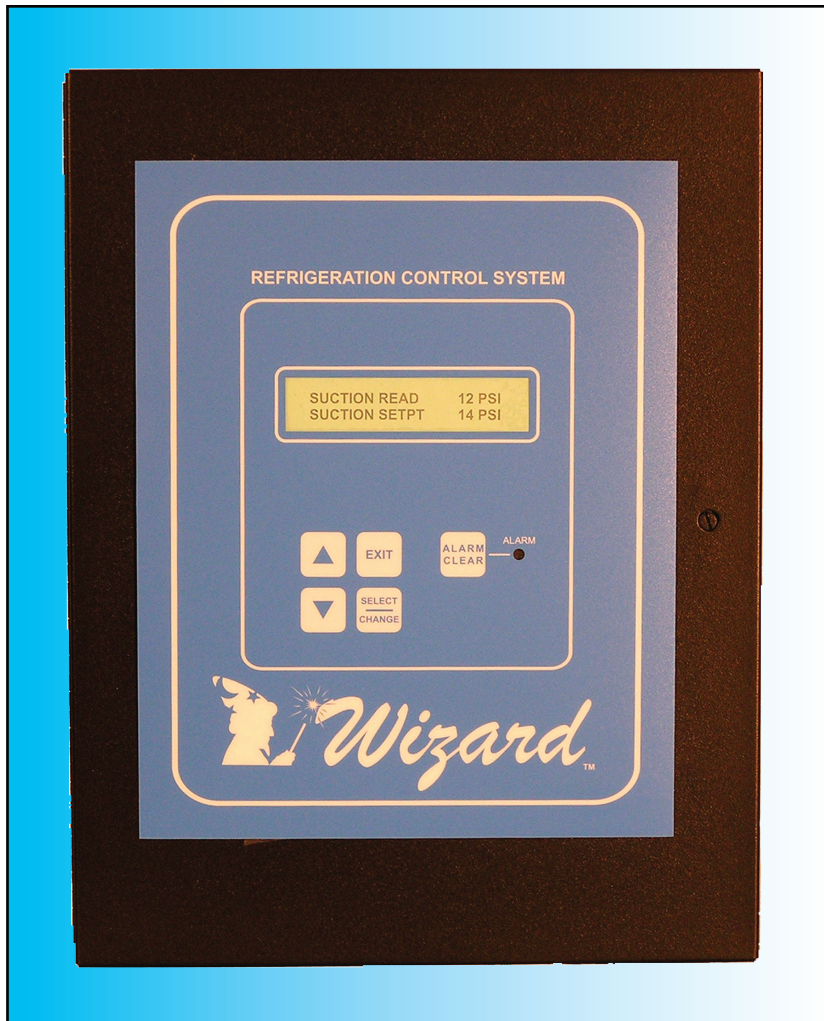


# Wizard

## Refrigeration Control System



**7 Stage Parallel Rack Compressor  
Control - Plus, Fixed Speed (WCC-P7)  
& Variable Speed (WCC-P7-VSD)**

# CONTROL A PARALLEL RACK WITH A SINGLE SUCTION GROUP

The *Wizard* Compressor Control - Plus seven Step (**WCC-P7**) will operate seven (7) stages of compressors or a group of parallel reciprocating or scroll compressors on a single suction or temperature group. The **WCC-P7** will maintain the suction pressure or temperature setpoint or use separate cut-in/cut-out pressures to maintain rack performance by turning staging up to seven compressor and/or unloaders on a single parallel rack system. The compressor on and off delay can be set internally to optimize rack efficiency. Compressors 1 and 2 can be configured for variable speed (-VSD option).

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

The **WCC-P7** is capable of controlling a single booster compressor (satellite) based upon a temperature sensor and a control setpoint / differential. The **WCC-P7** will cycle this compressor as needed and will activate the 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-P7** can raise the suction setpoint based upon the temperature of the SPR (room 1) temperature probe. When the room temperature is satisfied and the suction pressure is below the pressure setpoint, the **WCC-P7** will increase the suction pressure setpoint by increments of one pound every few minutes until a maximum offset of eight pounds.

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

The **WCC-P7** will monitor a head / discharge pressure transducer. The **WCC-P7** will turn on the alarm relay when the head pressure exceeds a high alarm for more than 90 seconds or is below its low alarm 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.

## **Monitor Suction Pressure in Temperature Control Mode (Optional)**

The **WCC-P7** will monitor a suction pressure transducer in the temperature control mode and will go into alarm when the suction pressure exceeds or goes below a set alarm limit.

## **Compressor / Unloader Staging Methods**

**Sequential** - The stages will be activated and deactivated in a First In and Last Out method. This method is suitable for rack designs requiring the first compressor running most of time.

**Round Robin** - The stages will be activated and deactivated in a First In and First Out method. This gives even run times on all compressors and prevents lubrication oil from migrating out of the compressors.

**Combination of Sequential & Round-Robin** - For systems with different sized compressors or one compressor with an unloader. Activates sequentially via the FILO format, then activates 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 de-activate in order to smooth the rack operating step sizes.

**Unloaders** - Any step not assigned as a compressor can be assigned as an unloader and to any compressor. An unloader operates on an accelerated algorithm compared to its compressor. When a compressor with an assigned unloader is activated, the compressor will initially start unloaded. If the **WCC-P7** requires an increase in the rack load, the compressor will become fully loaded before the next compressor is activated.

**Compressor 1 Swing Staging** - When the rack is set up to run in combination a small sequential compressor and more than one round-robin compressor, the sequential compressor will operate as the swing compressor and will turn on and off between activation of the round-robin compressors effectively acting as a half step, smoothing out rack performance.

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

## **Mechanical Backup**

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

**Series Switchback** - The **WCC-P7** 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 be activated and the low pressure mechanical switches will cut out the compressors as needed. **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-P7** is configured to operate the compressors by energizing the control relays. If the control fails or is 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 are set to run the rack as close to the suction set point as possible.

## Air Conditioning Mode

The **WCC-P7** can control an air conditioning rack. 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 and temperature will still be monitored. If the suction pressure reaches 50 lbs, the compressors will turn on and pump down until the suction pressure reaches 5 LBS. Then, all of the compressors turn off. When the defrost input opens, normal compressor cycling will resume.

## Oil Pressure Monitoring

The **WCC-P7** can monitor up to four oil pressures and be configured using pressure transducers or as digital inputs. The oil pressure control scheme can be assigned to either activate alarms or shut down specific compressors should the control indicate a low oil condition.

## Receiver Level Monitoring

The **WCC-P7** 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-P7** 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-P7** monitors up to six sensors and activates alarms based upon user defined alarm setpoints. These alarms include:

**Low or High Suction Pressure** - The **WCC-P7** 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-P7** monitors the oil pressure and calculates the pressure differential and will shut down compressors and activate an alarm when the oil pressure differential is below the low oil pressure differential alarm setpoint for a user defined delay period.

**High or Low Head Pressure** - The **WCC-P7** monitors the head/discharge pressure and will shutdown the compressors 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-P7** monitors up to two temperature sensors. One can be used for temperature control instead of a transducer. The other activates an alarm when the temperatures exceeds or goes below the temperature alarm setpoint for a user defined delay period.

**Low Receiver Level** - The **WCC-P7** monitors a receiver level indicator from either a digital signal from a float switch or an analog signal from a float level sensor and will activate an alarm when the receiver level is below the low level setpoint and if the analog sensor level drops below a set Level, the **WCC-P7** shuts down compressor operation.

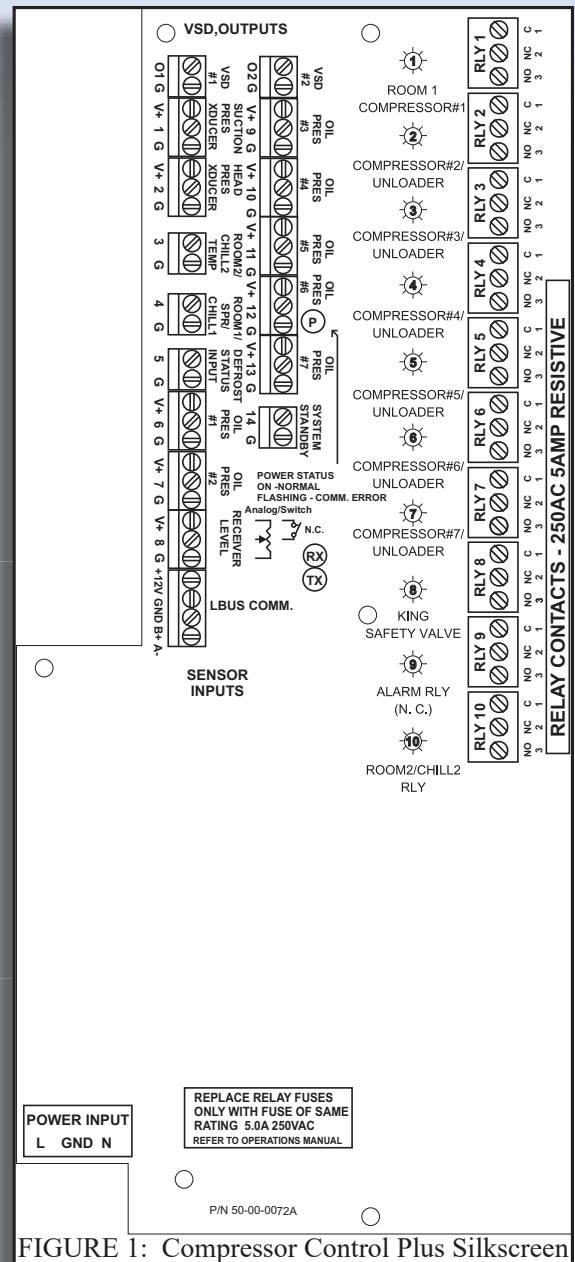


FIGURE 1: Compressor Control Plus Silkscreen

## OPTIONAL VSD CONTROL (Also VFD)

The **VSD** is a factory installed option and may not be present in your control. The **WCC-P7-VSD** will control up to 2 variable speed compressors (Variable Speed Drive (VSD) (Variable Frequency Drive (VFD))) with an analog output based upon the system Suction pressure. Two 4-20mA outputs are wired to the Comp1 and Comp2 outputs. When the suction pressure is above the system setpoint, the first VSD ramps up to 100% capacity before turning on the second. Both will then start at 50% capacity and ramp up together to 100% before bringing on additional compressors. When the suction pressure falls below the system setpoint, the work backward until ramping down the VSD's.

**Please Note:** The variable speed drive feature is only available as a factory installed option at the time of ordering.

## SPECIFICATIONS

- DISPLAY** 2 line by 20 characters Alphanumeric LCD with back light
- KEYPAD** 5 tactile key switches: Scroll up, Scroll down, Select/Change, Exit, Force Defrost Start/Advance
- POWER** 90 to 250VAC, 50/60 Hz, 1.0 Amps
- INPUTS** (All inputs use unpluggable screw terminals)
- Two (2) Control Pressure Transducers
    - Suction, 14.7in VAC - 100 psig or 0 - 200 psig
    - Head Pressure, 0-500 psig
  - Four (4) Oil Pressure, 0-200 psig or Digital, Oil Pressure Control Switch Input (Dry Contact)
  - Two (2) Temperature Sensors
    - Room 1 - Suction Pressure Reset (SPR) or Control 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 - Configurable Digital, 4-20ma, voltage

## OUTPUTS

- Ten (10) SPDT, 1 Form C, 250VAC, 3.15Amp relays
- Seven (7) Relays for Compressor / Unloader
- One (1) Relay for King Valve
- One (1) Relay for Satellite
- One (1) Relay for Alarming
- Up to 2 VSD Compressors

## ALARMS

- System Alarm (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

## OPERATING TEMPERATURE

-20°F - 120°F

## OPERATING HUMIDITY

20% - 90% RH, non-condensing

## ALARM INDICATORS

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

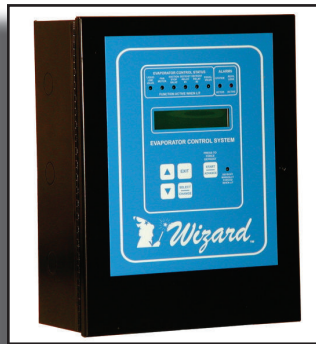
**BUZZER** Piezo-electric, 90db @10ft, silenceable

**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)



# GENESIS INTERNATIONAL, INC.

1040 FOX CHASE INDUSTRIAL DR  
ARNOLD, MO 63010  
EMAIL:MAIL@GENESIS-INTERNATIONAL.COM

TEL: 636-282-0011  
FAX:636-282-2722  
WEB:WWW.GENESIS-INTERNATIONAL.COM