GUARDIAN CONTROLS
international

Guardian *RCC-50*

Reciprocating Compressor Controller

RCC-50 provides automatic startup and capacity control for a single stage or a two stage reciprocating compressor. The control setpoint may be chosen from suction pressure or process temperature.
Menu settings are available for control of pump, motor, loading valves, bypass valve, crankcase heater and oil coolant valve.

Control strategy, setpoints, timers, alarm and trip settings may be changed locally at the panel or remotely from the RS485 Supervisory Alarm Monitor System PC or the TCP/IP network.

Optional Internet Protocol (IP) facilities include MODBUS supervisory alarm monitor communications over TCP/IP, email alarm messages and web page displays.

Standard panel

- Suction pressure or process temperature control
- Automatic control of motor, capacity, oil cooling & heater
- Single stage or two stage control with intermediate pressure
- Variable speed Compressor Motor and condenser fan control
- Alarm and trip monitoring of all variables and safety inputs
- Motor Load Amps alarm display with automatic capacity unload
- Multi-compressor operation on same suction/process line.
- Simple pushbutton operation of easily read LED display panel
- Simultaneous TCP/IP & RS485 MODBUS protocols
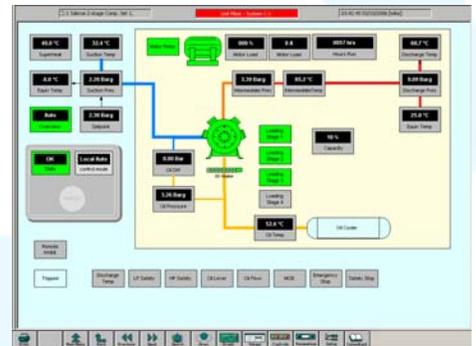
Supervisory Alarm Monitor Screen

GUARDIAN controls utilize the latest microprocessor technology to protect your machines, your product quality, your environment and your money

Guardian Products incorporate the experience accumulated internationally during two decades of automatic control of compressors and industrial refrigeration.

Rugged, reliable, accurate, cost-effective products,
Provide flexible system configurations and facilities for
Refrigeration Control and Monitoring.

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GUARDIAN IP RCC50 Hardware

Enclosure

Rating	IP65
Dimensions:-	w 600 x h 380 x d 200 mm
Power	230/110vac @ 50/60HZ 30VA
Operation	0-55 °C
Manufacturing to	ISO 9002, **CE**

Microprocessor
Well proven, rugged Intel 8051 microprocessor for all control functions with watchdog and power fail detection and recovery facilities.

Operator display panel
Easily understood operator control & display panel with simple push button operation and large LED displays of values and states The panel emulates conventional compressor meter displays and panel pushbutton operation. Compressor status values can be readily viewed from a distance of 5m.

Two serial communication ports
Both ports use RS485 Modbus protocol
One port is for external PC alarm monitoring
The second port provides inter-compressor communication for common suction or chiller temperature control.

Internet Protocol Option
The optional IPM3 module provides TCP/IP, HTML, SNMP interfaces for LAN and internet communications with alarm emails and web page.

Circuit breaker protection for mains power
The enclosure contains separate circuit breakers for controller power and compressor power. These MCBs trip under adverse site power conditions or can be used to isolate the compressor control power during commissioning.

Flexible analog inputs
Analog inputs for temperatures ,pressures and motor current are automatically configured dependent on model and control method selection Control selections are available for Single stage or 2-stage compressors.
Up to 4 loading valves may be selected.
Control Types selections are available for suction pressure, chiller temperature and condenser control.
Automatic range selection is available for a variety of pressure transducers.

Speed control Analog outputs
Analog outputs are available for compressor motor and pump or condenser speed control via inverters

Comms and Diagnostic LEDs
All digital inputs and outputs have on board LED state indicators for easy diagnostics. All communication ports have activity LEDs
All power supply rails have LED 'healthy' indicators.

EEPROM setpoint memory
All setpoints, limits and model selections are stored in EEPROM memory.
EEPROM memory storage is inherently secure and not subject to loss of information after a power fail.
All setpoint modifications are secured by entry of a passcode.
Only values in the permissible range can be saved.

Module replacement and fusing
The operator display panel and control PCB module containing all inputs and outputs are easily replaceable.
All input output signals are connected to the PCB via two-part terminals or plug and sockets. All signals that are potentially susceptible to external shorts are fused and provided with 'healthy' LED indicators.

GUARDIAN IP SCC50 Software

ALARM , TRIP, Shutdown Indication & Diagnostics
Whenever a high or low alarm or trip level is exceeded or a safety shutdown trip occurs then flashing indications and messages are displayed on the control panel for easy fault diagnosis. ALL trips shutdown the compressor and flash the red TRIPPED lamp. Contacts are available for flashing a remote alarm beacon or activating a remote dialout unit
All open circuit or short circuit pressure transducer or temperature probe inputs generate the appropriate diagnostic indications.

Compressor Control
User selectable compressor sequencing and controls are provided for oil pump, motor, economizer, capacity slide, liquid injection, Auto VI slide, oil heater, bypass valve and condenser fans. Two-stage screws control the loading on the additional high side slide.

Compressor Mode
The compressor control mode can be operator selected for OFF, Manual, Local Automatic or Remote Automatic (pack system) control. All safety trips and alarms always apply except when in OFF mode.

Dual setpoint control selection.
Switch input selection of high or low control setpoints for suction and discharge pressure or process temperature is available. This facility allows dual temperature usage of coldstores and energy saving on the condenser pressure when not in evaporator hotgas defrost mode.

Safety Backoff controls
Excessive motor loads or discharge pressures initiate automatic unloading of the compressor slide.
The maximum demand input is available for unloading the compressor slide to reduce site power whenever required..

Multiple compressor control
Automatic control of up to eight SCC50 compressors on the same refrigeration system is available in 'Remote' mode by using communication controls on the interconnecting RS485 highway. Each compressor can be selected for Even-Runhours, Lead, Lag, or Standby control.
If the master compressor is tripped or reaches minimum load and stops or becomes fully loaded, then the most appropriate compressor becomes master and automatically starts and then regulates its capacity.
This fail-safe system configuration ensures that failure of any one compressor always allows correct operation of the remainder.
Compressors can be selected to load share when in remote mode.

Compressor Monitoring
Analog inputs are provided for measurement of
suction, discharge, intermediate, oil and filter pressures.
Suction, discharge, intermediate, oil manifold, oil sump and chiller process temperatures.
Motor current, capacity slide and Auto VI slide position and ratio.
Calculated values include differential pressures, equivalent temperatures and compressor Runhours

Analog Signal Calibration
Facilities are available for calibration of all analog signals and minor adjustment of slide position, pressure transducer and temperatures.

Test Facilities
When selected in 'test' mode, facilites are available to toggle all analog and digital control outputs, VI slide stepper motor position and display all input states.

Optional Input /Output facilities
Modules to provide additional temperature monitoring or remote pushbutton operation are easily added and configured..
Condenser control of two fans is standard.
Facilities for control of up to six condenser fan stages is available as an option.
Cooling towers, process pumps or vessel control facilities are available as options when required.