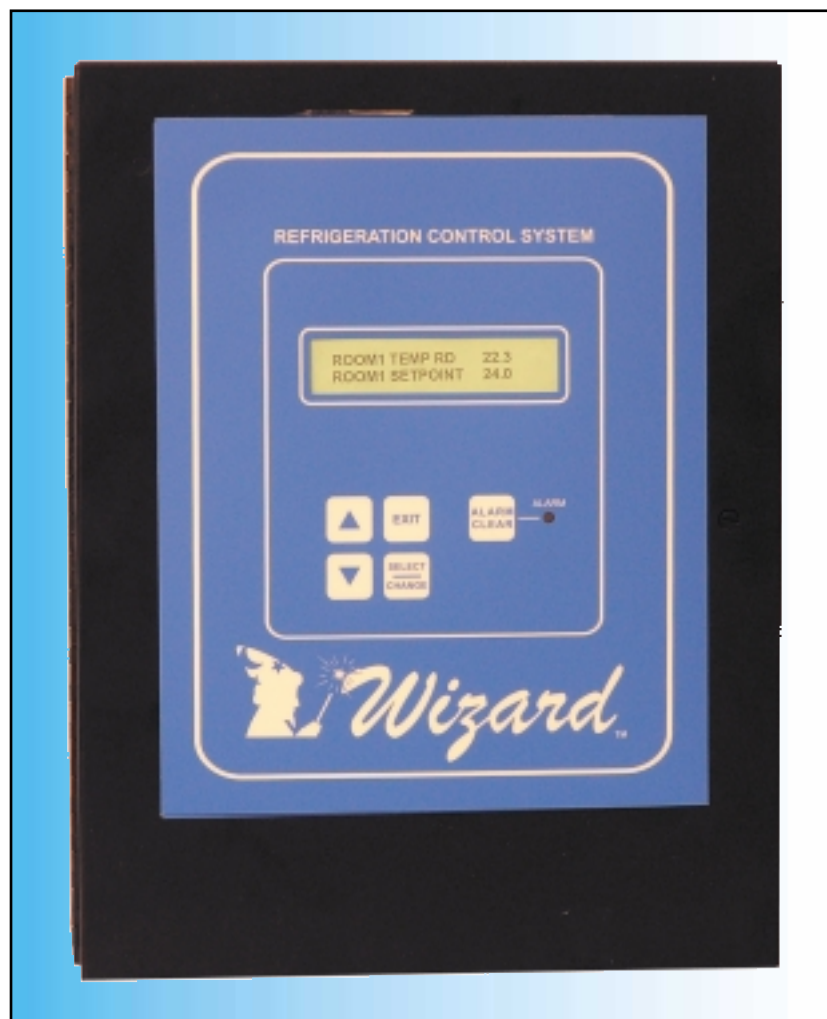


Wizard

Refrigeration Control System



**7 Stage Temperature Parallel
Compressor Control (WCC-T)**

CONTROL OF PARALLEL COMPRESSORS WITH ONE TEMPERATURE INPUT

PURPOSE

The **Wizard Compressor Temperature Control (WCC-T)** is designed for improved operation of a refrigeration rack. The system is distinguished by the simplicity of the front panel, which offers minimum yet versatile keys and functions. This Control is especially suited for single suction parallel rack or two stage split rack application.

OPERATING CAPACITY

Controls up to seven compressors / unloaders based on Room 1 Temperature input.

Controls one satellite compressor based on Room 2 temperature input.

TEMPERATURE CONTROL

Each **WCC-T** comes with 2 temperature sensor for monitoring or controlling the temperature in the refrigerated room. The control monitors for both high and low alarms each having a pre-determined alarm delay of 30 minutes. The **WCC-T** will maintain the space temperature by staging on and off compressors/relays based upon a Temperature Setpoint and a plus/minus differential.

TEMPERATURE ALARMING

The **WCC-T** will activate its "Alarm" relay when the space temperature exceeds the Hi Temp Alarm Limit for a duration longer than 30 minutes or when the space temperature goes below the Lo Temp Alarm Limit for a duration longer than 30 Minutes.

COMPRESSOR PRESSURE FAILURE

The **WCC-T** has four compressor Pressure failure inputs. These are dry contact inputs and will take a digital signal to let the WCC-T know when the pressure of up to 4 compressors is in pressure failure.

COMPRESSOR STAGING METHODS

Sequential - The stages will be activated and deactivated in a First In and Last Out (FILO) method. The first compressor will have the longest runtime and the last compressor has the least runtime. The method is suitable for those rack design requires

first compressor running most of time for proper oil distribution.

Round Robin - The stages will be activated and deactivated in a FILO method. This will maintain even run times on participate compressors. It also prevent the lubrication oil from migrating out of the compressors.

Combination of Sequential and Round-Robin - For parallel racks with two different sizes of compressors or one compressor with an unloader. activates the sequential compressors via the FILO format, then will activate the round-robin compressors randomly. The sequential compressors will be de-activated last.

Mix Match - On parallel racks with different compressor sizes. The user sets the order of which the compressors will activate and deactivate in order to smooth the rack operating step sizes.

Unloaders - The **WCC-T** can operate up to six unloaders per rack. Each unloader can be assigned to any of the parallel compressors. The unloaders will operate on an accelerated algorithm as compared to the compressor algorithm. When a compressor with an assigned unloader is activated, the compressor will initially start unloaded. If the **WCC-T** requires an increase in the rack load, the compressor will then be fully loaded before an additional compressor is activated.

Compressor 1 Swing Staging - When the rack is set up to run in a combination of one sequential compressor and more than one round-robin compressor mode, the first sequential compressor will operate as the swing compressor. This compressor, usually a smaller compressor, will swing in / swing out (turn on / turn off) between activation of the round robin (bigger) compressors. The smaller compressor acts as a half step, smoothing out the performance of the rack.

Unloader 1 Swing Staging - The first unloader can be activated as a Swing Unloader. It will be swung in / swung out (loading / unload-

ing) between compressor staging steps, effectively adding a half step to the staging, smoothing out the performance of the rack.

AIR CONDITIONING MODE

Select this option if this control is used for controlling the air conditioning rack. If this option is selected, the defrost input (dry contact) is used to put this control into idling mode. When the defrost input is closed, this control will turn off all the compressors and enter into idling mode. The message, "A/C OFF" will flash on the display. The suction pressure will still be monitored. If the suction pressure drifts up to 50 LBS, the compressors will turn on and start pumping down the suction pressure until it reaches 5 LBS. At that time all compressors will be turned off. When the defrost input is opened, normal compressor cycling will be resumed.

MECHANICAL SWITCHBACK BACKUP

Mechanical pressure controls can be installed on the rack and be operated by two different methods.

Series Switchback - The **WCC-T** is configured to operate the compressors by de-energizing the control relays. The mechanical low pressure control is wired in series with the **WCC-T**. If the Control fails or in suction high/low alarm, all compressor relays will be activated and the low pressure mechanical controllers will cut out the compressors when the suction goes below their settings. NOTE: This method is only possible with the addition of a timing relay in series with the compressor contactor coil voltage to prevent short cycling on start-up.

Parallel Switchback - The **WCC-T** is configured to operate the compressors by energizing the control relays. The mechanical low and high pressure controls are wired in parallel to the **WCC-T** with the line voltage to the backup wire through a "Switchback" time delay relay controlled by the Alarm Relay.

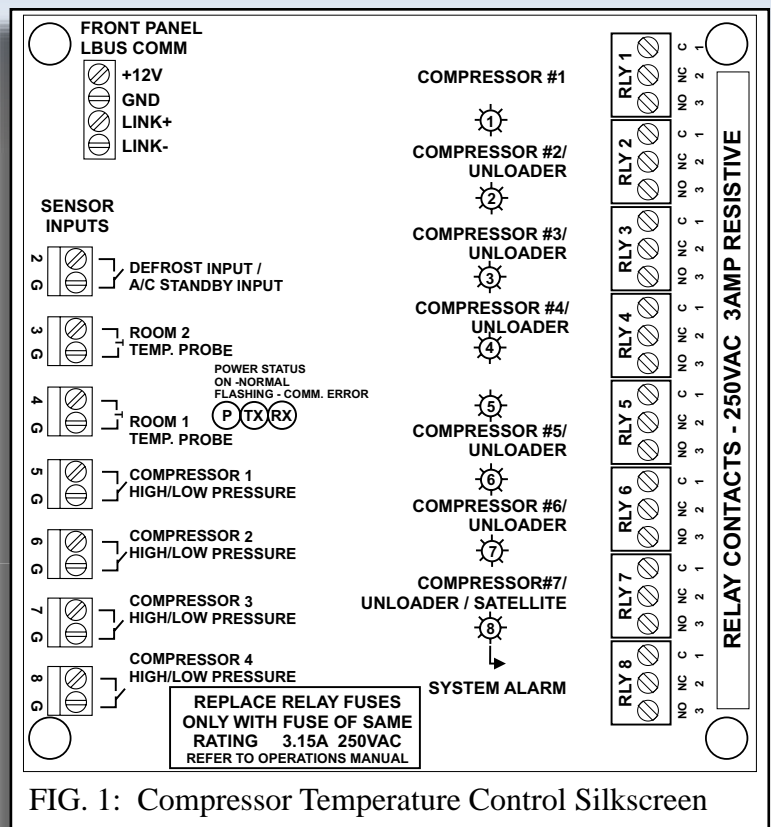


FIG. 1: Compressor Temperature Control Silkscreen

If the Control fails or in suction high/low alarm, all control relays are de-energized, the Switchback relay is energized and power is switched to the backups. The mechanical backup controls now operate the compressors based upon their Cut-IN and Cut-OUT settings. With this method, the backup settings can be set to run the rack as close to the temperature set point as possible.

HARDWARE SPECIFICATIONS

CONTROL SYSTEM

Control

Microprocessor based Program logic stored within non-volatile EPROM memory. Set points and system configuration stored within EEPROM. Logged Data stored within Battery Backed Memory chip, minimum of 10 years storage life.

Menu driven controls with all operating sequences and control algorithms included. The control has non-volatile program memory and a capacitor backed clock in the event of power outage. All programmable options are installed via a "Yes" or "No" question.

Keypad

Front panel accessible with 5 tactile key switches.
Key assignments -- UP, DOWN, SELECT/ENTER, EXIT, ALARM RESET.

Display

2 x 20 character LCD Back Lighted Display. Eight control status lights.

Power

Input -- 100-250 VAC, 50/60 HZ, 2.5 Amp.

Housing

Metal Cabinet, NEMA 1, Enclosure
Option 1 - Metal Cabinet, NEMA 1, Door Mountable
Option 2 - Metal Cabinet, NEMA 4X, ABS Enclosure,

INPUTS

2 Temperature Sensors (Room 1 & Room 2) - 2-wire thermistor, -40 to 150 °F
1 Defrost Status / AC Standby Dry Contact input
4 Compressor Pressure Failure Dry Contact inputs

OUTPUTS

8 Control Relays

7 Relays for compressor/unloaders, 1 Relay for system alarm. All Relay Outputs are 1 Form C SPDT rated for 250 VAC and 3 Amp per circuit. Each relay circuit is fused with a 3.15 Amp slow blow fuse on the common leg. All inputs use un-pluggable screw terminals. All outputs use screw terminals.

LISTINGS

ETL, Conforms to UL Std. 3111-1
Certified to CAN/CSA
C22.2 Std. No. 1010.1



NEMA 1 Compliant Enclosure - This enclosure is intended for indoor use only primarily to provide a degree of protection against contact with the enclosed equipment. The enclosure is not designed to provide protection from water or to be placed in a hazardous environment. Mount only in Pollution Level 2 environments, ie. environmentally controlled offices, control rooms, or environmentally controlled machine rooms.

Dimensions Inches (mm)

12.0 x 9.5 x 5.0 (305 x 241 x 127)

NEMA 4X Compliant Enclosure - This enclosure is intended for either indoor or outdoor use, 0 to 50 °C, to provide a degree of protection against corrosion, windblown dust and rain, splashing water, and hose directed water.

Dimensions Inches (mm)

14.0 x 15.0 x 8.2 (312 x 381 x 208)

NEMA 1 Panel Mount Option - The control and display assemblies must be suitably mounted in an enclosure. The Faceplate may be surface mounted onto a Nema 1 enclosure. The IO Board Assembly must be mounted within an enclosure providing at least Nema 1 protection.

Dimensions Inches (mm)

Faceplate -

10.2 x 8.5 x 2.0 (259 x 216 x 51)

Backplate -

10.6 x 8.5 x 3.0 (269 x 216 x 76)



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