Electrical Control Cabinets
Including digital controller

*I*ntroduction

Designed to facilitate installers work, this range of electrical cabinet is intended for use in cold rooms working at positive or negative temperatures and powered either with single phase or three phase power supply.

Based on specifically designed controllers, it incorporates all control functions as required by modern cold room units, such as compressor control, defrost management, fan management, alarm function and solenoid valve for "pump down".

It also includes all the safety equipment needed such as circuit breakers for the compressor and for the controller.

Particular attention has been given to the accessibility so that the installation time will be reduced to a minimum. Space has been left available for customisation.

12 modules (front) and 36 modules (back) models

Features and Benefits

❑ **Power rating from :** **0,37 to 1,5 kW in single phase** **1,5 to 7,5 kW in three phases**	Cover most of standard applications.
❑ **Standard DIN rail components**	Easy maintenance and servicing. Availability of components.
❑ **Most wiring integrated on the controller**	Increased quality and reduced space occupancy.
❑ **Specifically designed controller to manage Pump Down**	Better match application need.
❑ **Accurate and interchangeable IP 68 sensor**	Accurate control performance. No re-calibration needed.
❑ **IP 65 standard DIN polycarbonate cabinets**	High mechanical resistance. Installation in harsh environment.
❑ **Integrate circuit breaker for motor and controller**	No time lost defining appropriate protection
❑ **In field extension**	Possibility to field connect a condensing fan or a door frame heater.
❑ **Main Switch**	To power down the whole cabinet. Increased safety protection.

*G*eneral features

Controller

Based on the field proven MR family of controllers, it integrates specific features required in cold rooms.

Positive temperature applications:

MR12DR230-1C
- Pump down management (selectable)
- Fan option

Negative temperature applications:

MR15DR230-2C
- Pump down management (selectable)
- Fan management

For additional information please refer to MR documentation

Sensor

The CR series uses Johnson Controls A99 temperature sensor. Its accuracy, ± 0.5 K over a range from -20ºC to 75ºC, and its gas tight packaging makes it the best sensor for refrigeration applications.
For details please refer to A99 documentation.

Circuit Breaker for motor

(Three phase models only)

Selected for its high protection against short circuit, it features phase disconnection, thermal protection and manual On/Off. The adjusted protection value is independent of temperature condition inside your cabinet.

For details on the short circuit protection, see information page 13.

Circuit Breaker for controller, defrost and fans

Specifically selected for virtually all applications it features a high protection and an appropriate magneto-thermal characteristic in function of the application.

Positive temperature applications:
Mainly inductive loads: Curve D

Negative temperature applications:
Mainly resistive loads: Curve C

Negative temperature applications three phase defrost only:
Mainly inductive loads: Curve D
Defrost Line: Curve C

For details, see information page 13.

Contactor

A VDR protection across the coil extends the life of the controller relays. The contactor, being four (4) poles, allows you to customise the cabinet to your application. This additional contact could be used to drive a condensing fan (up to 3 Amps) or for signalling its operation.

Selected for use in AC-3 category: three-phase motor with cage with a nominal speed of 1500 rpm.
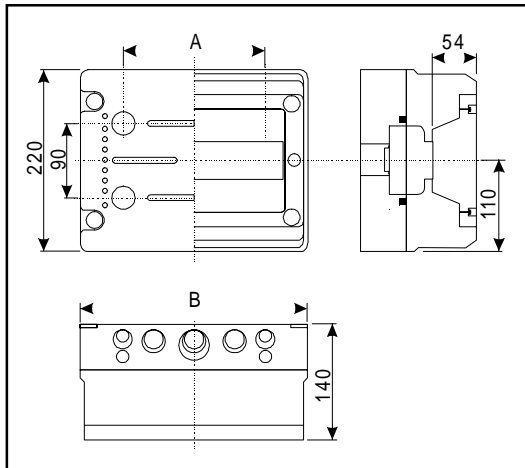
Cabinet

Thanks to a specifically designed MR, there is sufficient space in the cabinet in order to extend your application.
Wiring is easily accessible.
The high protection level (IP65) allows you to install this cabinet in harsh environment such as outdoors. The polycarbonate material has a high shock resistance, which could be necessary during handling or at installation.

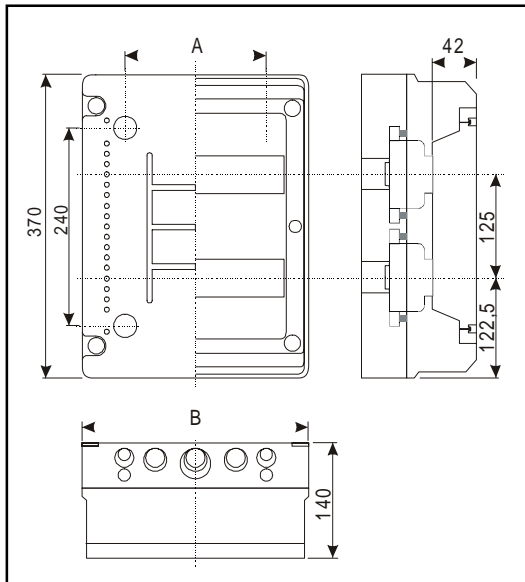The class 2 ▢ insulation gives you the safety required by all agencies.

Dimensions (in mm)
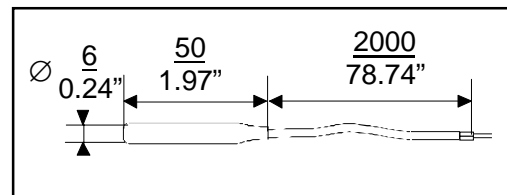

**DIN electrical cabinet
(12 or 18 modules)**
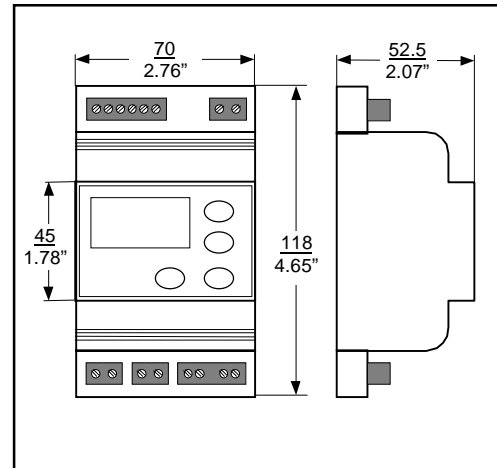
DIN Rail control enclosure

**DIN electrical cabinet
(24 or 36 modules)**

	A	B
12 modules	164	275
18 modules	269	380
24 modules	164	275
36 modules	269	380

A99B-9108 / A99BB-200C Sensor

Wiring Instruction

⚠ **WARNING**

When wiring and servicing make sure that:
- the electric supply to the actuator is switched off to avoid possible damage to the equipment, personal injury or shock.
- you do not touch or attempt to connect or disconnect wires when electric power is on.

All wiring must be in accordance with local regulations and national rules
These controllers are designed for use as an operating control. When an operating control failure would result in personal injury or loss of property, it is the responsibility of the installer to wire a separate backup control (e.g. a freeze protection thermostat) in order not to use the controller as an operating and safety device.

*P*ositive temperature cold room

Defrost functions

Defrost is initiated and terminated by a timer. The user sets the interval between successive cycles and its duration.

During the defrost cycle, the display can show either the last measurement before this cycle or the setpoint. You can also delay the normal display function after the defrost cycle has ended.

Manual defrost is possible by pushing a key on the controller keypad.

Fan management functions

You can choose whether the fan is to be run in parallel with the compressor or whether it should remain constantly ON. In this case the fan will be ON during defrost. This will decrease defrosting duration.

Fan and compressor switched in parallel

Continuous fan

Pump down selection

A selector is available to choose between the start stop strategy for the compressor.

Solenoid valve and compressor switched in parallel

Pump down

Condensing fan

On the 3-phase models, two terminals are available to field connect a condensing fan.

Digital input functions

All defrost controllers are equipped with a digital input performing the following functions:

- Shut-OFF: If the contact is open for a preset time, all outputs are de-energised and an alarm message is displayed.

- External alarm: Display shows AL, the Alarm output is switched ON, all other functions will perform as normal

- Door open: In this case the High alarm will be disabled, other functions will perform as normal.

Note:

A detailed list of available parameters and their description can be found at the end of this documentation.

Positive Temperature Cold Room Cabinet

Selection table:

Item code	Power supply		Compressor		Evap. Fan	Cond. Fan	Cabinet size	Shipping weight
	V ac	Φ	Power AC-3	Amps	Amps	Amps	modules	Kg
CR-PS037-1	230	1	0,37 kW	5	1,6	-	12	2,2
CR-PS075-1	230	1	0,75 kW	8	1,6	-	12	2,2
CR-PS110-1	230	1	1,1 kW	10	3,2	-	12	2,2
CR-PS150-1	230	1	1,5 kW	12	4,8	-	12	2,2
CR-PT150-1	400	3	1,5 kW	3,5	3,2	3	18	3,2
CR-PT250-1	400	3	2,5 kW	5,7	3,2	3	18	3,2
CR-PT400-1	400	3	4,0 kW	8,5	4,8	3	18	3,2
CR-PT550-1	400	3	5,5 kW	11,5	4,8	3	18	3,2
CR-PT750-1	400	3	7,5 kW	15,5	4,8	3	18	3,2

Wiring diagram
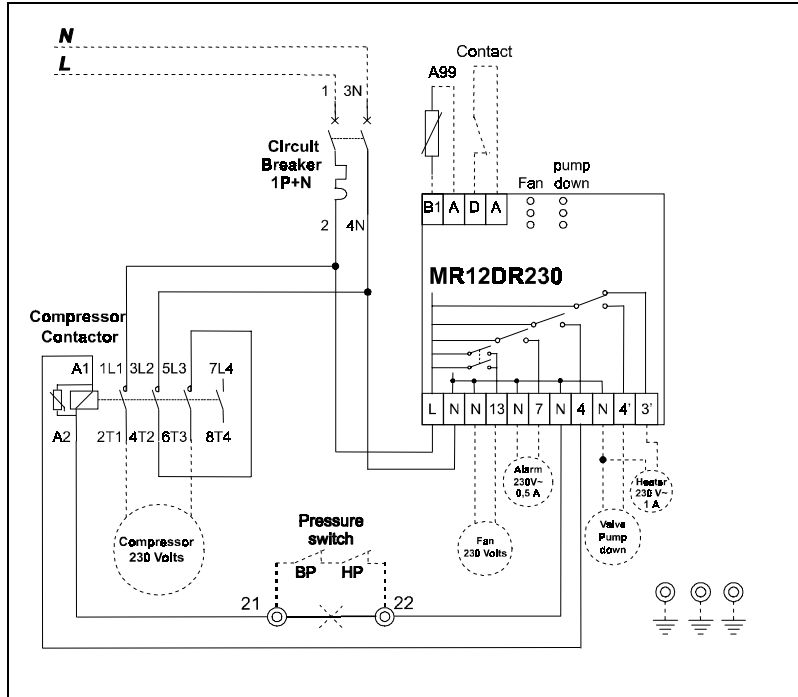
Positive temperature cold room single phase model
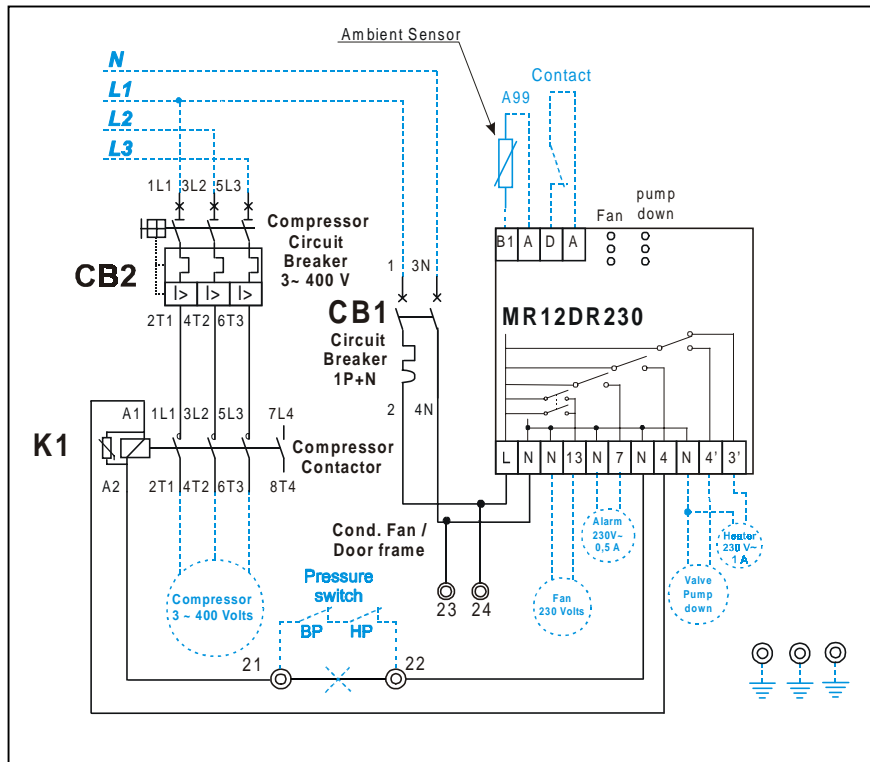
Positive temperature cold room three phase model

Negative temperature cold room

This control is equipped with two sensors, one for the control of the refrigeration unit, the other senses the evaporator temperature.

Defrost functions

Defrost cycle is initiated by a timer and terminated either by temperature or time, whichever comes first.
The defrost function includes the following parameters:

- Type of defrosts (Hot gas or electrical heating).
- Interval time to adjust defrost frequency.
- Type of defrosts termination: time or temperature.
- Defrost end temperature.
- Maximum defrosts duration.

You can stop the compressor for an additional configurable period called dripping time. This will allow the evaporator to dry prior to resuming normal operation.
In case of evaporator sensor failure, defrosts cycle will be terminated by the maximum defrost duration.
During defrost the display can be configured to show the last measurement before defrost or the setpoint.

Fan management functions

Through the controller, you can choose whether the fan is to be run in parallel to the compressor or constantly ON. In any case the fan is switched OFF during defrost.
After defrost, the fan can resume its work after a preset time or after the evaporator temperature has dropped below a user-settable temperature.

Condensing fan or door frame heater

On the 3-phase models, two terminals are available to field connect a condensing fan or a door frame heater to avoid the cell door sticking.

Digital input functions

All defrost controllers are equipped with an additional digital input which can be configured to perform the following functions:

- "Shut-OFF" function.
- External alarm function.
- "Door open" function.

Pump down selection

A selector is available to choose between the start stop strategy for the compressor

Solenoid valve and compressor switched in parallel

Pump down

Note:

A detailed list of available parameters and their description can be found at the end of this documentation.

Negative Temperature Cold Room Cabinet

Selection table:

Item code	Power supply		Compressor		Evap. Fan	Cond. Fan/ Door frame heater	Defrost	Cabinet Size	Shipping weight
	V ac	Φ	Power AC-3	Amps	Amps	Amps	Amps	modules	Kg
CR-NS037-1	230	1	0,37 kW	5	1,6	-	8	12	2,5
CR-NS075-1	230	1	0,75 kW	8	1,6	-	12	12	2,5
CR-NS110-1	230	1	1,1 kW	10	3,2	-	12	12	2,5
CR-NS150-1	230	1	1,5 kW	12	4,8	-	16	12	2,5
CR-NT150-1	400	3	1,5 kW	3,5	3,2	3	12	18	3,5
CR-NT250-1	400	3	2,5 kW	5,7	3,2	3	12	18	3,5
CR-NT400-1	400	3	4,0 kW	8,5	4,8	3	15	18	3,5
CR-NT550-1	400	3	5,5 kW	11,5	4,8	3	15	18	3,5
CR-NT750-1	400	3	7,5 kW	15,5	4,8	3	15	18	3,5

Wiring diagram
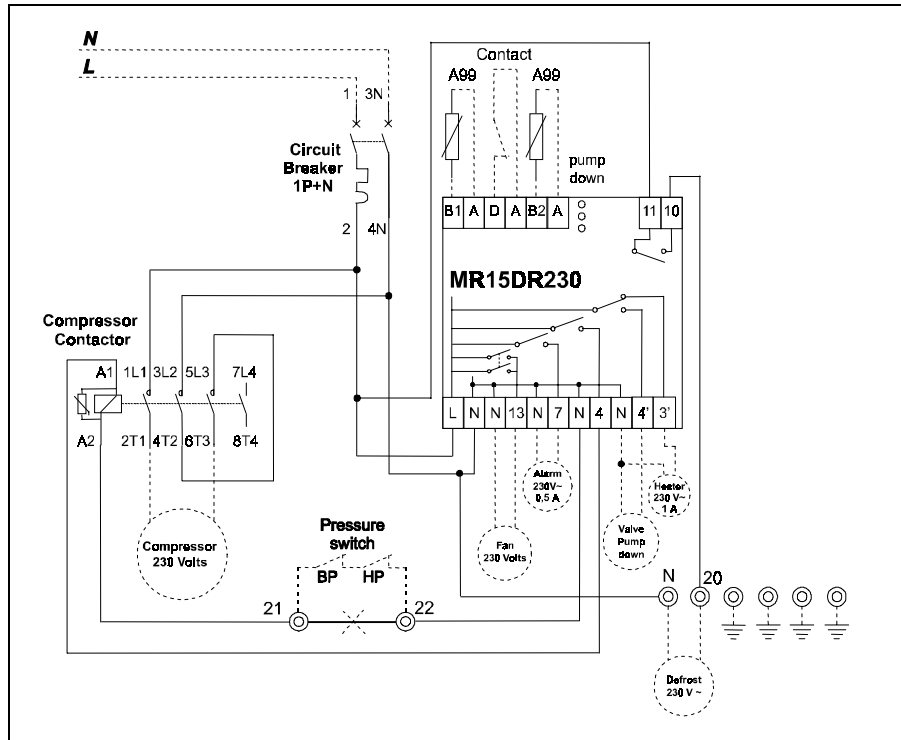
Negative temperature cold room single phase models

Negative temperature cold room three phase models

Negative temperature cold room with three phase defrost

Selection table:

Item code	Power supply		Compressor		Evap. Fan	Cond. Fan / Door frame heater	Defrost	Cabinet Size	Shipping weight
	V ac	Φ	Power AC-3	Amps	Amps	Amps	Amps	modules	Kg
CR-NDT150-1	400	3	1,5 kW	3,5	3,2	4	3 x 5	24	4,1
CR-NDT250-1	400	3	2,5 kW	5,7	3,2	4	3 x 9	24	4,1
CR-NDT400-1	400	3	4,0 kW	8,5	4,8	6	3 x 10	24	4,1
CR-NDT550-1	400	3	5,5 kW	11,5	4,8	6	3 x 12	24	4,1
CR-NDT750-1	400	3	7,5 kW	15,5	4,8	6	3 x 16	24	4,1

Wiring diagram:
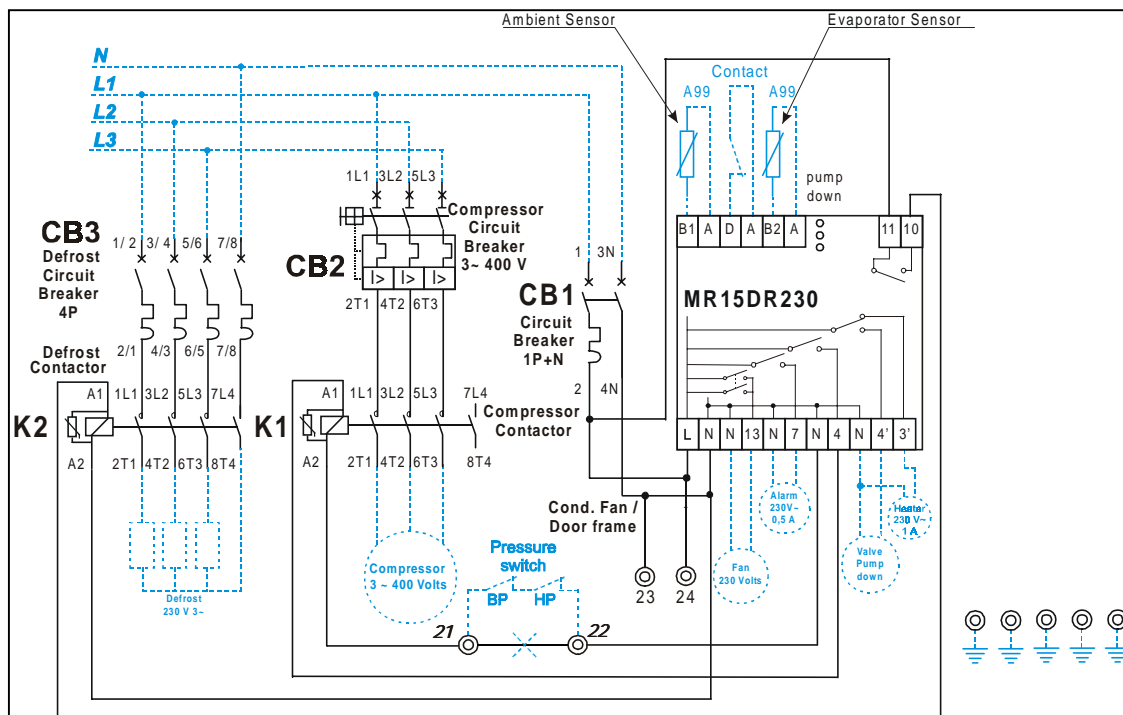
Negative temperature cold room three phase Compressor and three phase Defrost models

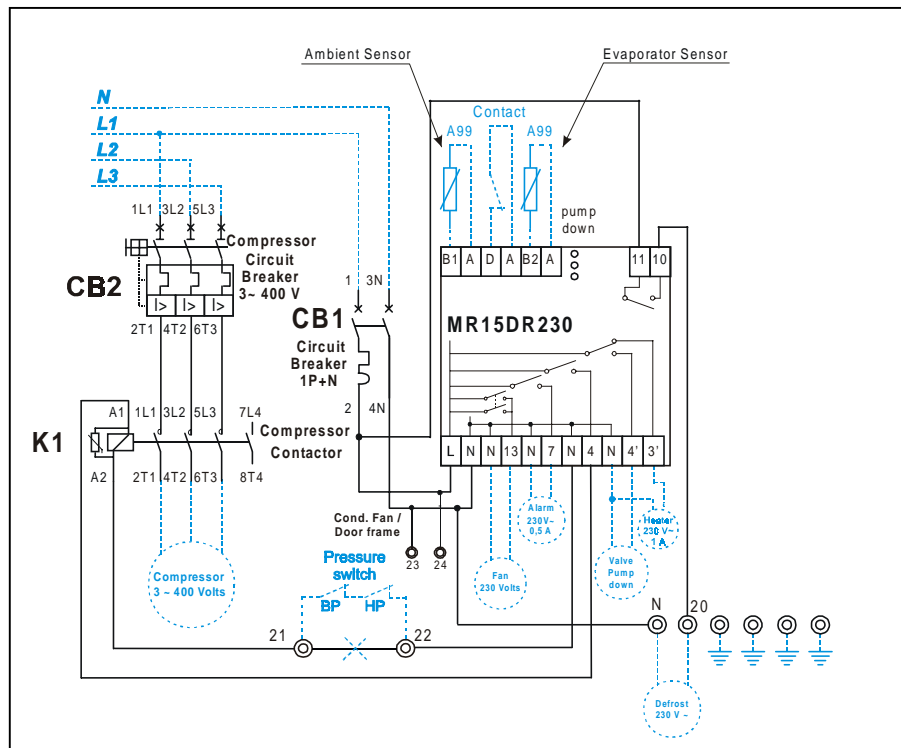# **N**egative temperature cold room with three phase defrost and evaporator fan

Selection table:

Item code	Power supply		Compressor		Evap. Fan	Cond. Fan / Door frame heater	Defrost	Cabinet Size	Shipping weight
	V ac	Φ	Power AC-3	Amps	Amps		Amps	modules	Kg
CR-NFDT150-1	400	3	1,5 kW	3,5	3 x 2	5	3 x 5	36	5,3
CR-NFDT400-1	400	3	4,0 kW	8,5	3 x 2	5	3 x 10	36	5,3
CR-NFDT750-1	400	3	7,5 kW	15,5	3 x 2	5	3 x 16	36	5,3

Wiring diagram

WIRING DIAGRAM FOR: CR-NFDT150-1 / CR-NFDT400-1 / CR-NFDT750-1
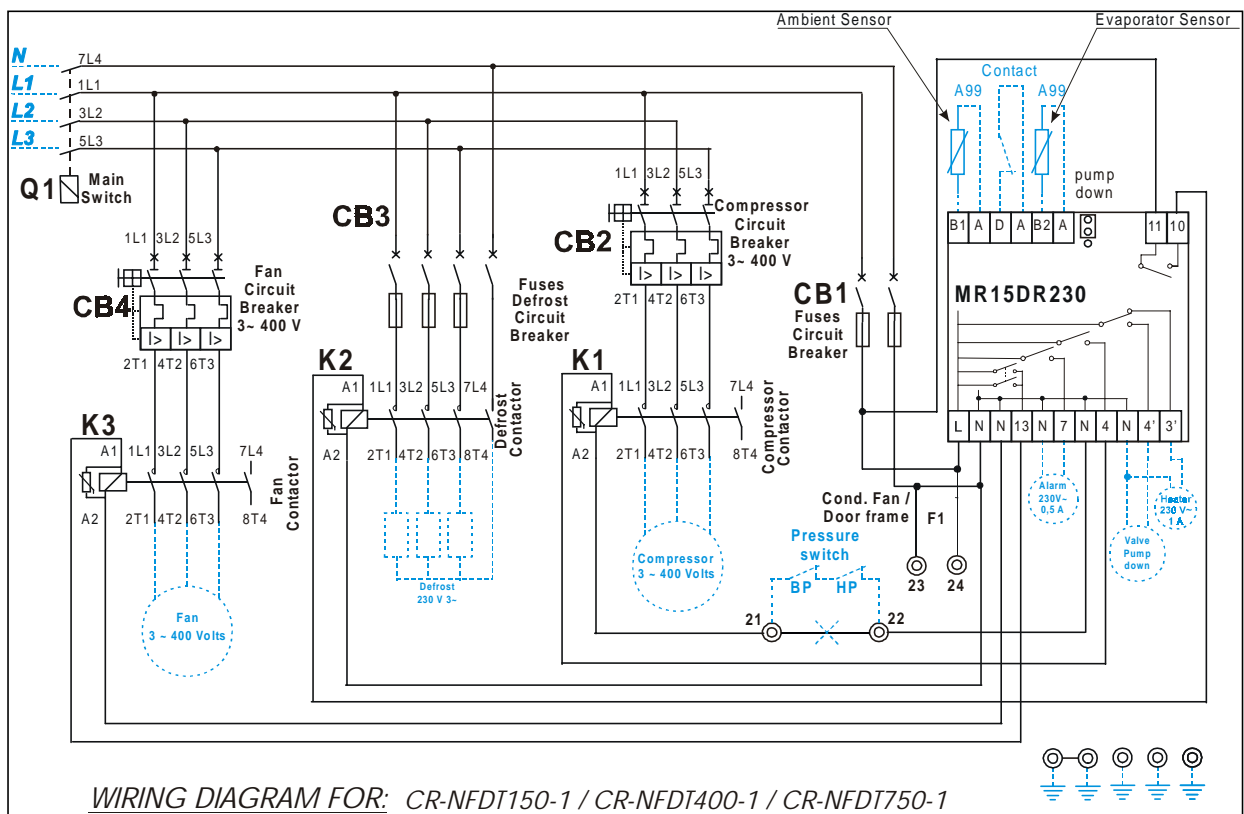
Negative temperature cold room- three phase Compressor, Defrost and Evaporator Fan

Description of each parameter

Setpoint :

is defined as the relay cut OFF.

Hy   Hysteresis

This is the difference between the temperature at which the compressor output is switched OFF and the temperature at which the output is switched ON. This is an absolute value, related to the setpoint.

Example:
Cooling Setpoint = 4 ºC
Differential = 2 K.
The compressor is switched ON when the temperature goes over 6 ºC, and is turned OFF when the temperature decreases to 4 ºC.

LL/HL Lower & Higher setpoint limit

The setpoint value cannot be adjusted outside the limits defined by these parameters, to avoid improper setpoint setting by the user.
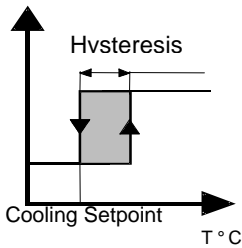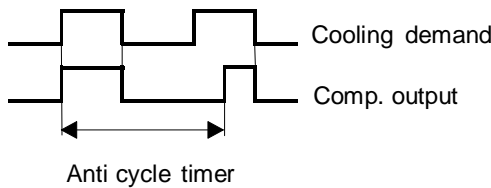
CC   Anti short cycle protection

This parameter prevents the compressor from being turned ON / OFF too often. The value that you set is the minimum time between two subsequent switches ON of the output.

Cooling demand

Comp. output

Anti cycle timer

Co   Deep freezing time

This is the time for which the compressor is forced ON when pressing the deep freezing cycle key from the faceplate.

AH   High temperature alarm:

High temperature alarm value relative to setpoint. If your set point is at 4ºC and you want an alarm 5 K above setpoint, it will be triggered at 9ºC.

AL   Low temperature alarm:

Low temperature alarm value relative to setpoint. If your set point is at 4ºC and you want an alarm 3 K below setpoint, it will be triggered at 1ºC.

Ad   Alarm differential:

Useful to avoid alarm oscillations.
For example:
Setpoint = 4ºC,
Max. Temperature alarm = 6 K,
Alarm differential = 2 K.
In this case, when the cold room temperature exceeds 4+6 = 10ºC for a time greater than parameter **At** the alarm is activated; when temperature drops below 4+6-2 = 8ºC the alarm is reset

At   Alarm time delay:

Delay between the detection of the temperature alarm and the activation of the alarm sequences. This is useful to prevent temporary conditions from causing an alarm. Furthermore, the controller automatically ignores the temperature alarm condition in the following cases:
-      for 20 minutes after the power-ON
-      during defrost and for 20 minutes after the defrost-end.

dF   Defrost function:

Select the type of your installation and the way defrost is performed
0 = Electrical defrost (Compressor OFF)
1 = Hot gas defrost (Compressor ON)

dE   Defrost end function:

Select the defrost termination type:
0 = timer based, set with parameter **dd**
In this case the evaporator sensor is not required and the fan will restart base on time.
1 = temperature based, set with parameter **dt**
Note: in any case defrost ends after the time set on parameter **dd**.

dt   Defrost termination temperature:

Used only when parameter **dE** =1. When the evaporator temperature reaches this value, defrost automatically ends.

di   Defrost interval time:

This is the time between two subsequent defrost cycles. This timer will initiate every defrost cycle.

dd   Maximum defrost duration:

If defrost end by time has been selected (parameter **dE=**1) defrost cycle will stop after this time, even if the end temperature has not reached parameter **dt.**
When defrost interval time is 1 hour, the maximum duration is limited to 40 min.

dC   Dripping time:

After defrost is terminated, the compressor is stopped to allow the evaporator to drip.

dU   **First defrost cycle after power-on:**

This parameter allows to delay a defrost cycle, after power-up. This will prevent a cycle from occurring before the cold room has reached its operation temperature.
When set to 'OFF', the first defrost will occur after a complete defrost interval (parameter **di**)

dP   **Display during defrosts:**

You can select what to display during the defrost cycle. This is meant to avoid misleading users during the defrost cycle.
0 =   last measured value before defrost cycle
1 =   setpoint

dr   **Delay displayed temperature after defrost**

During defrost cycles the ambient temperature is not displayed (see parameter **dP**). The actual temperature returns to display when its value reaches the setpoint value or, in any case, after the time defined by this parameter.

iF   **Digital input function:**

The digital input (normally closed) can be configured according to the plant requirements:

0=   the DI is not connected

1=   If the contact is open for a time longer than that set through parameter **id**, the plant is switched OFF and an alarm message is displayed; this can be used for condenser alarm...

2=   *Alarm function:* in this case an alarm message is displayed and the alarm digital output is switched ON

3=   *Open door in the cold room*. When the contact is open, the fan is switched OFF (when applicable) and if the contact is open for more than the time set through parameter **id** an alarm message is displayed and the alarm output is switched ON. High and low alarms are disabled.

id   **Digital input time delay:**

Time between the detection of the digital input opening and the enabling of the function selected through parameter **iF**.

FF   **Fan operating function:**

0=   fan runs in parallel to the compressor
1=   fan is always ON

Note: in both cases, the fan is switched OFF during the defrost cycle.

Fd   **Fan start-up delay after defrost end:**

This parameter is a safety function, the fan is activated after this time even if the temperature set through parameter **Fr** has not been reached

Fr   **Fan start temperature after defrosts end:**

Evaporator sensor temperature at which the fan is switched ON, after defrost cycle,
Note: in any case the fan is switched ON after the time set through parameter **Fd**.

SF   **Thermostat operating function when sensor failure:**

This defines the cycle of the thermostat output in case of failure
0 = Compressor ON
1 = Compressor OFF
2 = Automatic
In this mode, the controller will calculate the average time the compressor was ON for the last 4 cycles, and the compressor will run accordingly. If a deep freezing cycle or a defrost cycle occurred, they will not be taken into account nor will the first cycle afterwards.

So   **Offset thermostat sensor:**

This value is added to or subtracted from the measured value to compensate for possible field measurement offset errors. To compensate for extra long copper cabling use the following formula:

$$Compensation = -\frac{5 \times length}{1000 \times area} \ \mathbf{K}$$

Where:
length = length of the cable in meters
area = section of the cable in square millimetres
and compensate for the calculated value

Un   **Temperature units:**

0 = Celsius degrees,
1 = Fahrenheit degrees.

PU   **Display updating time delay:**

The temperature value displayed will be refreshed with this defined period. It will not affect the control performance.

*P*arameters :

	Parameter	Setting Range	Default	MR12	MR15
	Temperature control parameters				
	Setpoint	-40 to 70°C		•	•
Hy	Hysteresis (HY)	1 to 9 K	2	•	•
LL	Lower setpoint limit (LL)	-40°C to higher limit	-40	•	•
HL	Higher setpoint limit (HL)	lower limit to 70°C	70	•	•
CC	Anti short cycling (CC)	0 to 9 min	2	•	•
Co	Deep freezing time (Co)	0 to 99 min	60	•	•
	Alarm parameters				
AH	High. temperature alarm	0 to 50°C related to setpoint	10	•	•
AL	Low temperature alarm	-50 to 0°C related to setpoint	-10	•	•
Ad	Alarm differential	1 to 9 K	1	•	•
At	Alarm time delay	0 to 99 min	30	•	•
	Defrost parameters				
dF	Defrost function	0 = Electric heater 1 = Hot gas	0		•
dE	Defrost end function	0= by time 1= by temperature	1		•
dt	Defrost termination temp	0 to 20°C	7		•
di	Defrost interval time	0 to 99 hours	6	•	•
dd	Max. defrost duration	0 to 99 min	40	•	•
dC	Dripping time	0 to 99 min	5	•	•
dU	First defrost after power on	OFF, 0 to 99 min	OF	•	•
dP	Display during defrost	0 = Last value before defrost 1 = Set point	0	•	•
dr	Delay displayed temp after defrost	1 to 99 min	20	•	•
	Digital input parameters				
iF	Digital input function	0 = Instrument OFF 1 = Alarm signalling 2 = Alarm reset 3 = Alarm reset and fan cut-off	0	•	•
id	Digital input time delay	0 to 99 sec	5	•	•
	Fan control parameters				
FF	Fan operating function	0 = Parallel with compressor 1 = Continuous running	0		•
Fd	Fan start-up delay after defrost end	0 to 99 min.	5		•
Fr	Fan start-up temperature after defrost end	-30 to +5 °C/-22 to 41°F	2		•
	Other parameters				
SF	Thermostat operating function when sensor failure	0 = Always ON 1 = Always OFF 2 = Automatic	0	•	•
So	Offset thermostat sensor	-20 to +20 units	0	•	•
Un	Temperature units	0 = °C 1 = °F	0	•	•
PU	Display updating time delay	1 to 99 sec	1	•	•

Characteristic of the general circuit breaker

All models except CR-NDT and CR-NFDT

Interruption capacity	CR-PS CR-PT	CR-NS CR-NT
IEC 898 maximum	Icn = 10 kA	Icn = 6 kA
IEC 898 service	Ics = 10 kA	Ics = 6 kA
IEC 947-2 maximum	Icu = 15 kA	Icu = 10 kA
IEC 947-2 service	Ics = 10 kA	Ics = 7,5 kA
Curve	D	C

CR-NDT Models

Interruption capacity	Defrost	Controller Fan…
IEC 898 maximum	Icn = 6 kA	Icn = 10 kA
IEC 898 service	Ics = 6 kA	Ics = 10 kA
IEC 947-2 maximum	Icu = 10 kA	Icu = 15 kA
IEC 947-2 service	Ics = 7,5 kA	Ics = 10 kA
Curve	C	D

CR-NFDT Models

Defrost and controller in the NFDT models are fuse protected.

For further details refer to manufacturer's documentation (in this case ABB)

Characteristic of the circuit breaker for motor (three phase models only).

Item	Control range	Interruption capacity against short circuit 380-400 Vac Ics (kA)
CR-PT150-1	2,5….4	100
CR-PT250-1	4….6,3	100
CR-PT400-1	6,3….9	100
CR-PT550-1	9….12,5	75
CR-PT750-1	12,5….16	60
CR-NT150-1	2,5….4	100
CR-NT250-1	4….6,3	100
CR-NT400-1	6,3….9	100
CR-NT550-1	9….12,5	75
CR-NT750-1	12,5….16	60
CR-NDT150-1	2,5….4	100
CR-NDT250-1	4….6,3	100
CR-NDT400-1	6,3….9	100
CR-NDT550-1	9….12,5	75
CR-NDT750-1	12,5….16	60
CR-NFDT150-1	2,5….4	100
CR-NFDT400-1	6,3….9	100
CR-NFDT750-1	12,5….16	60

Fuses are nor required for a short circuit current below the interruption capacity of the circuit breaker.

For further details refer to manufacturer's documentation (in this case ABB).

*R*epair, Replacement and Spare-parts

Field repair is limited to change of components such as:

Item Code	Description	Supplier
Digital Controller		
MR12DR230-1C	Digital Controller for positive temperature applications	Johnson Controls
MR15DR230-2C	Digital controller for negative temperature applications	Johnson Controls
A99 sensors		
A99BB-100-1C	Temperature sensor, 1 mt cable, IP68, stainless steel	Johnson Controls
A99BB-200-1C	Temperature sensor, 2 mts cable, IP68, stainless steel	Johnson Controls
Note: In case of defective or improperly functioning control, please check with your nearest Johnson Controls / Penn supplier. When contacting the supplier for replacement, you should state the type or model number of the control. This number can be found on the data plate		
Compressor Contactor		
B7-40-00	Compressor Contactor, up to 5.5 kW	ABB
A16-40-40	Compressor Contactor, 7.5 kW	ABB
Defrost Contactor		
B7-40-00	Defrost Contactor, up to 16 Amps, 3ph	ABB
Alternatively		
LC1K0910M72	Defrost Contactor, 5 and 9 Amps, 3ph	Telemecanique
LC1D1210M7	Defrost Contactor, 10, 12 and 16 Amps, 3ph	Telemecanique
Compressor and Fan Motor Protection		
MS 325 / xx series	Motor protection, see relative amperage value in the wiring diagram	ABB
Alternatively		
GV2-Mxx series	Motor protection, see relative amperage value in the wiring diagram	Telemecanique
Circuit breakers		
S254 Cxx series	Circuit breaker for 3ph defrost, see relative amperage value in the wiring diagram	ABB Elettrocondoture
S271 Na xxx	1ph + N circuit breaker for digital controller, see relative amperage value and characteristic (D or C) in the wiring diagram	ABB Elettrocondoture
Alternatively		
S261-xxx NA series	1ph + N circuit breaker for digital controller, see relative amperage value and characteristic in the wiring diagram	ABB STOTZ
C60x xxx	1ph + N circuit breaker for digital controller, see relative amperage value and characteristic in the wiring diagram	Merlin Gerin
Main Switch		
OT45 E4	3ph main switch for NFDT models	ABB
Cabinet		
12 752	ABS cabinet, IP65, Europa series, 12 modules for CR-PS and CR-NS models	ABB
12 753	ABS cabinet, IP65, Europa series, 18 modules for CR-PT and CR-NT models	ABB
12 754	ABS cabinet, IP65, Europa series, 24 modules for CR-NDT models	ABB
12 755	ABS cabinet, IP65, Europa series, 36 modules for CR-NFDT models	ABB
Security Key		
CR-KEY-1	Cabinet Key lock for increased security, mounting kit	Johnson Controls

Note: In case of defective or improperly functioning element, please check with your nearest electrical equipment supplier. When contacting the supplier for replacement, you should state the type or model number of the control. This number can be found on the data plate. Equivalent equipment can be found from other manufacturers, only ABB products will match electrical requirements within physical dimensions.

*N*otes

Specifications

Power Supply Requirements	Single phase 230 Vac ±10% Three phase 400 Vac ±10%	Not all power supplies are available in every version. Please refer to selection tables.
Frequency	50/60 Hz	
Protection Class	IP 65	
Insulation	Class 2 when digital input switch and wire have a dielectric of 1300 Volts	
Ambient Operating Conditions	0° to +40°C (32° to 104°F) 0 to 100 % RH (when properly closed)	
Ambient Storage Conditions	-30° to +80°C (-22° to +176°F) 0 to 95 % RH (non condensing)	
Control range	-40 to +70°C	
Accuracy	± 1°C	
Sensor cables	2 meters	
Output ratings	**Compressor** **Defrost** **Fan** **Door Frame Heater** **Pump down** **Alarm** **Heater**	See selection table See selection table See selection table 0,1 Amps 230 V ac 0,5 Amps 230 V ac 1 Amps 230 V ac
Dimensions (H x W x D)	**12 Modules** **18 Modules** **24 Modules** **36 Modules**	275 x 220 x 140 380 x 220 x 140 275 x 370 x 140 380 x 370 x 140
Directives	EN 60439-1 Tested Type Appliance (TTA)	

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office or representative. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products. This document is subject to change without prior notice.

JOHNSON CONTROLS

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