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FURUNO

INSTALLATION MANUAL

DOPPLER SPEED LOG

DS-80

Marine Speed and Distance Measuring Equipment (SDME)

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

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⚠ SAFETY INSTRUCTIONS

⚠ WARNING



Only qualified personnel should work inside the equipment.

This equipment uses high voltage electricity which can shock, burn, or cause serious injury.



Turn off the power at the mains switchboard before beginning the installation. Post a sign near the switch to indicate it should not be turned on while the equipment is being installed.

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

Careful consideration is required to avoid ingress of water through the transducer tank. The tank shall be strong enough to withstand the water pressure in fully loaded conditions in rough weathers. FURUNO Electric Co., Ltd. is not liable to any loss of ship and personnel which is caused by installation procedures.

⚠ CAUTION

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

Connection to the wrong power supply can cause fire or equipment damage. The voltage rating appears on the label at the rear of the display unit.

Ground the equipment.

Ungrounded equipment can give off or receive electromagnetic interference or cause electrical shock.

Keep the following compass safe distances.

	Standard	Steering
Display Unit Digital Indicator Distance Indicator	0.50 m	0.40 m
Distribution Box	3.10 m	2.10m
Transceiver Unit	2.05 m	1.40 m
Terminal Box	0.65 m	0.45 m

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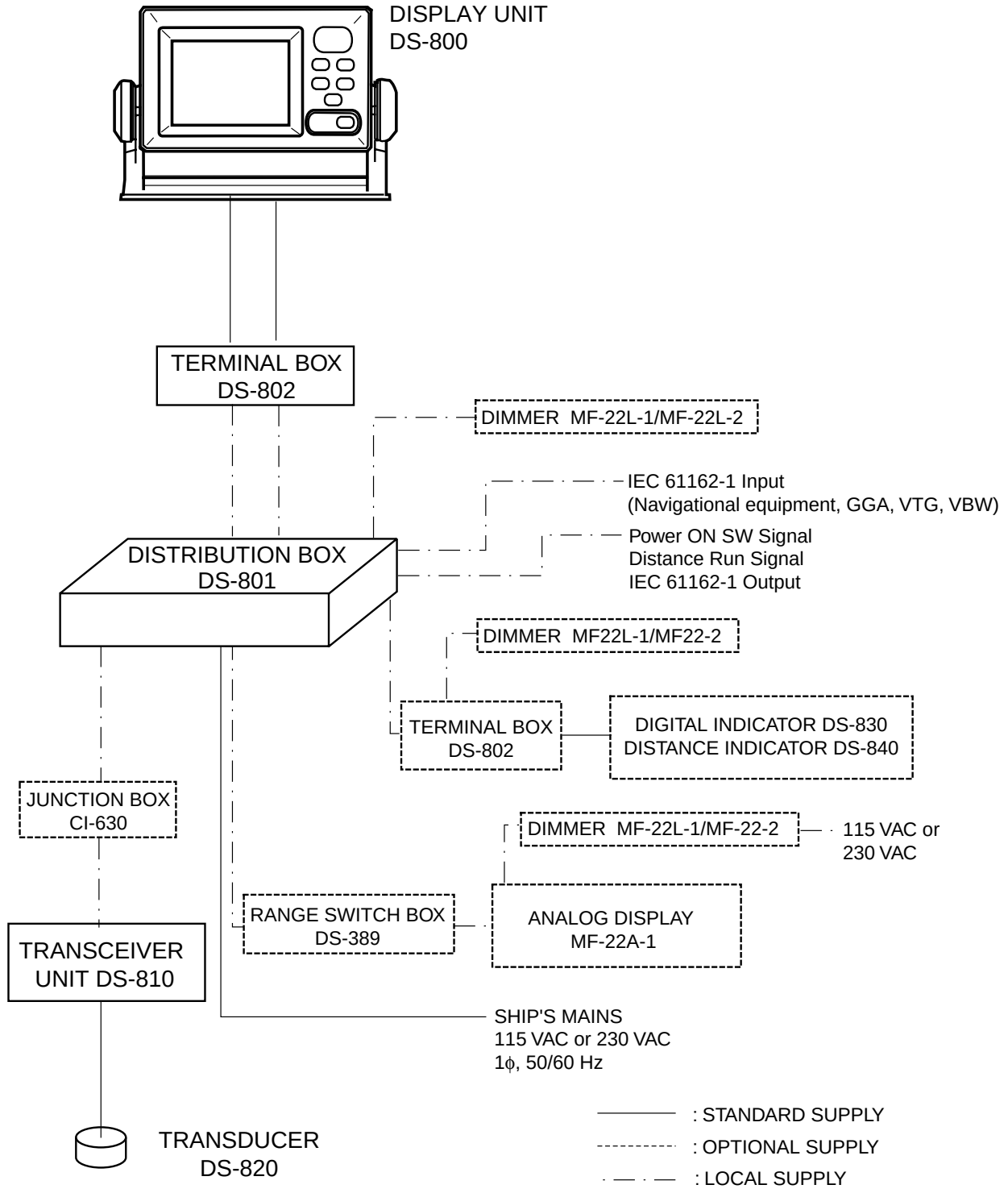
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SYSTEM CONFIGURATION



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EQUIPMENT LISTS

Standard supply

Name	Type	Code No.	Qty	Remarks
Display Unit	DS-800	-	1	
Distribution Box	DS-801-100	-	1	100 VAC
	DS-801-110	-		110 VAC
	DS-801-115	-		115 VAC
	DS-801-200	-		200 VAC
	DS-801-220	-		220 VAC
	DS-801-230	-		230 VAC
Transceiver Unit	DS-810	-	1	
Transducer Unit	DS-820	-	1	with 10/20/30m cable
Terminal Box	DS-802	-	1	
Spare Parts	SP65-00700	000-029-046	1 set	w/SP65-00701, SP65-00702, SP65-00601
Installation Materials	CP65-00900	000-029-047	1 set	w/CP65-00901, CP65-00902, CP65-903

Optional equipment

Digital Indicator (000-029-020)

Name	Type	Code No.	Qty	Remarks
Digital Indicator	DS-830	-	1	
Spare Parts	SP65-00601	002-889-730	1 set	Fuse
Accessories	FP65-00400	000-029-028	1 set	FP65-00401, FP65-00402, FP65-00403
Installation Materials	CP65-00800	000-029-027	1 set	CP65-00801, MJ-A7SPF-005-020, MJ-A6SPF-003-020

Remote Distance Indicator (000-029-022)

Name	Type	Code No.	Qty	Remarks
Distance Indicator	DS-840	-	1	
Spare Parts	SP65-00601	002-889-730	1 set	Fuse
Accessories	FP65-00400	000-029-028	1 set	FP65-00401, FP65-00402, FP65-00403
Installation Materials	CP65-00800	000-029-027	1 set	CP65-00801, MJ-A7SPF-005-020, MJ-A6SPF-003-020

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Optional equipment

Name	Type	Code No.	Qty	Remarks
Terminal Box	DS-802	000-029-048	1 set	w/CP65-00903
Range Switch Box	DS-389	000-028-039	1 set	w/CP66-01000
	MF-22R-1	000-069-391	1 set	Flush mount type
	MF-22R-2	000-069-392	1 set	Bulkhead type
Dimmer	MF22L-1-100V	000-069-401	1 set	flush mount
	MF22L-1-200V	000-069-402	1 set	flush mount
	MF22L-2-100V	000-069-403	1 set	bulkhead
	MF22L-2-200V	000-069-404	1 set	bulkhead
Junction Box	CI-630	-	1 set	w/CP66-00703
Seachest	DS-850	000-029-050	1 set	w/tightening handle
	DS-781	000-029-051	1 set	Projection type Through-hull Pipe [TFB-5000 (1)]
	DS-782	000-029-052	1 set	Gate valve, projection type
	DS-784	000-029-054	1 set	Flush type
	DS-786	000-029-055	1 set	Gate valve type
Analog Display	MF22A-1	000-069-381	1 set	-10 to +30 knots, compact type

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1 MOUNTING

1.1 Category of Equipment

Equipment for protected area

- Display Unit
- Distribution Box
- Transceiver Unit
- Terminal Box (one standard, other optional)
- Digital Indicator (option)
- Distance Indicator (option)
- Range Switch Box (option)
- Dimmer (option)
- Junction Box (option)
- Analog Display (option)

Equipment to be submerged

- Transducer

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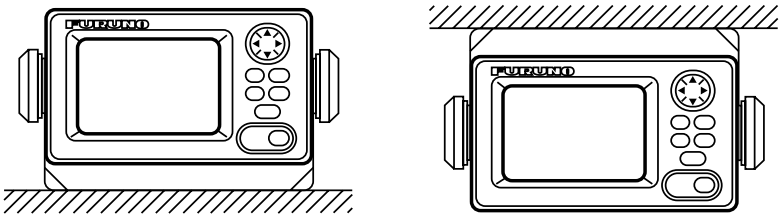
1.2 Display Unit

1.2.1 Mounting considerations

The display unit can be installed on a tabletop, on the overhead, on the bulkhead or flush mounted in a console or panel.

When selecting a mounting location for the display unit keep the following in mind.

- Keep the display unit out of direct sunlight.
- The temperature and humidity of the mounting location should be moderate and stable.
- Locate the unit away from exhaust pipes and vents.
- Keep the unit away from electromagnetic field-generating equipment such as motors and generators.
- For maintenance and checking purposes, leave sufficient space at the sides and rear of the unit and leave slack in cables.
- A magnetic compass will be affected if the display unit is too close to it. Observe the compass safe distances to prevent disturbance to the magnetic compass.



Tabletop Overhead

Display unit, tabletop and overhead mounting method

1.2.3 Mounting procedure (tabletop, overhead)

1. Fix the hanger with four tapping screws (M5x20).
2. Screw knob bolts in display unit, set it to hanger, and tighten knob bolts.

1.2.4 Flush mounting

There are two types of flush mount kits, F type and S type. For details, see the outline diagrams at the back of this manual.

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F type

1. Make a cutout of 167 X 92 mm.
2. Attach the cosmetic panel (supplied) to the display unit with hex bolts (M6X12, supplied) and spring washers (M6, supplied).
3. Fix the display unit to the mounting location with four tapping screws (5X20, supplied).

S type

1. Make a cutout 167 X 92 mm.
2. Attach two fixing metals (supplied) to the display unit with hex bolts (M6X12, supplied) and spring washers (M6, supplied).
3. Screw four wing bolts (supplied) to wing nuts (supplied).
4. Fasten the display unit to the mounting location with four wing bolts and nuts assembled at step 3.

1.3 Transceiver Unit

1.3.1 Mounting considerations

- Since the transceiver unit generates heat, install it in a dry, well-ventilated place. The cooling fans at the top of the unit must not be obstructed, to allow heat to escape.
- This unit is designed for bulkhead mounting to permit dissipation of heat. If bulkhead mounting is absolutely impossible, mount the unit on the floor leaving at least 50 mm clearance between it and the floor to permit dissipation of heat.
- The unit weights 7.1 kg. Reinforce the mounting area, if necessary.
- Leave space around the unit for maintenance and checking. Refer to the drawing at the end of this manual for minimum recommended maintenance space.
- A magnetic compass will be affected if the transceiver unit is placed too close to it. Observe the compass safe distances to prevent disturbance to the magnetic compass.

1.3.2 Mounting procedure

Fasten the transceiver unit with four tapping screws (6X30, supplied).

For bulkhead mounting, make sure there is 5 mm clearance between lower edge screw head and bulkhead.

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1.4 Transducer Unit

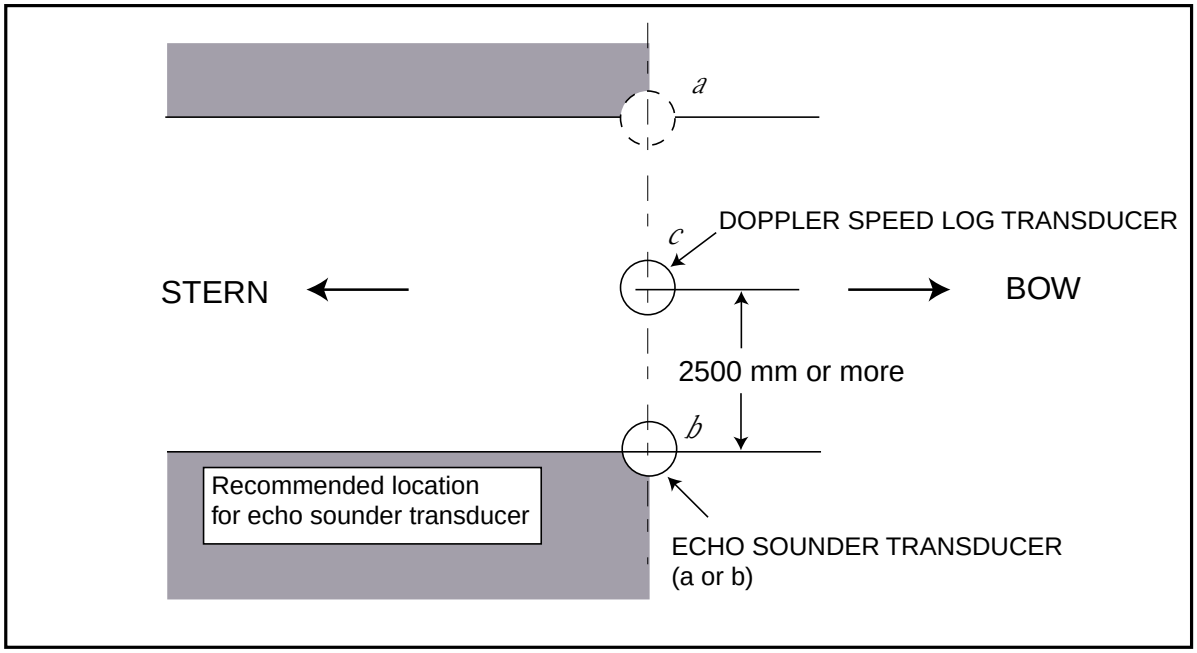
The performance of this equipment is directly dependent on the installation of the transducer.

The installation of the transducer and the tank should be accomplished by a dockyard referring to the installation drawings at the later part of this manual.

1.4.1 Mounting Location

To decide the location of the transducer, the following points should be taken into account.

- Locate the transducer of DS-80 at least 2.5 m from the transducer of an echo sounder.



Transducer, mounting location

- Separate as far as possible from air bubble sources; e.g., side thruster and water disposal pipes.
- Install in close proximity to the keel, for uniform water flow.
- Generally, best performance is obtained by mounting on the bow; the stern side is influenced more easily by air bubbles and propeller caviation.
- Never apply ordinary paint to the transducer face. Whenever the ship is dry docked, the transducer face should be cleaned off oysters and foreign materrial.

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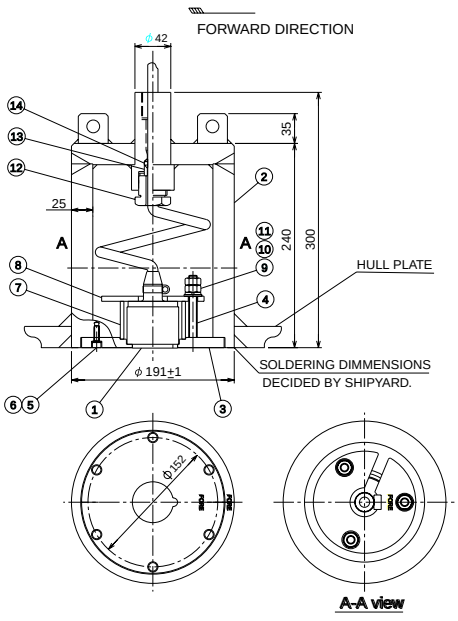
1.4.2 Mounting of transducer

Confirm that a metal cover is attached to the transducer. For seachest except DS-850, remove the hose clamp from the top of transducer.

Mounting of Flush Type Seachest DS-850

1. Fit the transducer (1) and spacer (7) to the bottom plate (3).
2. With the “FORE” mark on the fixing plate (8) facing upward, pass the transducer cable through the slot in the fixing plate (8).
3. Face the fixing plate (8) and bottom plate (3) in the ship’s bow direction, and then screw three bolts (4) in the holes of the bottom plate.
4. Fasten the fixing plate (8) with three flat washers (9), spring washers (10) and nuts (11) until the fixing plate (8) contacts the spacer (7).
5. Set the tightening nut (12), washer (13) and gasket (14) to the transducer cable in that order from the cable end.
6. Pass the transducer cable end through the though-hull pipe from below the hull.
7. Fasten the tightening nut (12) with the tightening handle (supplied) so that the length of the cable between the tightening nut and the top of the transducer is 300 mm.
8. Mate the bottom plate (3) and barrel (2), and fasten them with six spring washers (6) and hex. Bolts (5).

Note: The tank barrel needs not be filled with oil or any filler. Sea water will get into when the ship is placed in the water.
Do not seal the bottom plate to stop ingress of water into the tank.

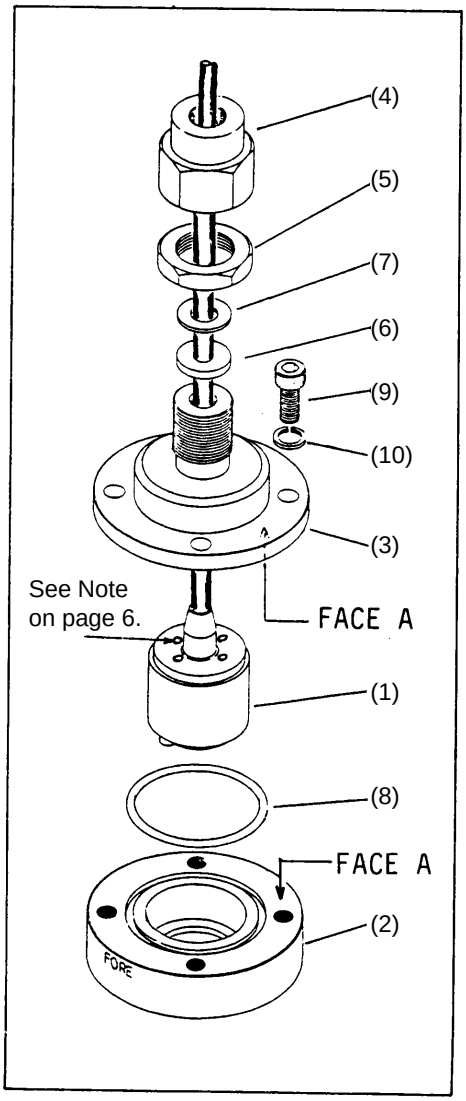


1.	TRANSDUCER	1 pc
2.	CASING	1 pc
3.	FIXING FLANGE	1 pc
4.	FIXING BOLT	3 pcs
5.	HEX. BOLT	6 pcs
6.	SPRING WASHER	6 pcs
7.	SPACER	1 pc
8.	FIXING PLATE	1 pc
9.	FLAT WASHER	3 pcs
10.	SPRING WASHER	3 pcs
11.	HEX. NUT	6 pcs
12.	TIGHTENING NUT	1 pc
13.	WASHER	1 pc
14.	GASKET	1 pc

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Mounting of Flush Type Seachest DS-784 (ref. Dwg. C7222-T06)

The seachest DS-784 is delivered temporarily assembled with the transducer.



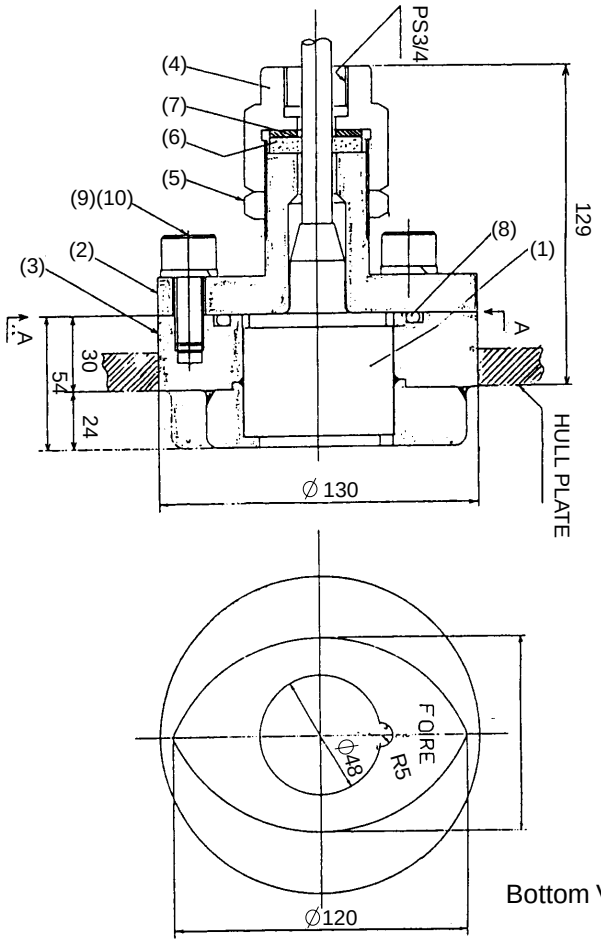
1. Loosen lock nut (5) with a wrench (hex. size: 50 mm) and take off cap nut (4) from top cover (3) together with gasket (6) and flat washer (7). (It is not necessary to draw the cap nut completely out from the cable.)
2. Unscrew hex socket head bolts (9) (M12X25, 4 pcs) by using a socket screw wrench (size: 10 mm). Separate the seachest (2) and transducer (1) from top cover (3). Handle O-ring (8) carefully.
3. Weld the seachest (2) to the hull plate. Confirm that the “FORE” alignment mark on the side of the seachest faces the fore-aft line of the ship within 1 degree. The seachest should also be level with ship’s normal trim within 1 degree.
4. Finish the outside hull plate with a grinder to ensure smooth water-flow.
5. Apply “Kinoruster (Anti-crevice corrosive sealant)” to face A of seachest (2), O-ring groove on the hull flange, O-ring (8) and face A of the stop cover (3).
6. Fit O-ring (8) onto the O-ring groove.
7. Place transducer (1) into seachest (2) so that the alignment nipple on the transducer face fits into the notch on the hull flange.
8. Clean the hull flange face with a clean cloth and settle stop cover (3) on the hull flange.
9. Tighten hex socket bolts (9) with a socket screw wrench.
10. Put gasket (6) and flat washer (7) over the transducer flange and tighten cap nut (4) securely with a wrench (hex. size: 50 mm). Screw lock nut (5).
11. When running the transducer cable inside the conduit pipe, screw the pipe onto the cap nut (PS3/4) for watertightness.

Note : Never remove the four flat head screws which seal screw holes, to maintain watertightness.

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Flush mount, Projection Type Seachest DS-783 (ref. Dwg. E7222-T-03)

1. Loosen lock nut (5) with a wrench (hex. size: 50 mm) and take off cap nut (4) from hull flange (3) together with gasket (6) and flat washer (7). (It is not necessary to draw the cap nut completely out from the cable.)
2. Unscrew hex. socket head bolts (10) (M12X32, 4 pcs.) by using a socket screw wrench (size: 10 mm). Separate flange (2) and transducer (1) from hull flange (3). Handle O-ring (8) carefully.
3. Weld hull flange (3) to the hull plate. Confirm that the “FORE” mark alignment line on the side of the hull flange faces the fore-aft line of the ship within 1 degree. The hull flange should also be horizontal within 1 degree at ship’s normal trim.
4. Finish the outside hull flange with a grinder to ensure smooth water-flow.



5. Apply “Kinoruster (Anti-crevice corrosive sealant)” to face A of hull flange (3), O-ring groove on the hull flange, O-ring (8) and face A of the flange.
6. Fit O-ring (8) onto the O-ring groove.
7. Place transducer (1) into hull flange (3) so that the alignment nipple on the transducer face fits into the notch on the hull flange.
8. Clean the hull flange face with a clean cloth and settle flange (2) on the hull flange.
9. Tighten hex. socket bolts (10) with a socket screw wrench.
10. Put gasket (6) and flat washer (7) on top of the transducer flange and tighten cap nut (4) securely with a wrench (hex. size: 50 mm). Screw lock nut (5).
11. When running the transducer cable inside the conduit pipe, screw the pipe end onto the cap nut (PS3/4) for watertightness.

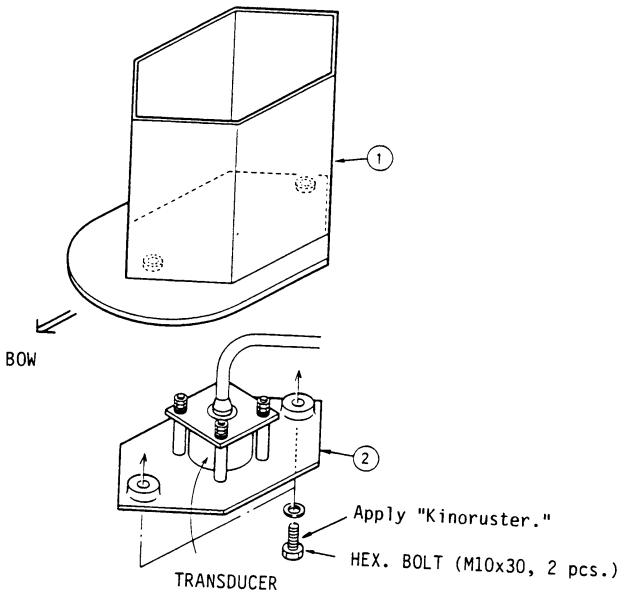
Note : Never remove the four flat head screws which seal screw holes, to preserve watertight integrity.

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Mounting of Projection Type Seachest DS-781 (ref. Dwg. C72222-T05)

1. Weld doubling plate (supplied by shipyard) to hull plate.
2. Remove the M10 bolts, and take out transducer fixing flange (2) (including transducer) from transducer housing (1).
3. Determine the projection distance, and cut transducer housing (1). The horizontal error should be within 1°.
4. Before beginning this step, remove the rubber gasket inside the thru-hull pipe to prevent it from melting. After cutting a hole through the hull plate for the thru-hull pipe (ϕ36), weld the thru-hull pipe to the hull plate.
5. Weld transducer housing (1) to doubling plate. Direction error from fore-aft line should be within 1°. At stern side of transducer housing, make air exhaust holes (ϕ 10-20).
6. Through the thru-hull pipe, pull up the transducer cable into the ship. Be careful not to jam the cable between the flange and housing. Next, using the two M10X30 bolts (“Kinoruster” applied) fasten the transducer fixing flange to the transducer housing.

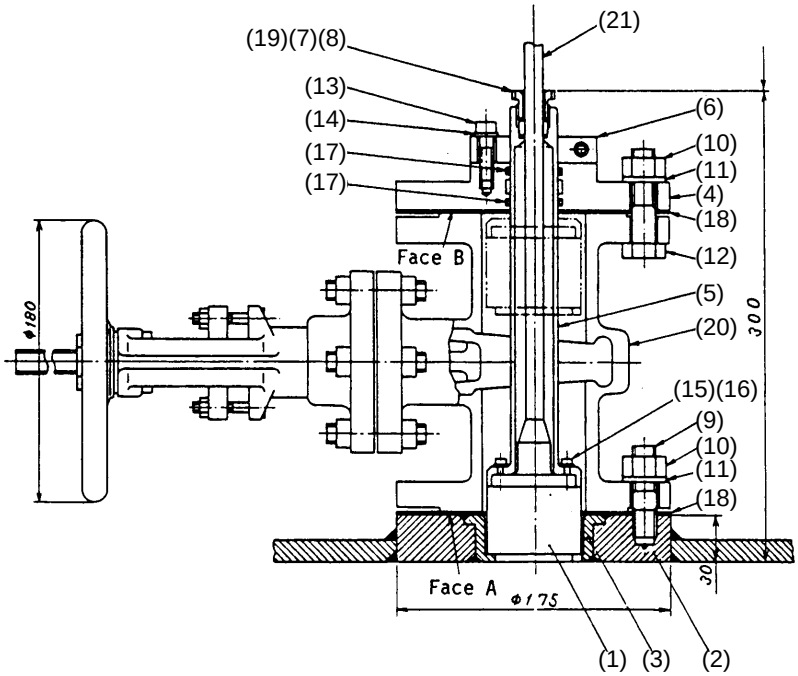
Note: Never remove the four flat head screws.



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Mounting of Gate Valve Type Seachest DS-786 (ref. Dwg. E7222-T04)

1. Separate hull flange (2) and flange (4) (with transducer (1) and shaft (5) from gate valve (20) by removing hex. nut.
2. Weld hull flange (2) to the hull plate. Confirm that the “FORE” and align marks on the side of the hull flange face the fore-aft line of the ship within 1 degree.
3. Apply “Kinoruster (Anti-crevice corrosive sealant)” to face A of hull flang (2), both faces of gasket (18) and flange of gate valve (20).
4. Put gasket (18) onto hull flange (2).
5. Mount gate valve (20), considering the direction of the handle (aft direction normally) so as to allow enough space for operation.
6. Apply “Kinoruster” to face B of flange (4), both faces of gasket (18) and the flange of gate valve (20).
7. Put gasket (18) onto the flange of gate valve (20).
8. Mount flange (4) (with transducer and shaft) to gate valve (20). Make sure the fore mark on flange (4) and hull flange (2) are aligned.
9. Loosen the hex. socket head bolt, then check that shaft (5) moves upward and downward smoothly by hand.
10. Lower shaft (5) completely and fasten hex. socket bolt (13).

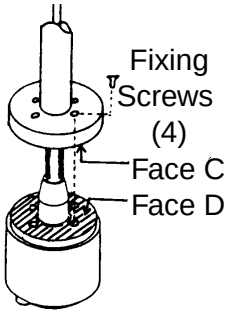


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11. Confirm that the transducer is flush with the hull.

Note: Never weld the hull flange or transducer tank when the transducer is accommodated, nor weld near the transducer of other equipment.

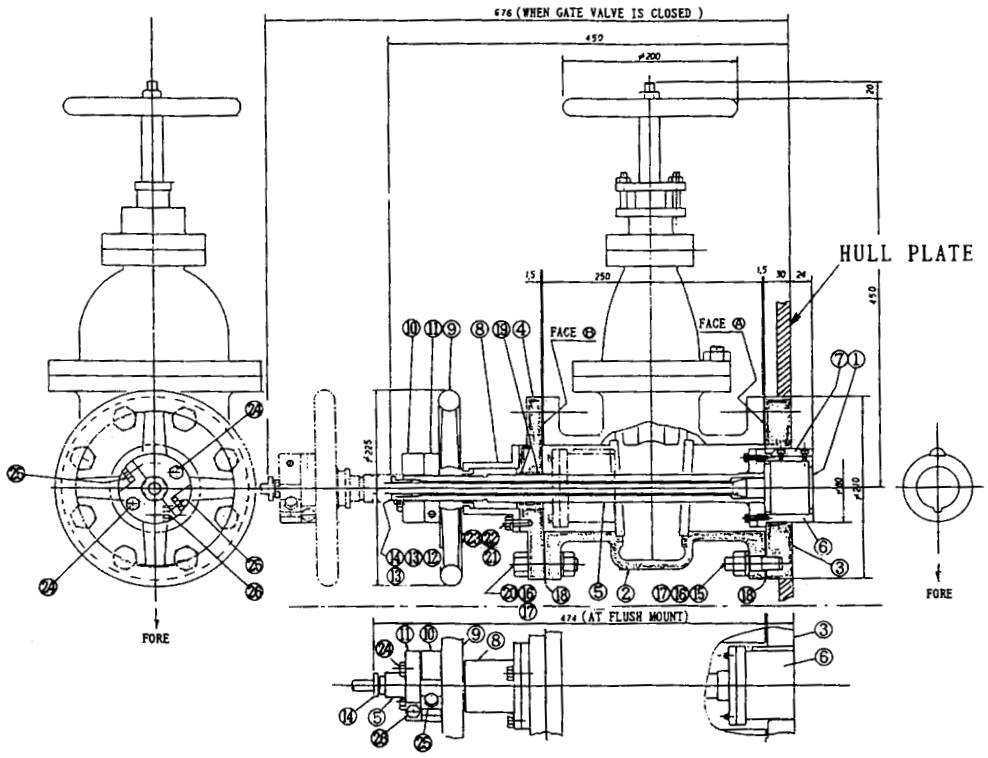
When the transducer ① is replaced, or separated from the shaft ⑤ re-assemble as follows;



1. Remove sealant from face C and face D.
2. Apply adhesive #1104 (Three Bond) to face D and four fixing screws.
3. Re-assemble shaft and transducer.

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Gate valve, Projection Type Transducer DS-782 (ref. Dwg. E7222-T02)



DS-782

1. Separate hull flange (3) and flange (4) (with transducer (1) and shaft (5)) from gate valve (2) by removing hex. Nut (17).
2. Weld hull flange (3) to the hull plate. Confirm that the “FORE” and align marks on the side of the hull flange face the fore-aft line of the ship within 1 degree. The hull flange should also be horizontal within 1 degree at ship’s normal trim. Finish the outside hull plate flat with a grinder.
3. Apply “Kinoruster (Anti-crevice corrosive sealant)” to face A of hull flange ③, both faces of gasket (18) and flange of gate valve (2).
4. Put gasket (18) onto hull flange (13).
5. Mount gate valve (2), considering the direction of the handle (aft direction normally or selectable every 45 degrees) so as to allow enough space for operation.
6. Apply “Kinoruster” to face B of flange (4), both faces of gasket (18) and the flange of gate valve (2).
7. Put gasket (18) onto the flange of gate valve (2).
8. Mount flange (4) (with transducer and shaft) to gate valve.
9. Loosen the hex. socket head bolts (23)and (26), then check that shaft (5) moves upward and downward smoothly by hand.

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10. Lower shaft (5) completely and fasten hex. socket bolt (23) and (26)
11. Lower the transducer by turning the handle until the transducer case (6) touches the hull flange (3).
12. Confirm that the hull plate projects by 24 mm.

Note: Never weld the hull flange or transducer tank when the transducer is being fitted, nor weld near the transducer of other equipment.

1.5 Distribution Box

The distribution box can be mounted on the deck or on a bulkhead.
Consider the following points when selecting a mounting location.

- Select a location which is both well ventilated and low in humidity to keep the unit cool.
- The unit weighs 12 kg. For bulkhead mounting, be sure the mounting location is strong enough to support the weight under the continued vibration normally encountered on the vessel.
- A magnetic compass will be affected if the distribution box is too close. Observe the compass safe distances to prevent disturbance to the magnetic compass.

Fasten the distribution box with four tapping screws (6X30, supplied).
Refer to the outline drawing at the end of this manual for mounting dimensions.

For bulkhead mounting;

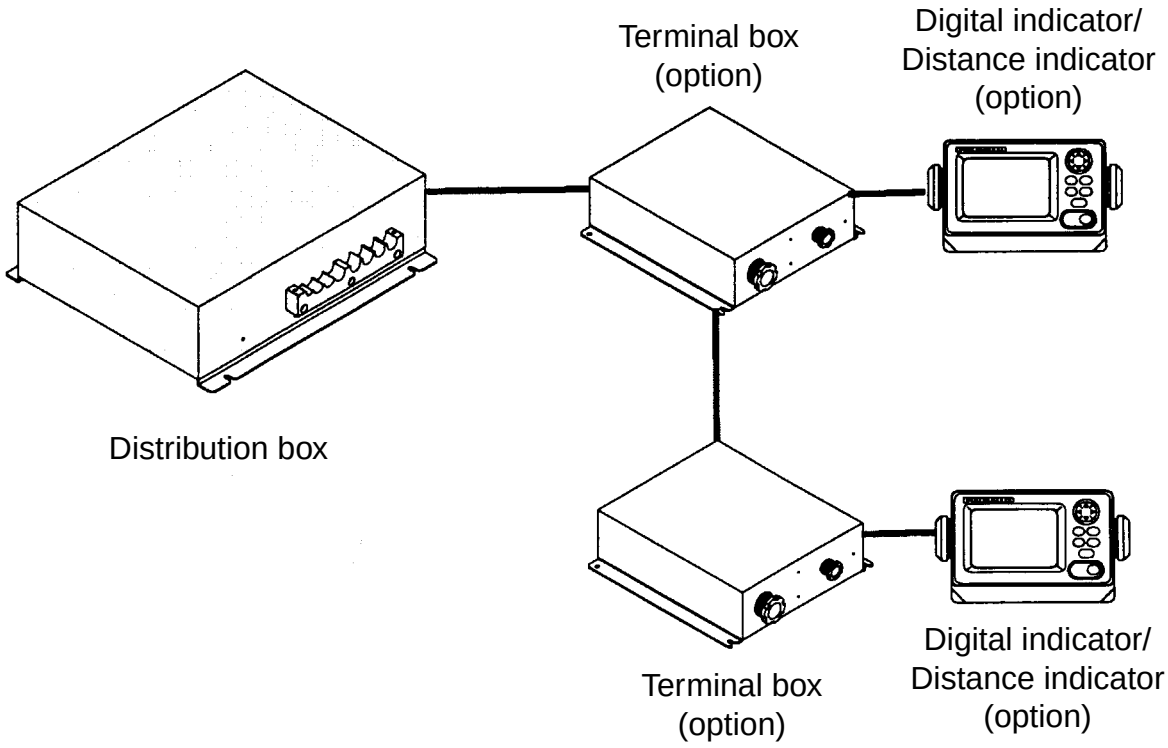
1. Tighten lower tapping screws so there is 5 mm clearance between bottom of screw head and bulkhead.
2. Screw slots of the unit with the tapping screws tightened at step 1.
3. Fasten the unit with upper tapping screws.

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1.6 Terminal box (option)

The terminal box forms a joint among the display unit, digital indicator, distance indicator and distribution box. Two digital indicators/distance indicators may be connected by installing an additional terminal box as follows.

- A magnetic compass will be affected if the terminal box is too close. Observe the compass safe distances to prevent disturbance to the magnetic compass.



Wiring with terminal box

Tighten four tapping screws (5X25) so there is 5 mm clearance between bottom of screw head and bulkhead, and screw slots of the unit with the tapping screws tightened.

1.7 Digital Indicator, Distance Indicator (option)

The digital indicator and distance indicator use the same housing as the display unit.

Refer to the section 1.2 Display Unit for mounting instructions.

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1.8 Junction Box (option)

1.8.1 Mounting considerations

The junction box forms a joint between the distribution box and the transceiver unit, and it is designed to be mounted on a bulkhead. Install it referring to the guidelines below.

- Keep the junction box away from noise-emitting electrical machinery, for example, electric generator, radio transmitter, TV, etc.
- Although the box is splashproof, do not install it in places of high humidity.
- Avoid installing the box where temperature varies greatly, since moisture may penetrate the box.
- The box is generally installed above the draft line of the ship and the transducer cable is run inside steel conduit. This permits replacement of the transducer without dry docking. Even if the junction box is installed below the draft line, the conduit is necessary to minimize picking up of noise. If use of conduit is not possible, install the box as near to the transducer as possible.

Procedure

Open the box cover, and fix the unit to a bulkhead, referring to the outline drawing at the back of this manual.

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1.9 Dimmer (option)

The optional dimmer, which is designed to comply with the Japan Industrial Standards (JIS F8852), is used for externally controlling the illumination of the display of the digital/analog displays. When a dimmer is supplied locally, refer to the interconnection diagram at the back of this manual for the values of the resistors since they are different depending on the display (digital or analog) and power supply (115 V or 230 VAC).

To use this equipment for display unit/digital indicator/distance indicator, set the dimmer setting on the unit menu. For detail, see “3.2 Setting of Unit Menu.

1.10 Range Switch Box, Analog Display Unit (option)

The range switch box selects the range to display on the analog display unit (option), and the range scales are –2 to +6 knots and –10 to +30 knots.

These units are available in both bulkhead and flush mount versions. See the optional equipment list at the beginning of this manual and the outline drawing at the back of this manual.

When selecting a mounting location for these units keep the following in mind.

- The temperature and humidity of the mounting location should be moderate and stable.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Keep the analog display unit away from strong magnetic field-generating equipment such as transformer and power generator.

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2 WIRING

2.1 Precautions for Cable Installation

Cable between transducer unit and transceiver unit

This cable carries very weak signals with amplitude of less than 0.1 μV which are easily interfered by noise. Ensure the ground wiring.

Cable between transceiver unit and distribution box

These cables carry echo signals with amplitudes of greater than 0.1 mV which can be interfered by noise from high tension power cables.

- Cable carrying more than few kilowatts power to fluctuating loads.
- Cable carrying switching waves generated by thyristor, etc.
- Transmission antenna cable of radio equipment.

Other cables of DS-80

Observe the following guidelines to prevent noise, interference problem.

- When the cables run in parallel with power cables, separate them 400 mm at minimum.

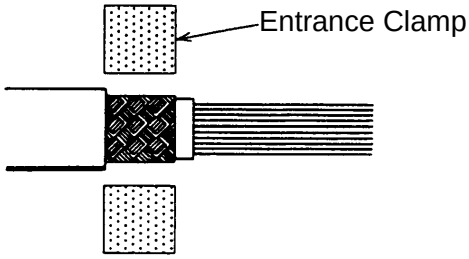
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2.2 Wiring of Distribution Box

The distribution box has two sets of cable clamps, upper for cable DPYCY-1.25/TTYCYS-1 (small hole) and lower for cables TTYCY-2S (medium hole), TTYCY-3S (large hole).
Lay the cables on the clamps as below depending on the terminal board.

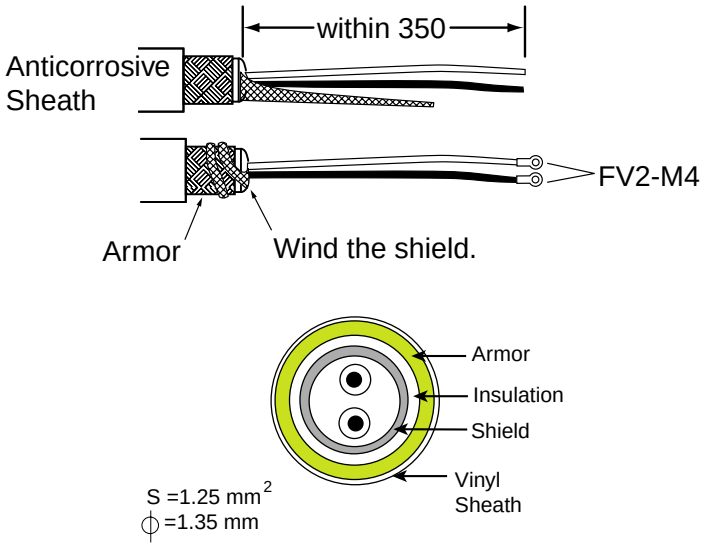
- TB1: Left side
- TB2: Center
- TB3: Right side

Cut the cables slack to bind them at the fixing plate with a cable tie, leaving some slack for future servicing and checking.
All cables except the power cable should be fixed by the clamp with the armor.



Fabrication of DPYCY-1.25/TTYCYS-1 (power cable, contact signal, analog signal, dimmer)

DPYCY-1.25 is a Japan Industrial Standard (JIS) cable. Use the equivalent. DPYCY-1.25 cable doesn't have shield.



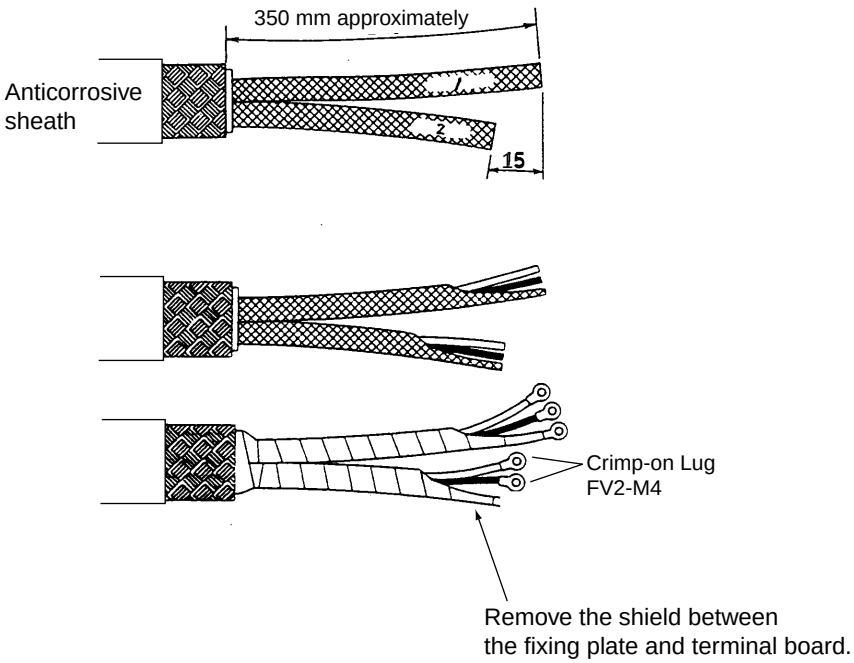
(Sectional view of DPYCY-1.25)

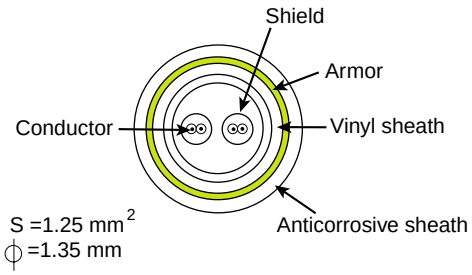
Fabrication of cable DPYCY-1.25/TTYCYS-1

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Fabrication of TTYCY-2S (display unit/digital indicator/distance indicator via terminal box, range switch box)

TTYCY is a Japan Industrial Standard (JIS) cable. Use the equivalent.





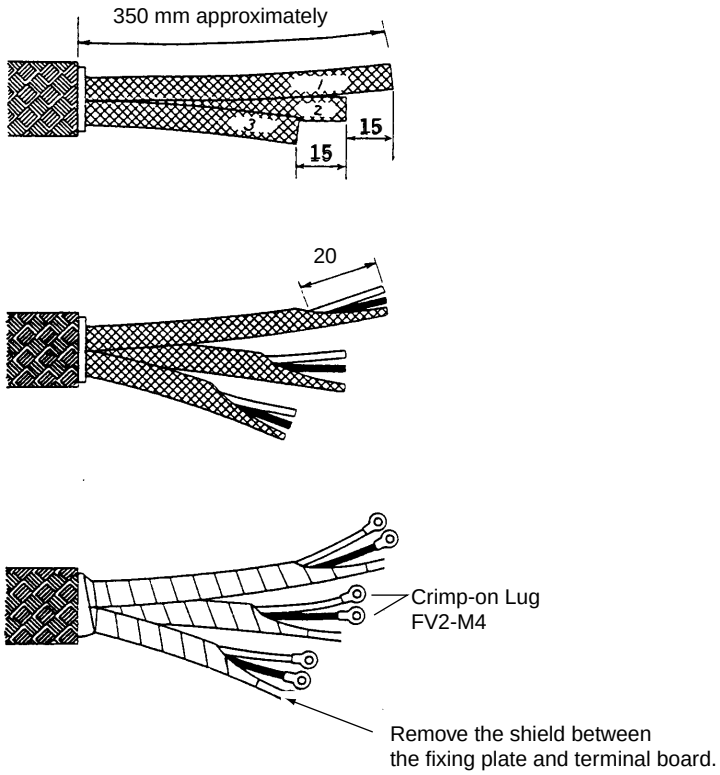
(Sectional view)

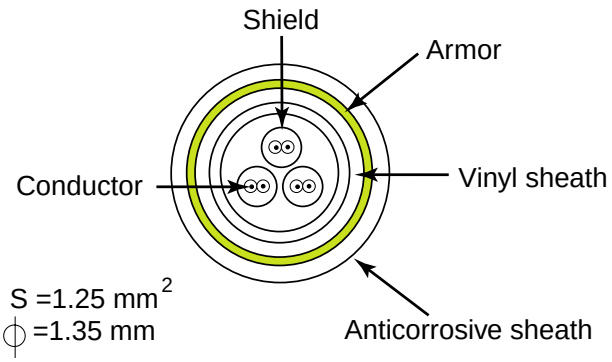
Fabrication of cable TTYCY-2S

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Fabrication of TTYCY-3S (transducer unit)

TTYCY-3S is a Japan Industrial Standard (JIS) cable. Use the equivalent.

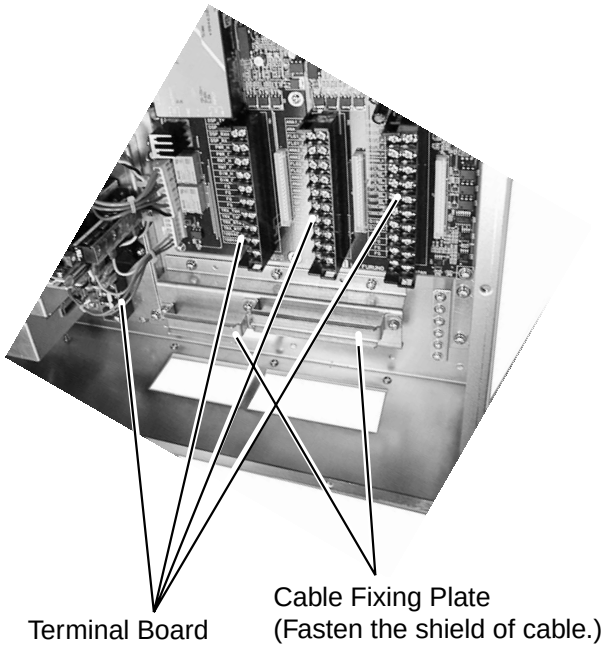


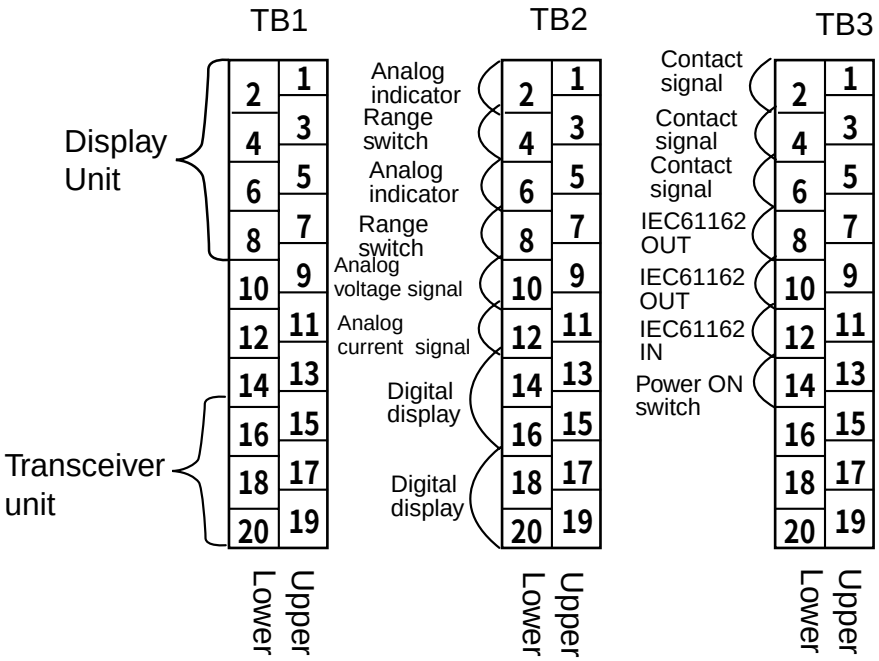


(Sectional view)

Fabrication of cable TTYCY-3S

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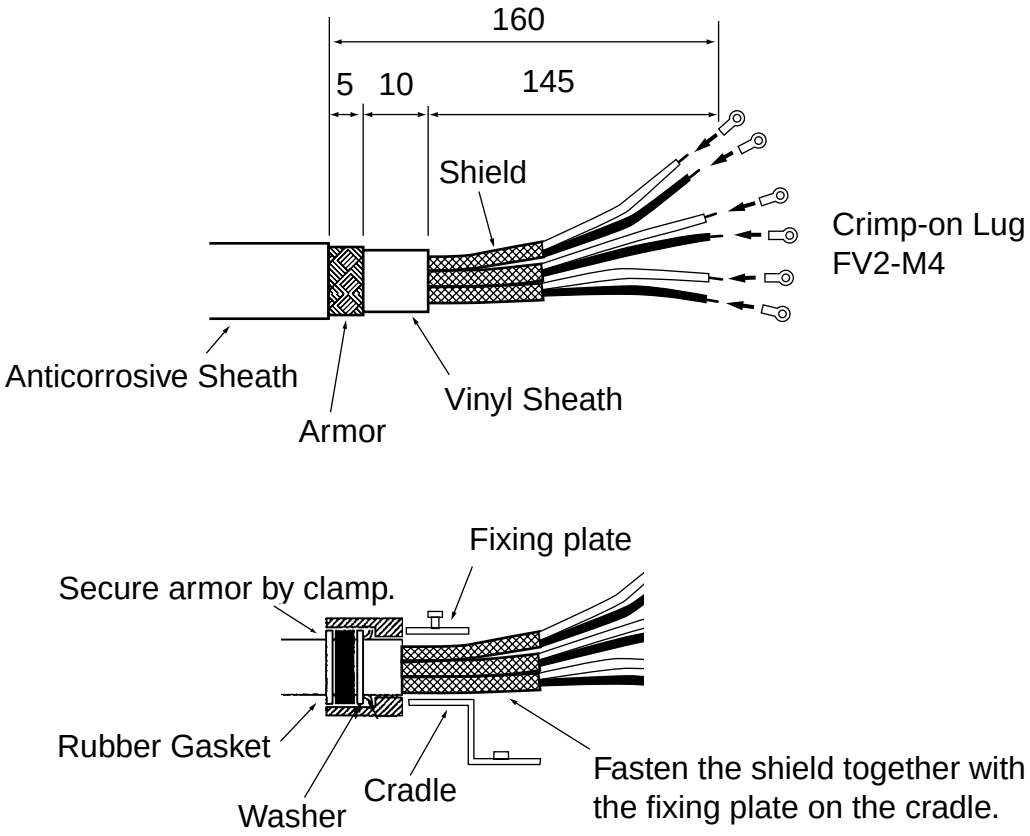
Distribution Box, inside view and terminal boxes

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2.3 Wiring of Transceiver Unit

Fabrication of cable TTYCY-3S, 65S1213/65S1239

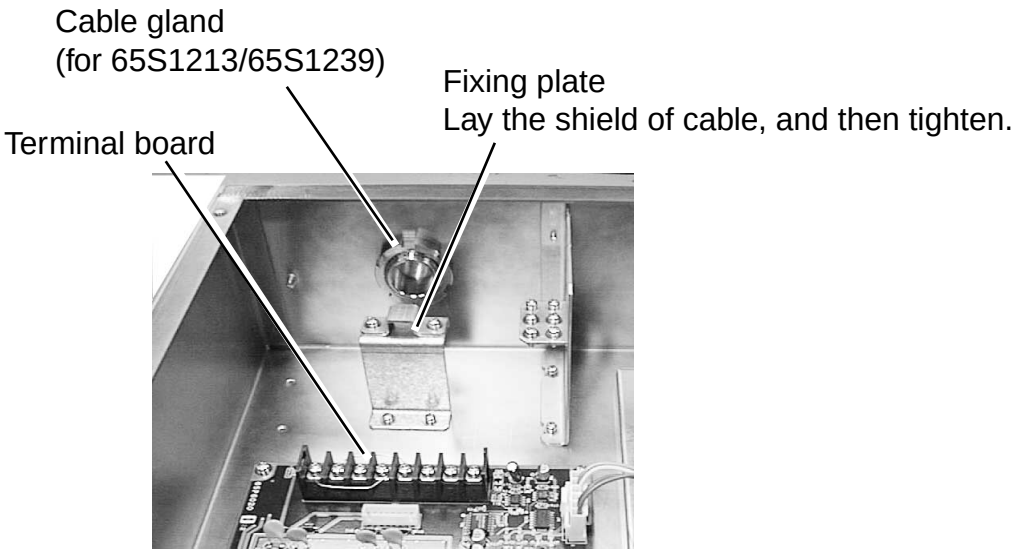
Cut the cables to fix them at the plate in the unit with a cable tie, leaving some slack for servicing and checking ease. Shield wire should be fixed at the plate. Twist pair cables together before connecting to the board.



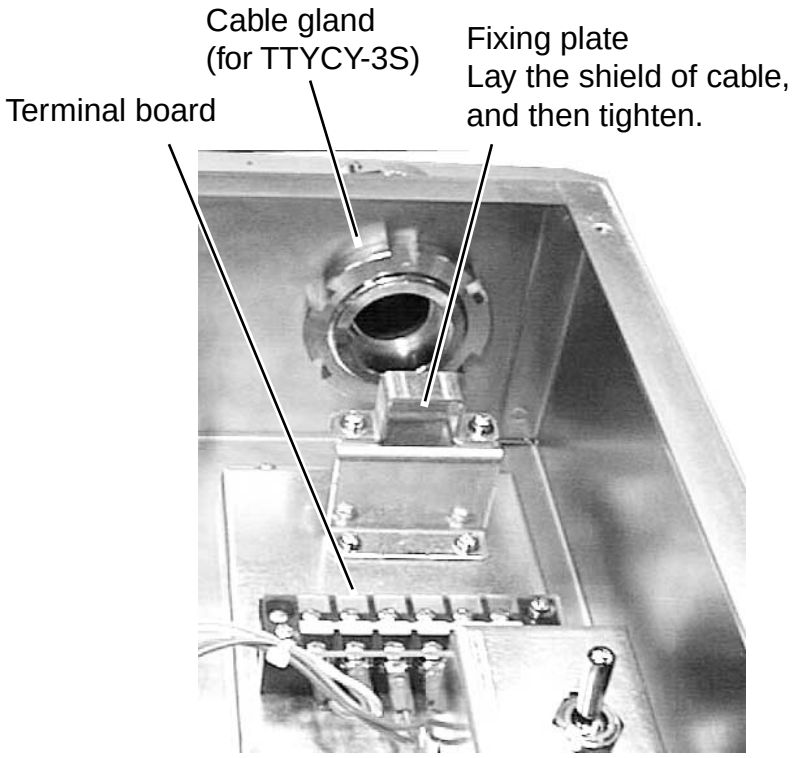
Fabrication of cable TTYCY-3S

When using the optional junction box, fabricate the cable same as the above figure.

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Transceiver unit, inside view 1



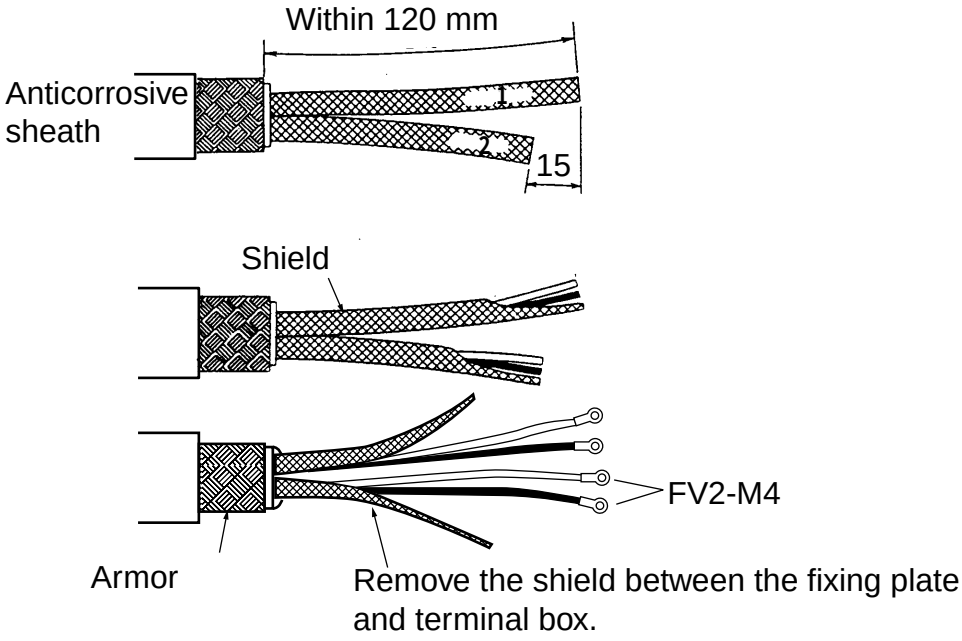
Transceiver unit, inside view 2

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2.4 Wiring of Terminal Box

Fix the cables with the cable tie at the fixing plate. All cables except the power cable should be fixed by the clamp with the armor.

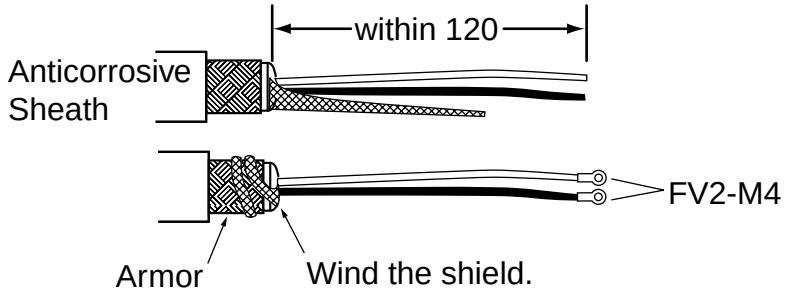
Fabrication of TTYCY-2S (for display unit and digital indicator/distance indicator)



Fabrication of cable TTYCY-3S

TTYCYS-1

Cut vinyl sheath between armor and shield, and wind shield around armor and then lay cable so armor is in the cable clamp.



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20S0251
(for display unit, digital indicator/distance indicator)

- Locate the fuse of the cable inside the terminal box.
- Tape the drain wire, and fix the earth terminal in the terminal box.
- Outer sheath should be fixed in the cable clamp.

65S1231
(for display unit, digital indicator/distance indicator)

Strip the outer sheath by 120 mm, and fasten it by the clamp. Attach the climp-on lug FV0.5-4 to each core.

2.5 Display Unit

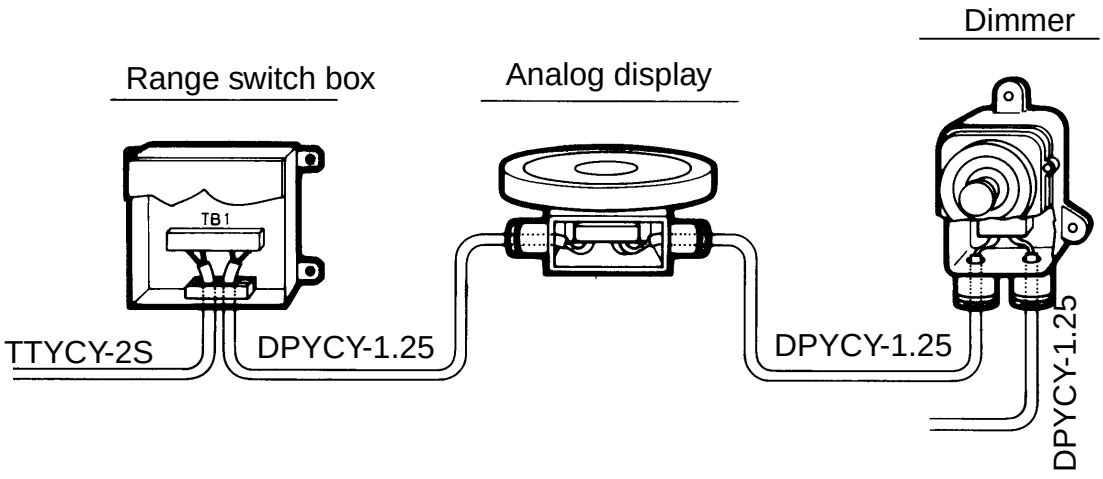
(Digital Indicator, Distance Indicator)

Use the cable assemblies MJ-A7SPF0009-020 and MJ-A6SPF0013-020 (supplied).

Connect the cable at the rear of the display unit, and fabricate the other end of the cable for connection to the terminal box. Refer to the interconnection diagram at the end of this manual.

2.6 Dimmer, Analog Display Unit, Range Switch Box

See the schematic diagram at the back of this manual.



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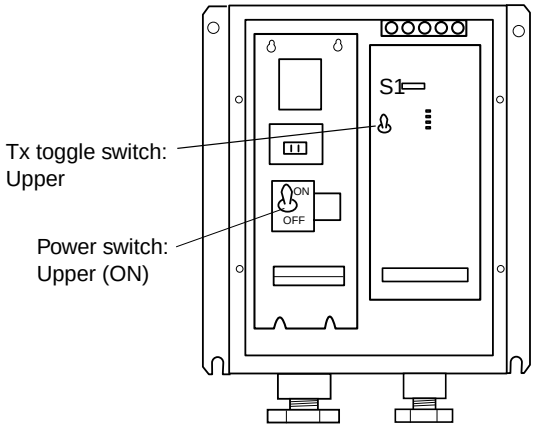
2.7 Grounding

This equipment uses pulse signals which may cause interference to other electronic equipment. It is strongly recommended to ground all cables referring to the guidelines below.

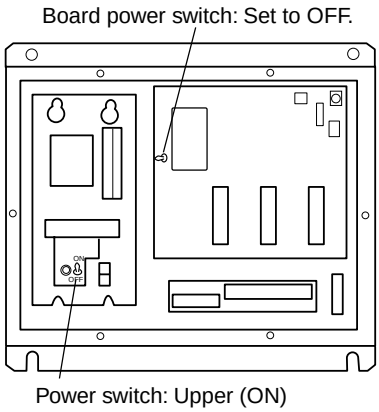
- Separate all units as far as possible from radio equipment.
- Do not run interconnection cables close to or near radio equipment or its cables.
- Run the cables in the shortest path practical.
- Ground all units with a copper strap or earth wire.
- To joint copper straps, use solder cream for perfect contact.

2.8 Wiring Check

After the all wiring, make sure the toggle switches are set as below in the transceiver unit and distribution box.



Transceiver unit DS-810, inside arrangment



Distribution box DS-801, inside arrangement

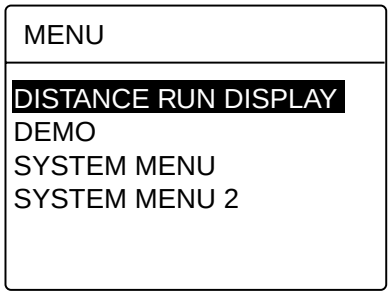
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3 SYSTEM SETTINGS

3.1 Transducer Adjustment

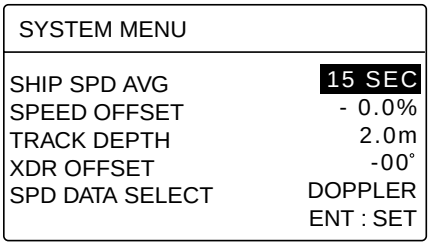
Transducer mounting error, which causes incorrect speed value, can be compensated through the menu (Range: -45° to +45°).

1. Press the [MENU] key to display the main menu.



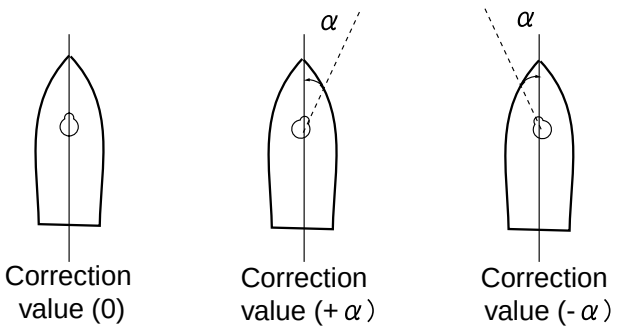
Main menu

2. Select SYSTEM MENU and press the [ENT] key to display the system menu.



System menu

3. Select XDR OFFSET and press the [ENT] key.
4. Press ◀ or ▶ to select the digit or sign (+ or -) you want to change; press ▲ or ▼ to select the digit and +/-. For example, when there is +5° error, enter “+05”.
5. Press the [ENT] key.
7. Press the [MENU] key twice to close the menu.



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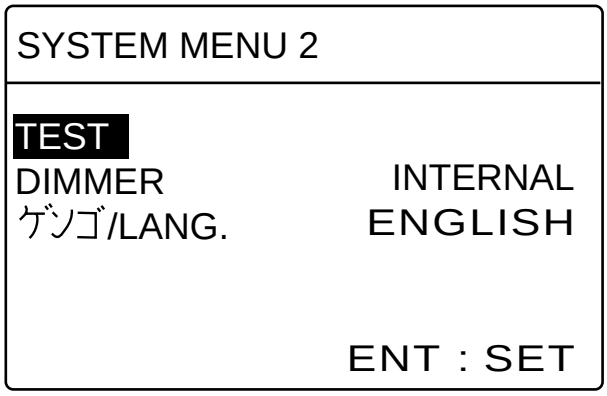
3.2 Setting of System Menu 2

System menu 2 provides for selection of display language and dimmer control, as well as a diagnostic facility.

Dimmer setting

Select the adjustment method of panel dimmer, internal or external.

1. Press the [MENU] key to display the main menu.
2. Select SYSTEM MENU 2 and then press the [ENT] key.



Unit menu

3. Select DIMMER and press the [ENT] key to display the dimmer pop-up window.



Dimmer pop-up dialog

4. Select INTERNAL or EXTERNAL with ▲ or ▼ key.
   INTERNAL: Without external dimmer control.
   EXTERNAL: With an external dimmer.
5. Press the [ENT] key.
6. Press the [MENU] key twice to close the menu.

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Setting of language

The display language can be selected for English or Japanese.

1. Press the [MENU] key to display the main menu.
2. Select SYSTEM MENU 2 and press the [ENT] key to display the system menu 2.
3. Select LANG. And press the [ENT] key to display the language pop-up menu.



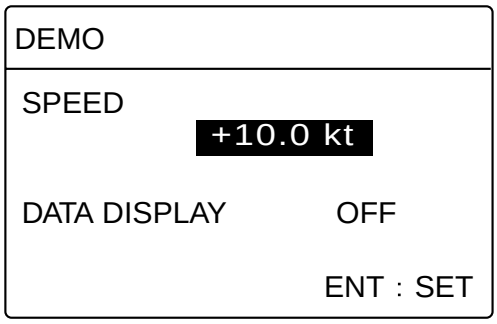
Language pop-up window

4. Select ENGLISH or JAPANESE with ▲ or ▼ key.
5. Press the [ENT] key.
6. Press the [MENU] key twice to close the menu.

3.3 Checking the Interconnection

After installation the equipment do the following to confirm if the doppler speed signal is being output correctly.

1. Press the [MENU] key to display the main menu.
2. Select DEMO, and press the [ENT] key to display the demo menu.



DEMO MODE menu

3. Select SPEED.
4. Press the [ENT] key.
5. Use the cursor pad to enter the speed value desired.
   ▲ ▼ : Change value, +/-
   ◀ ▶ : Change digit
6. Press the [ENT] key.

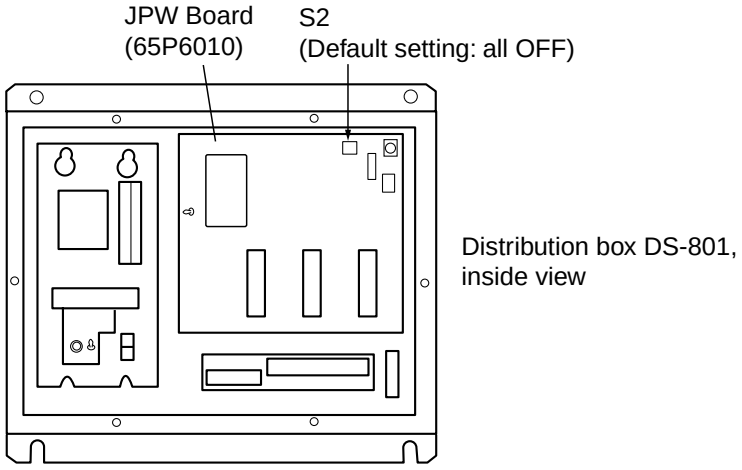
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7. Select DATA OUTPUT and press the [ENT] key.
8. Press ▲ to select ON and press the [ENT] key.
9. Press the [DISP] key.
10. Confirm the value displayed is the same as it entered at step 5.
    Confirm the same as speed is shown on external equipment (radar, GPS, etc.).
11. Select OFF at DATA OUTPUT, and press the [ENTER] key.

3.4 Setting of Maximum Speed Range

Change the maximum range of the connected analog display by setting ofDIP switch S2 in the distribution box.

Maximum speed	20 kt	30 kt	40 kt
S2	#1: ON Others: OFF	All: OFF	#2: ON Others: OFF



Distribution box, cover removed

3.5 Ship's Speed Adjustments

Adjusts the speed error using the test sheet on page AP-3 recorded.

1. Press the [MENU] key.
2. Select SYSTEM MENU, and press the [ENT] key.
3. Select SPEED OFFSET, and press the [ENT] key.
4. Use the cursor pad to enter the digit.
5. Press the [ENT] key.
6. Press the [MENU] key.

For detail, see page AP-1.

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3.6 Setting for Analog Display

When the analog indicator is connected, synchronize the speed displays of DS-80 display unit and analog display as follows.

Analog interface

Current output: 4 to 20 mA (-10 to 30 kt)

Voltage output: -3.3 to 10VDC (-10 to 30 kt)

Connected to TB2 ANA1 (analog 1)

1. Set at 0 knot on the DEMO display, and then adjust R29 in the distribution box so as that the analog display shows 0 knots.
2. Set at 30 knots on the DEMO display, and then adjust R40 in the distribution box so as that the analog display shows 30 knots.

Connected to TB2 ANA2 (analog 2)

1. Set at 0 knots on the DEMO display, and then adjust R27 in the distribution box so as that the analog display shows 0 knots.
2. Set at 30 knots on the DEMO display, and then adjust R36 in the distribution box so as that the analog display shows 30 knots.

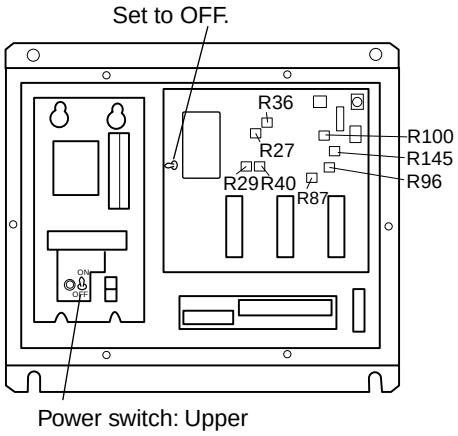
Connected to TB2 ANAV (analog voltage signal)

1. Set at 0 knots on the DEMO display, and then adjust R100 in the distribution box so as that the analog display shows 0 knots.
2. Set at 30 knots on the DEMO display, and then adjust R145 in the distribution box so as that the analog display shows 30 knots.

Connected to TB2 ANAC (analog current signal)

1. Set at -10 knots on the DEMO display, and then adjust R87 in the distribution box so as that the current is 4 mA.
2. Set at +30 knots on the DEMO display, and then adjust R96 in the distribution box so as that the current is 20 mA.

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Distribution box DS-801

3.7 DIP Switch Settings

JPW Board (65P6010)

S4-#6

The default setting (OFF) outputs only sentences VBW and VLW of all NMEA sentences input.

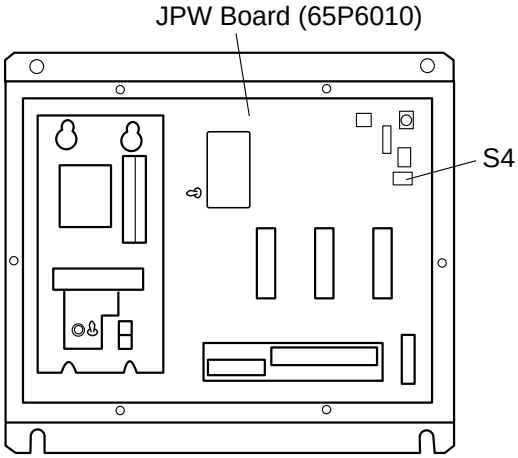
DIP switch S4-#6 setting	OFF	ON
Output NMEA sentences	VBW, VLW	All NMEA sentences

S4-#8

Select whether to output or don't output the distance run pulse if an error occurs, when DOPPLER is selected at SPD DATA in the SYSTEM MENU.

DIP switch S4-#8	OFF	ON
Distance run pulse	Output stopped	Output not stopped

Note: S4 #1-#5, #7, S2 #3, #4 should remain OFF, the default setting.



Distribution box, cover removed

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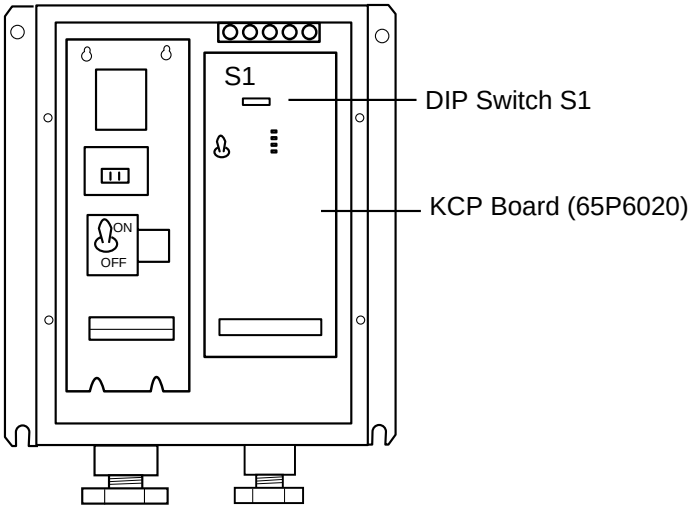
KCP Board (65P6020)

S1-#6

Turn on/off flashing of the indication “STW” when the thermistor value is abnormal.

DIP switch S1-#6	OFF	ON
“STW” flashing	No flashing	Flashing (default setting)

Note: S1 #1 - #5, #7, #8 should remain OFF, the default setting.



Transceiver unit DS-810

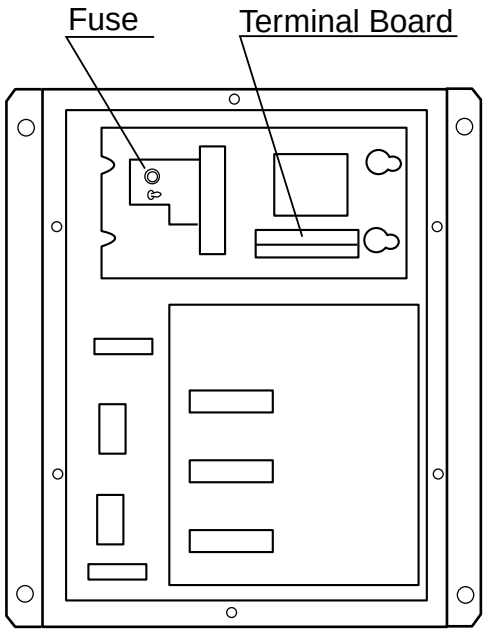
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4 CHANGING AC POWER TAP

The DS-80 is shipped from the factory ready for connection to the ordered AC power supply.

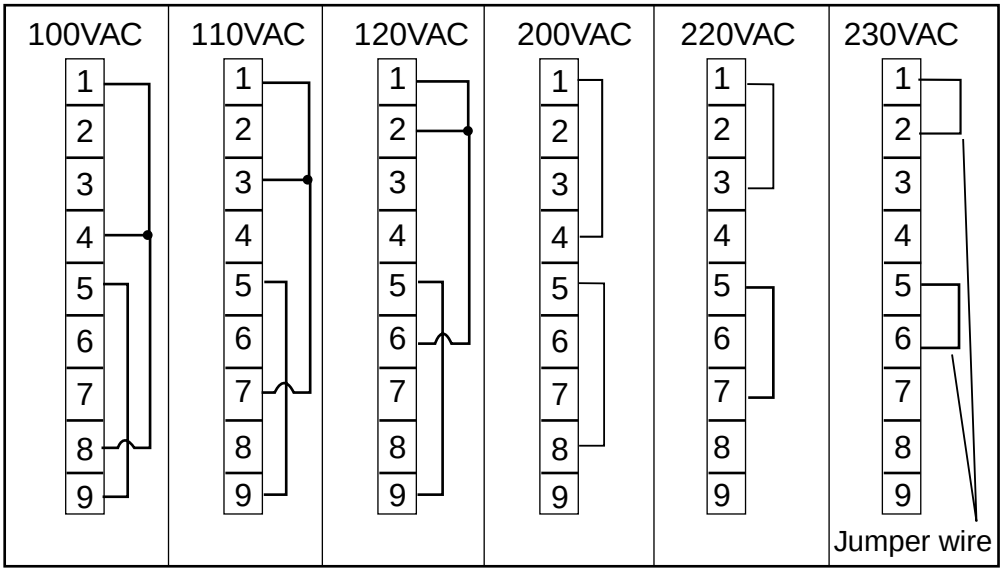
To connect to a different AC power supply, change the jumper wiring on the terminal board as shown on the next page.

Note: Replacement of fuse is not required; 3A fuse is commonly used.



Distribution box, cover removed

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AC power supply and jumper wires on the terminal board in the distribution box

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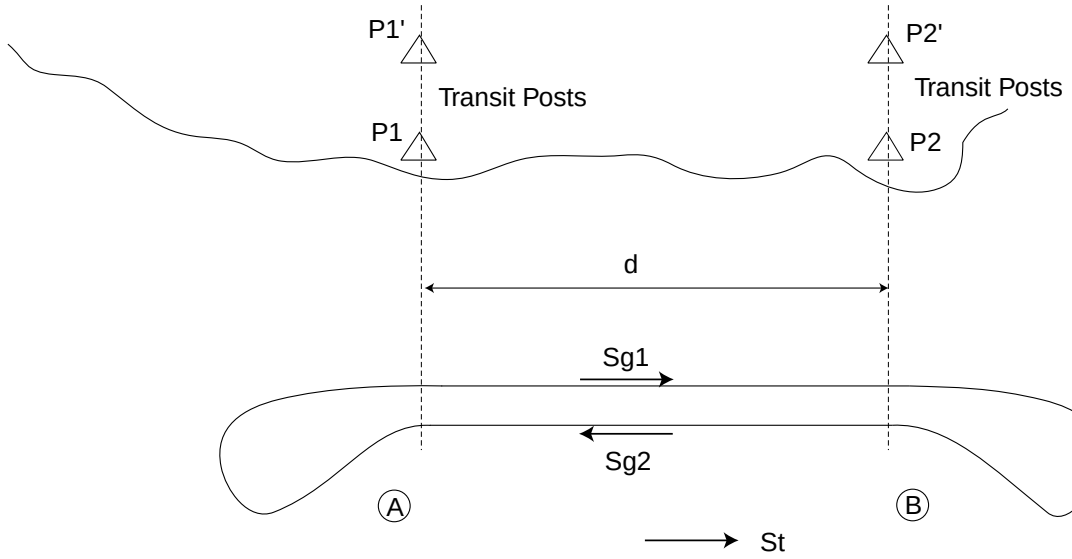
Milepost run

It is common practice to check a new ship's performance at an official trial run. Take this opportunity to calibrate the DS-80.

In practice, the ship speed is evaluated as follows.

1. Calculation with transit posts

Steer the ship at a steady speed on the test course, e.g. A →B in the illustration. Speed is obtained from the following equations. Note that Sg1 and Sg2 are both speeds over the ground (SOG); however the DS-80 provides the speed through the water. To find the speed through the water, a return trip is necessary.



Sg1 = d/t1 X 3600 (kt)……..(1)

Sg2 = d/t2 X 3600 (kt)……..(2)

Sw + St = Sg1 (kt)…..(3)

Sw – St = Sg2 (kt)…..(4)

Adding (4) and (3), we get;

2Sw = Sg1 + Sg2 (kt)

Therefore, Sw = (Sg1 + Sg2)/2 (kt)….(5)

where,

d = distance run (nm),

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t1 = time taken to run 1 (second),

t2 = time taken to run 2 (second). (Note: Runs 1 and 2 are in opposite direction.)

Sw = Speed through the water (kt),

St = Speed of tide current (kt),

Sg1 = SOG for run 1 (kt),

Sg2 = SOG for run 2 (kt).

Thus we can find a speed through the water by making a round tip.

2. Calculation with DS-80

To measure the distance run between points A and B by DS-80, do the following:

1. Reset the distance run figure of DS-80 to zero by selecting ON at RESET on the DISTANCE RUN DISPLAY menu at the moment the ship passes point A.
2. Run the ship from A to B at full speed, timinh with a stopwatch.
3. Read the distance run (nm) and time taken to run (second) exactly at the moment the ship passes point B.
4. Run the ship from B to A at full speed reerrinh to step 1 through 3.

Where,

n1 (nm) = distance run from A to B measured by DS-80

n2 (nm) = distance run from B ro A measured by DS-80

Therefore, the average run from A to B measured by DS-80

Therefore, the average ship speeds of run 1 and run 2 are calculated as follows.

Slog1 (kt) = n1/t1 X 3600

Slog2 (kt) = n2/t1 X3600

The average ship speed of round trip is Slog (kt) = (Slog1 + Slog2)/2. ……. (6)

3. Speedlog error

From (5) and (6),

Error = (Sw - Slog)/Slog X 100 (%)….. (7)

This error can be corrected at SPEED OFFSET on the system menu as follows:.

1. Press the [MENU] key.
2. Select SYSTEM MENU and press the [ENT] key.
3. Select SPEED OFFSET and press the [ENT] key.
4. Enter the value of error.

Repeat the above procedure several times to satisfy the speed accuracy specification.

CALIBRATION SHEET FOR DS-80 DOPPLER SPEED LOG

DATE: TEST SITE SHIP'S LENGTH (M) DRAFT Fore Aft Mean (m)
SHIP'S NAME Ser. No. DOCKYARD TRIM (m)

Location of Transducer (m) from bow or frame No.

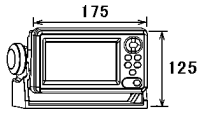
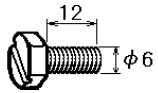
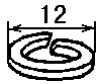
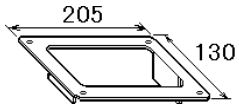
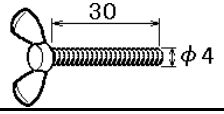
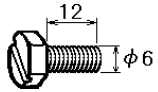
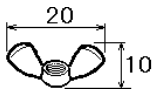
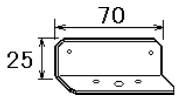
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	LOAD	OUT	RPM	RADIO LOG/ MILE POST		DISTANCE RUN (n. m.)		ERROR						
				KTS	TIME (s)	SPEED (kt)	TIME (s)	(%)						
MEAN														
MEAN														
MEAN														
MEAN														

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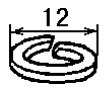
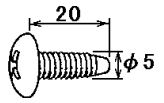
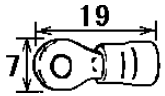
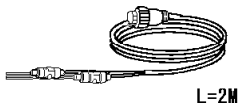
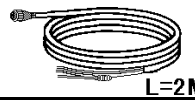
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PACKING LIST DS-800

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
主指示器 MAIN DISPLAY		DS-800 000-029-012**	1
付属品 ACCESSORIES FP65-00401			
六角ﾎﾞﾙﾄ ｽﾘ割り HEX.BOLT(SLOTTED HEAD)		M6X12 SUS304 000-862-127	2
ﾊﾞﾈ座金 SPRING WASHER		M6 SUS304 000-864-260	2
化粧ﾊﾟﾈﾙ COSMETIC PANEL		20-016-1051-0 100-251-370	1
付属品 ACCESSORIES FP65-00402			
蝶ﾎﾞﾙﾄ WING SCREW		M4X30 YBSC2 MBNI2 000-804-799	4
六角ﾎﾞﾙﾄ ｽﾘ割り HEX.BOLT(SLOTTED HEAD)		M6X12 SUS304 000-862-127	2
蝶ﾅｯﾄ WING NUT		M4 YBSC2 MBNI2 000-863-306	4
ﾌﾗｯｼｭﾏｳﾝﾄ FIXING PLATE FOR FLUSH MOUNT		20-007-2401-0 100-183-190	2

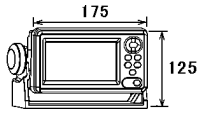
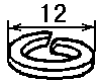
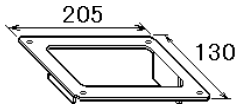
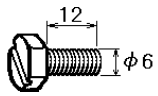
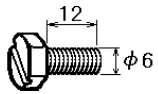
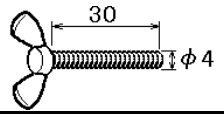
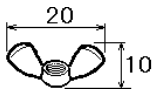
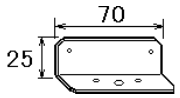
注記）1.ｺｰﾄﾞ番号末尾の[**]は、選択部品の代表ｺｰﾄﾞ番号を表します。
CODE NUMBER ENDED BY "**" INDICATES THE NUMBER OF TYPICAL MATERIAL.

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ﾊﾞﾈ座金 SPRING WASHER		M6 SUS304 000-864-260	2
付属品 ACCESSORIES FP65-00403			
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ TAPPING SCREW		5X20 SUS304 1種 ｸﾛ 000-802-840	4
工事材料 INSTALLATION MATERIALS CP65-00801			
圧着端子 CRIMP-ON LUG		FV0.5-4 ｷ(YEL) 000-107-268	20
その他工材 OTHER INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A7SPF0009-020 000-145-612	1
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A6SPF0013-020 000-142-658	1

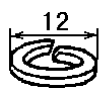
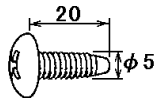
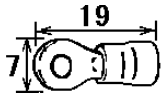
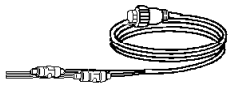
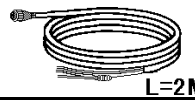
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

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PACKING LIST DS-830

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
ﾃﾞｼﾞﾀﾙ指示器 DIGITAL INDICATOR		DS-830 000-029-014**	1
付属品 ACCESSORIES FP65-00401			
ﾊﾞﾈ座金 SPRING WASHER		M6 SUS304 000-864-260	2
化粧ﾊﾟﾈﾙ COSMETIC PANEL		20-016-1051-0 100-251-370	1
六角ﾎﾞﾙﾄ ｽﾘ割り HEX.BOLT(SLOTTED HEAD)		M6X12 SUS304 000-862-127	2
付属品 ACCESSORIES FP65-00402			
六角ﾎﾞﾙﾄ ｽﾘ割り HEX.BOLT(SLOTTED HEAD)		M6X12 SUS304 000-862-127	2
蝶ﾎﾞﾙﾄ WING SCREW		M4X30 YBSC2 MBNI2 000-804-799	4
蝶ﾅｯﾄ WING NUT		M4 YBSC2 MBNI2 000-863-306	4
ﾌﾗｯｼｭﾏｳﾝﾄ FIXING PLATE FOR FLUSH MOUNT		20-007-2401-0 100-183-190	2

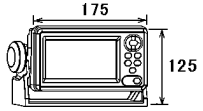
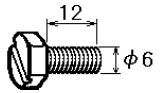
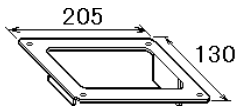
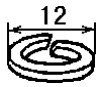
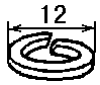
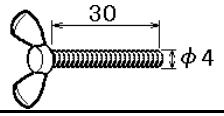
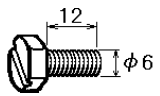
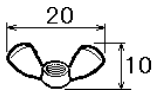
注記）1.ｺｰﾄﾞ番号末尾の[**]は、選択部品の代表ｺｰﾄﾞ番号を表します。
CODE NUMBER ENDED BY "**" INDICATES THE NUMBER OF TYPICAL MATERIAL.

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ﾊﾞﾈ座金 SPRING WASHER		M6 SUS304 000-864-260	2
付属品 ACCESSORIES FP65-00403			
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ TAPPING SCREW		5X20 SUS304 1種 ｸﾛ 000-802-840	4
工事材料 INSTALLATION MATERIALS CP65-00801			
圧着端子 CRIMP-ON LUG		FV0.5-4 ｷ(YEL) 000-107-268	20
その他工材 OTHER INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A7SPF0009-020 000-145-612	1
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A6SPF0013-020 000-142-658	1

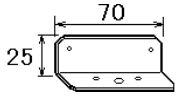
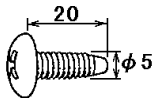
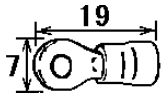
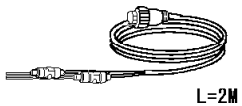
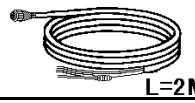
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

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PACKING LIST DS-840

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
航程計 REMOTE DISTANCE INDICATOR		DS-840 000-029-016**	1
付属品 ACCESSORIES FP65-00401			
六角ﾎﾞﾙﾄ ｽﾘ割り HEX.BOLT(SLOTTED HEAD)		M6X12 SUS304 000-862-127	2
化粧ﾊﾟﾈﾙ COSMETIC PANEL		20-016-1051-0 100-251-370	1
ﾊﾞﾈ座金 SPRING WASHER		M6 SUS304 000-864-260	2
付属品 ACCESSORIES FP65-00402			
ﾊﾞﾈ座金 SPRING WASHER		M6 SUS304 000-864-260	2
蝶ﾎﾞﾙﾄ WING SCREW		M4X30 YBSC2 MBNI2 000-804-799	4
六角ﾎﾞﾙﾄ ｽﾘ割り HEX.BOLT(SLOTTED HEAD)		M6X12 SUS304 000-862-127	2
蝶ﾅｯﾄ WING NUT		M4 YBSC2 MBNI2 000-863-306	4

注記）1.ｺｰﾄﾞ番号末尾の[**]は、選択部品の代表ｺｰﾄﾞ番号を表します。
CODE NUMBER ENDED BY "**" INDICATES THE NUMBER OF TYPICAL MATERIAL.

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ﾌﾗｯｼｭﾏｳﾝﾄ FIXING PLATE FOR FLUSH MOUNT		20-007-2401-0 100-183-190	2
付属品 ACCESSORIES FP65-00403			
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ TAPPING SCREW		5X20 SUS304 1種 ｸﾛ 000-802-840	4
工事材料 INSTALLATION MATERIALS CP65-00801			
圧着端子 CRIMP-ON LUG		FV0.5-4 ｷ(YEL) 000-107-268	20
その他工材 OTHER INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A7SPF0009-020 000-145-612	1
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A6SPF0013-020 000-142-658	1

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

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FURUNO

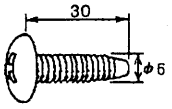
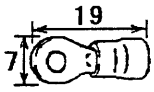
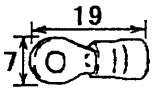
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TYPE	CP65-00901	1/1

工事材料表

INSTALLATION MATERIALS

DS-80

ﾄﾞｯﾌﾟﾗｰｽﾋﾟｰﾄﾞﾛｸﾞ
DOPPLER SPEED LOG
分配器用
FOR DISTRIBUTION BOX

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	+ﾄﾗｽﾀｯﾋﾟﾝｸﾞﾈｼﾞ 1種 TAPPING SCREW		6X30 SUS304 CODE NO. 000-802-085	4	
2	圧着端子 CRIMP-ON LUG		FV0.5-4 ｷ(YEL) CODE NO. 000-107-268	20	
3	圧着端子 CRIMP-ON LUG		FV2-M4 CODE NO. 000-536-716	80	

DWG NO.
C7247-M01- A

FURUNO ELECTRIC CO ., LTD

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

www.reelschematic.com

FURUNO

CODE NO.	002-888-470	65AD-X-9402 -0
TYPE	CP65-00902	1/1

工事材料表

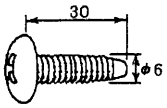
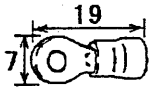
INSTALLATION MATERIALS

DS-80

ドップラースピードログ

DOPPLER SPEED LOG

送受信器用
FOR TRANSCEIVER UNIT

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	+トラスタッピングネジ 1種 TAPPING SCREW		6X30 SUS304 CODE NO. 000-802-085	4	
2	圧着端子 CRIMP-ON LUG		FV2-M4 CODE NO. 000-536-716	20	

DWG NO. C7247-M02- A

FURUNO ELECTRIC CO ., LTD

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www.reelschematic.com

FURUNO

CODE NO.	002-888-480	65AD-X-9403 -0
TYPE	CP65-00903	1/1

工事材料表

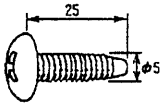
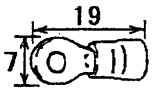
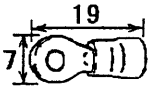
INSTALLATION MATERIALS

DS-80

ﾄﾞｯﾌﾟﾗｰｽﾋﾟｰﾄﾞﾛｸﾞ

DOPPLER SPEED LOG

端子台箱用
FOR TERMINAL BOX

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	+ﾄﾗｽﾀｯﾋﾟﾝｸﾞﾈｼﾞ 1種 TAPPING SCREW		5X25 SUS304 CODE NO. 000-802-082	4	
2	圧着端子 CRIMP-ON LUG		FV0.5-4 ｷ(YEL) CODE NO. 000-107-268	20	
3	圧着端子 CRIMP-ON LUG		FV2-M4 CODE NO. 000-536-716	30	

DWG NO.
C7247-M03- A

FURUNO ELECTRIC CO ., LTD

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

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FURUNO

CODE NO.	002-888-500	65AD-X-9404 -0
TYPE	CP65-01001	1/1

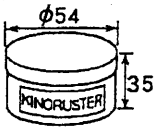
工事材料表

INSTALLATION MATERIALS

DS-850/781
DS-782/783
DS-784/786

船底部

HULL UNIT

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	キノラスタ KINORUSTER		855 50G イリ CODE NO. 000-801-328	1	

DWG NO.
C7247-M04- A

FURUNO ELECTRIC CO ., LTD

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

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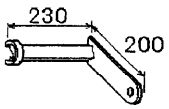
FURUNO

CODE NO.	002-888-510	65AD-X-9501 -1
TYPE	FP65-00501	1/1

付属品表

ACCESSORIES

DS-80

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	締付ﾊﾝﾄﾞﾙ TIGHTENING HANDLE		65-007-6007-2 CODE NO. 100-278-892	1	

DWG NO.
C7247-F01- B

FURUNO ELECTRIC CO., LTD.

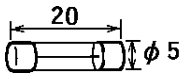
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

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FURUNO

CODE NO.	002-889-730	65AD-X-9303 -1 1/1
TYPE	SP65-00601	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY			REMARKS/CODE NO.
				WORKING PER SET	WORKING PER VES	SPARE	
1	ﾋｭｰｽﾞ FUSE		FGMB 1A 125V			2	000-114-805

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C7247-P03-B	1/1

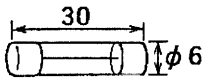
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

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FURUNO

CODE NO.	002-888-440	65AD-X-9301 -1
TYPE	SP65-00701	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL
	DS-80 ドップラースピードログ DOPPLER SPEED LOG	分配器 DISTRIBUTION BOX	

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	QUANTITY SPARE	REMARKS/CODE NO.
1	ヒューズ FUSE		FGBO 3A AC250V	1		2	000-549-021

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C7247-P01- B	1/1

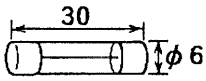
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

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FURUNO

CODE NO.	002-888-450	65AD-X-9302 -1
TYPE	SP65-00702	BOX NO. P

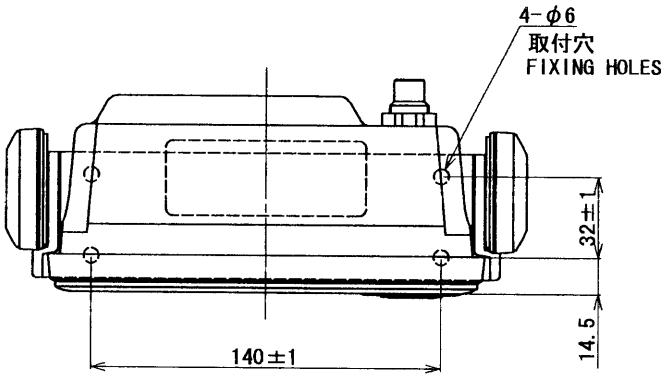
SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL
	DS-80 ﾄﾞｯﾌﾟﾗｰｽﾋﾟｰﾄﾞﾛｸﾞ DOPPLER SPEED LOG	送受信器用 TRANSCIVER UNIT	

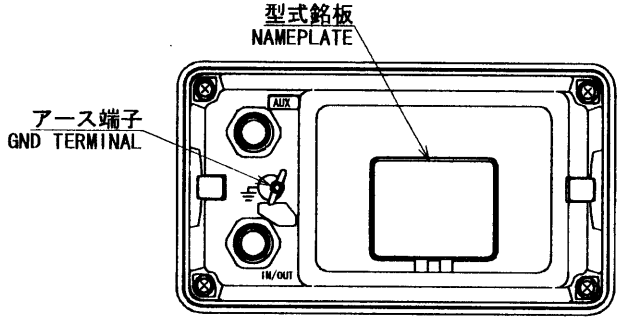
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	QUANTITY SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ FUSE		FGBO 1A AC250V	1		2	000-549-019

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C7247-P02- B	1/1

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

FURUNO

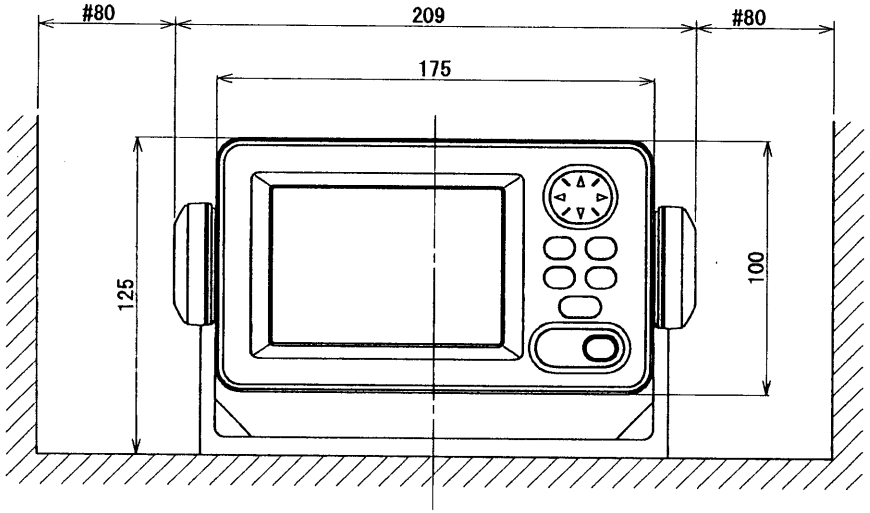


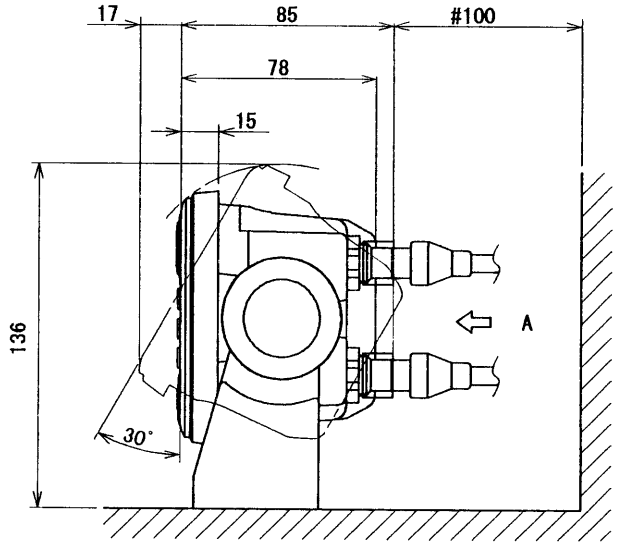


矢視 A
VIEW A

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

表 1
TABLE 1





注 記

1） #印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表１による。
3） 取付用ネジはトラスタッピンネジ呼び径５×２０を使用のこと。
4） 装備ケーブルはサービス時、本体を前方に十分引き出せるよう余裕を持たせること。

NOTE

1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE TAPPING SCREWS 5x20 FOR FIXING UNIT.
4. KEEP SUFFICIENT CABLE LENGTH BEHIND UNIT.

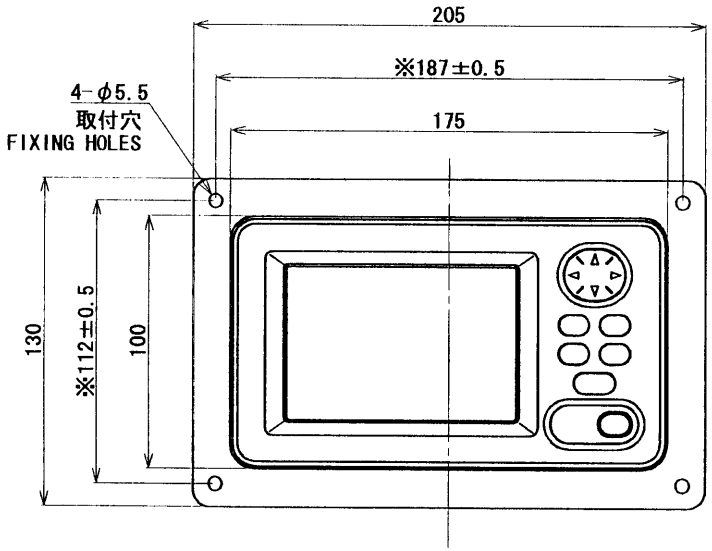
DRAWN Mar 17 '00 T.YAMASAKI			TITLE DS-800/830/840
CHECKED Mar 17 '00 Y.Kimura			名称 主指示器/デジタル指示器/航程計(卓上装備)
APPROVED Mar 17 '00 T.Kimura	DS-80		外寸図
SCALE 1/3	MASS ±10% 0.60 kg		NAME DISPLAY UNIT (DESKTOP MOUNT) DIGITAL INDICATOR / DISTANCE INDICATOR
DWG. No. C7247-G01- D	65-007-1000-G2		OUTLINE DRAWING

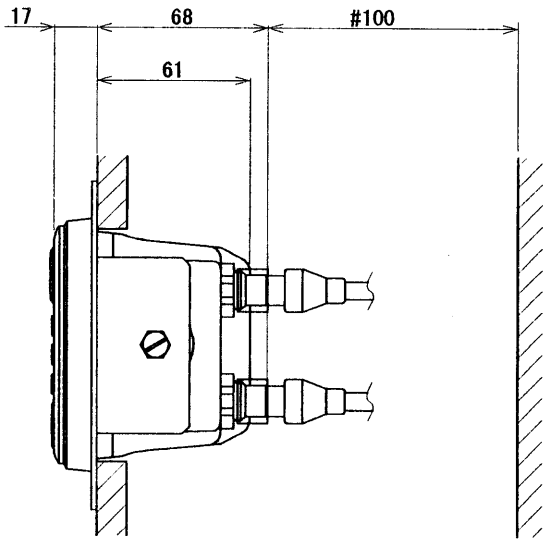
FURUNO ELECTRIC CO., LTD.

D-1

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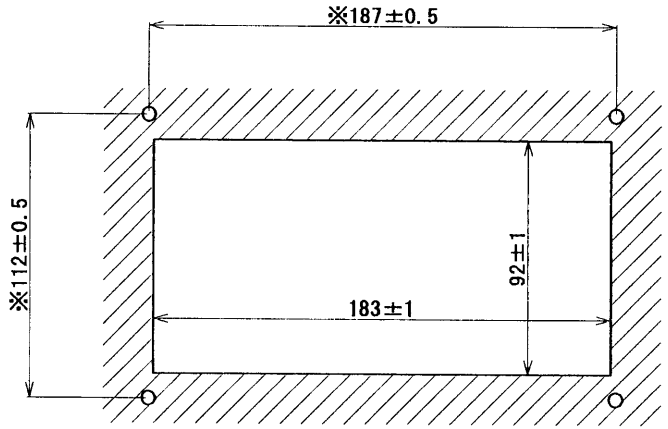
FURUNO





寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 ＜ L ≦ 50	±1．5
50 ＜ L ≦ 100	±2．5
100 ＜ L ≦ 500	±3

表 1
TABLE 1



取付穴寸法図（参考図）
CUTOUT DIMENSIONS

注 記

1） #印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表１による。
3） 取付用ネジはタッピンネジ呼び径５×２０を使用のこと。
4） ※印寸法は取付穴位置寸法とする。

NOTE

1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE TAPPING SCREWS 5x20 FOR FIXING UNIT.
4. ※: DIMENSION OF FIXING HOLES PITCH.

DRAWN Mar 17 '00 T.YAMASAKI			TITLE DS-800/830/840
CHECKED Mar 17 '00			名称 主指示器/デジタル指示器/航程計(埋込装備F)
APPROVED Mar 17 '00	DS-80		外寸図
SCALE 1/3	MASS ±10% 0.60 kg		NAME DISPLAY UNIT (FLASH MOUNT F) DIGITAL INDICATOR / DISTANCE INDICATOR
DWG. No. C7247-G02- D	65-007-1010-G2		OUTLINE DRAWING

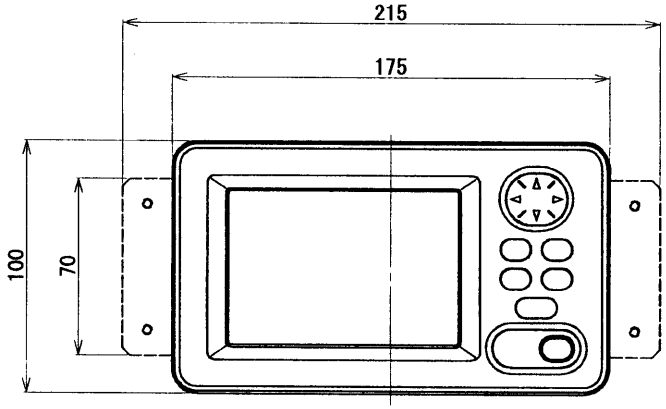
FURUNO ELECTRIC CO., LTD.

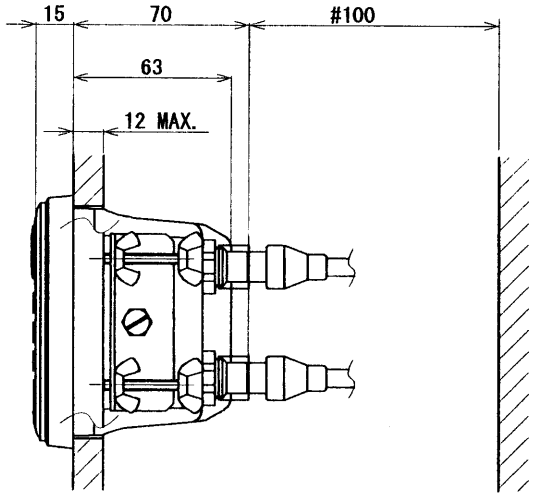
www.reelschematic.com

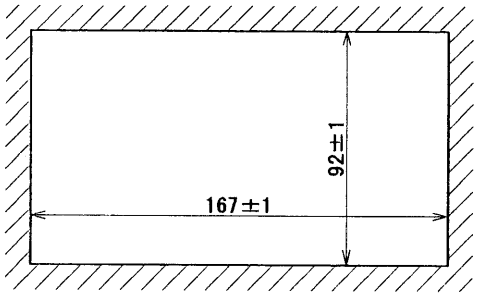
FURUNO

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0＜L≦50	±1．5
50＜L≦100	±2．5
100＜L≦500	±3

表 1
TABLE 1







取付穴寸法図（参考図）
CUTTING DIMENSIONS

注 記 1） #印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表１による。

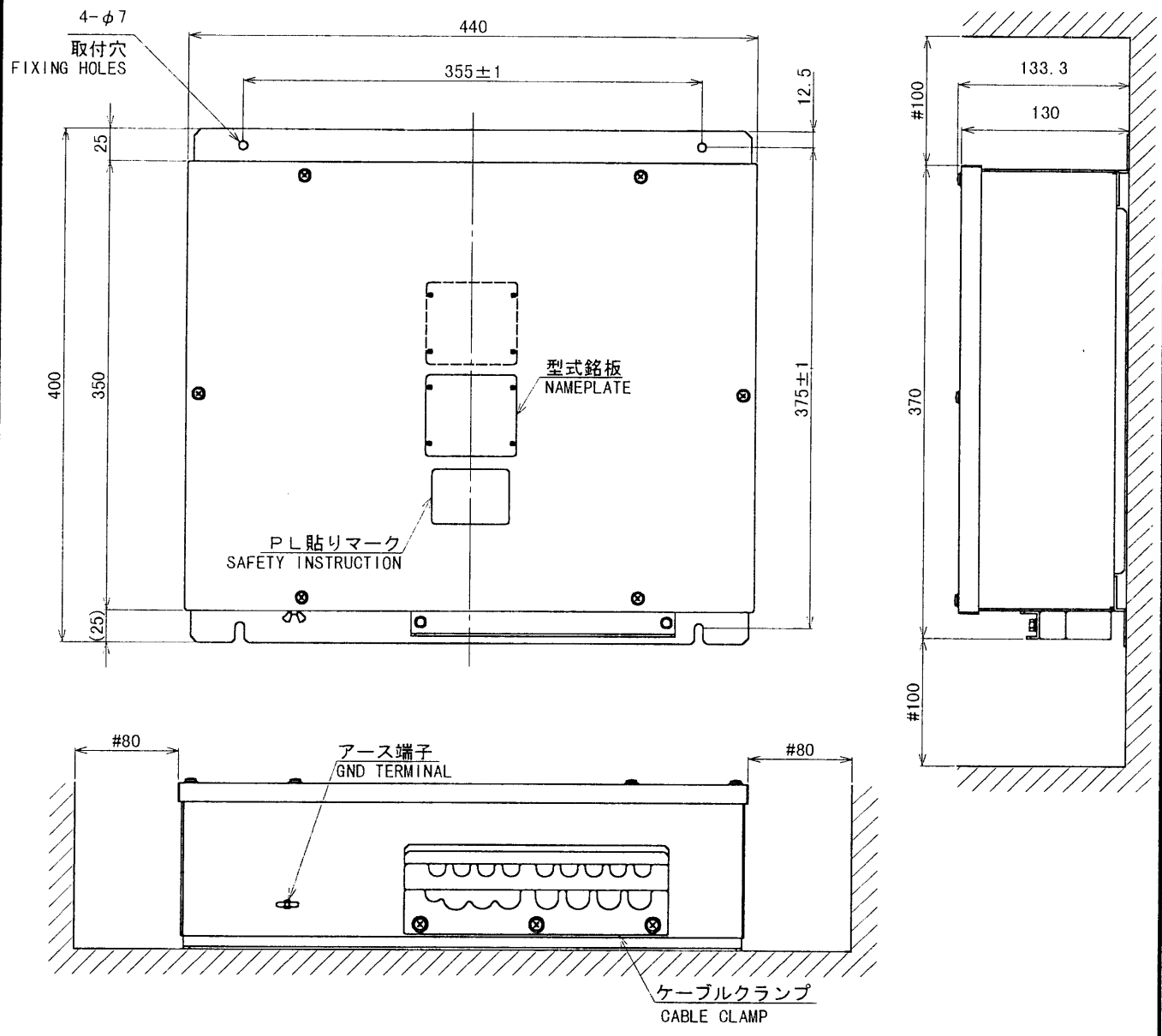
NOTE 1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN T.YAMASAKI '00.7.7			TITLE DS-800/830/840
CHECKED Y.Kuni '00.7.11			名称 主指示器/デジタル指示器/航程計(埋込装備S)
APPROVED Y.Kuni '00.7.17	DS-80		外寸図
SCALE 1/3	MASS ±10% 0.58 kg		NAME DISPLAY UNIT (FLASH MOUNT S) DIGITAL INDICATOR / DISTANCE INDICATOR
DWG. No. C7247-G03- D	65-007-1020-G2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

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注　記　1）　#印寸法は最小サービス空間寸法とする。
2）　指定外の寸法公差は表１による。
3）　取付用ネジは＋トラスタッピンネジ６Ｘ３０を使用のこと。
4）　装備ケーブルの端末処理は装備要領書参照のこと。

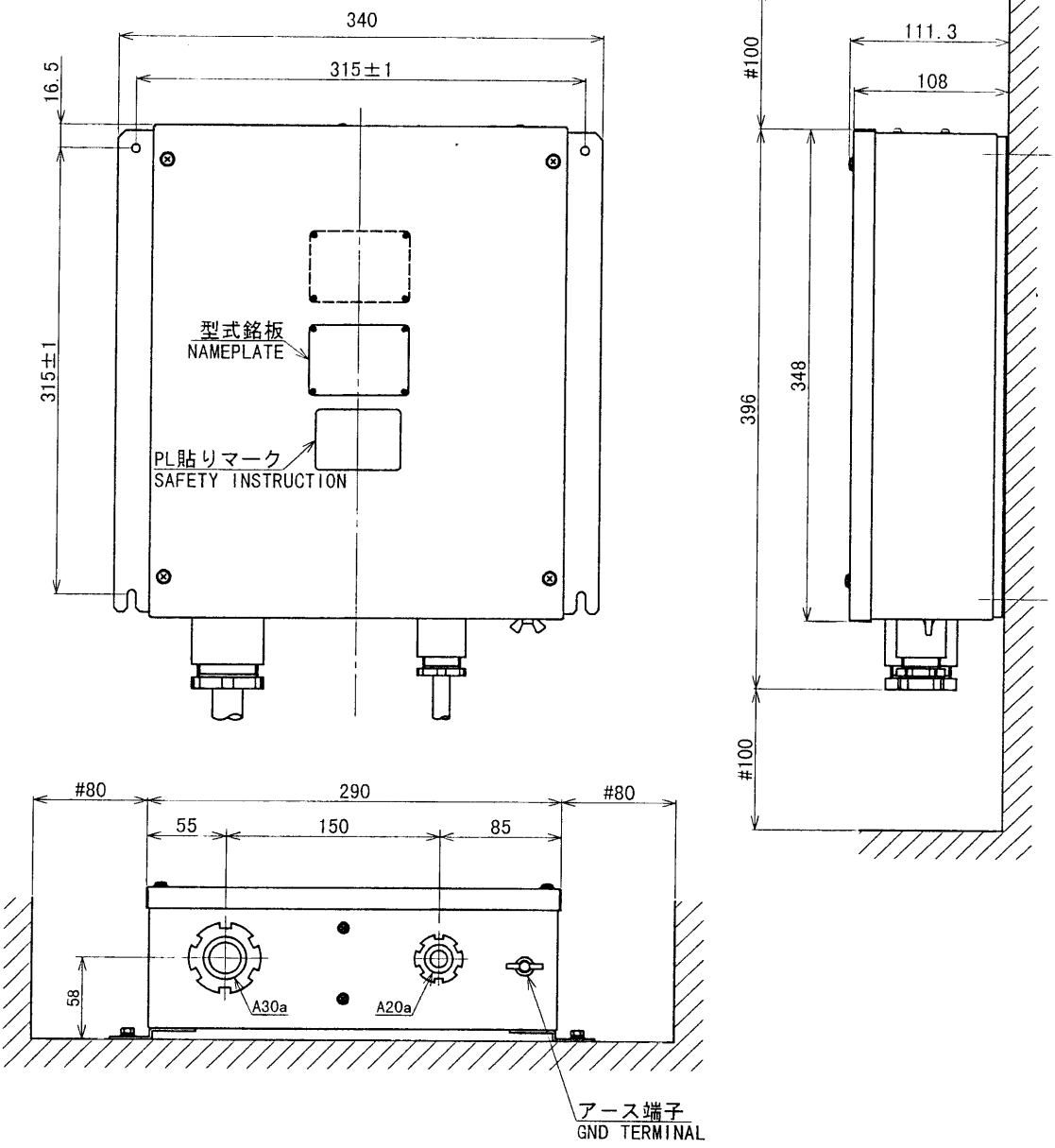
NOTE　1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE TAPPING SCREWS 6x30 FOR FIXING UNIT.
4. REFER TO INSTALLATION INSTRUCTIONS FOR FABRICATION OF CABLE ENDS.

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
0＜L≦50	±1．5
50＜L≦100	±2．5
100＜L≦500	±3

表 1
TABLE 1

DRAWN Feb22'00 T.YAMADA			TITLE DS-801
CHECKED Feb22'00 K.Furuno			名称 分配器
APPROVED Feb22'00 K.Furuno		DS-80	外寸図
SCALE 1/5	MASS 12 ±10% kg		NAME DISTRIBUTOR
DWG. No. C7247-G04- B		65-007-2000-G2	OUTLINE DRAWING

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注　記　1）#印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表１による。
3）取付用ネジは＋トラスタッピンネジ6×30を使用のこと。
4）装備ケーブルの端末処理は装備要領書参照のこと。

NOTE　1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE TAPPING SCREWS 6x30 FOR FIXING UNIT.
4. REFER TO INSTALLATION INSTRUCTIONS FOR FABRICATION OF CABLE ENDS.

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
0＜L≦50	±1．5
50＜L≦100	±2．5
100＜L≦500	±3

表 1
TABLE 1

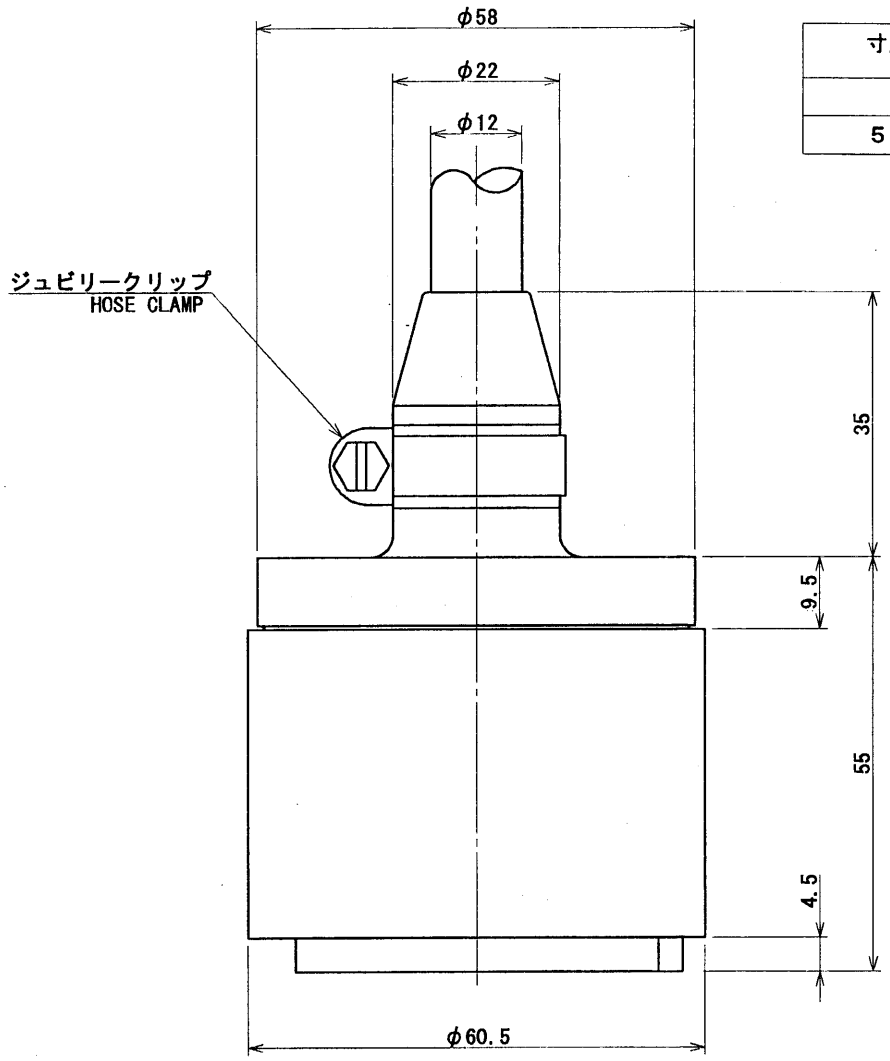
DRAWN Feb-22'00 T.YAMASAKI			TITLE DS-810
CHECKED Feb 22'00 K.Kusano			名称 送受信器
APPROVED Feb 22'00 K.Kusano	DS-80		外寸図
SCALE 1/5	MASS 7.1 kg ±10%	-	NAME TRANSCEIVER UNIT
DWG. No. C7247-G05- C	65-007-3000-G2		OUTLINE DRAWING

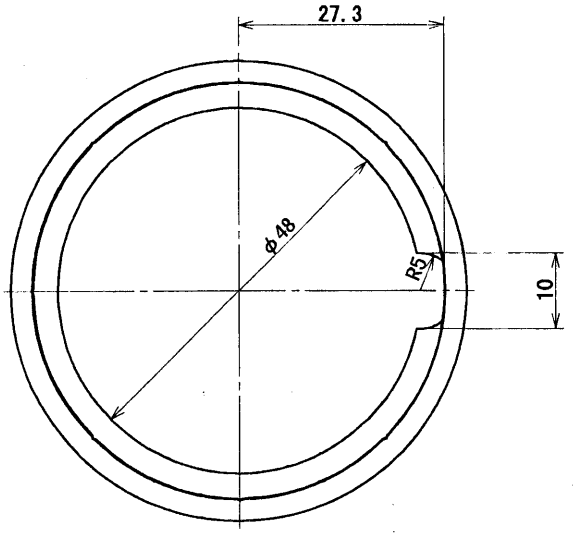
www.reelschematic.com

FURUNO

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0＜L≦50	±1．5
50＜L≦100	±2．5

表 1
TABLE 1





船首方向
FORWARD

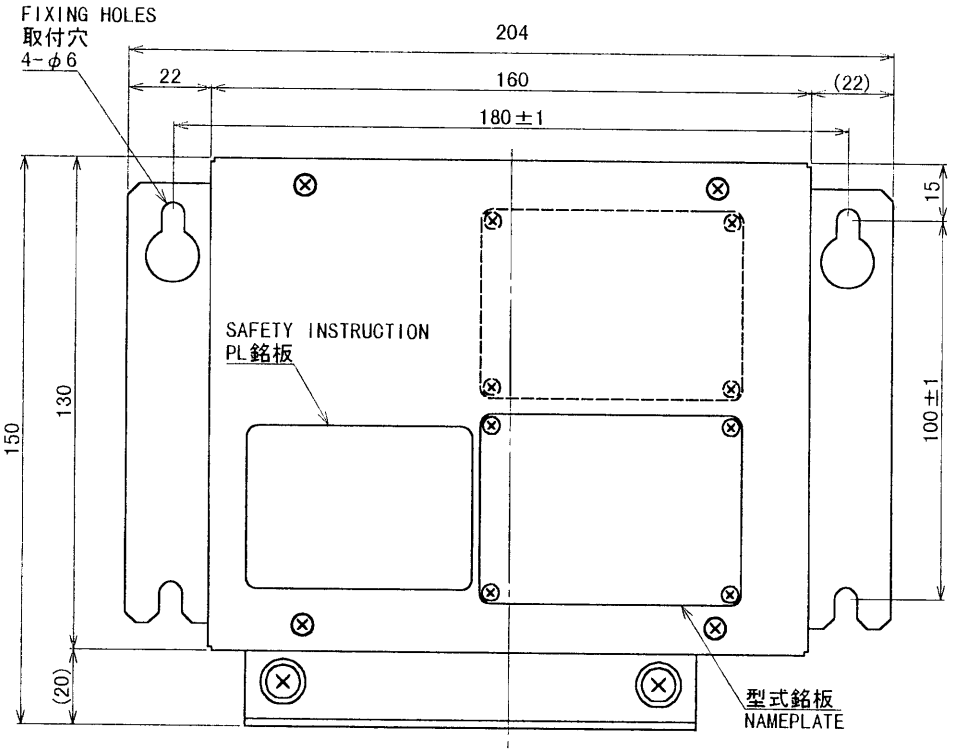
ケーブル長さ(m) CABLE LENGTH	質量(kg) MASS(±10%)
10	2.2
20	3.7
30	5.3

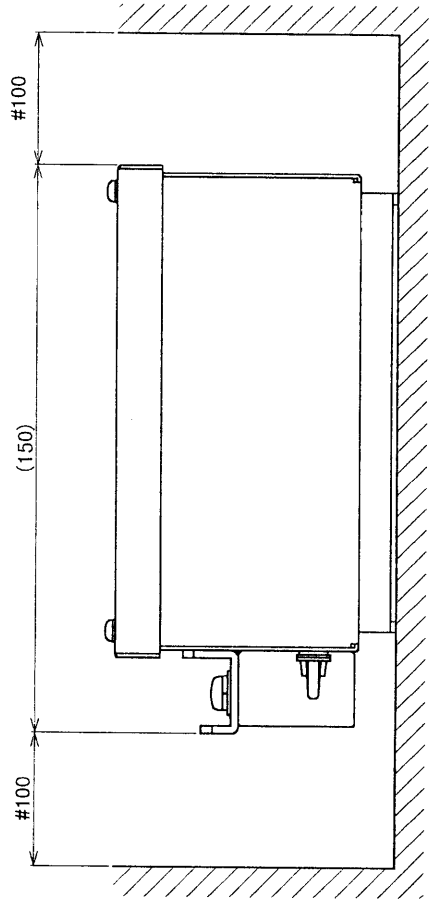
表2 TABLE 2

DRAWN Nov.16'99 T.YAMASAKI		TITLE	DS-820
CHECKED Nov.16'99 K.KUSUNOKI		名称	送受波器
APPROVED Nov.16'99 K.KUSUNOKI			外寸図
SCALE 1/1	MASS 表2 TABLE 2	NAME	TRANSDUCER
DWG. No. C7247-G07- A	65-007-4000-G0		OUTLINE DRAWING

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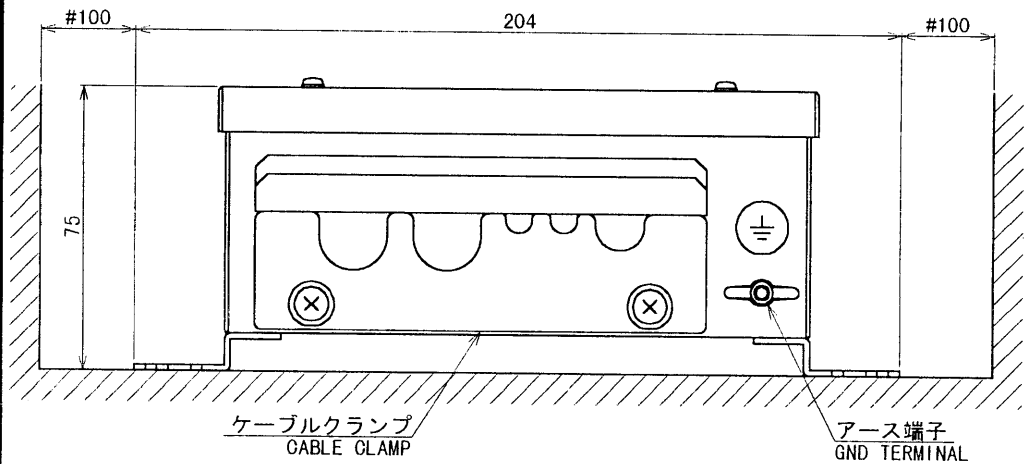
FURUNO





寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0＜L≦50	±1．5
50＜L≦100	±2．5
100＜L≦500	±3

表 1
TABLE 1



注　記　1）#印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表１による。
3）取付用ネジはタッピングネジ呼び径５×２０を使用のこと。

NOTE　1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE TAPPING SCREWS φ5x20 FOR FIXING UNIT.

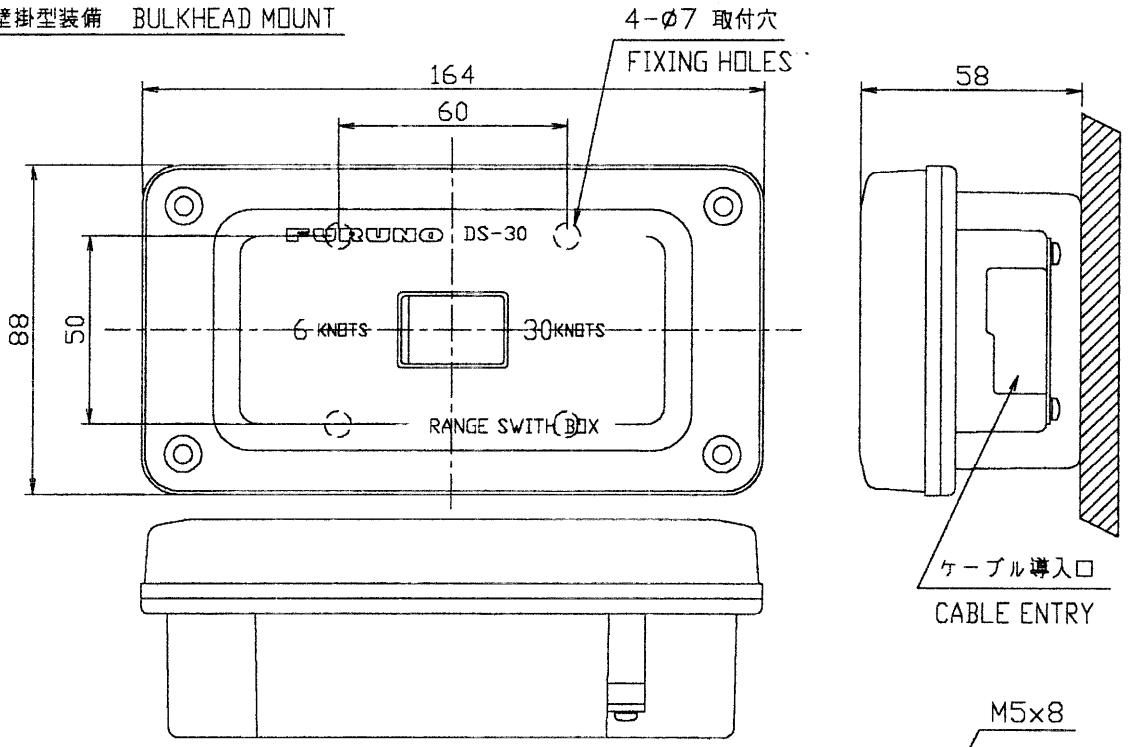
DRAWN Feb.22'01 T.YAMASAKI		TITLE	DS-802
CHECKED Feb.22'01 K.KOBAYASHI		名称	端子台箱
APPROVED Feb.22'01 K.KUSUKI			外寸図
SCALE 1/2	MASS ±10% 1.1 kg	NAME	TERMINAL BOX
DWG. No. C7247-G06- B	66-072-7000-G2		OUTLINE DRAWING

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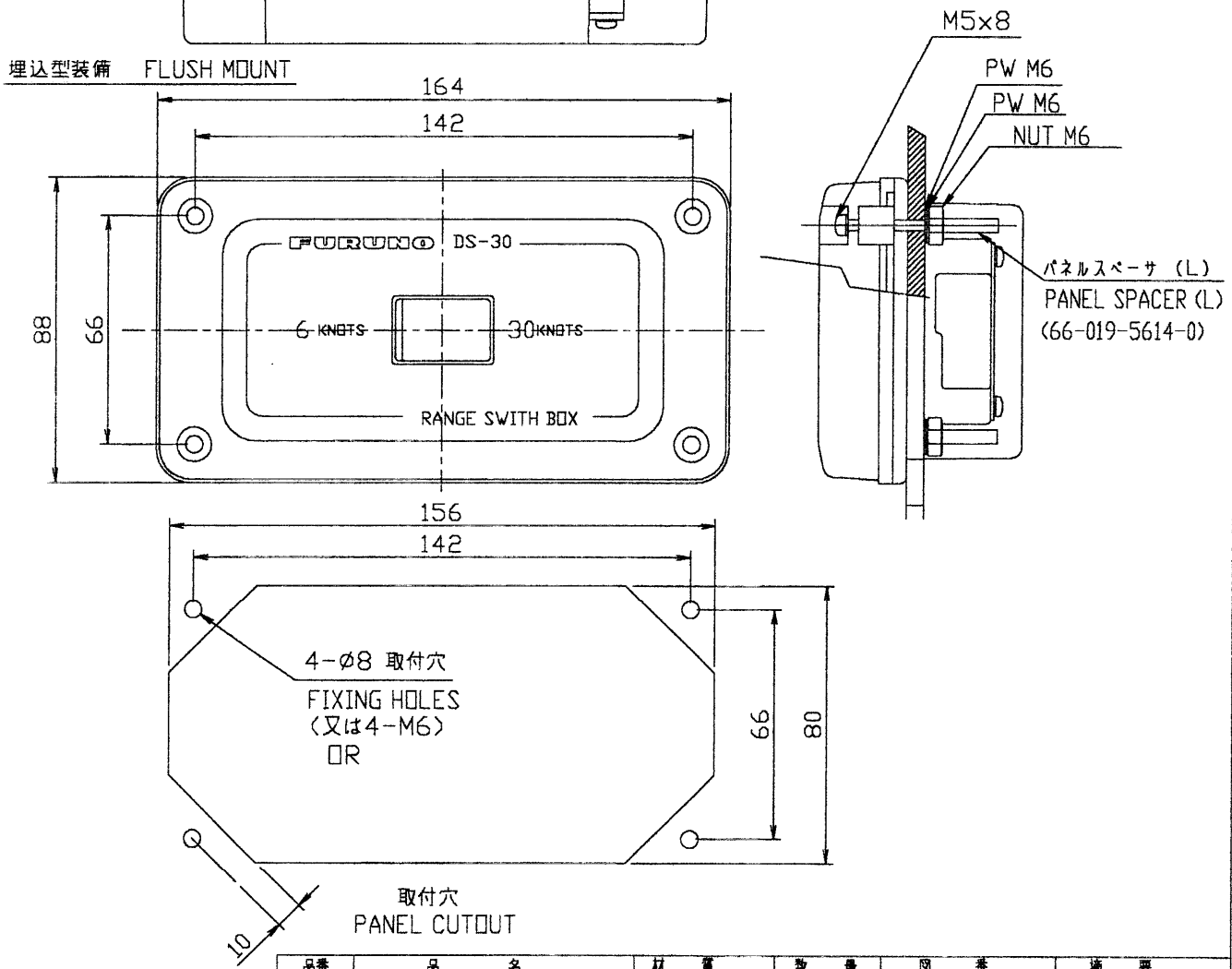
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壁掛型装備 BULKHEAD MOUNT



埋込型装備 FLUSH MOUNT

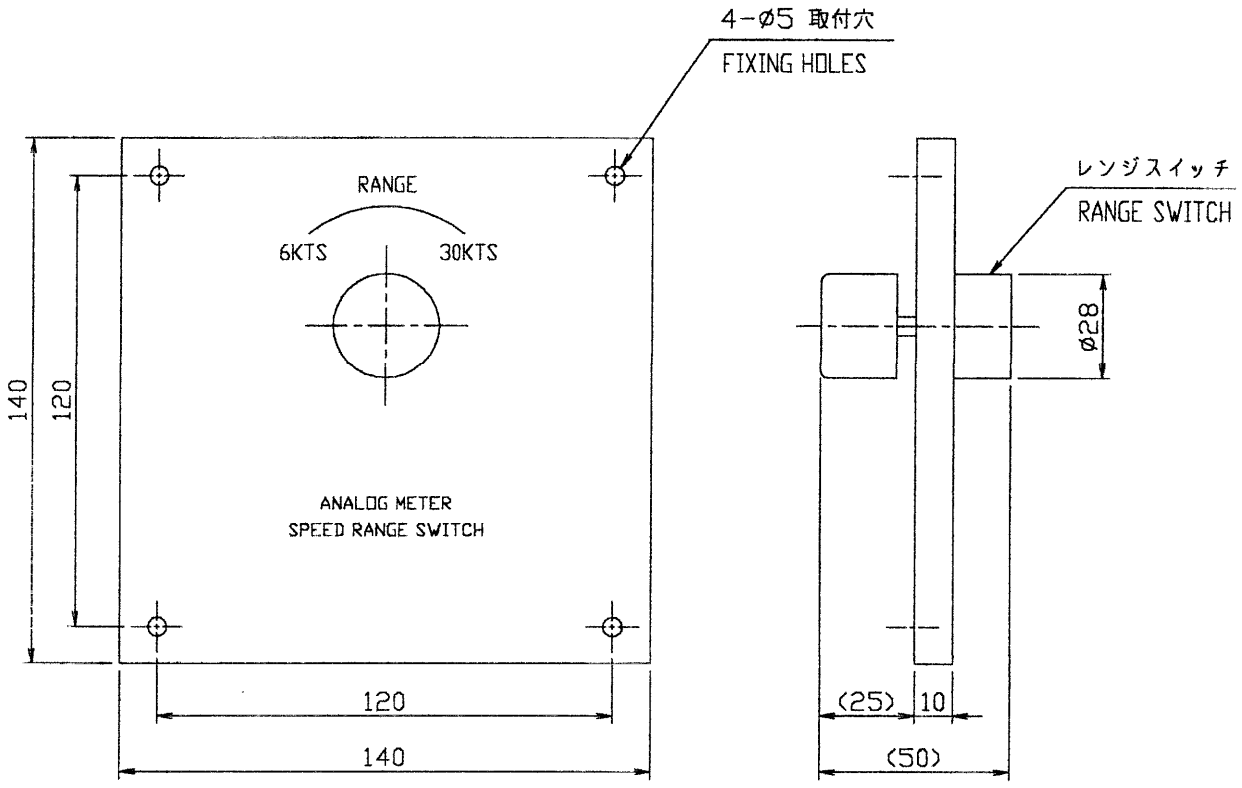


品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

DRAWN Jun. 27 '01	T.YAMASAKI	TITLE	DS-389
CHECKED Jun. 27 '01	Y.KIMURA	名称	レンジ切換器
APPROVED Jun. 27 '01	Y.KIMURA		外寸図
SCALE 1/2	MASS 0.7 ±10% kg	NAME	RANGE SWITCH BOX
DWG.No. C7236-G22-C			OUTLINE DRAWING

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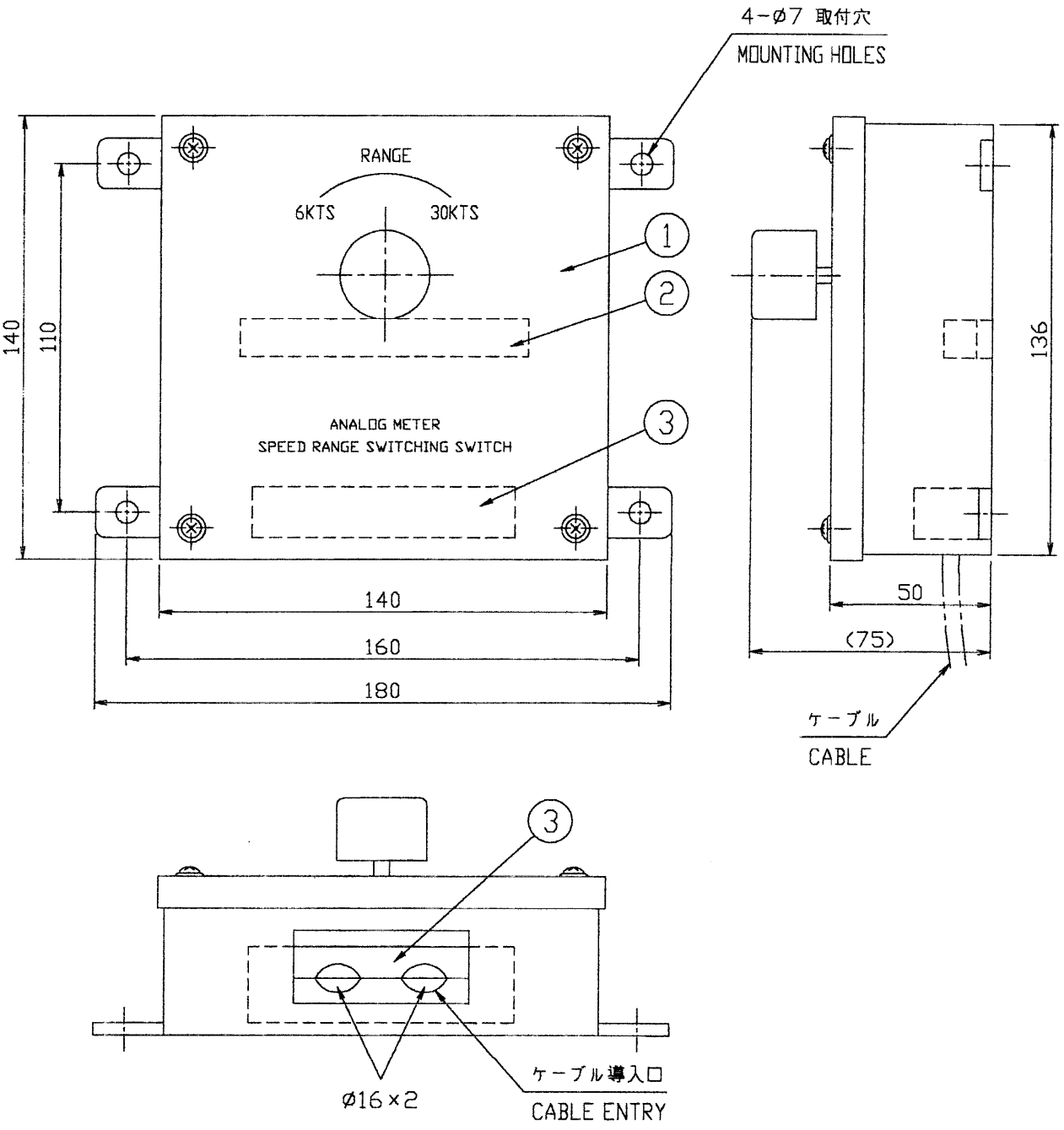


品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO	摘要 REMARKS

DRAWN Jun. 27 '01 T. YAMASAKI	TITLE MF-22R-1
CHECKED Jun. 27 '01 Y. KIMURA	名称 アナログ指示器レンジ切換器
APPROVED Jun. 27 '01 Y. KIMURA	外寸図
SCALE 1/2 MASS 0.7 ±10% kg	NAME ANALOG DISPLAY RANGE SWITCH (FLUSH MOUNT)
DWG.No. C7203-080-D	OUTLINE DRAWING

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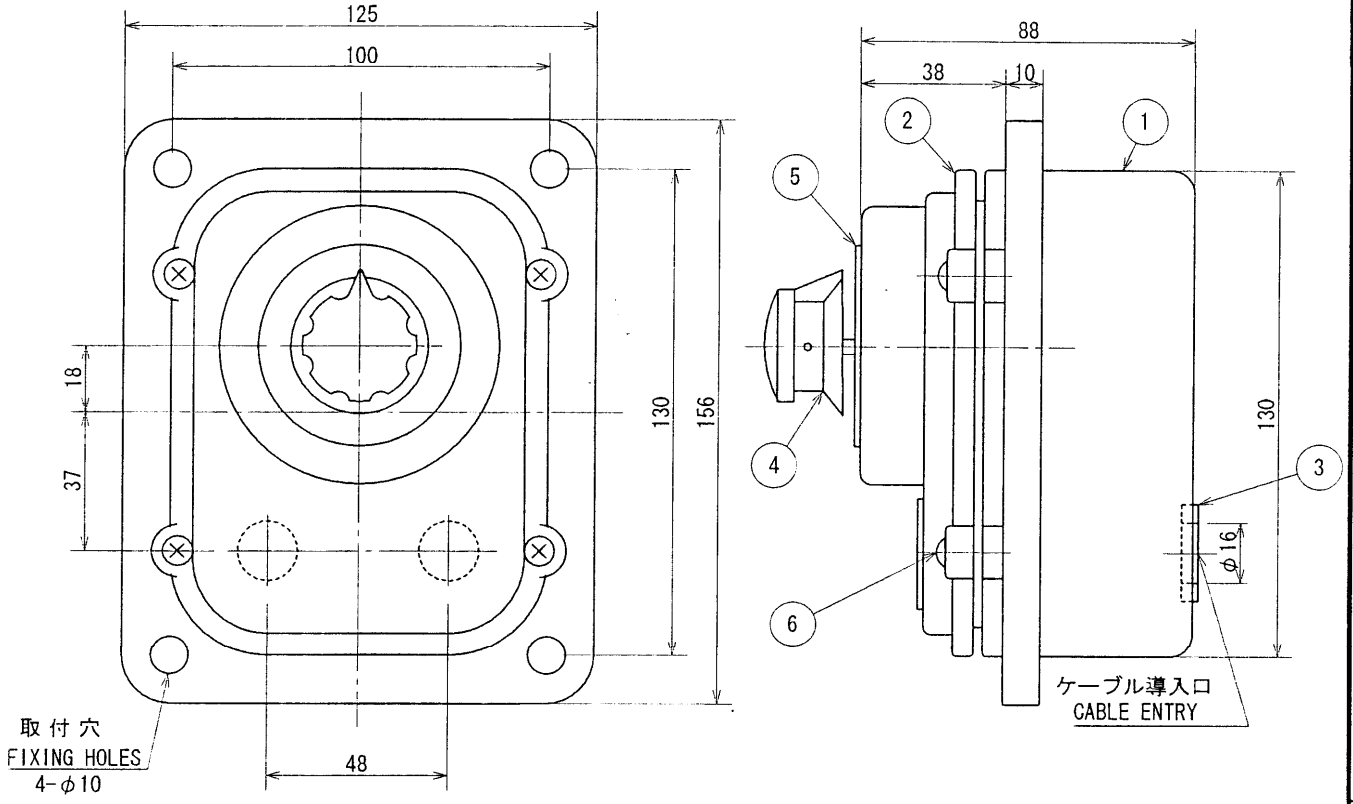


品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
3	ケーブル クランプ CABLE CLAMP	A5052B	1		
2	端子台 TERMINAL STRIP		1		10P-3mm
1	ケース本体 HOUSING	SPCC	1		

DRAWN Jun. 27 '01 T. YAMASAKI		TITLE	MF-22R-2
CHECKED Jun. 27 '01 Y. KIMURA		名称	アナログ指示器レンジ切換器
APPROVED Jun. 27 '01 Y. KIMURA			外寸図
SCALE 1/2	MASS 1.1 ±10% kg	NAME	ANALOG DISPLAY RANGE SWITCH (BULKHEAD MOUNT)
DWG.No. C7203-063-F			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

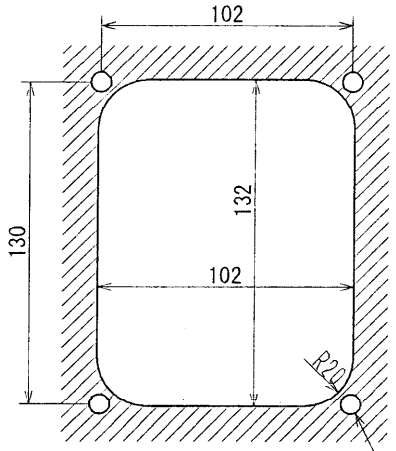
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注記
1）指定なき寸法公差は表１による。
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

表１　TABLE 1

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



取付穴寸法
CUTOUT DIMENSIONS
縮尺 1/3
SCALE: 1/3

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. No.	摘要 REMARKS
6	取付ネジ SET SCREW	BSBM2	1		
5	銘板 NAMEPLATE	SUS	1		
4	ノブ KNOB		1		
3	ブッシュ BUSH	RUBBER	2		
2	フタ COVER	AC7AF	1		
1	体 BODY	AC7AF	1		

DRAWN July 12'00 T.YAMASAKI	TITLE	MF-22L-1
CHECKED July 13'00 Y.K	名称	調光器（埋込型）
APPROVED July 13 '00 Y.K		外寸図
SCALE 1/2 MASS 1.2 kg	NAME	DIMMER (FLUSH MOUNT)
DWG. No. C7213-027- F		OUTLINE DRAWING

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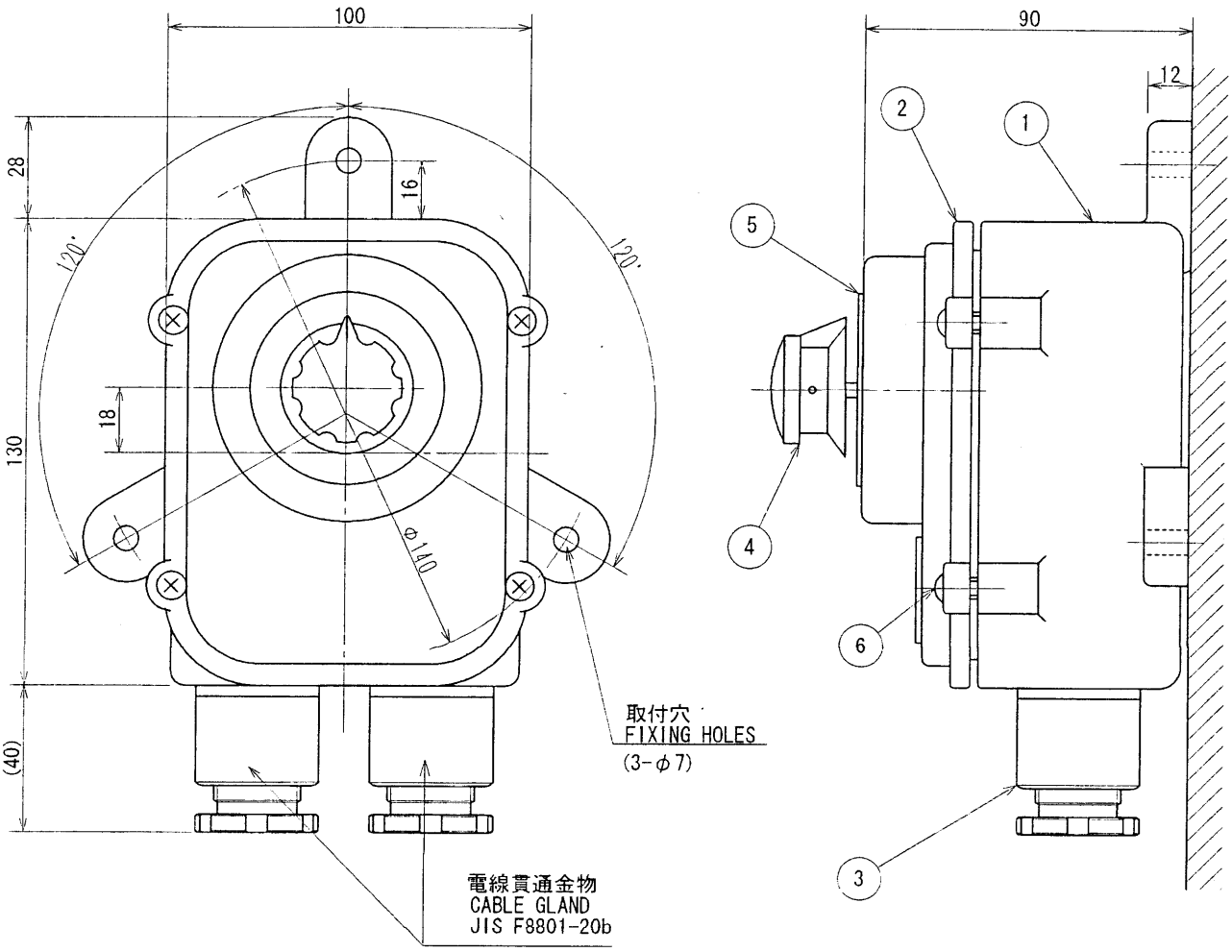


表1　TABLE 1

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

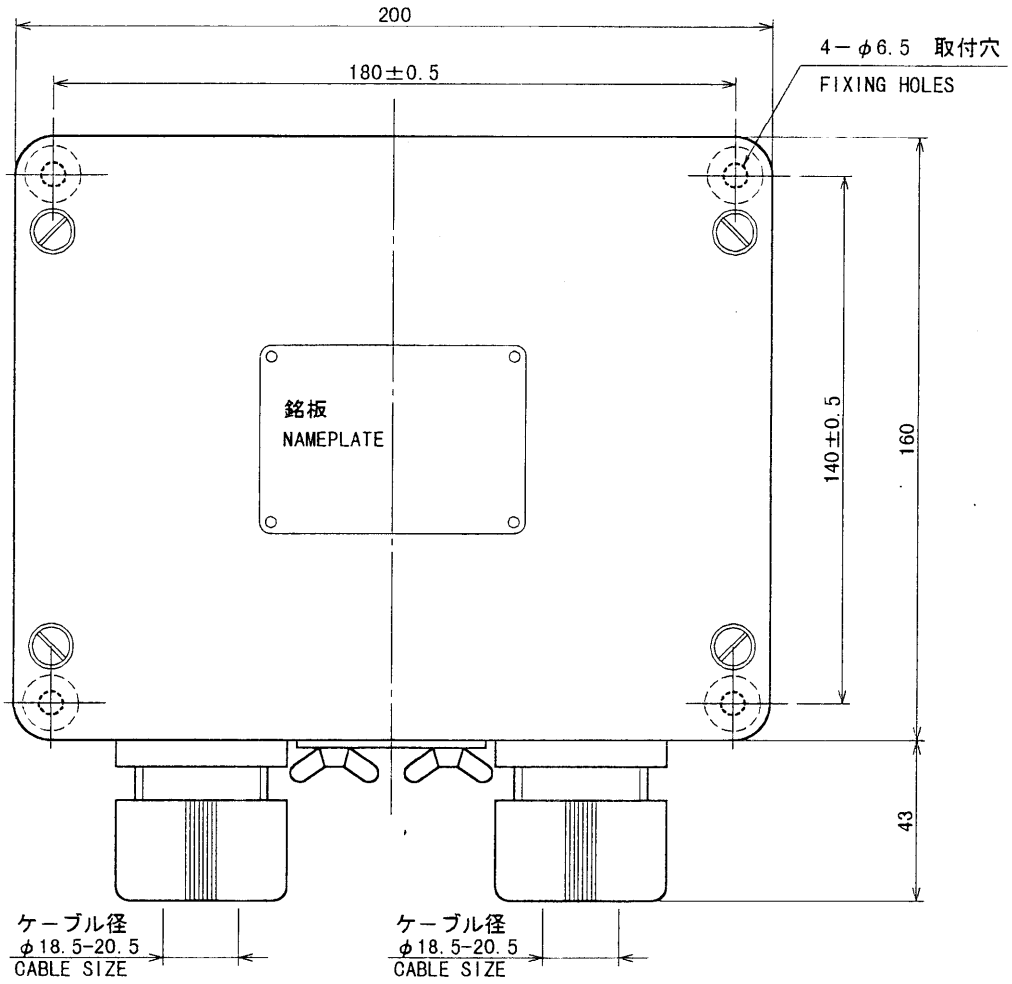
注記
1）指定なき寸法公差は表1による。
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. No.	摘要 REMARKS
6	取付ネジ SET SCREW	BUBM2	1		
5	銘板 NAMEPLATE	SUS	1		
4	ノブ KNOB		1		
3	グランド GLAND	AC7AF	2	JIS F8801-20b	
2	フタ COVER	AC7AF	1		
1	体 BODY	AC7AF	1		

DRAWN July 12'00 T.YAMASAKI	TITLE	MF-22L-2
CHECKED July 13'00 Y.K	名称	調光器（壁掛型）
APPROVED July 13'00 Y.K		外寸図
SCALE 1/2 MASS 1.3 kg	NAME	DIMMER (BULKHEAD MOUNT)
DWG. No. C7213-033- G		OUTLINE DRAWING

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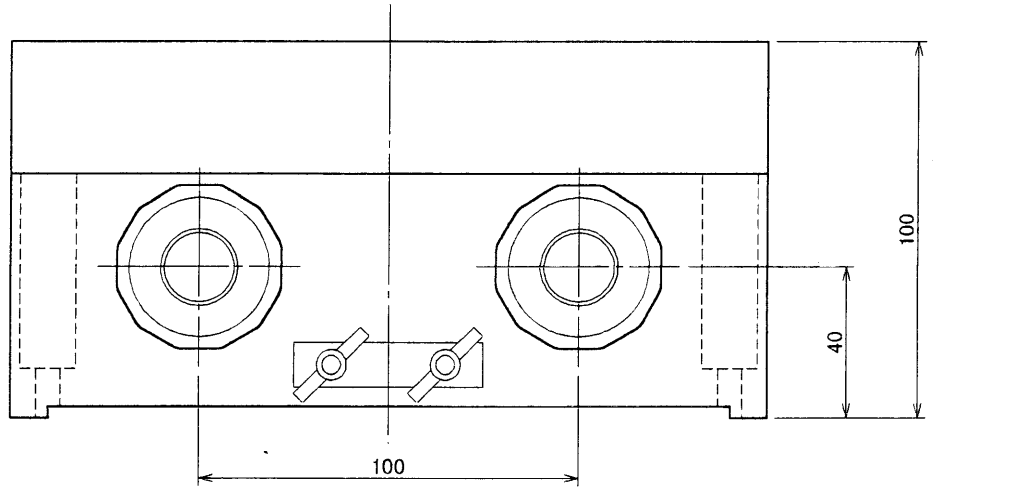


表1 TABLE 1

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

注記 指定なき寸法公差は表1による。

NOTE TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

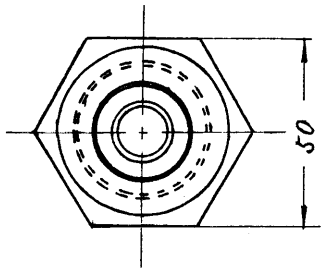
DRAWN Apr.17'00 T.YAMASAKI		TITLE	CI-630
CHECKED Apr.17'00 Y.K	DS-50	名称	接続箱
APPROVED Apr.17'00 Y.K	CI-80 CI-60/60G		外寸図
SCALE 1/2 MASS 2 kg ±10%		NAME	JUNCTION BOX
DWG. No. C7228-G03- D			OUTLINE DRAWING

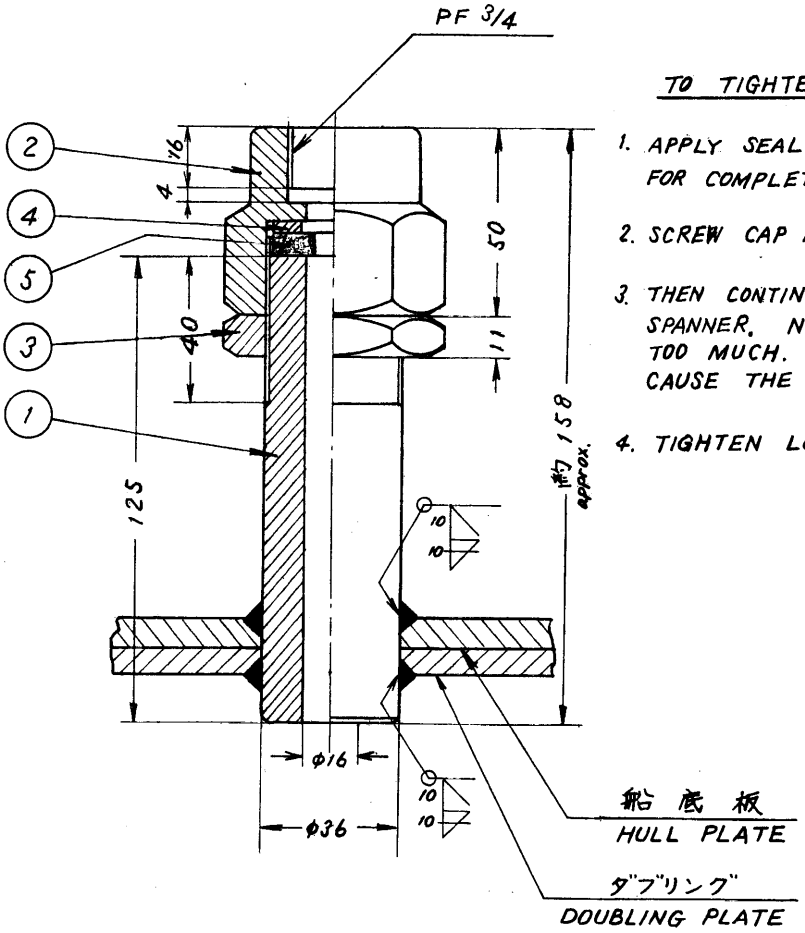
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キャップナットの締め付け

1. 貫通金物用体①のねじ部に、シールテープにて漏水防止の処理を施す。
2. キャップナット②を手で回せるだけ一杯ねじ込む。
3. 更にスパナで二回転程確実に締め付ける。但し余り強く締め過ぎるとパッキン⑤が圧縮されて芯線を切断することがあるので、漏水を防ぐ程度以上には締めないこと。
4. 最後に止めナット③で固定する。





TO TIGHTEN CAP NUT

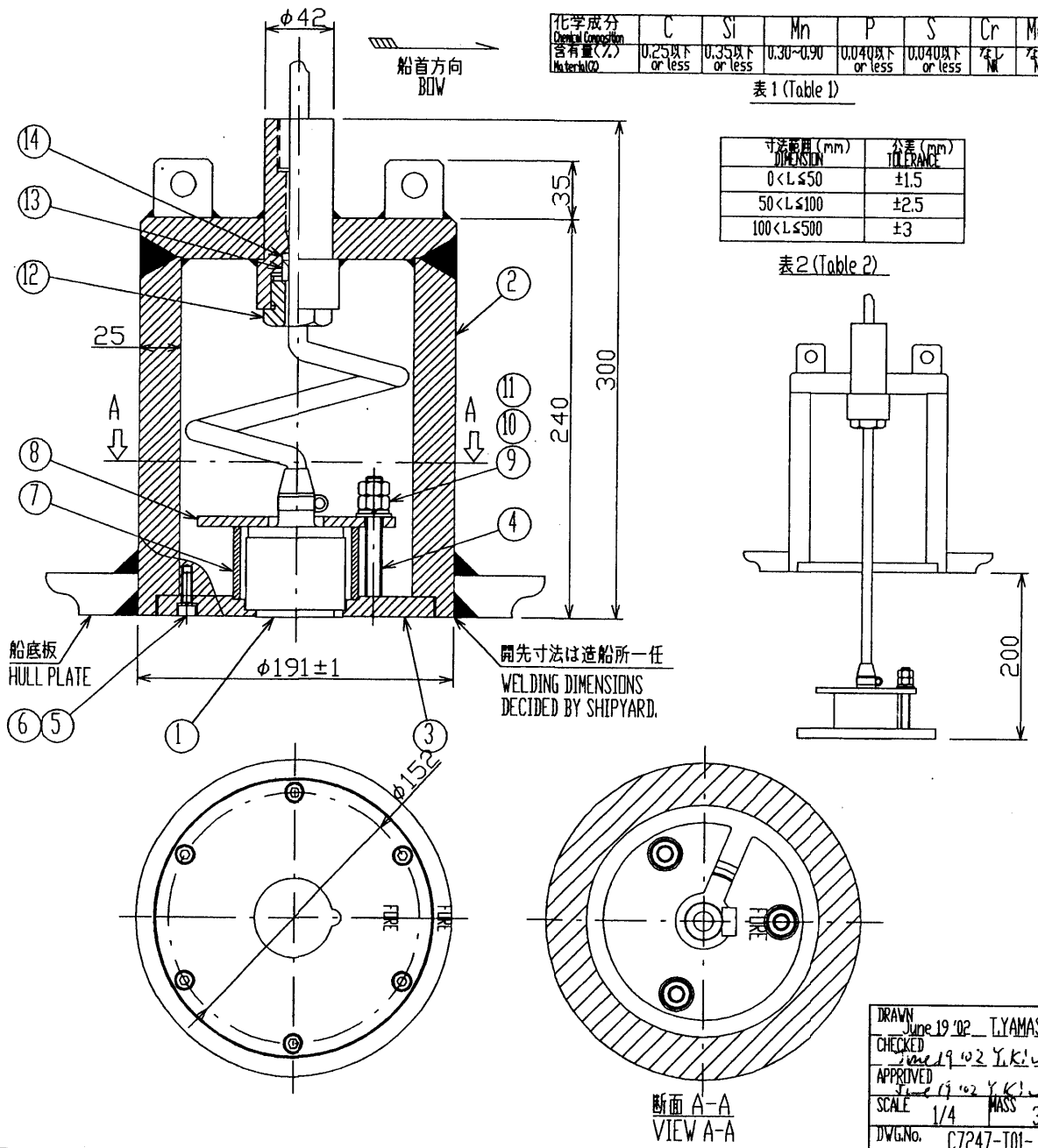
1. APPLY SEAL TAPE TO THREADS OF PIPE ① FOR COMPLETE WATERTIGHTNESS.
2. SCREW CAP NUT ② ONTO PIPE ① BY HAND.
3. THEN CONTINUE ABOUT TOW TURNS WITH A SPANNER. NEVER TIGHTEN CAP NUT ② TOO MUCH. EXCESSIVE TIGHTENING MAY CAUSE THE CABLE TO BE DAMAGED.
4. TIGHTEN LOCK NUT ③

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARK
5	パッキン PACKING	CR	1	TPB-1-08	
4	座金 WASHER	SPCC	1	TPB-1-07	
3	止めナット LOCK NUT	SS41	1	TPB-1-04	
2	キャップナット CAP NUT	SS41	1	TPB-1-02	
1	貫通金物用体 PIPE	SS41	1	TPB-4-01	

課長 APPROVED		尺度 SCALE	1/2	名称 TFB-5000; 5号電線貫通金物(1芯用) TITLE: TFB-5000; THRU-HULL PIPE NO.5 (FOR ONE CABLE)
検図 CHECKED		図法 DRAWING	三角法 TRIGON	
製図 DRAWN	'76.10.21	重量 WEIGHT	1.3 kg	図番 DWG. NO. C2002-010-F

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化学成分 Chemical Composition	C	Si	Mn	P	S	Cr	Mo
含有量(%) Material(%)	0.25以下 or less	0.35以下 or less	0.30~0.90	0.040以下 or less	0.040以下 or less	なし Nil	なし Nil

表1 (Table 1)

寸法範囲(mm) DIMENSION	公差(mm) TOLERANCE
0<L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

表2 (Table 2)

注記
1. 船底タンク板厚は標準25mmです。25mm以上の厚さが必要な場合は別途打合せ願います。
2. 船底タンク材質はKSTPG370です。その化学成分は表1の通りです。
3. 装備の際、タンク下面が船底板と面一になる様に（凹にならない様に）して下さい。
4. 船底タンクを船底に溶接する際、船首船尾方向の据付の誤差は±1°以内として下さい。また、水平方向の取付はタンクのフランジが吃水線と±1°以内の誤差で平行になるようにして下さい。
5. 切断・溶接の際は、歪み防止のため送受波器を取り外した状態の“取付けフランジ”を必ず取り付けておいて下さい。
6. 送受波器面には塗料を塗布しないでください。
7. 締め付けナットはタンク本体に当たるまで締め付けてください。
8. 指定外の寸法公差は表2による。

Note
1. Nominal thickness of the tank is 25 mm. The tank thickness subject to agreement.
2. Tank material KSTPG370 is as Table 1.
3. The transducer tank should be welded flush with ship's hull plate.
4. Orient bow mark of the tank in parallel with ship's fore-aft line and the top of the tank in parallel with waterline to an accuracy of 1 degree or better.
5. To avoid distortion by heat, put the "FIXING FLANGE" (without transducer) onto the tank while cutting and/or welding.
6. Do not apply paint to the transducer radiation surface.
7. Fasten the tightening nut until it touches the tank.
8. Table 2 indicates tolerance of dimensions.

ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.No.	摘要 REMARKS
14	防水ゴム GASKET	CR	1	TWB-1009	
13	防水ゴム押え金具 WASHER	SUS316	1	65-007-6006	
12	締付ナット TIGHTENING NUT	SUS316	1	65-007-6005	
11	六角ナット HEX NUT	SUS304	6	M10	
10	バネ座金 SPRING WASHER	SUS304	3	M10	
9	平座金 FLAT WASHER	SUS304	3	M10	
8	押え板 FIXING PLATE	SS400	1	65-007-6004	
7	スペーサ SPACER	SGP	1	65-007-6003	
6	バネ座金 SPRING WASHER	SUS304	6	M6	
5	六角穴付きボルト HEX BOLT	SUS304	6	M6X20	
4	植付けボルト STUD BOLT	SUS304	3	M10	
3	取付けフランジ FIXING FLANGE	SS400	1	65-007-6002	
2	タンク本体 CASING	KSTPG370	1	65-007-6001	NK認定材 NK Authorized Material
1	送受波器 TRANSDUCER		1	DS-820	

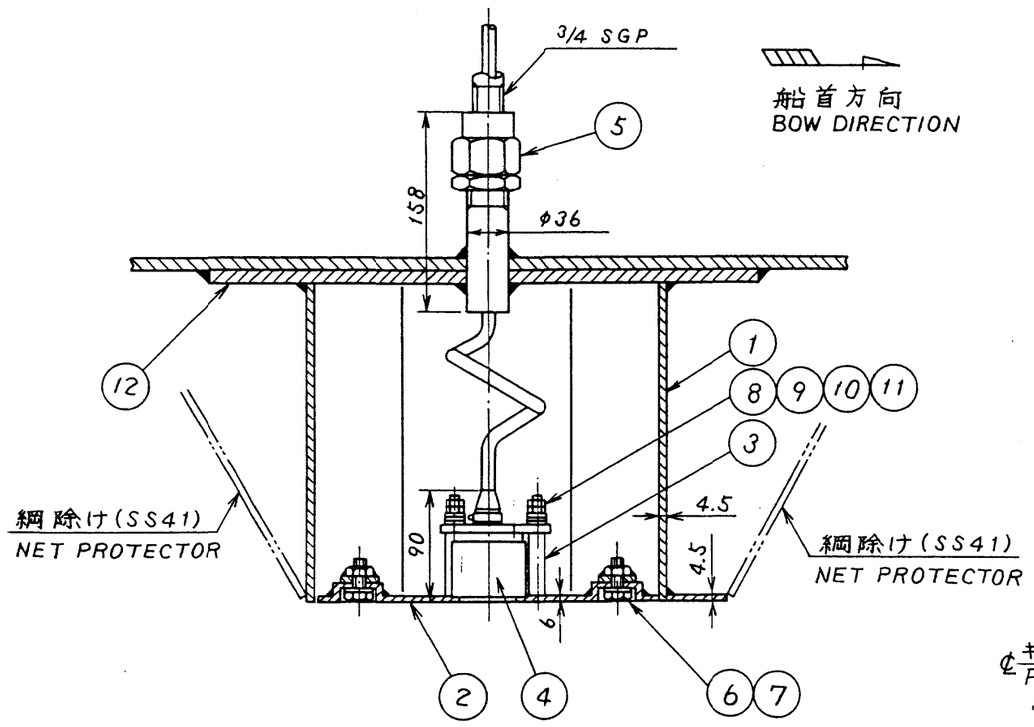
DRAWN June 19 '02 T.YAMASAKI		TITLE	DS-850
CHECKED June 19 '02 Y.Kii		名称	船底タンク
APPROVED June 19 '02 Y.Kii	DS-80		送受波器装備図
SCALE 1/4 MASS 31 ±10% kg		NAME	HULL UNIT
DWG.No. C7247-T01-C	65-007-6000-G2		TRANSDUCER INSTALLATION

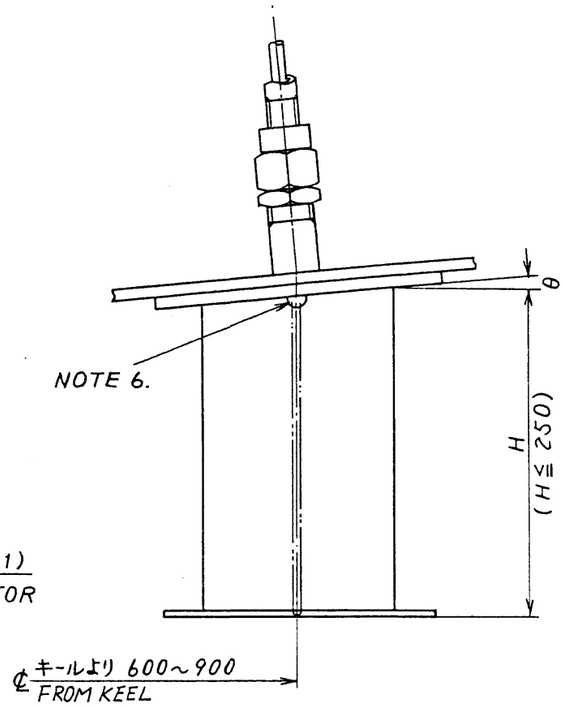
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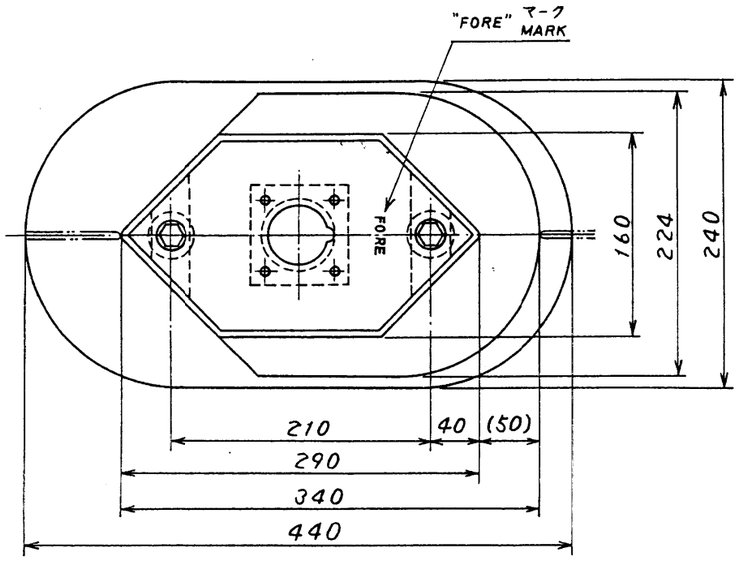
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NOTE
1. θは船底傾斜角。
2. 要目表は船主又は造船所と協議の上記入すること。
3. 網除け、保護タンクは必要に応じて造船所にて製作のこと。
4. 電線貫通金物はフレーム等のじゃまにならない所で振動子に当らず、キャップナットが容易に締付けられる位置に取付けること。
5. 船尾側上端に空気抜き用穴(φ10~φ20程度)を明けて下さい。
6. 振動子ケースを船底に溶接する際"FORE"マークを確認して、船首一船尾方向の取付誤差は±1°以内とすること。
7. 振動子面と水平面との平行取付誤差は±1°以内になるよう振動子ケースを切断すること。

1. θ : RISING ANGLE OF SHIP'S HULL.
2. DECIDE PRINCIPAL ITEMS UPON DISCUSSING WITH SHIP'S OWNER OR SHIPYARD.
3. IF NECESSARY, NET PROTECTOR AND PROTECTION TANK TO BE MADE BY SHIPYARD.
4. ALLOW ENOUGH CLEARANCE AROUND THRU-HULL PIPE FOR EASY TIGHTENING AND SERVICING.
5. MAKE A HOLE OF 10 TO 20 MM IN DIA. ON STERN SIDE TO ALLOW AIR TO ESCAPE FROM TANK.
   WHEN WELDING THE TRANSDUCER HOUSING TO HULL, CONFIRM "FORE" MARK.
6. FORE-AFT INSTALLATION ERROR SHOULD BE WITHIN ±1 DEGREE.
7. CUT THE TRANSDUCER HOUSING SO THAT THE FACE OF TRANSDUCER IS ALIGNED IN PARALLEL WITH THE DRAFT LINE. (WITH IN ±1 DEGREE)



要目表 PRINCIPAL ITEM		
位置 POSITION	船首から FROM BOW	m
	キールから FROM KEEL	mm
突出量 H PROJECTING		mm
取付状態 FIXING CONDITION	走行時水平 HORIZONTAL AT RUNNING	
保護タンク PROTECTION TANK		

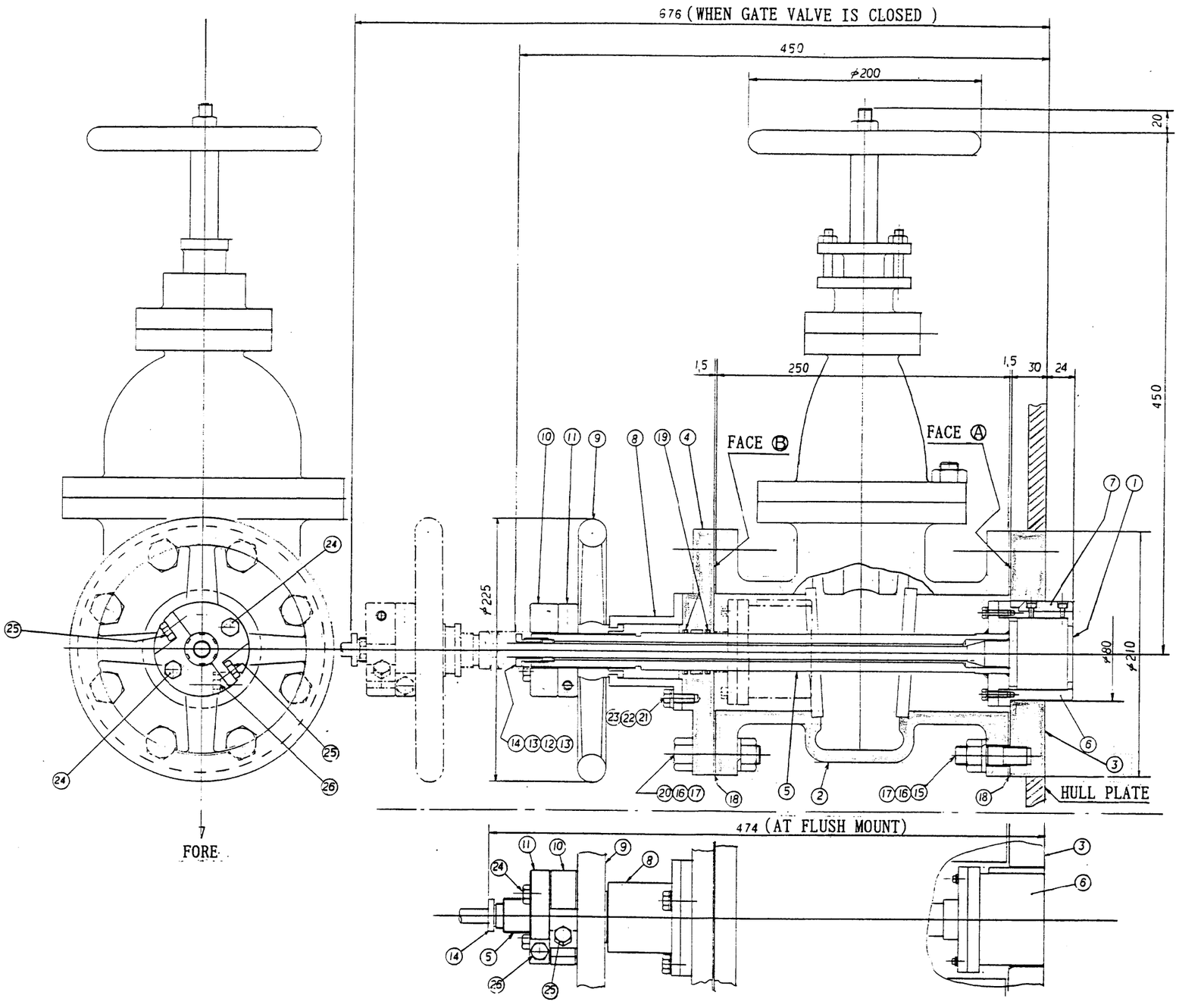
ITEM	NAME	MATERIAL	Q'TY	DWG.NO.	REMARKS
12	補強板 DOUBLING PLATE	SM41	1		造船所手配 DOCKYARD SUPPLY
11	六角ナット (M8) HEX. NUT	SUS304	8		
10	バネ座金 SPRING WASHER (M8)	SUS304	4		
9	平座金 FLAT WASHER (M8)	SUS304	4		
8	平ワッシャ(呼び8 NOMI. 8) FLAT WASHER	P.C.	4		
7	バネ座金 SPRING WASHER (M10)	SUS304	2		
6	六角ボルト (M10×30) HEX. BOLT	SUS304	2		
5	5号電線貫通金物 THRU HULL PIPE NO.5		1	TFB-5000	
4	送受波器 TRANSDUCER			DS-785/820	
3	スペーサ SPACER	SGP40A	4	T-606-03	
2	振動子取付フランジ TRANSDUCER FIXING FLANGE	SS41	1	65-003-9201	
1	振動子ケース TRANSDUCER HOUSING	SS41	1	T-604-01	

DRAWN Oct/3'00 T.YAMASAKI		TYPE	DS-781
CHECKED Oct/3'00 T.KI		名称	船底タンク(突出型)
APPROVED Oct/3'00 T.K	DS-80 DS-70		送受波器装備図
SCALE 1/5 MASS 11 kg	APPLICABLE TO; (MODEL) BLOCK NO.	NAME	SEACHEST (PROJECTION TYPE)
DWG NO. C7222-T05- C			TRANSDUCER INSTALLATION

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NOTE/INSTALLATION PROCEDURE

1 SEPARATE ③ HULL FLANGE AND ④ FLANGE (WITH ① TRANSDUCER/⑤ SHAFT) FROM ② GATE VALVE BY REMOVING ⑰ HEX. NUT.
2 WELD ③ HULL FLANGE TO HULL PLATE. CONFIRM "FORE" AND REFERENTIAL MARKS SO THAT FORE-AFT INSTALLATION ERROR IS WITHIN ±1 DEGREE. ALSO THE FACE OF ③ HULL FLANGE SHOULD BE ALIGNED IN PARALLEL WITH THE DRAFT LINE (WITHIN ±1 DEGREE). USING A GRINDER OR SIMILAR TOOL, FINISH THE OUTSIDE HULL FLANGE SO THAT IT IS SMOOTH.
3 APPLY KINORUSTER (ANTI-CREVICE CORROSIVE SEALANT) TO FACE A OF ③ HULL FLANGE AND TO BOTH FACES OF ⑱ GASKET AND FLANGE OF ② GATE VALVE.
4 PUT ⑱ GASKET ONTO ③ HULL FLANGE.
5 FASTEN ② GATE VALVE TO ③ HULL FLANGE. THE DIRECTION OF ② GATE VALVE CAN BE SELECTED EVERY 45 DEGREES. (STANDARD DIRECTION OF HANDLE: AFT)
6 APPLY KINORUSTER TO FACE B OF ④ FLANGE AND TO BOTH FACES OF ⑱ GASKET AND FLANGE OF ② GATE VALVE.
7 PUT ⑱ GASKET ONTO FLANGE OF ② GATE VALVE.
8 FASTEN ④ FLANGE (WITH ① TRANSDUCER/⑤ SHAFT) TO ② GATE VALVE.
9 FOR TESTING THE MOVE OF ⑤ SHAFT, RAISE AND LOWER IT AFTER LOOSENING ㉓ ㉔ HEX. BOLTS AND HEX. BOLT OF ㉓ LOCK RING.
10 FASTEN THE ㉓ HEX. BOLT OF ㉓ LOCK RING.
11 LOWER THE TRANSDUCER BY TURNING THE HANDLE UNTIL THE ⑥ TRANSDUCER CASE TOUCH THE ③ HULL FLANGE .
12 CONFIRM THAT FACES OF TRANSDUCER IS PROJECTED BY 24mm.

FOR FLUSH MOUNT OF TRANSDUCER

1 FOR STEPS 1) TO 12), FOLLOW ABOVE PROCEDURE.
2 RAISE THE SHAFT BY TURNING THE ⑨ HANDLE UNTIL THE ⑩ SPACER (24mm) IS INSERTED BETWEEN TOP OF ⑨ HANDLE AND ⑪ LOCK RING.
3 PUT THE ⑩ SPACER BETWEEN ⑨ HANDLE AND ⑪ LOCK RING, AND LOWER THE SHAFT.
4 CONFIRM THAT FACES OF HULL PLATE AND TRANSDUCER ARE EVEN.

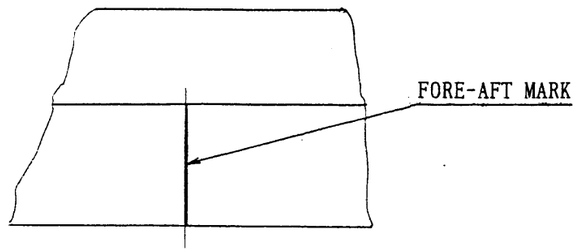
ITEM	NAME	MATERIAL	Q'TY	REMARKS
26	HEX. BOLT	SUS304	1	M8x30
25	HEX. BOLT	SUS304	2	M8x30
24	HEX. BOLT	SUS304	2	M8x30
23	HEX. BOLT	SUS304	4	M8x20
22	SPRING WASHER	SUS304	4	M8
21	FLAT WASHER	SUS304	4	M8
20	HEX. BOLT	SUS304	8	M16x60
19	O-RING	NBR	2	JISB2401-1A-P32
18	GASKET	T/#1000-S	2	JIS-10K 100A-1.5
17	HEX. NUT	SUS304	16	M16 CLASS 1
16	SPRING WASHER	SUS304	16	M16
15	STUD BOLT	SUS304	8	M16x40
14	CABLE GLAND	C3604	1	JISF8801 FOR 15
13	SECURE RING	SPC	2	
12	GASKET	CR	1	
11	LOCK RING	SS41	1	
10	SPACER	RESIN	2	
9	HANDLE	FC20	1	
8	LOCK RING	C3604B	2	
7	TURNING STOPPER	SUS304	1	
6	TRANSDUCER CASE	SUS304	1	
5	RETRACTION SHAFT	SUS304	1	
4	UPPER FLANGE	SS41	1	
3	HULL FLANGE	KAS	1	
2	GATE VALVE		1	
1	TRANSDUCER			DS-785/820

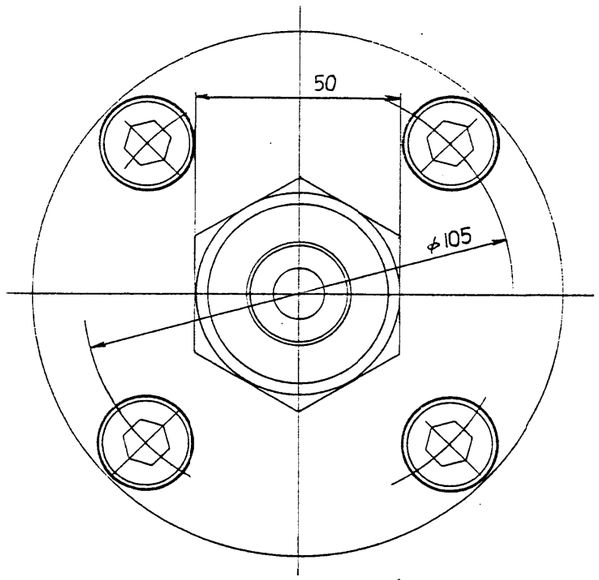
DRAWN: 04.13'00 T.YAMASAKI			TYPE: DS-782
CHECKED: 04.13'00 [illegible]			名称: 送受波器装備図
APPROVED: 04.13'00 [illegible]	DS-80 DS-70		
SCALE: / MASS: 75kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME: SEACHEST (PROJECTION TYPE) TRANSDUCER INSTALLATION
DWG NO. E7222-T02- B			

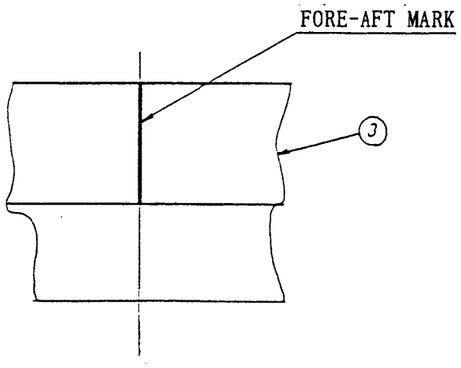
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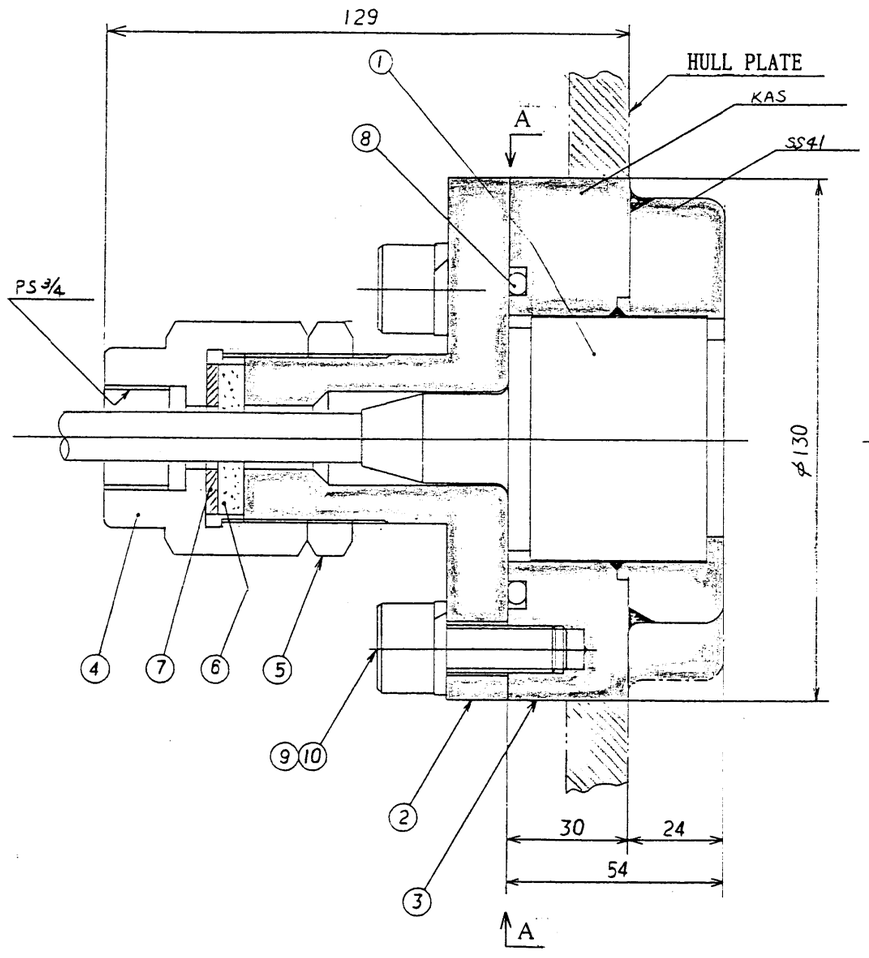


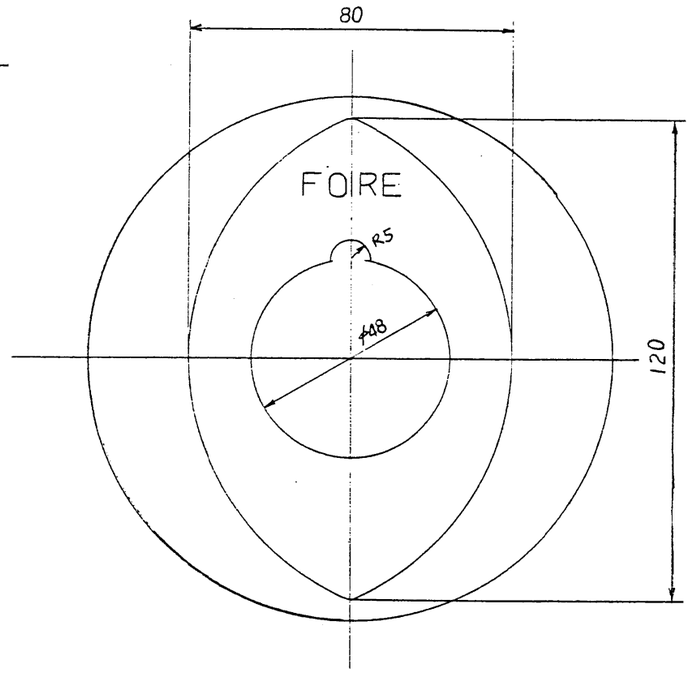




Mounting Procedure

1 Loosen lock nut ⑤ with a wrench (hex. size: 50mm) and take off cap nut ④ from hull flange ③ together with gasket ⑥ and flat washer⑦. (It is not necessary to draw the cap nut completely out from the cable.)
2 Unscrew hex. socket head bolts⑩ (M12 x 32, 4 pcs.) by using a socket screw wrench (size: 10mm). Separate flange ② and transducer ① from hull flange ③. Handle O-ring⑧ carefully so as not to damage it.
3 Weld hull flange③ to the hull plate. Confirm that the "FORE" mark is orientated to fore and alignment lines on the side of hull flange are in parallel with the fore-aft line of the ship within ±1degree. The hull flange③ should also be horizontal within ±1 degree at ship's normal trim.
4 Finish the outside of hull flange with a grinder to ensure smooth water-flow.
5 Apply kinoruster (Anti-crevice corrosion sealant) to face A of hull flange③, O-ring groove on the hull flange, O-ring⑧ and face A of the flange.
6 Fit O-ring⑧ onto the O-ring groove.
7 Place transducer① into hull flange ③ so that the alignment nipple on the transducer face fits into the notch on the hull flange.
8 Settle flange ② on the hull flange.
9 Tighten hex. socket holts ⑩ with a socket screw wrench.
10 Put gasket⑥ and flat washer⑦ on the top of the flange and tighten cap nut ④ securely with a wrench (hex. size: 50mm). Screw lock nut⑤.
11 When running the transducer cable inside the conduit pipe, screw the pipe end onto the cap nut (PS3/4) for watertightness.





ITEM	NAME	MATERIAL	Q'TY	REMARKS
10	SOCKET-HEAD SCREW	SUS304	4	M12 x 32
9	SPRING WASHER	SUS304	4	12
8	O-RING	NBR	1	JISB2401-1A-P75
7	FLAT WASHER	SPC	1	9106
6	GASKET	CR	1	9105
5	NUT	SS41	1	9104
4	CAP NUT	SS41	1	9103
3	HULL FLANGE	KAS/SS41	1	9502
2	FLANGE	SS41	1	65-003-9501
1	TRANSDUCER			DS-785/820

DRAWN: Oct 13 '00 TYAMASAKI		TYPE: DS-783	
CHECKED: Oct 13 '00 Y.K	DS-80 DS-70	名称: 送受波器装備図	
APPROVED: Oct 13 '00 Y.K			
SCALE: /	MASS: 5.6 kg	APPLICABLE TO; (MODEL)	BLOCK NO.
DWG NO.: E7222-T03- B		NAME: SEACHEST (FLUSH MOUNT TYPE) TRANSDUCER INSTALLATION	

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取付要領

1 ⑤止めナットを緩め（仮締めなので手で回る。堅い時は対辺50㎜スパナを使用のこと）、④キャップナットを③振動子フランジから外す（ケーブルから抜き取る必要はない）。⑥ガスケット、⑦座金も④キャップナットの方へ移しておくこと。

2 ⑨M12 六角穴付きボルト４本を外し（対辺10㎜六角棒スパナを使用）、③振動子フランジと①振動子を②船底フランジから分離する。（⑨ボルト、⑩ばね座金、⑧Ｏリングは保管しておく。）

3 ②船底フランジを船底に溶接する。この時以下の点に注意のこと。
・側面に刻印されている“FORE”の文字と船首、船尾の２本の基準線を船の船首－船尾方向に合せて溶接する。（取付誤差は±１°以内）
・水平方向も吃水線と平行になるように溶接する。（取付誤差は±１°以内）

4 船底溶接部はグラインダー等で面一に仕上げる。

5 付属のキノラスタ（金属スキマ腐食防止剤）を②船底フランジのフランジ面（Ａ面）、リング溝内及び振動子フランジ面（Ａ面）に塗布する。

6 ⑧Ｏリングを②船底フランジに装着する。

7 ①振動子を②船底フランジにはめ込む。（船首マークである②船底フランジの切欠と①振動子の突起を合せること。）

8 ③振動子フランジを②船底フランジに乗せる。

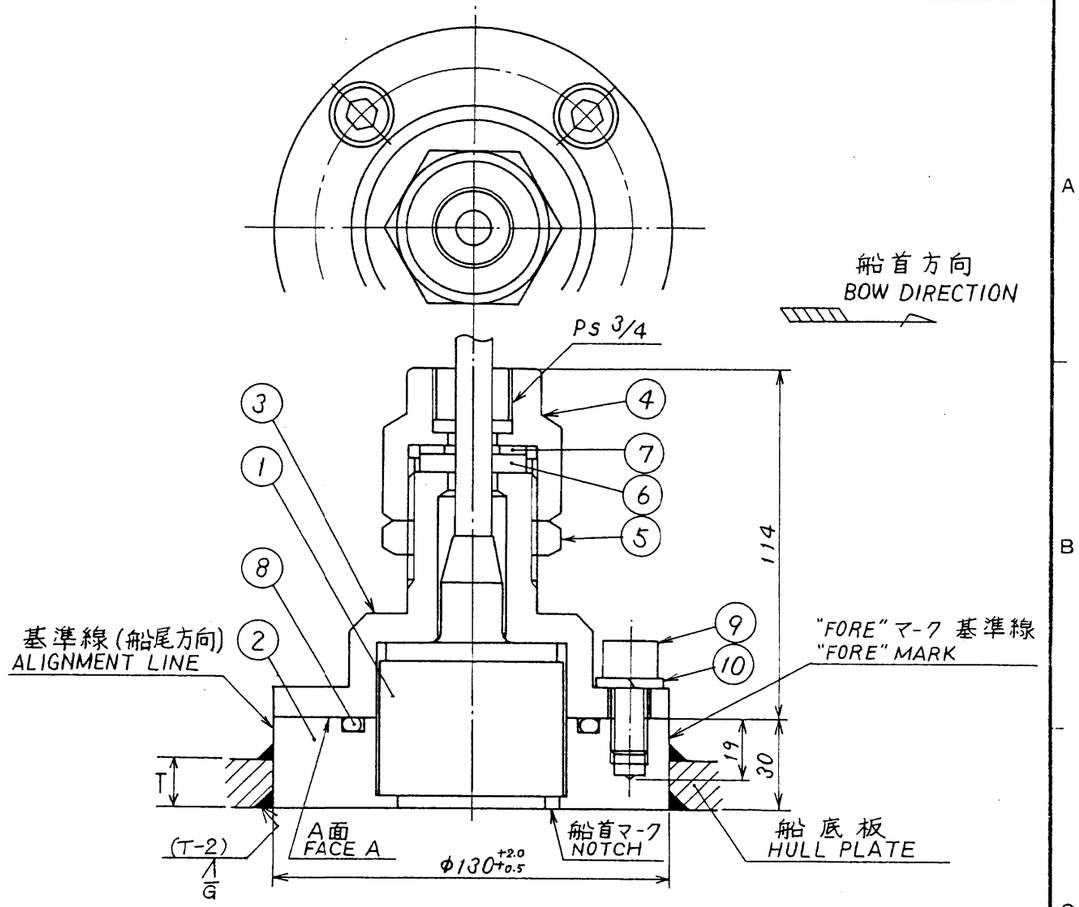
9 ⑨六角穴付きボルトを締め付ける。（③振動子フランジは船首方向に関係なく任意方向でよい）

10 ⑥ガスケット、⑦座金を③振動子フランジ上に移し④キャップナットを締める（対辺50㎜スパナ使用）。それから⑤止めナットを緩み止めとして④キャップナットにかける。

11 振動子ケーブルに配管する時は、④キャップナット上部のPS 3/4ねじを利用すること。

Mounting of Flush Type Transducer

1. Loosen lock nut ⑤ with a wrench (hex. size: 50mm) and take off cap nut ④ from transducer flange ③ together with gasket ⑥ and flat washer ⑦. (It is not necessary to draw the cap nut completely out from the cable.)
2. Unscrew hex. socket head bolts ⑨ (M12 x 25, 4 pcs.) by using a socket screw wrench (size: 10mm). Separate hull flange ② and transducer ① from transducer flange ③. Handle O-ring ⑧ carefully so as not to damage it.
3. Weld hull flange ② to the hull plate. Confirm that the "FORE" mark alignment line on the side of the hull flange faces the fore-aft line of the ship within ±1 degree. The hull flange ② should also be horizontal within ±1 degree at ship's normal trim.
4. Finish the outside hull plate with a grinder to ensure smooth water-flow.
5. Apply kinoruster (Anti-Crevice corrosion sealant) to face A of hull flange ② , O-ring groove on the hull flange, O-ring ⑧ and face A of the transducer flange.
6. Fit O-ring ⑧ onto the O-ring groove.
7. Place transducer ① into hull flange ② so that the alignment nipple on the transducer face fits into the notch on the hull flange.
8. Settle transducer flange ③ on the hull flange.
9. Tighten hex. socket bolts ⑨ with a socket screw wrench.
10. Put gasket ⑥ and flat washer ⑦ on top of the transducer flange and tighten cap nut ④ securely with a wrench (hex. size: 50 mm). Screw lock nut ⑤
11. When running the transducer cable inside the conduit pipe, screw the pipe end onto the cap nut (PS3/4) for watertightness.



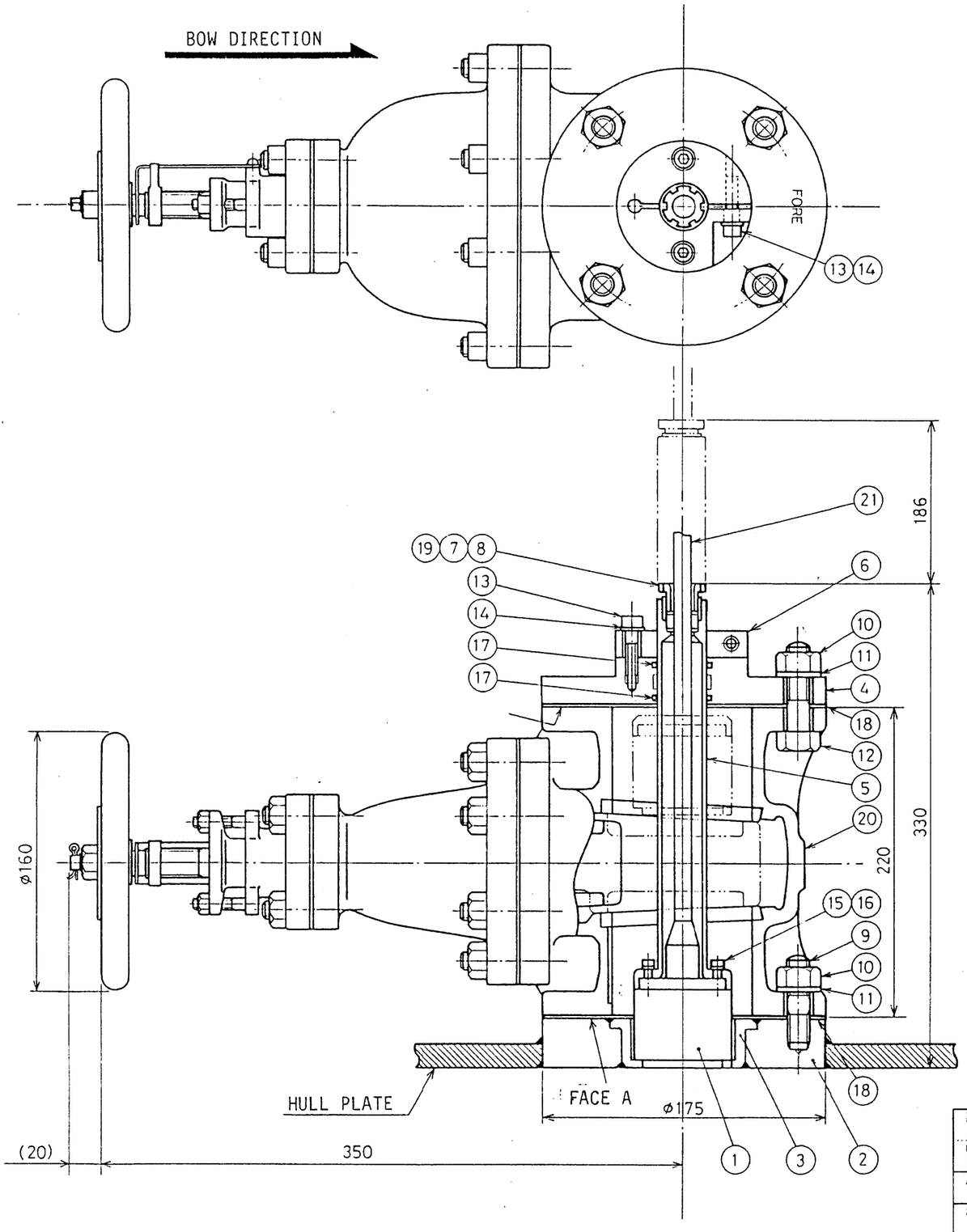
ITEM	NAME	MATERIAL	Q'TY	DWG.NO.	REMARKS
10	バネ座金 SPRING WASHER	SUS304	4		M12
9	六角穴付きボルト HEX. SOCKET HEAD BOLT	SUS304	4		M12 x 25
8	Oリング O RING	NBR	1		JIS B2401 P75
7	平座金 FLAT WASHER	SPC	1		5/8
6	(電線貫通金物用)ガスケット GASKET	CR	1		
5	(電線貫通金物用)止メナット NUT	SS41	1		
4	(電線貫通金物用)キャップナット CAP NUT	SS41	1		
3	振動子フランジ TRANSDUCER FLANGE	SS41	1		
2	船底フランジ FLANGE	KA	1		
1	送受波器 TRANSDUCER			DS-785/820	

DRAWN Oct 13'00 T.YAMASAKI		TYPE DS-784
CHECKED Oct 13'00 T.K		名称 船底タンク（埋込型）
APPROVED Oct 13'00 T.K	DS-80 DS-70	送受波器装備図
SCALE 1/2 MASS 9.5 kg	APPLICABLE TO; (MODEL) BLOCK NO.	NAME SEACHEST(FLUSH TYPE)
DWG NO. C7222-T06- D		TRANSDUCER INSTALLATION

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NOTE/INSTALLATION PROCEDURE

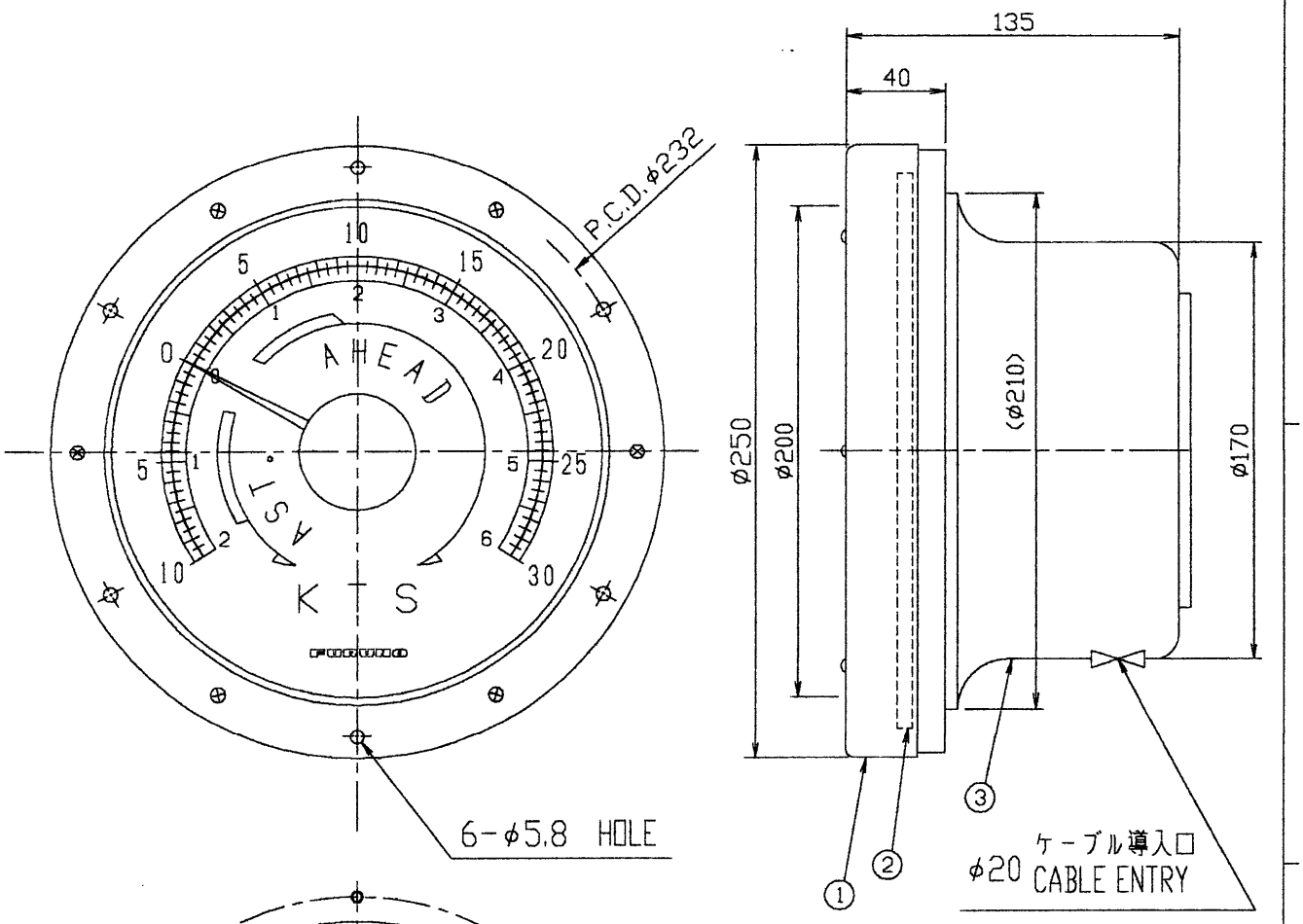
1. SEPARATE ②HULL FLANGE AND ④FLANGE (WITH ①TRANSDUCER/ ⑤SHAFT) FROM ⑳ GATE VALVE BY REMOVING ⑩ HEX. NUT.
2. WELD ②HULL FLANGE TO HULL PLATE. CONFIRM "FORE" AND REFERENTIAL MARKS SO THAT FORE-AFT INSTALLATION ERROR IS WITHIN +1 DEGREE. ALSO THE FACE OF ② HULL FLANGE SHOULD BE ALIGNED IN PARALLEL WITH THE DRAFT LINE (WITHIN +1 DEGREE). USING A GRINDER OR SIMILAR TOOL, FINISH THE OUTSIDE HULL PLATE SO THAT IT IS SMOOTH AND FLAT.
3. APPLY KINORUSTER (ANTI-CREVICE CORROSIVE SEALANT) TO FACE A OF ②HULL FLANGE AND TO BOTH FACES OF ⑱ GASKET AND FLANGE OF ⑳ GATE VALVE.
4. PUT ⑱ GASKET ONTO ②HULL FLANGE.
5. FASTEN ⑳ GATE VALVE TO ②HULL FLANGE. THE DIRECTION OF ⑳ GATE VALVE CAN BE SELECTED EVERY 90 DEGREES. (STANDARD DIRECTION OF HANDLE: AFT)
6. APPLY KINORUSTER TO FACE B OF ④FLANGE AND TO BOTH FACES OF ⑱ GASKET AND FLANGE OF ⑳ GATE VALVE.
7. PUT ⑱ GASKET ONTO FLANGE OF ⑳ GATE VALVE.
8. FASTEN ④FLANGE (WITH ①TRANSDUCER/ ⑤SHAFT) TO ⑳ GATE VALVE. ALIGN THE "FORE" MARK OF ④FLANGE WITH THE "FORE" MARK OF ②HULL FLANGE AT THIS TIME.
9. FOR TESTING THE MOVE OF ⑤SHAFT, RAISE AND LOWER IT AFTER LOOSENING ⑬ HEX. SOCKET HEAD BOLT OF ⑥LOCK RING.
10. FASTEN THE ⑬ HEX. SOCKET HEAD BOLT OF ⑥LOCK RING AT THE LOWEST POSITION ON THE ⑤SHAFT. ALIGN THE BOW DIRECTION MARK AT THE UPPER SIDE OF ⑤SHAFT WITH "FORE" MARK OF ④FLANGE.
11. CONFIRM THAT FACES OF HULL PLATE AND TRANSDUCER ARE EVEN.

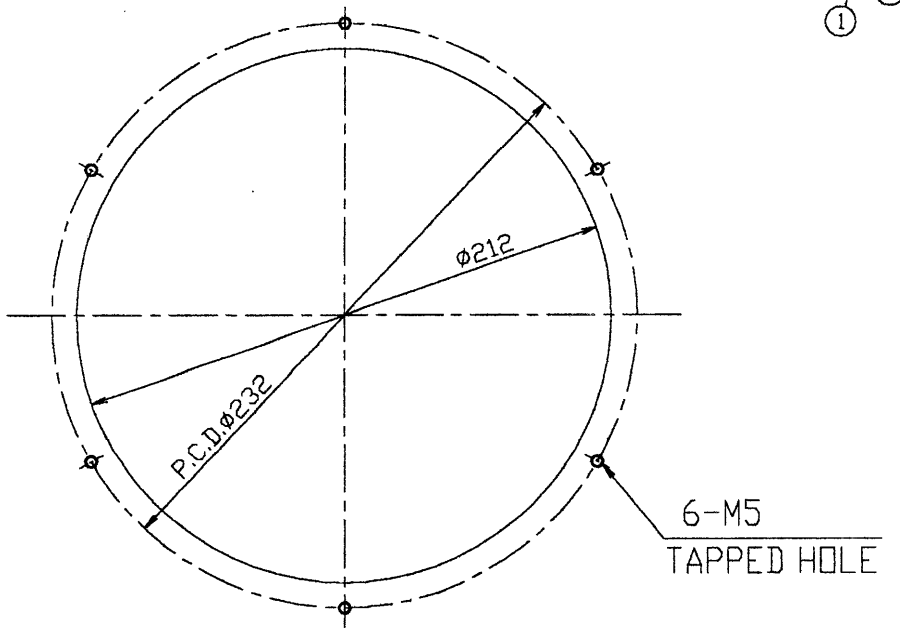
ITEM	NAME	MATERIAL	Q'TY	REMARKS
21	CONNECTION CABLE			ø11.8
20	GATE VALVE	SC	1	10kg/cm²x65
19	FIXING GLAND	BRASS	1	
18	GASKET		2	10kg/cm²x65
17	O RING	NBR	2	JIS B2401 P30
16	SEAL WASHER	SUS NBR	4	M4
15	HEX. SOCKET HEAD BOLT	SUS304	4	M4x16
14	SPRING WASHER	SUS304	3	M8
13	HEX. SOCKET HEAD BOLT	SUS304	3	M8x30
12	HEX. BOLT	SUS304	4	M16x60
11	SPRING WASHER	SUS304	8	M16
10	HEX. NUT	SUS304	8	M16
9	TAP-END STUD BOLT	SUS304	4	M16x40
8	WASHER	SPC	2	
7	GASKET	CR	1	
6	LOCK RING	SS41	1	
5	SHAFT	SUS304	1	
4	FLANGE	SUS304	1	
3	BUSHING	SUS304	1	
2	HULL FLANGE	KA	1	
1	TRANSDUCER			DS-785/820

DRAWN: Oct/13'00 T.YAMASAKI		TYPE: DS-786	
CHECKED: Oct/13'00 Y.K		名称	
APPROVED: Oct/13'00 Y.K	DS-80 DS-70	送受波器装備図	
SCALE: 1/3	MASS: 44 kg	APPLICABLE TO; (MODEL)	BLOCK NO.
DWG NO.: E7222-T04- C		NAME: SEACHEST TYPE (W/ GATEVALVE) TRANSDUCER INSTALLATION	

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取付寸法図
FIXING DIMENSION

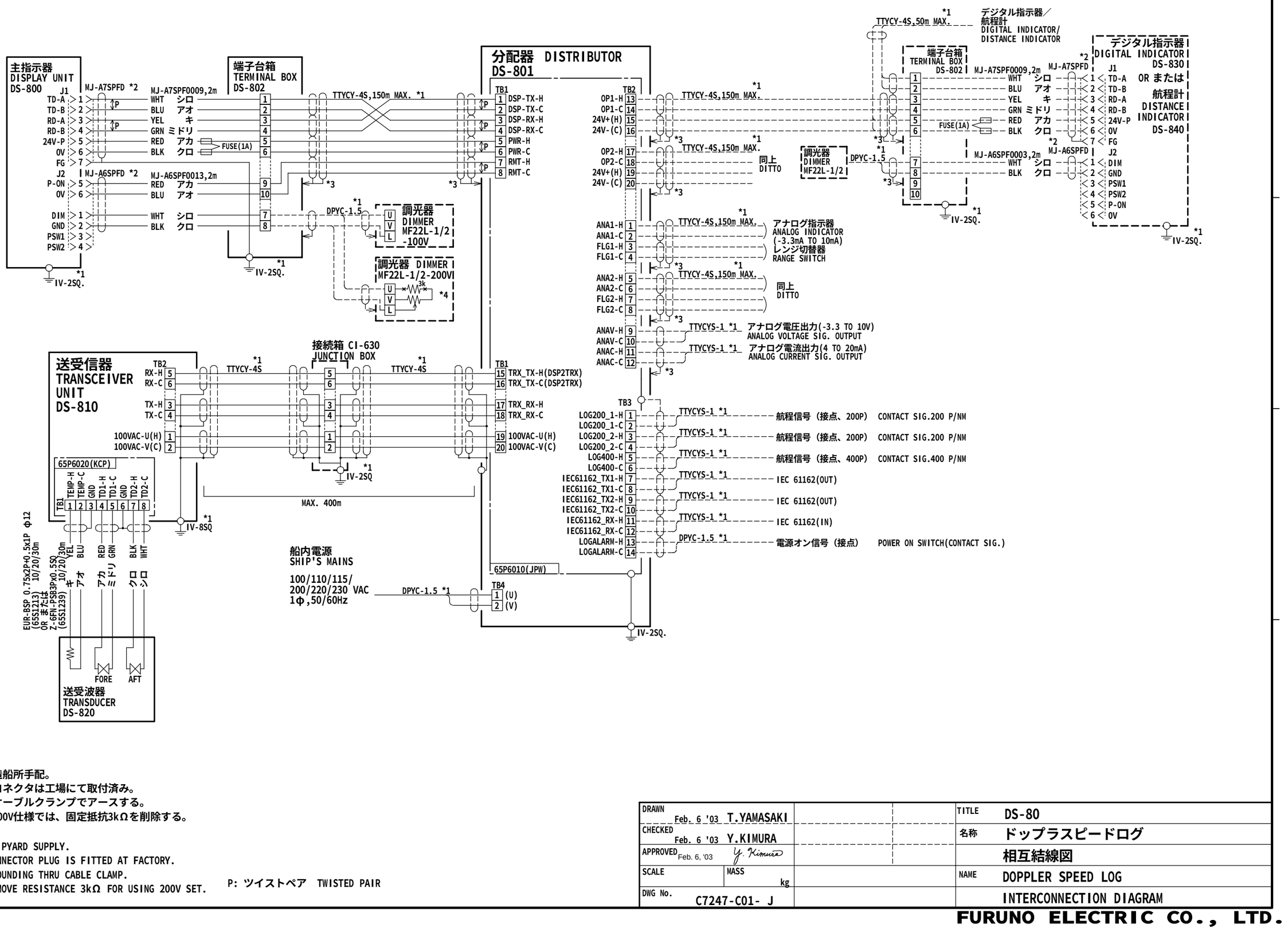
品番 PART NO.	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS
3	本体 BODY	AC7AF	1		
2	EL板 E.L. PLATE		1		
1	フタ COVER	AC7AF	1		

DRAWN Jun. 27' 01 T. YAMASAKI		TITLE	MF-22A-4
CHECKED Jun. 27' 01 Y. KIMURA		名称	アナログ指示器（埋込型）
APPROVED Jun. 27' 01 Y. KIMURA			外寸図
SCALE 1/3	MASS ±10% 4.4 kg	NAME	ANALOGUE DISPLAY UNIT (FLUSH MOUNT)
DWG.No. C7213-096-D			OUTLINE DRAWING

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注記
＊1）造船所手配。
＊2）コネクタは工場にて取付済み。
＊3）ケーブルクランプでアースする。
＊4）200V仕様では、固定抵抗3kΩを削除する。

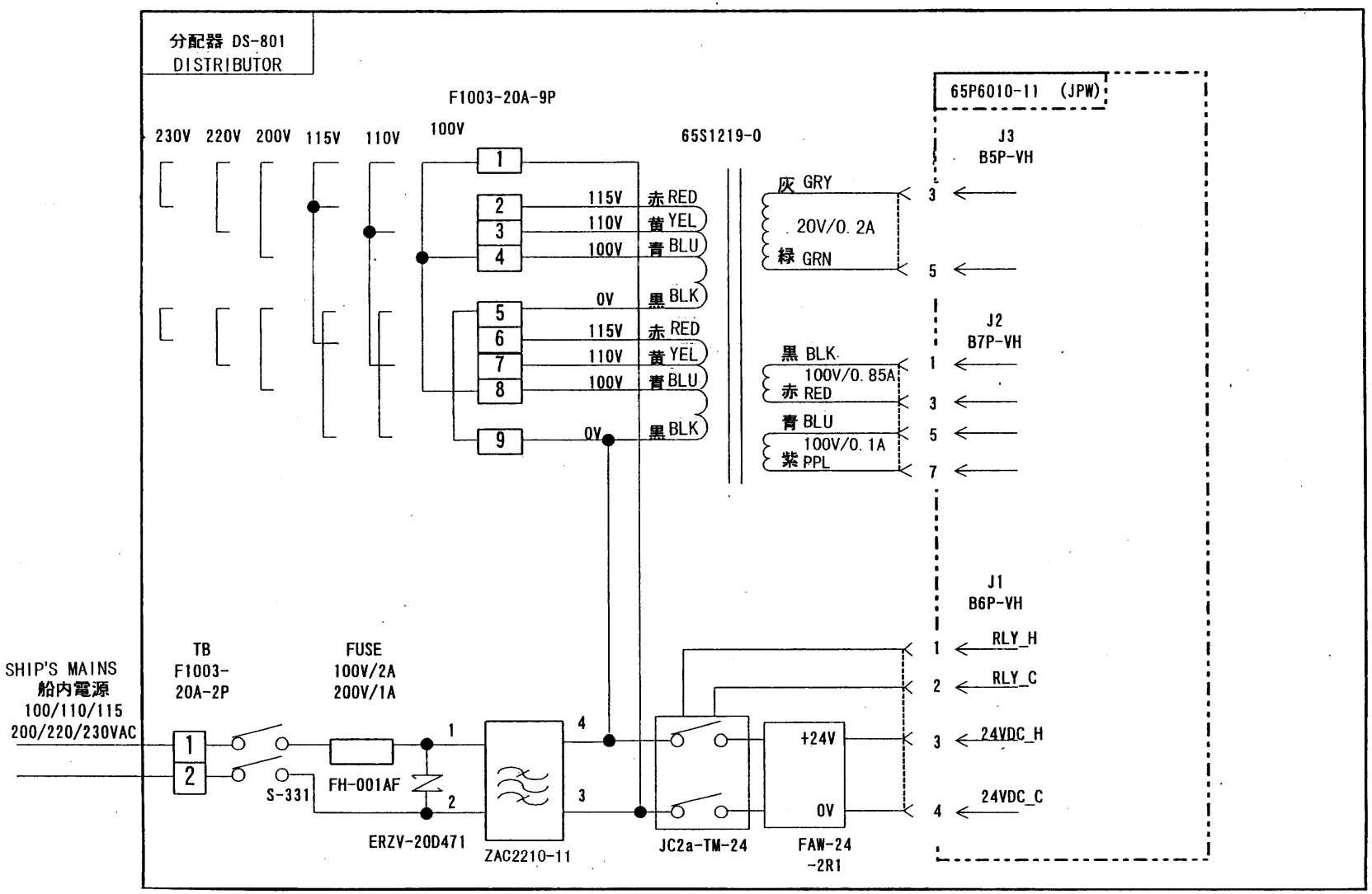
NOTE
*1. SHIPYARD SUPPLY.
*2. CONNECTOR PLUG IS FITTED AT FACTORY.
*3. GROUNDING THRU CABLE CLAMP.
*4. REMOVE RESISTANCE 3kΩ FOR USING 200V SET.

P: ツイストペア TWISTED PAIR

DRAWN Feb. 6 '03 T.YAMASAKI		TITLE	DS-80
CHECKED Feb. 6 '03 Y.KIMURA		名称	ドップラスピードログ
APPROVED Feb. 6, '03 Y. Kimura			相互結線図
SCALE / MASS kg		NAME	DOPPLER SPEED LOG
DWG No. C7247-C01- J			INTERCONNECTION DIAGRAM

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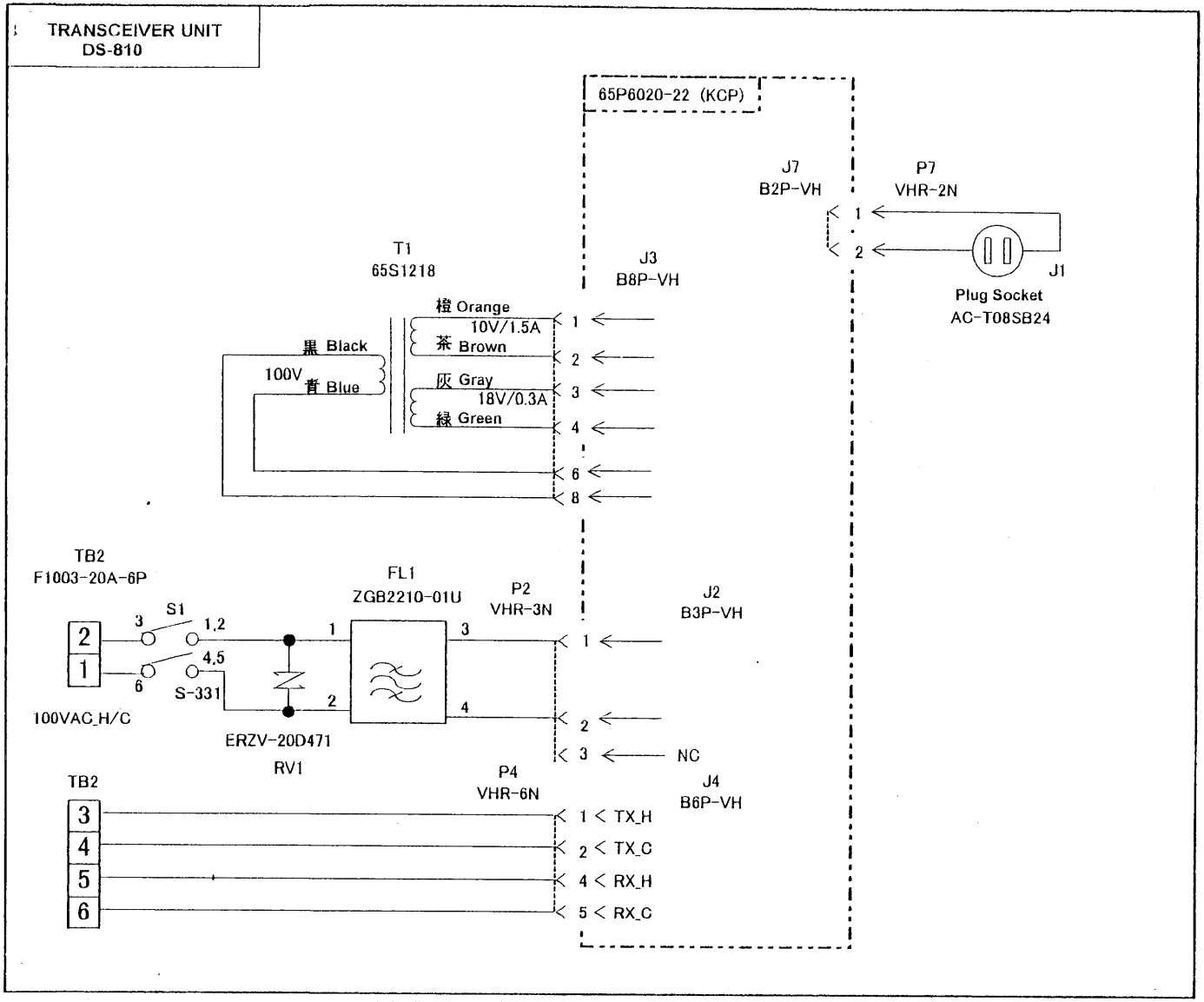
DRAWN Jan 12'00 T.YAMASAKI			TYPE DS-801
CHECKED Jan 12'00 K.Tsuruta			名称 分配器
APPROVED Jan 12'00 K.TSUJIMOTO	DS-80		回路図
SCALE / MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME DISTRIBUTOR
DWG NO. C7247-K03- B			SCHEMATIC DIAGRAM

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TRANSCEIVER UNIT
DS-810

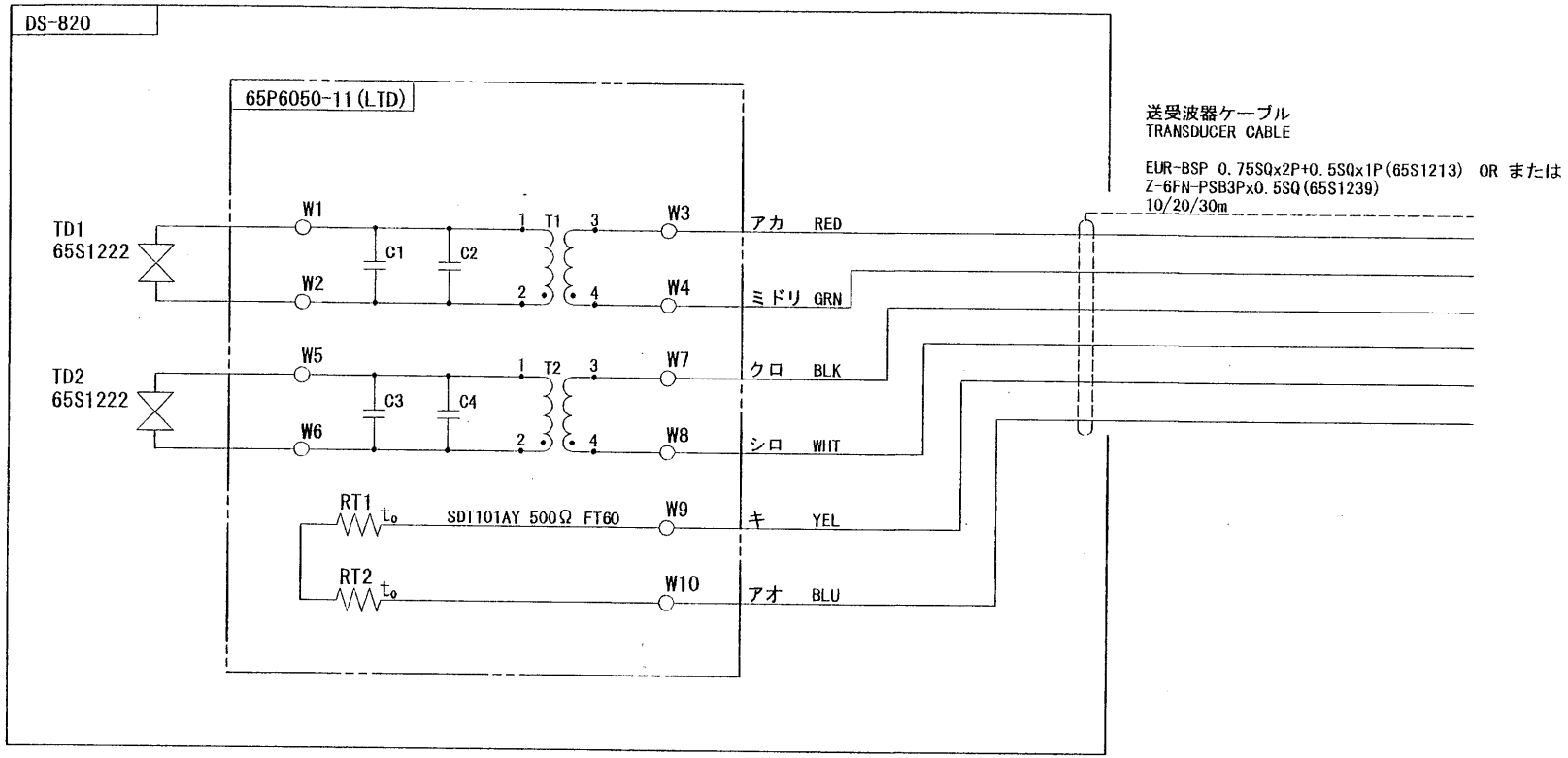


DRAWN May 25 '00 T.YAMASAKI				TYPE DS-810
CHECKED May 25 '00 T.Kimura				名称 送受信器
APPROVED May 25 '00 T.Kimura				回路図
SCALE /	MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME TRANSCEIVER
DWG NO. C7247-K02- B		65-005-1003-		SCHEMATIC DIAGRAM

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DRAWN Mar. 15 '01 T. YAMASAKI			TITLE DS-820
CHECKED Mar 16 '01			名称 送受波器
APPROVED Mar 16 '01 S. Yoshi			回路図
SCALE	MASS kg		NAME TRANSDUCER
DWG. No. C7247-K01- B		65-005-1004- 0	SCHEMATIC DIAGRAM

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S-4

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