

SERVICE BULLETIN

Carrier Corporation



North American Operations

Title: PIC II Controls Familiarization

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Supersedes: New

Date: N/A

Models Affected: 19XR, 19XRT, 23XL

Purpose:

To inform the field of a new Product Integrated Control system (PIC) for the 19XR/XRT product line.

Information:

A new control system called PIC II (Product Integrated Control II) has been designed for the 19XR/XRT product line. As of production week 28 (July 6, 1998) all 19XR chillers with compressor frame size 2 through 5 and 19XRT chillers with compressor frame size 3 have PIC II controls installed. The PIC II controls are a major design upgrade to the existing PIC I (Product Integrated Control I) controls that have existed on the 19XR/XRT product line.

Familiarization:

The following Comparison Table is arranged to summarize the comparison between the new PIC II control and the older PIC I control. The table on the left lists all the components in PIC I control and the table on the right lists all the components that replace the existing control with the new PIC II components. A comparison will be provided for the following portions of the control system: Control Panel, Power Panel, Motor Starter, Machine Sensors/Actuators, and Machine Safeties.

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COMPARISON TABLE
PIC I vs PIC II
 (19XR/XRT chiller with Cutler-Hammer unit mounted starter)

PIC I

CONTROL PANEL
<ul style="list-style-type: none"> • LID2B (Local Interface Device) • PSIOII-02 (Processor Sensor Input/Output Module) • 6 Pack Relay Board • Power Supply/ Comparator Board • 8 Input Options Module (1 & 2)

PIC II

CONTROL PANEL
<ul style="list-style-type: none"> • CVC (Chiller Visual Controller) • CCM (Chiller Control Module)

PIC I

POWER PANEL
<ul style="list-style-type: none"> • (3) 24 VAC control transformers • (1) 21 VAC control transformer • Oil differential pressure switch • 1C oil heater contactor • 2C oil pump contactor • 3C HGBP relay (optional) • 115/230 VAC selector switch

PIC II

POWER PANEL
<ul style="list-style-type: none"> • (2) 24 VAC control transformers • 1C oil heater contactor • 2C oil pump contactor • 3C HGBP relay (optional)

PIC I

MOTOR STARTER
<ul style="list-style-type: none"> • SMM (Starter Management Module) • IQ1000II Motor Protection System • IQDP4130 Digital Volt Meter (Optional) • (5) pilot relays • T2 24 VAC transformer • T3 24 VAC transformer

PIC II

MOTOR STARTER
<ul style="list-style-type: none"> • ISM (Integrated Starter Module)

PIC I

PIC II

MACHINE SENSORS/ACTUATORS

- (8) 5 kΩ thermistors
- (4) 5 VDC pressure transducers (refrigerant side)

- Inlet guide vane motor with 4-20 mA drive
- Diffuser actuator motor with 4-20 mA drive

MACHINE SENSORS/ACTUATORS

- (8) 5 kΩ thermistors
- (4) 5 VDC pressure transducers (refrigerant side) ((5) for frame 5 compressor)
- (4) 5 VDC pressure transducers (waterside)
- Inlet guide vane motor with floating point drive and 0-3 VDC feedback
- Diffuser actuator motor with 4-20 mA drive

PIC I

PIC II

MACHINE SAFETIES

- High discharge pressure cutout switch (pressure limiting device)
- (2) Waterside differential pressure switches (flow switch)

MACHINE SAFETIES

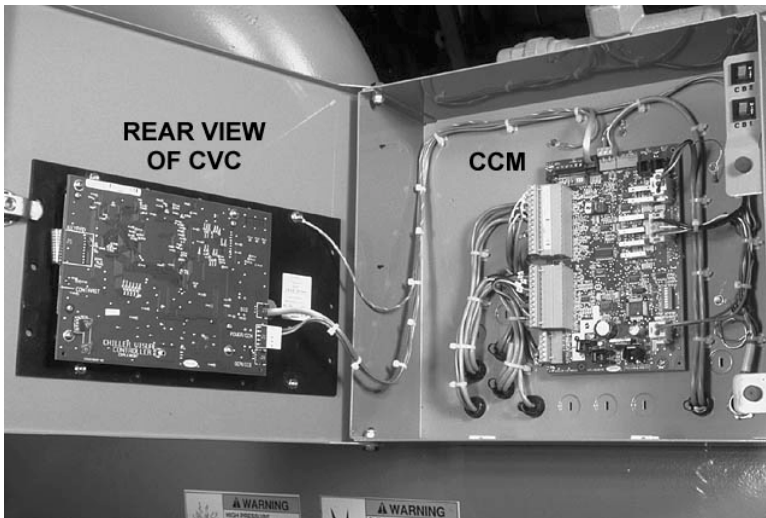
- High discharge pressure cutout switch (pressure limiting device)
- No waterside differential pressure switches are required. Water flow is sensed by pressure transducers (waterside flow devices) for flow/no flow confirmation.
- HPR (High Pressure Relay) (contacts in series with 1CR). Located in pressure limiting circuit driven off 2C auxiliary contact on the compressor oil pump contactor.



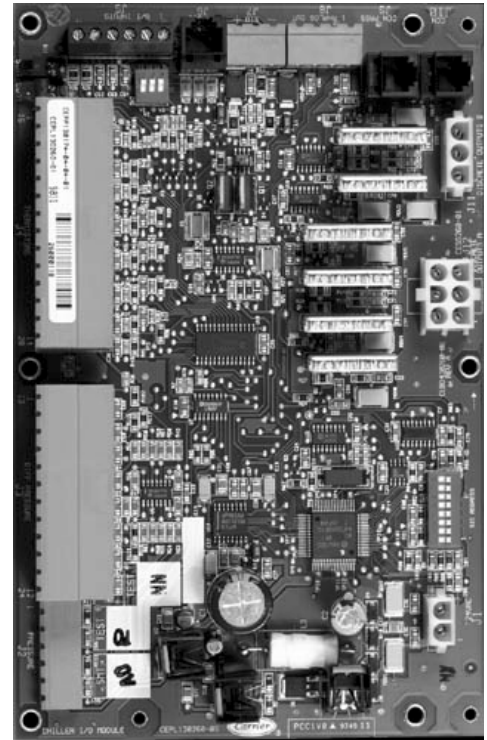
PIC II CONTROL PANEL
WITH CVC (CHILLER VISUAL CONTROLLER)

The CVC mounted in the control panel contains the following features:

- Visual display with integral back lighting (light shuts off after 15 minutes of inactivity)
- Programmable softkeys for selecting menus, and changing points
- Contains the software to control the chiller and stop operation due to safety trips
- Contains non-volatile memory (EPROM). No battery back-up is required
- Connects to the CCN network (Carrier Comfort Network) and EMS systems (Energy Management)



INTERNAL VIEW OF CONTROL PANEL
INCLUDING REAR VIEW OF CVC



CCM
(CHILLER CONTROL MODULE)

The CCM mounted in the control panel contains the following features:

- Monitors inputs from machine sensors which include thermistors for temperature sensing, pressure transducers, and inlet guide vane position feedback
- Includes termination points for optional temperature sensing, remote temperature reset, auto demand limit, auto chilled water reset, and refrigerant leak sensor
- Provides AC switching (through TRIACs) to directly control hot gas bypass, compressor oil pump, and compressor oil heater contacts including switching for floating point drive control of the guide vane actuator motor
- Provides a 4-20 mA output to control the split ring diffuser for the frame 5 compressor



ISM
(INTEGRATED STARTER MODULE)

The ISM mounted in all motor starter types except Benshaw Inc. solid state starters* contains the following features:

- Provides motor starting control, monitoring and motor protection reported to the CVC through RS485 communications on the SIO (Sensor Input Output) buss
- Provides protection for:
 - 1M/2M contact faults
 - Starter acceleration fault
 - Phase loss
 - Single cycle dropout
 - High line voltage
 - Low line voltage
 - Power loss
 - High motor amps
 - Motor locked rotor trip
 - Starter lock rotor trip
 - Phase reversal
 - Line frequency trip
 - Voltage imbalance
 - Current imbalance
 - Starter fault (optional starter protective devices)
 - Motor overload trip (I^2T electronic motor overload)
 - Ground fault protection, including phase to phase on low voltage units
- Convenient motor starter configuration and display of motor status at CVC in control panel which includes the display of:
 - Line current on phase 1, 2, and 3
 - Average line current
 - Line voltage on phase 1, 2, and 3
 - Average line voltage
 - Power factor
 - Kilowatts
 - Kilowatt-Hours
 - Line frequency
 - Ground fault on all three phases (low voltage units only)
 - Ground fault on phase 1 (for medium and high voltage units)
 - I^2T sum heat on phase 1, 2, and 3 (electronic motor overload)

*The REDISTART MICRO™ control in the Benshaw Inc. solid state starter communicates directly to the CVC and provides all ISM functionality. A separate ISM module is not used. The software that normally resides in the ISM is now resident in the EPROM on the CPU card in the REDISTART MICRO™ control.

Literature/Training material

The following is a list of literature and training material available for PIC II control and can be ordered through Literature Distribution:

Title	Form Number	Catalog Number
19XR/XRT Product Data	19XR-3PD	521-900
19XR Installation Instructions	19XR-3SI	531-973
19XR Start-up, Operation, and Maintenance Instructions	19XR-3SS	531-974
19XRT Installation Instructions	19XRT-2SI	531-976
19XRT Start-up, Operation, and Maintenance Instructions	19XRT-2SS	531-977
<u>Prepared by the Bynum Training Center:</u>		
Program (Video/Slides/Book)	19XR/XRT-03	021-907
Book	19XR/XRT-04	021-908
CD-ROM Multimedia Trainer with audio and book	19XR/XRT-04CD	021-909