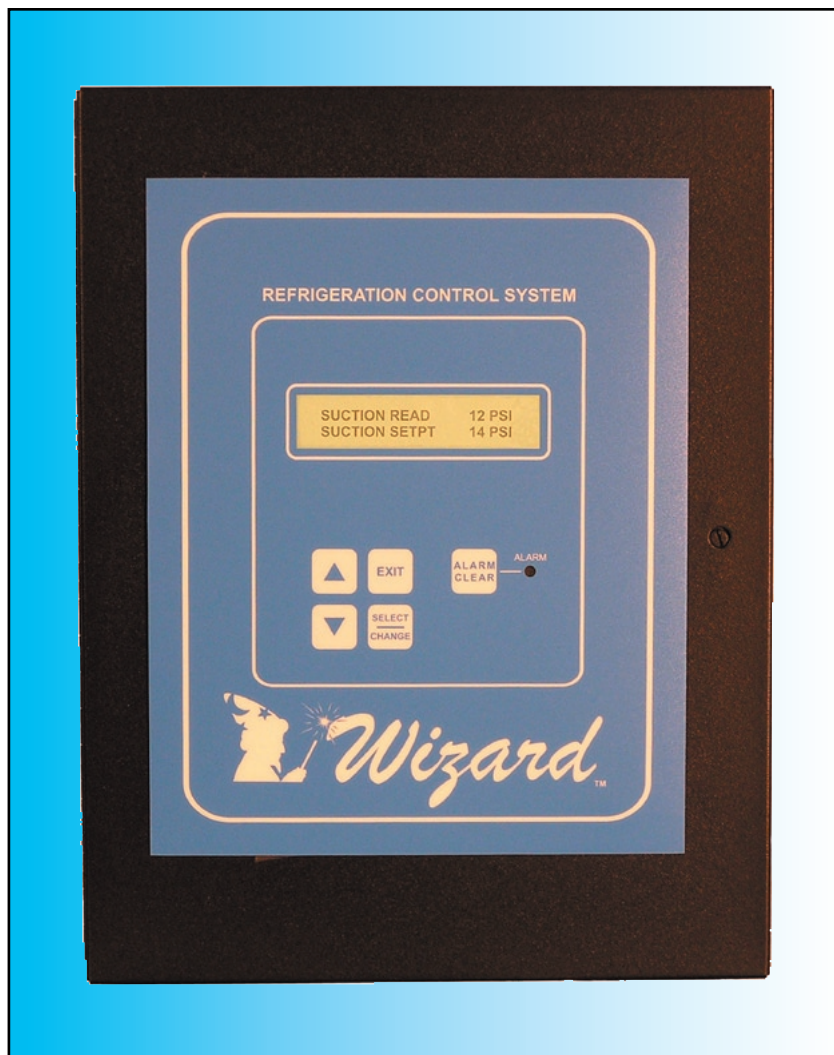


# Wizard

## Refrigeration Control System



**12 Stage Parallel Rack Compressor  
Control - Plus (WCC-P12)**

# CONTROL A PARALLEL RACK WITH A SINGLE SUCTION GROUP

The *Wizard Compressor Control Plus Twelve Step (WCC-P12)* is designed to operate a parallel Twelve (12) stage compressor rack or group of parallel reciprocating or scroll compressors on a single suction group. The **WCC-P12** will maintain the suction pressure close to the Suction Pressure Setpoint by turning on/off up to 12 compressor / unloader stages on a single suction refrigeration system.

## **Booster Compressor Satellite Control (Optional)**

The **WCC-P12** is capable of controlling a single Booster Compressor (Satellite Compressor) based on a temperature and a control setpoint / differential. The **WCC-P12** will cycle a Booster Compressor as needed and will go into alarm and activate a System Alarm Relay when the room temperature exceeds a high or low alarm limit for more than 30 minutes.

## **Suction Pressure Reset (SPR) - Load Shedding**

The **WCC-P12** can raise the Suction Setpoint up to eight pounds based upon the temperature of the SPR (Room 1) Temperature Probe. When the room temperature is satisfied and the Suction Pressure is below the Suction Pressure Setpoint, the **WCC-P12** will increase the Suction Pressure Setpoint by increments of one pound every few minutes until it reaches a maximum offset of eight pounds.

## **Monitor Head Pressure (Optional)**

The **WCC-P12** will monitor a 0-500PSIG Head/Discharge Pressure transducer. The **WCC-P12** will go into alarm and turn on the alarm relay when the head pressure exceeds a high alarm limit for more than 90 seconds or the head pressure is below its low alarm limit for more than six minutes. The Head Pressure input can be used as high side suction input on split suction system with high side and low side interlock. In a two stage system, the suction pressure on the high side system becomes the head pressure on the low side system.

## **Compressor/Unloader Staging Methods (up to Twelve Stages)**

**Sequential** - The stages will be activated and deactivated in a First In and Last Out method. This 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 First In and First Out method. This will give even run times on all compressors. It also prevents lubrication oil from migrating out of the compressors.

**Combination of Sequential and Round-Robin** - For Racks with two different sizes of compressors or one compressor with an unloader. The **WCC-P12** activates sequentially via the FILO format, then activates 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 de-activate in order to smooth the rack operating step sizes.

**Unloaders** - The **WCC-P12** can operate up to six unloaders per rack. Any unloader can be assigned to any compressor. The unloaders will operate on an accelerated algorithm as compared to the compressors. When a compressor with an assigned unloader is activated, the compressor will initially start unloaded. If the **WCC-P12** requires an increase in the rack load, the compressor will then be fully loaded before additional compressors are 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 will swing in / swing out (turn on / turn off) between activation of the round-robin compressors. The smaller compressors act as a half step, smoothing out rack performance.

**Unloader 1 Swing Staging** - The first unloader activates as a Swing Unloader. It will swing in / swing out (Load / Unload) between staging steps to add a half step to the staging, smoothing out rack performance.

## **Air Conditioning Mode**

The **WCC-P12** can control an air conditioning rack. The Defrost Status Input puts the control into and idle mode. When the Defrost Status Input closes, the control will turn off all the compressors and enter into idle mode. The message, "A/C OFF" will flash on the display. The suction pressure will still be monitored. If the suction pressure reaches 50 LBS, the compressors will turn on and pump down the suction pressure until it reaches 5 LBS. Then time all compressors turn off. When the defrost input opens, normal compressor cycling will resume.

## **Mechanical Backup**

Mechanical pressure controls can be installed on the rack and operate in two different methods.

**Series Switchback** - The **WCC-P12** is configured to operate the compressors by de-energizing the control

relays. If the Control fails or is in suction high/low alarm, all compressor relays will activate 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 timing relay in series with the compressor contactor coil voltage to prevent short cycling on start-up.

**Parallel Switchback** - The **WCC-P12** is configured to operate the compressors by energizing the control relays. 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 on the Cut-In/Cut-Out settings. The backup settings can be set to run the rack as close to the suction set point as possible.

### Oil Pressure Monitoring

The **WCC-P12** can monitor up to four oil pressure transducers or digital inputs. The Oil Pressure control scheme can be assigned to either activate alarms, or to shut down specific compressors should the control indicate a Low Oil condition. The Oil Pressure Monitor can be configured as a pressure sensor or a digital input.

### Receiver Level Monitoring

The **WCC-P12** can monitor an analog receiver level sensor or a digital float and activate alarms if the receiver level goes below a user defined level. If the sensor is analog, the **WCC-P12** can be configured with two alarm levels, one for alarm and one for system shutdown. The sensor can be configured for 4-20ma, 0-5VDC, 1-2VDC, 1-6VDC and others.

### Monitoring and Alarming

The **WCC-P12** monitors six separate sensors and activates alarms based upon user definable alarm set-points. These alarms include:

**Low or High Suction Pressure** - The **WCC-P12** shuts down all compressor operations and activates alarms when the suction pressure is below or exceeds the Suction Alarm Setpoint for a user defined delay period

**Low Oil Pressure Differential** - The **WCC-P12** monitors an oil pressure transducer and calculates the pressure differential. The **WCC-P12** will shutdown the compressor operation and activate an alarm when the oil pressure differential is below the Low Oil Pressure Differential Alarm Setpoint for a user defined delay period

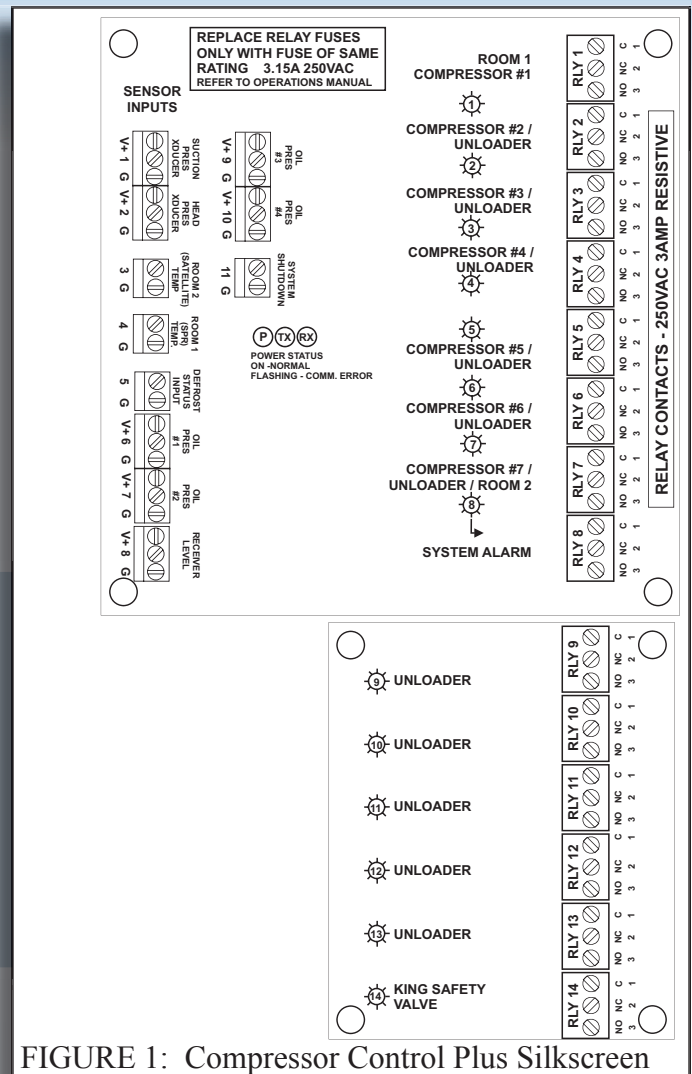


FIGURE 1: Compressor Control Plus Silkscreen

**High or Low Head Pressure** - The **WCC-P12** monitors the Head / Discharge Pressure and will shutdown the compressor operation and activate an alarm when the head pressure exceeds or is below the Head Pressure Alarm Setpoint for a user defined delay period

**High/Low Room Temperature** - The **WCC-P12** can monitor up to two temperature sensors located in a refrigerated spaces. The **WCC-P12** activates an alarm when the space temperatures exceeds the High Temperature Alarm Setpoint or goes below the Low Temperature Alarm Setpoint for a user defined delay period

**Low Receiver Level** - The **WCC-P12** monitors receiver level indicator, either a digital signal from a float switch or an analog signal from a float level sensor. The **WCC-P12** activates an alarm when the receiver level is below the Low Receiver Level Setpoint and if the analog sensor level drops below a Shutdown Level, the **WCC-P12** shuts down compressor operation.

## SPECIFICATIONS

**POWER** 90 to 250VAC, 50/60 Hz, 1.0 Amps

**INPUTS** (All inputs use unpluggable screw terminals)

Two (2) Control Pressure Transducers

Suction Pressure, 14.7in VAC-100 psig or 0-200 psig

Four (4) Oil Pressure, 0 - 200 psig

Head Pressure, 0 - 500 psig

Four (4) Configurable Oil Pressure Sensors

Four (4) Oil Pressure, 0 - 200 psig

or

Digital, Oil Pressure Control Switch Input  
(Dry Contact)

Two (2) RTD Temperature Sensors

Room 1 - Suction Pressure Reset

(SPR) Temperature, 2-wire thermistor,  
-40 to 150°F

Room 2 - Booster Compressor

(Satellite) Temperature, 2-wire  
thermistor, -40 - 150°F

One (1) Dry Contact - Defrost Status  
(AC Shutdown)

One (1) Dry Contact - System  
Shutdown

One (1) Receiver - CPR-Surge  
Vessel Level Indicator - Config-  
urable Digital, 4-20ma, voltage

## OUTPUTS

Fourteen (14) SPDT, 1 Form C,  
250VAC, 3.15Amp relays

Twelve (12) Relays for  
Compressor/Unloader

One (1) Relay for King Valve

One (1) Relay for Alarming

## OPERATING TEMPERATURE

-20°F - 120°F

## OPERATING HUMIDITY

20% - 90% RH, non- condensing

## ALARMS

 System Alarms (1 relay),

Suction High / Low,

Oil Pressure Low,

Head Pressure High/Low,

Room Temp High/Low,

Receiver-CPR-Surge Vessel Level,  
Low/Shutdown

Receiver Level High / Shutdown,  
System Internal Alarm Conditions

**DISPLAY** 2 lines by 20 characters Alphanumeric  
LCD with back light

**KEYPAD** 5 tactile key switches: Scroll up,  
Scroll down, Select/Change, Exit,  
Force Defrost, Start/Advance

## ALARM INDICATORS

**LCD DISPLAY** Name, description, and current  
reading of alarming sensor

**BUZZER** Piezo-electric, 90db @10ft, silenceable

**STROBE LIGHT** (Optional) Mounted on top of  
the housing, activates during any alarm condition.

**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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