REFRIGERATION CONTROL & MONITORING

GUARDIAN CONTROLS international

GUARDIAN GC-45 VS Pack

Energy optimizing control of Compressors & Condensers

Up to forty percent of the energy costs of powering refrigeration packs can be saved by using Guardian *Optimizing controls.*

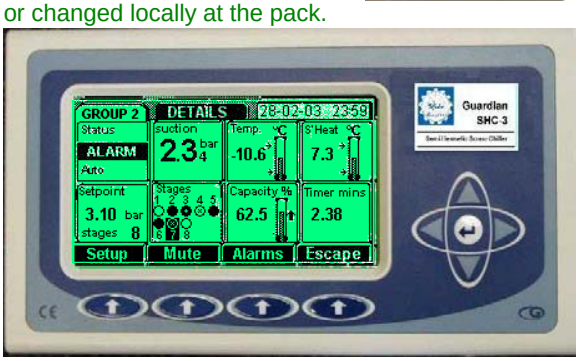
Pack and case controllers cooperate via the optimization network to ensure correct product temperatures are maintained whilst generating a stable refrigerant flow and saving energy.

- **Refrigeration system savings of up to 40%** of pack energy costs per year when used with Guardian *Optimizing* case and pack controls and variable speed drives.
- **Flexible allocation of compressors and fans in two suction groups and one discharge group.** The number of input/outputs can be extended using additional I/O uni**ts.**
- **Fully automatic optimized pack control of suction and discharge pressures.**
- **Superheats with alarms** calculated from pack pressure & temperature.
- **Liquid level monitoring and alarms.**
- **Pack load AMPS monitoring** with energy (kWh) usage**.**
- **Variable speed compressor and condenser Fan control.**
- **Fault inputs for all compressors, fans & pack faults.**
- **Ethernet and RS485 communications for displays and graphs.**
- **Local display and setup** with standard LED-485 or optional LCD-8 display units.

- **Stable compressor pack operation** is achieved by very stable evaporator controls. Stable pack operation avoids unnecessary compressor starts and stops which reduces failures and maintenance costs and prolongs plant life.
- **Energy optimization of pack capacity** is achieved by using a combination of compressors, loading valves and variable speed drives.
- **Optimized suction pressure setpoint** control of compressors is dependent on the evaporator temperatures actually being achieved.
- **Stable discharge pressure condenser fan control** is largely achieved as a result of variable speed motors and a stable pack.
- **Energy optimization of condenser capacity** uses fan staging and/or variable speed drives to achieve the desired discharge pressure.
- **Optimized discharge pressure setpoint control** of condensers fans depends on environmental conditions at the condenser
- **Fan power monitoring and trip recording for EBM Papst variable speed condenser fans** is available using the EBM-16 Ethernet interface.

GC-45 VS Pack Controller
This flexible refrigeration Pack Controller provides suction pressure control using variable speed compressors and discharge pressure control with normal or variable speed Condenser Fans.

LED-485 Display
Pack status, temperatures, pressures, control setpoint and timers settings may be viewed or changed locally at the pack.



Optional LCD-8 Display
Provides LCD display and setup of pack status, temperatures, pressures, alarms and trips, compressor and fan states, control settings and timers.

GC-064 Input/Output
(6 mains inputs and 4 relay outputs)
Provides additional inputs and outputs for pack control.
Larger extra I/O requirements can be configured using another GC-45

MU-10 Marshalling unit
Provides easy plug and socket marshalling for RS485 and Ethernet communications and power cables for GC-45and displays.

Ethernet interface for multiple EBM Fans

EBM-16 provides parameter displays, alarms and trip status from up to 16 EBM Variable speed condenser fans.

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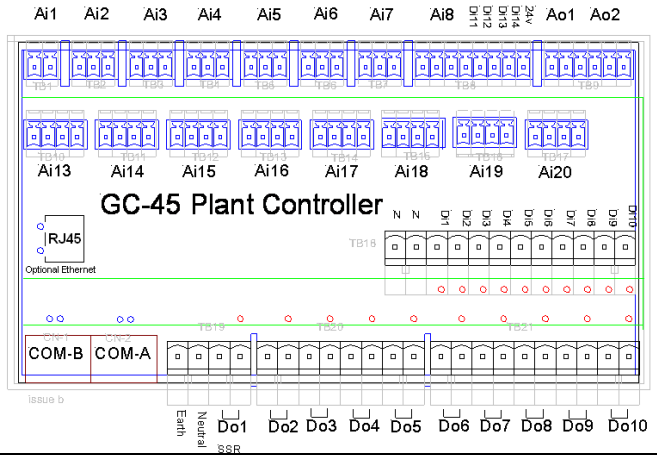
Qty	REF #	GC-45 INPUT OUTPUT SIGNALS
1	Ai1	Motor Load AMPS (0-5A from CT)
6	Ai2-Ai7	Pressures @ 4-20ma Suction 1, Suction 2, Discharge,
1	Ai8	Liquid Level (0-10vdc) Hansen Liquid level transducer
4	Di11-Di14	Pack fault /digital inputs @ 24vac Common Oil, High Discharge, Trip Reset button ,Auto/Off
2	Ao1-Ao2	Speed outputs @ 0-10vdc or 4-20ma Compresssors and Condenser fans
8	Ai13-Ai20	Temperatures PT1000 or 2k2 Suction 1, Suction 2, 10 Discharge, Ambient air
10	Di1-Di10	Compressor & Fan running inputs @ 24vac Compressors, Condenser Fans **4 additional outputs** provided by GC064 extension I/O Su **10 additional outputs** provided by GC-45 extension I/O
10	Do1-Do10	Relay outputs n/o @ 5A Compressors, Condenser Fans, Alarm, **6 additional inputs** provided by GC064 extension I/O **10 additional inputs** provided by GC-45 extension I/O
2	COM-A COM-B	RS485 communication links @19600baud Uses Modbus RTU protocol for LCD-8, LED-485 displays, extension units and remote PC monitoring.
2	1	Optional Ethernet link Supports SNMP or modbus over TCP/IP


Supermarket pack GC-45 control panel


Supermarket pack plant room

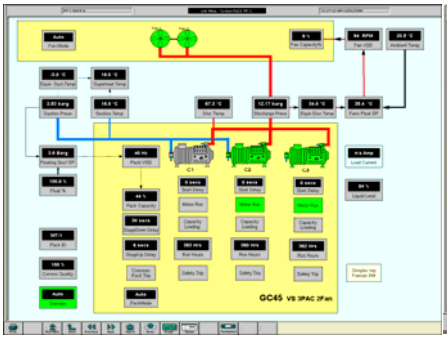
GC-45 Terminals

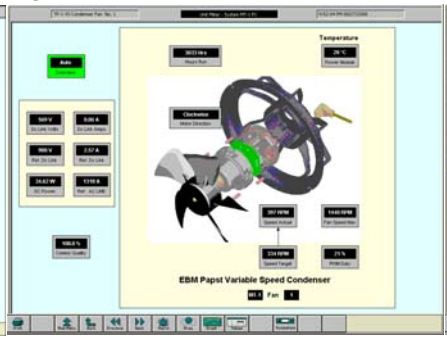


GC-45 Specification CE

Power		**24Vdc** **0.3A** **50-60Hz**
Operation		**0 to 50 °C**
Dimensions Height Length Depth		 **86 mm** **156 mm** **59 mm**
Mounting		**DIN rail**
Connectors		
Terminals No./ Size type	34 64	5.08mm 3.50mm 2-part Screw clamp
Power and RS485	2	4-way sockets Modbus RTU
Ethernet	1	RJ45 TCP/IP, SNMP

Typical 'Consultant' PC Pack display screens


Guardian GC-45 Compressor 3-Pack Mimic



EBM Papst Condenser Fans mimic


Optimized Pack suction & discharge pressures

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