MANUFACTURER DOCUMENT PACKAGE

# Manufacturer's Manual

Reference package for procurement and maintenance review

YOKOGAWA

## SPW482-13 S1

**AC INPUT POWER MODULE**

Used with the applicable ProSafe-RS SPW48x configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Yokogawa IM 32Q06C10-31E, fourth edition; SPW482 supply configuration, output rails and replacement procedure.

# 1.1 Configuration of Safety Control Unit

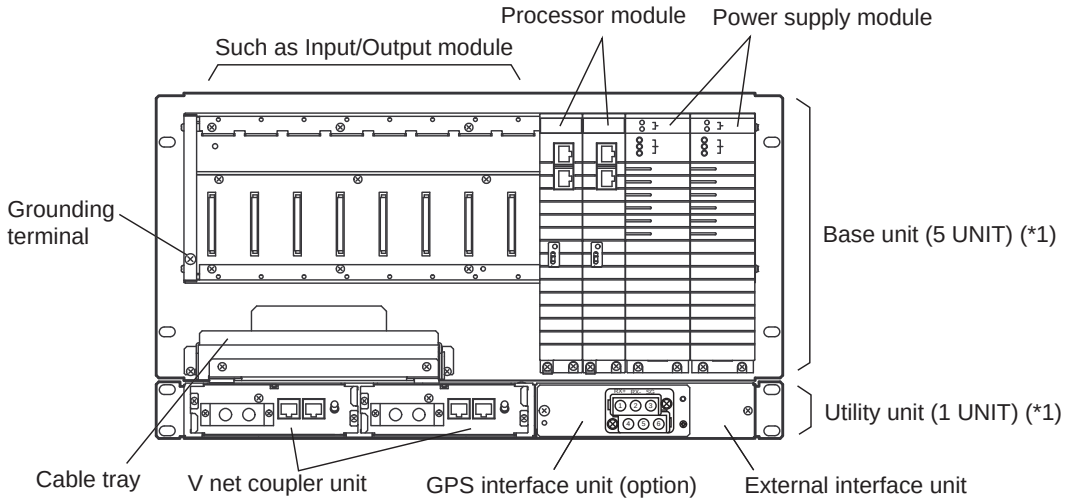
There are two types of safety control unit. The standard type safety control unit (Ambient Temperature: -20 to 50 deg. C) and wide range temperature type safety control unit (Ambient Temperature: -20 to 70 deg. C).

In this manual, the illustrations and descriptions are mainly focused on the standard type safety control unit in which the cooling fans are not installed.

## Standard Type Safety Control Unit for V net

The components of the standard type safety control unit (Model: SSC10S-S/SSC10D-S) are shown in the following figure.

In this figure, the control unit is a duplexed type (redundant configuration). The power supply modules are always dual-redundantly configured. For a non-redundant configuration, a single processor module is installed to the left slot. The slot at the right is covered using a dummy cover. If a safety node is connected, the ESB bus coupler modules are installed with the redundant configuration.




*1: 1 UNIT=44.45 mm

**Figure 1.1-1 Configuration of Safety Control Unit (SSC10D-S)**

**Table 1.1-1 Model Names of Safety Control Unit Components (Standard type)**

| Name | Standard type safety control unit | | | |
|---|---|---|---|---|
| | Single configuration (SSC10S-S) | | Duplexed configuration (SSC10D-S) | |
| Power supply module (100-120 V AC) | SPW481 | 2pcs | SPW481 | 2pcs |
| Power supply module (220-240 V AC) | SPW482 | 2pcs | SPW482 | 2pcs |
| Power supply module (24 V DC) | SPW484 | 2pcs | SPW484 | 2pcs |
| Processor module | SCP401 | 1pcs | SCP401 | 2pcs |
| Dummy cover (for processor module)(*1) | T9083VB | 1pcs | - | - |
| Dummy cover (for I/O module)(*2) | SDCV01 | as required | SDCV01 | as required |
| ESB bus coupler module(*3) | SEC401 | 2pcs | SEC401 | 2pcs |
| V net coupler unit | AIP504 | 2pcs | AIP504 | 2pcs |
| External interface unit for standard type safety control unit | - | 1pcs | - | 1pcs |
| GPS interface unit (option) | - | 1pcs | - | 1pcs |

# 1.2 Configuration of Safety Node Unit

The following figure shows the units that make up the safety node unit (Model: SNB10D).

The power supply modules and ESB bus interface modules are always dual-redundantly configured.

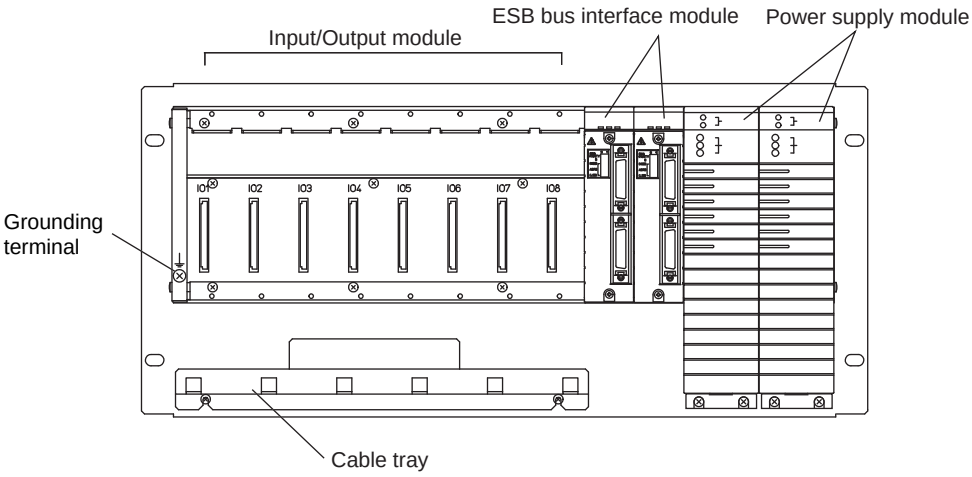



**Figure 1.2-1 Configuration of Safety Node Unit**

## Configuration of SNB10D

**Table 1.2-1 Module Name and Model of Safety Node Unit**

| Name | Safety node unit | |
|---|---|---|
| | SNB10D | |
| Power supply module (100-120 V AC) | SPW481 | 2pcs |
| Power supply module (220-240 V AC) | SPW482 | 2pcs |
| Power supply module (24 V DC) | SPW484 | 2pcs |
| ESB bus interface module | SSB401 | 2pcs |
| Dummy cover (for I/O module) (*1) | SDCV01 | as required |

*1: :To cover the empty I/O module slot.

# 1.3 Configuration of Unit for Optical Bus Repeater Module

The following figure shows the components of the unit for optical bus repeater module (Model: SNT10D).

The power supply modules are always dual-redundantly configured.

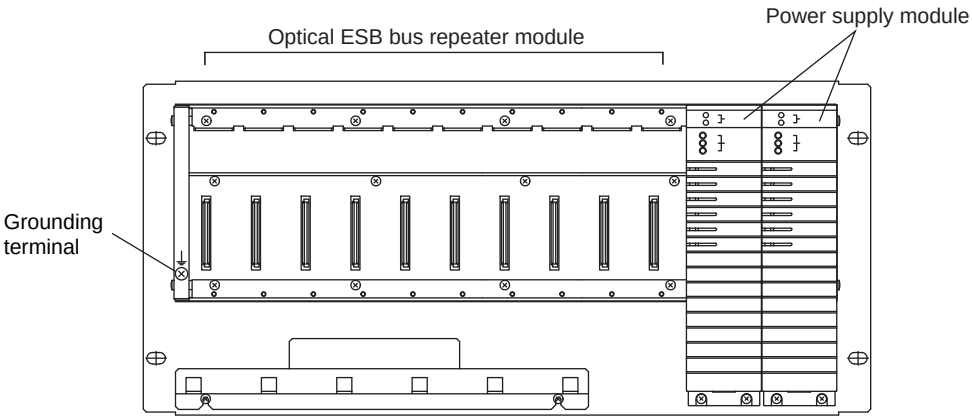



**Figure 1.3-1 Configuration of Unit for Optical Bus Repeater Module**

## Configuration of SNT10D

**Table 1.3-1 Module Name and Model of Unit for Optical Bus Repeater Module**

| Name | Unit for Optical Bus Repeater Module | |
|---|---|---|
| | SNT10D | |
| Power supply module (100-120 V AC) | SPW481 | 2pcs |
| Power supply module (220-240 V AC) | SPW482 | 2pcs |
| Power supply module (24 V DC) | SPW484 | 2pcs |
| Dummy cover (for I/O module) (*1) | SDCV01 | as required |

*1: To cover the empty optical ESB bus repeater module slot.

Optical ESB bus repeater master module (SNT401/SNT411) and optical ESB bus repeater slave module (SNT501/SNT511) are installable in the unit for optical bus repeater module.

# 4.1 Power Supply Module

A power supply module is connected to a 100 to 120 V AC or 220 to 240 V AC or 24 V DC main source and supplies insulated +5 V and +24 V to each installed I/O module through the back board.

The +5 V and +24 V outputs support dual-redundant insulated output operation.

Power supply modules available to ProSafe-RS: SPW481 (100-120 V AC), SPW482 (220-240 V AC), SPW484 (24 V DC)

## Configuration

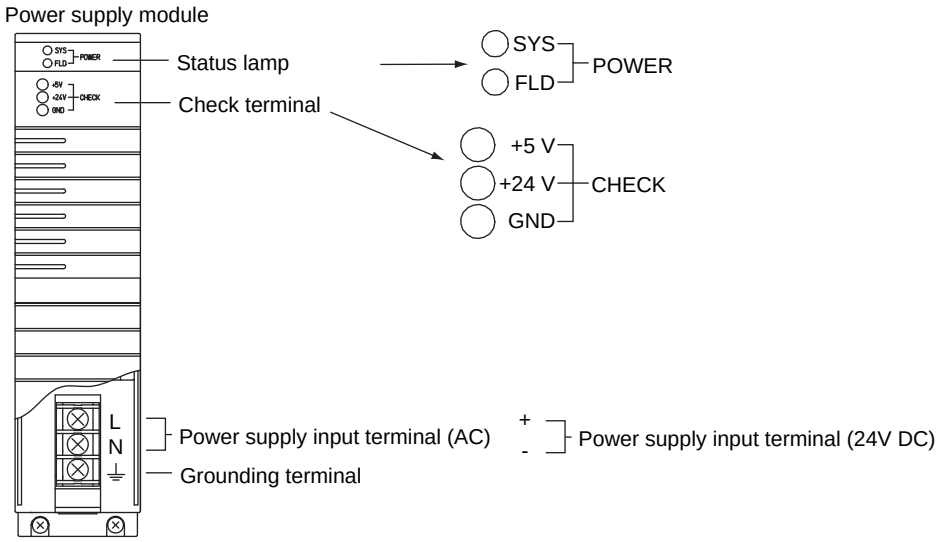



**Figure 4.1-1 Power Supply Module**

### Power Supply Input Terminal

This terminal receives the specified power supply voltage.

- L (+) : Line
- N (-) : Neutral
- Grounding terminal: For grounding

**SEE ALSO**

For more information about removing power supply module, refer to:

7.2.2, “Replacing Power Supply Module” on page 7-8

For more information about power distribution unit, refer to:

4.9, “Power Distribution Unit” on page 4-25

For more information about models of Yokogawa power distribution units and power cables, refer to:

3.1, “Power Cable Wiring” on page 3-2

### Status LEDs

- SYS: The lamp is ON when +5 V is output properly. Otherwise, the lamp is OFF.
- FLD: The lamp is ON when +24 V is output properly. Otherwise, the lamp is OFF.

### Check Terminal

It is possible to measure output voltages of +5 V DC and +24 V DC using these terminals for maintenance purposes.

## 7.2.2 Replacing Power Supply Module

This section describes how to replace the power supply modules.

**IMPORTANT**

It is necessary to switch off the power supply before removing the power supply modules and make sure that the power status indication LED is off.

If the power distribution unit of Yokogawa is used, the power supply of the power supply module can be cut by disconnecting the power cable from the power distribution unit.

**TIP**

The specifications for the power supply module for ProSafe-RS I/O nodes are based on using a dual-redundant configuration. You must observe this note if the processor module of the non-redundant safety control unit or at least one of the processor modules of the dual-redundant safety control unit is as follows:

SCP401 of unit version "U:5" or earlier

SCP451 of unit version "U:4" or earlier

If an error occurs and only one of the paired modules powers up, or a power failure occurs on one module, and you have no choice but to continue in the non-redundant state, the diagnostic information message (No. 0065) for the ESB bus interface module (SSB401) error might be generated for that node. After about one second the system recovers. This phenomenon occurs very rarely and it does not indicate the abnormality of SSB401 module and the related ESB bus and devices. It does not harm communication either.

Prevention:

The power supply modules should be kept in dual-redundant configuration.

Restoration:

If the abnormality indication disappears in a second, there is no need to do anything about it.

When one of the paired power supply modules fails, the failed module should be replaced with a good one as soon as possible so as to return to the normal state (dual-redundant power supply configuration).

### Procedure for Removing Power Supply Modules

1. Shut off the power supply of the power supply module to be removed.
2. Disconnect the power cable from the power supply input terminals.
3. Remove the fixing screws of the power supply module. There is one at the upper part and two at the bottom part.
4. Pull the power supply module forward and remove it from the base unit.

### Procedure for Installing Power Supply Modules

**IMPORTANT**

Use a phillips screwdriver or screwdriver to tighten the screws for fixing the power supply module. As a guideline, the screw tightening torque should be approximately 0.5 N•m.

Install the power supply module following the steps of the "Procedure for Removing Power Supply Modules" in the reverse order.

1. Install the power supply module on the base unit.
2. Fix screws in one place at the upper part and two places at the bottom part of the power supply module.

3. Connect the power cable to the power supply input terminals.
4. Switch on the power supply.
   If the power distribution unit of Yokogawa is used, the power of the power supply module can be supplied by connecting the power cable to the power distribution unit.

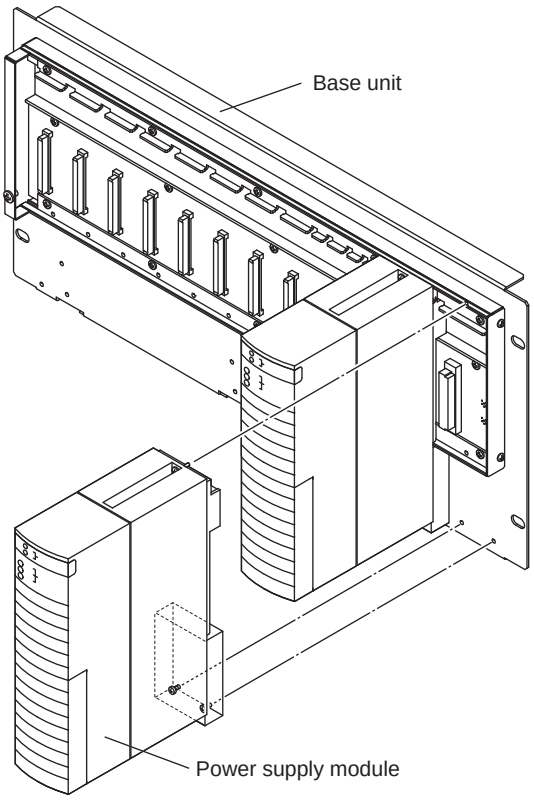



**Figure 7.2.2-1 Replacing Power Supply Module**

# 7.7 Parts Requiring Periodical Replacement

Read the following important points thoroughly and carry out the periodical replacement.

The parts having defined life spans, which can be replaced by the user are available as spare parts and consumables. Purchase and replace as necessary.

**IMPORTANT**

Precautions for parts having defined life spans

- The term “Parts having defined life spans” refers to parts that are expected to wear out or break down within 10 years from initial use under normal conditions of usage and storage. Therefore, parts with expected life spans of 10 years from more are excluded here.
- The recommended replacement cycle is the cycle estimated for preventive maintenance. It provides no guarantee against the accidental failures.
- The recommended replacement cycle is merely a reference, and varies depending on the usage conditions.
- The recommended replacement cycle is subject to change according to actual field results.

## Periodic Replacement Parts Having Defined Life Spans

A safety control unit and safety node unit include parts having defined life spans, which require periodical replacement. The following table shows the recommended part replacement cycles for preventive maintenance.

**Table 7.7-1 Periodic Replacement Parts Having Defined Life Spans**

| Part name | Part number | Recommended replacement cycle | Replacement by user | Remarks |
|---|---|---|---|---|
| Power supply module (100-120 V AC) | SPW481 | 8 years | Yes | At the ambient temperature of 40 deg. C or lower on average |
| Power supply module (220-240 V AC) | SPW482 | 8 years | Yes | At the ambient temperature of 40 deg. C or lower on average |
| Power supply module (24 V DC) | SPW484 | 8 years | Yes | At the ambient temperature of 40 deg. C or lower on average |
| Battery pack | S9185FA | 3 years(*1) | Yes | At the ambient temperature of 30 deg. C or lower on average |
| | | 1.5 years (*1) | Yes | At the ambient temperature of 40 deg. C or lower on average |
| | | 9 months (*1) | Yes | At the ambient temperature of 50 deg. C or lower on average |
| Aluminum electrolytic capacitor | - | 8 years | No(*2) | For SPW481,SPW482,SPW484 At the ambient temperature of 40 deg. C or lower on average |
| Fuse built in power supply unit | S9109VK | 8 years | No(*2) | SPW481 |
| | S9109VK | 8 years | No(*2) | SPW482 |
| | A1546EF | 8 years | No(*2) | SPW484 |
| Fan unit | AIP602 | 4 years | Yes | At the ambient temperature of 60 deg. C or lower on average |

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