SSD3.2 System Status/Control Panel - Remote and Local Monitor

19" (48 cm) or 23" (58 cm) wide, +24V DC or -48V DC

Improved Version

The *SSD3.2* System Status and Control Panel offers remote and local monitoring of the DC power system (rectifiers, battery, and power distribution board) and provides local and remote status and alarm conditions as well as some control functions. Remote access is via a built-in phone line modem or RS-232 port. Control actions are limited to setting alarm levels, activating single or dual low voltage disconnects, and automatic call back via phone line. The *SSD3.2* is compatible with *TwinPack Plus*® and *PS-23* DC power systems containing up to **100** rectifiers for all signals except temperature compensated battery charging and remote shutdown (max. of 25 rectifiers for these two functions). The 1.75" (4.5 cm) high (1 RU) panel weighs 5.5 lbs. (1.6 kg) and includes: a key pad, a digital meter, LEDs for local status monitoring and alarm indications, Normally Closed/ Normally Open contacts with a trio of 9, 12 and 15-pin connectors, a front-mounted 9-pin D-sub RS-232 local computer port, and a built-in 1200 baud modem with a rear-mounted RJ-11 jack. Panels are available for 19" (48 cm) or 23" (58 cm) rack mounting. The *SSD3.2* panel meets seismic requirements (zone 4) in accordance with Telcordia Technologies GR-63-CORE. It also meets the requirements of UL 1950 and applicable CE specifications.

Key Pad. The key pad on the front panel is used to select various functions to be indicated by the meter, and to select the five user-adjustable settings.

User-Adjustable Settings

1. System High DC Voltage Alarm
2. System Low DC Voltage Alarm
3. System Extra Low Voltage Alarm
4. System Low Voltage Disconnect Pickup
5. System Low Voltage Disconnect Dropout

The **Digital Meter** selectively monitors the following:

1. System DC Volts
2. System DC Amps
3. Converter Output Volts
4. Converter Output Amps (Total)
5. High DC Voltage Alarm Set Point
6. Low DC Voltage Alarm Set Point
7. System Extra Low DC Voltage Alarm Set Point
8. System LVD Pickup Set Point
9. System LVD Dropout Set Point
10. Battery Temperature (°C)
11. *SSD3.2* Internal Temperature (°C)
12. Equalize Timer Hours
13. Auxiliary 1 Amps
14. Auxiliary 2 Amps

Ambient Temperature. The *SSD3.2* will perform all functions in an ambient of -40°C (-40°F) to +65°C (149°F) at 5,000 ft. altitude. Decrease the operating temperature range by 2°C for 1,000 ft. of increased elevation above 5,000 feet.

Audible Alarms. An audible alarm with local cutoff acknowledge key operates in the event of *any* alarm. The audible alarm can be disabled in the field by removing a jumper on the rear panel, or remotely via computer.

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Thirty-Two (32) LED (Visual) Indicators
Front panel mounted LEDs provide local (visual) indication of an alarm condition of the following:

A. Rectifier and DC to DC Converter Failure (Major and Minor)
B. High DC Voltage Alarm
C. Low DC Voltage Alarm
D. Extra Low DC Voltage Alarm
E. Load Connect/Disconnect
F. Distribution Fuse/Circuit Breaker Disconnect
G. AC Fail (Major or Minor)
H. Float/Equalize Mode
I. Temperature Compensated Battery Charging Active
J. Battery Disconnect Open
K. Open Remote Sense Fuse
L. Open Power Fuse

The rectifier and converter MINOR FAIL LEDs illuminate when one rectifier or converter has failed. The rectifier and converter MAJOR FAIL LEDs illuminate when two or more rectifiers or converters have failed. The AC Minor Fail LED illuminates when one AC feed fails. The AC Major Fail LED illuminates when two or more AC feeds fail. A major alarm will not be activated with only one rectifier in a system. The FUSE ALARM LED illuminates when a distribution fuse opens or a distribution circuit breaker trips. In systems with +24 VDC and -48 VDC distribution breaker panels, the *SSD3.2* panel provides one breaker trip alarm for any (+24 VDC or -48 VDC) breaker trip under load. Additional LEDs indicate digital meter selection and other monitoring and control functions.

Remote Alarm Indication
One pair of Normally Closed/Normally Open (NC/NO) contacts for connection to remote customer alarm circuits are provided for each of the following:

1. Rectifier Failure, Minor
2. Rectifier Failure, Major
3. High DC Voltage Alarm
4. Low DC Voltage Alarm
5. Extra Low Voltage Alarm
6. Distribution Fuse/Breaker Trip
7. Converter Failure, Minor
8. Converter Failure, Major
9. AC Failure, Minor
10. AC Failure, Major
11. Summation Alarm
12. Low Voltage Disconnect Operate

General Purpose Digital Inputs
Eight inputs are provided for user-defined alarms. These inputs are intended to be remotely monitored via software (no front-panel indicators are provided for these inputs). The inputs are optically isolated, polarity-insensitive, and operate over an input range of 18 to 65 volts AC/DC. Examples of user-defined alarms are: door open/close, engine generator start, and HVAC operation.

High/Low/Extra Low DC Voltage Alarm
The High/Low/Extra Low DC Voltage Alarm monitors the DC output voltage of the system and provides local and remote alarm indications if the system voltage drops below or exceeds the preset low or high voltage levels. The exact alarm settings can be read locally on the digital meters or remotely via computer. Adjustments can be performed on-line without interrupting or varying the system voltage. Local alarm indication is provided by the front panel LOW, HIGH, and EXTRA LOW alarm LEDs, and remote alarm indication is accomplished by three sets of NC/NO contacts.

Two Low Voltage Disconnect Controls
The *SSD3.2* panel incorporates a sensor and controls for optional redundant external low voltage disconnect contactors. The LVD pickup and dropout set points are read on the digital meter. Two LEDs on the panel indicate the status of the sensor (connect or disconnect). The external contactors can be supplied in ratings up through 1200 amps in either a redundant or nonredundant configuration. The two LVD controls in the *SSD3.2* are independently adjustable.

Remote Equalize Control
The *SSD3.2* panel allows all of the rectifiers in the system to be switched from FLOAT mode to EQUALIZE mode of operation either manually or automatically. Manually, this is accomplished locally via a switch on the front panel of the *SSD3.2*, or remotely via computer. Automatically, EQUALIZE mode can be initiated after an AC power failure once the AC power failure has lasted longer than the computer programmed 10-60 minute adjustable “hold-off” time period. The EQUALIZE mode reverts to FLOAT mode when a preset internal timer expires. The internal timer is adjustable remotely and locally in one hour increments up to 120 hours. The Equalize function can be disabled by setting the timer to zero hours.

Auxiliary (Shunt) Inputs. Two uncommitted inputs are provided for 0-50 millivolt DC signals. These inputs can be used to monitor individual battery string or load branch currents. The current shunts must be inserted into the system ground leg. These shunt input measurements are presented on the front panel as the "AUX AMPS" meter modes.

Thermal Management Control
Included are controls for automatic temperature compensation charging of batteries. Via temperature sensors (P/N 0000916783 - 3/8" terminals; P/N 0000926862 - 1/4" terminals - extra cost option, 6 max. per system) on the battery posts, this circuit controls the output of the rectifier(s) to prevent thermal runaway of the batteries. An optional expansion panel (P/N 8850000012) can be ordered to increase the number of thermal sensor inputs. Beginning at 30°C (86°F), the circuit reduces the output of the rectifier(s) by 100 mV per °C (48 VDC models); 50 mV per °C (24 VDC models) with maximum output reduction attained at 57°C (135°F) (2.7 V for 48 VDC models; 1.35 VDC for 24 VDC models). (Limited to systems with 25 rectifiers or less.) Start and stop temperatures and slopes are adjustable via software access. Start point temperature is adjustable from 10°C to 50°C. Slope is adjustable from -3 to -5 mV per cell per °C.

Internal Fuses
GMT fuses are provided for:
- Hot Remote Sense Lead
- Incoming Power to the *SSD3.2* Panel

Rectifier Shutdown. This feature allows users to test and verify minor and major alarm functions, set up and test rectifier forced paralleling, for setting up new and/or added rectifiers, or to completely remove all charging current in the event of battery over-temperature, hydrogen venting, fire, or other emergency condition. Rectifiers are shut down in columnar fashion – for example: in a four-shelf system (16 rectifiers), when a shutdown command is issued to the Rectifier 1 position, all rectifiers occupying Position 1 in the four shelves (a total of four rectifiers, in this example) will be shut down. This feature is activated via a host terminal.

Emergency Call Back
The *SSD3.2* can be configured to call up to three numbers when an alarm (user selectable) occurs. The unit will expect a computer to answer and download a text file which will include site information and current status.

Remote Access
Software to access the *SSD3.2* remotely will be provided. It will be designed to operate on an external computer using Windows 95.

Optional RS485 Port
Contact factory for ordering information and availability.

***SSD3.2* Ordering Information.**

Model Number	Part Number	Description
SSD3.2	7301000000	Latest version of SSD3 family of local and remote monitors. Allows the user the convenience of dry contacts, modem, or RS-232 connection for alarms and control functions. **NOTE: The SSD3.2 requires an external shunt or shunt/low voltage disconnect contactor (SWS3) panel (see ordering information on next page).**

Note: If panel is not ordered as part of a system, order Signal Cable Assembly - P/N 0000881614 - for customer installation.

Monitor Setup (Voltage, Current, Polarity). The *SSD3.2* has only one part number. When the *SSD3.2* is furnished as part of a complete DC power system, it will be configured for the correct voltage (e.g. +24 VDC or -48 VDC), current (e.g. 200 amps or 1200 amps) and polarity (e.g. positive or negative ground) at the factory. Configurations can be easily changed in the field. The voltage and current settings are made from the front panel using the arrow keys and the digital meter. The polarity change is made on the rear of the panel.

Shunt Panel Ordering Information.

Model Number	Part Number	DC Amps	Mounting
SP600-19	8800026014	600	19" / 48 cm
SP600-23	8800026021	600	23" / 58 cm
SP800-23	8800028025	800	23" / 58 cm
SP1200-23	8800031222	1200	23" / 58 cm

SWS3 (Shunt and Low Voltage Disconnect Contactor) Panel Ordering Information.

SWS3 Model Number	SWS3 Part Number	DC Amps	Mounting
SWS3-24/48-200-19FA	8800022042	200	19" / 48 cm
SWS3-24/48-200-23FA	8800022043	200	23" / 58 cm
SWS3-24/48-400-19FA	8800024044	400	19" / 48 cm
SWS3-24/48-400-23FA	8800024045	400	23" / 58 cm
SWS3-24/48-600-19FA*	8800026013	600	19" / 48 cm
SWS3-24/48-600-23FA*	8800026022	600	23" / 58 cm
SWS3-24/48-800-23FA*	8800028029	800	23" / 58 cm
SWS3-24/48-1200-23FA*	8800031021	1200	23" / 58 cm

***Does not include shunt. 1200 Amp Shunt (P/N 0000900521) must be ordered separately.**

Miscellaneous Part Numbers

Cables	Part Number
• SSD3.2 - TWP-CE shelf cable	0000926868
• TWPP-CE shelf-to-shelf cable	0000926868
• TWPP-CE rack-to-rack cable	0000926869
• *SSD3.2* TWPP non-CE shelf	0000926870
• Alarm cable, 36 conductor Sold by the foot.	2765999511

Conversion Kits

If the application calls for the field replacement of an *SSD2* with an *SSD3.2* panel, the customer must order one of four conversion kits described below. These kits consist of conversion cables, hardware, and a printed wiring board if required. Instructions are also included.

Conversion Kit Part Numbers

For positive ground systems with shunt panel only (no SWS panel)	9999002236
For negative ground systems with shunt panel only (no SWS panel)	9999002238
For positive ground systems with SWS2 panel	9999002237
For negative ground systems with SWS2 panel	9999002239

Application Notes

1. The *SSD3.2* is designed for use with the “CE” TWPP rectifier shelf and the SWS3 LVD panel. Other combinations are possible, using conversion kits above, but should be used only when necessary.
2. All *SSD3.2* panels can be configured for flush or offset (NEBS) mounting.
3. The table above provides a reference for use of an SWS3 panel with the appropriate *SSD3.2* panel. SWS3 panels in excess of 1200 amperes are not available. SWS3 panels are only specified when the customer requires the LVD feature. If this feature is not required, use the standard shunt panel. It is also possible that the meter shunt will be incorporated into the bus detail for the system. *SSD3.2* panels to monitor currents greater than 1200 amps are designed for systems with shunt panels or with the shunt integrated into the power bus detail. If an LVD is required with systems this large, the loads must be split into 1200 amp segments. Also note that the *SSD3.2* can operate two LVD contactors. An additional drive relay is required if more than two contactors are needed.