SC200 System Controller

Contents

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Specifications apply to an SC200 installed with a single IOBGP System IO Board. Refer to the IOBGP data sheet for detailed system input and output specifications. Some features require SC200 version 4 software.

Hardware and Software Compatibility

Rectifiers controlled:	APR24-3G APR48-3G Energy Saver Rectifier APR48-ES EPR48-3G CR48-3G NPR48-ES
Number of rectifiers supported:	126
Remote Control and Management Software:	PowerManagerII Any SNMP Network Management Software. *SNMP MIBs available on request.* Any Building Management System (BMS) using Modbus-RTU or Modbus-TCP. *Refer to Application Note AN0107 for full details.* Third party management software using S3P protocol. *S3P interface specifications available on request.*
Set-up / installation / service tools:	DCTools ICE Web browser (Internet Explorer, Mozilla Firefox, Google Chrome or other compatible browser)

Mechanical

Dimensions H, W, D:	133.5mm (3U), 44.5mm (1U), 70mm
Weight:	140g [5 oz]
Mounting options:	Panel mount Rectifier slot mount
Orientation:	Vertical, horizontal left, horizontal right

Environmental Requirements

Ambient Temperature	
Rated Operating Range:	-10°C to +50°C (14°F to 122°F)
Extended Operating Range:	-25°C to +70°C (-13°F to 158°F) *May affect product lifetime, metering accuracy and display contrast.*
Altitude:	<3000m (9800 feet)
Humidity:	<95%RH (Non-condensing)
Location:	This unit must be installed in a restricted access location.

DC Input

Rated Voltage:	24V / 48V nominal *From an SELV power source, earthed or unearthed.*
Operational Range: Power input connector: Input current	18V to 60V RJ-45 (part of RXP bus) 0.18A (24V) / 0.06A (48V)
Earthing:	Class II ⧈
Fault Protection (external):	Over-current protection of the SC200 / IOBGP power supply (RXP bus) is required to prevent excessive current flow during fault conditions.
Approved over-current devices:	Powerware Voltage Feed Module (VFN), or Tyco RXEF135 or Littelfuse 60R135 polyswitch in series with LIVE input of the DC power source.

Keypad and Display

Display type:	160 x 128 back-lit color dot matrix
Viewable area:	30.5mm x 36mm
Display settings:	Contrast Adjustable Orientation Vertical, Horizontal Left or Horizontal Right
Main Screen Values	Configurable to any analog input value, or key system values
Keypad:	6 keys, elastomer type (Up / Down / Left / Right / Softkey 1 / Softkey 2)
Keypad Access Security Protection: Set/cleared:	 Prevents configuration changes from the keypad. Optionally allows temporary write access using a 4 digit PIN. From DCTools or Web.
User interface functions:	View system values View and change alarms View status messages Start / stop control functions Test and characterize LVDs Test alarm relays Change operating settings Map I/O boards
Language (standard): Language options:	English Chinese, German, Spanish, Russian (download by web) *Other languages available on request.*

Indicators

Status LEDs Power On: Critical / Major Alarm: Minor Alarm:	 Green Red Yellow
Audible Alarm Indicator:	Enabled/Disabled (default: Enabled)

Data Logging

Event Log:	Up to 10,000 records
Data Log Records: Continuous Log Interval: Off-normal Log Offset: Off-normal Log Interval:	 Up to 10,000 records 10s to 1 day (default: 1800s - 30 minutes) 1.0 to 8.0V (default: 4.0V) 1s to 1 day (default: 180s – 3 minutes)

Communications

Ethernet Interface: Connector: Protocols: Settings:	 10baseT RJ-45 TCP/IP, SNMP, S3P over IP, http (Web), https (secure Web), Modbus-TCP IP Address, Subnet mask, Gateway address
USB Version Speed Function	 1.1 Full Speed (12Mbits/s) Local viewing of values and configuration using DCTools
RS-232 Serial Interface: Connectors: Protocols:	 RS-232 (DTE) DB9M S3P, MII (China-specific), Modbus RTU

Communications (continued)

System Communications	
Interface:	RS-485
Connector:	RJ-45 (Rear panel)
Protocols	RXP
External modem options	
GSM Modem:	SMS (TXT) system status and alarm messages (see following).
GPRS/HSUPA Router:	Ethernet over mobile network. Communications to PowerManagerII, DCTools or third-party Network management System (NMS).
SMS Messaging	Requires suitable external GSM modem
System Status Message:	Trigger: Text message to modem, starting with lower case or capital "P" Destination: number of mobile phone that sent trigger message Contents: Site name, number of alarms active, bus voltage, load current, AC voltage, battery current, temperature, battery time remaining
Alarm Message:	Trigger: Any alarm activation or de-activation, Critical, Major or Minor, as configured Destination: up to 8 mobile phone numbers Contents: Site name, triggering alarm name and status (active or inactive), bus voltage, load current, AC voltage, battery current, temperature, battery time remaining
Email alarm messages	
Communications	Requires access to external SMTP server
Number of destinations	Up to 6
When sent	An email is sent a configurable delay after a new alarm with a sufficiently high severity is activated or de-activated
Email Delay	Configurable per destination
Email subject	Triggering alarm name and severity
Alarm message contents	System Identity details Active alarms System Values System Status Recent events (all events occurring in the previous hour)
SNMP Interface	
Functions:	Get/Set/Trap
SNMP Versions:	1, 2c, 3
MIBs supported:	SC200 MIB (Eaton proprietary), MIB II
Trap format options:	Eaton (multiple trap numbers) or X.733 (single trap number)
SNMPv3 security settings:	Authentication password, privacy password (single-user only)
SNMPv3 protocols:	Authentication: HMAC-SHA Privacy: CBC-DES
Web Interface	
Functions:	Full configuration and control supported
Security:	Secure web (https), username/password access control
Software upgrades:	Via Ethernet port *Allows remote software upgrade over network.*
Remote Access Password Security	
Protection:	Prevents configuration changes and control function operations by DCTools or PowerManagerII through the serial or Ethernet port.
Set:	From web or DCTools
Cleared:	From web, DCTools or keypad

Communications (continued)

Serial Server	
Operation	Allows remote access to a device connected to the SC200's RS232 port via Ethernet.
Protocol:	Any serial protocol over IP
Port number:	15000

Alarms

Alarm severity settings:	Critical, Major, Minor, Warning, Control (does not cause remote alarm; not shown on front panel)
Standard alarm relay settings	Summary Minor, Low / High Load, Rectifier Fail, AC Fail, Load/Batt Disconnect, Monitor OK
System Alarms	Low Float, Low Load, High Float, High Load, Rectifier Fail, Multiple Rectifier Fail, Rectifier Comms Lost, Multiple Rectifier Comms Lost, Partial AC Fail, AC Fail, System Overload*, Load Fuse Fail, Battery Fuse Fail, MOV Fail, ACD Fan Fail, LVD1 Disconnected, LVD1 Fail, LVD1 Manual, LVD1 Characterization Error, LVD2 Disconnected, LVD2 Fail, LVD2 Manual, LVD2 Characterization Error, Batt Temp High, Batt Temp Low, Sensor Fail, Battery Test Fail, Equalize, Fast Charge, Battery Test, Aux Sensor Fail, In Discharge, Configuration Error, Monitor OK, Battery Current Limit, Rectifier No Load, Rectifier Current Limit, Rectifier Over Temperature, Generator Fail, Cabinet Fan Fail, IOB Comms Lost, Unmapped IOB Found, Unknown Hardware, Missing Hardware, String Fail, Standby Mode, LVD Disconnected, LVD Fail, LVD Manual, LVD Characterization Error, Wrong Battery Polarity, Characterizing Battery, DO Manual, Normal Charge, AC Phase 1 Voltage, AC Phase 1 Fail, AC Phase 2 Voltage, AC Phase 2 Fail, AC Phase 3Voltage, AC Phase 3 Fail. ** System overload alarm can be configured in System overload or N+1 Redundancy modes.* *Not all alarms are enabled by default; refer to the configuration file for alarm settings.*
Voltage Alarm settings	
Low float:	0 to 60V (default: 52.8V)
Low load:	0 to 60V (default: 47.0V)
High float:	0 to 60V (default: 55.6V)
High load:	0 to 60V (default: 57.6V)
System Overload Alarm setting	
% capacity:	0 to 100% (default: 85%)
Overload time:	0 to 10,000 min (default: 4 hours)
Overload type:	Total capacity / Redundancy (default: Total capacity)
Optional Note	Size: 60 text characters per alarm Viewing: from DCTools, Web, in SNMP trap, in email alarm message, on LCD display
User Alarms	
Digital (any DI including system inputs):	Configurable name, active state, severity, relays (up to two)
Analog (any AI including system inputs):	Configurable name, high alarm threshold, high alarm severity, high alarm relays (up to two), low alarm threshold, low alarm severity, low alarm relays (up to two), hysteresis (shared by low and high alarms)

Smart Alarms

Operation	Boolean combinations of alarm sources
Maximum Number	32
Logic Functions	AND, OR or XOR
Recognition Period	0 seconds to 20 hours
De-Recognition Period	0 seconds to 20 hours
Alarm Sources	
Maximum Number:	64
Type:	System Alarm, Analog Input High Alarm, Analog Input Low Alarm, Digital Input Alarm, Smart Alarm
Logic:	EQUAL or NOT
Scheduled Sources	
Maximum Number:	20
Functions:	First Date/Time Number of Activations (default: 0) Duration (default: 60 minutes) Interval (default: 1440 minutes = 1 day)
System Value Sources	
Maximum Number:	20
System Values:	Bus Voltage, Rectifier Current, Load Current, Battery Current, Battery Temperature, Load Power, System Power, Ah Discharged, Number Of Rectifiers Failed, Number Of Rectifiers Comms Lost, AC Voltage, Battery Time Remaining, Alternative Source Current, Highest Rectifier Heatsink Temperature, Fuel Level, Generator Backup Time, Fuel Remaining Time
Threshold Type:	High/Low

Standard Input/Output (with single IOBGP)

Digital Inputs	
System:	4 (Load Fuse Fail, Battery Fuse Fail, MOV Fail, ACD Fan Fail)
User:	6
Digital Outputs:	6 (one also used as Monitor OK relay)
Analog Inputs	
Bus Voltage:	1 (assigned to system bus voltage)
Temperature:	2 (one assigned to battery temperature, one user)
Current:	3 (assignment depends on system)
Battery Mid-point Monitoring (MPM)	
Inputs (number of strings):	Standard: 4 (single IOBGP) Maximum: 24 (requires extra IOBGP modules; 4 strings per module)
Input range	0 to 36V

Optional Input/Output with extra IOBGP or IOBSS Modules

Digital Inputs:	6 per IOBGP, 10 per IOBSS
Digital Outputs:	6 per IOBGP, 6 per IOBSS
Analog Inputs:	4 per IOBSS module (4 per IOBGP if mid point inputs are used)
Temperature sense inputs:	2 per IOBGP, 2 per IOBSS
Current sense inputs:	3 per IOBGP, 3 per IOBSS
Bus voltage sense input:	1 per IOBGP, 1 per IOBSS
Maximum number of inputs and outputs	
Analog Inputs:	48
Digital Inputs:	108
Digital Outputs:	32

Control Processes [require IOBGP]

Note: Default voltage settings are shown for 48V systems.

Active Voltage Control	
Default status:	Enabled
Batteries	
No. of cells per string:	0 to 26 (default: 24)
Total capacity:	1 to 100,000Ah (default: 300Ah)
Battery Current Limit	
Default status:	Disabled
Battery current limit setting	0 to 100% of Battery Ah (default: 10%)
Engine run limit setting	0 to 100% of Battery Ah (default: 1%)
Engine Run operation	The current limit setting changes from *Battery Current Limit* to *Engine Run Limit*.
Activation:	The generator control process has started the generator, or a digital input with Function set to *Engine Run* is active
Battery Test	
Default status:	Disabled
Lockout period:	48 hours after an AC fail (set Interval to zero to override lockout)
Termination voltage:	18 to 60V (default: 47.5V)
Activation options:	Periodic
	Manual using web, DCTools or front panel
	Using a digital input with the function set to Start Battery Test
Duration:	1 to 1000 minutes (default: 30 minutes)
Periodic activation settings	
Start date/time:	User selectable
Interval:	0 to 366 days (default: 183 days)
Current Share	
Default status:	Enabled
Balance:	± 2% of rated rectifier current
Equalize	
Default status:	Disabled
Equalize voltage:	0 to 60.0V (default: 56V)
Activation options	Periodic
	Manual using web, DCTools or front panel
	Using a digital input with the function set to Start Equalize
Duration:	1 to 10,000 min (default: 600 minutes)
Periodic activation settings	
Start date/time:	User selectable
Periodic Equalize interval:	0 to 365 days (default: 0 days – no periodic equalize)
Fast Charge	
Default status:	Disabled
Charge voltage:	0 to 60.0V (default: 56.0V)
Start thresholds	
Ampere hour threshold:	1 to 100% (default: 25%)
Voltage threshold:	0 to 60.0 V (default: 48.0V)
Stop Thresholds	
Maximum duration	0 to 10,000min (default: 1440 minutes)
Recharge percentage	1 to 200% (default: 110%)
Ampere-hour threshold	0 to 100% (default: 0%)

Control Processes (continued)

Generator Control	
Control Relay	Any Digital Output (Default: None; generator control is disabled)
Can Run with Mains Present	Yes, No (Default: No)
Automatic Control Mode	Disabled, Fast Charge Only (default) , Fast Charge & Equalize, Every Mains Failure
Start/Stop conditions:	Refer to Fast Charge and Equalize Threshold Settings
Controls	Start / Stop Manual Generator Run
Control input:	Engine Run; a digital input active when the generator is running
Fuel Metering	
Fuel Tank Volume	0 to unlimited (Default: 0 l)
Manual Generator Run Time	0 to unlimited (Default: 0 min)
Calculated values	
Generator Refuel Date	When the generator was last refuelled
Generator Refuel Volume	How much fuel was added at the last refuel
Generator Backup Time	How long the generator can continuously run until empty
Tank Empty Date	When the tank will be empty, based on the average usage
Rectifier Shut Down	Disabled, Manual, Automatic (Default: Disabled)
Load Based Rectifier Shutdown (LBRS)[1]	
Operates	When Shutdown is set to Automatic
High Threshold	20 to 90% (Default: 60%)
Low Threshold	10 to 80% (Default: 40%)
Interval	5 min to 30 days (Default: 7 days)
System Voltages	
Float voltage:	5.0 to 60.0V (default: 54.5V)
Maximum voltage:	5.0 to 60.0V (default: 57.6V)
Minimum voltage:	5.0 to 60.0V (default: 42.6V)
Temperature Compensation	
Default status:	Enabled
Slope:	-10.00 to -0.01mV/°C/cell (default: -4.00mV/°C/cell)
Low cut-off:	-40°C to +20°C (default: 0°C)
High cut-off:	+21°C to +60°C (default: +50°C)
Reference Temperature:	0.0°C to 50.0°C (default: 20°C)
LVDs	
Number of logical LVDs supported:	16
Number of contactors supported:	16 (up to two per IOBGP)
Logical LVD settings (each of 16 LVDs)	
Voltage Based Disconnect:	Disabled/Enabled (default: Enabled)
Disconnect Voltage:	0 to 60.0V (default: 43.2V)
Reconnect Voltage:	0 to 60.0V (default: 48.0V)
Recognition Time:	10 to 600s (default: 10s)
AC Timer Based Disconnect:	Disabled/Enabled (default: Disabled)
AC Timer Delay:	0 to 6,000 minutes (default: 240 minutes)
Smart Alarm Based Disconnects:	Disabled/Enabled (default: Disabled)
Smart Alarm Index:	1 to 32 (default: 1)
Chained to Previous:	Disabled/Enabled (default: Disabled)
Physical Contactor Settings (each of 16 Contactors)	
LVD Number:	1 to 16 (default: 1 / 2)
Enable:	Disabled/Enabled (default: Disabled)
IOB Number:	1 to 16 (default: 1)
IOB LVD Number:	1 to 16 (default: 1 / 2)
Type:	Normally Open / Normally Closed (default: Normally Open)

[1] Only with rectifiers that support LBRS

Other Functions

Battery Time Remaining	
Typical accuracy at C_{10} rate:	+/-20% of time remaining (subject to battery characterization discharge completed prior)
Settings:	
End Voltage:	1.65 to 2.00V per cell (default 1.80V per cell)
Automatic Characterization:	Disabled/Enabled (default Disabled)
Automatic Characterization Delay:	0 to 7 days (default 48hours)
Battery Mid-point Monitoring	
Number of Battery Strings Supported:	Up to 24 (4 per IOBGP)
Settings	
MPM Enabled:	Disabled/Enabled (default: Disabled)
MPM lockout Period:	0 to 24 hours (default: 12 hours)
MPM Convergence Period:	0 to 24 hours (default: 24 hours)
String Fail Recognition Period:	0 to 12 hours (default: 1 hour)
MPM Start Threshold:	0.5 to 10% (default: 8.0%)
MPM Stable Threshold:	0.5 to 10% (default: 4.0%)
Reverse Battery Protection	
Operation:	Prevents LVD connection on reverse battery wiring
Wiring Requirements:	Uses one mid-point input on IOBGP per string (inputs are not available for mid-point measurement)

Compliances

Safety	EN 60950-1, UL 60950-1, AS/NZS 60950.1
EMC Product family standard	EN 300 386 (OTTC)
EMC Generic standards	
Emissions:	EN 61000-6-3
Immunity:	EN 61000-6-2
Environmental	RoHS and WEEE Directives

Certifications

China	MII
Europe	CE – mark
North America	FCC Verification, IC, UL
Australia/New Zealand	C-Tick