2 - B1* B2
	8	-	A1 A2 - B1 B2
	9	-	A1 A2 - B1* B2 B3
	10	-	A1 A2 - B1 B2 B3
	11	-	A1 A2 A3 - B1* B2 B3
	12	-	A1 A2 A3 - B1* B2 B3
	13	-	A1 A2 A3 A4 - B1* B2 B3
	14	-	A1 A2 A3 A4 - B1 B2 B3
A1(*), A2, A3, A4 B1 (*), B2, B3	1	A1*	B1*
	2	A1	B1
	3	A1* - B1*	A1* - B1*
	4	A1 - B1*	A1*- B1
	5	A1 - B1	A1 - B1
	6	A1* A2 - B1*	A1* - B1* B2
	7	A1* A2 - B1	A1 - B1* B2
	8	A1 A2 - B1	A1 - B1 B2
	9	A1* A2 - B1* B2	A1* A2 - B1* B2
	10	A1 A2 - B1* B2	A1* A2 - B1 B2

UNIT SIZE	STAGES	LOADING SEQUENCE A	LOADING SEQUENCE B
	11	A1 A2 - B1 B2	A1 A2 - B1 B2
	12	A1* A2 A3 - B1* B2	A1* A2 - B1* B2 B3
	13	A1* A2 A3 - B1 B2	A1 A2 - B1* B2 B3
	14	A1 A2 A3 - B1 B2	A1 A2 - B1 B2 B3
	15	A1* A2 A3 - B1* B2 B3	A1* A2 A3 - B1* B2 B3
	16	A1 A2 A3 - B1* B2 B3	A1* A2 A3 - B1 B2 B3
	17	A1 A2 A3 - B1 B2 B3	A1 A2 A3 - B1 B2 B3
	18	A1* A2 A3 A4 - B1* B2 B3	A1* A2 A3 A4- B1* B2 B3
	19	A1* A2 A3 A4 - B1 B2 B3	A1* A2 A3 A4 - B1 B2 B3
	20	A1 A2 A3 A4 - B1 B2 B3	A1 A2 A3 A4 - B1 B2 B3
A1, A2, A3, A4 B1, B2, B3, B4	1	A1	B1
	2	A1 - B1	A1 - B1
	3	A1 A2 - B1	A1 - B1 B2
	4	A1 A2 - B1 B2	A1 A2 - B1 B2
	5	A1 A2 A3 - B1 B2	A1 A2 - B1 B2 B3
	6	A1 A2 A3 - B1 B2 B3	A1 A2 A3 - B1 B2 B3
	7	A1 A2 A3 A4 - B1 B2 B3	A1 A2 A3 - B1 B2 B3 B4
	8	A1 A2 A3 A4 - B1 B2 B3 B4	A1 A2 A3 A4 - B1 B2 B3 B4
A1, A2, A3, A4 B1(*), B2, B3, B4	1	A1*	-
	2	A1	-
	3	A1* - B1	-
	4	A1 - B1	-
	5	A1* A2 - B1	-
	6	A1 A2 - B1	-
	7	A1* A2 - B1 B2	-
	8	A1 A2 - B1 B2	-
	9	A1* A2 A3 - B1 B2	-
	10	A1 A2 A3 - B1 B2	-
	11	A1* A2 A3 - B1 B2 B3	-
	12	A1 A2 A3 - B1 B2 B3	-
	13	A1* A2 A3 A4 - B1 B2 B3	-
	14	A1 A2 A3 A4 - B1 B2 B3	-
	15	A1* A2 A3 A4 - B1 B2 B3 B4	-
	16	A1 A2 A3 A4 - B1 B2 B3 B4	-
A1(*), A2, A3, A4 B1(*), B2, B3, B4	1	A1*	B1*
	2	A1	B1
	3	A1* - B1*	A1* - B1*
	4	A1 - B1*	A1*- B1
	5	A1 - B1	A1 - B1
	6	A1* A2 - B1*	A1* - B1* B2
	7	A1* A2 - B1	A1 - B1* B2
	8	A1 A2 - B1	A1 - B1 B2
	9	A1* A2 - B1* B2	A1* A2 - B1* B2
	10	A1 A2 - B1* B2	A1* A2 - B1 B2
	11	A1 A2 - B1 B2	A1 A2 - B1 B2
	12	A1* A2 A3 - B1* B2	A1* A2 - B1* B2 B3
	13	A1* A2 A3 - B1 B2	A1 A2 - B1* B2 B3
	14	A1 A2 A3 - B1 B2	A1 A2 - B1 B2 B3
	15	A1* A2 A3 - B1* B2 B3	A1* A2 A3 - B1* B2 B3
	16	A1 A2 A3 - B1* B2 B3	A1* A2 A3 - B1* B2 B3
	17	A1 A2 A3 - B1 B2 B3	A1 A2 A3 - B1 B2 B3
	18	A1* A2 A3 A4 - B1* B2 B3	A1 A2 A3 - B1* B2 B3 B4
	19	A1* A2 A3 A4 - B1 B2 B3	A1 A2 A3 - B1* B2 B3 B4
	20	A1 A2 A3 A4 - B1 B2 B3	A1 A2 A3 - B1 B2 B3 B4
	21	A1* A2 A3 A4 - B1* B2 B3 B4	A1* A2 A3 A4 - B1* B2 B3 B4
	22	A1 A2 A3 A4 - B1* B2 B3 B4	A1* A2 A3 A4 - B1 B2 B3 B4
	23	A1 A2 A3 A4 - B1 B2 B3 B4	A1 A2 A3 A4 - B1 B2 B3 B4

5.13 - EXV CONTROL

EXV valves control the flow of liquid refrigerant into the cooler. They are operated by processor to maintain a specified superheat at lead compressor entering gas thermistor (located between compressor motor and cylinders). There is one EXV per circuit.

One thermistor and one pressure transducer located in each circuit lead compressor are used to determine the superheat. The thermistor measures the temperature of the superheat gas entering the cylinders. The pressure transducer measures the suction line pressure. The control converts this pressure into saturated temperature. The difference between the superheat gas and the saturated temperature gives the superheat. The control modulates the EXV position as to maintain this superheat as close as possible to the configured superheat setpoint.

Because the EXV's are controlled by the processor module it is possible to track valve position in order to use this information for others control functions. During unit start-up, EXV is fully closed and performs pumpdown. When the pumpdown is achieved, the control modulates and tracks permanently the position of the EXV. When the circuit is stopped, the EXV is closed to allow pumpdown procedure.

The EXV is also used to limit the cooler suction temperature. This makes it possible for chiller to start at higher cooler water temperatures without overloading compressors. this is commonly referred to as MOP (maximum operating pressure), and serves as a load limiting device to prevent compressor motor overloading.

5.14 - HEAD PRESSURE CONTROL ON AIR COLED UNITS

Two methods are available for condenser fan control.

- ***Setpoint control :*** For setpoint head pressure control the saturated condensing temperature is controlled to a fixed setpoint. This is done by cycling condenser fans on and off and through the adjustment of motormaster fans speed (if used). The fixed setpoint is adjustable through the HSIO. See HSIO setpoint subfunction.

- ***EXV position :*** For EXV position based controlled the head pressure is controlled based on the EXV valve position by cycling condenser fans on and off and through adjustment of the motormaster fan speed (if used). Units using EXV's only.

  As the condensing temperature drops, the EXV opens to maintain the proper suction superheat. Once the EXV is fully open, if the condensing temperature continue to drop and is less than the circuit head pressure setpoint minus 19.4° C during 2 minutes then a fan stage is removed.

  As the condensing temperature rises, the EXV closes to maintain the proper suction superheat. Once the EXV has closed to 39.5% open, a fan stage is added after 2 minutes.

During start-up and whatever the head pressure configuration, two fan stages are started if the condensing temperature is above 35°C to prevent excessive discharge pressure during pulldown.

Note: Depending of unit wiring the control can handle up to 3 fan stages per circuit.

5.15 - HEAD PRESSURE CONTROL ON WATER COOLED UNITS

Water valves can be used to control the head pressure of each circuit (water cooled units).

Two methods of water valve control are available:

- Setpoint controlled: The water valve position of each circuit is adjusted to maintain a saturated condensing temperature equal to a fixed setpoint.

- EXV controlled: The water valve position of each circuit is adjusted to maintain a superheat equal to the superheat setpoint plus 4.4°C. Units using EXV's only.

5.16 - PUMPOUT

When the lead compressor in each circuit is started or stopped, that circuit goes through a pumpout cycle to purge the cooler and refrigerant suction line of refrigerant. The maximum duration of the pumpout cycle is 3 minutes.

The pumpout cycle starts immediately upon starting the lead compressor and continues until the saturated suction temperature is:

- 5.5°C below the saturated suction temperature meas ured at pumpout initiation
- or is 5.5°C below the cooler leaving fluid temperature
- or reaches -26°C.

During the pumpout cycle, the EXV (if the unit uses EXV's) or the liquid line solenoid (if the unit uses TXV's) is maintained closed.

When one of the above conditions is satisfied, the EXV starts to open gradually (or the liquid line solenoid is opened on units using TXV's) to provide a controlled start-up to prevent liquid flood-back to the compressor. This pumpout at startup is not executed if the circuit has been off less than 15 minutes.

At circuit shutdown, the EXV (if the unit uses EXV's) or the liquid line solenoid (if the unit uses TXV's) is closed and the pumpout cycle continues until the circuit saturated suction temperature is:

- 5.5 below the saturated suction temperature measured at pumpout initiation
- or reaches -26°C.

At that point, the lead compressor shuts down.

6 - Troubleshooting

6.1 - GENERAL

The Flotronic II control has many features to aid the technicians in troubleshooting a Flotronic II chiller. By using keypad and display module and Status function, actual operating conditions of the chiller are displayed while unit is running. Test function allows proprer operation of compressors, compressors unloaders, fans, EXV's and other componenents to be checked while chiller is stopped. Service function displays how configurable items are configured.

6.2 - DISPLAYING CURRENT ALARM CODES

If an operating fault is detected, and alarm is generated and an alarm code(s) is displayed under the subfunction [2] [STAT], along with an explanation of the fault. Up to 10 current alarm codes are stored.

When an alarm is generated:

- The alarm relay is activated.
- The alarm code(s) is displayed under the HSIO subfunction 2<STAT>. Up to 10 current alarm codes can be stored. To view them in sequence, press [2] [STAT] to enter the alarm display and then press [↓] to move to the individual alarm display. Pressing the Expand Display key provides a full description of the alarm followed by the date and time of the alarm.

Keyboard Entry	Display Response	Comment
[2] [STAT]	2 ALRMS	In this example there is 2 alarms in effect.
[↓]	RSAL DSB	This item is used for alarm reset.
[↓]	Alert 40	First alarm code.
[EXPN]	CIRCUIT A LOW OIL PRESSURE AUG/25 14-21	Pressing the expand display key provides a full description of the alarm followed by the date and time of the alarm. This message is scrolling across the 8 characters display field.
[↓]	Alarm 43	Second alarm code.
[EXPN]	LOW COOLER FLUID FLOW AUG/25 18-30	Full description of the alarm followed by date and time of the alarm.

Example : Checking Alarm Display Codes

6.3 - RESET PROCEDURE

After the cause of stoppage has been corrected, alarm reset is either automatic or manual, depending on fault (see fault description listed below).

Manual reset requires the following procedure:

Keyboard Entry	Display Response	Comment
[2] [STAT]	2 ALRMS	In this example there is 2 alarms in effect.
[↓]	RSAL DSB	This item is used for alarm reset.
[1] [ENTR]	RSAL ENB	Entering 1 allows to reset all active alarms
	0 ALRMS	All alarms are reset

Manual Reset Procedure

After reset, alarm codes are stored with their date and time into the HSIO 3<HIST> subfunction.

Note: Alarm reset can be done with the unit running. It is thus possible to reset alarms without stopping the unit.

In case of power failure, the unit restarts automatically. However, the defaults which were in effect just before the power failure are still stored and can possibly avoid a circuit or the unit restart.

6.4 - ALARM CODES DESCRIPTION

Following is a complete description of each alarm error code and its possible cause.

Alarm codes summary					
Display	**Description**	**Action taken by control**	**Circuit pumpdown**	**Reset type**	**Probable cause**
1	Compressor A1 failure	Circuit A shut down	No	Manual	- High Pressure switch trip. - Compressor motor internal protection or discharge gas temperature too high detected by sensor module. - Ground fault module contact open.
2,3,4	Compressor A2, A3, A4 failure	Compressor shut down	No	Manual	
5	Compressor B1 failure	Circuit B shut down	No	Manual	
6, 7, 8	Compressor B2, B3, B4 failure	Compressor shutdown	No	Manual	
9	Cooler leaving fluid thermistor failure	Unit shutdown	Yes	Auto	Thermistor failure, wiring error or loose connection.
10	Cooler entering fluid thermistor failure	Unit shutdown	Yes	Auto	
11	Condenser leaving fluid thermistor failure	Heat machine : Unit shutdown Others : No action	Yes -	Auto Auto	
12	Condenser entering fluid thermistor failure	No action	-	Auto	
13	Heat reclaim entering fluid thermistor failure	No action	-	Auto	
14	Heat reclaim leaving fluid thermistor failure	No action	-	Auto	
15	Not used	-	-	-	
16	Not used	-	-	-	
17	Not used	-	-	-	
18	Not used	-	-	-	
19	Compressor A1 suction thermistor failure	Circuit A shut down	Yes	Auto	Thermistor failure, wiring error or loose connection
20	Compressor B1 suction thermistor failure	Circuit B shut down	Yes	Auto	
21	Reset thermistor sensor failure	Normal setpoint used	Yes	Auto	
22	Discharge pressure transducer failure, circuit A	Circuit A shut down	Yes	Auto	Bad transducer or wiring error
23	Discharge pressure transducer failure, circuit B	Circuit B shut down	Yes	Auto	
24	Suction pressure transducer failure, Circuit A	Circuit A shut down	No	Auto	
25	Suction pressure transducer failure, Circuit A	Circuit B shut down	No	Auto	
26	Oil pressure transducer failure, circuit B	Circuit A shut down	No	Auto	
27	Oil pressure transducer failure, circuit B	Circuit B shut down	No	Auto	
28	Transducer supply voltage failure	Unit shut down	No	Auto	Faulty transformer or primary voltage out of range
29	Local/Stop/CCN switch failure	Unit shut down	No	Manual	Faulty switch, wiring error or loose connection.
30	4-20 mA reset input failure	Normal setpoint used	No	Auto	Wiring error or faulty module or input signal out of range
31	4-20 mA demand limit input failure	Demand limit ignored	No	Auto	
32	Loss of communication with DSIO-1(LV)	Unit shut down	No	Auto	Wiring error or faulty module or improper address code.
33	Loss of communication with DSIO-2(EXV)	Unit shut down	No	Auto	
34	Loss of communication with option board 1 (4X4)	Unit shut down	Yes	Auto	
35	Loss of communication with option board 2 (8IN)	Unit shut down	Yes	Auto	
36	Low refrigerant pressure, circuit A	Circuit A shut down	No	*	Low refrigerant charge, faulty EXV, plugged filtrer drier.
37	Low refrigerant pressure, circuit B	Circuit B shut down	No	*	
38	Failure to pumpdown, circuit A	Circuit A shut down	No	Manual	Faulty transducer or EXV
39	Failure to pumpdown, circuit B	Circuit B shut down	No	Manual	

* Reset automatic first time, manual if repeated same day

Alarm codes summary					
Display	**Description**	**Action taken by control**	**Circuit pumpdown**	**Reset type**	**Probable cause**
40	Low oil pressure, circuit A	Circuit A shut down	No	Manual	Faulty compressor, EXV, crankcase heater or transducer, refrigerant overcharge, insufficient oil charge.
41	Low oil pressure, circuit B	Circuit B shut down	No	Manual	
42	Cooler freeze protection	Unit shut down	No	*	Low water flow or faulty thermistor.
43	Low cooler fluid flow	Unit shut down	No	Manual	Faulty chilled water pump, control or thermistor
44	Low cooler suction temperature, Circuit A	Circuit A shut down after 10 minutes	No	Manual	Low refrigerant charge, plugged filter drier, faulty EXV or thermistor.
45	Low cooler suction temperature, Circuit B	Circuit B shut down after 10 minutes	No	Manual	
46	High suction superheat, circuit A	Circuit A shut down	Yes	Manual	Low charge, faulty EXV or thermistor or plugged filter drier.
47	High suction superheat, circuit B	Circuit B shut down	Yes	Manual	
48	Low suction superheat, circuit A	Circuit A shut down	Yes	Manual	Faulty EXV or thermistor.
49	Low suction superheat, circuit B	Circuit B shut down	Yes	Manual	
50	Illegal configuration	Unit cannot start	-	Auto	Configuration error
51	Initial configuration required	Unit cannot start	-	Auto	Configuration omitted
52	Emergency stop by CCN command	Unit shut down	No	CCN	Network command.
53	Cooler pump interlock failure at startup	Unit not allowed to start	-	Manual	Failure of chilled water pump or wiring error.
54	Cooler pump interlock failure - Contact open during normal operation.	Unit shut down	No	Manual	
55	Cooler pump interlock failure - Contact closed while pump is off.	Unit cannot start	-	Manual	
56	WSM loss of communication	Unit reverts to standalone operation	-	Auto	Faulty or improperty connected plug, wiring error, interferences on CCN bus or faulty module.
57	Not used	-	-	-	
58	Not used	-	-	-	
59	Not used	-	-	-	
60	Not used	-	-	-	
61	Not used	-	-	-	
62	Not used	-	-	-	
63	Unit down due to failure	None	-	Auto	100 % of the unit is down due to failure.
64	Not used	-	-	-	
65	Not used	-	-	-	
66	FSM loss of communication	Unit reverts to standalone operations	-	Auto	Faulty or improperty connected plug, wiring error, interferences on CCN bus or faulty module.
67	Not used	-	-	-	
68	Loss of communication with remote alarm DSIO-1	None	-	Auto	Faulty or improperty connected plug, wiring error, interferences on CCN bus or faulty module.
69	Loss of communication with remote alarm DSIO-1	None	-	Auto	Faulty or improperty connected plug, wiring error, interferences on CCN bus or faulty module.
70	High leaving chilled water temperature	None	-	Auto	Unit cannot satisfy cooling or heating demand.

* reset automatic first time, manual if repeated same day

Code 1, 5 : A1 or B1 Lead Compressor Failure

Cause : The compressor feedback signal is off when the compressor is commanded to be on.

Action : Circuit stops without pumpdown.

Reset : Manual. Pumpdown at restart.

Code 2, 3, 4 : A2 or A3 or A4 Lag Compressor Failure
Code 6, 7, 8 : B2 or B3 or B4 Lag Compressor Failure

Cause : The compressor feedback signal is off when the compressor is commanded to be on.

Action : The circuit stops without pumpdown. The circuit restarts, with pumpdown, until one minute has elapsed since it shut down. The faulty compressor is not restarted.

Reset : Manual

Possible causes for alarms 1 to 8

- **High-Pressure Switch Open :** High pressure switch for each compressor is wired in series with 24V power that energizes compressor control relay. If high-pressure switch opens during operation the compressor stops. This is detected by microprocessor through the feedback terminals.
- **Sensor Module Contact :** Compressor motor internal protection and discharge gas sensor are detected by the sensor module in the terminal box of each compressor. The contact is in series with 24 V power that energizes control relay. If switch opens, the compressor stops. Failure is detected through feedback terminals.
- **DSIO Module Failure :** If a DSIO relay module relay fails opened or closed, the microprocessor, locks the compressor off and indicates an error.
- **Wiring Errors :** If a wiring error causes a control relay or feedback switch not to function properly, the microprocessor indicates an error.
- **Processor (PSIO) Failure :** If a hardware monitoring feedback switch fails, or processor fails to energize a relay module to ON, an error may be indicated.
- **Ground Fault Module :** Ground fault module contact is wired in series with the 24 V supply to the compressor control relay. If ground current protection module contact opens during operation, the compressor stops. This is detected by microprocessor through the feeedback terminals.

Code 9 : Cooler Leaving Fluid Thermistor Failure
Code 10 : Cooler Entering Fluid Thermistor Failure

Cause : The temperature measured by the leaving cooler fluid sensor is outside the range -40 to 116°C (-40 to 240°F).

Action : The unit stops through pumpdown.

Reset : Automatic if temperature returns to acceptable range. Unit restarts normally.

Possible causes : Bad thermistor, wiring error, loose connection.

Code 11 : Condenser Leaving Fluid Thermistor Failure

Cause : 1. For a heat machine, the leaving condenser fluid is outside the range -40 to 116°C (-40 to 240°F).
2. For a water cooled unit with optional condenser fluid sensors, the sensor is outside the range -40 to 116° C (-40 to 240°F).

Action : Case 1 : The unit stops through pumpdown.
Case 2 : None

Reset : Automatic if temperature returns to acceptable range.

Possible causes : Bad thermistor, wiring error, loose connection.

Code 12 : Condenser Entering Fluid Thermistor Failure

Cause : 1. For a heat machine the entering condenser fluid is outside the range -40 to 116°C (-40 to 240°F).
2. For a water cooled machine with optional sensors, the sensor is outside the range -40 to 116°C (-40 to 240°F)

Action : Case 1 : The unit continues to run but a default value/ is used by the capacity control function. Return fluid reset is not used.
Case 2 : None

Reset : Automatic if temperature returns to acceptable range.

Possible causes : Bad thermistor, wiring error, loose connection.

Code13 : Heat Reclaim Entering Thermistor Failure
Code 14 : Heat Reclaim Leaving Fluid Thermistor Failure

Cause : For a heat reclaim unit with the optional heat reclaim thermistors, one sensor is outside the range -40 to 116°C (-40 to 240°F).

Action : None.

Reset : Automatic if temperature returns to acceptable range.

Possible causes : Bad thermistor, wiring error, loose connection.

Code 15 to Code 18 : Not Used for this Product

Code 19 : Circuit A Compressor Suction Thermistor Failure
Code 20 : Circuit B Compressor Suction Thermistor Failure

Cause : For units using EXV's, the thermistor in the lead compressor is outside the range -40 to 116°C (-40 to 240°F).

Action : Circuit stops through pumpdown.

Reset : Automatic if temperature returns to acceptable range. Circuit restarts normally.

Possible causes : Bad thermistor, wiring error, loose connection.

Code 21 : Reset Thermistor Sensor Failure

Cause : If the external temperature reset sensor is being used and the reset temperature sensor is outside the range -40 to 116°C (-40° to 240°F).

Action : Reset function is stopped and the normal setpoint is used.

Reset : Automatic if temperature returns to acceptable range.

Possible causes : Bad thermistor, wiring error, loose connection.

Code 22 : Circuit A Discharge Pressure Transducer Failure

Code 23 : Circuit B Discharge Pressure Transducer Failure

Cause : The transducer output voltage is greater than 5 Volts.

Action : Circuit stops through pumpdown.

Reset : Automatic when output voltage returns to the acceptable range. Circuit restarts normaly.

Possible causes : Bad transducer, wiring error.

Code 24 : Circuit A Suction Pressure Transducer Failure

Code 25: Circuit B Suction Pressure Transducer Failure

Cause : The transducer output voltage is greater than 5 Volts.

Action : Circuit stops without pumpdown.

Reset : Automatic when output voltage returns to acceptable range. Circuit pumpdown at restart.

Possible causes : Bad transducer, wiring error.

Code 26 : Circuit A Oil Pressure Transducer Failure

Code 27 : Circuit B Oil Pressure Transducer Failure

Cause : The transducer output voltage is greater than 5 Volts.

Action : Circuit stops without pumpdown.

Reset : Automatic when output voltage returns to the acceptable range. Circuit pumps down at restart.

Possible causes : Bad transducer, wiring error.

Code 28 : Transducer Supply Voltage Failure

Cause : The reference voltage is outside the range 4.5 to 5.5 Volts.

Action : Circuit stops without pumpdown.

Reset : Automatic if supply voltage returns to the acceptable range. Circuit pumps down at restart.

Possible causes : Faulty transformer, or primary voltage out of range.

Code 29 : LOCAL/STOP/CCN Switch Failure

Cause : The Local/Stop/CCN switch reading is outside the valid range.

Action : Unit stops without pumpdown.

Reset : Manual. Unit is restarted with pumpdown.

Possible causes : Faulty switch, wiring error, loose connection.

Code 30 : 4-20 mA Reset Input Failure

Cause : Reset input signal is less than 2 mA or greater than 22 mA.

Action : Reset function is ignored and the unit uses the normal setpoint.

Reset : Automatic when the reset signal returns within the acceptable range.

Possible causes : Faulty 4x4 module or a wiring error or an input signal out of range.

Code 31 : 4-20 mA Demand Limit Input Failure

Cause : The unit uses a 4-20 mA demand limit input signal and the signal is less than 2 mA or greater than 22 mA.

Action : The demand limit function is ineffective and control is based on a 100 % demand limit.

Reset : Automatic when the input signal returns to the acceptable range.

Possible causes : Faulty 4x4 module, wiring error, or an input signal out of range.

Code 32 : Loss of Communication with DSIO-1

Cause : Communication with DSIO-1 (compressor relay module) is lost.

Action : Unit stops without pumpdown.

Reset : Automatic when communication is re-established. Pumpdown at restart.

Possible causes : Faulty or improperly connected plug, wiring error, faulty module.

Code 33 : Loss of Communication with DSIO-2

Cause : Communication with DSIO-2 (EXV) is lost.

Action : Unit stops without pumpdown.

Reset : Automatic when communication is re-established. Pumpdown at restart.

Possible causes : Faulty or improperly connected plug, wiring error, faulty module.

Code 34 : Loss of Communication with Option Board 1 (4 IN x 4 OUT)

Cause : The unit uses one of the following functions and the communication is lost with the 4 IN/4 OUT module :

- External temperature reset with remote sensor
- 4-20 mA temperature reset
- External switch controlled dual setpoint
- Switch controlled demand limiting
- 4-20 mA demand limiting
- 7 or 8 compressors with 1 or 2 unloaders
- Less than 7 compressors with more than 2 unloaders
- Direct controlled Motormaster
- Hot gas bypass

Action : Unit stops through pumpdown.

Reset : Automatic when communication is re-established. Pumpdown at restart.

Possible causes : Faulty or improperly connected plug, wiring error, faulty module.

Code 35 : Loss of Communication with Option Board 2 (8 IN)

Cause : The unit uses one of the following functions and the communication is lost with the 8 IN module :

- Air cooled chiller with heat reclaim sensors
- Water cooled chiller with heat reclaim sensors
- Water cooled chiller with transducers and condenser fluid sensors
- Heat machine with pressure transducers.

Action : Unit stops through pumpdown.

Reset : Automatic when communication is re-established. Pumpdown at restart.

Possible causes : Faulty or improperly connected plug, wiring error, faulty module.

Code 36 : Circuit A Low Refrigerant Pressure
Code 37 : Circuit B Low Refrigerant Pressure

Cause : The unit is running and the suction pressure falls below the low pressure setpoint for more than 3 minutes

Action : The circuit stops without pumdown.

Reset : Automatic when the pressure transducer pressure is 10 psi above the trip point and a low pressure trip, with the same error code and date, does not exist in the alarm history file. Pumpdown at restart.
Reset is manual if the alarm history file contains an error with the same code and date. Pumpdown at restart.

Possible causes : Low refrigerant charge, faulty EXV, plugged filter-drier, faulty transducer.

Code 38 : Circuit A Failure to Pumpdown
Code 39 : Circuit B Failure to Pumpdown

Cause : Pumpdown default. See pumpdown description section.

Action : Circuit stops.

Reset : Manual. Pumpdown at restart.

Possible causes : Bad transducer, faulty EXV.

Code 40 : Circuit A Low Oil Pressure
Code 41 : Circuit B Low Oil Pressure

This alarm is not tested during one minute after the lead compressor start.

Cause : The unit is equipped with oil pressure switch and the oil pressure swith is open continuously for one minute.
Or the unit is equipped with pressure transducers and the oil pressure differential is less than the oil setpoint for 1 minute. Factory configured differential oil pressure setpoint is 69 kPa or 117 kPa depending on compressor size.

Action : Circuit stops without pumpdown.

Reset : Manual. Pumpdown at restart.

Possible causes : Faulty compressor, EXV, crankcase heater, or transducer, refrigerant overcharge, insufficient oil charge.

Code 42 : Cooler Freeze Protection

Freeze Point Water : 1.1°C
Freeze Point (Brine unit using single setpoint) : CSP1 - 4.4°C
Freeze (Brine unit using dual Setpoint : Smaller of CSP1/CSP2 -4.4°C

Cause : The cooler entering or leaving fluid temperature is below freeze point.

Action : Unit stops without pumpdown and chilled water pump continues to run if controlled by chiller control.

Reset : Automatic if an alarm does not exist in alarm history with the current date code and if the leaving fluid is 3.3°C (6°F) above the setpoint. Pumpdown at restart.
Manual if an alarm 42 exists in the alarm buffer with the current date code. Pumpdown at restart.

Possible causes : Low water flow, faulty thermistor.

Code 43 : Low Cooler Fluid Flow

Cause : If any compressors are operating and the entering fluid temperature is 1.6°C (3°F) or more below the leaving fluid temperature for 1 minute.

Action : Unit stops without pumpdown.

Reset : Manual. Pumpdown at restart.

Possible causes : Faulty chilled water pump control or thermistor.

Note : This is a suitable method for sensing low water flow because the entering water thermistor is in the cooler shell and responds quicker to compressor operation than the leaving water thermistor in the leaving water nozzle.

Code 44 : Circuit A Low Cooler Suction Temperature
Code 45 : Circuit B Low Cooler Suction Temperature

Cause : 1.The circuit is running and the Saturated Suction Temperature is 13.3°C (24°F) or more below the cooler leaving fluid temperature and is less than freeze - 1.1°C (freeze -2°F) for more than 5 minutes.
2.The circuit is running and the Saturated Suc tion Temperature 16.6°C (30°F) or more below the cooler leaving fluid temperature and is less than freeze - 1.1°C (freeze -2°F) for more than 10 minutes.

Action : Cause 1. The mode 14 is displayed and no additional lag compressor is added. Circuit con tinues to run until the conditions described in cause 2 are met.
Cause 2. The circuit stops without pumpdown.

Reset : Manual. Pumpdown at restart.

Possible causes : Low refrigerant charge, plugged filter drier, faulty EXV or thermistor.

Note : See alarm 42 for freeze point description.

Code 46 : Circuit A High Suction Superheat
Code 47 : Circuit B High Suction Superheat

Cause : 1.The EXV is at or above 98 %, the suction superheat is greater than 41.6°C (75°F) and the evaporator suction is less than the MOP setpoint for more than 5 minutes.
2.The unit is equipped with direct motomaster fan control. The motormaster output must be at or below 2 % in addition to the criteria listed in 1.
3.The unit is equipped with water valve. The water valve output must be at 2 % open in addition to the criteria listed in cause 1.

Action : The circuit stops through pumpdown.

Reset : Manual.

Possible causes : Low refrigerant charge, plugged filter drier, faulty EXV or thermistor.

Code 48 : Circuit A Low Suction Superheat
Code 49 : Circuit B Low Suction Superheat

Cause : 1.The EXV is less than or equal to the minimum position + 2 % and either the (suction superheat is less than the superheat setpoint - 5.5°C (10°F) or the evaporator suction temperature is greater than the MOP setpoint) for more than 5 minutes.
2.The unit is equipped with direct motormaster fan control. The motormaster output must be at or above 98 % in addition to the criteria listed in 1.
3.The unit is equipped with water cooled valve. The water valve output must be at or above 98 % in addition to the criteria listed in 1.

Action : If the above safety is tripped the first time on this date, the circuit stops after pumping down and then restarts without pumpdown. During the stop-restart period, mode 18 is displayed. Alarms 48 and 49 are not issued.
If the above safety is tripped again on a particular date, an alarm 48 or 49 is issued and the circuit stops after pumpdown.

Reset : Manual.

Possible causes : Faulty EXV or thermistor.

Code 50 : Illegal Configuration

Cause : An illegal configuration is detected.

Action : The unit cannot start.

Reset : Auto when configuration is corrected.

Possible causes : Bad configuration, wrong checksum.

Code 51 : Initial Configuration Required

Cause : The unit is not configured.

Action : The unit cannot start.

Reset : Auto when configuration is entered.

Possible causes : Replacement of the processor module.

Code 52 : Emergency Stop

Cause : Emergency stop command sent across the network.

Action : Unit stops without pumpdown.

Reset : Automatic after the CCN variable EMSTOP returns to normal. Pumpdown at restart.

Code 53 : Cooler Pump Interlock Failure at Startup

Cause : If the unit is in the allowed-to-run state, is configured for cooler pump interlock, interlock fails to close within 1 minute of the transition from the not-allowed-to-run state to the allowed-to-run state.

Action : Compressor is not allowed to start. If configured to be controlled, the cooler pump is turned off.

Reset : Manual.

Possible causes : Failure of chilled water pump or wiring error.

Code 54 : Cooler Pump Interlock Failure - Contact Open During Normal Operation

Cause : The unit is in the allowed-to-run state, the unit is configured for cooler pump interlock, the interlock transitions from closed to open.

Action : Unit stops without going through pumpdown. If configured to be controlled, the cooler pump is turned off.

Reset : Manual. Pumpdown at restart.

Possible causes : Failure of chilled water pump.

Code 55 : Cooler Pump Interlock Failure - Contact Closed While Pump is Off

Cause : The unit is configured for cooler pump control **and** interlock is closed while the cooler pump relay is off **and** one of the following conditions is satisfied :

- The control switch is in Local position and the Clock is Off and a single setpoint is used.
- The control switch is in the CCN position and the CHIL_S_S variable is Disabled.
- The control switch is in the CCN position and the CHIL_S_S variable is Enabled and the clock is Off and a single set-point is used.
- The unit is down due to failure and the control switch is either in Local or CCN position.

Action : The unit cannot start.

Reset : Manual.

Possible causes : Failure of chilled water pump.

Code 56 : WSM Loss of Communication

Cause : If the WSM (Water System Manager) has previously established communication with the control and the WSM is not disabled and has not communicated with the control within the last 5 minutes.

Action : The unit reverts to standalone operation.

Reset : Automatic upon regaining communication with WSM.

Possible causes : Faulty or improperly connected plug, wiring error, interference on CCN bus , or faulty module.

Code 57 : Not Used for this product

Code 58 : Not Used for this product

Code 59 : Not Used for this Product

Code 60 : Not Used for this Product

Code 61 : Not Used for this Product

Code 62 : Not Used for this Product

Code 63 : Unit Down Due to Failure

Cause : The unit cannot start due to alarm.

Action : The unit cannot start.

Reset : Automatic when all of the alarms that prevent the unit from starting have been cleared and reset.

Note : This alarm is intended to notify the user that 100 % of the unit is shut down due to failure.

Code 64 : Not Used for this Product

Code 65 : Not Used for this Product

Code 66 : FSM Loss of Communication

Cause : Communication is lost with the FSM (Flotronic System Manager) for more than 20 seconds.

Action : The unit reverts to standalone operation.

Reset : Automatic upon regaining communication with FSM.

Possible causes : Faulty or improperly connected plug, wiring error, interference on CCN bus, or faulty module.

Code 67 : Not Used for this Product

Code 68 : Loss of Communication with Remote Alarm DSIO-1

Code 69 : Loss of Communication with Remote Alarm DSIO-2

Cause : Remote alarm DSIO are configured and communication with this module is lost.

Action : None.

Reset : Automatic upon re-establishment of the communication with the module.

Possible causes : Faulty or improperly connected plug, wiring error, or faulty module.

Code 70 : High Leaving Chilled Water Temperature

High LCW Alert Limit = 1.1 to 33.3°C (configuration in HSIO **5<SET>**).

Cause : The leaving chilled water temperature is greater than the configurable limit (high LCW alert limit), the total unit capacity is equal to 100 %, and the leaving chilled water temperature is higher than the leaving chilled water temperature one minute before the current reading.

Action : None.

Reset : Automatic when the leaving chilled water temperature is 3°C below the limit or less than the setpoint.

Possible causes

Unit cannot satisfy cooling or heating demand.

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