

# Installation Manual FISH SIZE INIDICATOR Model FCV-2100

(Product Name: FISH FINDER)

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(TEHI ) FCV-2100



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# **▲** SAFETY INSTRUCTIONS

The installer must read the appropriate safety instructions before attempting to install the equipment.



# SYSTEM CONFIGURATION



# **EQUIPMENT LISTS**

## Standard Supply

Name	Туре	Code No.	Qty	Remarks
Processor unit	FCV-2101	-	1	
Transceiver unit	FCV-2102	-	1	
Transducer	FCV-2103	-	1	
Trackball control unit	TCU-001	-	1	
Installation materials	CP02-09500	000-030-008	1	For processor unit
	CP02-09300	000-029-457	1	For transceiver unit
	CP14-06801	001-303-390	1	For trackball control unit
Accessory	FP19-01801	001-205-650	1	For processor unit
Spare parts	SP14-03601	001-246-900	1	For processor unit
	SP24-00301	001-041-310	1	For transceiver unit

## **Optional Supply**

Name	Туре	Code No.		Remarks
USB device server	UDS-001	-	w/ Installation guide	
Flush mount kit	OP14-70	001-132-700	For track	ball control unit.
Rectifier	PR-62	-	For 100/	110/220/230VAC
LAN cable assembly	MOD-Z072-020+	001-167-880-10	2 m	For between pro-
	MOD-Z072-050+	000-167-890-10	5 m	cessor unit and
	MOD-Z072-100+	001-167-900-10	10 m	transceiver unit
LAN cable	FR-FTPC-CY*10M*	001-240-510	10 m w/	armor
	FR-FTPC-CY*20M*	001-240-520	20 m w/ armor	
	FR-FTPC-CY*30M*	001-240-530	30 m w/	armor
	FR-FTPC-CY*50M*	001-240-540	50 m w/	armor
	FR-FTPC-CY*100M*	001-240-550	100 m w/ armor	
Connector	CP03-28901	008-542-460	LAN mod	dular plug
Ethernet HUB	HUB-101	-	w/ Install	ation guide
	HUB-102	-		
Cable assembly	DVI-D/D S-LINK5M	001-132-960-10	5 m for n	nonitor
	DVI-D/D S-LINK10M	001-133-980-10	10 m for	monitor
Thru-hull pipe	TFB-5000 (1)	-	For steel hull	
	TFB-1000 (1)	-	For FRP	hull

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1. MOUNTING

# NOTICE

Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

# 1.1 Processor Unit

The processor unit can be installed on a tabletop or bulkhead. When selecting a mounting location, keep in mind the following points:

- Locate the unit out of direct sunlight.
- Install the unit away from areas subject to water splash or rain.
- Select an installation location that is well ventilated.
- Do not prevent ventilation of the outer fitted fan.
- Locate the unit where shock and vibration are minimal.
- Leave sufficient service clearance around the unit. Refer to the outline drawing at the back of this manual.
- · Keep in mind the compass safe distance shown on page i.
- Locate the unit in the environmental condition permitted. (-15 °C to +55°C, IP22)
- Face the cable connectors downward for bulkhead mount.



#### How to mount the processor unit

Follow the procedure below to mount the processor unit on a bulkhead or a tabletop.

 Attach the washers and knobs to both side of processor unit. Note: Attach the included sealing sticker to the holes at the screws on both sides, when the knobs are not used.

- 2. Drill four pilot holes in the bulkhead or panel on a tabletop for self-tapping screws. Refer to the outline drawing at back of this manual for mounting dimensions.
- 3. Fasten four self-tapping screws ( $\phi$ 6x20) into the pilot holes, leave 5 mm protruding.
- 4. Hang (or set) the processor unit to the screws, then slide the processor unit downward (or to the front).



5. Fasten the screws to secure the unit in place.

# 1.2 Transceiver Unit

The transceiver unit can be installed on a tabletop or bulkhead. When selecting a mounting location, keep in mind following points:

- Locate the unit out of direct sunlight.
- Select an installation location that is well ventilated.
- · Locate the unit where shock or vibration is minimal.
- Keep sufficient service clearance around the unit for maintenance.
- · Keep in mind the compass safe distance shown on page i.

• Face the cable connectors downward for bulkhead mount.



#### How to mount the transceiver unit

- 1. Drill four pilot holes in the bulkhead or tabletop for self-tapping screws.
- Screw two self-tapping screws (\$\$\phi\$5x20\$) into the lower pilot holes, leave 5 mm protruding.
- 3. Hang (or set) the notches of transceiver unit onto the screws.
- 4. Screw two self-tapping screws into the upper fixing holes.
- 5. Fasten the screws to fix the unit in place.

# 1.3 Transducer

# NOTICE

Do not install the transducer on the inner side of the hull. The signal strength is reduced and may affect the accuracy of measurements.

**Do not cover the transducer with FRP resin. The heat generated when the resin hardens may damage the transducer.** For mounting the transducer, use a flange for transducer tank.

The performance of the fish finder depends on the transducer position. When selecting a mounting location, keep in mind following points.

- A place least affected by air bubbles should be selected since turbulence blocks the sounding path.
- Select a place least influenced by engine noise.
- Select a place without other sounder interference. The transducer should be separated from other transducers with the same frequency by 2.5 m or farther.
- Install the transducer face parallel to the sea surface.

• Orient the transducer fore mark to ship's bow within ±5 degree.

It is known that air bubbles are fewest at the place where the bow first falls and the next wave raises, at usual cruising speed. In small, slow-speed boats, the position between 1/2 and 2/3 of the ship's length from the bow is usually a good place.



Refer to the drawing for transducer tank installation at the end of this manual. The transducer tank T-615 (code: 000-015-841) should be prepared locally.

Transducer face

**Note:** The face of the transducer must be facing the sea bottom in normal cruising trim of the boat.

#### 2100 data sheet sticker

The transducer is supplied with three data sheet stickers. Remove the stickers from the base of the transducer cable and attach them at places as follows.

Refer to paragraph 2.2.2, step 9 for detail of attachment.

- [FCV-2103 30M] sticker: to the end of transducer cable.
- [TRANSDUCER DATA] sticker: to the cover of transceiver unit and the back cover of operator's manual.



# 1.4 Trackball Control Unit

The trackball control unit can be installed on a tabletop or flush mounted in a console. Flush mounting requires the optional flush mount kit.

#### Installation considerations

- · Select a location where the control unit can be operated easily.
- Locate the unit away from heat sources, because heat can build up inside the cabinet. Heat build-up can damaged the unit.

- Locate the unit away from places subject to water splash and rain.
- Leave sufficient clearance at the sides and rear of the unit to facilitate maintenance.
- Determine the location considering the length of the signal cable between this unit and the processor unit.
- Keep in mind the compass safe distance shown on page i.

## **1.4.1** How to mount the unit on a desktop

You can install the unit flat on the desktop, or use the fixing plate for a tilted installation.

#### Mounting with fixing plate

1. Attach the fixing plate onto the trackball control unit from rear side with two screws (M3x8, supplied).



Secure the fixing plate to the desktop with two self-tapping screws (\$\$x20, supplied).



### Surface mounting

- Drill four holes (\$\$\phi4\$) on the table referring to the outline drawing at the back of this manual.
- Secure the trackball control unit with four screws (M3, local supply) from the underside of the table. The length of screws should be determined depending on the thickness of panel. Refer to the outline drawing at the back of this manual.



## 1.4.2 How to mount the unit in a console panel

Use the optional flush mount kit OP14-70 to install the unit in a console.

Name	Туре	Code No.	QTY	Remark
SEMS B screw	M3 x 8	000-162-649-10	4	
FM1 assy.	OP14-70-1	001-133-860	2	w/ wing bolt/nut
FM2 assy.	OP14-70-2	001-133-870	2	w/ wing bolt/nut
FM1 fixture	14-078-2301-1	100-364-711-10	2	Spare

#### Flush mount kit OP14-70

**Note:** Do not mount the trackball control unit on a inclined surface, as drainage may be prevented.

- 1. Prepare a cutout in the installation location. Refer to the outline drawing at the back of this manual for the cutout dimensions.
- 2. Set the unit to the cutout.
- Attach the mounting plate to the unit with four screws (M3x8, supplied) from rear side.
- 4. Screw the wing bolts and the wing nuts so that the protectors for the screws move to the flush mount assembly.



5. Fasten each wing bolt and then fasten each wing nut.

Where there is insufficient space to use the FM2 assembly, use the spare FM1 fixing plates.Use the wing nuts and wing bolts from the unused FM2 assemblies to complete the spare FM1 assemblies.



# 1.5 Monitor (Local Supply)

The following FURUNO monitors are available for connection to your FCV-2100: MU-150HD, MU-190 and MU-190HD. Refer to the monitor's manual for installation. You can use an after-market monitor which has specifications as follows:

- Video signal: DVI-D, single link (monitor cable: option)
- Resolution: XGA (1024 x 768, default setting), SXGA (1280 x 1024), Full-HD (1920 x 1080), UXGA (1600 x 1200) or WUXGA (1920 x 1200) are available.

Up to two sub monitor can be connected. The sub monitor resolution should be XGA and video signals are DVI and RGB. A monitor cable for DVI is optional supply, and a monitor cable for RGB should be supplied by the user.

#### 1. MOUNTING

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# 2.1 Processor Unit

Use the specified cables to connect cables to the processor unit. When the connectors are not used, connector protective caps should be left on the connectors.



**Note:** Do not connect equipment other than the FCV-2102 or HUB-101/102 to the NETWORK port.

# 2.1.1 Power cable and grounding

Connect the power cable (MJ-A3SPF0017A-050ZC, 5 m, supplied) to 24VDC power. Connect the ground wire (IV-2sq., local supply) between ground terminal and ship's ground. 2. WIRING

## 2.1.2 Control cable, Monitor cable and External connection

The control, monitor and external equipments connection ports are behind the connector cover on the rear panel. Access the ports and connect cables as shown in the procedure on the following page.

**Note:** The processor unit must be mounted indoors to do this connection because of reduction in waterproofing.

1. Disassemble the waterproofing cover.

The assembled parts are numbered from 1 to 4. These parts should be installed in numerical order, as described in this procedure, or the waterproofing rating is reduced.



Path the cables through the connector

5. Attach the fixing plate 1 to the entrance of the connector cover. **Note:** Face the markings outwards.



6. Pass the cables through appropriate holes in the gasket.

7. Set the gasket to the entrance of the connector cover.



8. Remove sticker only from the slots to be used on the fixing plate 2.



- 9. Attach the fixing plate 2 to the entrance of the connector cover.
- 10. Fasten the fixing metal to the connector cover with three binding screws.
- 11. Fix the cables to the cable clamp with cable ties (2 pcs. each).



#### Trackball control unit

Trackball control unit cable (5 m) is connected to CONT1 port or CONT2 port.

#### External monitor (XGA resolution only)

The FURUNO MU-150HD monitor, or equivalent XGA after-market monitor can be connected as an external monitor. Connect the monitor to the correct port, depending on whether the monitor has analog or digital output.

- Digital (DVI-D2 port): Use the DVI-D/D S-LINK cable (5/10 m, option)
- Analog (RGB port): Use the coax. cable 3COX-2P-6C cable (local supply)

#### NAV equipment

The NMEA1/2/3 ports are available to connect the navigational equipment. CIF signals are also available from menu setting. Use the supplied cable PHR-10/PHR-5-L2000 (2m) for connecting.

The default settings of ports as follows

- NMEA1/2 port: For NMEA (NMEA Ver 1.5, 4800 bps)
- NMEA3: For CIF (4800 bps)

#### USB device

The USB1/2 ports are available to connect the USB device, such as a USB flush memory. In order to maintain waterproof rating, this USB ports should be attached at all times. The USB3 port is used for maintenance only.

## 2.1.3 Main monitor

The following FURUNO monitors are available for connection to your FCV-2100: MU-150HD, MU-190 and MU-190HD. You can use an after-market monitor also. The aftermarket monitor should have following display resolutions: XGA, SXGA, Full HD or UXGA or WUXGA.

In order to maintain waterproofing, use a DVI-D/D S-LINK cable to connect the main monitor to the DVI-D1 port.

**Note:** The processor unit must be mounted indoors to do this connection because of reduction in waterproofing.

1. Attach a spacer tube to the DVI cable.

Open the slit on the spacer tube and set the tube to the DVI cable directly behind the connector. Secure the spacer tube in place with cable ties (supplied).



2. Disassemble the boot cover.

The assembled parts are numbered from 1 to 3. To maintain waterproofing, be sure the parts are re-assembled in numerical order.



3. Attach the waterproofing gasket to the boot cover, and then pass the DVI-D/D S-LINK cable through the boot cover.



- 4. Attach the DVI-D/D S-LINK cable connector plug to the DVI-D1 port.
- 5. Fasten the four binding screws to fix the boot cover.



6. Set the fixing plate to the entrance of boot cover.



Pass the cable through the hole in gasket.
 Be aware of the gasket orientation. The slit must be on the right-hand side.



8. Set the gasket to the entrance of the boot cover.



#### 2. WIRING

9. Attach the waterproofing sheet to the rear of the cable fixing plate.



10. Fasten the two binding screws to secure the fixing plate to the boot cover.



Secure the cable to the cable clamp with two cable ties.
 Note: Cable ties are necessary for waterproofing. Failure to secure cables as outlined in this procedure can cause water ingress.



# 2.2 Transceiver Unit

Use the specified cable to connect the transceiver unit to external equipment.



## 2.2.1 Power cable and grounding

Connect the plug of power cable (MJ-A3SPF0013-035C, 3.5m) to the 24VDC port. This unit should be grounded to prevent mutual interference. Connect a copper strap (WEA-1004, 1.2m, supplied) between this unit and the ship's ground. The length of the ground strap should be as short as possible.

# 2.2.2 Transducer cable



### Prepare the following for installation

- · Cable cutting knife
- Wire cutter
- Cable stripper (AWG25 equivalent)
- Vinyl tape or plastic tube for insulation
- Phillips head screw driver

## How to connect the transducer cable

Fabricate the cable end as follows.
 Note: To avoid interference, do not change the specified length of fabrication.



2. Unfasten six screws to remove the cover from the processor unit.

#### 2. WIRING

3. Unplug the WAGO connector (TB1) from the transducer port shown below.



4. Unfasten the seal nut from TRANSDUCER port, and then remove the seal.



- 5. Run the cable through the seal nut and the seal in order, and then pass the end of cable into the transceiver through the claw and super gland.
- Connect the cores to the WAGO connector plug. The connector opener is attached on the cover. (See figure at step 3)

How to attach wires to the WAGO connector



Failure to connect the cores as shown in the table may cause equipment damage or affect equipment functions.

- Connect the cable to the TB1 connector on the PWRTX board. Confirm that the cores from the WAGO connector are not excessively bent.
- 8. Secure the shield and drain wires to the grounding terminal next to the connector. See the figure at step 10 for details.
- 9. Attach the transducer sticker [FCV-2103 30M] to the transducer cable. Refer to section 1.3 for sticker details.
- 10. Fix the cable to the plate with three cable saddles.



12. Fasten the seal-nut to secure the transducer cable. Tighten the seal-nut leaving approx. 6 mm gap between the seal-nut and the super-gland fixing nut.



13. Attach the [Transducer data] sticker on the rear side of transceiver unit cover.



14. Close the cover of the transceiver unit.

2. WIRING

## 2.2.3 **Processor unit cable (LAN cable)**

Connect the processor unit with LAN cable (MOD-Z072-050+, 5m). When using the optional armored cable, peal the external sheath and armor from the cabling. Refer to the following page for armored cable fabrication.

**Note:** Do not connect equipment other than the FCV-2102 or HUB-101/102 to the NETWORK port.

- 1. Open the cover of the transceiver unit.
- 2. Unfasten the seal nut of NETWORK port and disassemble the seal assembly.



3. Dismantle the seal assembly as shown below.



- 4. Pass the cable into the seal nut and seal assembly, then insert the cable into the unit through the cable gland.
- 5. Set the gasket assembly onto the LAN cable.
- 6. Pack the gasket assembly into the seal nut.



7. Connect the LAN cable plug to LAN port on the TRX board. Make a loop to prevent stress on the connector.

8. Adjust the cable length then fasten the seal nut to fix the cable.

Tighten the seal nut leaving approx.2 mm gap between the seal nut and super gland fixing nut.



9. Close the cover of the transceiver unit.

#### Fabricating LAN cables

Fabricate the LAN cables when using the optional armored cable FR-FTPC-CY. Confirm that the shield of the cable touches the case of the modular plug.



Cover with vinyl tape (20 mm width)



# 2.2.4 Ethernet HUB and USB Device Server

The optional USB device server UDS-001 enables the extension of the trackball control unit cable. The optional HUB-101/102 Ethernet HUB is required to connect the UDS-001. The Ethernet HUB also allows connection to external network fish finders. Refer to the interconnection diagram at the end of this manual to connect the units.

When connecting the trackball control unit TCU-001, the UDS-001 DIP switches must be returned to the default settings, as follows:

SW No.	Settings (default)
SW1	OFF ON OFF OFF
SW2	
SW3	<b>I</b>

2. WIRING

## 2.2.5 External KP control

To control the external KP, connect the external fish finder with a MPYCSLA-4 or equivalent cable (local supply). Refer to the interconnection diagram at end of this manual to connect the cable.

1. Fabricate the cable ends referring to the figure below.



2. Open the cover of the transceiver unit.



- 3. Detach the WAGO connector (TB2) from the board.
- 4. Unfasten the seal nut of EXT-KP port and disassemble the seal assembly. Remove a seal grommet to pass the cable.
- 5. Pass the cable into the seal nut and seal assembly, then insert the cable into the unit through the cable gland.
- 6. Connect the cable cores to the WAGO connector referring to the interconnection diagram.

#### 2. WIRING

7. Reattach the WAGO connector.

Fasten the drain wire terminal lug to the chassis with a binding screw.



- 8. Set the gasket assembly and pack them into the seal nut.
- 9. Adjust the cable length then fasten the seal nut to fix the cable.

Tighten the seal nut leaving approx. 3 mm gap between the seal nut and super gland fixing nut.



10. Close the cover of the transceiver unit.

# 2.3 Data Sentences

This equipment can input/output the following NMEA data sentences.

Data	I/O	Sentence
Time, position	Input	GNS>GGA>GLL
Course over the ground (COG) and speed over the ground (SOG)	Input	VTG
Water speed and heading	Input	VHW
Time and date	Input	ZDA
Water depth	Output	DBS, DBT, DPT
Water temperature	Input/Output	MTW
Target position	Output	TLL
Proprietary sentences	Output	SDafl, SDbtm, SDes1, SDes2, SDesd, SDflg, SDmrk, pidat

# 3. INITIAL SETTINGS

This chapter covers the initial setup of the equipment.

# 3.1 How to Set the Language and Measurement Unit

Set the language and measurement unit from the advanced setting menu at installation.

- Turn the power on. Open the power button cover on the trackball control unit, then press the power button [ ()]. An audible "beep" indicates the equipment is starting up and the start-up screen appears.
- Show the InstantAccess bar<sup>™</sup> by press the [ ] button at left-top when the InstantAccess bar<sup>™</sup> is hidden. To hide the InstantAccess bar<sup>™</sup>, press the [ ] button or right-click of trackball control on anywhere of the screen.



3. Select the [Advanced Settings] icon ( ) from the In-

stantAccess bar<sup>™</sup> to expand the [Advanced Settings] menu bar.

4. Select the [Advanced Settings] icon ( 💥 ) from the Menu bar.

The [Advanced Settings] menu window appears.

5. Select the [User Interface Settings] from the menu. The user interface settings appear.

			<ul> <li>Select this icon to reset</li> </ul>
FCV-2100 [ver 0252446->	xx xx		the current menu settings
Sounder	😓 Us	er Interface Settings	to factory default
Display	Language	English	
Alarm	Depth	ft	
▲ System	Speed	kn	
Range	Temperature	۴	
- TX/RX	Fish Size	inch	
- Control 14-18	Date Auto Adjust	On	
User Interface Settings	Date Setting	*****	
Stabilization	Time Setting	*****	
Mode	Time Difference	9:00	
Tests	Save Destination For Screenshots	Internal Memory	
Service	Save Intervals For Screenshots	10	
			Confirm changes and close the menu.
		OK Apply Cancel	(Menu remains open).
			ciose ine menu.

#### 3. INITIAL SETTINGS

- 6. Select the appropriate language from the [Language] item. Default setting is "English".
- 7. Select the measurement units.

ltem	Meaning	Unit
Depth	Water depth	m, ft, fa, HR, pb
Speed	Ship's speed	kn, km/h, sm/h
Temperature	Water temperature	°C, °F
Fish Size	Fish length	cm, inch

**Note:** When you change any unit except speed, the following appears. Press the [OK] button to close the message and restore all related settings to default.



8. Select [OK] to save the current changes and close the menu window.

# 3.2 How to Set the Service Menu

Set the initial parameters for this system from the main monitor.

## 3.2.1 How to Display the Service Menu

1. Select the [Advanced Settings] icon ( 2 ) from the InstantAccess bar<sup>TM</sup> and se-

lect the [Advanced Setting] icon ( 💥 ) from the expanded menu bar.

- 2. Select [Service] to expand the service menu. The message "Ask your dealer to change service settings." appears.
- 3. Press and hold the [OK] button to open the service advanced menu.

FCV-2100 [ver 0252446-xx			FCV-2100 [ver 0252446-xx.xx]
Sounder Display Measurement Alarm System - Range - TX/RX - Control Unit - User Interface Settings - Calibration - Stabilization - Mode - Tests - Service	Ask your dealer to change service settings.	10 s later	Sounder Display Measurement Alam System Range TX/FX Control Unit User Interface Settings Calibration Stabilization Mode Tests Service Shared Settings Measurement External Echo Sounder
	OK Apply Cancel		Restore Default Settings

4. Select [Shared Settings] to open the [Shared Settings] menu.

## 3.2.2 Monitor setting

Set the monitors (main/sub) from the service menu.

1. Select [Shared Settings] on the [Service] menu. The [Shared Settings] menu appears.

- Sounder	<b>*</b>	Shared Settings
Display	Display Resolution	XGA
···· Measurement	Sub Monitor Position	Off
- System	Sub Monitor Display Resolution	XGA
Range	TX Triggering	Off
TX/RX	Trigger Input	t
Control Unit	Trigger Output	Positive
User Interface Settings	External Trigger Delay	0
- Calibration	TX Mode	FM
Mode	TX Frequency	100
Tests	Temp Source	NMEA
Service	Random TX	On
- Shared Settings	External Fish Finder Window	Off
Measurement	External Echo Sounder:Depth	Off
External Echo Sounder	Transducer Parameter1	27.00
	Transducer Parameter2	0.00
	PRC Settings	*****
	Update PRC Settings	Off
	Update program version	Off

- Select the display resolution from the [Resolution] menu. Selectable resolution: XGA (1024x768, default setting), SXGA (1280x1024), UXGA (1600x1200), Full HD (1920x1080) or WUXGA (1920x1200)
   Note: This selection is available for main monitor port (DVI-D1) only. XGA resolution is fixed for monitors connected to sub monitor ports (DVI-D2/RGB). For main monitor settings, go to step 6. For sub monitors, go to step 3.
- 3. Select the sub monitor position (left/right) from the [Sub Monitor Position] menu.
- 4. Select the sub monitor display resolution from the [Sub Monitor Display Resolution] menu.

Selectable display resolution: XGA

5. Where an external monitor and an external fish finder are connected, set [External Fish Finder] to [On].

The message window "Settings will be reset." appears.

The setting should be left [Off] if no external monitor is connected.



Main monitor: FCV-2100 echo picture Sub monitor: External fish finder

• [Off]: The echo pictures for this equipment and external sounder are displayed on main monitor.

• [On]: The echo picture for this equipment is displayed on main monitor and the echo picture for external sounder is displayed on sub monitor. To display the echo picture on the sub monitor, select the [External Echo Sounder] icon



- Set [External Echo Sounder:Depth] to [On] or [Off] as required.
   [On] allows for a possible backup depth reading, in the event that your FCV-2100 cannot find the seabed, provided that the external fish finder can find the seabed.
   Further, if you set [Depth] as an output for the NMEA data (see section 3.3), the depth from the external sounder is displayed on-screen.
- 7. Press the [OK] button. The following confirmation screen appears.



- Press the [Yes] button to store the setting. The message "The change has been stored. Restart the system." appears.
- Press the [OK] button to reset the system.
   Note: The display resolution setting is required when the monitor type is changed.

## 3.2.3 KP control and water temperature setting

Set the KP control signals and water temperature for external equipment and sensor.

- 1. Select [Shared Settings] on the [Service] menu.
- 2. Set the [TX triggering] for external KP control.

TX Triggering: On
Trigger Input: ↑ (ascent edge) or ↓ (decent edge)
Trigger Output: Positive or Negative
External Trigger Display: 0-200 ms (value setting)
Note: External KP levels are follows:

- Input: 5 V to 12 V
- Output: 12 V
- 3. Select [Temp Source] to set the data source for water temperature data. Select the temperature sensor data format from NMEA/ CIF/ External E/S Water temperature/ External transducer.

- · NMEA: Signal from the connected equipment
- CIF: Signal from the connected equipment
- External E/S Water Temperature: Temperature sensor connected to external sounder
- External Transducer (HF/LF): Temperature sensor in the external sounder's transducer, frequency to use **Note:** The DFF1-UHD uses a combined transducer. The output data is the same for both HF and LF in this case.
- 4. Select [OK] to close the menu.

### 3.2.4 Transducer setting

You can increase the accuracy of your fish finder by adjusting transducer parameters. Adjust the parameters as follows:

- 1. Select the [Shared Settings] on the [Service] menu.
- 2. Select the [Transducer Parameter1].
- Input the information as shown on the data sheets included with the transducer. The data sheets are attached to the base of the transducer cable. Do not change the setting for [Transducer Parameter 2] (default: 0.00).
- 4. Select [OK] to close the menu.

**Note:** The adjustment must be re-done if the transducer is replaced or the unit factory default settings are restored.

# 3.3 Communication Port Setting

You can set the communication port (NMEA1/2/3) from the [Tests] menu. To select the signals for communication, do the following.

1. Select the [Advanced Settings] icon ( | | | ) from the InstantAccess bar<sup>imessilon</sup> and se-

lect the [Advanced Setting] icon ( 🞇 ) from the expanded menu bar.

 Select [Tests] from the [System] menu. The [Tests] menu appears on the right-hand side of the window.

FCV-2100 [ver 0252446-xx.x	x]	×
Sounder Display Measurement Alam	Tests	]
▲ System Range		1
TX/RX Control Unit User Interface Settings	Communication Port Monitor	
Calibration Stabilization Mode	Log Output	
Service	Control Unit Test	
	LCD Test	
	TX/RX Monitor	
	OK Apply Cancel	

#### 3. INITIAL SETTINGS

3. Select the [Communication Port Monitor] from the [Tests] menu. The communication port monitor window appears.



- 4. Select a port tab to show the corresponding port.
- 5. Press the [Settings] button ( ) to show the port setting menu. The items circumscribed in the figure below are for research technicians.



6. Select a data type from the [Data Type] menu depending on connected equipment. (NMEA or CIF)

The parameter list changes according to the data type selected. For [NMEA] go to step 7; for [CIF] go to step 10.

 For NMEA data type, select a NMEA format among Ver 1.5, Ver 2.0, Ver 3.0, [Squid-Fishing] or [Echo] (see Note below) as the data format of equipment connected. Select the version according to the input data format of the equipment connected to the NMEA port. If squid fishing is selected, all menu items below [NMEA format] are fixed and not available. Go to step 11.

**Note:** The [Echo] setting is intended for use by researchers. Do not select the setting unless applicable. The NMEA outputs echo data (baud rate: 38400, 57600 or 115200 bps), however data from the navigation equipment cannot be received.

- 8. For NMEA data type, select output data from [Depth], [Temperature], [Hardness] or [Fish size]. You can select more than one datum. The fish size function requires the baud rate set to 38400 bps.
- 9. For NMEA data type, select a TLL output data from [TLL], [FURUNO-TLL] or [Off].
  - [TLL]: Shows L/L data output
  - [FURUNO-TLL]: Shows L/L, water temperature and fish size data output
  - · [Off]: Shows no data output

Note: These output data require appropriate external data input.

- 10. Select a baud rate from [Baud Rate] menu, then click the [OK] button to close the menu.
  - For NMEA data (Ver. 1.5, Ver. 2.0, or Ver. 3.0): 600, 4800 or 38400 bps
    For CIF data: 600, 1200, 2400 or 4800 bps

Note: The baud rate for the NMEA data type [Echo] is 38400, 57600 or 115200.

- 11. Push the [OK] button to close the port setting menu.
- 12. Set the parameters for other port tabs referring to this procedure's steps 4 to 11.
- 13. Press the [Close Window] button to close the [Communication Port Monitor] window.

#### **Communication port monitor**

The serial signal monitor is available for each port.

- Serial Port 1 (NMEA): NMEA1 port on processor unit. (default setting: NMEA)
- Serial Port 2 (NMEA): NMEA2 port on processor unit. (default setting: NMEA)
- Serial Port 3 (CIF): NMEA3 port on processor unit. (default setting: CIF)
- Network: Network (LAN) port on processor unit,

Select the port tab from the communication port monitor window, then press the [Update] button to display the receiving data for selected port.

[Upda	ate] button	Port	tab
Serial Fort 1(NMEA)	Serial Port 2(NMEA)	Seria: Port 3(CIF)	Network
<del>F</del> 3			¥
\$GPVTG,100.0,T,20,M,1	1.2,N,1.2,K*52		
\$GPMTW,013.75,C*04 \$VDVHW 9 00 T 9 0 M 99	9 9 N 94 K*6D		
\$GPVTG.100.0.T.20.M.1	1.2.N.1.2.K*52		
\$GPMTW,013.75,C*04			
\$VDVHW,9.00,T,9.0,M,99	9.9,N,94,K*6D		
\$GPVTG,100.0,T,20,M,1	1.2,N,1.2,K*52		
\$GPMTW,013.75,C*04			
\$VDVHW,9.00,T,9.0,M,99	9.9,N,94,K*6D		
\$GPVTG,100.0,T,20,M,11	1.2,N,1.2,K*52		
\$GPMTW,013.75,C*04		Signal mo	onitor area
\$VDVHW,9.00,T,9.0,M,99	9.9,N,94,K*6D		
\$GPVTG,100.0,T,20,M,1	1.2,N,1.2,K*52		
\$GPMTW,013.75,C*04			
\$VDVHW,9.00,T,9.0,M,99	9.9,N,94,K*6D		E
\$GPV1G,100.0,1,20,M,1	1.2,N,1.2,K*52		
\$GPMTW,013.75,C*04			
\$VDVHW,9.00,1,9.0,M,99	1.9, N, 94, K. OU		
\$GPMTW 012 75 C*04	1.2, N, 1.2, K 02		
\$VDVHW 9 00 T 9 0 M 90	9 N 94 K*6D		
\$GPVTG 100 0 T 20 M 1	12N12K*		-

# 3.4 External Echo Sounder Setting

To set the external echo sounder, two methods are available: from main monitor or sub monitor. If you have a sub monitor and [External Fish Finder Window] is set to [On], the parameters are set from the sub monitor's menu.

**Note:** When connecting an external echo sounder for the first time, the network sounder settings must be initialized before connection to your FCV-2100. Initialization is done from the network echo sounder's DIP SWITCH settings. For details, see the installation manual for the network sounder.

## 3.4.1 [External Fish Finder Window] setting: Off

The compatible external echo sounders (fish finder) are either a DFF3 or a DFF1-UHD. Set the transducer parameters from the main monitor as belows:

1. Select the [Advanced Settings] icon ( 💥 ) from the InstantAccess bar<sup>™</sup>, and se-

lect the [Advanced Settings] icon ( 👫 ) from the menu bar.

The [Advanced Settings] menu windows appears.

- 2. Select [Service] to expand the service menu. The message "Ask your dealer to change service settings." appears.
- 3. Press and hold the [OK] button to open the service advanced menu.
- 4. Select the "External Echo Sounder" from the [Service] menu.
- Select the fish finder model from the list. (DFF3/DFF1-UHD) The message appears to reset the settings. Press the [OK] button to close the message.

FCV-2100 [ver 0252446- xx.xx]	8	FCV-2100 [ver 0252446-'xx.xx]
Survive     S	External Echo Sounder DFF3 Or Ntoel	Source Setting Mathod Transformer - Calibration - Calibration - Calibration - Stating Mathod - Calibration - Calibration
Restore Default Settings	OK Apply Cancel	Restore Default Settings OK Apply Cancel
D	FF3	DFF1-UHD

**Note:** The window shown below appears after changing the setting in the above menu. Click the [OK] button to reset.

Settings will be reset.	
ОК	

- 6. Next, do the settings for the network fish finder. <u>Procedure for DFF3</u>
  - Select the [TX Triggering] to [On] to enable the KP control with DFF3.
     Note: The main transceiver's TX trigger setting should be 'Off' while this external TX trigger is set 'On'.
  - 2) Select the [Setting Method] to [Model] or [Manual] for transducer in use.
    - Model: for FURUNO or Airmar transducers.
    - Manual: for other transducer settings manually.
  - 3) Select the [External Echo Sounder] to [HF] (High Frequency) or [LF] (Low Frequency) to set the transducer parameters.



Available when [Setting Method] is [Manual].

- Select a transducer model from the drop-down menu list when the [Setting Method] is set to [Model].
- 5) If the [Setting Method] is [Manual], do the following:
  - Select the output power of the transducer connected to [TX Power], from among 1kW, 2kW, 3kW.
  - Select [Voltage], then set TX voltage of the transducer.
  - 3) Select [Freq], then set the frequency of the transducer.



4) Select [Band Width], then set the band width of the transducer.

#### Procedure for DFF1-UHD

- Select the [TX Triggering] to [On] to enable the KP control with DFF1-UHD.
   Note: The main transceiver's TX trigger setting should be 'Off' while this external TX trigger is set 'On'.
- 2) Select the [Setting Method] to [Model] or [Manual] for transducer in use.
  - Model: for FURUNO or Airmar transducers.
  - Manual: for other transducer settings manually.
- 3) Select the transducer from the drop down list, from among, B265LH, CM265LH, B275LH-W, CM275LH-W.

<sup>[</sup>Setting Method] is [Model]

- Click the [OK] button. A window indicates the equipment will restart.
   Note: If, for the DFF1-UHD, [Setting Method]=[TD-ID], the TD-ID information is not received, you are informed that the transducer could not be set and to retry setting the transducer. Click the [No] button to restart the equipment.
- 8. Click the [OK] button to restart the equipment.

**Note:** For the DFF3, if this equipment is not powered within one minute and 30 seconds after powering the DFF3, an error message informs you that you should wait for this equipment to connect to the DFF3, which takes approx. seven minutes.

## 3.4.2 [External Fish Finder Window] setting: On

The external echo sounder (fish finder) settings are available on sub monitor window when the sub monitor is connected. Set the transducer's parameters from sub monitor window as belows. Suppose the sub monitor is installed and the [External Fish Finder Window] is set to [On] already.

1. Select the [Windows] icon (| | ) from the [InstantAccess] bar<sup>M</sup>, and press the

[Sub monitor] icon ( ) to display the echo window of external fish finder on sub monitor.

- 2. Move the cursor on the sub monitor and right-click to show the [Shared settings] menu for external sounder setting.
- Select [Service] to expand the service menu.
   The message "Ask your dealer to change service settings." appears.
- 4. Press and hold the [OK] button for approximately ten seconds. The service advanced menu for external sounder appears.

Sounder	*	Shared Settings
HF	TX Triggering	Off
Display	Connected Fish Finder	DFF3
4 System	Setting Method	Model
Range	Transducer	
▲ TX/RX		
- HF		
- LF		
Calibration		
-LF		
Stabilization		
<ul> <li>Service</li> </ul>		
A Shared Settings		
HF		
LF		
Restore Default Settings		OK Apply Cancel

- 5. Select [Shared Settings] to open the [Shared Settings] menu.
- 6. Select [External Fish Finder] to [On] and select fish finder type (DFF3/ DFF1- UHD).

**Note:** The main transceiver's TX trigger setting should be 'Off' while this external TX trigger is set 'On'.

7. Select the transducer type from menu for DFF3, or set the transducer parameters for DFF1-UHD

Refer to the procedure for paragraph 3.4.1

8. Select [OK] to close the menu.

# 3.5 Calibration Setting

The calibration menu allows you to calibrate various settings. You can set the calibration for main system's transducer and external sounder's transducer.

## 3.5.1 Calibration for main system transducer

1. Select the [Advanced Settings] icon ( 3 ) from the InstantAccess bar<sup>imess</sup> and se-

lect the [Advanced Setting] icon ( | | | ) from the expanded menu bar.

2. Select [Calibration] from the [System] menu. The [Calibration] menu appears.

FCV-2100 [ver 0252446-)	(X.XX]	×
Sounder	*	Calibration
- Display	Sound Speed	1500.0 • •
- Alarm	Temperature	0.0
<ul> <li>System</li> </ul>	Bottom Level	0
Range	Position to Start Bottom Detection	0.0
TX/RX	Zero Line Rejection	Off
Control Unit	Zero Line Area	4.5
User Interface Settings	Zero Line Fill	Off
Stabilization	Draft	0.0
Mode	Gain ADJ	0
Tests	Fish Size	0
Service	Calibration Setting	0.0
	Absorption Coefficient	Manual
	Manual	29.0
	Temperature	External Input Value
	Fixed Temperature	50.0

3. Set the calibration parameters referring to the table below:

ltem	Meaning	Setting values
Sound speed	Calibration for speed of sound.	200.0 to 2000.0 m/s
Temperature	The water temperature indication is correct- ed. For example, if the actual temperature is 2°C higher than the temperature displayed on screen, set the offset to [+2°C].	-35.0 to +35.0°F
Bottom level	Set the strength at which an echo is deter- mined to be the bottom. If the level is too low, however, it may be difficult to distinguish bot- tom fish from the bottom echo.	-40 to +40
Position to start bottom detection	Set the depth threshold at which the sounder detects the seabed.	0.0 to 20.0 m
Zero line rejec- tion	Turn the zero line (transmission line) on or off.	Off/ On
Zero line area	Adjusts the transmission line so that the transmission line disappears when the [Zero Line Rejector] is turned on. For long tail, in- crease the value. If the transmission line does not disappear, lower the TX power.	1.4 to 3.0 m
Zero line fill	Turn off to see fish echoes within 1 m from the surface.	Off/ On

ltem	Meaning	Setting values
Draft	The default depth display shows the distance from the transducer. If you would rather show the distance from the sea surface, set your ship's draft. The draft line for HF and LF can be set respectively.	-9.0 to +30.4 m
Gain adjust	If the gain is too high or too low, or the gain for the low and high frequencies appears un- balanced, you can compensate it here.	-50 to +50
Fish size	Compensate for incorrect fish size indica- tions.	-80 to +300%
	Setting value (%)Adjustment-801/5-751/4-651/3-501/2+50x1.5+100x2+200x3+300x4	
Calibration set- tings	Set the target strength (echo strength for in- dividual fish).	-
Absorption Coef- ficient	Choose how to calculate the absorption co- efficient. The number is a measure of fish size and hardness (seabed). Used when cal- culating bottom hardness.	Manual, Auto
Manual	Available when [Absorption Coefficient] is set to [Manual]. Set the value to be used for calculating the absorption coefficient.	0.0 to 60.0 (dB)
Temperature	<ul> <li>Available when [Absorption Coefficient] is set to [Auto]. Select the input source of the water temperature used for automatic calculation of absorption coefficient.</li> <li>External input: Use the external water temperature data selected at [Temp Source] in the [Shared Settings] menu.</li> <li>Fixed temperature: Use the temperature set with [Fixed Temperature] (below).</li> </ul>	External Input Val- ue, Fixed Tempera- ture
Fixed Tempera- ture	Available when [Absorption Coefficient] is set to [Auto], and [Temperature] is set to [Fixed Temperature]. Set the temperature to be used for automatic calculation of absorp- tion coefficient.	32.0 to 122.0°F

4. Select [OK] to close the menu.

# 3.5.2 Calibration for external system transducer

The calibration procedure for external echo sounder is different from the FCV-2100. There are two method, depending on equipment configuration.

### External Echo Sounder mode is 'Off'

1. Select the [Advanced Settings] icon ( | | ) from the InstantAccess bar<sup>M</sup>, and se-

lect the [Advanced Setting] icon ( | | | ) from the expanded menu bar.

2. Select [Calibration] from the [Sounder] menu under the [External Echo Sounder] menu list.

The [Calibration] menu appears.

FCV-2100 [ver 0252446-	XX.XX]	×
Measurement	*	Calibration
Alarm	Zero Line Rejection	Off 🔹
A Sounder	Zero Line Area	4.5
HF	Gain Stabilization (HF)	0
LF	Gain Stabilization (LF)	0
Calibration	TD fore-aft	0.0
TX/RX	TD port-stbd	0.0
⊿ System	ANT TD height	0.0
Range		
- Control Unit		

3. Set the calibration parameters from the list.

Item	Meaning	Setting values
Zero line rejection	Turn the zero line (transmission line) on or off.	Off/ On
Zero line area	Adjusts the transmission line. Re- fer to sub-section above.	1.4 to 3.0 m
Gain stabilization (LF/HF)	Set the antenna position for the Satellite Compass <sup>™</sup> .	-50 to +50
TD fore-aft/port-stbd	Distance (m) from antenna to transducer on the fore-aft/port-stbd line. Enter a positive value for a fore-side transducer.	-100.0 to +100.0 m
ANT TD height	Vertical distance (m) between the antenna and the transducer. Enter a positive value for starboard-side transducer.	0.0 to 100.0 m



4. Select [OK] to close the menu.

### External Echo Sounder mode is 'On'

1. Select the [Display] icon (  $\square$  ) from the InstantAccess bar<sup>M</sup>, and select the [Ex-

ternal Sounder] icon (

( ] ) from the expanded menu bar.

The external echo picture is displayed on sub monitor.

- 2. Move the cursor onto the sub monitor and right-click on the screen. The setting menu for external echo sounder appears.
- 3. Select [Service] of the setting menu and press and hold [OK] for approximately ten seconds.

The expanded menu appears under the service column.

4. Select the [Calibration] menu from the [System] menu. The [Calibration] menu appears.

ltem	Meaning			Setting values
Zero line rejection	Turn the zero line (transmission line) on or off.		on C	Off/ On
Zero line area	Adjusts the transmiss	ion line.	1	1.4 to 3.0 m
Draft	The default depth display shows the dis- tance from the transducer.		is	9.0 to +30.4 m
Fish size	Compensate for incorrect fish size indi- cations.		li	80 to +100%
	Setting value (%) -80 -75 -65 -50 +50 +100	Adjustment 1/5 1/4 1/3 1/2 x1.5 x2		
Sound speed	Calibration for speed of sound		2	200.0 to 2000.0 m/s

5. Set the calibration parameters referring to the table below:

6. Set the calibration parameters for bottom level and gain adjust from the [LF/HF] menu under the [Calibration] menu.

ltem	Meaning	Setting values
Bottom level	Set the strength at which an echo is de- termined to be the bottom. Be aware of low level setting may cause misread the bottom staying fish from seabed.	-40 to +40
Gain adjust	If the gain is too high or too low, or the gain for the low and high frequencies appears unbalanced.	-50 to +50

7. Select [OK] to close the menu.

# 3.6 Stabilization Setting

The [Stabilization] menu compensates for the effects of heaving, and requires a Satellite Compass<sup>™</sup>.

**Note 1:** The menu is not available when there is no data from the Satellite Compass<sup>T</sup>.

**Note 2:** This function is not available when the "TX Triggering" on the [Shared Settings] menu is 'On'.

## 3.6.1 Stabilization for main system transducer

Set the stabilization menu for main system and external system transducers when the [External sounder] is set [Off].

1. Select the [Advanced Settings] icon ( 💥 ) from the InstantAccess bar<sup>™</sup>, and se-

lect the [Advanced Setting] icon ( 💥 ) from the expanded menu bar.

2. Select the [Stabilization] menu from the [System] menu. The [Stabilization] menu appears.



- Set [Stabilization] to [On] to enable the stabilization mode. Turn this function on when seas are rough, to get stable pictures regardless of sea conditions. When heaving stabilization is turned on, the symbol ( M-) appears at the "Advance" header on the screen.
- Select the model of Satellite Compass<sup>™</sup> from the list on menu. When you select other than 'manual', go to step 6.
- 5. Set the delay time between 0 and 1000 ms.
- 6. Set the antenna position for the Satellite Compass<sup>T</sup>.



- TD fore-aft: Distance (m) from antenna to transducer on the fore-aft line. Enter a positive value for a fore-side transducer, a negative value for an aft-side transducer. (-100.0 to +100.0m)
- TD port-stbd: Distance (m) from antenna to transducer on the port-stbd line. Enter a positive value for starboard-side transducer, a negative value for a portside transducer. (-100.0 to +100.0m)
- ANT TD height: Vertical distance (m) between the antenna and the transducer. (0.0m to 110.0m)
- 7. Select the [OK] to close the menu.

**Note:** For the heaving feature, set the SC-30/50/110 Satellite Compass<sup>™</sup> output as follows. Refer to respective operator's manual for setting details.

Feature	SC-50/110 (Data out setting)	SC-30 (IF-NMEASC setting)
Sentence	ATT, HVE	ATT, HVE
Baud rate	38400 bps	38400 bps
Cycle	25 ms	25 ms
Format	IEC Ed.1	-

## 3.6.2 Stabilization for external sounder transducer

Set the stabilization menu for external system transducers when the [External sounder] is set [On].

- 1. Move the cursor onto the sub monitor and right-click on the screen The setting menu for external sounder appears.
- 2. Select [Stabilization] from the list on menu. The [Stabilization] menu appears.

Sounder	*	Stabilization
HF	Stabilization	Off
Display	Stabilization Sensor	SC-50
Measurement	Delay Time	250
System	TD fore-aft	0.0
Range	TD port-stbd	0.0
TX/RX	ANT TD height	0.0
TX/RX     Calibration     HF     LF     Stabilization     Service		

3. Set the stabilization parameters refer to step 3 to 7 of subsection above.

# 3.7 Reset to Default Setting

To reset all customized settings for advanced setting menus and external sounder setting menus to their default settings. The external echo sounder setting should be reset before the reset of main system setting. Do the following procedure.

Note: Customized settings cannot be restored. If necessary jot down the settings.

#### Reset the external sounder settings

- 1. Move the cursor to the external echo picture on sub monitor, and right-click on the screen.
- 2. Select [Service] from the menu, then press and hold the [OK] button for approximately ten seconds.

The [Shared Settings] menu appears.

3. Select [Restore Default Settings] at the left bottom corner of the window. The message window appears as below.



4. Select [Yes] to restart the system.

#### Reset the advanced settings for main system

1. Select the [Advanced Settings] icon ( | | ) from the InstantAccess bar<sup>M</sup>, and se-

lect the [Advanced Settings] icon ( | | | ) from the expanded menu bar.

- Select [Service] from the menu and press and hold the [OK] button for approximately ten seconds. The [Shared Settings] menu appears.
- 3. Select [Restore Default Settings] at the left bottom corner of the window. The message window appears same as above.
- 4. Select [Yes] to restart the system.

#### 3. INITIAL SETTINGS

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# APPX. 1 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<sup>2</sup>)* 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.

2. Insulation Type

#### 1. Core Type

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

# 4. Armor Type

C: Steel

### 5. Sheath Type

Y: Anticorrosive vinyl sheath

## 6. Shielding Type

3. Sheath Type

Y: PVC (Vinyl)

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







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

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

FCV-2101-J/E	ING LIST	026S-X-9851 -2 1/1 A-1	PAC FCV-2102	KING LIST	02GS->
NAME	OUTLINE	DESCRIPTION/CODE No. Q'TY	N A M E	OUTLINE	DESCRIPTION/CODE
ユニット UNIT 御部			ユニット	JNIT . 390 .	
CESSOD INIT	a ca (do r	FCV-2101-* 1		328	FCV-2102-*
CESSOR UNIT	350	000-029-449-00 **	TRANSGEIVER UNTT	75	000-029-453-0
F備品 SPAF	RE PARTS		予備品	SPARE PARTS	
品		SP14-03601	予備品		SP24-00301
RE PARTS		001 246 000 00	SPARE PARTS		001 041 210 0
「属品 ACCE	ESSORIES	001-240-300-00	工事材料	INSTALLATION MATERIALS	001-041-310-0
5 <b>6</b>		ED10_01901	ケーフ ル (クミヒン) MJ		MIL 4200E00124_02E0
ESSORIES	$\checkmark$	1113-01001	CABLE ASSEMBLY		MJ-A33FF0013A-0350
·事材料 INST	FALLATION MATERIALS	001-205-650-00	ケーフ <sup>*</sup> ル(組品)LAN	L=3. 3M	000-176-666-1
'ル(組品)MJ					MOD-Z072-050+
LE ASSEMBLY		MJ-A3SPF0017A-050ZC 1	LAN UADLE ASSEMDLT	L=5M	001-167-890-1
(組品)	L0M	000-178-421-10	工事材料		0000 00001
/ Visa AR/		PHR-10/PHR-5-L2000 1	INSTALLATION MATERIALS		GP02-09301
NEGIOR ASSEMBLY	L=2M	001-248-530-00			001-436-230-0
\$材料					
TALLATION MATERIALS		CP02-09001 1			
		001-248-550-00			
Nan "Amin	110	CP02-09002 1			
ERPROOF COVER A ASSEMBLY	359	001-259-930-00			
<カバ-B組品	rd a				
ERPROOF COVER B ASSEMBLY	105 62	CP02-09003 1			
14k 000	72	001-275-530-00			
<b>1日 DUG</b> 取説明書	210				
RATOR'S MANUAL		0M*-23910-* 1			
	287	000-191-380-1* **			
青要領書	210	1We 22010 e			
TALLATION MANUAL	297	111 23310 *			
→ 番号末尾の[**]は、選択品の代 ODE NUMBER ENDING WITH "**"	INDICATES THE CODE NUMBER OF REPR	RESENTATIVE MATERIAL.			
+ 番号末尾の(+*)は、選択品の代 ODE NUMBER ENDING WITH "++" 略図の寸法は、参考値です。	INDICATES THE CODE NUMBER OF REPF	resentative material. Rence Only.) C2391-Z01-C	(韓國の寸法は、参考値です	F。 DIMENSIONS IN DRAWING FOR REFER	RENCE ONLY.)
★ 寄考末尾の(**)は、選択品の代 DDE NUMBER ENDING WITH "**" 溶図の寸法は、参考値です。   PACK FCY-2103 NAN 5	INCLUE AND A LIST	RESENTATIVE MATERIAL NENCE ONLY.) C2391-Z01-C 0265-X-9853 -0 1/1 A-3 DESCRIPTION (CORE IN: 1 -0	(略図の寸法は、参考値で1	F。 DIMENSIONS IN DRAWING FOR REFER	RENCE ONLY.)
+ 新考末尾の(++)は、選択品の代 ODE NUMBER ENDING WITH "++" 略図の寸法は、参考値です。 I PACK FCV-2103 NAME L=ット UNI1	INGLATES THE CODE NUMBER OF REPE DIMENSIONS IN DRAWING FOR REFER	RESENTATIVE MATERIAL RENCE ONLY.) C2391–Z01–C 0265–X-9853 –0 1/1 A-3 DESCRIPTION/CODE No. 0'TY	(第回の寸法は、参考値で FURU	F. DIMENSIONS IN DRAWING FOR REFER	001-248-550-00 0264
+ 新考末尾の1+4)は、選択品の代 ODE NUMBER ENDING WITH "++" 略図の寸法は、参考値です。 I PACK FCV-2103 NAME L=ット UNII 波器	INGLATES THE CODE NUMBER OF REPE INFORMETSIONS IN DRAWING FOR REFER	RESENTATIVE MATERIAL RENCE ONLY.) C2391–Z01–C 026S–X–9853 –0 1/1 A-3 DESCRIPTION/CODE Na. 0'TY COV. 1000	(第回の寸法は、参考値です FURL 下事材料実	F. DIMENSIONS IN DRAWING FOR REFER	RENCE ONLY.) 001-248-550-00 0268 CP02-09001 0268
ト 新考末尾の1+4)は、選択品の代 ODE NUMBER ENDING WITH "**" 略図の寸法は、参考値です。 I PACK FCV-2103 NAME Lニット UNIT 波器 NSDUCER	INGLATES THE CODE NUMBER OF REPE INDUCATES THE CODE NUMBER OF REPER UMENSIONS IN DRAWING FOR REFER	RESENTATIVE MATERIAL RENCE ONLY.) C2391–Z01–C 026S–X–9853 –0 1/1 A-3 DESCRIPTION/CODE Na. 0'TY FCV–2103 1	(第回の寸法は、参考値です FURU 工事材料表		RENCE ONLY.) 001-248-550-00 0264 CP02-09001 0264
+ 新考末尾の1+4)は、選択品の代 ODE NUMBER ENDING WITH "++" 略図の寸法は、参考値です。 I PACK FCV-2103 NAME Lニット UNII 波器 NSDUCER		RESENTATIVE MATERIAL RENCE ONLY.) C2391–Z01–C 026S–X–9853 –0 1/1 A-3 DESCRIPTION/CODE Na. 0'TY FCV-2103 1 1	(略図の寸法は、参考値です FURL 工事材料表 INSTALLATION MATER		RENCE ONLY.) 001-248-550-00 0264 CP02-09001 0264 0264 0264 0264 0264 0264 0264 0264
★ 書考末尾の1**1ば、選択品の代 DDE NUMBER ENDING WITH "**" 塔図の寸法は、参考値です。 1 PACK FCV-2103 NAME ニット UNII 波器 ISDUCER		RESENTATIVE MATERIAL RENCE ONLY.) C2391–Z01–C 0265–X-9853 –0 1/1 A-3 DESCRIPTION/CODE No. 0'TY FCV-2103 1 1	(第回の寸法は、参考値です <b>FURL</b> <b>INSTALLATION MATER</b> 第10 1000 1000 1000 1000 1000 1000 1000 1		RENCE ONLY.) 001-248-550-00 0260 0020-09001 0020-09001 145/現格 教育 SR1P110NS 011
ト 香考末尾の1+41は、選択品の代 DDE NUMBER ENDING WITH "++" 塔図の寸法は、参考値です。 I PACK FCV-2103 NAME ニーット UNII 波器 ISDUCER	INGLESSONS IN DRAWING FOR REPER	RESENTATIVE MATERIAL RENCE ONLY.) C2391–Z01–C 026S–X–9853 –0 1/1 A-3 DESCRIPTION/CODE Na. 0'TY FCV–2103 1 1	(略図の寸法は、参考値です		RENCE ONLY.) 001-248-550-00 0260 0001-248-550-00 0260 0702-09001 184./現格 071 017-0 10 10 10 10 10 10 10 10 10 10 10 10 10
ト 香弓末尾の1**1は、選択品の代 DDE NUMBER ENDING WITH "**" 各図の寸法は、参考値です。 1 PACK FCV-2103 NAME .ニット UNIT 波器 ISDUCER	INGLATES THE CODE NUMBER OF REPE INDUCATES THE CODE NUMBER OF REPER UMENSIONS IN DRAWING FOR REFER	RESENTATIVE MATERIAL RENCE ONLY.) C2391–Z01–C 026S–X–9853 –0 1/1 A-3 DESCRIPTION/CODE Na. 0'TY FCV-2103 1 1	(路図の寸法は、参考値です <b>FURU</b>	DIMENSIONS IN DRAWING FOR REFER           CODE NO.           CODE NO.           TYPE           IALS         85         81         90           ITH         Image: Dimension of the second secon	RENCE ONLY.) 001-248-550-00 0260 0P02-09001 28./現格 0170 10 10 10 10 10 10 10 10 10 10 10 10 10
ト 香弓末尾の1**1は、選択品の代 DDE NUMBER ENDING WITH "**" 名図の寸法は、参考値です。 1 PACK FCV-2103 NAME .ニット UNII 波器 ISDUCER	INGLESSONS IN DRAWING FOR REFE UNIVERSIONS IN DRAWING FOR REFEF	RESENTATIVE MATERIAL RENCE ONLY.) C2391–Z01–C 026S–X–9853 –0 1/1 A-3 DESCRIPTION/CODE Na. 0'TY FCV-2103 1 1	(路図の寸法は、参考値です	DIMENSIONS IN DRAWING FOR REFER           CODE NO.           CODE NO.           TYPE           IALS         State           OUTLINE         DES           ITH         D         19-031- CODE NO.           60         0	RENCE ONLY.) 001-248-550-00 0260 0P02-09001 28./現格 0170 10 100-378-420-10 10
★ 書考末尾の1*4)は、選択品の代 DDE NUMBER ENDING WITH "**" 塔図の寸法は、参考値です。 I PACK FCV-2103 NAME ニット UNII 波器 ISDUCER	INGLESSONS IN DRAWING FOR REFE UMPORTED THE CODE NUMBER OF REFE INGLESSONS IN DRAWING FOR REFEF	RESENTATIVE MATERIAL RENCE ONLY.) C2391–Z01–C 0265–X-9853 –0 1/1 A-3 DESCRIPTION/CODE No. 0'TY FCV-2103 1 1	(路図の寸法は、参考値です <b>FURU</b>	DIMENSIONS IN DRAWING FOR REFER           CODE NO.           CODE NO.           TYPE           IALS         St. (R)         St.           OUTLINE         DES         St.           ITH         (P)         19-021- (CODE NO.         19-021- (CODE NO.           ED         OUTLINE         St.         St.           ITH         (P)         19-021- (CODE NO.         19-021- (CODE NO.	RENCE ONLY.) 001-248-550-00 0260 CP02-09001 2名/現格 0170 10 10 10 10 1 1
★ 書考末尾の1+3/1式、選択品の代 DDE NUMBER ENDING WITH "++" 塔図の寸法は、参考値です。 I PACK FCV-2103 NAME ニーット UNII 波器 ISDUCER	INGLESSONS IN DRAWING FOR REFE UNIVERSIONS IN DRAWING FOR REFEF	RESENTATIVE MATERIAL RENCE ONLY.) C2391–Z01–C 0265–X–9853 –0 1/1 A-3 DESCRIPTION/CODE Na. 0'TY FCV–2103 1 1	(路図の寸法は、参考値です	Bit Coore NO. TYPE           IALS         85         19         020         N0           ITH         010         19         021         0200         N0           ITH         010         19         021         0200         N0         0200         N0         0200         N0	RENCE ONLY.) 001-248-550-00 0260 CP02-09001 2名/規格 の17 1017-0 10 100-378-420-10 1
★ 書考末尾の1+3/L 選択品の代 DDE NUMBER ENDING WITH "++" 塔図の寸法は、参考値です。 I PACK FCV-2103 NAME ニット UN11 波器 ISDUCER	INGLESSONS IN DRAWING FOR REFE INDUCATES THE CODE NUMBER OF REFE UMENSIONS IN DRAWING FOR REFEF	RESENTATIVE MATERIAL RENCE ONLY.) C2391-Z01-C 0265-X-9853 -0 1/1 A-3 DESCRIPTION/CODE No. 0'TY FCV-2103 1 1	(路図の寸法は、参考値です <b>FURE</b> INSTALLATION MATER <sup>1</sup> 5-1単行投付が SELL 0 1 SEL 0 SEL 0 SE	Bit Coore NO. TYPE           IALS         85         68         55           OUTLINE         0E1         0E1         0E1           ITH         0         19-031- CODE NO.         000E NO.         19-031- CODE NO.           20         000000000000000000000000000000000000	RENCE ONLY.) 001-248-550-00 0268 CP02-09001 2名/規格 の17 1017-0 10 100-378-740-10 1 100-378-740-10 1 100-378-740-10 1 100-10 1 1 100-10 1 1 100-10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
▶ 香考末尾の1**1は、選択品の代 DDE NUMBER ENDING WITH "**" 名図の寸法は、参考値です。 I PACK FCV-2103 NAME .=ット UN11 波器 ISDUCER	INGLESSONS IN DRAWING FOR REFE UNIVERSIONS IN DRAWING FOR REFEF INGLESSONS IN DRAWING FOR REFEF UNIT LINE F F F F F F F F F F F F F	RESENTATIVE MATERIAL RENCE ONLY.) 0265-X-9853 -0 1/1 A-3 DESCRIPTION/CODE Na. 0'TY FCV-2103 1 1	(路図の寸法は、参考値です <b>FURE</b>	F. DIMENSIONS IN DRAWING FOR REFER COOPE NO. TYPE IALS	RENCE ONLY.) 001-248-550-00 0268 GP02-09001 2名/規格 の17 1017-0 10 100-378-420-10 1 100-378-440-10 1 100-378-440-10 1 1 100-378-440-10 1 1 100-10 1 1 100-10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
▶ 巻考末尾の1**1は、選択品の代 DDE NUMBER ENDING WITH "**" 名図の寸法は、参考値です。 I PACK FCV-2103 NAME .=ット UN11 波器 ISDUCER	INGLESSON IN DRAWING FOR REFE INDUCATES THE CODE NUMBER OF REFE INGLESSONS IN DRAWING FOR REFEF	RESENTATIVE MATERIAL RENCE ONLY.) C2391-Z01-C 0265-X-9853 -0 1/1 A-3 DESCRIPTION/CODE Na. 0'TY FCV-2103 1 1	(路図の寸法は、参考値です	Bit Colore NO. TYPE           IALS         000000000000000000000000000000000000	RENCE ONLY.) 001-248-550-00 0268 GP02-09001 2名/現格 の17 1017-0 10 100-378-420-10 1 100-378-440-10 1 100-162-213-10 1

型式/コード番号が2 殻の場合、下殻より上殻に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。 TND TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME. (時間のサメはよう争論です。 DIMENSIONS IN DRAWING FOR REFERENCE OMLY.) FURUNO ELECTRIC CO ., LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

C2380-M01-B

C2391-Z02-C

C2391-M01-D

T	<b>URUR</b> 事材料表		CODE NO. Type	001-436-230-00 CP02-09301	)	026S-X-9401 -3 1/1
INST. 番号 NO.	ALLATION MATERIALS 名称 NAME	略 図 OUTLINE	型: DESC	名/規格 RIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	+トラスタッビンネジ 1シュ SELF-TAPPING SCREW	¢5	5X20 SUS3 CODE NO.	104	4	
2	圧着端子 CRIMP-ON LUG	8	FV1. 25-4 CODE NO.	(LF) RED K 000-166-666-11	1	
3	圧着端子 CRIMP-ON LUG	19	FV2-M4 K CODE NO.	000-157-229-11	2	
4	7-ス板 COPPER STRAP	50 L=1.2m	WEA-1004-0 ROHS CODE NO. 500-310-040-10			

	URU		CODE NO.	001-205-650-0	0	19BD-X-9501 -0
			空ロ06 N0.         001-205-650-00         1           YPFE         FP19-01801         1           空名ン規格 DESCRIPTIONS         数量 0'TY         0'TY           05-022-0132-1 ROHS         2         2           CODE N0.         100-087-911-10         2           05-104-6604-0         2         2           CODE N0.         100-373-480-16         2           19-028-2073-1         205-80         2           CODE N0.         100-373-480-16         2	1/		
付	属品表					
ACCE	SSORIES					
番 号 NO.	名称 NAME	略 図 OUTLINE	型 DES(	名/規格 CRIPTIONS	数量 0'TY	用途/備考 REMARKS
1	ハンガ <sup>*</sup> ーファシャー HANGER WASHER	¢26,	05-029-0 CODE NO.	132-1 ROHS 100-087-911-10	2	
2	フ <sup>*</sup> ライント <sup>*</sup> シール2N2.5 BLIND SEAL 2 N2.5	¢ 30	05-104-60 CODE NO.	504–0 100–373–480–10	2	
3	/7" (N2. 5) KNOB (N2. 5)	<b>44</b> <b>10 10 7</b> 3	19-028-20 CODE NO.	073-1 100-340-481-10	2	
4	ヒュース <sup>*</sup> ハリマーク FUSE LABEL	60	19-031-1 CODE NO.	561-0	1	

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO ., LTD.

型式/コード番号が2 殻の場合、下殻より上殻に代わる過激期品であり、どちらかが入っています。 なお、品質は変わりません。 TND TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME (感謝のウォネは、今今後です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.) FURUNO ELECTRIC CO ., LTD.

C4472-F01-A

						CODE NO.	00 .SP	11-246- 14-036	-900-00 601	14	CZ-X-930	01 <u>-0</u>
				1107 500	I	IIFC		F 000	/01		SETS	PER
anir	NU.	5PA	IRE PARTS	LIST FOR			0 8	E			VESS	EL
	1			DWG. 1	10.	Q	UANTIT	Y	REMA	rks/code	NO.	
I TEN No.	NA Pa	NE OF Rt	G	UTLINE	OR	NO.	WORI PER SET	VES	SPARE			
1	ヒュース GLASS FUSE	5 TUBE	ļ.	<u>30</u> 	FGB0-A 5A PBF	125V	1		2	000-	155-853	-10
			+		-							
			_		-							
NFR'	S NAME		FURUNO	ELECTRIC C	0. , LTD.		DWG N	<b>D.</b> C	4483-P	01-A		

	-					GUDE NO. 001-041-310-00						24AI-X-9301 -0 1/1			
						TYPE		SP24	4-003	301	803	BOX NO. P			
HIP I	10.	SP/	ARE PARTS	LIST FOR			U	S E			VESSEL				
		BRIDGE	ALARM SYST	EM											
		BR-1000													
						DWG. NO.		QUANTITY			REMA	RKS/CODE N	D.		
TEN No.	PAR	IE OF	0	UTLINE		OR Type No.	WO	RKIN	6	CDADE					
							SET	Í	ĒS	OF ANL					
	ヒュース		-	30 🔪											
1	FUSE TUBE	GLASS TYPE	Ū	()] <b>⊺</b> ¢	6	FGB0-A 125V				2					
						3A PBF					000-	155-850-1	0		
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FR' S	NANE		FURUNO	ELECTRIC	CO.	LTD.	DWG	NO.	C4	1450-P0	01-A		1/1		
	(略國	の寸法は	、参考値で	きす。 DIMENS	IONS	IN DRAWING F	OR REFE	RENC	EON	.Y.)					

A-6



FURUNO ELECTRIC CO., LTD.





FURUNO ELECTRIC CO., LTD.











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