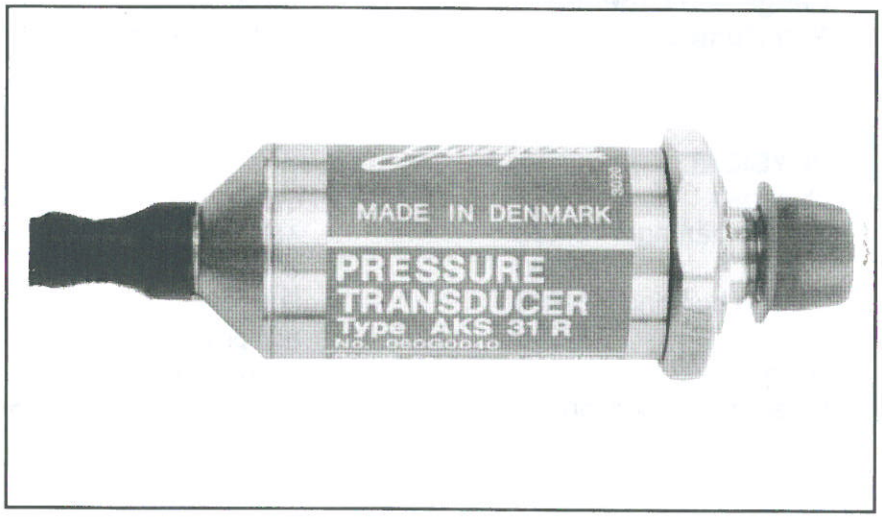
Peripheral Hardware – AKS 31R & AKS 32

Pressure Transducers/Pressure Transmitters

Description



The AKS 31R is a pressure transducer with a normalized voltage ratiometric output signal which transforms a measured pressure into an electric signal in a Wheatstone measuring bridge.

The AKS 32 is a pressure transmitter which transforms a measured pressure into a standard voltage output signal (1-5 VDC).

The AKS 31R pressure transducers' and AKS 32 pressure transmitters' silicone-filled, stainless steel housing protects them from harsh external conditions and offers maximum protection against moisture. They are suitable for an array of applications and are compatible with all refrigerants including ammonia.

The piezo-resistive silicon sensor is separated from the pressure media by means of a thin stainless steel diaphragm.

This sensor is of the sealed gauge type and is zero calibrated at 14.5 psig. Measurement is, therefore, independent of any variations in atmospheric pressure when applied on hermetic systems.

The AKS 31R is a four (4) wire ratiometric device that uses the 5 VDC power from a Danfoss DDAI8-TP.

The AKS 32's internal voltage regulator allows the use of power sources from 8 VDC to 30 VDC.

The sensors can be easily mounted and supported from their stainless steel pressure ports and are compatible with Danfoss' angle shut-off valve (ASOV).

Peripheral Hardware – AKS 31R & AKS 32

SERIES	AKS 31 R	AKS 32
Range and Ordering Part Number	0-200 psig (060G0040) 0-500 psig (060G0041)	0-200 psig (060G2030) 0-500 psig (060G2031)

PHYSICAL		
Overload		
– w/o damage: 0-200	400 psig	400 psig
0-500	800 psig	800 psig
– w/o bursting: 0-200	800 psig	800 psig
0-500	800 psig	800 psig
Weight:	.22 oz. (.1kg)	.66 oz. (.3kg)
Pressure connection:	1/8"-27NPT threaded port	1/8"-27NPT threaded port

TECHNICAL		
Linearity:	±0.5% full scale	±0.2% full scale
Repeatability & hysteresis:	±0.1% full scale	±0.1% full scale
Zero point balance at 20°C:	± 1.0% full scale	N/A
Signal range inaccuracy at 20°C:	<±0.5%	N/A
Temperature operation:		
Zero:	<0.03% full scale/°C*	<0.04% full scale/°C*
Temperature operation:		
Sensitivity:	<0.03%/°C*	<0.04%/°C*
Long-term stability:	0.5% full scale/year	0.5% full scale/year
Power supply:	5 VDC	8-30 VDC polarity protected
Power consumption:	<5mA	<5mA
Output signal:	10mV/V power supply	1-5 VDC
Impedance:	3-6 Kohm (Wheatstone bridge)	>10 Kohm (load)
Response time:	<0.1 ms	<4.0 ms
Ambient temperature:		
- during operation:	-40 to 80°C (-40 to 175°F)	-40 to 80°C (-40 to 175°F)
- during transport:	-50 to 80°C (-60 to 175°F)	-50 to 80°C (-60 to 175°F)

*(in compensated temperature range of -30/40°C (-20/105°F) for 0-200 and 0/80°C (32/175°F) for 0-500)

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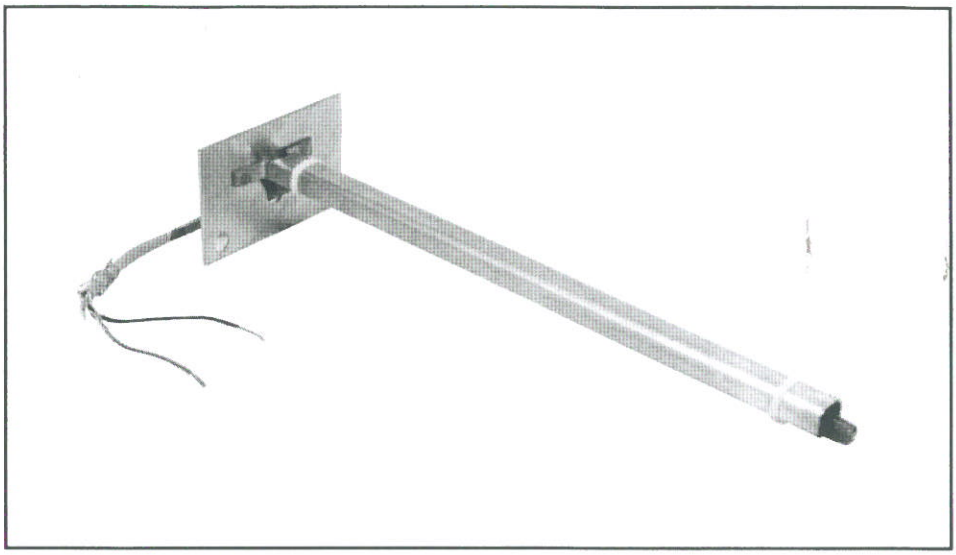
Peripheral Hardware – ASTP3

Air Supply Temperature Probe

Description



The Air Supply Temperature Probe (ASTP3) consists of a precision thermistor temperature sensor supported by a steel shaft which is typically mounted in supply or return air ducts of HVAC systems. ASTP sensor readings are frequently used to verify the operation and output efficiency of stages of heating or air conditioning.

The sensor is also used in conjunction with air control strategies involving the temperature differential between supply and return air.

(See also Danfoss-EMC's product specification sheet for THERM3 linear thermistor sensor series.)

Specifications

air supply temp probe

Model
- **ASTP3:** Three-wire ratiometric thermistor with support shaft; requires Network Controller assembly with DDAI8 or temperature amplifier board (TAB).

Power Requirement
- **ASTP3:** +5 VDC supplied by Network Controller assembly or TAB board.

Output Voltage
- 0-5 VDC to TAB assembly or DDAI8.

Physical Data
- Overall Length: 9"
- Mounting Plate: 2-3/4"H x 1-3/4"W
- Weight: 4 ounces

Operating Environment
- See THERM3 Spec Sheet.

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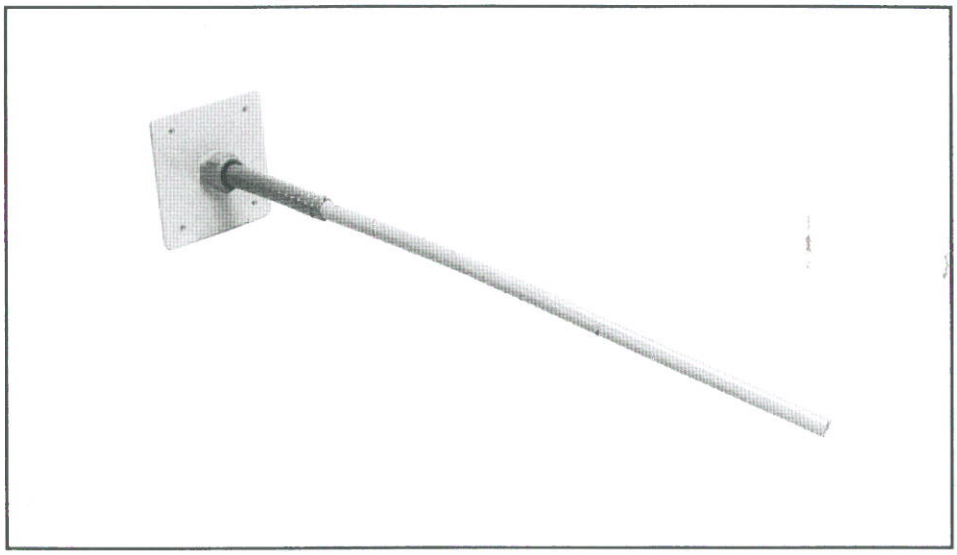
Peripheral Hardware – BXP3

Box Probe

Description



The Box Probe (BXP3) is typically used for measuring ambient air temperature in refrigerated boxes. A thermistor temperature probe protrudes approximately 3/8" from the lower end of the assembly which is fabricated from plastic piping for protection against condensation and corrosion. (See also Danfoss-EMC's product specification sheet for THERM3 linear thermistor sensors.)

Specifications

- BXP3: Box temperature probe assembly with three-wire ratiometric thermistor sensor (THERM3); requires Network Controller assembly with DDAI8 or Temperature Amplifier Board (TAB).

Mounting

- The assembly is mounted on the ceiling of the refrigerated box.

Power Requirement

- BXP3: 5 VDC supplied by Network Controller assembly
- Output Voltage: 0-5 VDC

Operating Environment

- See THERM3 Spec Sheet

Physical Data:

- Overall Length: 2'
- Mounting Plate 4-7/8"H x 4-7/8"W x 1/4"D
- Weight: 12 ounces
- Housing: Polyvinyl chloride (PVC); moisture-proof construction.

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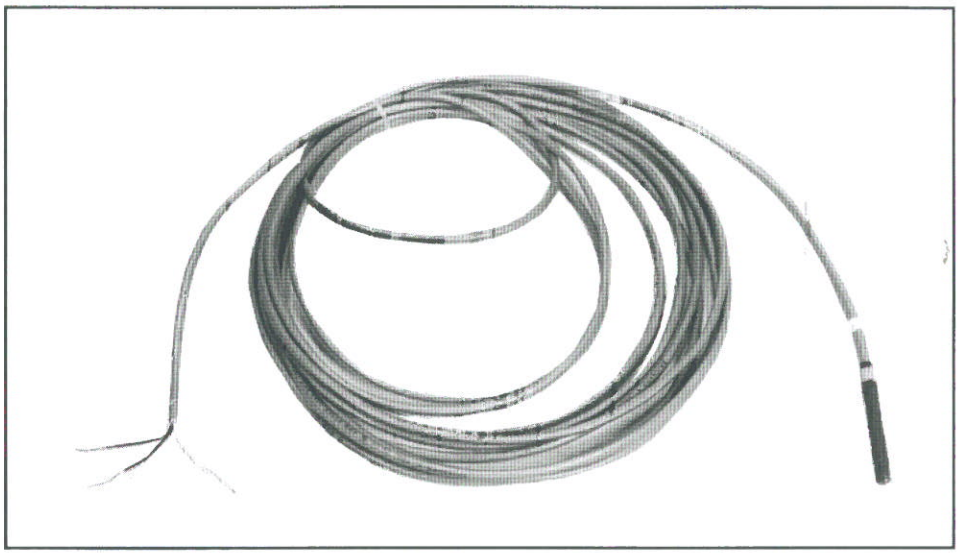
Peripheral Hardware — CP3

Case Probe

Description



The Case Probe (CP series) is a precision thermistor sensor, to which 22' of three conductor 22 gauge shielded cable is attached.

The sensor can be attached to an air grill or can be supplied with a mounting disk for placement through the wall of primary discharge or return airflows of refrigerated cases. The CP sensor has a maximum temperature error of ±.74°F (±.41°C).

(See also Danfoss-EMC's Thermistor Sensors product specification sheet.)

Specifications

Model

- CP3: Three-wire ratiometric thermistor with 22' pigtail; requires Network Controller assembly with DDAI8.

Power Requirement

- CP3: +5 VDC supplied by Network Controller assembly or temperature amplifier board.

Weight

- CP3: 9.0 ounces

Operating Environment

- Ambient Temperature:
  -5°F to 160°F (-20°C to 70°C)
- Humidity:
  0% to 95% RH, non-consensing

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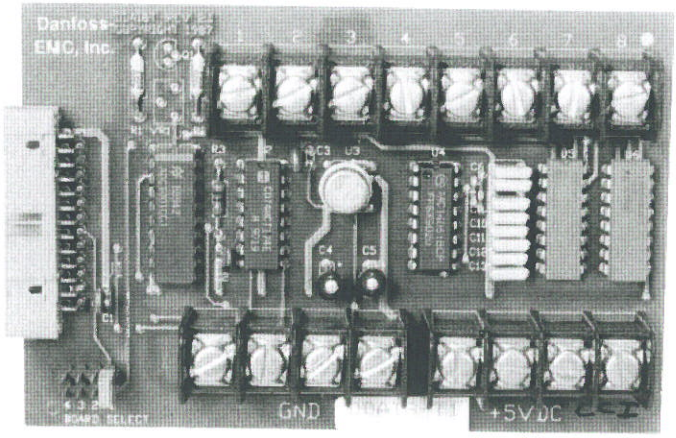
NC System Hardware — DDAI8-T1

Direct Digital Analog Input Board

Electronic Controls

Description



The Direct Digital Analog Input Eight (DDAI8) board is designed as a ratiometric analog input system. The standard board comes equipped with a 10 bit A/D converter and uses a variety of input sensors.

A three (3) wire temperature sensor designed to operate with the ratiometric system provides temperature readings at an accuracy of ±1/2°F. In addition, the DDAI8 has the ability to receive inputs from a wide range of standard available sensors. Among these are pressure, photo cell, relative humidity, etc.

Specifications

- Inputs: up to eight (8) 0-5VDC analog inputs can be connected to 1 DDAI8 board.
- Power: supplied by DD BUS
- DDAI8: up to four (4) DDAI8 boards can be connected to each NC10 and up to six (6) DDAI8 boards can be connected to the NC25.
- Connection: connected on daisy chain 26 pin (DD BUS) keyed ribbon cable.

Operating Environment

- Ambient Temperature
  -5°F to 160°F (-20°C to 70°C)
- Humidity:
  0% to 95% RH non-condensing

Physical Data

- Size: 3" x 5"
- Weight: 3" PVC snap track
- Cooling: Free Air

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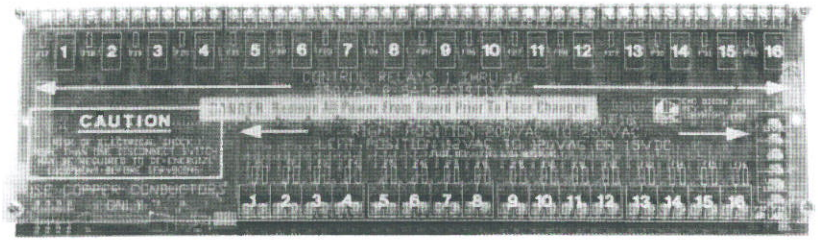
NC System Hardware – DDIO16

Direct Digital Input Output (16) Board

Electronic Controls

Description



The Direct Digital Input Output (DDIO16) board has sixteen (16) output relays for primary series control with common and both normally open and normally closed dry contacts and sixteen (16) digital inputs for equipment monitoring. Both inputs and outputs are fused while coil spikes are dampened with capacitators. Board addressing allows its use for any group of sixteen (16) digital inputs or outputs.

Specifications

- Outputs:
  sixteen (16) digital outputs.
- Relays:
  Contacts: 5 amps @ 110 VAC
  4 amps @ 240 VAC
  Coil: 37 mills current @ 12 VDC
- Inputs:
  sixteen (16) digital inputs for voltages from 12 VDC to 240 VAC.
- NC25 Connection:
  connected on daisy chain 26 pin keyed ribbon cable (DD) buss.

Operating Environment

- Ambient Temperature:
  -5°F to 160°F (-20°C to 70°C)
- Humidity:
  0% to 95% RH, non-condensing

Physical Data

- Size: 5" x 16.75"
- Mounting: NC25 Backplane snap track
- Cooling: Free Air

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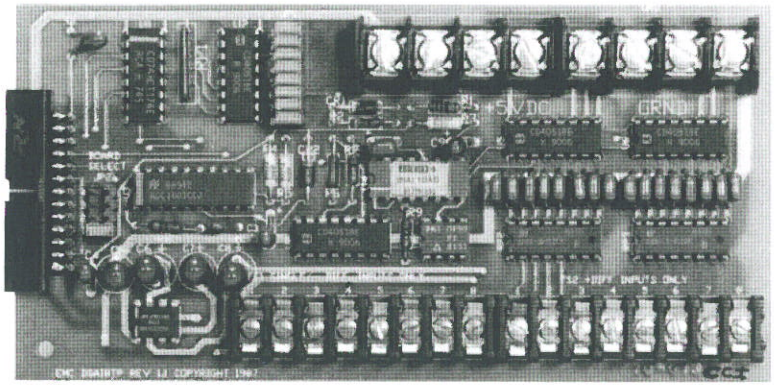
NC System Hardware – DDAI8-TP

Direct Ditigal Analog Input Board-TP

Electronic Controls

Description



The Direct Digital Analog Input Eight-TP (DDAI8-TP) board is designed as a ratiometric analog input system. The standard board comes equipped with a 10 bit A/D converter which supports the full line of Danfoss-EMC sensors including the four (4) wire series of ratiometric pressure transducers, three (3) wire temperature sensors, analog humidistat, photocells and etc.

Specifications

- Inputs: up to eight (8) 0-5VDC or 0-40MVDC analog inputs can be connected to 1 DDAI8-TP board.
- Power: supplied by DD BUS
- DDAI8: up to four (4) DDAI8-TP boards can be connected to each NC10, where each uses one (1) input port and the first uses one output port, and up to six (6) DDAI8-TP boards can be connected to the NC25.
- Connection: connected on daisy chain 26 pin (DD buss) keyed ribbon cable.

Operating Environment

- Ambient Temperature: -5°F to 160°F (-20°C to 70°C)
- Humidity: 0% to 95% RH, non-condensing

Physical Data

- Size: 3"x 6"
- Mounting: 3" PVC snap track
- Cooling: Free Air

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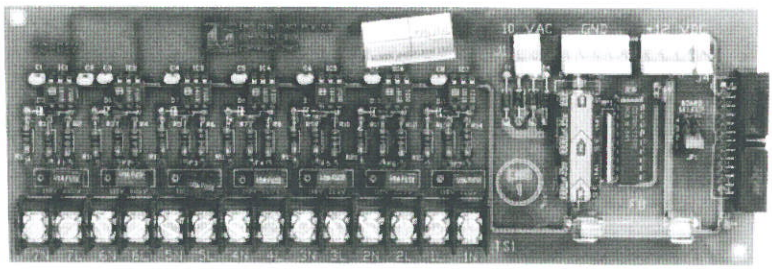
NC System Hardware — DDIN-AC

Direct Digital Input Board (AC)

Description



The Direct Digital Input (AC) board is a stand-alone NC10 monitor board. The board can monitor loads using 24 VAC, 120 VAC or 208/240 VAC.

The DDIN (AC) provides high voltage fuses in addition to both optic-isolation and low voltage fuses. Short duration spikes are handled by the optic-isolators while longer duration spikes or shorts are protected via the fuse.

Specifications

- Inputs: up to 7 AC inputs
- Power Requirement: 50 milliamps @ 12 VAC
- DDIN (AC)/NC10: up to four (4) DDIN (AC)'s can be connected per NC10. Each DDIN (AC) requires 1 input port.
- NC10 connectors: connected on daisy chain 26 pin keyed ribbon cable.

Operating Enviroment

- Ambient Temperature: -5°F to 160°F (-20°C to 70°C)
- Humidity: 0% to 95% RH non-condensing

Physical Data

- Size: 3" x 9"
- Mounting: PVC snap track
- Cooling: Free Air

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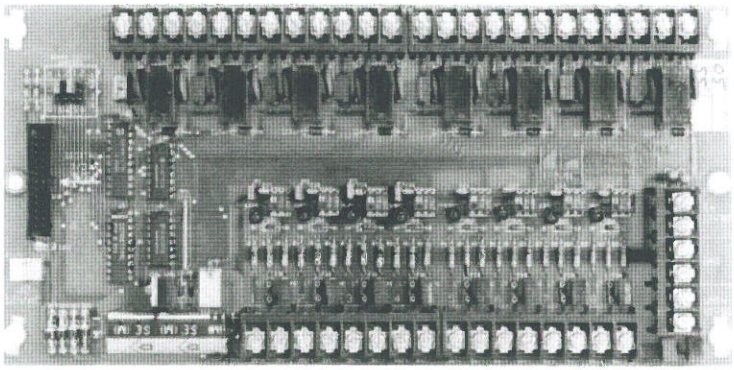
NC System Hardware – DDI08

Direct Digital Input Output (8) Board

Description



The Direct Digital Input Output (DDI08) board has eight (8) output relays for primary series control with common and both normally open and normally closed dry contacts and eight (8) digital inputs for equipment monitoring. Both inputs and outputs are fused while coil spikes are dampended with capacitors. Board addressing allows its use for any group of eight (8) digital inputs or outputs.

Specifications

- Outputs:
  eight (8) digital outputs.
- Relays:
  Contacts: 5 amps @ 110 VAC
  4 amps @ 240 VAC
  Coil: 37 mills current @ 12 VDC
- Inputs:
  eight (8) digital inputs for voltages from 12 VDC to 240 VAC.
- NC25 Connection:
  connected on daisy chain 26 pin keyed ribbon cable (DD) buss.

Operating Environment

- Ambient Temperature:
  -5°F to 160°F (-20°C to 70°C)
- Humidity:
  0% to 95% RH non-condensing

Physical Data

- Size: 5" x 10"
- Mounting: NC25 Backplane snap track
- Cooling: Free Air

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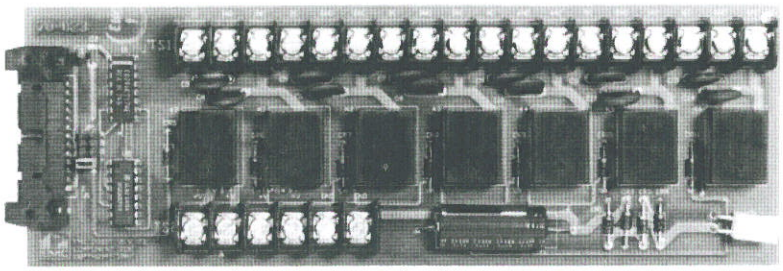
NC System Hardware – DDOUT

Electronic Controls

Direct Digital Output Board

Description



The Direct Digital Output (DDOUT) board is designed to control six (6) outputs in series and has one fail safe relay designed to trip control back to an on or off condition.

Because of its standard design and high amp contacts in the relays, it has a variety of uses. It can be used in HVAC systems where discrete control is not required, on refrigeration racks, lighting controls, etc.

Specifications

- Outputs: six (6) output relays with both normally open and normally closed contacts.
- Relays:
  Contacts: 5 amps @ 120 VAC
  4 amps @ 240 VAC
  Coil: 37 mills current @ 12 VDC
- Power Requirements:
  1/4 amp @ 12 VAC
- DDOUT/NC10: up to three (3) DDOUT's per NC10 may be connected. Each takes one output port
- NC10 Connection: connected on daisy chain 26 pin keyed ribbon cable.

Operating Environment

- Ambient Temperature:
  -5°F to 160°F (-20°C to 70°C)
- Humidity:
  0% to 95% RH, non-condensing
- Power Requirement:
  1/2 amp @ 12 VAC

Physical Data

- Size: 3" x 7-7/8"
- Mounting: PVC snap track
- Cooling: Free air

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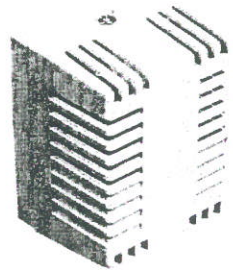
Peripheral Hardware – EMHS 1

Humidistat/Temperature Sensor

Electronic Controls

Description



Danfoss-EMC's combination Humidistat and Zone Temperature Sensor (EMHS1) combines a THERM3 with an analog humidity sensor in a compact, common housing. Through conditions established in a database, these values can be used to calculate dewpoint.

Specifications

- **Power:**
  either 5vdc from a DDAI8 or 8 to 20 vdc from a DDI014/16 or PS12D. These ranges are Berg pin selectable.
- Outputs:
  two (2) 0 to 5vdc analog signals. One each for humidity and temperature.

Operating Environment

- Ambient Temperature:
  32°F to 120°F (0°C to 50°C)
- Humidity:
  0% to 100% RH non-condensing
- Indoor Use Only

Physical Data

- Size: 1-1/2"H x 1"W x 2-1/2"D
- Cooling: Free Air

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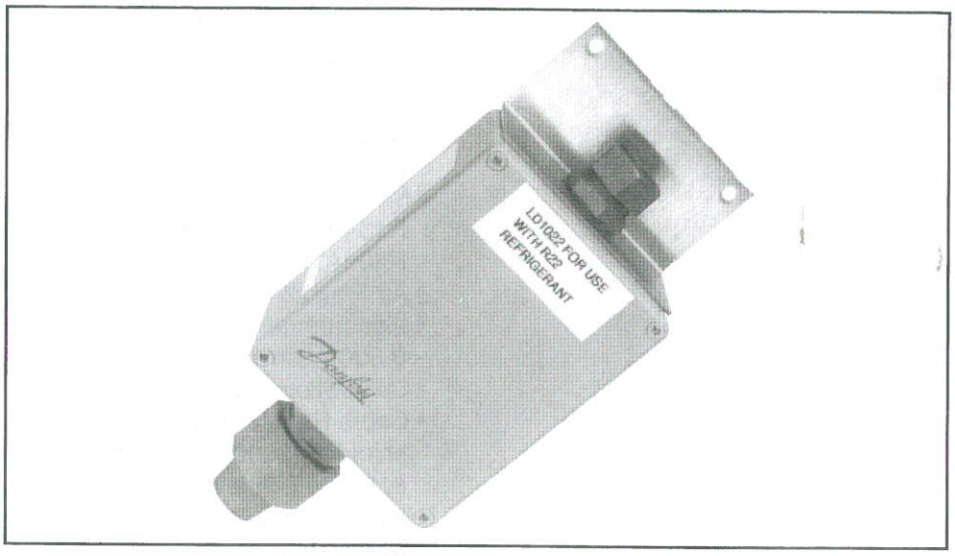
Refrigerant Sensor

Description



The Series LD1000 Refrigerant Sensor senses the presence of various CFC refrigerants in the ambient atmosphere and produces an output voltage proportional to the concentration of these gases in parts per million.

Each sensor is factory adjusted for a specific refrigerant; the model designation indicates the target gas for which the sensor is calibrated.

The LD1000 is an analog sensor that is designed to work with an electronic control system such as the Danfoss OzoneSaver (LDS2000), ZX Network Manager, or NC25.

Alarm settings based on concentration level, rate of change, long term averages as well as minimum (nuisance alarm) levels and other user defined functions are all handled by the host system software.

The sensing element of the LD1000 is a device whose electrical resistance changes in response to ambient gas concentration. The linearizing circuit of the LD1000 converts the nonlinear sensor response to a straight line proportional to the concentration present. This eliminates the need for software linearization by the host system and allows the LD1000 to be monitored by any system capable of accepting a 0 to 5 VDC input signal.

Technical

Input Power: 12 VAC/DC ±30%, 50/60 Hz, 275 ma maximum

- Output Current: 4.0 ma (resistive)
- Output Resolution: 1 mv= 1 ppm gas concentration in air
- Monitors: R11, R12, R22, R113, R134A, R114, R502, R124, R402A, R404A, R401A, R507.
- Air Flow: 2 ft/sec max at sensor
- Measurement Range: 0-3000 ppm/air = 1-4 VDC output
- Calibration: Factory calibrated
- Cable Required: 4-wire, #22 AWG, shielded, 2000 ft. max length or #18 AWG, shielded, 5000 ft. max length (7.5 VAC or VDC must be available at sensor)
- Input power wires must be shielded separately from signal wires when 12 VAC is used

Specifications

- **Accuracy**
  0°C to 50°C (32°F to 120°F): ±30% of full scale
  -20°C to 0°C (-4°F to 32°F): ±50% of full scale

Operating Environment:

- Ambient Environment: -20°C to 50°C (-4°F to 120°F)
- Humidity: 35% to 90% noncondensing
- Sensor Placement: Lowest point in area of interest
- Sensor Orientation: Element down

Models:

- LD1022 for R22
- LD1012 for R12
- LD1502 for R502
- LD1011 for R11
- LD1113 for R113
- LD134a for R134a
- LD1114 for R114
- LD1124 for R124
- LDHP80 for R402A
- LDMP39 for R401A
- LDHP62 for R404A
- LDAZ50 for R507

Physical Data:

- Size: 6.5"H x 3.5"W x 2.12"D

WARNING: An excessive concentration of airborne refrigerant is dangerous to personnel. For additional information on refrigerant toxicity refer to Appendix A of the LDS2000 OzoneSaver Refrigerant Detector User Manual (RC.OX.J1.22).

CAUTION: Exposure to highly corrosive chemicals, such as hydrogen sulfide, oxides of sulfur, chlorine, hydrochloric or other strong acids, etc., may substantially degrade LD1000 sensor performance. Environments containing silicone vapors may cause a coating of silicone to deposit on the sensor, rendering it ineffective.

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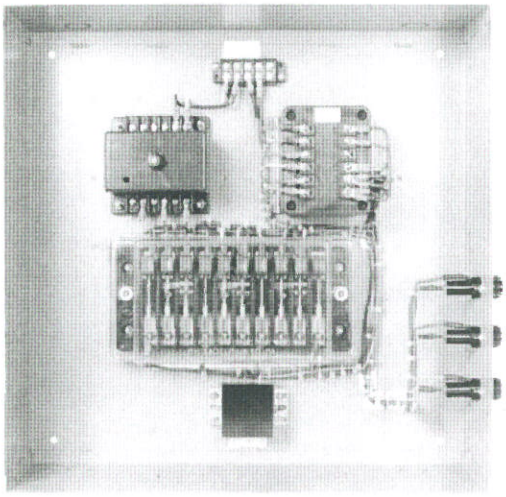
Peripheral Hardware – MPB

Meter Pulse Box

Description



The Meter Pulse Box (MPB) assembly is available in several configurations and can be extremely valuable in monitoring the effectiveness of your ZX or Network Controller system. Controlled equipment or the entire facility can be monitored as well as protected from damage due to brown outs or phase loss with the addition of a Phase Loss Detector (PLD).

Specifications

- NC10MPB1:
  MPB with one Watt Hour Transducer and an NC10 Network Controller.
- MPB1:
  One Watt Hour Transducer for 208VAC.
- MPB2:
  One Watt Hour Transducer for 480VAC.
- MPB3:
  MPB1 with Phase Loss Detector.
- MPB4:
  MPB2 with Phase Loss Detector.
- All above units include a ten (10) pole state switch for CT disconnect shunting.
- Power: NC10MPB's include a transformer while the MPB's require 12VDC from the PS12D supply.

Operating Environment

- Ambient Temperature:
  32°F to 120°F (0°C to 50°C)

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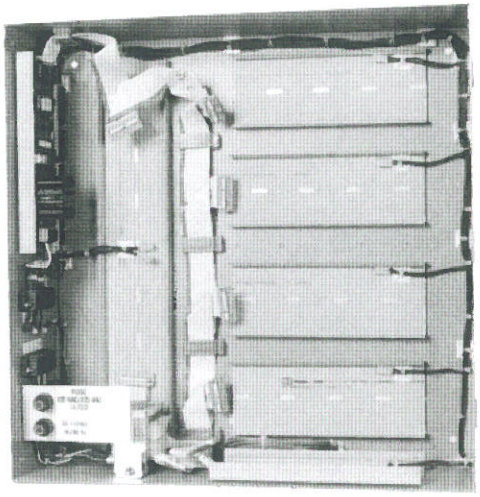
NC System Hardware – NC10B2

Network Controller Assembly

Electronic Controls

Description



The Network Controller Assembly (NC10B2) box comes fully equipped with a Danfoss-EMC NC10 network controller communications board for receiving instructions and sending back information to a host ZX or NC25 computer. Seven (7) empty snap tracks are positioned inside to facilitate mounting digital input, output and analog input boards (except the waterproof NC10BR2 model, which has six). A 110/240 VAC input transformer is included to supply the 12 VAC power for the input/output boards as are a wiring harness for power distribution and 26 pin keyed ribbon cable for communication between the boards.

Specifications

Models

- NC10B2: Network Controller Box with NC10, 12 VAC power transformer and 3" PVC snap track for seven I/O boards.
- NC10BR2: Network Controller Rainbox with NC10, 12 VAC power transformer and 3" PVC snap track for six I/O boards.

Power Transformer

- 4 amps @ 10 VAC (RMS)
- Input supply voltage: 110/240 VAC

Physical Data

- Size: 18"H x 18"W x 4"D
- Weight: NC10B2: 21 lbs.
  NC10BR2: 30 lbs.
- Cooling: Free Air

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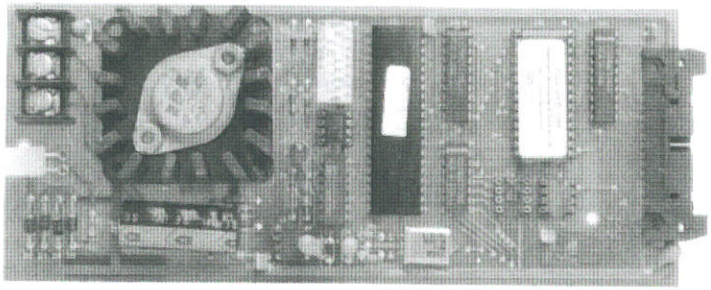
NC System Hardware – NC10-3

Network Controller 10

Description



The Network Controller 10 (NC10-3) is a three (3) wire long distance differential transmission microprocessor system. It utilized the Electronic Industries Association (EIA) RS-485 differential interface that allows long distance communication with high transmission speeds. (With reasonable conditions 120 NC10's can communicate at distances of 2 miles at 9600 Baud).

The NC10 utilizes a modular design concept allowing the use of a wide range of input/output boards to meet almost all requirements. Among the most common of these are the following:

- Analog Input
- Analog Output
- Direct Digital Input
- Direct Digital Output
- Lighting Control Output
- Defrost Control Input
- Defrost Control Output

The NC10 is a positive RS-485 communication system. Output transmissions from the ZX or NC25 are sent with check sums. The receiving NC10 checks all data and sends the host a positive acknowledgement of correct action or data requested.

The communication system is so complete that the host can be told to notify the user, via an error logger, of an NC10 failure. At the same time, the NC10 can default to existing controls or in some instances pre-programmed backup conditions.

Hardware

Please see Danfoss representative for other options.

- Provided with multi-tapped transformer that can be wired to 120, 240 VAC.
- Standard RS-485 long distance differential communications.
- Has three (3) output ports and four (4) input ports.
- Hardware/software watchdog circuit for automatic reset if required.
- RS-485 protection against ground potential variations.

Software

Please see Danfoss representative for other options.

- Transmission checksum routines.
- Automatic failure fallback routines.
- Automatic restart.
- ZX and NC25 remote alarm ability.
- ZX and NC25 failure logging.

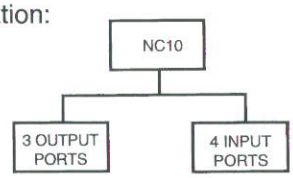
NC System Hardware – NC10-3

Specifications

CPU: 7.3 MHz 8031
Memory: 8K EPROM, 128 Bytes RAM
Transmit: 9600 Baud
NC10's/Z: Up to 120 NC10's per ZX
Power Transformer
Input: 120/240 VAC
Output: 10.5 VAC @ 4A
Output Voltage: (Analog Input Sensors)
- Approximately 5 VDC for ratio-metric high precision temperature and pressure sensor.

Operating Environment:
- Ambient temperature: -5°F to 160°F (-20°C to 70°C)
- Humidity: 0% to 95% RH, non-condensing

Configuration:



(Refer to specific requirements for input/output ports used by each board connected to NC10 on right).

Physical Data:
- Size: 3" X 7-1/4"
- Mounting: 3" PVC Snap Track
- Cooling: Free air, regulator equipped with heat-sink.

Special Features:
- An EPROM chip that allows an NC10 to become an NC10 tester.

Input/Output Requirements Standard Boards

	Port Used	
	Output	**Input**
DDOUT (6 direct digital outputs)	1	0
DDATC (6 direct digital outputs for automatic temperature control of HVAC systems).	1	0
DDIN (DC) (7 digital inputs) Requires RM15(X) or CCB for monitoring interface	0	1
DDIN (AC) (7 digital inputs) 24 VAC through 240 VAC	0	1
DDAI8 (8 analog inputs) *(Only first DDAI8 requires output port and input port. 2nd through 4th connected to same NC10 require only 1 input port each).	1*	1
DDMC1 (Motor control 1) Voltage divider that divides input voltage into 1.58% resolution for analog outputs.	1	0
DDMC2 (Motor control 2) Two relay outputs for positioning motors, etc., in either direction. One analog input used to read current device position.	1	1
DDSW (Defrost Manual Override when Z is inactive.)	0	1

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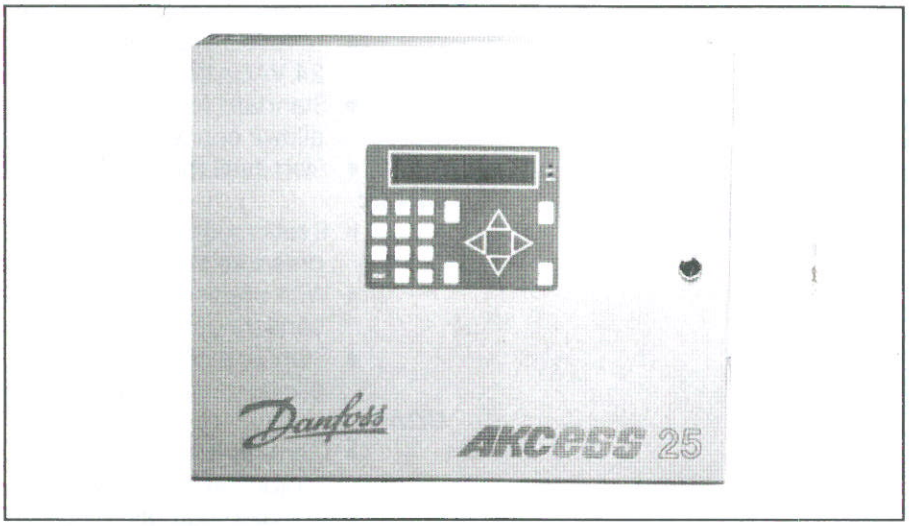
System Hardware -- NC25-4

Rack Controller

Description



The AKCESS 25 (available in enclosure or as panel-mount), has a full set of features for refrigeration rack control and monitoring. Its modular design allows selection of analog and digital input and output boards to exactly fit an application.

Each AKCESS 25 provides up to 48 device control points and software algorithms to give refrigeration users options for:

- Cut -in / Cut-out control
- Temperature-modified rate-of-change control
- Variable speed compressor and fan control
- Screw compressor control
- Condenser control
- Defrost control
- Smart Case Control (with AKC 16 Smart Case Controllers)

The AKCESS 25 also includes all the functions necessary for effective HVAC and lighting control.

The AKCESS 25 can be installed as a stand-alone controller but usually serves as part of a Danfoss network. In a typical supermarket installation, one AKCESS 25 is used for each refrigeration rack and one for each large built-up or packaged HVAC system.

If Danfoss Smart Case Controllers (type AKC 16) are installed, the AKCESS 25 serves to coordinate the functions of Smart Case Control for all the fixtures served by the rack.

A bright back-lit LCD display and keypad can be used (after entry of an authorization code) to make changes to set-points, schedules, and other control parameters. The AKCESS 25 has a connector for access by a local PC or terminal. In stand-alone installations, the optional modem allows remote communications and alarm dial-out.

Configuration programming is accomplished with Danfoss AKCESS BUILD software, which is included with each unit.

System Hardware -- NC25-4

Standard Input and Output Boards

DDIO16 (and DDIO8):

- 16 direct digital fused outputs; one fail-safe relay for fall-back control. Control relays rated 5 amp (120 VAC); 4 amp (250 VAC).
- 16 fused digital inputs for monitoring; standard inputs 15 VDC, 24 VAC, 120 VAC, 240 VAC; 480 VAC available on request.
- Standard NC25-4 accepts 2 DDIO16 boards; NC25EXP option allows connection of an additional DDIO16.
- Also available is DDIO8, with 8 outputs and 8 inputs.

DDAI8:

- 8 ratiometric analog inputs, which may be temperature sensors, pressure transducers, photocells, etc.
- With precision regulated input, most non-ratiometric 0-5 VDC sensors can be used.
- Standard NC25-4 accepts 4 DDAI8 boards; NC25EXP option allows connection of an additional 2 DDAI8 boards.

DDA04:

- Generates a true analog output to drive inverters, proportional motors, and other variable input devices.
- 4 analog outputs: 0 to 5 VDC and 0 to 10 VDC in any combination (each output's range is jumper-selectable).
- Standard NC25-4 accepts up to 8 DDAO4 boards.

Software Features

- Automatic reset and fail-safe mode.
- Complete refrigeration, HVAC, and lighting algorithms.
- Up to 32 user-definable alarms.

Hardware Features

- RS485 communications port for network communications.
- RS232 communications port for local terminal or PC interface.
- User-configured communications port (RS232 or RS485).
- Hardware-Software watchdog for automatic reset if needed.
- 4-line by 40 character bright back-lit LCD alphanumeric display.
- Real-time clock with battery back-up.
- Optional modem (with NC25EXP).

Hardware Specifications

Power: 1 amp @115 VAC or ½ amp @ 230 VAC

Operating environment:

32 °F to 120 °F (0 °C to 50 °C)
0% to 95% Relative humidity, non-condensing

Physical dimensions:

NC25B44: 18"H x 22"W x 5"D (standard)
NC25B44E: 26"H x 24"W x 7"D (with NC25EXP expander)
Also available for OEM panel mounting.

Cooling: Free air

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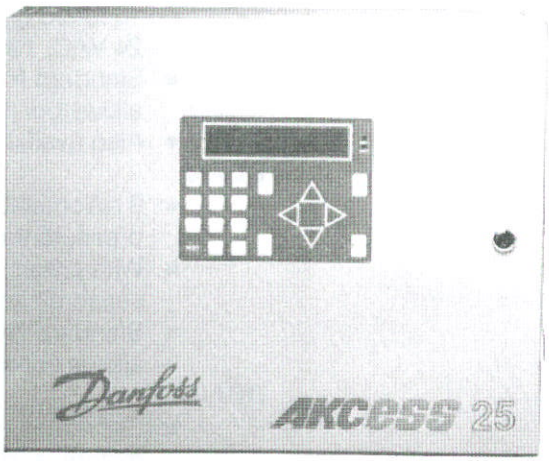
System Hardware -- NC25-4

HVAC Controller

Description



The AKCESS 25 (available in enclosure or as panel-mount), has a full complement of features for HVAC control and monitoring. Its modular design allows selection of analog and digital input and output boards tailored to the specific application.

Each AKCESS 25 provides up to 48 device control points and software algorithms to give HVAC users options for:

- Distributed control
- Night set back
- Multi-zone temperature control
- Temperature reset
- Humidity control
- Dynamic start-up
- Variable speed compressor and fan control
- Chiller and Boiler control
- Screw compressor control
- Condenser control

Users may define up to 32 alarms based on sensor readings, outputs, or logical conditions.

The AKCESS 25 also includes all the functions necessary for highly efficient refrigeration and lighting control. In a typical application, one AKCESS 25 is used for each large built-up or packaged HVAC system.

The AKCESS 25 can be installed as a stand-alone controller or as part of a Danfoss network. A bright back-lit LCD display and keypad can be used (after entry of an authorization code) to make changes to set-points, schedules, and other control parameters. The AKCESS 25 has a connector for access by a local PC or terminal. In stand-alone installations, the optional modem allows remote communications and alarm dial-out.

Configuration programming is accomplished with Danfoss AKCESS BUILD software, which is included with each unit.

System Hardware -- NC25-4

Standard Input and Output Boards

DDIO16 (and DDIO8):

- 16 direct digital fused outputs; one fail-safe relay for fall-back control. Control relays rated 5 amp (120 VAC); 4 amp (250 VAC).
- 16 fused digital inputs for monitoring; standard inputs 15 VDC, 24 VAC, 120 VAC, 240 VAC; 480 VAC available on request.
- Standard NC25-4 accepts 2 DDIO16 boards; NC25EXP option allows connection of an additional DDIO16.
- Also available is DDIO8, with 8 outputs and 8 inputs.

DDAI8:

- 8 ratiometric analog inputs, which may be temperature sensors, pressure transducers, photocells, etc.
- With precision regulated input, most non-ratiometric 0-5 VDC sensors can be used.
- Standard NC25-4 accepts 4 DDAI8 boards; NC25EXP option allows connection of an additional 2 DDAI8 boards.

DDA04:

- Generates a true analog output to drive inverters, proportional motors, and other variable input devices.
- 4 analog outputs: 0 to 5 VDC and 0 to 10 VDC in any combination (each output's range is jumper-selectable).
- Standard NC25-4 accepts up to 8 DDAO4 boards.

Software Features

- Automatic reset and fail-safe mode.
- Complete HVAC, refrigeration, and lighting algorithms.
- Up to 32 user-definable alarms.

Hardware Features

- RS485 communications port for network communications.
- RS232 communications port for local terminal or PC interface.
- User-configured communications port (RS232 or RS485).
- Hardware-Software watchdog for automatic reset if needed.
- 4-line by 40 character bright back-lit LCD alphanumeric display.
- real-time clock with battery back-up.
- Optional modem (with NC25EXP).

Hardware Specifications

Power: 1 amp @115 VAC or ½ amp @ 230 VAC

Operating environment:

32 °F to 120 °F (0 °C to 50 °C)
0% to 95% Relative humidity, non-condensing

Physical dimensions:

NC25B44: 18"H x 22"W x 5"D (standard)
NC25B44E: 26"H x 24"W x 7"D (with NC25EXP expander)
Also available for OEM panel mounting.

Cooling: Free air

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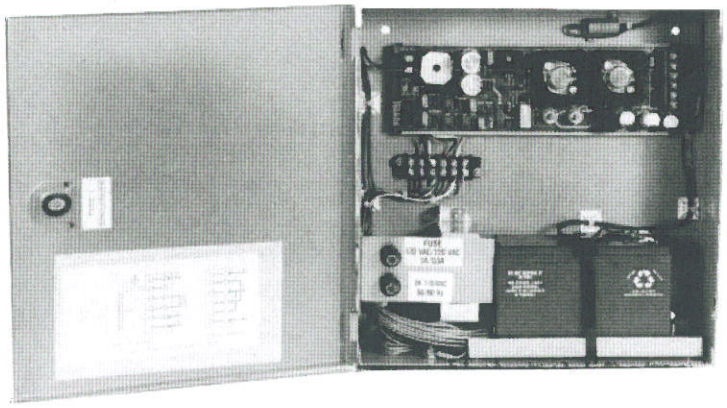
NC System Hardware – NCUPS

Network Controller Uninteruptable Power Supply

Description



The Network Controller Uninteruptable Power Supply (NCUPS) is designed to power NC25's and NC10's during power outages. By automatically switching from utility power to internal battery backup the NCUPS provides a means to monitor and dial out alarms during a power loss. Its circuitry includes signals to digital inputs to indicate battery or power failure and an input to activate the battery test.

Specifications

Power Requirement

- Inputs: One (1) for battery test.
- Outputs: One (1) for battery fail and One (1) for power fail.
- Power: 120 or 220VAC input ,12VDC output.
- Provides 2 to 6 hours of system backup from a 6 AMP. Hr. (72 VA) battery.
- Requires approximately 72 hours to completely recover from total battery discharge.

Operating Environment

- Ambient Temperature -5°F to 160°F (-20°C to 70°C)
- Humidity: 0% to 95% RH non-condensing

Physical Data

- Size: 12"W x 12"H x 4"D
- Cooling: Free Air

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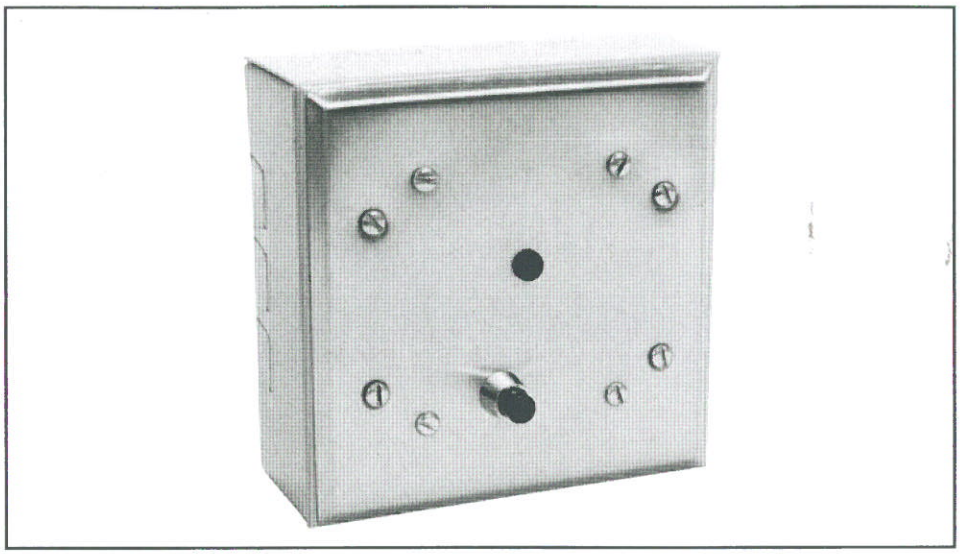
Peripheral Hardware — OAB

Office Alarm Box

Description



The OAB is a remote alarm box which lets building personnel know that an alarm condition has been detected by the computer. The alarm box can be mounted up to 500 feet away from the microprocessor. When an alarm occurs, the OAB emits a pleasant audio tone and lights a small red LED on the face of the assembly. There is a reset button above the unit's LED.

The OAB can be controlled by various logical strategies which are data base selectable. It can be programmed so that the reset button de-activates the audio alarm but keeps the LED lighted so long as the alarm situation exists. As another example, the OAB can be programmed to resound the alarm after a predetermined time. Contact your Danfoss-EMC representative to discuss other OAB control strategies.

Specifications

Physical Data
- Size: 4-3/4"H x 4-3/4"W x 1-7/8"D Standard wiremold enclosure
- Cable: Requires 3 Conductor #18 THHN to computer

Power Requirement
- 15 VDC @ 500 milliamps, supplied by computer

Operating Environment
- Ambient Temperature: -5°F to 160°F (-20°C to 70°C)
- Humidity: 0% to 95% RH, non-condensing

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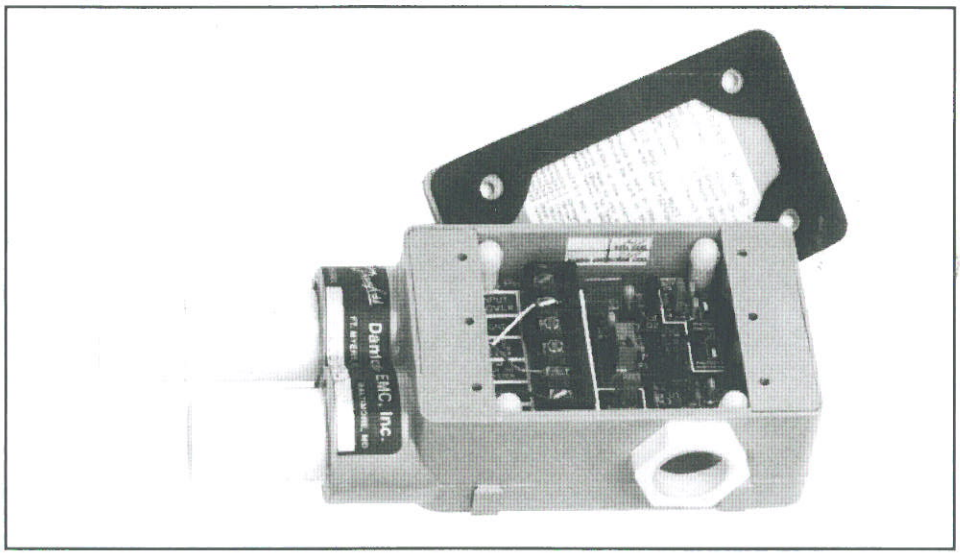
Peripheral Hardware — PHOTOZX3-1

Electronic Controls

Weatherproof Photocell — Temperature Sensing Assembly

Description



The PHOTOZX3-1 is generally used to sense outside ambient temperature and light level. The sensor for the photocell is recessed so as to be directional. The device is normally mounted four feet above the roof line and oriented so that the photo sensitive element faces north or south.

An integral amplifier PC board provides a 0-5 VDC output from the photocell and an analog 0-5 VDC output from the THERM3 outside ambient temperature sensor.
(See also Danfoss-EMC's product specification sheet for THERM3 linear thermistor sensor series).

Specifications

Power Requirements

- +12 VDC @ 0.2 amp from ZX or NC25 microprocessor power supply; fused in line for photocell & THERM3
- Outputs:
  Photocell:
  0-5 VDC, expressed in foot candles

THERM3:
0-5 VDC over a temperature range of -35˚C to 52˚C (-30˚F to 125˚F)

Physical Data

- Threaded port for mounting on 1/2" EMT
- 8"Hx3 1/8"Wx2 1/4"D

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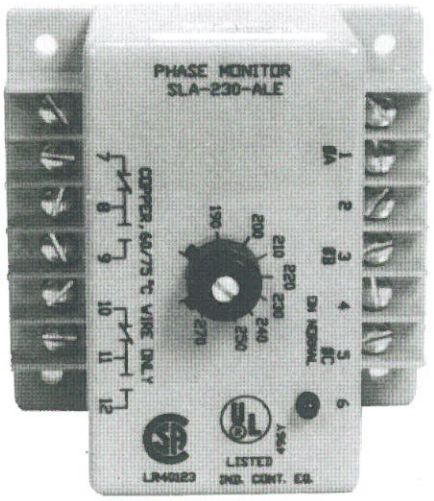
Peripheral Hardware – PLMB

Phase Loss Monitor Box

Description



The Phase Loss Monitor Box (PLMB) protects three phase equipment against phase loss, phase reversal, and brown-out conditions. When phase sequence is correct and fill line voltage is present on all three phases, the LED on the front of the monitor is lit. When incorrect phase sequence or phase loss occurs or the phase voltages drop below the preset drop-out voltage, a signal is sent through a set of normally open contacts to Danfoss-EMC's computerized control system. The computer will then take the appropriate control actions such as turning off three phase equipment and generating an outbound telephone call to an alarm logging station.

Specifications

Models

- PLMB1: 208 VAC phase loss detector in 8"H x 8"W x 4"D enclosure; weighs 11 lbs.
- PLMB2: 480 VAC phase loss detector in 8"H x 8"W x 4"D enclosure; weighs 11 lbs.

Power Requirement

- +12 VDC supplied by ZX PS12D external power supply or NC25 DDIO14/16.
- Supply Voltage: 95 VAC to 480 VAC, phase-to-phase; 50/60 Hz
- Drop-Out Voltage:
  1f Low: 83% of nominal
  3f Low: 90% of nominal
- Power Dissipation: 3 watts
- Terminations: Twelve (12) #8 screw terminals

Operating Temperature

- 32°F to 120°F (0°C to 50°C)

Agency Approval

- UL listed, CSA approved

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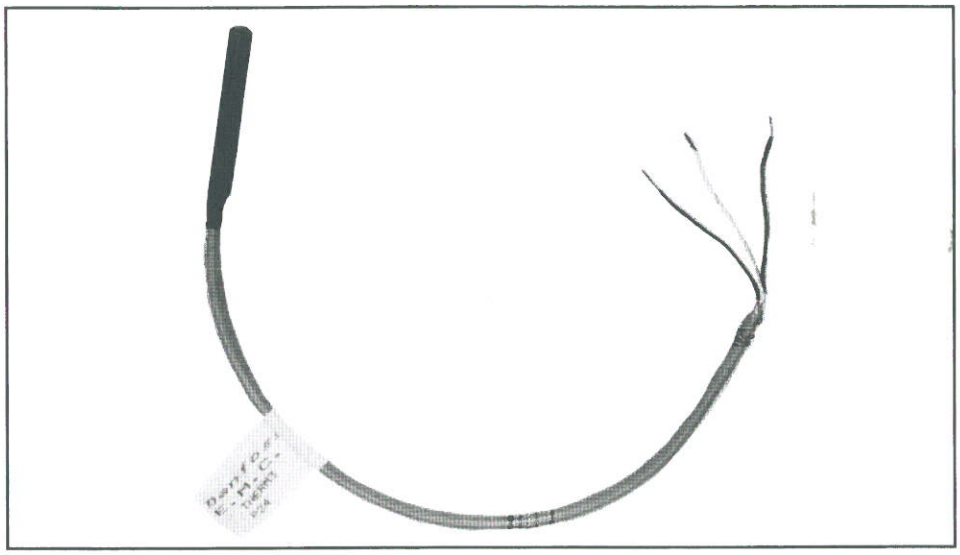
Peripheral Hardware — THERM 3

Thermistor Sensor

Electronic Controls

Description



The THERM3 temperature sensor consists of precision resistors and thermistors which produce a resistance change or voltage output that varies linearly with temperature over the selected temperature range. The three-wire THERM3 module used in conjunction with Danfoss-EMC's Network Controller (NC10 or NC25) is a ratiometric, unregulated sensor for which source voltage is compared by the ZX or the NC25 to the sensor's output voltage to determine temperature. The high accuracy THERM3 sensor has a maximum temperature error of ±.74°F (±.41°C).

Specifications

Features

- Durable epoxy construction and 12" leads make for flexibility in mounting applications.
- Lead resistance has minimal effect on accuracy in remote locations.
- Interchangeable from unit to unit.
- High accuracy.

Models

- Range:

THERM3:	-30°F to 125°F (-25°C to 52°C)
THERM3-HI:	32°F to 250°F (0°C to 121°C)
THERM3-LO:	-60°F to -10°F (-52°C to -23°C)

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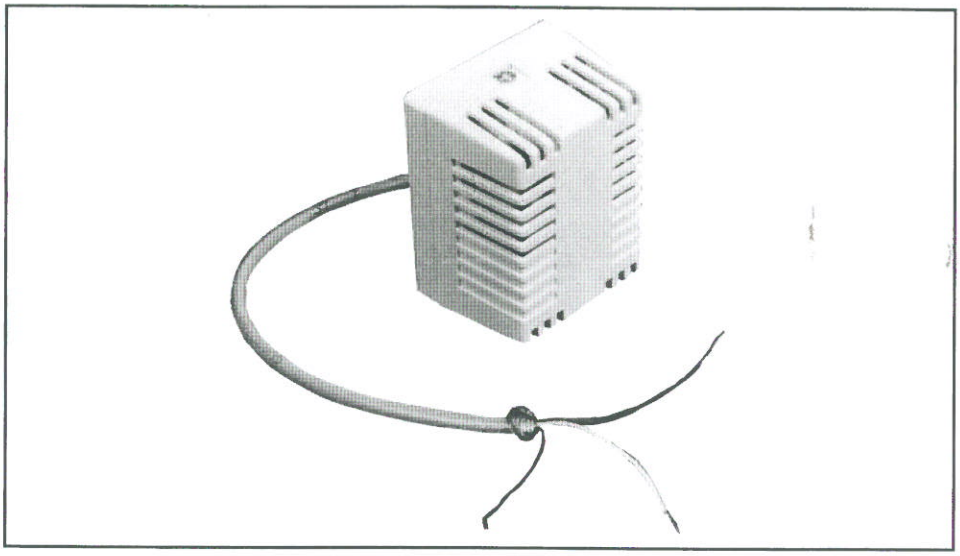
Peripheral Hardware — ZTP3

Zone Termperature Probe

Description



The Zone Temperature Probe (ZTP) assembly consists of a thermistor temperature probe mounted in a plastic housing designed for omni-directional air flow and aesthetic appeal. The ZTP is typically used for monitoring area ambient air temperature and for controlling associated HVAC and Refrigeration devices in such places as offices, sales floors, refrigerated work rooms, hotels, and hospital rooms.

Specifications

Mounting

- Typically attached to interior wall or column at a height of 6'6" from floor line or 2' below ceiling line in refrigerated areas.

Models

- **ZTP3:** Three wire ratiometric thermistor mounted in plastic housing; requires Direct Digital Analog Input Board (DDAI8)

Power Requiment

- **ZTP3:** +5 VDC supplied by DDAI8 assembly

Operating Environment

- Ambient Temperature: -5°F to 160°F (-20°C to 70°C)
- Humidity: 0% to 95% RH, non-condensing

Physical Data

- Size: 1-1/2"H x 1"W x 2-1/2"D
- Weight: 4 ounces
- Color: Light Beige

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