FURUNO

Installation Guide
AC/DC POWER SUPPLY UNIT
Model PR-241

FURUNO ELECTRIC CO., LTD.

www.furuno.com

⚠ SAFETY INSTRUCTIONS

The operator and installer must read the applicable safety instructions before attempting to install or operate the equipment.

⚠ WARNING	Indicates a condition that can cause death or serious injury if not avoided.
⚠ CAUTION	Indicates a condition that can cause minor or moderate injury if not avoided.

⚠ Warning, Caution Prohibitive Action Mandatory Action

⚠ WARNING

Turn off the power at the switchboard before beginning the installation.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or damage the equipment.

Use only the specified power cable.

Fire or damage to the equipment can result if a different cable is used.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can occur.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

Observe the following compass safe distances to prevent deviation of a magnetic compass:

	Standard compass	Steering compass
PR-241	0.85 m	0.55 m

Warning Labels(s)

Warning label(s) is(are) attached to the unit.
Do not remove the label(s). If a label is missing or damaged, contact a FURUNO agent or dealer about replacement.

Name: Warning Label 1
Type: 86-003-1011-3
Code No.: 100-236-233-10

Disclosure of Information about China RoHS

With regards to China RoHS information for our products, please refer to our website (www.furuno.com).

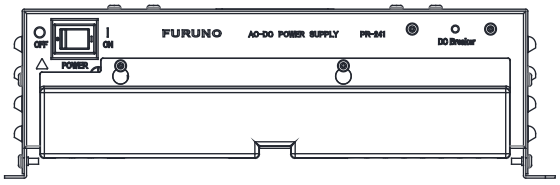
OVERVIEW

The PR-241 is a unit integrates the functions of our AC/DC power supply units and rectifiers listed below.

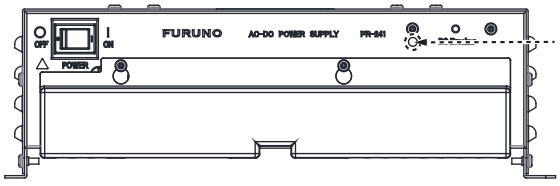
- AC/DC power supply unit PR-240, PR-300
- Rectifier unit RU-1746B-2, RU-3423, and RU-3424.

Important notices

The specifications of PR-241 have been changed to be compatible with DC bypass. The DC compatible unit has a white dot as shown in the figure below. Up to two units can be connected in parallel, the same as the previous specifications. However, the DC bypass compatible units cannot be connected in parallel with the DC bypass non-compatible units.



DC bypass non-compatible unit



DC bypass compatible unit

The differences from the conventional PR-241 (DC bypass non-compatible units) are as shown in the table below.

	DC bypass non-compatible units	**DC bypass compatible units**
When the input from the AC power source is disconnected.	No power is supplied from DC power source.	Power is automatically supplied from DC power source.
When DC power is turned ON while the power switch is turned OFF.	24 VDC is not output.	24 VDC is output.
Standby power when no device is connected.	Not generated.	4.8 W is generated.

The following concern acts as our importer in Europe, as defined in DECISION No 768/2008/EC.
- Name: FURUNO EUROPE B.V.
- Address: Ridderhaven 19B, 2984 BT Ridderkerk, The Netherland

The following concern acts as our importer in UK, as defined in SI 2016/1025 as amended SI 2019/470.
-Name: FURUNO (UK) LTD.
-Address: West Building Penner Road Havant Hampshire PO9 1QY, U.K .

Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (http://www.ei-ae.org/) for the correct method of disposal.

EQUIPMENT LIST

Standard Supply

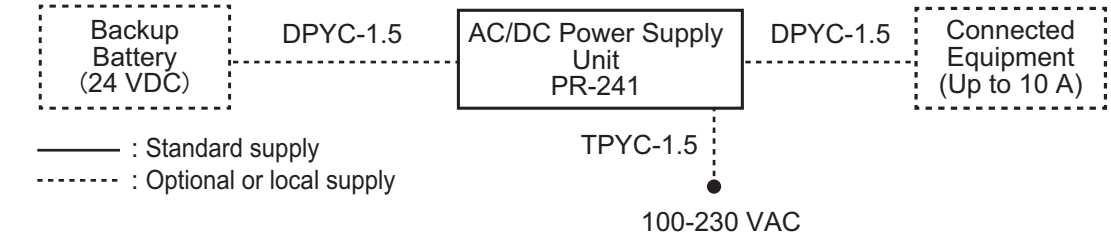
Name	Type	Code No.	Qty.	Remarks
AC/DC Power Supply unit	PR-241	-	1	

Optional Supply

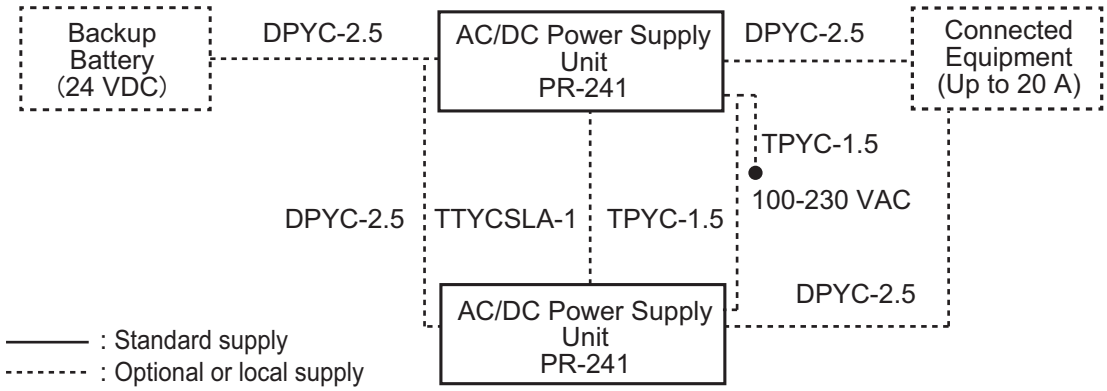
Name	Type	Code No.	Qty.	Remarks
Ferrite Core	OP86-11	001-594-450	1	EMI Cores (GRFC-10, 7 pcs. and GRFC-13, 3 pcs)

SYSTEM CONFIGURATION

System configuration for single use



System configuration for dual use



1. MOUNTING

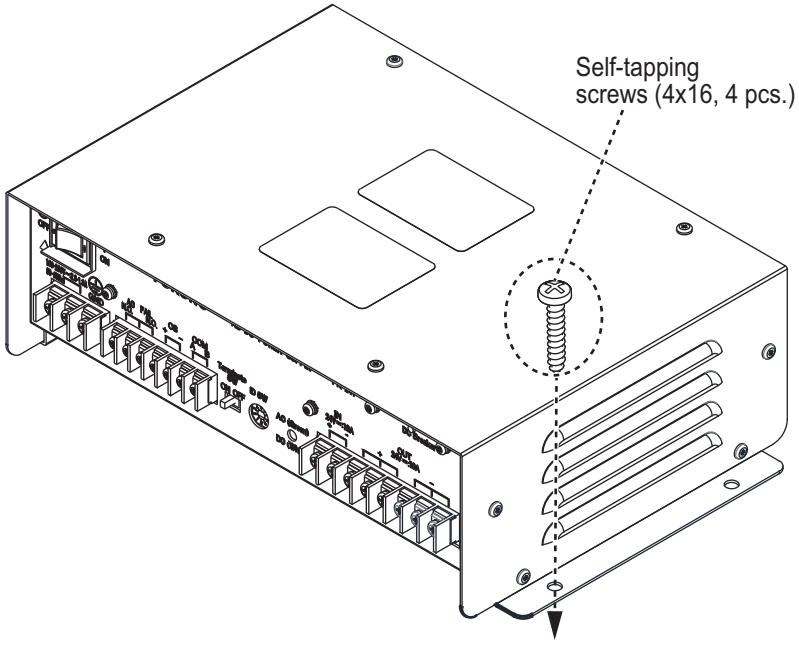
This unit can be mounted on a desktop or bulkhead. Refer to outline drawing in the back of this manual when you mount the unit.

When mounting the unit, pay attention to the following points.

- This unit has the following ingress-proof ratings: IP22 for desktop mounting, IP20 for wall mounting.
- When using in dual, do not input from multiple AC power supplies or batteries. Due to the difference in the load characteristics of the battery and the PR-241, it may not function as a power supply.
- When using in dual, do not stack the units. Always leave sufficient space between the units to allow for air-flow and prevent heat build-up. See the outline drawing at the back of this manual for minimum distances required.
- Turn off the power at the switchboard before beginning the installation.
- Referring to the outline drawings at the back of this manual, leave sufficient room for service and maintenance.

The mounting procedure is as follows:

1. Referring to the outline drawing at the back of this manual, make four pilot holes for self-tapping screws (4x16, local supply) in the mounting location.
2. Place the unit in a fixed position and align the screw holes.
3. Secure the unit by tightening the self-tapping screws.



2. WIRING FOR SINGLE USE

⚠ CAUTION

To prevent noise and interference, separate the AC IN, DC IN and DC OUT cables of this unit from connected equipment's cables.

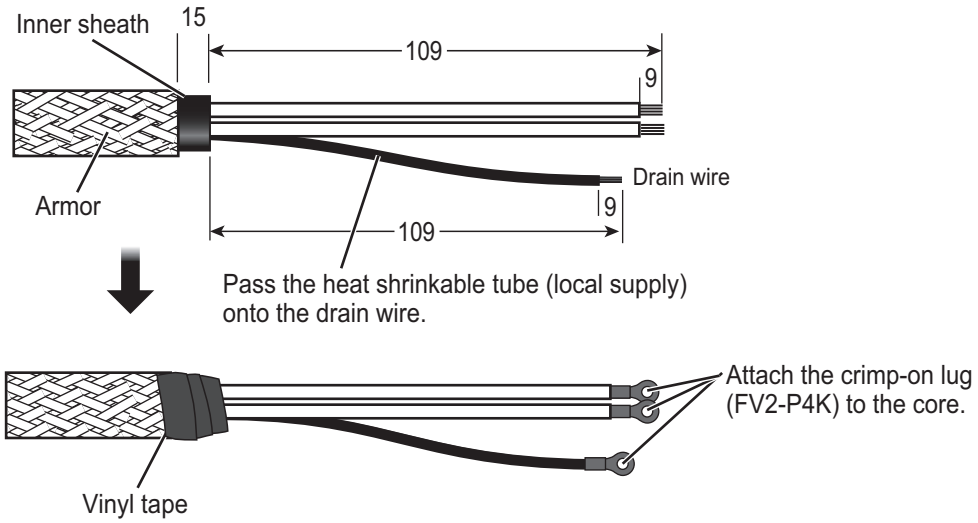
Fabrication

Use the following crimp-on lugs (local supply) and cables or equivalent (local supply) for connection with the power supply unit.

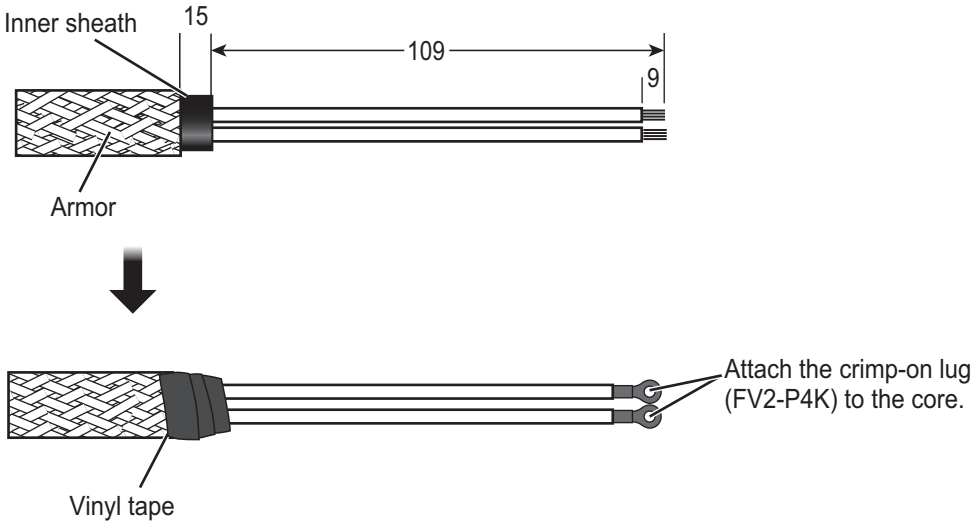
- Power cable: TPYC-1.5, DPYC-1.5
- Crimp-on lugs (see below figure): FV2-P4K

FV2-P4K (or equivalent)

Fabrication of TPYC-1.5

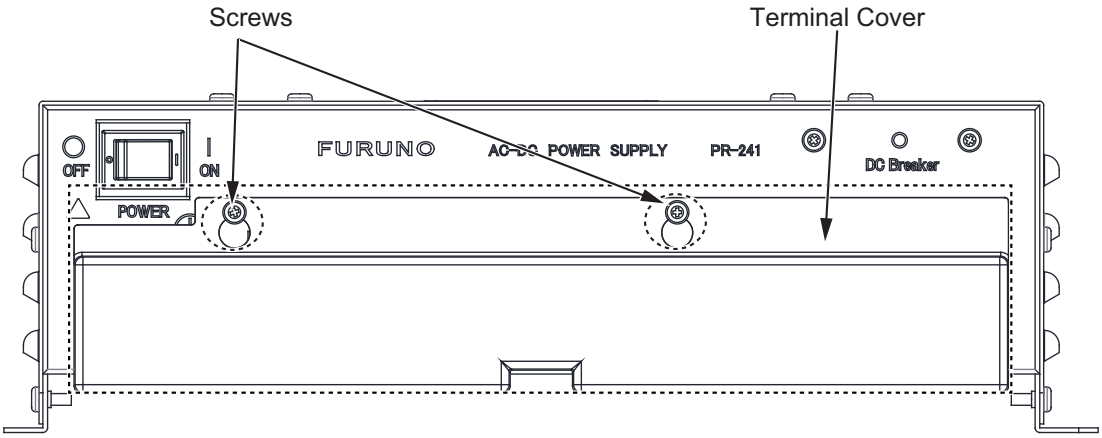


Fabrication of DPYC-1.5

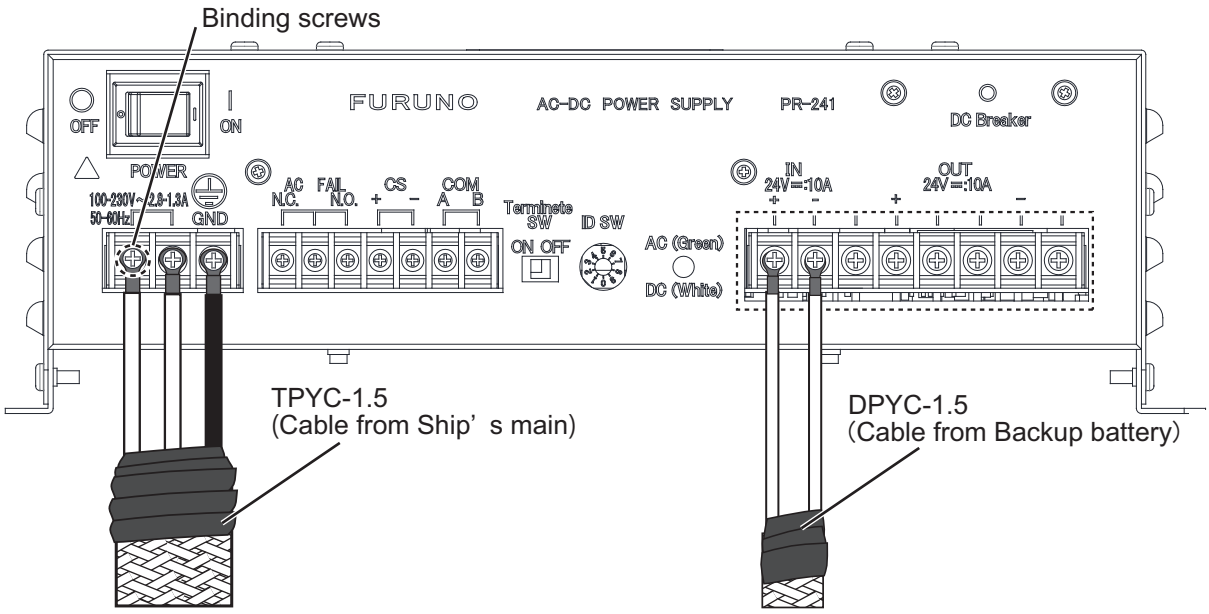


The procedure of the wiring is as follows;

1. Unfasten the screws on the terminal cover, then remove the cover. The screws and cover are required, do not discard them.



2. Unfasten the binding screws on the terminal and attach the fabricated following cables to the appropriate terminal.
   - TPYC-1.5 (Power cable from ship's main)
   - DPYC-1.5 (Power cable from backup battery)



3. Attach the terminal cover to the unit and fasten the screws removed at step 2.

Note: The terminal cover also acts as protection against water damage and must be installed.

3. WIRING FOR DUAL USE

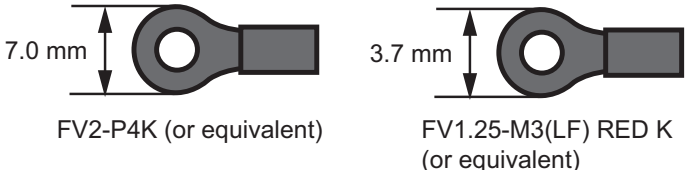
⚠ CAUTION

To prevent noise and interference, separate the AC IN, DC IN and DC OUT cables of this unit from connected equipment's cables.

Fabrication

Use the following crimp-on lugs (local supply) and cables or equivalent (local supply) for connection with the power supply unit.

- Power cable: TPYC-1.5, DPYC-2.5
- Signal cable: TTYCSLA-1
- Crimp-on lugs (see below figure): FV2-P4K (for power cable), FV1.25-M3(LF) RED K (for signal cable)

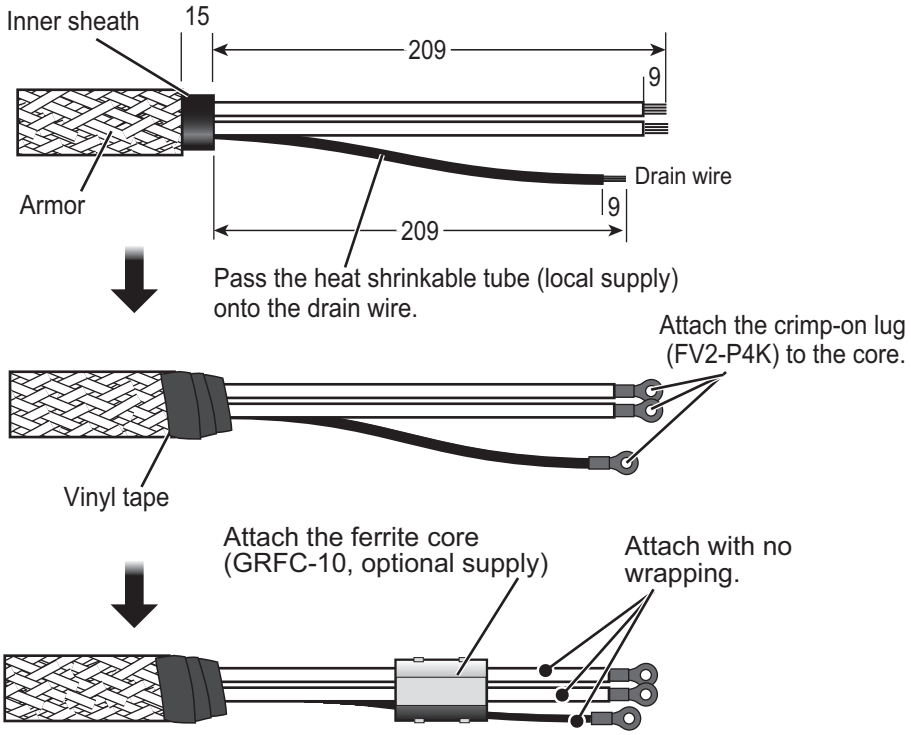


FV2-P4K (or equivalent)

FV1.25-M3(LF) RED K (or equivalent)

Fabrication of TPYC-1.5

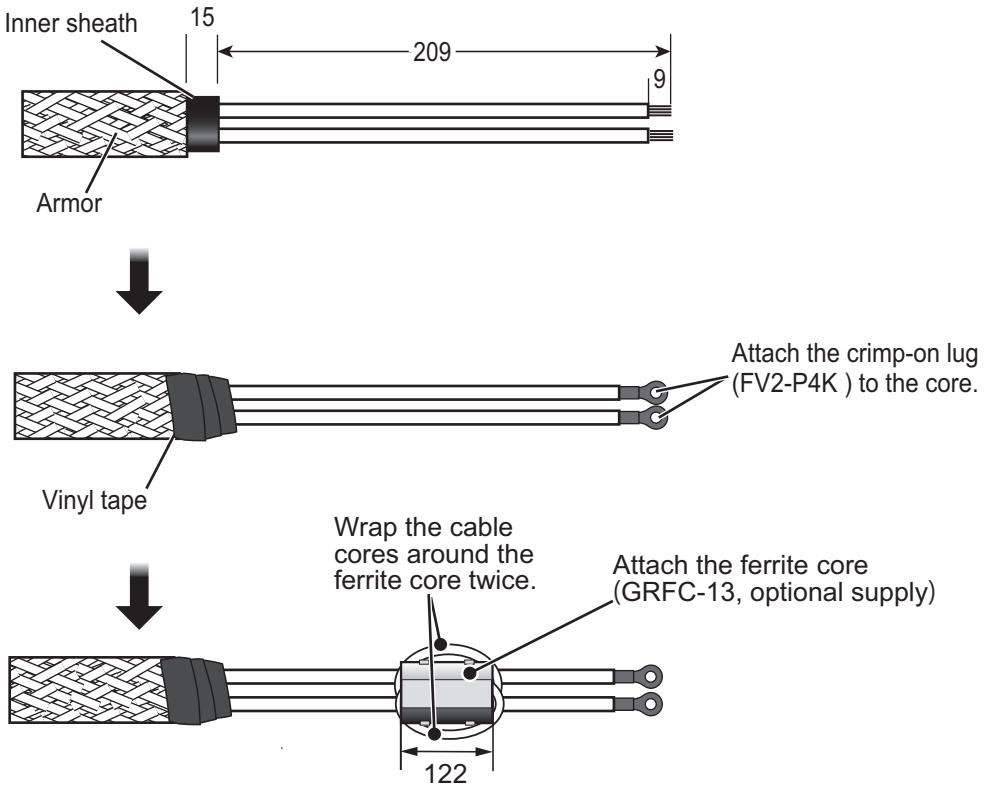
Note: Attach the Ferrite cores as close as possible to the unit.



Fabrication of DPYC-2.5

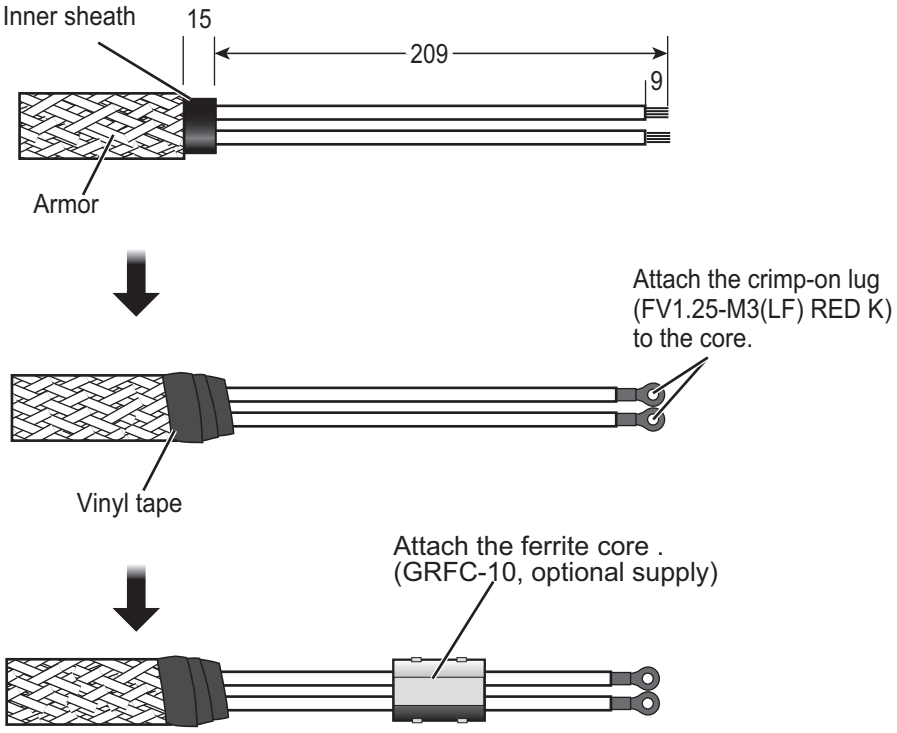
Note 1: Attach the Ferrite cores as close as possible to the unit

Note 2: For the DC OUT, attach the ferrite cores without wrapping the cable cores.



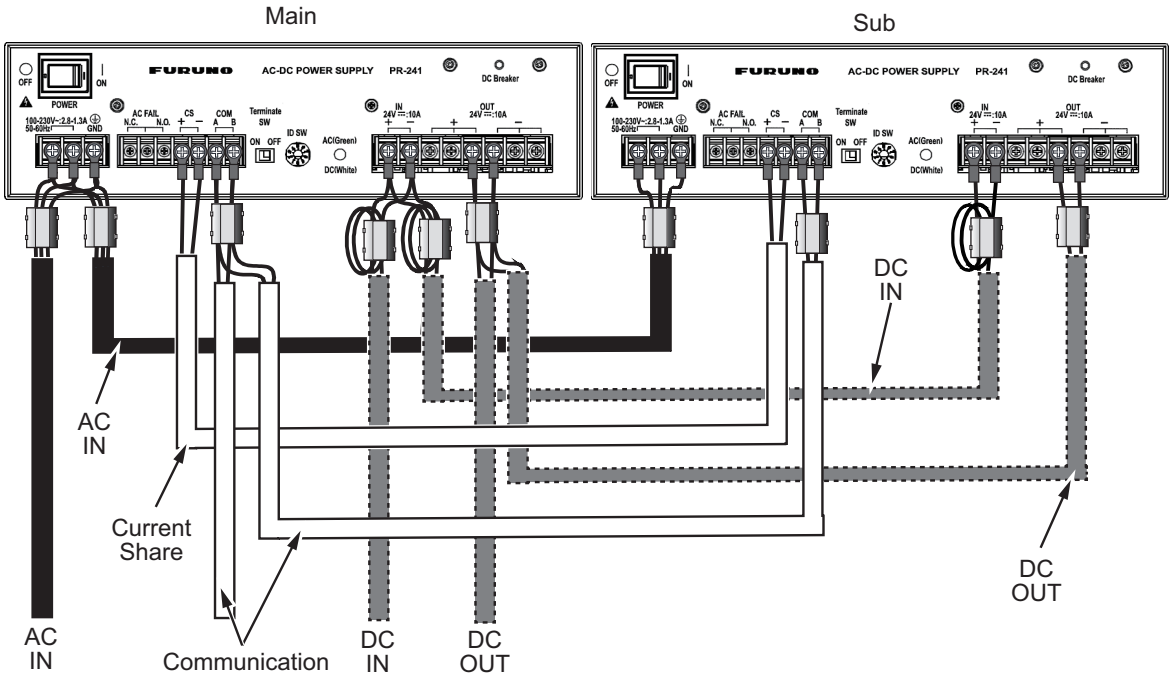
Fabrication of TTYCSLA-1

Note: Attach the Ferrite cores as close as possible to the unit.



Installations for dual use, make the necessary connections with the following procedure.

1. Refer to the step 1 on page 4, unfasten the screws on the terminal cover, then remove the cover. The screws and cover are required, do not discard them.
2. Refer to the step 2 on page 5, unfasten the binding screws on the terminal and attach the fabricated following cables to the appropriate terminal.
   - TPYC-1.5 (Power cable from ship's main)
   - DPYC-2.5 (Power cable from backup battery)
   - TTYCSLA-1 (Signal cable between main and sub)

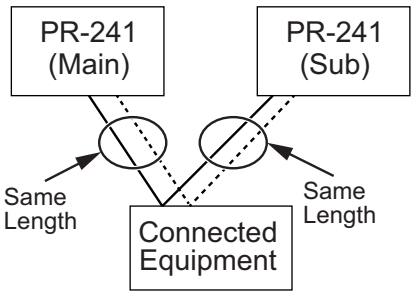


The maximum length of the cable that connects between the main and sub is as shown in the table below.

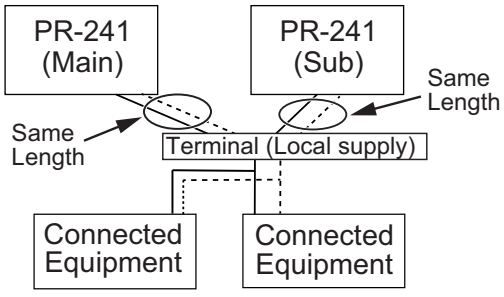
Purpose	Cable	Maximum Length	Pattern of Cable
AC IN	TPYC-1.5	90 cm	
DC IN	DPYC-2.5	90 cm	
DC OUT		50 cm	
Current Share	TTYCSLA-1	70 cm	
Communication		20 m	

Note 1: To prevent current imbalance, the input and output cables indicated in the below figures must be the same length and the difference in the resistance value of the cables must be 3 mΩ or less.

In the case the connected equipment is single



In the case the connected equipment is multiple



—— : Output from the main
····· : Output from the sub

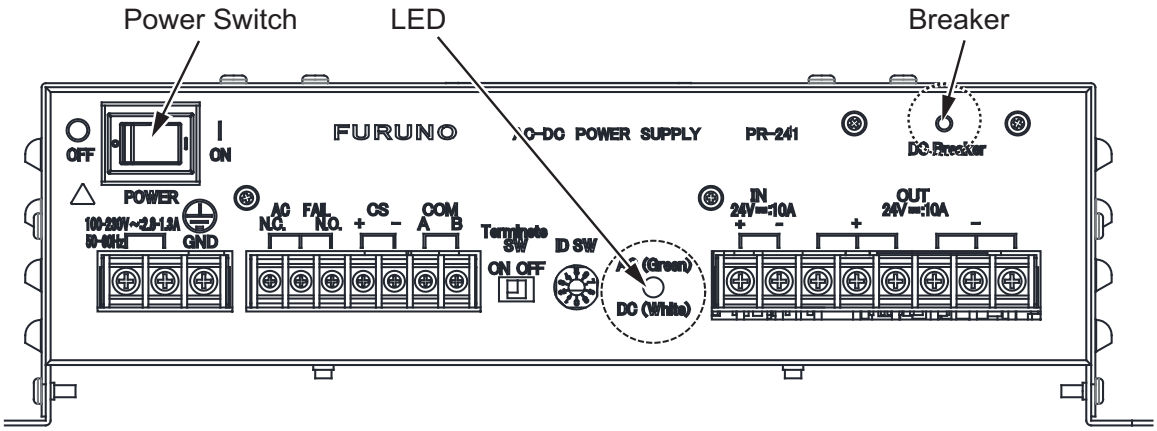
Note 2: When backing up power from the battery, signal cable connection is not required.

3. Attach the terminal cover to the unit and fasten the screws removed at step 2.

Note: The terminal cover also acts as protection against water damage and must be installed.

4. HOW TO USE THE UNIT

Use the power switch to turn this unit on.



After turning on the power switch, the LED lights up as follows:

- AC is selected as the input: Green
- Battery is selected as the input: White
- No Input: OFF

Procedure in dual use

Note 1: Do not use the ID SW and Terminate SW of this unit when using this unit in dual.

Note 2: To avoid breaking the breaker, set the total current to 20A or less before starting the unit up.

The procedure in dual use is as follows:

Note: If you do not follow this procedure, the breaker may break.

1. Turn on the main switch.
2. Turn on the sub switch.
3. Turn on the ship's main switch.

Maintenance

- If the LED does not turn on when the power switch is turned on, contact your local dealer.
- If the breaker breaks, check the cause and take corrective action before resetting the breaker.
- If the breaker is cut off again after doing above, contact your local dealer.

5. JIS CABLE GUIDE

Cables listed in the manual are usually shown as Japanese Industrial Standard (JIS). Use the following guide to locate an equivalent cable locally.

JIS cable names may have up to 6 alphabetical characters, followed by a dash and a numerical value (example: DPYC-2.5).
For core types D and T, the numerical designation indicates the *cross-sectional Area (mm^2)* of the core wire(s) in the cable.
For core types M and TT, the numerical designation indicates the *number of core wires* in the cable.

1. Core Type

D: Double core power line
T: Triple core power line
M: Multi core
TT: Twisted pair communications (1Q=quad cable)

2. Insulation Type

P: Ethylene Propylene Rubber

3. Sheath Type

Y: PVC (Vinyl)

4. Armor Type

C: Steel

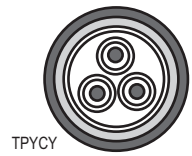
5. Sheath Type

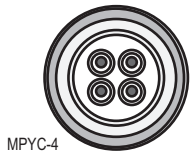
Y: Anticorrosive vinyl sheath

6. Shielding Type

SLA: All cores in one shield, plastic tape w/aluminum tape
-SLA: Individually shielded cores, plastic tape w/aluminum tape


DPYCY


TPYCY


MPYC-4


TTYCSLA-4

1 3 4 5 6
EX: TTYCYSLA - 4
Designation type — # of twisted pairs

1 2 3 4
MPYC - 4
Designation type — # of cores

The following reference table lists gives the measurements of JIS cables commonly used with Furuno products:

Type	Core Area	Core Diameter	Cable Diameter	Type	Core Area	Core Diameter	Cable Diameter
DPYC-1.5	1.5mm²	1.56mm	11.7mm	TTYCSLA-1	0.75mm²	1.11mm	9.4mm
DPYC-2.5	2.5mm²	2.01mm	12.8mm	TTYCSLA-1T	0.75mm²	1.11mm	10.1mm
DPYC-4	4.0mm²	2.55mm	13.9mm	TTYCSLA-1Q	0.75mm²	1.11mm	10.8mm
DPYC-6	6.0mm²	3.12mm	15.2mm	TTYCSLA-4	0.75mm²	1.11mm	15.7mm
DPYC-10	10.0mm²	4.05mm	17.1mm	TTYCY-1	0.75mm²	1.11mm	11.0mm
DPYCY-1.5	1.5mm²	1.56mm	13.7mm	TTYCY-1T	0.75mm²	1.11mm	11.7mm
DPYCY-2.5	2.5mm²	2.01mm	14.8mm	TTYCY-1Q	0.75mm²	1.11mm	12.6mm
DPYCY-4	4.0mm²	2.55mm	15.9mm	TTYCY-4	0.75mm²	1.11mm	17.7mm
MPYC-2	1.0mm²	1.29mm	10.0mm	TTYCY-4SLA	0.75mm²	1.11mm	19.5mm
MPYC-4	1.0mm²	1.29mm	11.2mm	TTYCYSLA-1	0.75mm²	1.11mm	11.2mm
MPYC-7	1.0mm²	1.29mm	13.2mm	TTYCYSLA-4	0.75mm²	1.11mm	17.9mm
MPYC-12	1.0mm²	1.29mm	16.8mm	TTPYCSLA-1	0.75mm²	1.11mm	9.2mm
TPYC-1.5	1.5mm²	1.56mm	12.5mm	TTPYCSLA-1T	0.75mm²	1.11mm	9.8mm
TPYC-2.5	2.5mm²	2.01mm	13.5mm	TTPYCSLA-1Q	0.75mm²	1.11mm	10.5mm
TPYC-4	4.0mm²	2.55mm	14.7mm	TTPYCSLA-4	0.75mm²	1.11mm	15.3mm
TPYCY-1.5	1.5mm²	1.56mm	14.5mm				
TPYCY-2.5	2.5mm²	2.01mm	15.5mm				
TPYCY-4	4.0mm²	2.55mm	16.9mm				

SPECIFICATIONS OF AC/DC POWER SUPPLY UNIT
PR-241

1 GENERAL

1.1	Rated input voltage	100-230 VAC, 1 phase, 50-60 Hz and 24 VDC from backup battery
1.2	Input current under no-load	0.8 A max. (60 Hz), 1.0 A max. (50 Hz)
1.3	Rated output voltage	24 VDC±5%: 10 A max. (up to two units connectable)
1.4	LED indication	Input source status (AC: green, DC: white)
1.5	Protective circuit	Over current for in/out and over voltage for output
1.6	Switching backup battery	Auto switching from relay
1.7	AC failure detection	Relay contact: 1 A, 250 VAC

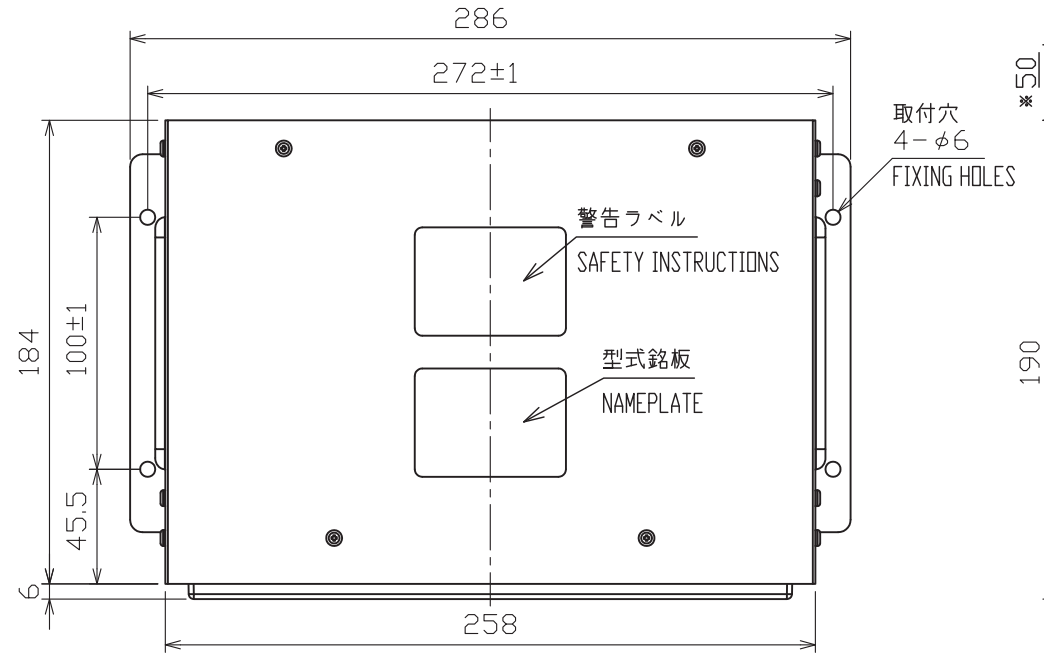
2 ENVIRONMENTAL CONDITIONS

2.1	Ambient temperature	-15°C to +55°C (storage: -20°C to +70°C)
2.2	Relative humidity	93% or less at +40°C
2.3	Degree of protection	IP22 (tabletop mount), IP20 (bulkhead mount)
2.4	Vibration	IEC 60945 Ed.4

3 UNIT COLOR

N2.5

FURUNO



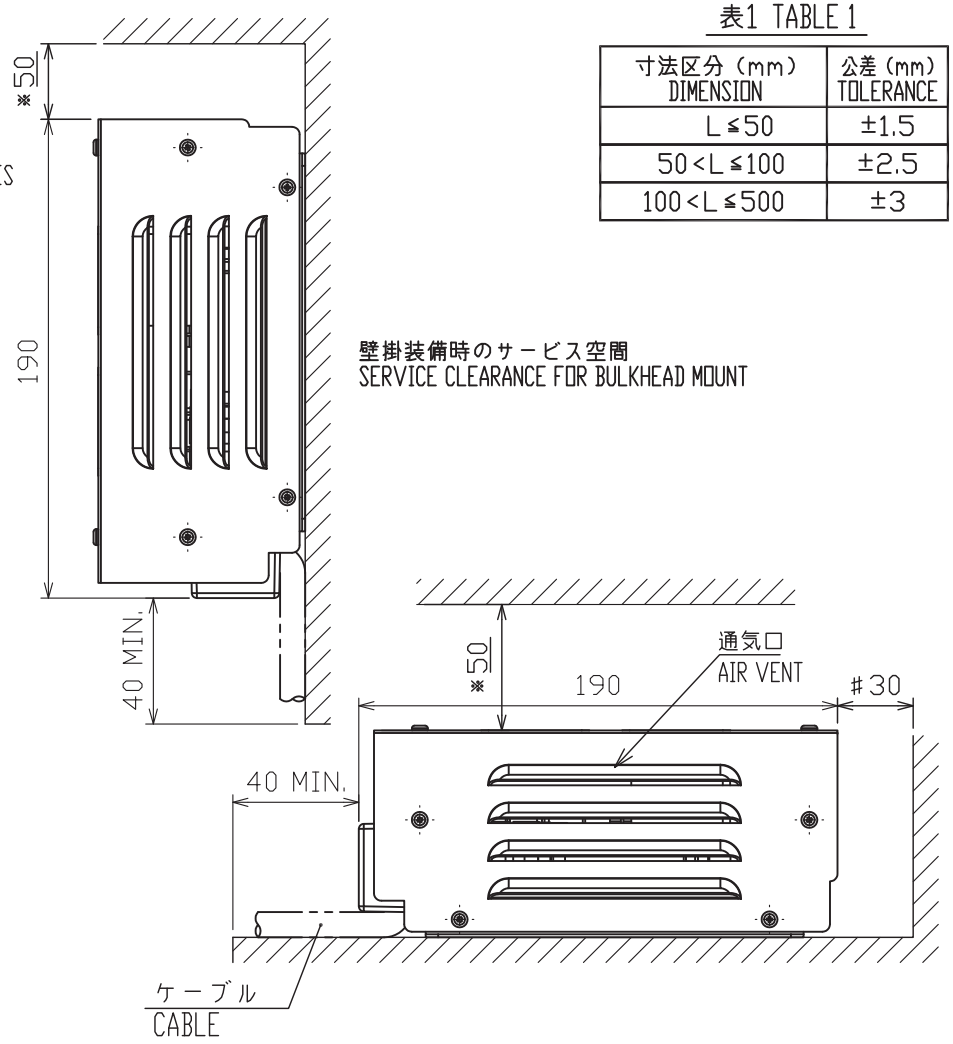


表1 TABLE 1

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

注記
1）指定なき寸法公差は表１の通り。
2）＃印寸法は最小サービス空間寸法とする。
3）取付ネジは呼び径４×16を使用のこと。
4）※印寸法は放熱空間とする。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE ø4x16 SCREWS FOR FIXING THE UNIT.
4. ※: HEAT RADIATING SPACE.

DRAWN 10/Sep/2020 T.YAMASAKI		TITLE	PR-241
CHECKED 10/Sep/2020 H.MAKI		名称	AC/DC電源ユニット（卓上・壁掛装備）
APPROVED 11/Sep/2020 H.MAKI			外寸図
SCALE 1/3 MASS 2.8 ±10% kg		NAME	AC/DC POWER SUPPLY UNIT (TABLETOP/BULKHEAD MOUNT)
DWG.No. C5003-G04- C	REF.No.		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

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www.furuno.com

Publication No. DOCQA1515

Declaration of Conformity

We FURUNO ELECTRIC CO., LTD.
(Manufacturer)

9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan
(Address)

declare under our sole responsibility that the product

AC/DC POWER SUPPLY UNIT PR-241
(Model name, type number)

to which this declaration relates conforms to the following standard(s) or other normative document(s)

EU
EMC Directive 2014/30/EU

IEC 60945 Ed.4.0: 2002

For assessment, see
• Test report
Labotech International Co., Ltd.
LIC 12-20-120 Rev.1, 22 Oct 2020

UK
SI 2016 No.1091 EMC Regulations 2016 as amended

EN 60945: 2002

For assessment, see
• Test report
Labotech International Co., Ltd.
LIC 12-20-120 Rev.1, 22 Oct 2020

(title and/or number and date of issue of the standard(s) or other normative document(s))

On behalf of Furuno Electric Co., Ltd.

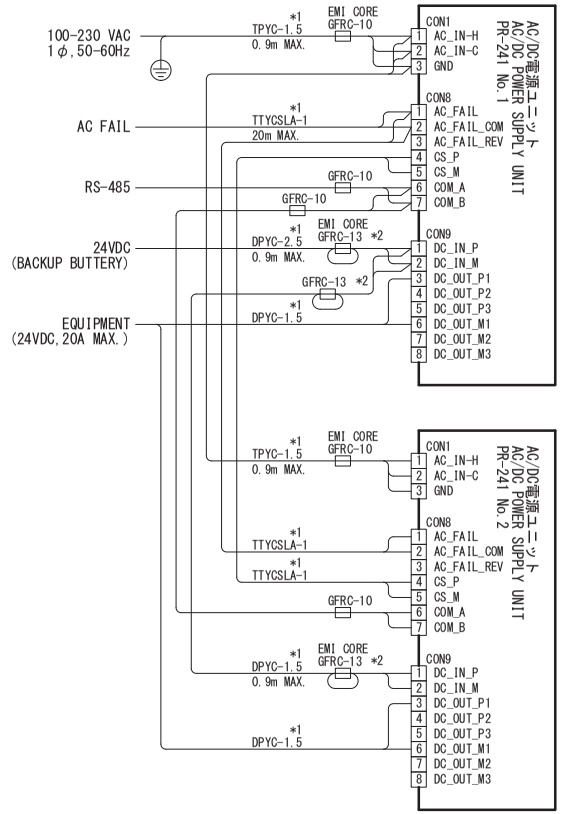
Nishinomiya City, Japan
26 July 2021
(Place and date of issue)

Akihiko Kanechika
Department General Manager
Quality Assurance Department
(name and signature or equivalent marking of authorized person)

FURUNO

注記
＊1）造船所手配。
＊2）EMIコアGFRC-13には芯線を2回通すこと。

NOTE
*1: SHIPYARD SUPPLY.
*2: EMI CORE GFRC-13 SHOULD BE PASSED THE CORES TWICE.



DRAWN	26/Jan/2021	T. YAMASAKI	
CHECKED	26/Jan/2021	H. MAKI	
APPROVED	28/May/2021	H.MAKI	
SCALE		MASS	kg
DWG. No.	C5003-C01- A		
REF. No.			

TITLE: PR-241
名 称: AC/DC電源ユニット
NAME: 相互結線図
AC/DC POWER SUPPLY UNIT
INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.