



**PS SERIES
PARALLEL RACK SYSTEM
GLYCOL CHILLER
START UP GUIDE**

Master Rack Compressor Sequencer
7/21/2017



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INTRODUCTION

Thank you for purchasing Master-Bilt refrigeration equipment. This manual contains important instructions for startup, and troubleshooting. Read this entire manual carefully before starting or servicing your Master-Bilt equipment.



NOTICE

Installation and service of the refrigeration and electrical components must be performed by a refrigeration mechanic or licensed electrician.



DANGER

Equipment **MUST** be properly grounded. Improper or faulty hook-up of electrical components of the refrigeration units can result in severe injury or death. All electrical wiring hook-ups must be done in accordance with all applicable local, regional or national standards.



NOTICE

Read this manual before installing your refrigeration equipment. Keep the manual and refer to it before doing any service. Failure to do so could result in personal injury or equipment damage.

The portions of this manual covering refrigeration and electrical components contain technical instructions intended only for persons qualified to perform refrigeration and electrical work. This manual cannot cover every installation, use, or service situation. If you need additional information, call or write us:

Parts and Technical Service Department
Master-Bilt Products
908 Highway 15 North
New Albany, MS 38652
Phone (800) 684-8988
Email: service@master-bilt.com

WARNING LABELS AND SAFETY INSTRUCTIONS



This is the safety-alert symbol. When you see this symbol, be alert to the potential for personal injury or damage to your equipment.

Be sure you understand all safety messages and always follow recommended precautions and safe operating practices.



NOTICE TO EMPLOYERS

You must make sure that everyone who installs, uses, or services your refrigeration equipment is thoroughly familiar with all safety information and procedures.

Important safety information is presented in this section and throughout the manual. The following signal words are used in the warnings and safety messages:

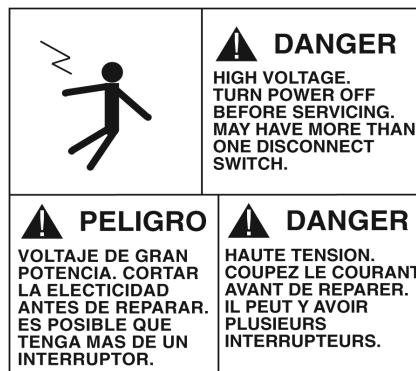
DANGER: Severe injury or death WILL occur if you ignore the message.

WARNING: Severe injury or death CAN occur if you ignore the message.

CAUTION: Minor injury or damage to your refrigeration can occur if you ignore the message.

NOTICE: This is important installation, operation or service information. If you ignore the message, you may damage your refrigeration.

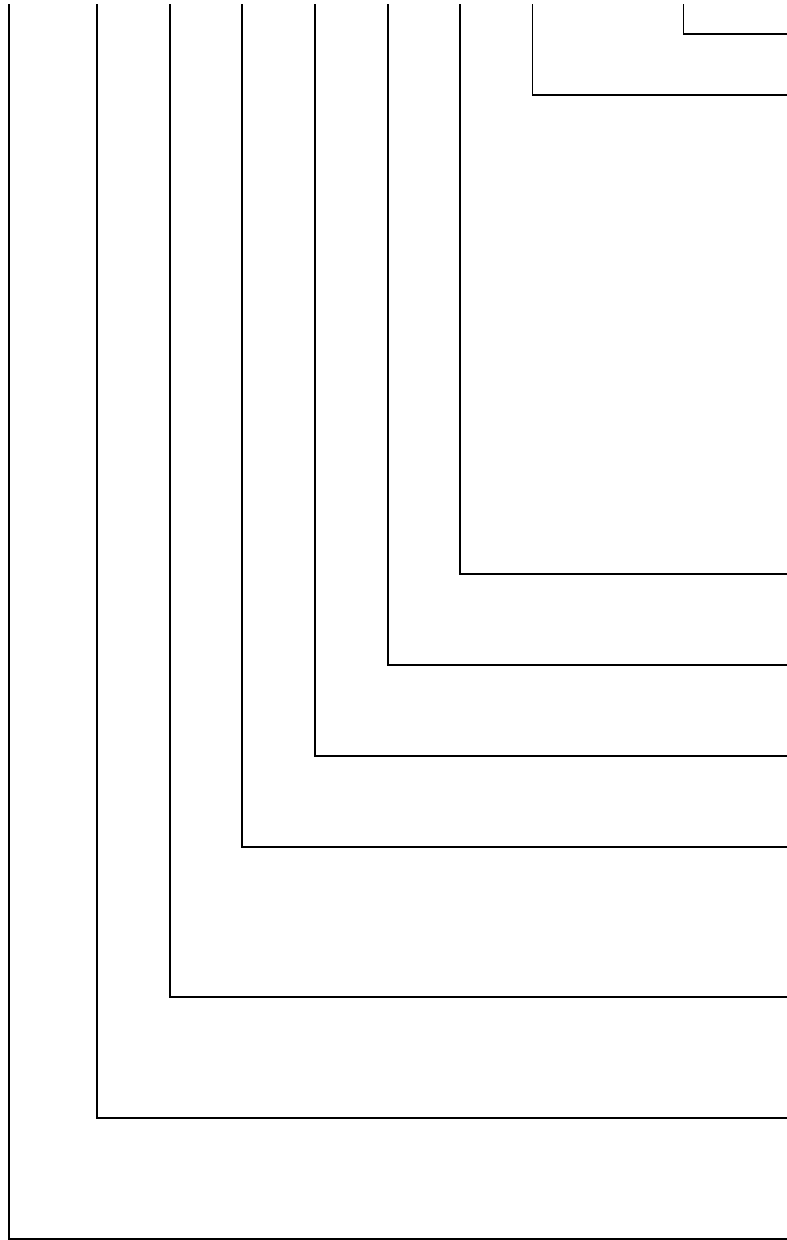
The warning and safety labels shown throughout this manual are placed on your Master-Bilt Products refrigeration at the factory. Follow all warning label instructions. If any warning or safety labels become lost or damaged, call your customer service department at (800) 684-8988 for replacements.



This Label is located on the condensing unit

PARALLEL RACK NOMENCLATURE

PS E A C 5 2 V C - XXXXX



Quote Number

Voltage

- A = 115/60/1
- B = 208-230/60/1
- C = 208-230/60/3
- D = 460/60/1
- E = 460/60/3
- F = 200-220/50/3
- G = 380-420/50/3
- H = 208/60/1
- J = 380/50/1
- K = 200-220/50/1 or 220/50/1
- L = 575/3/60
- M = 200-230/60/3
- R = 265/60/1
- T = 380/60/3

Refrigerant

- Z = R404A; V = R407A; D = R448/R449A

Suction Groups

- 1 to 3

Compressors

- 2 to 10

Condenser Location

- R = Remote
- I = Integrated
- C = Mounted on Common Frame

Condensing Method

- A = Air Cooled
- W = Water Cooled

Frame

- I = Interior
- E = Exterior

Rack

- PS = Standard Rack
- GPS = Glycol Rack

GENERAL RACK DESCRIPTION

Master-Bilt GPS series parallel rack systems operate with up to ten compressors in parallel design. A typical rack system has a single suction group and a common discharge and liquid circuit. The suction group is for medium temperature equipment with an average temperature of +23°F SST. This suction group transfers heat from a glycol pumping loop through a brazed plate heat exchanger. The glycol pump station has a primary and backup pump to supply refrigerated glycol solution to glycol unit coolers and other equipment.

TYPICAL DX REFRIGERATION COMPONENTS

- 2-10 Scroll compressors
- Individual Compressor Dual Pressure Controls
- Individual Compressor Oil Level Controls
- Oil Pressure Differential Valve
- Oil Line Sight Glass
- Oil Filter
- Oil Separator
- Air Cooled or Water Cooled Condenser
- Head Pressure and Hot Gas Bypass Valves
- Liquid Receiver with Dual Pressure Relief Valves
- Replaceable Core Liquid Filter/ Drier
- Liquid Sight Glass
- Replaceable Core Suction Filter
- Suction Accumulator

TYPICAL CONTROL/ POWER COMPONENTS

- 220V Control Circuit
- Main Disconnect Switch and Circuit Breaker
- Power Distribution Blocks
- GFCI Service Receptacle (115V)
- KE2Therm Compressor Sequencer Controller
- Digital Compressor Controller by Compressor Sequencer
- Individual Compressor Circuit Breakers
- Individual Compressor Contactors
- Condenser Fan Contactors
- Phase Monitor
- 230V to 24V Transformers for Liquid Level and Oil Controls Power
- Receiver Liquid Level Probe
- Suction, Discharge, and Drop Leg Pressure Transducers
- Suction, Discharge, Drop Leg, and Ambient Temperature Probes
- Variable Frequency Drive for Pump Motor
- Motor Starter for Backup Pump Motor
- KE2Therm Valve Control for Electronic Expansion Valve

TYPICAL PUMP STATION COMPONENTS

- Brazed Plate Heat Exchanger
- Analog Pressure Gauges
- Pressure Relief Valve
- Pressure Transducers
- Low Pump Suction Safety Switch
- Glycol Fill Tank
- Air Separator and Vent
- Expansion Tank
- Primary and Backup Glycol Pump
- Constant Bypass Valve

CONTROL THEORY

The Compressor Sequencer controller receives pressure and controls outputs to maintain set points. SST for a suction group is maintained by reading the pressure input from the suction group and switching or unloading compressors to maintain a programmed pressure set point. Inputs from discharge and drop leg pressure transducers are used for internal setpoints. Valve controller opens and closes the liquid refrigerant solenoid based on returning glycol temperature. Set points for glycol temperature are changeable in the Valve controller.

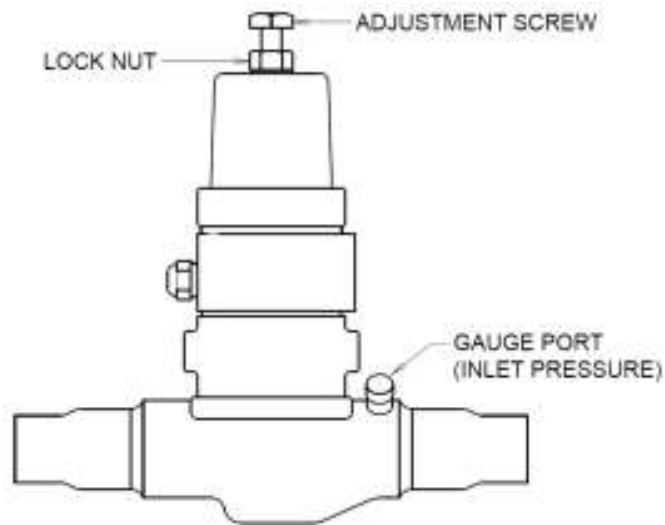
PRE-START UP

- Glycol chiller systems are pre-charged from the factory with Refrigerant:
- System is shipped with initial filter/drier cores installed.
- Oil is pre-charged from the factory. Ensure adequate oil charge before starting the compressors. Use manufacturer recommended oil type. Add until oil is shown in the upper glass on the oil reservoir.
- Never allow liquid refrigerant to reach the compressors. Damage to the compressors may occur.

START UP

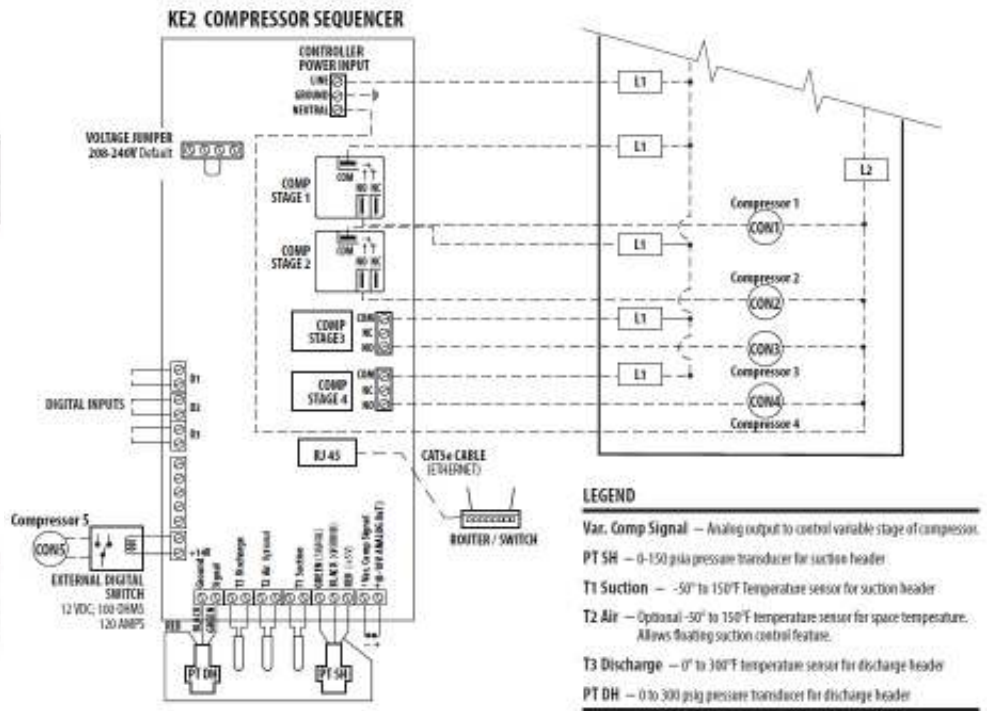
1. Verify all breakers and switches are in the off position.
2. Verify all loads are in refrigeration mode.
3. Turn on condenser power switch and breaker.
4. Turn on all compressor toggle switches.
5. Turn on main power switch and breaker.
6. Turn on control power breaker (2 pole 240V). All compressor contactors should engage while controller is booting up. If a contactor did not engage, adjust dual pressure switch and ensure switch is closed.
7. Check the phase monitor to verify that the green light is illuminated. If red, measure input power and adjust voltage on phase monitor. If still red adjust phasing on main power.
8. Add glycol to pump station at fill tank.
9. Turn on VFD pump breaker and verify proper rotation.
10. Continue to add glycol to system and remove air from system until all air is purged and 25-35 psi pump discharge pressure is achieved.
11. Turn on backup pump breaker.
12. Review rack controller for correct setpoint readings.
13. Turn on breaker for compressor 1 and ensure proper rotation of compressor.
14. Turn on breakers for all other compressors.
15. Monitor suction pressure and discharge pressure for expected operation. S
16. Add refrigerant to the high side of the system as required until the receiver has 20% during the coldest weather for the region. Use high side charging method only.

17. Verify the suction header pressure and discharge header pressure with an accurate refrigeration gauge set.
18. Set the head pressure valve (typically A8 valve) to achieve 200 psi head pressure.

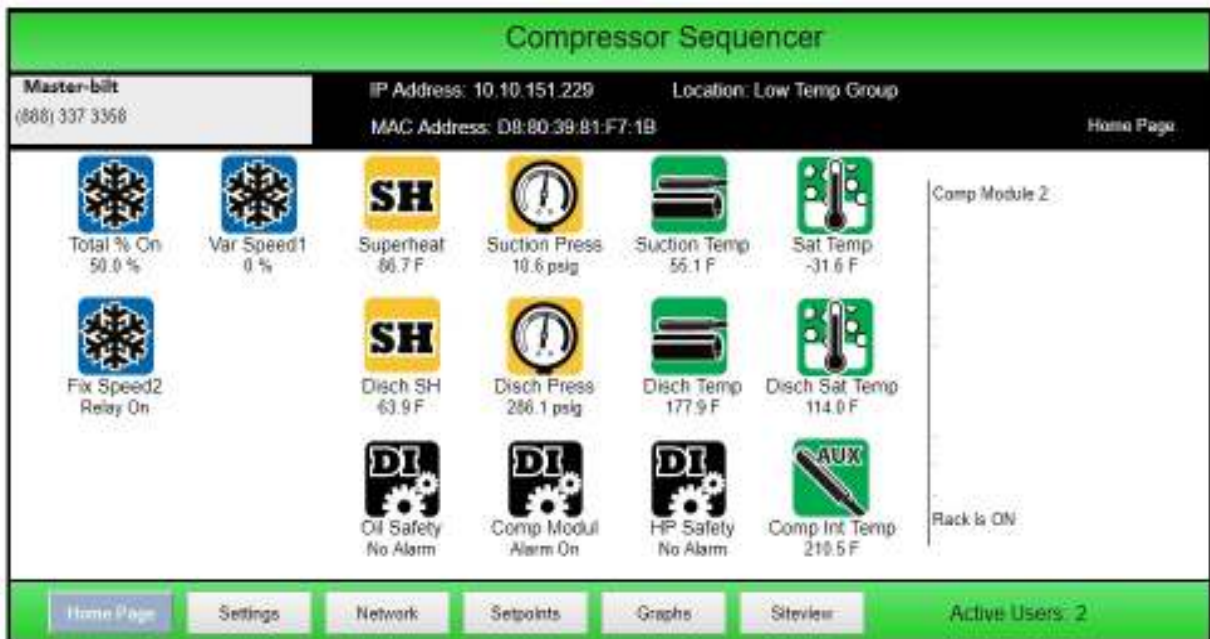


19. Verify Glycol Circuit Temperature set point in controller. Typical glycol temperature is 25F.
20. If returning glycol temperature has stabilized and is too warm, gradually lower suction set point until desired returning glycol temperature is achieved. Typical returning glycol is 25F.
21. Set rack EPR to rack suction set point pressure. This setting will prevent glycol temperature from dropping if rack suction pressure drops.
22. Once all coolers are approximately at operating temperature. Set and check flow valves on each case and cooler.
23. Check oil reservoir after two (2) days of operation and add oil as necessary.
24. After all adjustments have been made, check all valves for proper stem position and replace valve caps.
25. Change filter/ drier cores after start up (approximately 3 days).

MASTER RACK COMPRESSOR SEQUENCER CONTROLLER



Compressor Sequencer accesses all information about the system performance, setpoints and allows for quick adjustments through the controller interface and it capable for TCP/IP communication using a laptop or mobile phone. If networked, the controller's information can be accessed, reviewed, and changed from anywhere there is network access.



Compressor Sequencer

Master-Bilt (888) 337 3358	IP Address: 10.10.151.229 MAC Address: D8:90:39:81:F7:1B	Location: Low Temp Group Setpoints Page
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Relay #1 Type: Variable Speed Comp HP: 5.0 HP	Relay #2 Type: Fixed Speed Comp HP: 5.0 HP	Relay #3 Type: Disabled	Digital Inputs Dig In 1 Mode: Oil Safety Sw Dig In 1 State: Closed Dig In 2 Mode: Comp Module Dig In 2 State: Closed Dig In 3 Mode: Hi Pres Switch Dig In 3 State: Closed
Relay #4 Type: Disabled	Relay #5 Type: Disabled	Var Speed Min Speed: 10.0 % Voltage: DigScroll	Sensor Offsets Aux Temp Offset: 0.0 F Suct Pressure Offset: 0.0 psi Suct Temp Offset: 0.0 F Disch Temp Offset: 0.0 F Disch Pres Offset: 0.0 F
Defrost Load Max Load: 0 Units: Btu		PID Proportional Cmp: 1 Integral Cmp: 1 Derivative Cmp: 0 PID Time Cmp: 1	
Refrigeration Fixed/Float Suction: Fixed Suction Aux Temp Type: Int Comp Temp Suction Pressure: 12.0 psi Room Temp: -10.0 F Refrigerant: R-404A Temp Units: Fahrenheit Min Comp Runtime: 60 sec Min Safety Suc SH: 0.0 F Min Comp Offtime: 60 sec Max Safety Suc Tmp: 90.0 F Min Comp Switch Time: 15 sec Suc Press Diff: 2.0 psi 2nd Suction Pressure: 50.0 psi 2nd Room Temp: -50.0 F Cut Out Pressure: 5.0 psi Max Safety Pressure: 350.0 psi Max Pump Out Time: 2 min			
Alarms Hi Temp Alarm Offset: 10.0 F Min Suction SH: 15.0 F Hi Temp Alarm Delay: 60 min Max Suction SH: 50.0 F Low Temp Alarm Offset: 4.0 F Min/Max SH Del: Disabled Low Temp Alarm Delay: 0 min Max Disch Temp: 268.0 F Max Disch Pres: 375.0 psi Max Dis Tmp Del: Disabled Max Dis Pres Del: Disabled			

Home Page
Settings
Network
Setpoints
Save
Restore
System is On
Login

For More information's please refer to Master Rack Compressor Sequencer Instruction manual

STARTUP TROUBLESHOOTING

Compressor contactors don't engage when Green LED display con the controller is on:

- Check dual pressure switch on compressor.
 - Initial setting is 25 cut-in, 20 differential, 375 high cut out.
 - Adjust cut-in and differential set points.
- Check voltage at each device along control circuit. See wiring diagram.

Head pressure is too low/ high:

- Adjust A8 head pressure valve until 200 psi is reached.

Evaporator pressure/ temperature too high:

- Fully open EPR valve at evaporators.
- Adjust suction set point downward in small increments until evaporator pressure is reached.

Rack failure on phase loss:

- If phase monitor LED is red, adjust voltage range to match input voltage.
- If phase monitor LED is red, verify input phases are aligned to rack.
- If phase monitor LED is green, verify input logic is correct in program.

REFERENCE DOCUMENTS

Compressor Sequencer Connectivity and setpoint manual

https://drive.google.com/open?id=0B_qriwKEC0tsaVZFVTFfMnVPTjA

Simple Interface Board for Electronic EPR valve:

https://drive.google.com/open?id=0B_qriwKEC0tsTWRrSUIhX0dlcGs

Rack Efficiency Control manual and setpoint:

https://drive.google.com/open?id=0B_qriwKEC0tsNFNKRTZsay14RIE

Parker Compact Wide-Range Pressure Regulators, Bulletin 25-94 G

<http://www.parker.com/parker/jsp/documentdisplay.jsp?mgmtid=427d42a204b83110VqnVCM10000048021dacRCRD>

Evaporator Pressure Regulating Valves, Bulletin 90-20, Form SD-73:

<http://www.parker.com/parker/jsp/documentdisplay.jsp?mgmtid=deec166a991b9210VqnVCM10000048021dacRCRD>

<http://www.parker.com/parker/jsp/documentdisplay.jsp?mgmtid=a21d166a991b9210VqnVCM10000048021dacRCRD>

Oil Level Control System, Bulletin 110-10:

<http://www.parker.com/parker/jsp/documentdisplay.jsp?mgmtid=abcf166a991b9210VqnVCM10000048021dacRCRD>