

GUARDIAN GC-45 Blast Freezer

Energy optimizing control of Refrigeration Plant

- Fully automatic optimized Blast Freezer/Chiller control using either Return air temperature or Product probe temperature.
- Hot Gas Defrost sequence prior to each blast operation with automatic temperature termination.
- Blast Period Termination temperature controls selectable for either return air or product probe temperatures.
- Automatic Holding mode after Blast Termination.
- Manual control inputs for mode selection pushbuttons at the freezer (Defrost, Standby, Blast Start, Holding).
- Control of Suction, Liquid, Hot gas, Equalization & Pressure Relief Valves plus drip tray Heater.
- Fault inputs for all Fans Overloads and Heater MCBs.
- Ethernet and RS485 communications for displays, alarms, settings and graphs.
- Local display & setup with standard LED-485 display
- Future Variable speed Evaporator Fan control.



GC-45 Blast Freezer / Chiller

This flexible refrigeration controller provides energy optimising facilities for Blast Chilling or Blast Freezing based on return air or product probe control. The controller provides automatic hot gas defrost prior to each blast.

LED-485 Display

Blast status, temperatures, pressures, control setpoint and timers settings may be viewed or changed locally at the panel.



MU-10 Marshalling unit

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

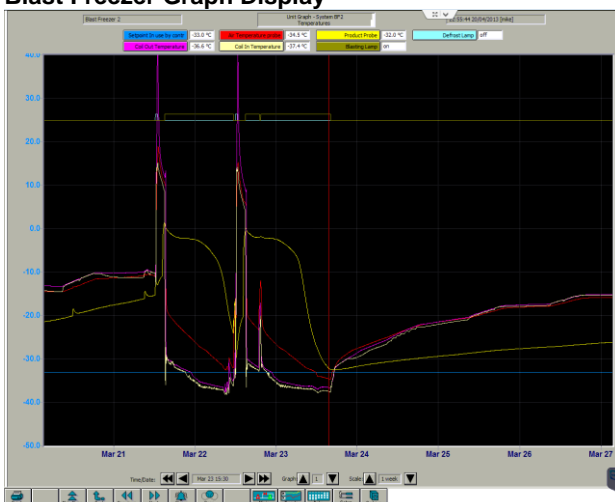


DR4524 Power Supply

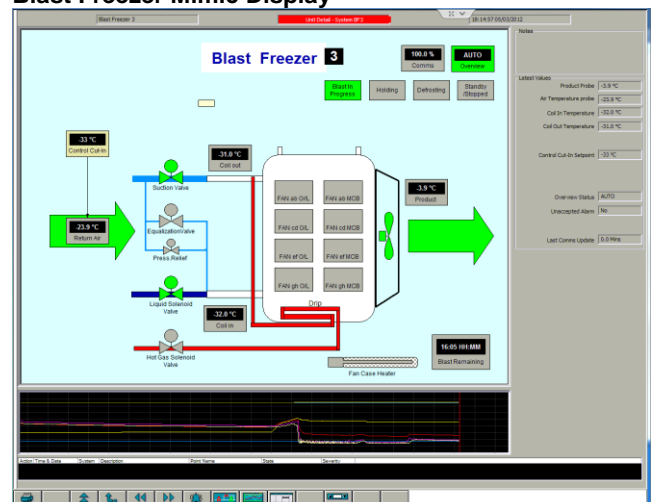
Provides 45W power at 24vdc for GC45 Blast Freezers Installations.



Blast Freezer Graph Display



Blast Freezer Mimic Display



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,	GC-45 Specification Power 24Vdc 0.3A 50-60Hz Operation 0 to 50 °C Dimensions Height 86 mm Length 156 mm Depth 59 mm Mounting DIN rail Connectors Terminals 34 5.08mm No./ Size 64 3.50mm type 2-part Screw clamp Power and RS485 2 4-way sockets Modbus RTU Ethernet 1 RJ45 TCP/IP, SNMP GC45 units can have their Application Software Re-flashed remotely via the RS485 or Ethernet communications links. This is of great benefit when developing new applications.	
1	Ai8	Liquid Level (0-10vdc) Hansen Liquid level transducer		
4	Di11-Di14	Digital inputs @ 24vac Pushbuttons defrost,holding, blast start,standby		
2	Ao1-Ao2	Speed outputs @ 0-10vdc or 4-20ma Compressors, Condenser OR Evaporator Fans speeds		
8	Ai13-Ai20	Temperatures PT1000 or 2k2 Cooler Temp ,Coil In ,Coil out, Product probe		
10	Di1-Di10	inputs or trips @ 24vac Fans and heater faults		
10	Do1-Do10	Relay outputs n/o @ 5A Indicator lamps,Fans, Heaters, Valves,		
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		

INPUT/OUTPUT SIGNAL ALLOCATION

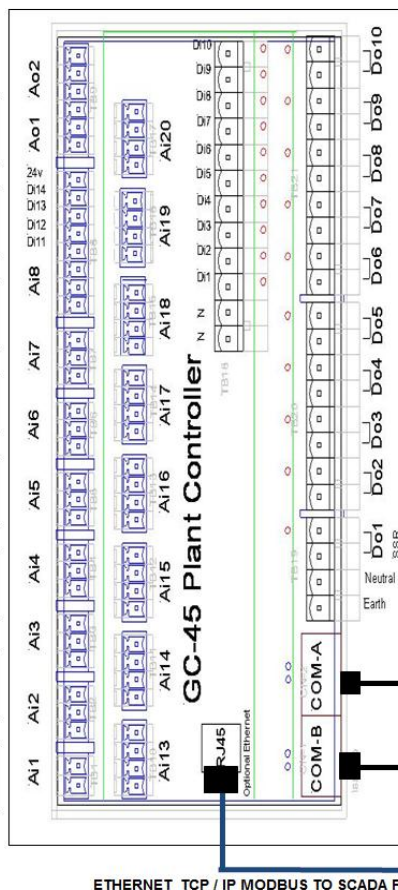
GC-E45 Blast Freezer (KSF)

ANALOG INPUTS (Lower Terminals)

Ao 2	
Ao 1	FUTURE COOLER VSD FAN SPEED CONTROL
24v	24vdc
Di14	DEFROST PUSHBUTTON
Di13	HOLDING PUSHBUTTON
Di12	BLAST START PUSHBUTTON
Di11	STANBY PUSHBUTTON
Ai 7	
Ai 7	40-20ma -1 to 24 barg
Ai 6	40-20ma -1 to 24 barg
Ai 5	40-20ma -1 to 24 barg
Ai 4	40-20ma -1 to 24 barg
Ai 3	40-20ma -1 to 24 barg
Ai 2	40-20ma -1 to 24 barg
Ai 1	BLAST LOAD (AMPS) XXX.5A CT

TEMPERATURE INPUTS (Upper Terminals)

Ai28 Ai20	Thermistor 2k253 Air probe
Ai27 Ai19	Thermistor 2k253 Air probe
Ai26 Ai18	Thermistor 2k253 Air probe
Ai17	Thermistor 2k253 Air probe
Ai16	COOLER PRODUCT TEMP Thermistor 2k253
Ai15	COOLER AIR TEMP Thermistor 2k253
Ai14	COOLER COIL-OUT TEMP Thermistor 2k253
Ai13	COOLER COIL-IN TEMP Thermistor 2k253

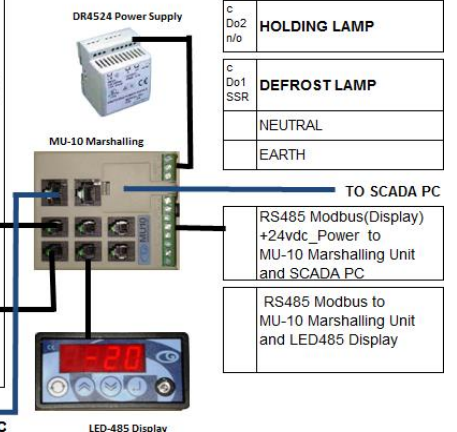


A/C DIGITAL INPUTS (Upper Terminals)

Di10	GENERAL FAULT
Di 9	SPARE
Di 8	HEATER G/H MCB
Di 7	HEATER E/F MCB
Di 6	HEATER C/D MCB
Di 5	HEATER A/B MCB
Di 4	FANS G/H FAULT
Di 3	FANS E/F FAULT O/L
Di 2	FANS C/D FAULT O/L
Di 1	FANS A/B FAULT O/L
N	NEUTRAL
N	NEUTRAL

RELAY OUTPUTS (Lower Terminals)

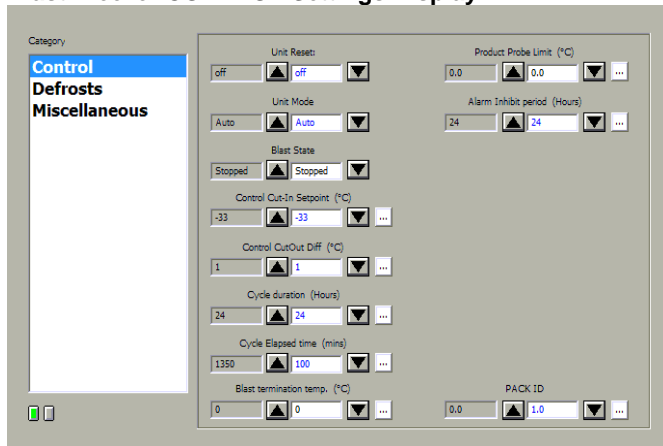
Do10 n/o	LIQUID VALVE
Do9 n/o	SUCTION VALVE
Do8 n/o	HOT GAS VALVE
Do7 n/o	EQUALIZATION VALVE
Do6 n/o	FAN MOTORS
Do5 n/o	FAN HEATERS
Do4 n/o	STANDBY LAMP
Do3 n/o	BLASTING LAMP
Do2 n/o	HOLDING LAMP
Do1 SSR	DEFROST LAMP
Neutral	NEUTRAL
Earth	EARTH



GC45 Blast Freezer Modbus Allocation

Modbus	Gcomm	s
INPUT		
1000	10000	Controller Read only values
1001	10001	Not used
1002	10002	Control variable - Air temperature
1003	10003	Control action: 0 = Neutral zone, -2 = below cutin, 2 = above cutin
1004	10004	Set Point In Use
1005	10005	Terminate on product probe(0 = No, 1 = Yes)
1006	10006	Cycle End Time (mins)
1007	10007	Cycle Elapsed timer(mins)
1008	10008	Alarm Inhibit timer(mins)
1009	10009	Alarm Shutdown timer(mins)
1010	10010	Product Probe timer(mins)
1011	10011	Defrost state(0=completed, 1=start delay, 2=pumpdown, 3= gplx delay, 4=hot gas, 5=equalization, 6=coil freeze)
1012	10012	Timer(secs, used during defrost, counts down to zero)
1013	10013	Coil In Temperature
1014	10014	Coil Out Temperature
1015	10015	Air Temperature
1016	10016	Product Probe Temperature
1017	10017	Defrost Lamp
1018	10018	Holding Lamp
1019	10019	Blasting Lamp
1020	10020	Standby/Stopped Lamp
1021	10021	Fan Heaters
1022	10022	Fan Motors
1023	10023	Equalization Valve
1024	10024	Hot Gas Valve
1025	10025	Suction Valve
1026	10026	Liquid Valve
1027	10027	Fault Input 1 (0=Clear, 1=Alarm)
1028	10028	Fault Input 2 (0=Clear, 1=Alarm)
1029	10029	Fault Input 3 (0=Clear, 1=Alarm)
1030	10030	Fault Input 4 (0=Clear, 1=Alarm)
1031	10031	Fault Input 5 (0=Clear, 1=Alarm)
1032	10032	Fault Input 6 (0=Clear, 1=Alarm)
1033	10033	Fault Input 7 (0=Clear, 1=Alarm)
1034	10034	Fault Input 8 (0=Clear, 1=Alarm)
1035	10035	Fault Input 9 (0=Clear, 1=Alarm)
1035	10035	Fault Input 10 (0=Clear, 1=Alarm)
HOLDING		
12000	12000	Controller Read/Write parameters
12001	12001	Unit Reset: set to 1 to reset all alarm conditions
12002	12002	Unit Mode: Off = 0, Auto = 3
12003	12003	Blast State (0= stopped, 1= blasting, 2= holding, 3 = defrosting.
12004	12004	CutIn
12005	12005	CutOutDiff
12006	12006	Cycle duration (Hours)
12007	12007	Cycle Elapsed time(minutes)
12008	12008	Blast termination temperature
12009	12009	Product Probe Limit (probe must be above this temperature up to product period)
12010	12010	Product Probe Period(Hours)
12011	12011	Alarm Inhibit period(Hours from start of Blast)
12012	12012	Alarm Shutdown period(Hours, High alarm stops blast)
12013	12013	Defrost Start period(secs)
12014	12014	Defrost Pumpdown period(mins)
12015	12015	Defrost GPLX period(secs)
12016	12016	Defrost Hot Gas period(mins)
12017	12017	Defrost Equalization period(mins)
12017	12017	Defrost Coil Freeze period(mins)

Blast Freezer CONTROL Settings Display



Category: Control, Defrosts, Miscellaneous

Unit Reset: off

Product Probe Limit (°C): 0.0

Unit Mode: Auto

Alarm Inhibit period (Hours): 24

Blast State: Stopped

Control Cut-In Setpoint (°C): -33

Control CutOut Diff (°C): 1

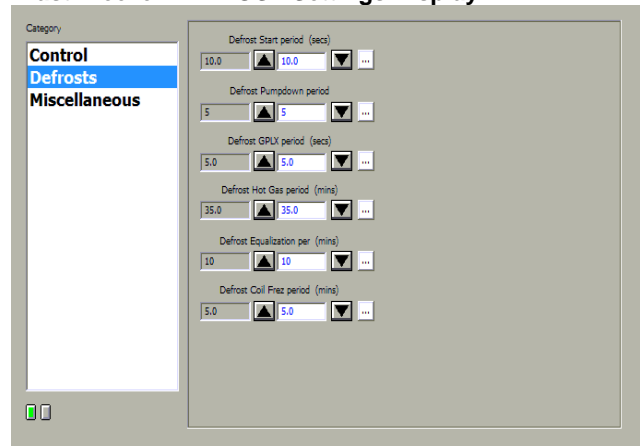
Cycle duration (Hours): 24

Cycle Elapsed time (mins): 1350

Blast termination temp. (°C): 0

PACK ID: 0.0

Blast Freezer DEFROST Settings Display



Category: Control, Defrosts, Miscellaneous

Defrost Start period (secs): 10.0

Defrost Pumpdown period (mins): 5

Defrost GPLX period (secs): 5.0

Defrost Hot Gas period (mins): 35.0

Defrost Equalization per (mins): 10

Defrost Coil Freez period (mins): 5.0

