

## *Installation Manual*

# **DOPLER SPEED LOG**

### *Model DS-80*

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**ECF**

(Elemental Chlorine Free)

The paper used in this manual  
is elemental chlorine free.

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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.

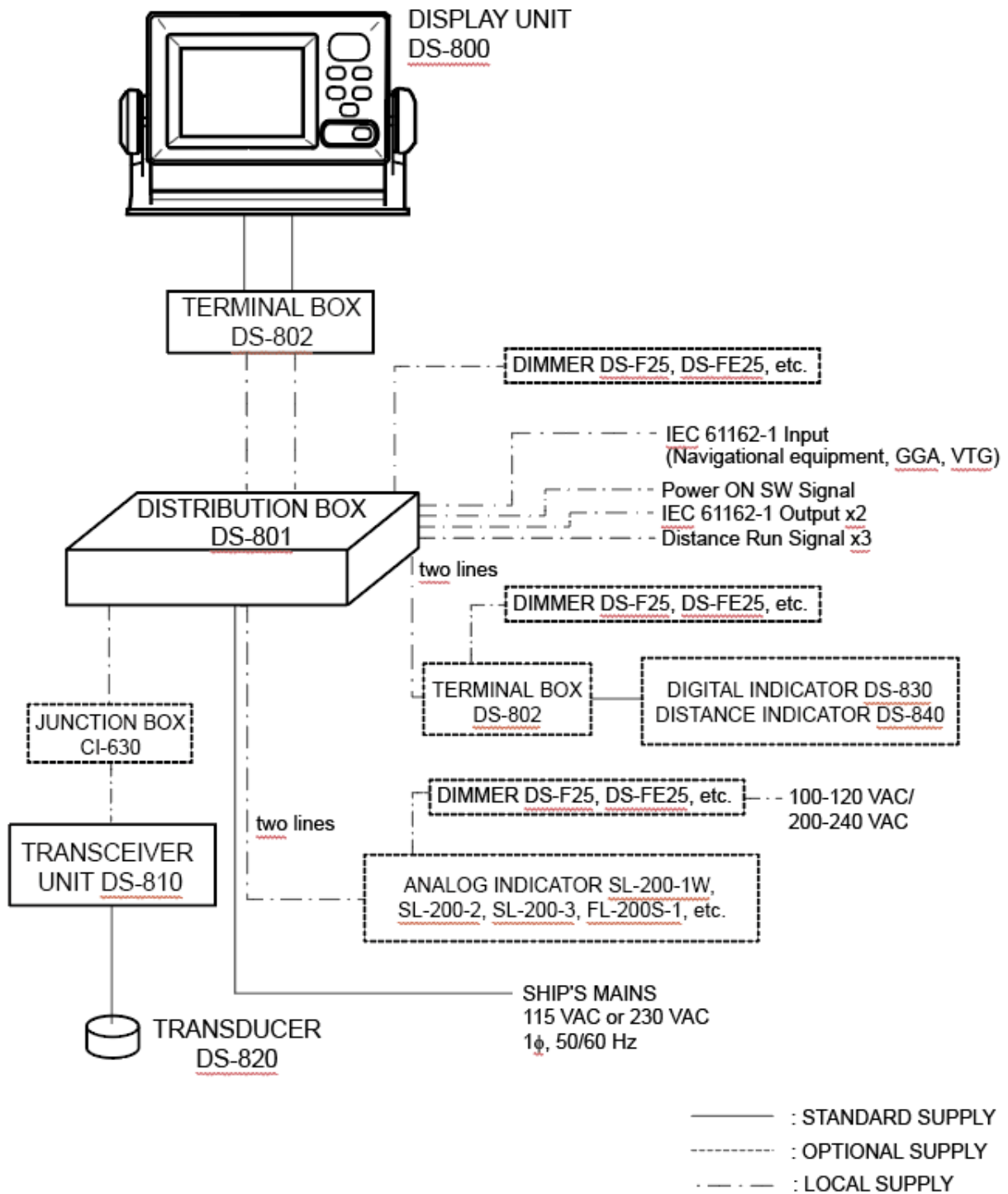
**Ground the equipment.**

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	0.30 m	0.30 m
Distribution Box	2.15 m	1.45m
Transceiver Unit	2.00 m	1.15 m
Terminal Box	0.85 m	0.50 m

# SYSTEM CONFIGURATION



# EQUIPMENT LISTS

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## 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	select 10/20/30/40m 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

## Optional equipment

Name	Type	Code No.	Qty	Remarks
Terminal Box	DS-802	000-029-048	1 set	w/CP65-00903
Dimmer	DS-F25	-	1 set	100-120 VAC, flush mount
	DS-FE25	-	1 set	200-240 VAC, flush mount
	DS-S25	-	1 set	100-120 VAC, bulkhead
	DS-SE25	-	1 set	200-240 VAC, bulkhead
Junction Box	CI-630	000-069-770	1 set	w/CP66-02201
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-783	000-029-053	1 set	Flush mount type
	DS-784	000-029-054	1 set	Flush type
	DS-786	000-029-055	1 set	Gate valve type
Transducer Tank	DS-854	-	1 set	Ball valve type
Alarm unit	AU-12	-	1 set	
Range Switch Box	MF-22R-1	-	1 set	flush mount
	MF-22R-2	-	1 set	bulkhead
Analog Indicator	FE-90	-	1 set	Displayed scale range: -10 to 30 kn, panel flush mount
	FL-90	-	1 set	Displayed scale range: -10 to 30 kn, panel flush mount
	SL-200-1W	-	1 set	Displayed scale range: -10 to 30 kn, bulkhead, Degree of protection: IP56
	SL-200-5W	-	1 set	Displayed scale range: 30 to -10 kn, bulkhead, Degree of protection: IP56
	SL-200-2	-	1 set	Displayed scale range: -10 to 40 kn, bulkhead, Degree of protection: IP56
	SL-200-3	-	1 set	Displayed scale range: -10 to 20 kn, bulkhead, Degree of protection: IP56
	FL-200S-1	-	1 set	Displayed scale range: -10 to 30 kn, flush mount, Degree of protection: IP5X
	FL-200S-1W	-	1 set	Displayed scale range: -10 to 30 kn, flush mount, Degree of protection: IP5X

# 1. MOUNTING

---

## NOTICE

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

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

## 1.1 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

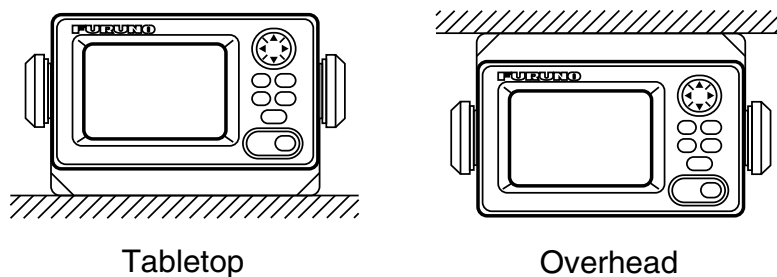
## 1.2 Display Unit

### 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.



*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.



## **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.

## 1.4 Transducer Unit

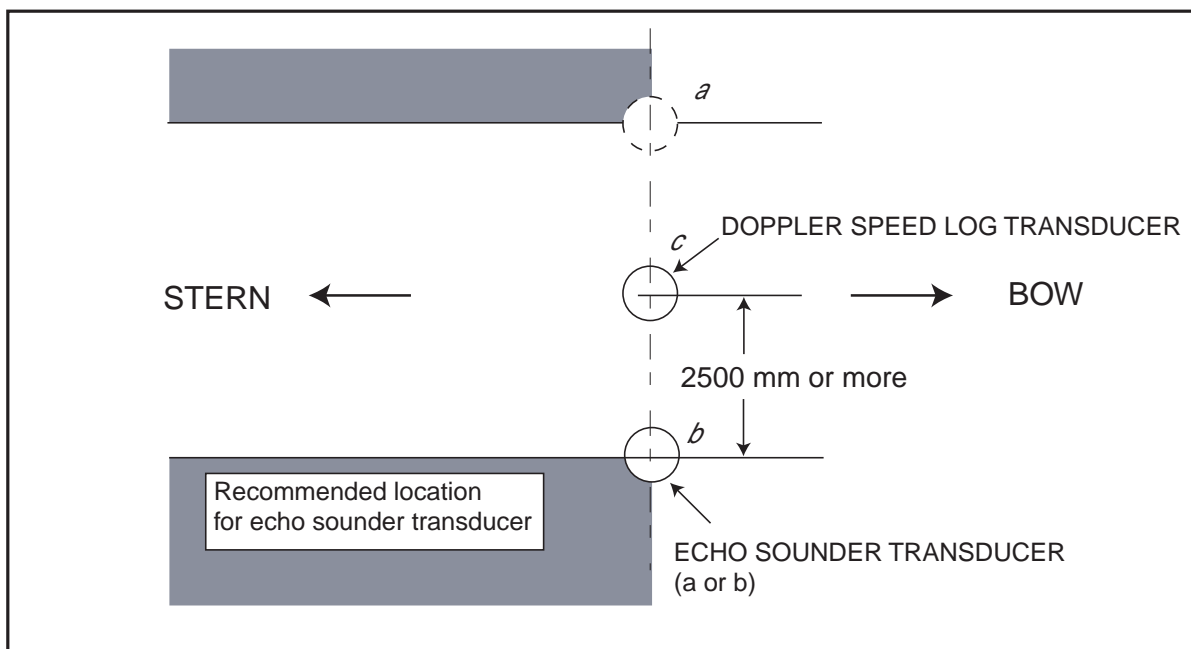
The performance of this equipment is directly dependent on the installation of the transducer.

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 cavitation.
- Never apply ordinary paint to the transducer face. Whenever the ship is dry docked, the transducer face should be cleaned off oysters and foreign material.

## 1.4.2 Mounting of transducer

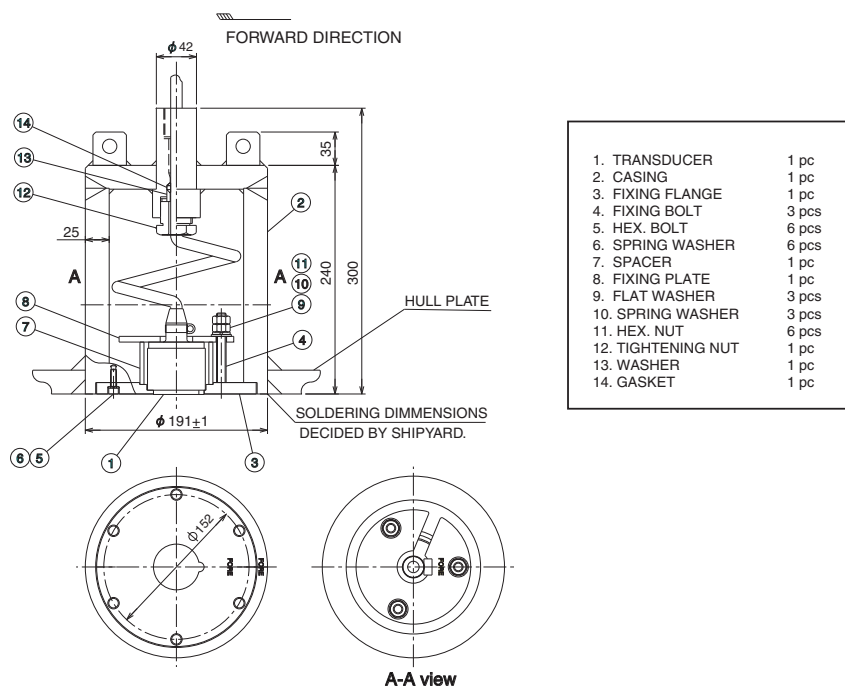
Confirm that a metal cover is attached to the transducer. For seachest except DS-850, remove the hose clamp from the top of transducer.

### 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 tapped 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 through-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.

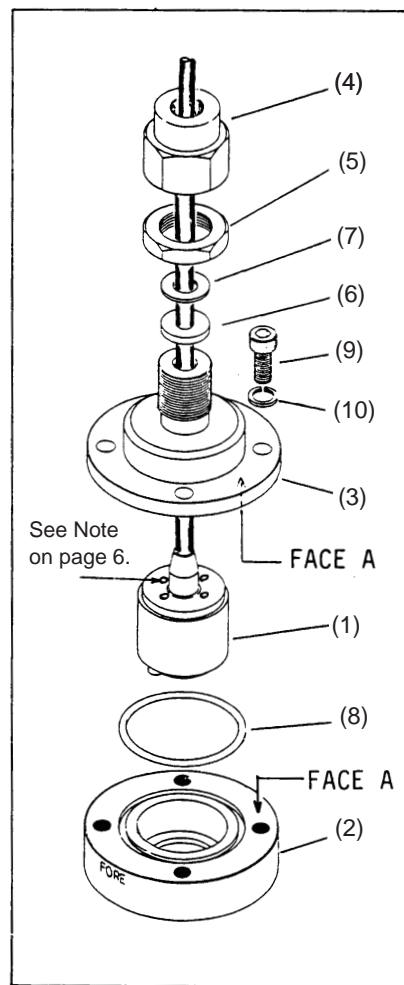
Do not seal the bottom plate to stop ingress of water into the tank.



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

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

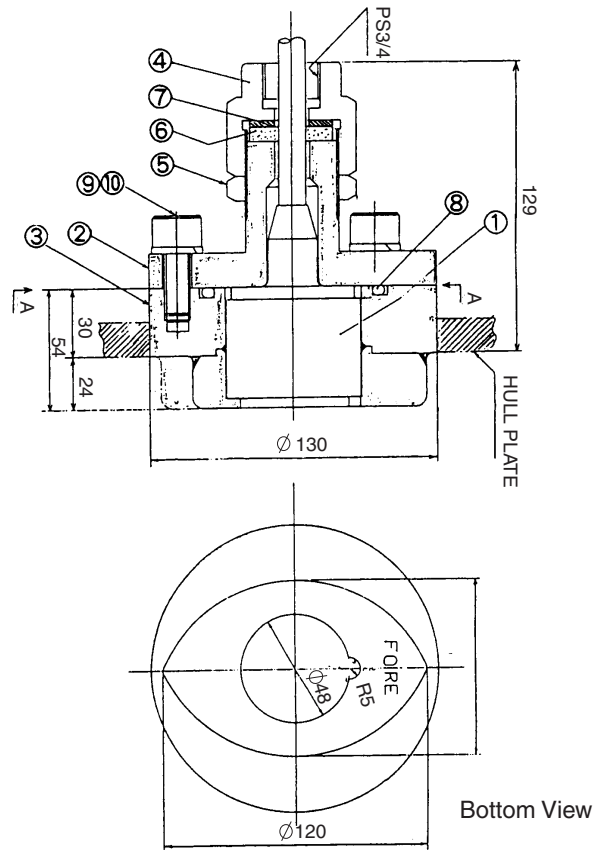
1. Loosen lock nut (5) with a wrench (hex. size: 50 mm) and take off cap nut (4) from top cover (3) together with gasket (6) and flat washer (7). (It is not necessary to draw the cap nut completely out from the cable.)
2. Unscrew hex. socket head bolts (9) (M12X25, 4 pcs.) by using a socket screw wrench (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 seacjst (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.

## **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.

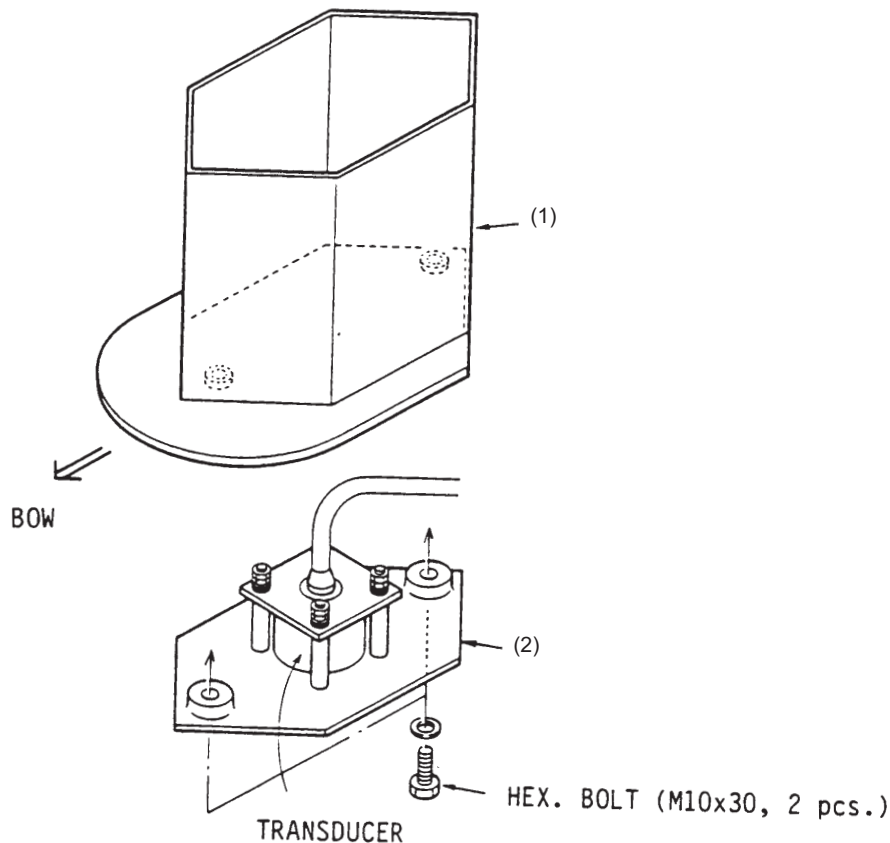


**Note:** Never remove the four flat head screws which seal screw holes, to preserve watertight integrity.

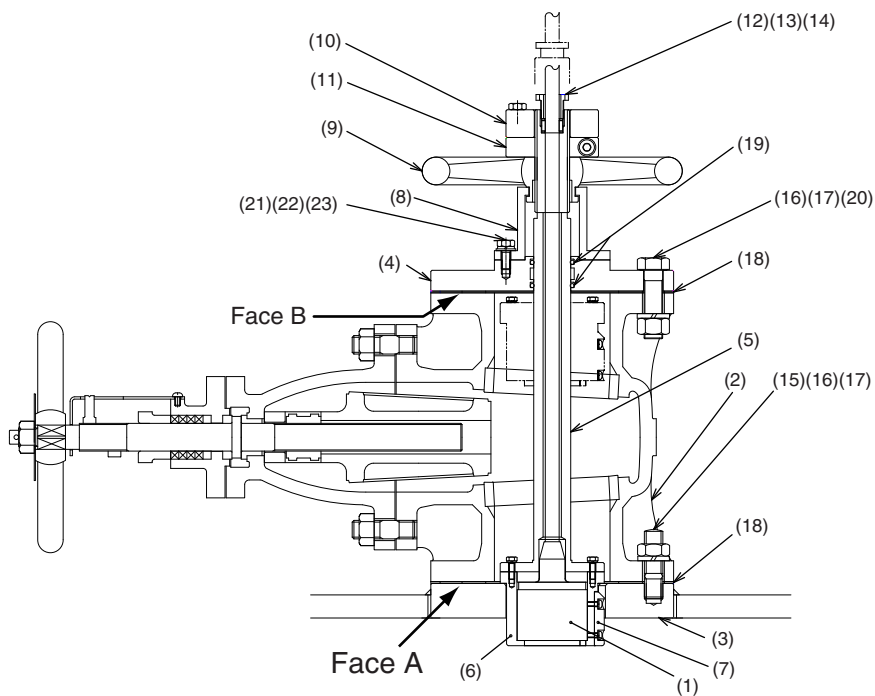
## **Mounting of Projection Type Seachest DS-781 (ref. Dwg. C72222-T05)**

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 ( $\phi 36$ ), 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 ( $\phi 10-20$ ).
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, fasten the transducer fixing flange to the transducer housing.

**Note:** Never remove the four flat head screws.



**Gate valve, Projection Type Transducer DS-782 (ref. Dwg. C7222-T02)**



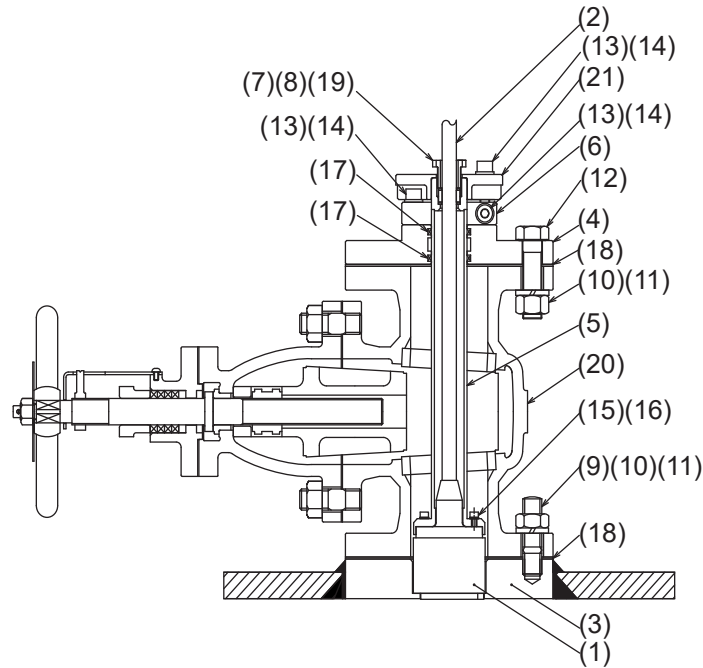
*DS-782*

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 (3).
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.

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.

**Gate valve, Projection Type Transducer DS-786 (ref. Dwg. C7222-T04)**



*DS-786 gate valve, sectional view*

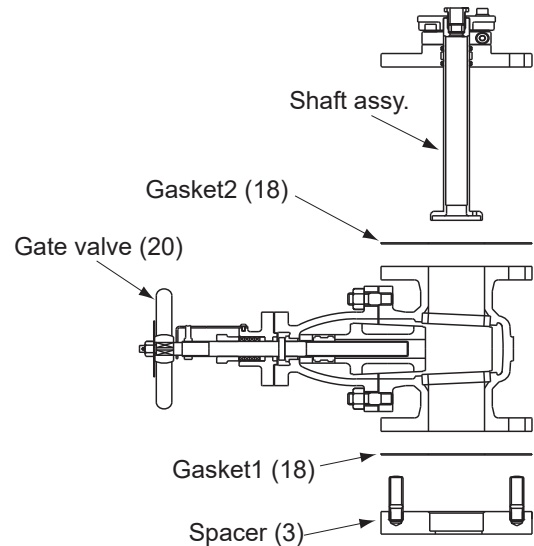
**Note:** The gate valve requires service space of 700 mm. For details, see the installation drawing at the back of this manual.



1. Unfasten M16 nut (3) and spring washer (11) from the assembled gate valve to remove the five items shown below.

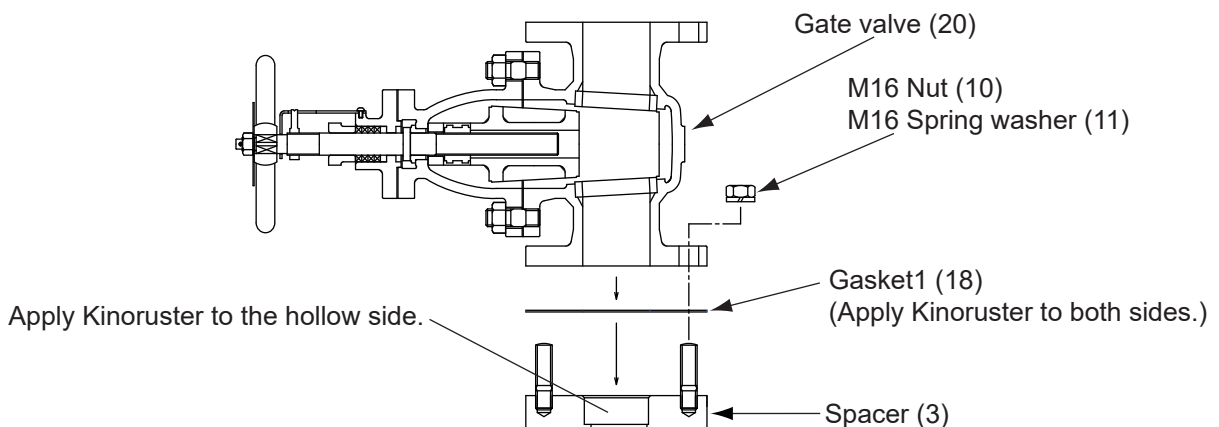
- Gate valve (20)
- Spacer (3)
- Gasket 1(18)
- Gasket 2(18)
- Shaft assy.

2. Set the spacer (3) to the mounting location.  
The "FORE-AFT" line on the spacer must be parallel with the ship's fore and aft line (within 1°). For horizontal direction, the bottom of the spacer must be parallel with the ship's draft.

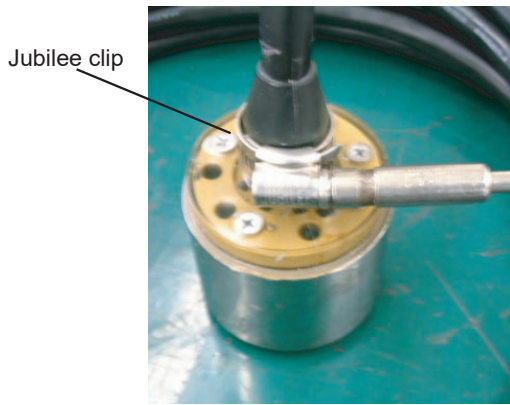


**Note:** Handle the top side of the spacer (3) carefully to preserve the waterproof effect.

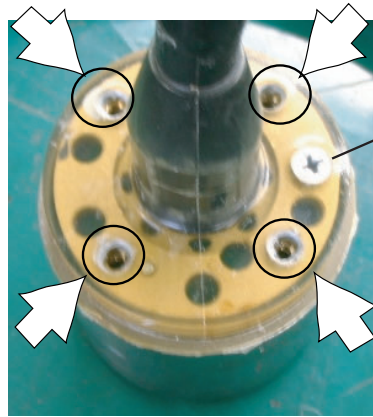
3. Weld the spacer (3) to the ship's hull. The welding and doubling methods are left up to the shipyard.
4. Apply Kinoruster (supplied) to both sides of the gasket1 (18), and put it on the spacer (3).
5. Apply Kinoruster (supplied) to the hollow side of the spacer (3).
6. Clean the top and bottom of the gate valve (20), and put it on the gasket1 (18) set on the spacer (3).
7. Fasten M16 nut (10) and M16 spring washer (11) loosely to the stud bolt of the spacer (3).
8. Paint the gate valve (20) and the spacer (3) the same color as ship's body. Paint only gray-colored areas; for other part, seal with a masking tape. Remove the tape when the paint dries.



9. Unfasten two sets of hex. bolt (13) and M8 spring washer (14) from the top side of the shaft to remove the fixing plate (21).
10. Remove the gland (19), gasket (7) and washer (8)(2 pcs.) from the shaft.
11. Remove Jubilee clip located at the base of the transducer (1) cable and M4 flat-head Phillips screw at the top side of the transducer (1).



Removing Jubilee clip



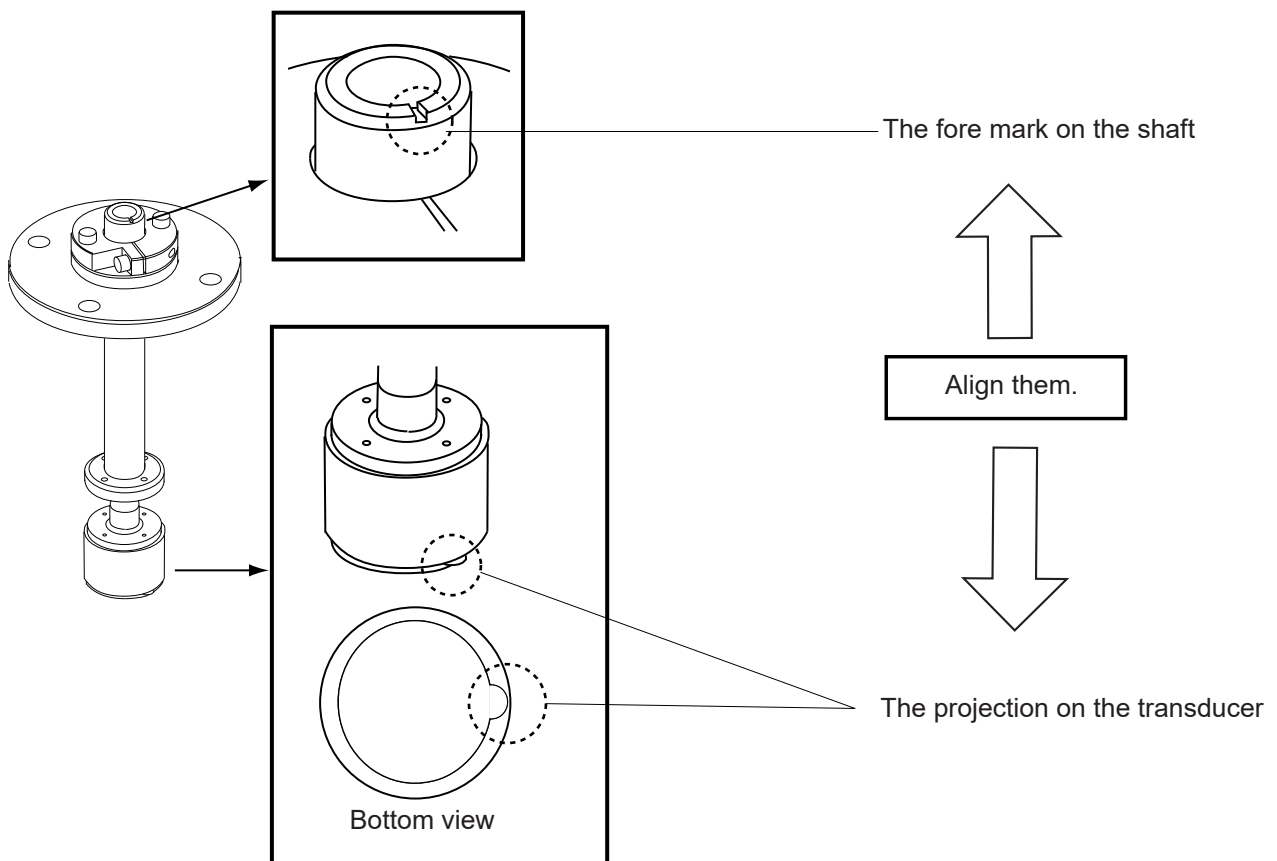
Removing flat-head Phillips screws

12. Pass the transducer cable through the shaft from the flange side.

13. Apply Three Bond (1104 200G:local supply) to the top side of the transducer evenly.

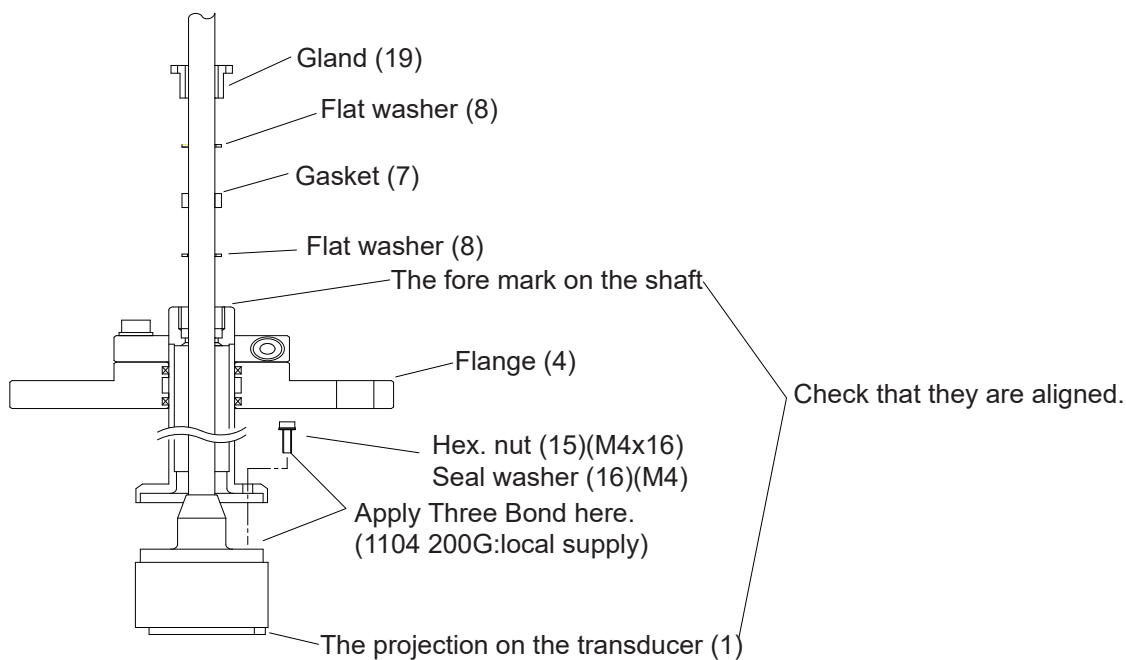
14. Apply Three Bond to the thread part of hex. bolt (15) with seal washer (16) and use them to fasten the transducer.

Check that the fore mark on the shaft is aligned with the projection at the bottom of the transducer.



15. Pass the flat washer (8), gasket (7), washer (8), and the gland (19) onto the transducer cable.

16. Fasten the gland (19) to the top of the shaft (5).



17. Apply Kinoruster to both sides of the gasket2 (18), and put it on the gate valve (20).

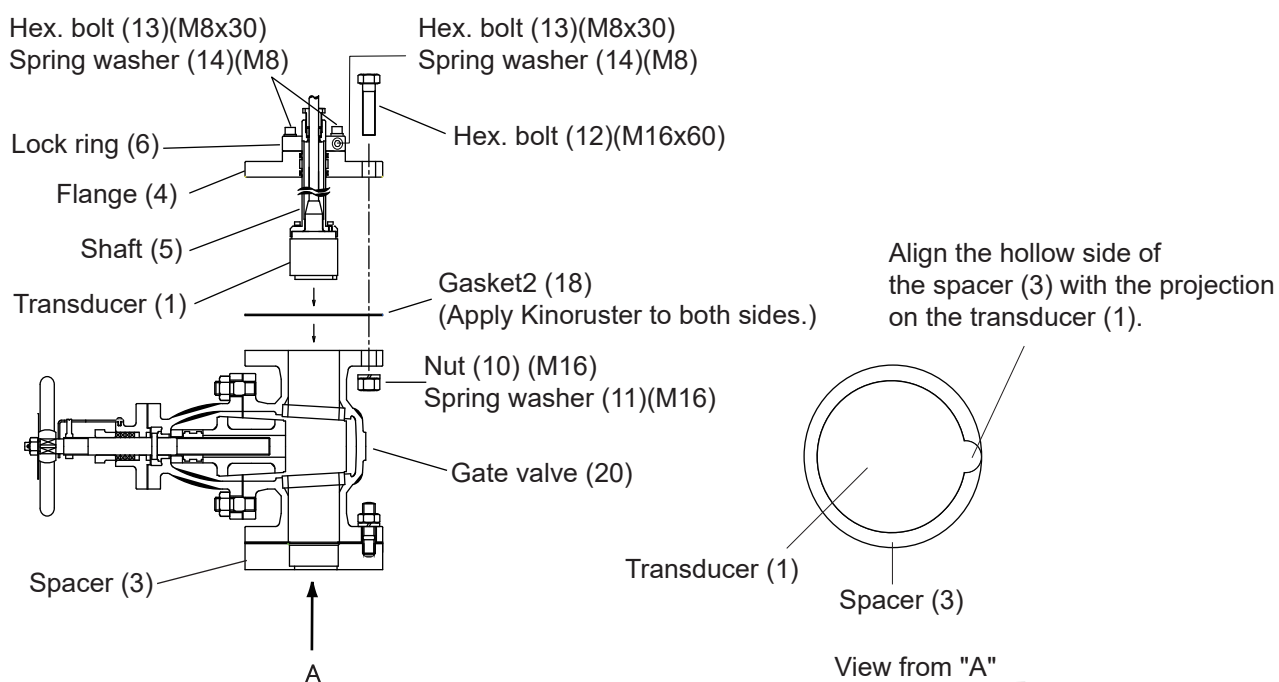
18. Put the shaft on the gasket2 (18), and align the hollow side on the spacer (3) with the projection of the transducer (1).

19. Remove M8 hex. bolt (13) and M8 spring washer (14) from the lock ring to free the shaft (5).

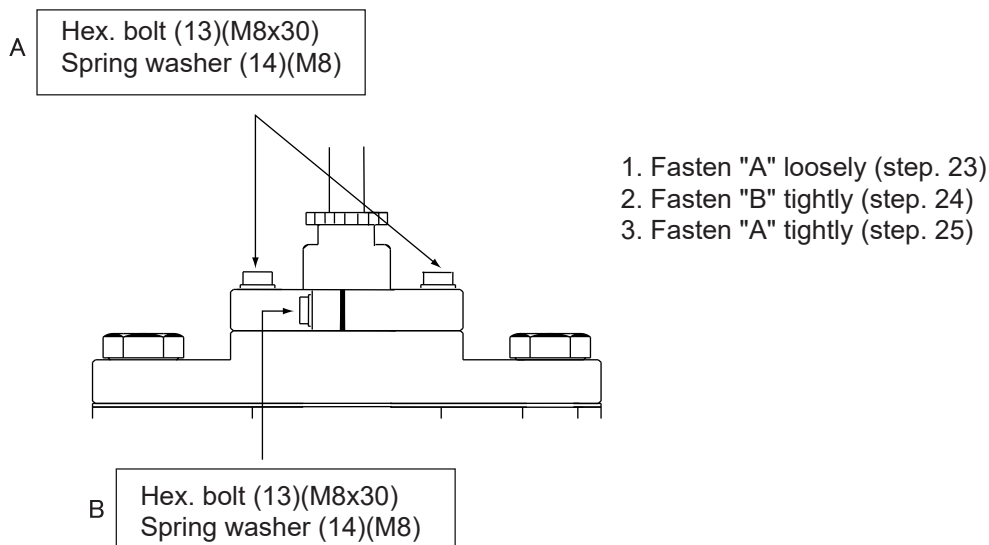
20. Use the M16 hex. bolt (12), M16 nut (10) and M16 spring washer (11) to fasten the flange (4) loosely.

21. Insert the shaft so the projection on the transducer fits in the groove on the spacer (3). Move the shaft up and down by hand to confirm that it moves smoothly.

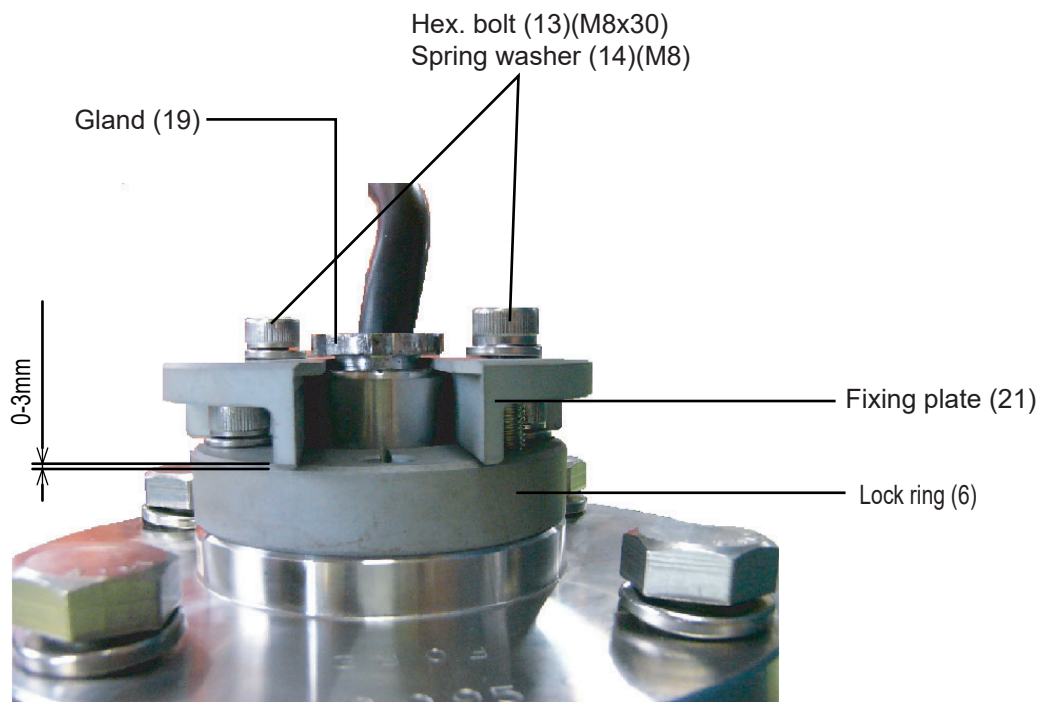
22. Tighten the M16 nut(8 pcs.) on the gate valve (20).



23. Loosely fasten two sets of M8 hex. bolt (13) and M8 spring washer (14) at the top side of the lock ring (6).
24. Tightly fasten the M8 hex. bolt (13) tightly and the M8 spring washer (14) at the lateral side of the lock ring.
25. Loosely fasten two sets of M8 hex. bolt (13) and M8 spring washer (14) fastened at step 23.



26. Put the fixing plate (21) between the shaft (5) and gland (19). Fasten the plate with two sets of M8 hex. bolt (13) and M8 spring washer (14).  
Check the clearance between the fixing plate (21) and the lock ring (6). If the clearance is more than 3 mm, be sure to check that the hollow side of the spacer (3) is aligned with the projection on the transducer (1).



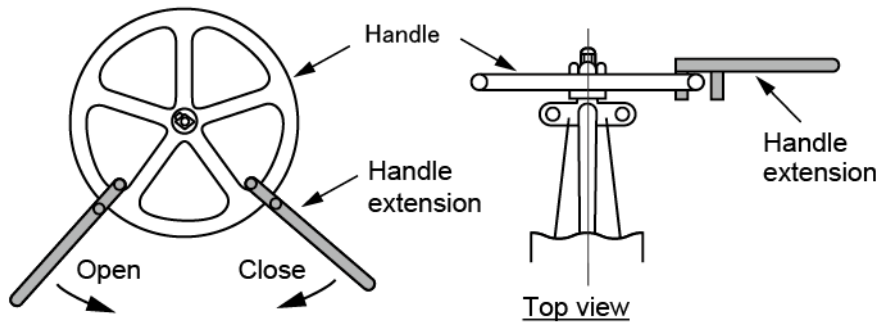
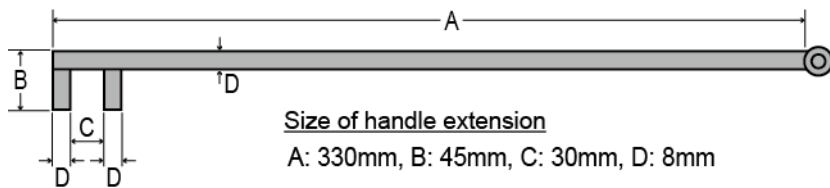
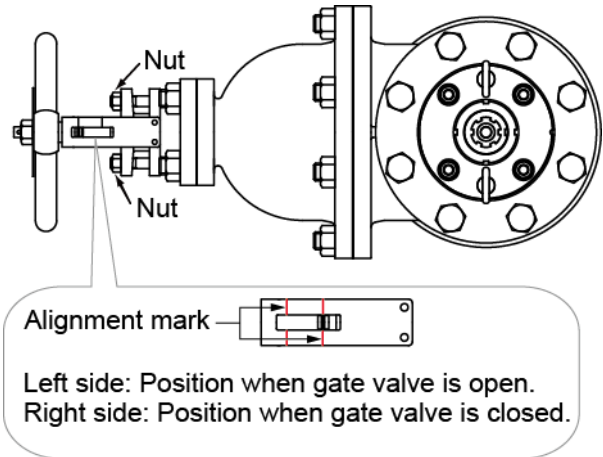
27. Check that all bolts are fastened tightly.

## How to open, close the gate valve

1. Loosen the two nuts fixing the gland gasket until the handle can be turned.
2. Operate the handle to open or close the gate valve.

### When closing the gate valve

If additional tightening is necessary after turning the handle by hand, prepare separate handle extensions. Tighten again using the handle extension until the main handle can no longer be turned. For the size and usage of the handle extension, refer to the figure below.

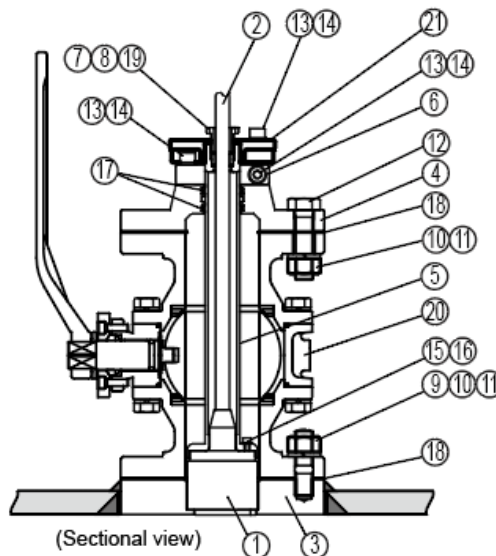


3. After opening or closing the gate valve, tighten the loosened nuts until the handle cannot be turned.

## Ball valve Transducer DS-854



Ball valve DS-854

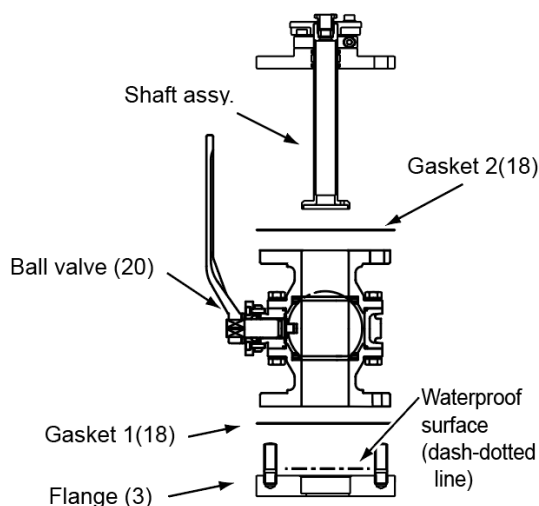


**Note 1:** The liquid gasket for installation may not be supplied due to export regulations. If the liquid gasket TB1121 is not included in the installation materials, prepare the liquid gasket specified in your country.

**Note 2:** The ball valve requires service space of 700 mm. For details, see the installation drawing at the back of this manual.

1. Unfasten M16 nut (10) and flat washer (11) from the assembled gate valve to remove the five items shown below.

- Ball valve (20)
- Flange (3)
- Gasket 1(18)
- Gasket 2(18)
- Shaft assy.

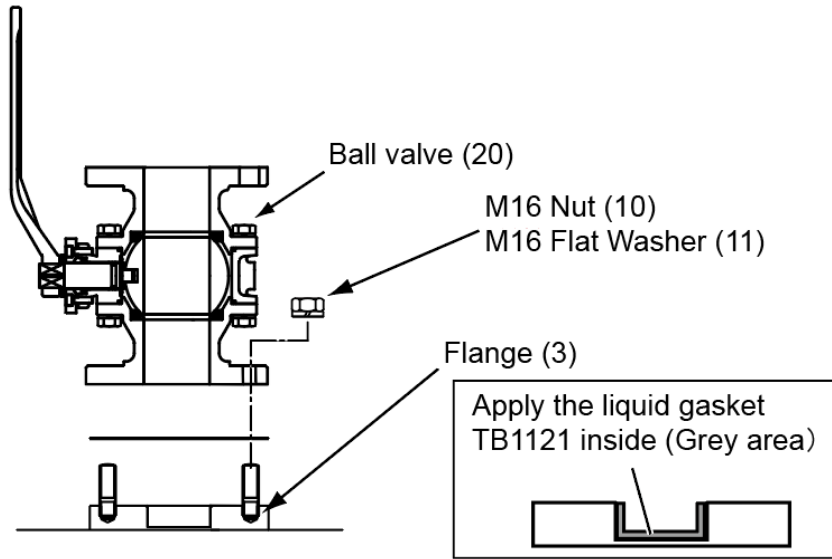


2. Set the flange (3) to the mounting location. The “FORE-AFT” line on the spacer must be parallel with the ship’s fore and aft line (within 1°). For horizontal direction, the bottom of the spacer must be parallel with the ship’s draft.

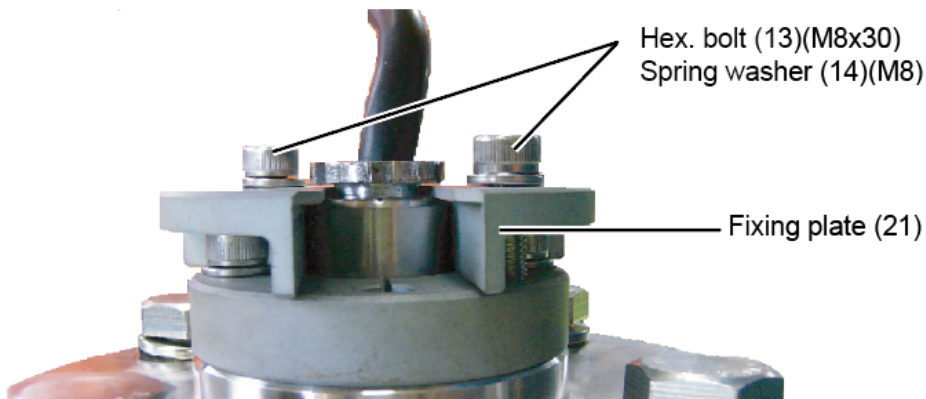
**Note:** Do not paint the top side of the flange (3) and handle it carefully to preserve the waterproofing.

3. Weld the flange (3) to the ship’s hull. The welding and doubling methods are left up to the shipyard.
4. Apply the Liquid gasket TB1121 to both sides of the gasket1 (18), and put it on the flange (3) which is indicated as “dashed-dotted line” (mounting surface for the Gasket 1 (18)) in the figure at step 1.
5. Apply the Liquid gasket TB1121 to the hollow side of the flange (3).
6. Clean the top and bottom of the ball valve (20), and put it on the gasket1 (18) set on the flange (3).

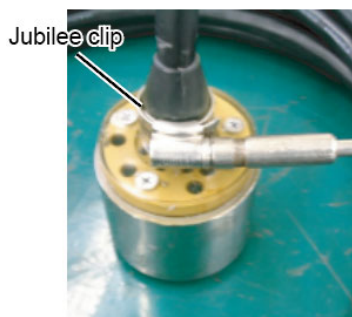
- Fasten M16 nut (10) and M16 flat washer (11) loosely to the stud bolt of the flange (3) loosely.



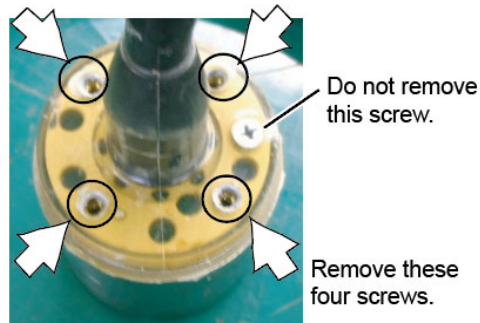
- Unfasten two sets of hex. bolt (13) and M8 spring washer (14) from the top side of the shaft to remove the fixing plate (21).



- Remove the gland (19), gasket (7) and washer (8) (2 pcs.) from the shaft.
- Remove the Jubilee clip located at the base of the transducer (1) cable and four M4 flat-head Phillips screws at the top side of the transducer (1).



Removing Jubilee clip

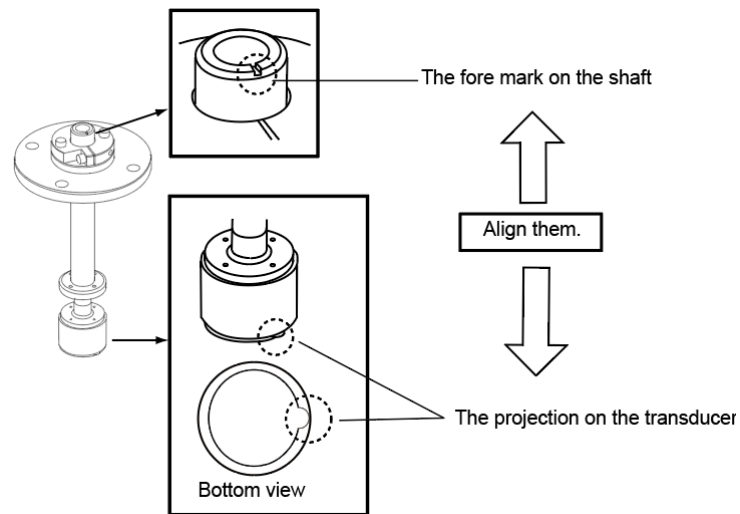


Removing flat-head Phillips screws

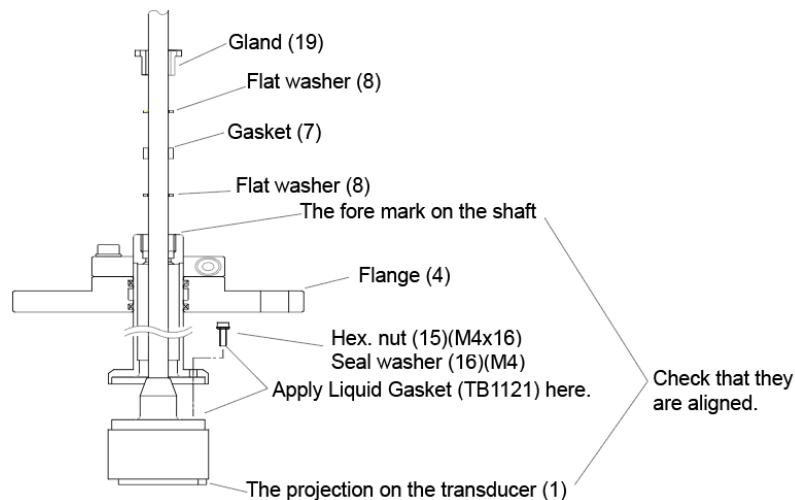
- Pass the transducer cable through the shaft from the flange side.
- Apply the Liquid Gasket TB1121 to the top side of the transducer evenly.



- Apply the Liquid Gasket TB1121 to the thread part of hex. bolt (15) with seal washer (16) and use them to fasten the transducer. Check that the fore mark on the shaft is aligned with the projection at the bottom of the transducer.



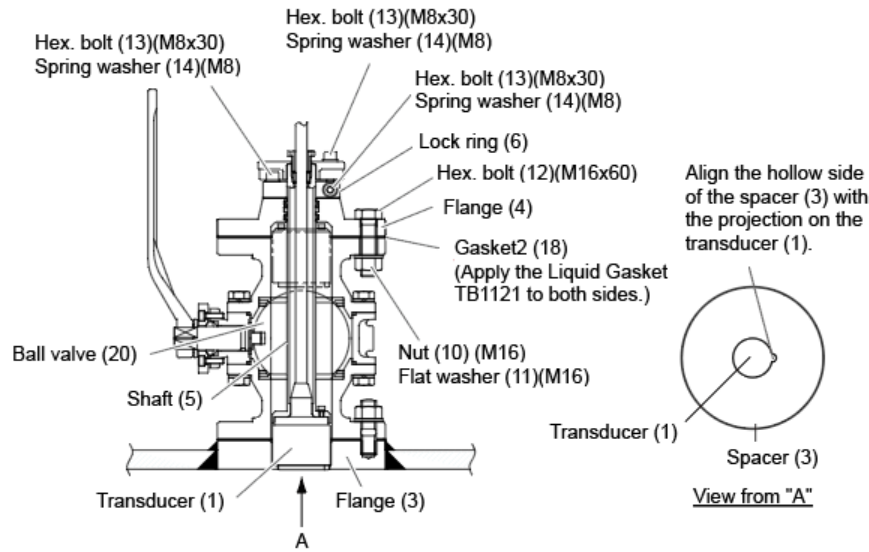
- Pass the flat washer (8), gasket (7), washer (8), and the gland (19) onto the transducer cable.
- Fasten the gland (19) to the top of the shaft (5).



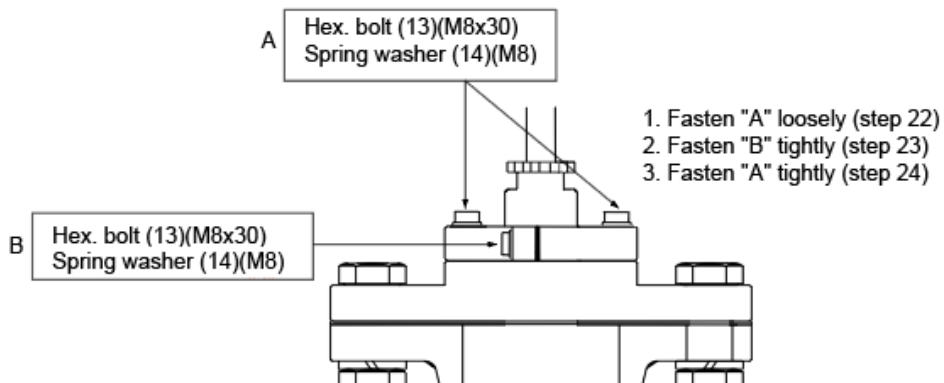
- Apply the Liquid Gasket TB1121 to both sides of the gasket2 (18), and put it on the ball valve (20).
- Put the shaft on the gasket2 (18), and align the hollow side on the flange (3) with the projection of the transducer (1).
- Remove three M8 hex. bolts (13) and three M8 spring washers (14) from the lock ring (6) to free the shaft (5).
- Fasten the flange (4) loosely with the M16 hex. bolt (12), M16 nut (10) and M16 flat washer (11).



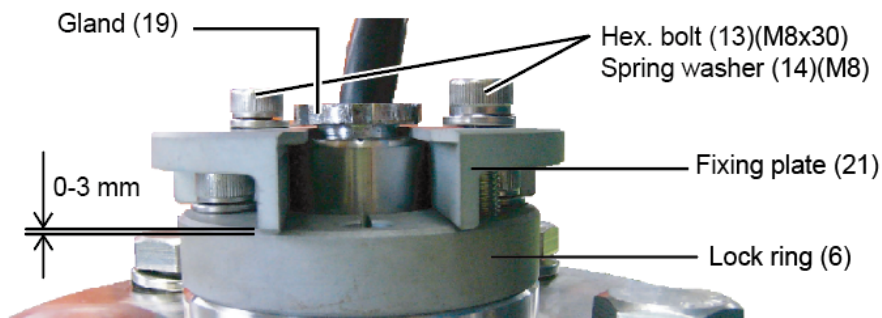
20. Insert the shaft so the projection on the transducer (1) fits in the groove on the flange (3).  
Move the shaft up and down by hand to confirm that it moves smoothly.
21. Tighten the M16 nut (8 pcs.) on the ball valve (20).



22. Loosely fasten two sets of M8 hex. bolt (13) and M8 spring washer (14) at the top side of the lock ring (6).
23. Fasten the M8 hex. bolt (13) tightly and the M8 spring washer (14) at the lateral side of the lock ring (6) to fasten the shaft (5).
24. Fasten tightly two sets of M8 hex. bolt (13) and M8 spring washer (14) fastened at step 22.



25. Put the fixing plate (21) between the shaft (5) and gland (19). Fasten the plate with two sets of M8 hex. bolt (13) and M8 spring washer (14). Check the clearance between the fixing plate (21) and the lock ring (6). If the clearance is more than 3 mm, be sure to check that the hollow side of the flange (3) is aligned with the projection on the transducer (1).

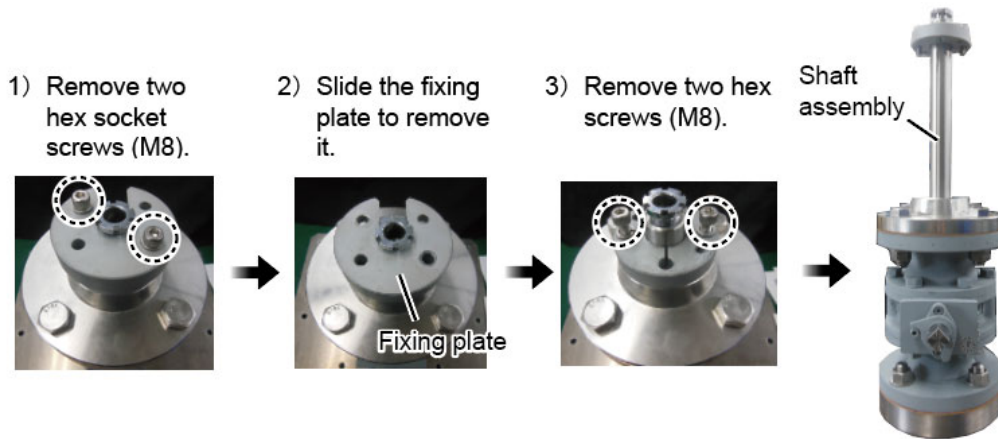


26. Check that all bolts are fastened tightly.
27. Paint the ball valve (20) and the flange (3) the same color as ship's body. Paint only gray-colored areas; for other parts, seal with masking tape. Remove the tape when the paint dries.

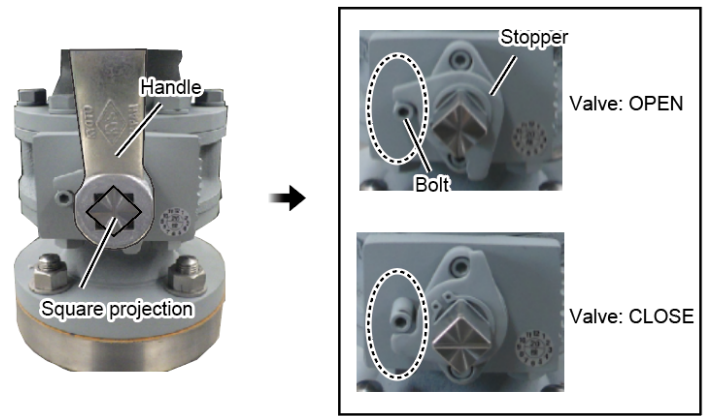
**<How to open/close the ball valve>**

To open/close the ball valve, attach the supplied handle to the square projection then change the stopper position.

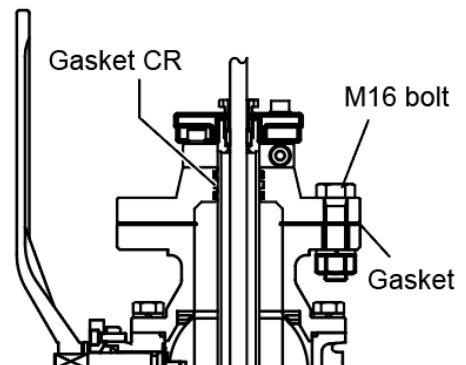
1. Remove the fixing plate as shown figure below then pull the shaft assembly up.



2. Attach the supplied handle to the square projection and then turn the handle 90° to change the stopper position.



3. After opening or closing the ball valve, tighten the removed nuts until the handle cannot be turned. Also, remove four bolts (M16) to remove the shaft and the transducer assembly. After removing the assemblies, replace the gasket and the gasket CR as shown in the figure to the right.



## 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.

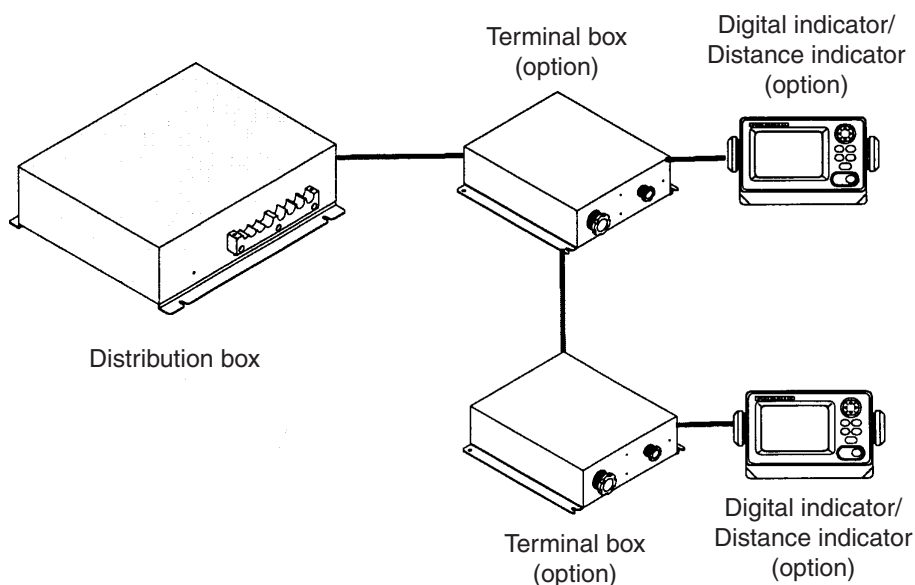
For bulkhead mounting;

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.

## 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.

## 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.

## 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.

## 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  $0.1 \mu\text{V}$  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  $0.1 \text{ mV}$  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  $400 \text{ mm}$  at minimum.

### 2.2 Wiring of Distribution Box

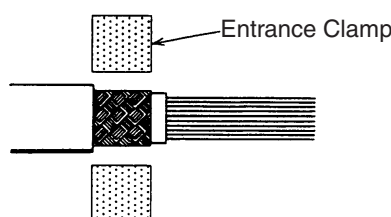
The distribution box has two sets of cable clamps, upper for cable DPYCY-1.25/TTYCY-1 (small hole) and lower for cables TTYCY-2S (medium hole), TTYCY-3S (large hole).

Lay the cables on the clamps as below depending on the terminal board.

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

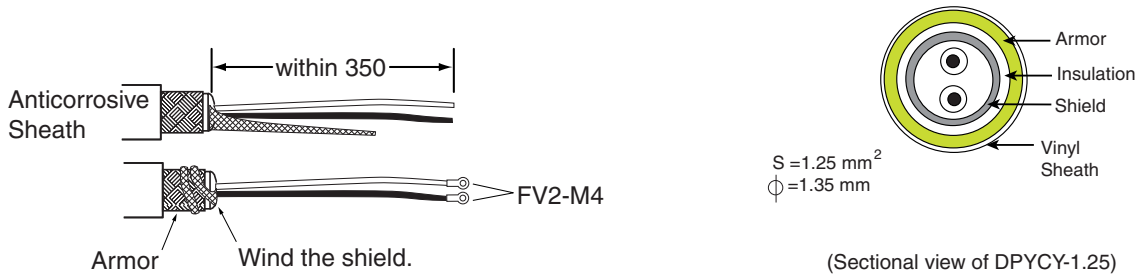
Cut the cables slack to bind them at the fixing plate with a cable tie, leaving some slack for future servicing and checking.

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)

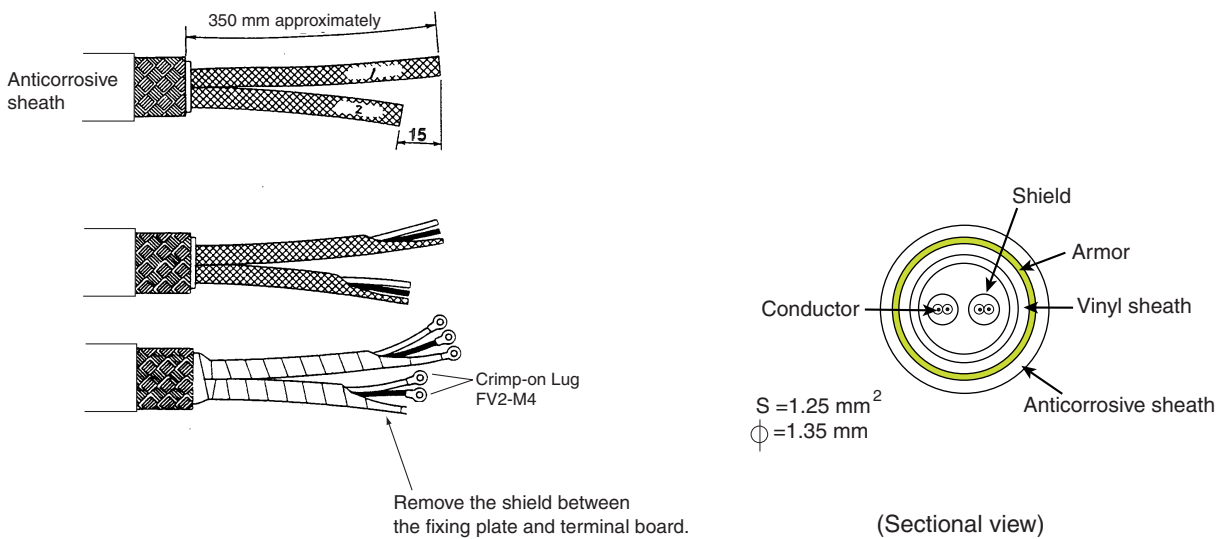
DPYCY-1.25 is a Japan Industrial Standard (JIS) cable. Use the equivalent. DPYCY-1.25 cable doesn't have shield.



*Fabrication of cable DPYCY-1.25/TTYCYS-1*

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

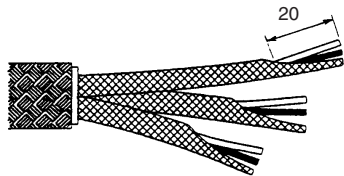
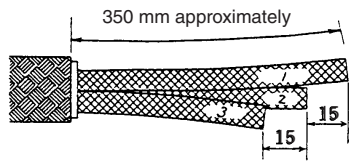
TTYCY is a Japan Industrial Standard (JIS) cable. Use the equivalent.



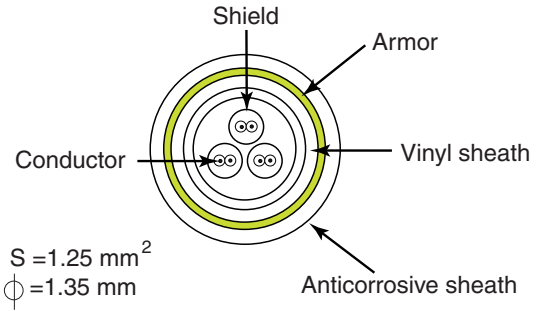
*Fabrication of cable TTYCY-2S*

# Fabrication of TTYCY-3S (transducer unit)

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

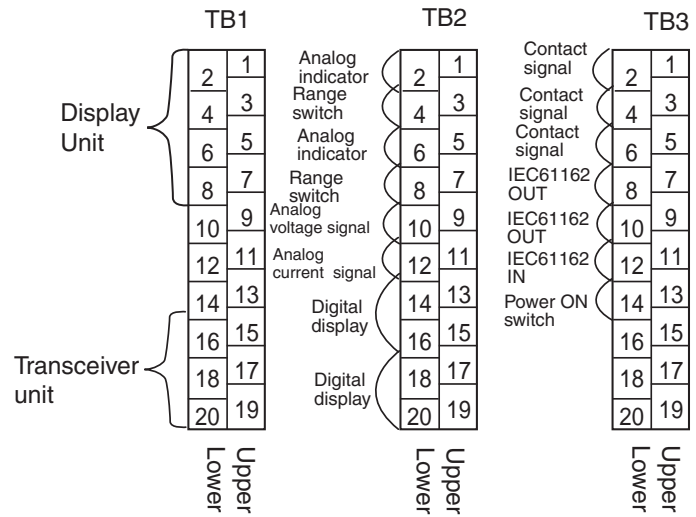
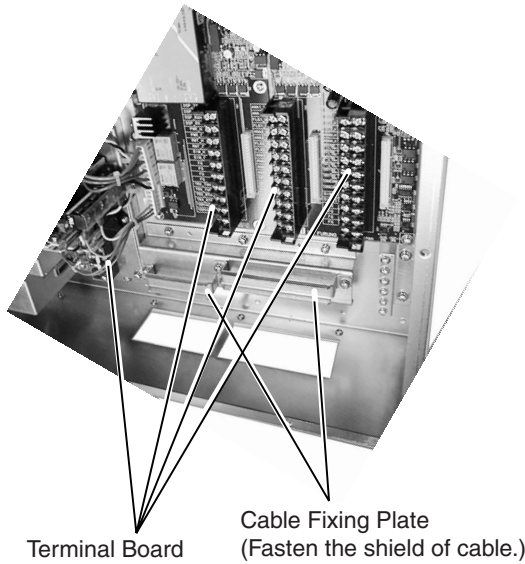


Remove the shield between the fixing plate and terminal board.



(Sectional view)

## Fabrication of cable TTYCY-3S

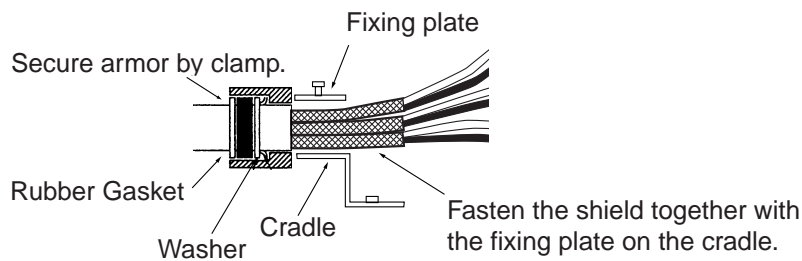
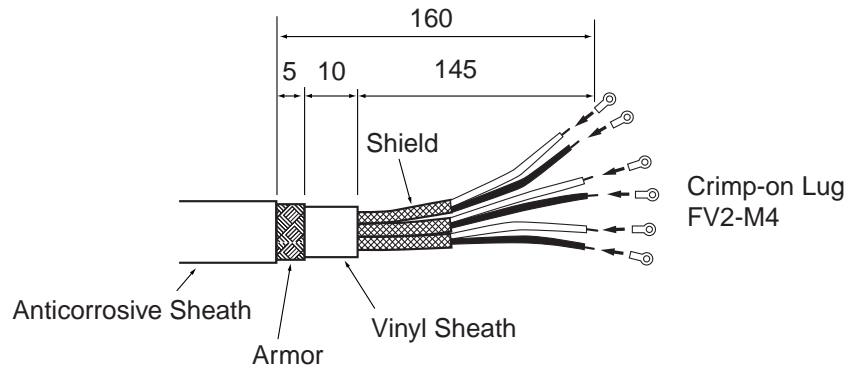


Distribution Box, inside view and terminal boxes

## 2.3 Wiring of Transceiver Unit

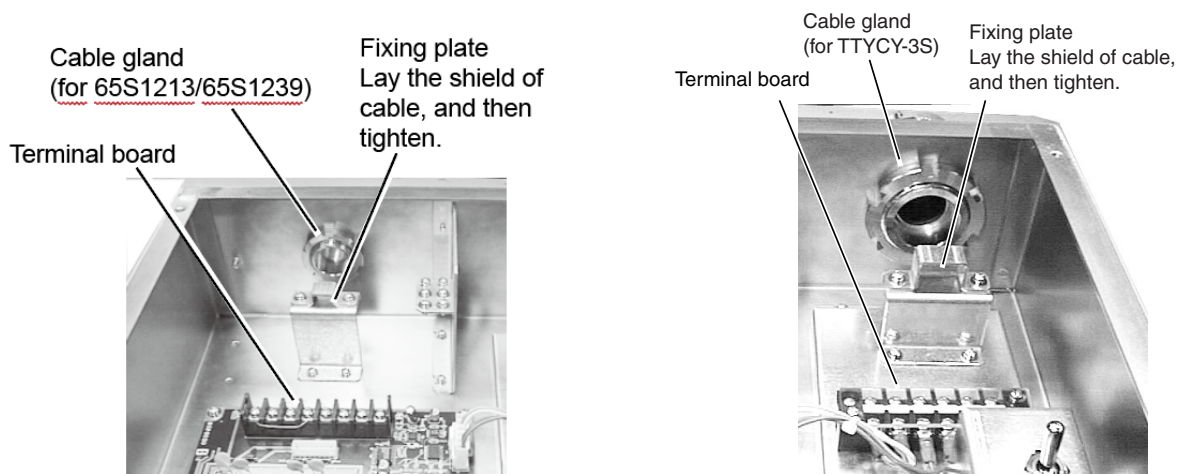
### Fabrication of cable TTYCY-3S, 65S1213/65S1239

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.



*Transceiver unit, inside view 1*

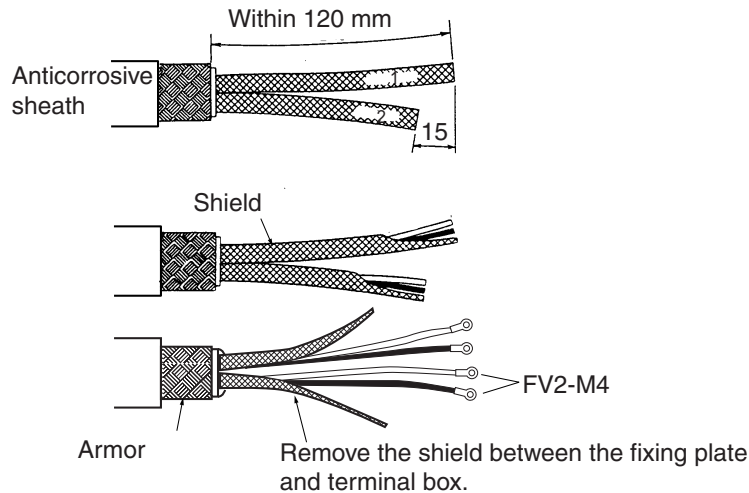
*Transceiver unit, inside view 2*



## 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.

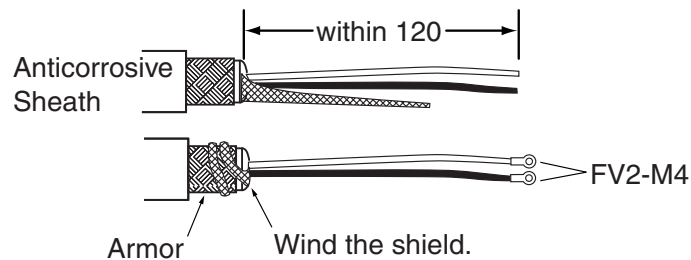
### Fabrication of TTYCY-2S (for display unit and digital indicator/distance indicator)



*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.



### 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.

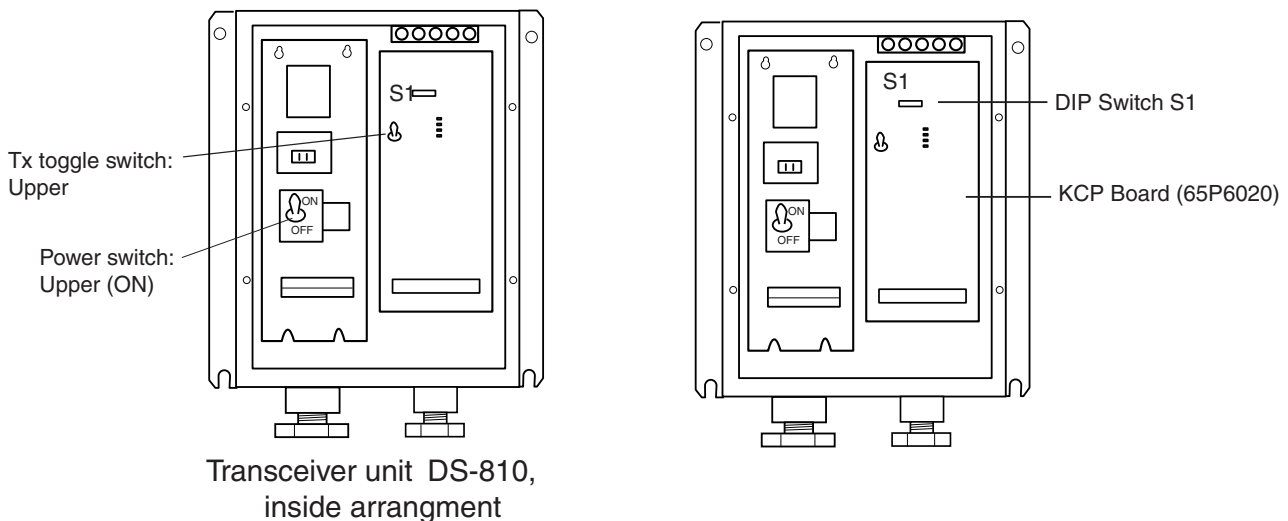
## 2.6 Grounding

This equipment uses pulse signals which may cause interference to other electronic equipments. 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.

## 2.7 Wiring Check

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



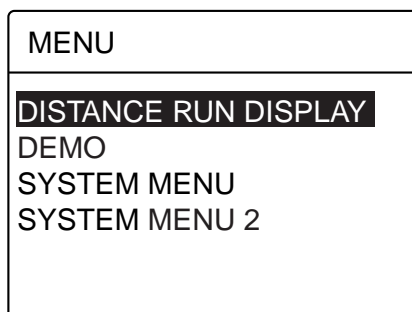
# 3. SYSTEM SETTINGS

---

## 3.1 Transducer Adjustment

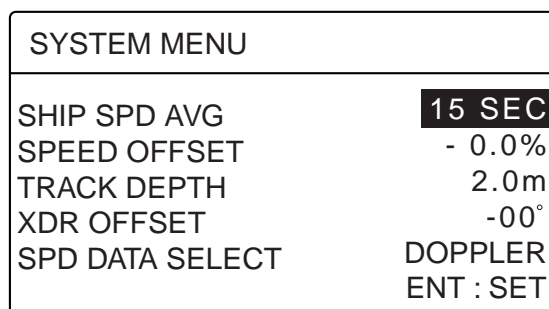
Transducer mounted error, which causes incorrect speed value, can be compensated through the menu (Range:  $-45^{\circ}$  to  $+45^{\circ}$  ).

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



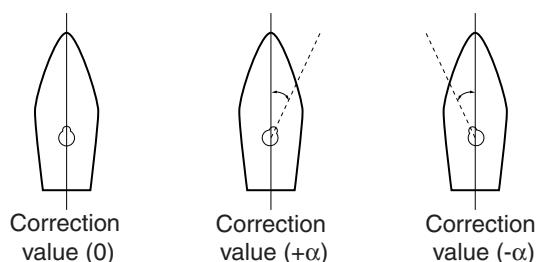
*Main menu*

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  $+5^{\circ}$  error, enter “+05”.
5. Press the [ENT] key.
6. Press the [MENU] key twice to close the menu.



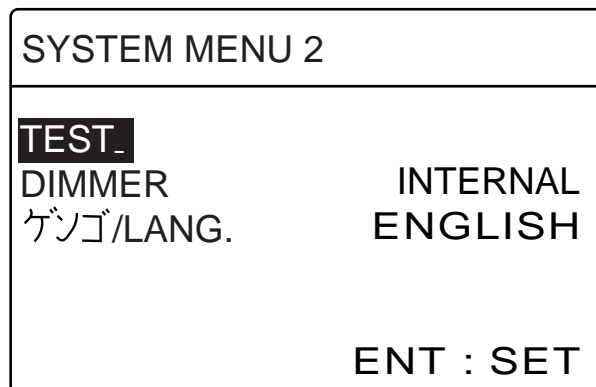
## 3.2 Setting of System Menu 2

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.

## 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.



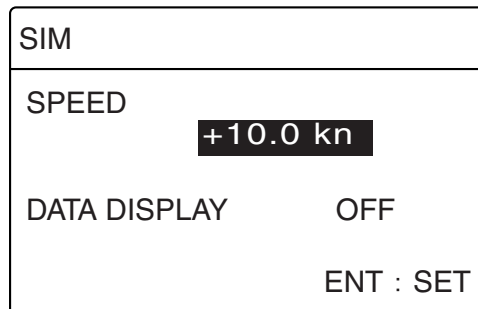
*Language pop-up window*

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 SIM, and press the [ENT] key to display the sim menu.



*SIM MODE menu*

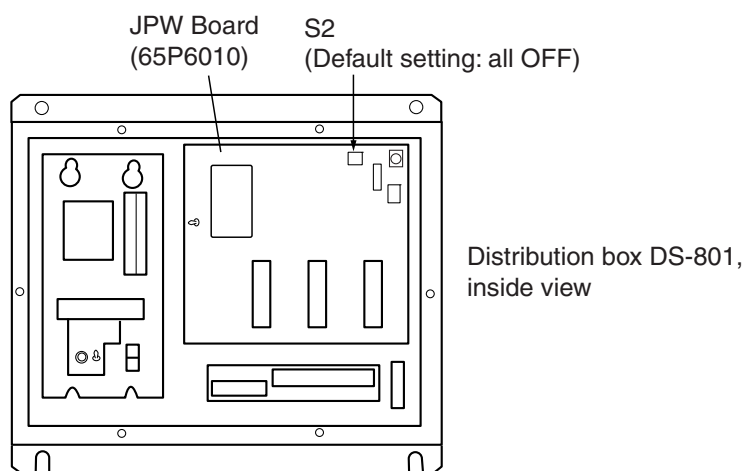
3. Select SPEED.
4. Press the [ENT] key.
5. Use the cursor pad to enter the speed value desired.
  - ▲ ▼ : Change value, +/-
  - ◀ ▶ : Change digit
6. Press the [ENT] key.

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 of DIP switch S2 in the distribution box.

Maximum speed	20 kn	30 kn	40 kn
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.

## 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 kn)

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

### **Connected to TB2 ANA1 (analog 1)**

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

### **Connected to TB2 ANA2 (analog 2)**

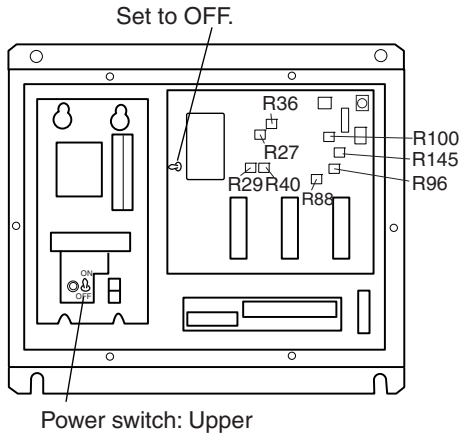
1. Set at 0 knots on the SIM display, and then adjust R27 in the distribution box so as that the analog display shows 0 knots.
2. Set at 30 knots on the SIM display, and then adjust R36 in the distribution box so as that the analog display shows 30 knots.

### **Connected to TB2 ANAV (analog voltage signal)**

1. Set at 0 knots on the SIM 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 SIM 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 SIM display, and then adjust R88 in the distribution box so as that the current is 4 mA.
2. Set at +30 knots on the SIM display, and then adjust R96 in the distribution box so as that the current is 20 mA.



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.

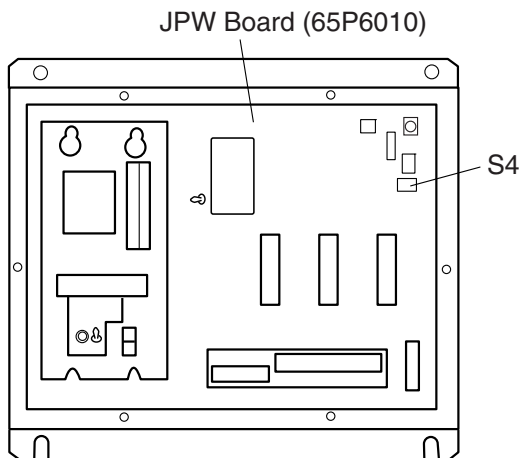
DIP switch S4-#6 setting	OFF	ON
Output NMEA sentences	VBW, VLW	All NMEA sentences

##### 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



## KCP Board (65P6020)

### S1-#6

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

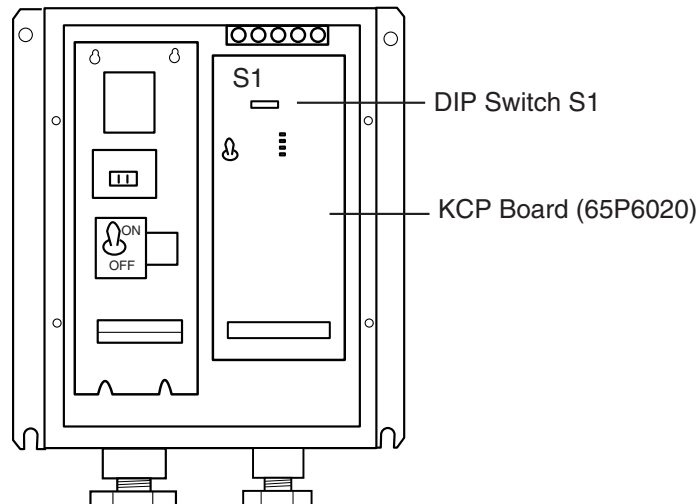
	ON	OFF
S1-#6	Flashing (default setting)	No flashing

### S1-#5, #8

Changeover of IEC61162-1 Edition.

	S1-#5 ON	S1-#5 OFF
S1-#8 ON	IEC61162-1 Ed3 / Ed4	IEC61162-1 Ed3 / Ed4
S1-#8 OFF	IEC61162-1 Ed2	IEC61162-1 Ed1 (default setting)

**Note:** S1 #1 - #4, #7 should remain OFF, the default setting.



*Transceiver unit DS-810*

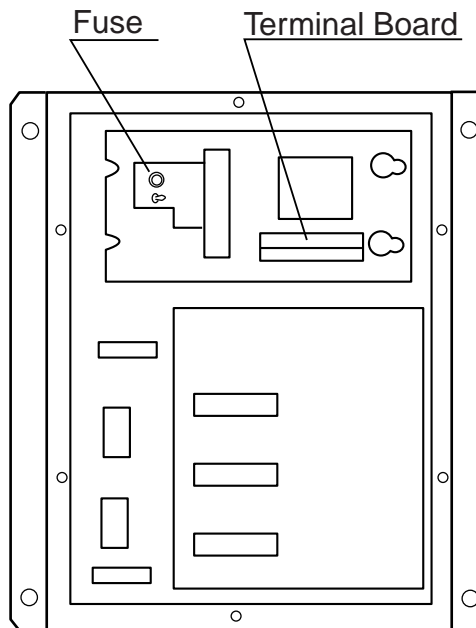
## 4. CHANGING AC POWER TAP

---

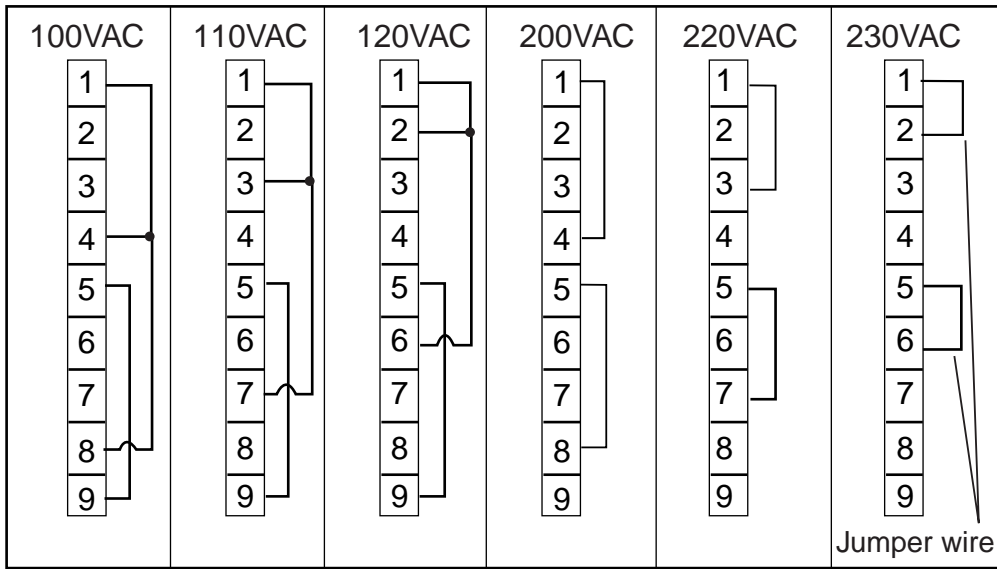
The DS-80 is shipped from the factory ready for connection to the ordered AC power supply.

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*



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

# CALIBRATION

---

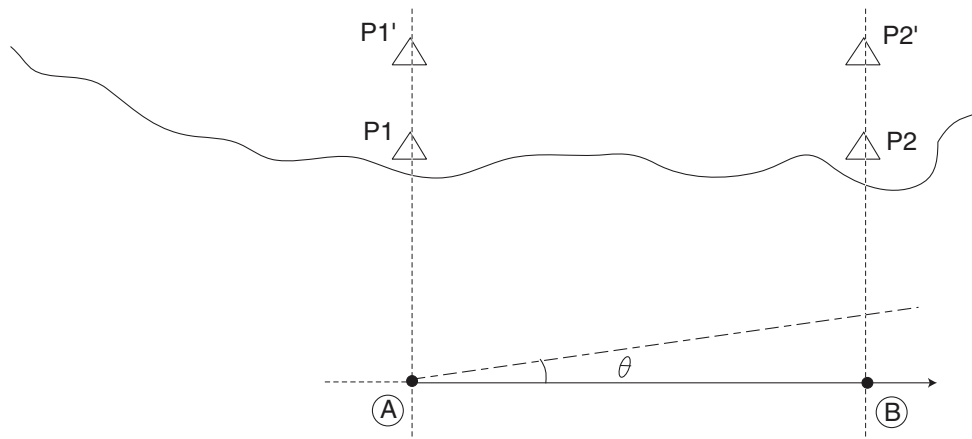
## Milepost run

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.



$$Sg1 = d/t1 \times 3600 \text{ (kn)} \dots\dots\dots(1)$$

$$Sg2 = d/t2 \times 3600 \text{ (kn)} \dots\dots\dots(2)$$

$$Sw + St = Sg1 \text{ (kn)} \dots\dots\dots (3)$$

$$Sw - St = Sg2 \text{ (kn)} \dots\dots\dots (4)$$

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

$$2Sw = Sg1 + Sg2 \text{ (kn)}$$

$$\text{Therefore, } Sw = (Sg1 + Sg2)/2 \text{ (kn)} \dots\dots\dots (5)$$

where,

d = distance run (NM),

$t_1$  = time taken to run 1 (second),

$t_2$  = time taken to run 2 (second). (Note: Runs 1 and 2 are in opposite direction.)

$S_w$  = Speed through the water (kn),

$S_t$  = Speed of tide current (kn),

$S_{g1}$  = SOG for run 1 (kn),

$S_{g2}$  = SOG for run 2 (kn).

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

## 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, timing 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 referring to step 1 through 3.

Where,

$n_1$  (NM) = distance run from A to B measured by DS-80

$n_2$  (NM) = distance run from B to 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.

$S_{log1}$  (kn) =  $n_1/t_1 \times 3600$

$S_{log2}$  (kn) =  $n_2/t_2 \times 3600$

The average ship speed of round trip is  $S_{log}$  (kn) =  $(S_{log1} + S_{log2})/2$ . ..... (6)

## 3. Speedlog error

From (5) and (6),

Error =  $(S_w - S_{log})/S_{log} \times 100$  (%)..... (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.



PACKING LIST  
DS-800/HK

65AD-X-9860 -2

1/1

A-1

NAME	UNIT	OUTLINE	DESCRIPTION/CODE No.	QTY
<b>ユニット</b>				
主指示器 MAIN DISPLAY			DS-800/DS-800-HK 000-020-381-00**	1
<b>予備品</b>				
予備品 SPARE PARTS			SP65-00601 001-163-560-00	1
<b>付属品</b>				
フラッシュマウント FLASH MOUNTING PANEL			FP65-00401 001-163-590-00	1
<b>付属品</b>				
フラッシュマウント FLASH MOUNTING PANEL			FP65-00402 001-163-610-00	1
<b>付属品</b>				
付属品 ACCESSORIES			FP65-00403 001-163-600-00	1
<b>工事材料</b>				
工事材料 INSTALLATION MATERIALS			CP65-00801 001-163-580-00	1
<b>工事材料</b>				
ケーブル組品 CABLE ASSY.			IMJ-A6SPF0013-020C 000-159-701-10	1
ケーブル組品 CABLE ASSY.			IMJ-A7SPF0009-020C 000-159-686-10	1

コード番号末尾の「\*\*」は、選択品の代表コードを表します。  
CODE NUMBER ENDING WITH "\*\*" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

C7247-710-C

PACKING LIST  
DS-830/HK

65AD-X-9852 -7

1/1

A-2

NAME	UNIT	OUTLINE	DESCRIPTION/CODE No.	QTY
<b>ユニット</b>				
デジタル指示器 DIGITAL INDICATOR			DS-830/DS-830-HK 000-020-378-00**	1
<b>付属品</b>				
フラッシュマウント FLASH MOUNTING PANEL			FP65-00401 001-163-590-00	1
<b>付属品</b>				
フラッシュマウント FLASH MOUNTING PANEL			FP65-00402 001-163-610-00	1
<b>付属品</b>				
付属品 ACCESSORIES			FP65-00403 001-163-600-00	1
<b>工事材料</b>				
工事材料 INSTALLATION MATERIALS			CP65-00801 001-163-580-00	1
<b>工事材料</b>				
ケーブル組品 CABLE ASSY.			IMJ-A7SPF0009-020C 000-159-686-10	1
ケーブル組品 CABLE ASSY.			IMJ-A6SPF0013-020C 000-159-701-10	1

注記) コード番号末尾の「\*\*」は、選択品の代表コード番号を表します。  
CODE NUMBER ENDING BY "\*\*" INDICATES THE NUMBER OF TYPICAL MATERIAL.

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

C7247-702-G

PACKING LIST  
DS-840/HK

65AD-X-9853 -7 1/1 A-3

NAME	UNIT	OUTLINE	DESCRIPTION/CODE No.	Q'TY
<b>ユニット</b>				
航程計			DS-840/DS-840-HK	1
REMOTE DISTANCE INDICATOR			000-020-380-00 **	
<b>付属品</b>				
フラッシュマウント			FP65-00401	1
FLUSH MOUNTING PANEL			001-163-590-00	
<b>付属品</b>				
フラッシュマウント			FP65-00402	1
FLUSH MOUNTING PANEL			001-163-610-00	
<b>付属品</b>				
付属品			FP65-00403	1
ACCESSORIES			001-163-600-00	
<b>工事材料</b>				
工事材料			QP65-00801	1
INSTALLATION MATERIALS			001-163-580-00	
<b>工事材料</b>				
ケーブル組品			IMJ-A7SPF0009-020C	1
CABLE ASSY.			000-159-686-10	
ケーブル組品			IMJ-A6SPF0013-020C	1
CABLE ASSY.			000-159-701-10	

注記) [コード番号末尾の[\*\*]]は、選別部品の代表コード番号を表します。  
CODE NUMBER ENDED BY "\*\*" INDICATES THE NUMBER OF TYPICAL MATERIAL.

型式/コード番号が異なる場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。  
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

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

C7247-703-G

FURUNO

A-4

CODE NO.	002-888-510-00	65AD-X-9501-3			
TYPE	FP65-00501	1/1			
<b>付属品表</b>					
<b>ACCESSORIES</b>					
番号	名称	略図	型名/規格	数量	用途/備考
NO.	NAME	OUTLINE	DESCRIPTIONS	Q'TY	REMARKS
1	締付ハンドル TIGHTENING HANDLE		GS-007-6007-2 R0HS CODE NO. 100-276-892-10	1	

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

FURUNO ELECTRIC CO., LTD.

C7247-F01-E



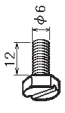


**FURUNO**

CODE NO.	001-163-590-00	65AD-X-9502-4	1/1
TYPE	FP65-00401		

**付属品表**

## ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	化粧パネル COSMETIC PANEL		205 130 20-016-1061-0 CODE NO. 100-281-370-10	1	
2	バネ金 SPRING WASHER		M6 SUS304 CODE NO. 000-166-885-10	2	
3	六角ボルト HEX BOLT (SLOTTED HEAD)		M6X12 SUS304 CODE NO. 000-162-887-10	2	

型式/コード番号が2段の場合、下段より上段に代わる選定部品であり、どちらかが入っています。なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME. DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.

KR

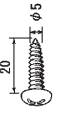
C7247-F03-E

**FURUNO**

CODE NO.	001-163-600-00	65AD-X-9503-2	1/1
TYPE	FP65-00403		

**付属品表**

## ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	セルフタッピングネジ SELF-TAPPING SCREW		5X20 SUS304 CODE NO. 000-162-609-10	4	

型式/コード番号が2段の場合、下段より上段に代わる選定部品であり、どちらかが入っています。なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME. DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.

KR

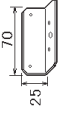

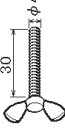


C7247-F04-C

**FURUNO**

CODE NO.	001-163-610-00	65AD-X-9504-7	1/1
TYPE	FP65-00402		

**付属品表**

## ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	フラッシュマウント FLUSH MOUNT		ZD-007-2401-0 RHM5 CODE NO. 100-163-190-10	2	
2	蝶ナット 2種 WING NUT 2 SYU		M4 YBSC2 CODE NO. 000-162-163-10	4	
3	蝶ボルト WING BOLT		M4X30 YBSC2 CODE NO. 000-168-243-10	4	
4	ハネばね SPRING WASHER		M6 SUS304 CODE NO. 000-155-855-10	2	
5	六角ボルト 平頭 HEX BOLT (SLOTTED HEAD)		M6X12 SUS304 CODE NO. 000-162-897-10	2	

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

FURUNO ELECTRIC CO., LTD.

KR

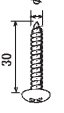


C7247-F02-H

**FURUNO**

CODE NO.	002-888-460-00	65AD-X-9401-3	1/1
TYPE	CP65-00901		

**工事材料表**

## INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	セルフタッピングネジ SELF-TAPPING SCREW		Φ6.30 SUS304 CODE NO. 000-162-614-10	4	
2	圧着端子 CRIMP-ON LUG		FV0.9-4 (LF) K CODE NO. 000-166-885-11	20	
3	圧着端子 CRIMP-ON LUG		FV2-M4 K CODE NO. 000-157-229-11	80	

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

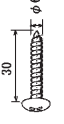
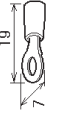
FURUNO ELECTRIC CO., LTD.

C7247-M01-D

CODE NO.	002-888-470-00	65AD-X-9402-3
TYPE	CP65-00902	1/1

**工事材料表**

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	+157φ7.1/2 SELF-TAPPING SCREW		SX25 SUS304 CODE NO. 000-162-614-10	4	
2	圧着端子 CRIMP-ON LUG		FV2-M4 K CODE NO. 000-157-229-11	20	

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

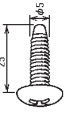
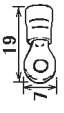
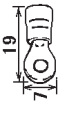
FURUNO ELECTRIC CO., LTD.

C7247-M02-D

CODE NO.	002-888-480-00	65AD-X-9403-2
TYPE	CP65-00903	1/1

**工事材料表**

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	+157φ7.1/2 SELF-TAPPING SCREW		SX25 SUS304 CODE NO. 000-162-610-10	4	
2	圧着端子 CRIMP-ON LUG		FV0.5-4(LF) CODE NO. 000-166-665-10	20	
3	圧着端子 CRIMP-ON LUG		FV2-M4 CODE NO. 000-157-229-10 FV2-M4 CODE NO. 000-536-716-30	30	

型式/コード番号が2取の場合、下取より上取に代わる標準部品であり、どちらかが入っています。なお、品質は変わりませ  
ん。 TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER  
PRODUCT. QUALITY IS THE SAME.

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

FURUNO ELECTRIC CO., LTD.

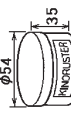
C7247-M03-C

**FURUNO**

CODE NO.	002-888-500-00	65AD-X-9404 -1	1/1
TYPE	CP65-01001		

**工事材料表**

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	アンチ腐蝕性シーラント ANTI CORROSTIVE SEALANT		655 #6082/9* CODE NO. 000-165-726-10	1	

型式/コード番号が2段の場合、下段より上段に代わる通達期品であり、どちらが入っています。なお、品質は変わりません。  
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(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

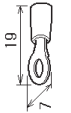
FURUNO ELECTRIC CO., LTD.

**FURUNO**

CODE NO.	001-163-580-00	65AD-X-9406 -3	1/1
TYPE	CP65-00801		

**工事材料表**

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 QTY	用途/備考 REMARKS
1	圧着端子 CRIMP-ON LUG		FV0.9-4 (LP) K CODE NO. 000-166-885-11	20	

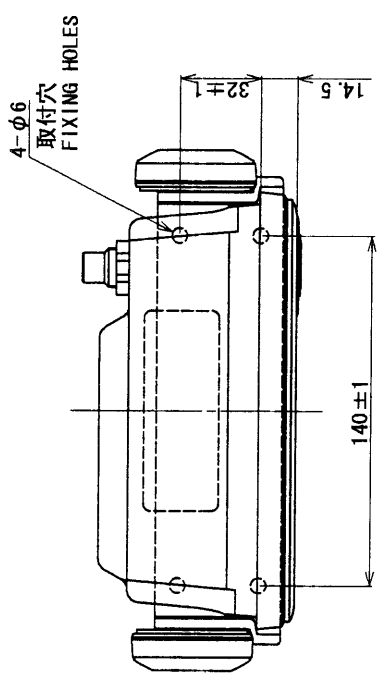
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.



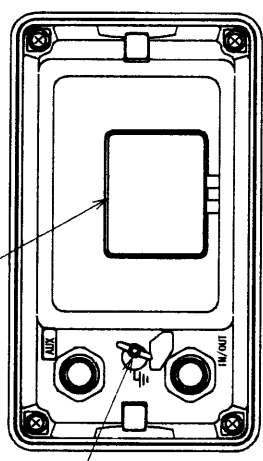


2 3 4



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

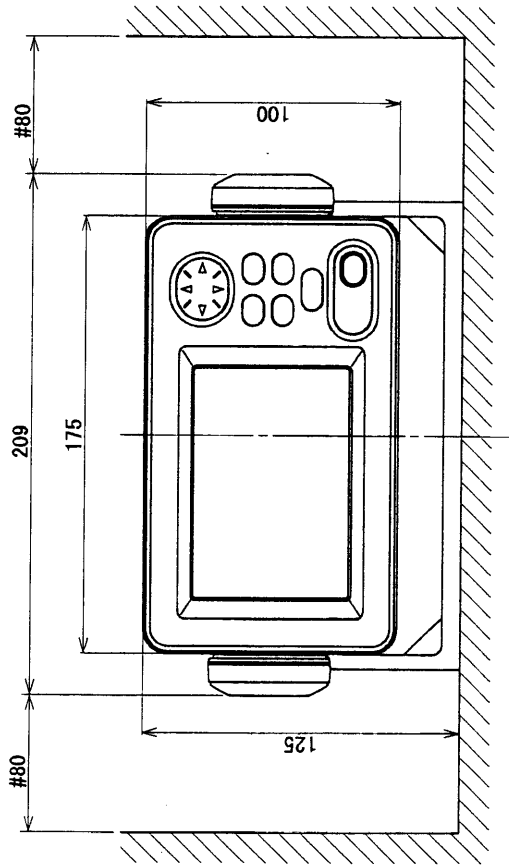
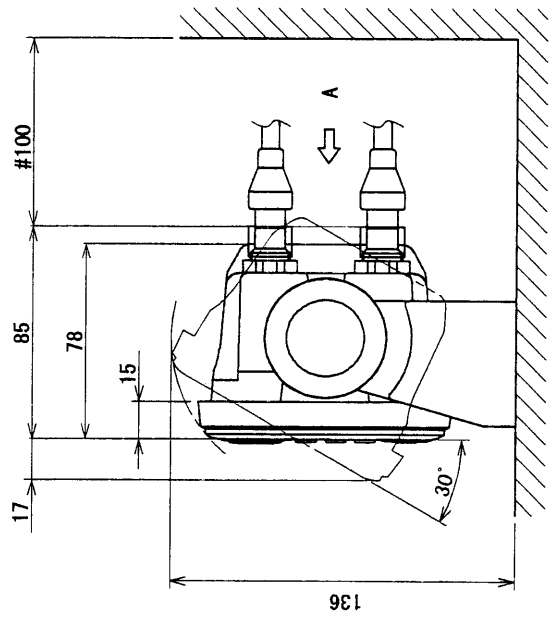
型式銘板  
NAMEPLATE



アース端子  
GND TERMINAL

表 1  
TABLE 1

矢視 A  
VIEW A



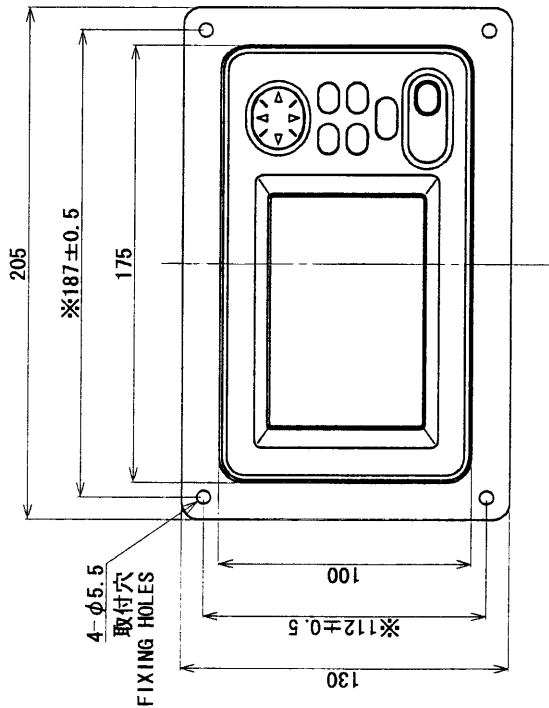
注 記

- 1) #印寸法は最小サービスペース寸法とする。
- 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ーピンネジ呼び径 5 × 2.0 を使用のこと。
- 4) 装備ケーブルはサービスペース時、本体を前方に十分引き出せるよう余裕を持たせること。

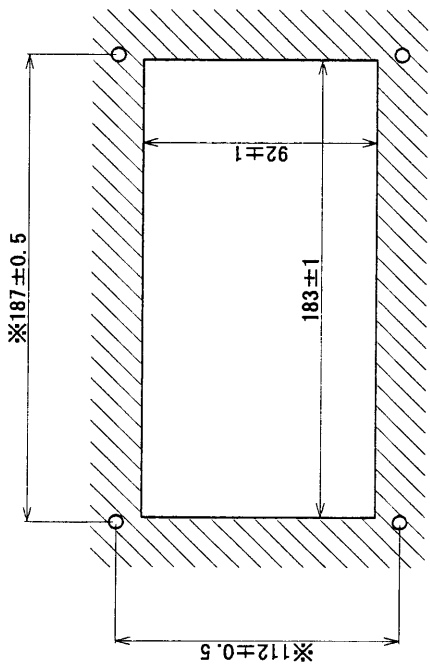
NOTE

1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE TAPPING SCREWS 5x2.0 FOR FIXING UNIT.
4. KEEP SUFFICIENT CABLE LENGTH BEHIND UNIT.

DRAWN Mar 17 '00 T. Kameyama	TITLE DS-800/830/840
CHECKED Mar 17 '00 S. Kameyama	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. Kameyama	外寸図 DS-80
SCALE 1/3	NAME DISPLAY UNIT (DESKTOP MOUNT) DIGITAL INDICATOR / DISTANCE INDICATOR
DRG. No. C7247-601-D	65-007-1000-62
OUTLINE DRAWING	

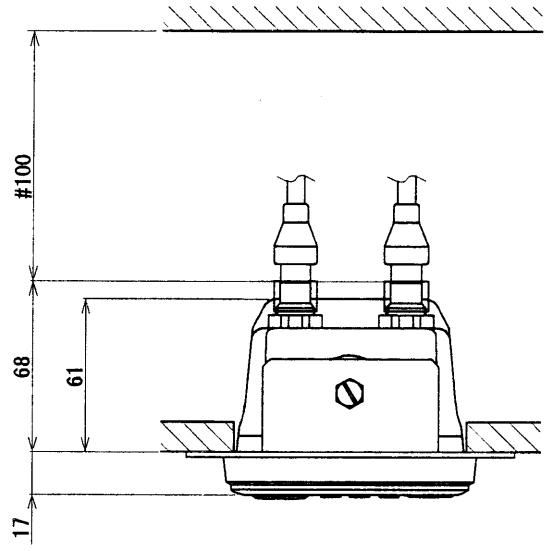


A



B

取付穴寸法図 (参考図)  
CUTOUT DIMENSIONS



3 4

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

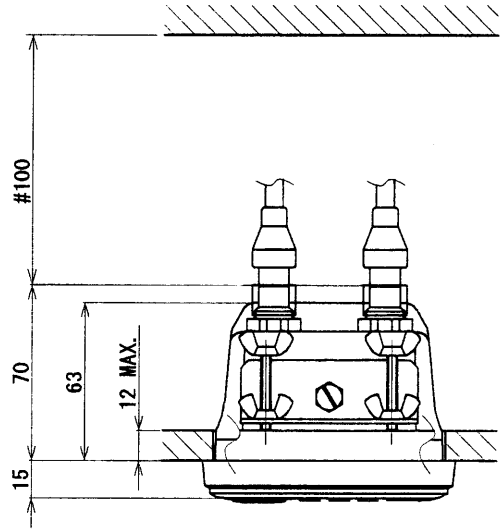
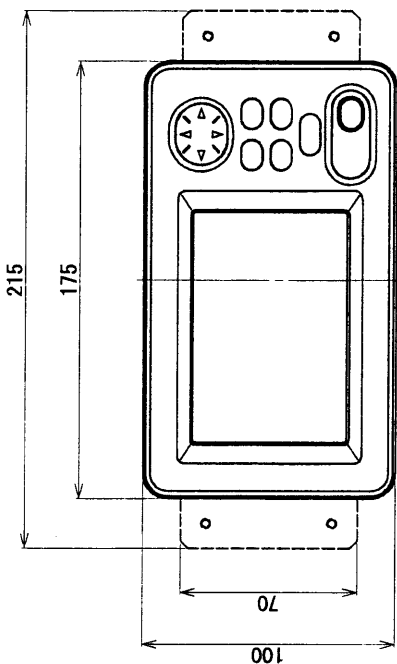
NOTE

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 Mori 2007.10.14	TITILE DS-800/830/840
CHECKED Koy 07.10.14	名称 主指示器/デジタル指示器/航程計(埋込装備F)
APPROVED Mori 07.10.14	外寸図 NAME DISPLAY UNIT (FLASH MOUNT F) DIGITAL INDICATOR / DISTANCE INDICATOR
SCALE 1/3	DS-80
DRG. No. C7247-602-D	65-007-1010-62
OUTLINE DRAWING	

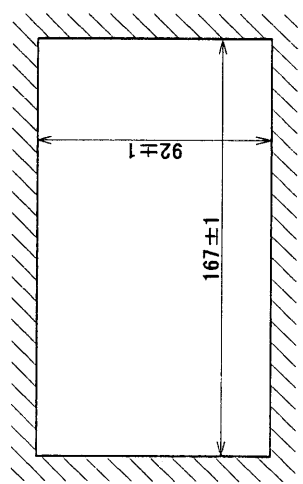


2 3 4



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

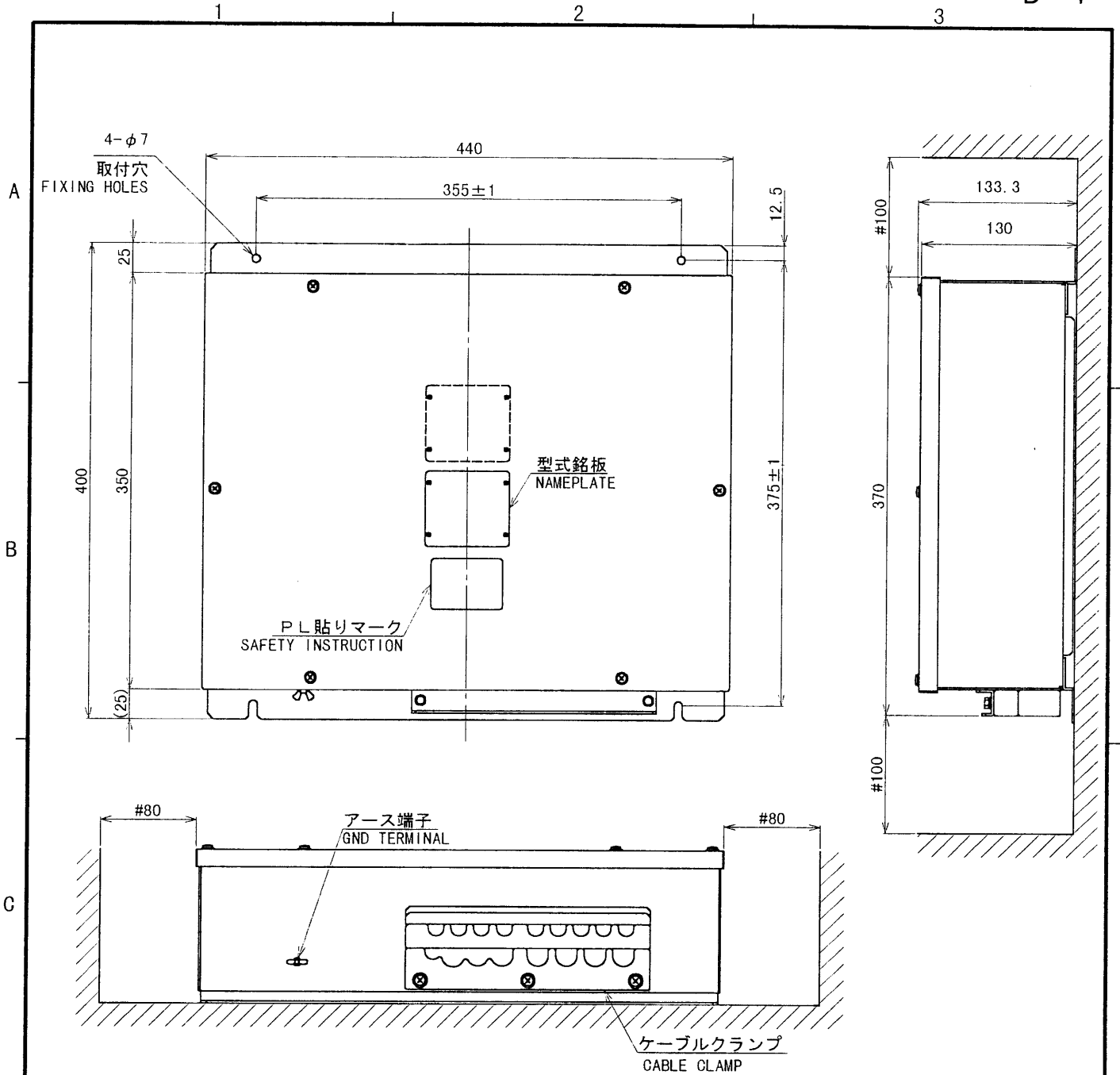
表 1  
TABLE 1



取付寸法図 (参考図)  
CUTTING DIMENSIONS

- 注 記
- 1) 印寸法は最小サーピス空間寸法とする。
  - 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 <i>Mitsuru YAMASHITA</i>	TITLE DS-800/830/840
CHECKED <i>M. O. Y. K.</i>	名称 主指示器/デジタル指示器/航程計(埋込装備S)
APPROVED <i>M. O. Y. K.</i>	外寸図 DS-80
SCALE 1/3	DISPLAY UNIT (FLASH MOUNT S) DIGITAL INDICATOR / DISTANCE INDICATOR
DWG. No. C7247-G03-D	65-007-1020-G2 OUTLINE DRAWING



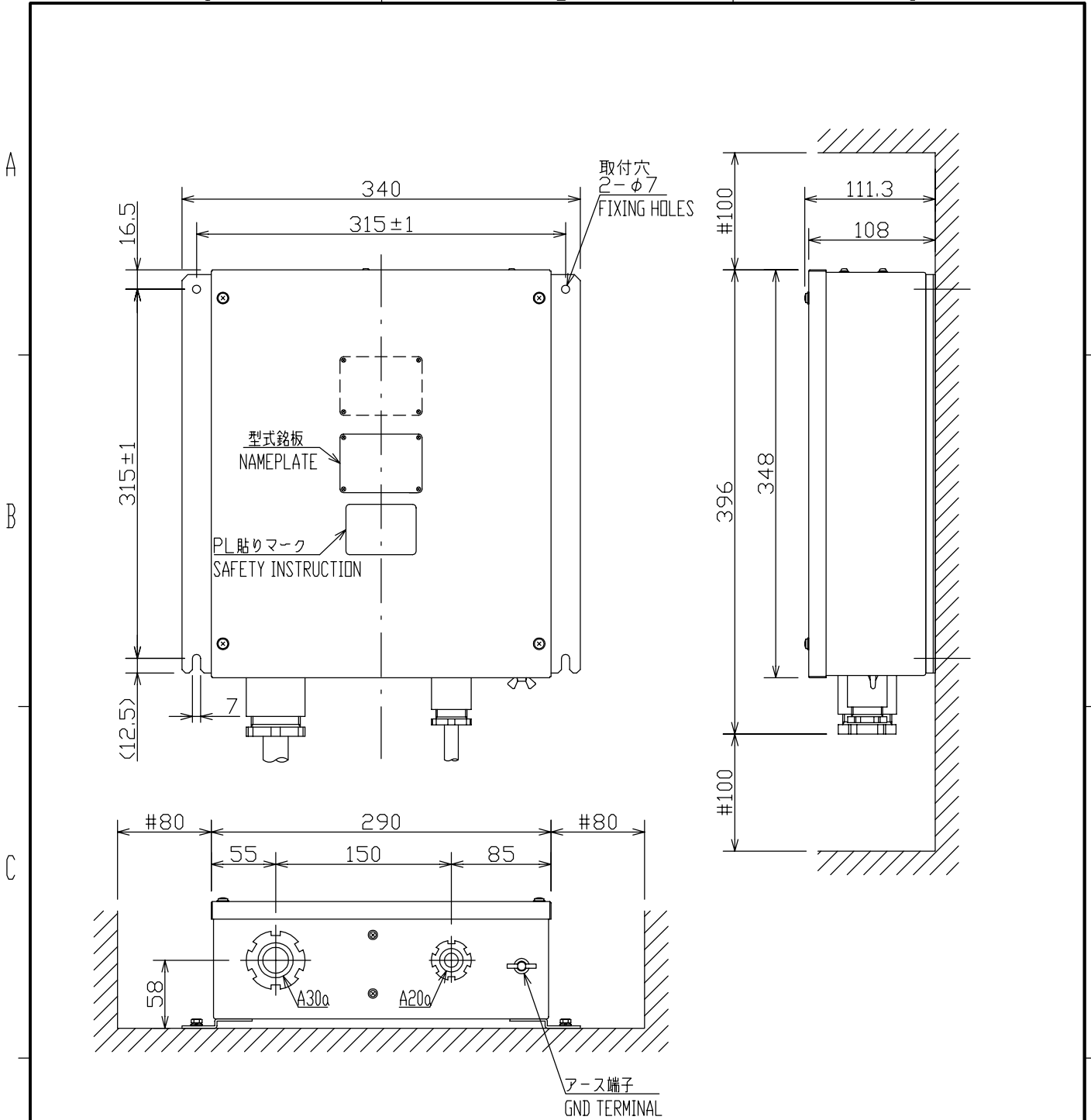
- 注記
- 1) #印寸法は最小サービス空間寸法とする。
  - 2) 指定外の寸法公差は表 1 による。
  - 3) 取付用ネジはトラスタッピングネジ 6 × 3.0 を使用のこと。
  - 4) 装備ケーブルの端末処理は装備要領書参照のこと。

- NOTE
1. #: RECOMMENDED SERVICE CLEARANCE.
  2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
  3. USE TAPPING SCREWS 6x3.0 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. Yamada		TITLE DS-801
CHECKED Feb 22 '00 K. Kusumoto		名称 分配器
APPROVED Feb 22 '00 K. Kusumoto	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



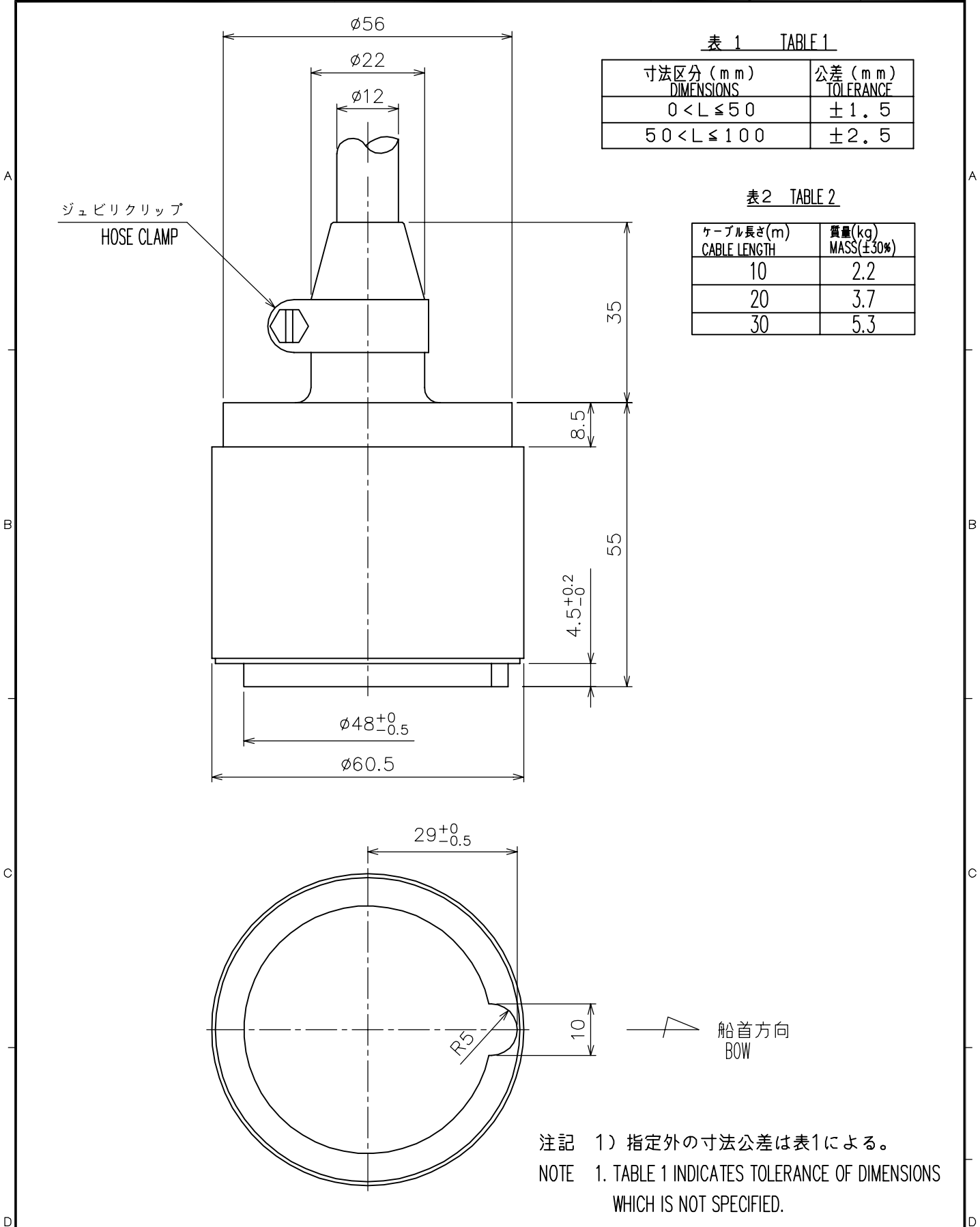
- 注記
- 1) #印寸法は最小サービス空間寸法とする。
  - 2) 指定外の寸法公差は表1による。
  - 3) 取付用ネジは+トラスタッピンネジ6×30を使用のこと。
  - 4) 装備ケーブルの端末処理は装備要領書参照のこと。

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

- NOTE
1. #: RECOMMENDED SERVICE CLEARANCE.
  2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
  3. USE TAPPING SCREWS 6×30 FOR FIXING UNIT.
  4. REFER TO INSTALLATION INSTRUCTIONS FOR FABRICATION OF CABLE ENDS.

DRAWN Sep. 9 '03 T. YAMASAKI		TITLE DS-810
CHECKED Sep. 9 '03 T. MATSUGUCHI		名称 送受信器
APPROVED Sep. 09 '03 Matsuguchi	DS-80	外寸図
SCALE 1/5	MASS 7.1 ±10% kg	NAME TRANSCIVER UNIT
DWG.No. C7247-G05-D	65-007-3000-G2	OUTLINE DRAWING



注記 1) 指定外の寸法公差は表1による。  
NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN Nov. 4, '05 E.MIYOSHI	TITLE DS-820
CHECKED TAKAHASHI.T	名称 送受波器
APPROVED Y. Hatai	外寸図
SCALE 1/1	NAME TRANSDUCER
DWG.No. C7247-G07-C	REF.No. 65-007-400G-4
MASS 表2 TABLE 2	OUTLINE DRAWING

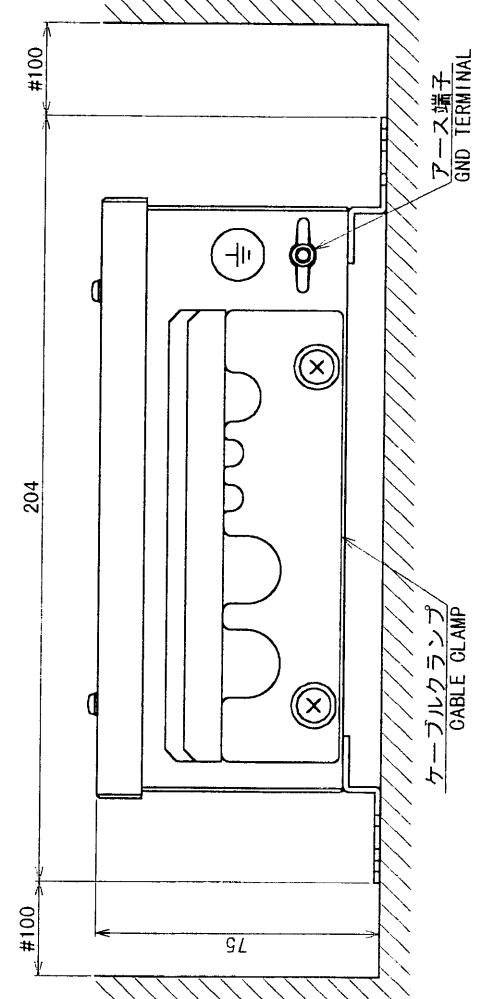
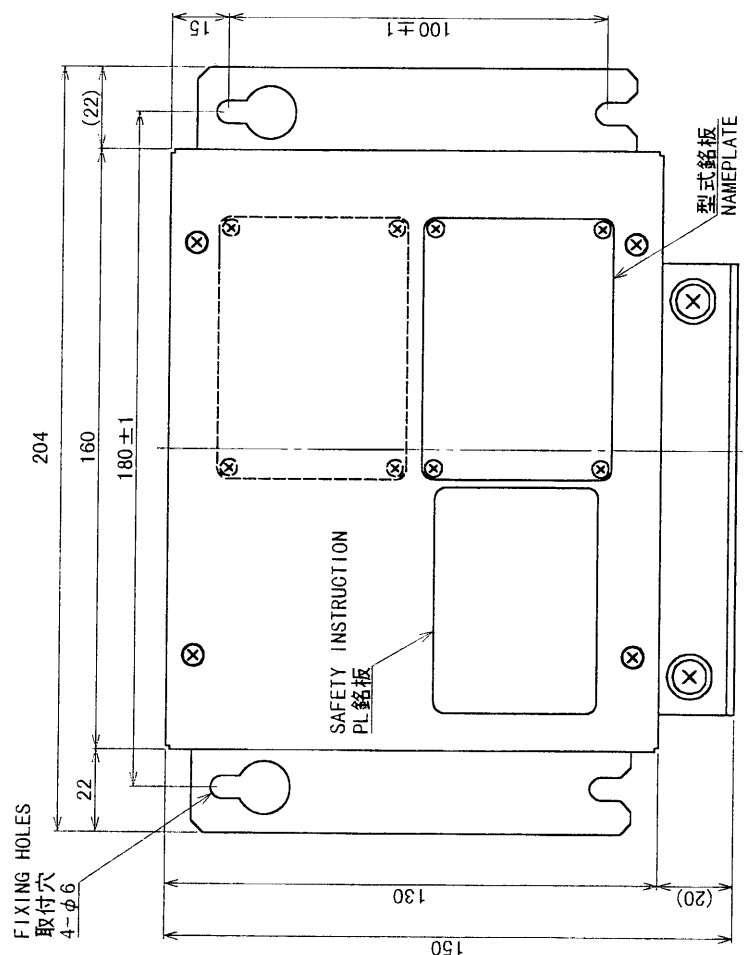
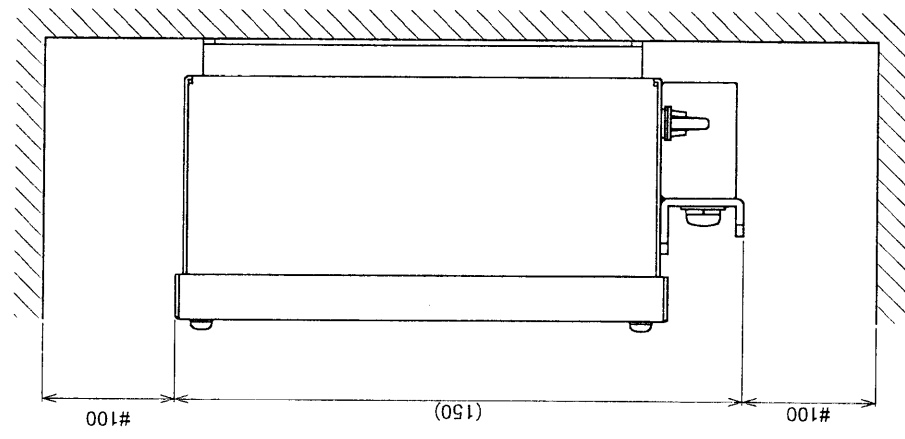
4

3

2

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

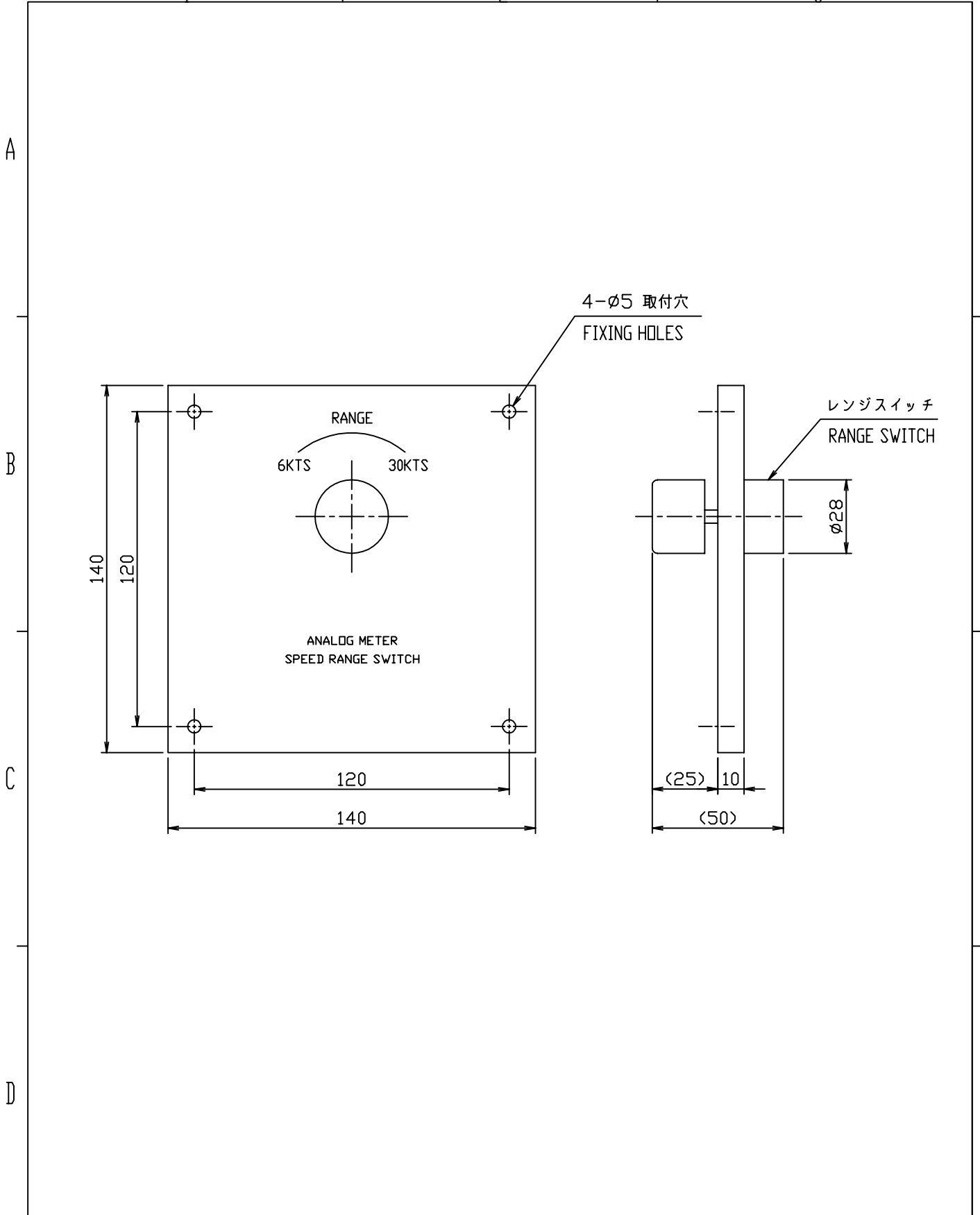
表 1  
TABLE 1



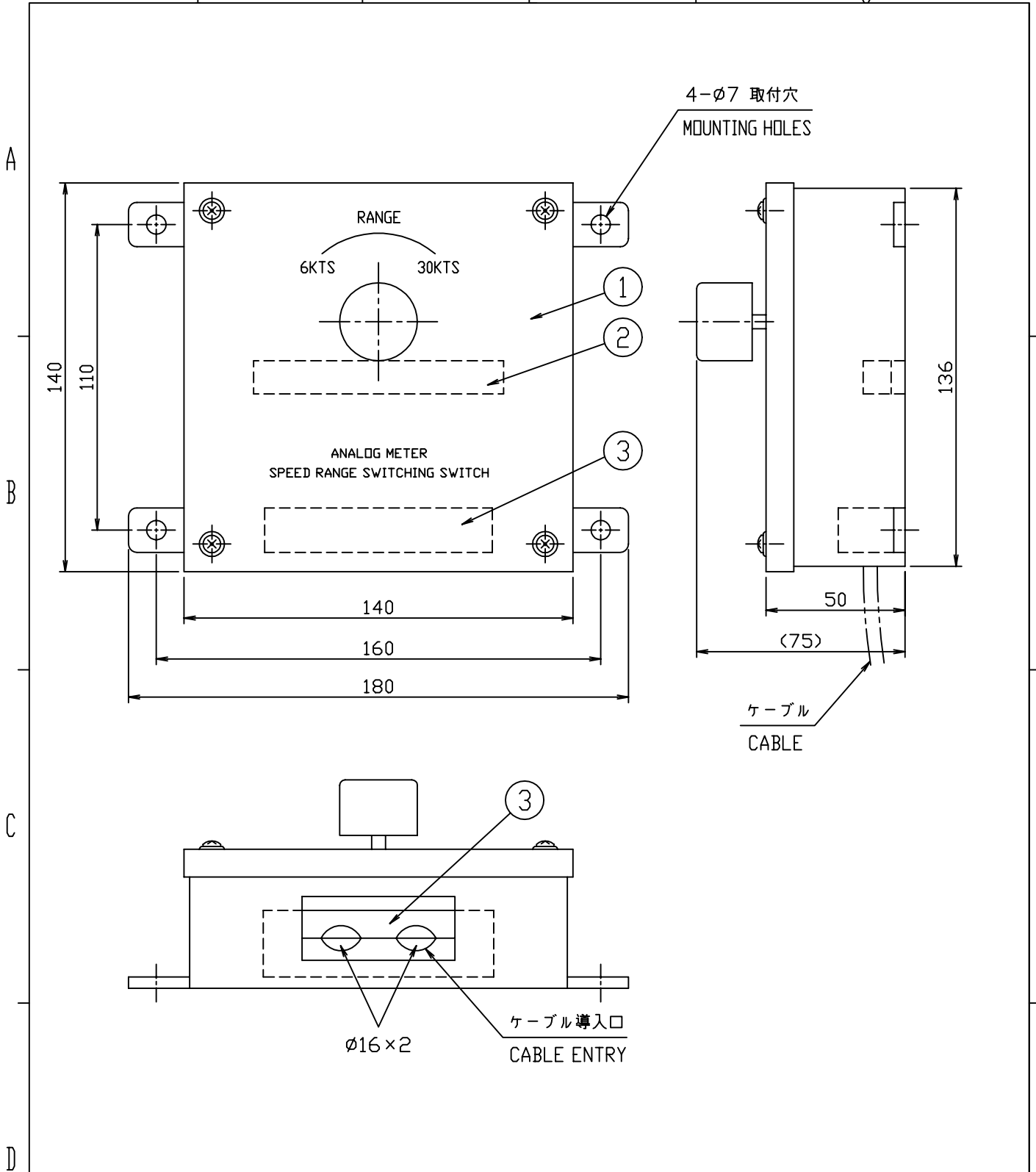
注 記  
 1) #印寸法は最小サージ空間寸法とする。  
 2) 指定外の寸法公差は表 1 による。  
 3) 取付用ネジはタッピングネジ呼び径 5 × 2.0 を使用のこと。

NOTE  
 1. #: RECOMMENDED SERVICE CLEARANCE.  
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.  
 3. USE TAPPING SCREWS φ5x2.0 FOR FIXING UNIT.

DRAWN Feb 22/00 TAMASHE	TITLE DS-802
CHECKED T. I. N.	名称 端子台箱
APPROVED T. I. N.	外寸図
SCALE 1/2	NAME TERMINAL BOX
MASS ±10%	OUTLINE DRAWING
DWG. No. C7247-G06-B	66-072-7000-G2



品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWGNO.	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 <sup>±10%</sup> kg	NAME	ANALOG DISPLAY RANGE SWITCH (FLUSH MOUNT)
DWG.No.	C7203-080-D				OUTLINE DRAWING



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		
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWGNO.	摘要 REMARKS

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

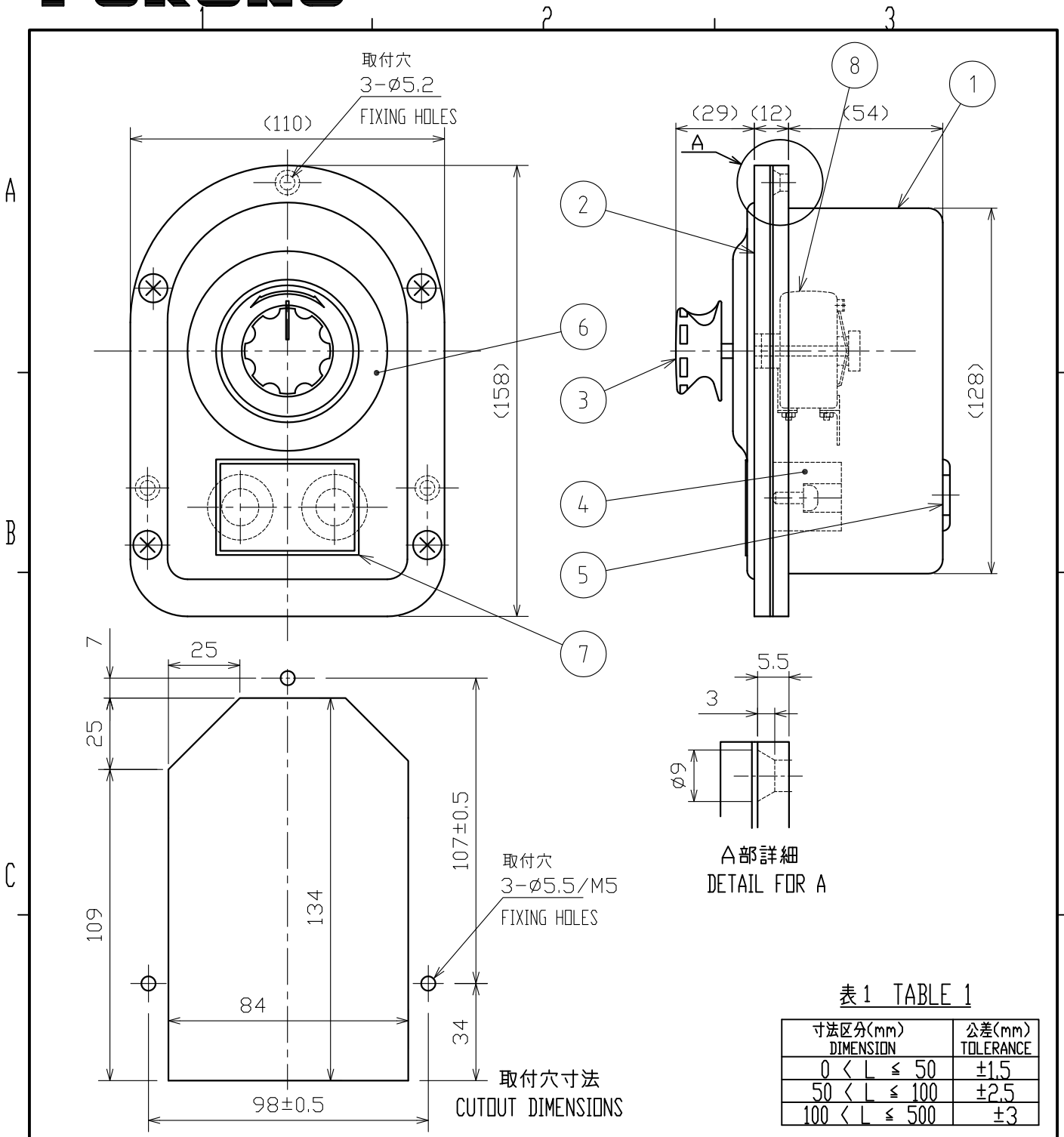


表1 TABLE 1

寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
0 < L $\leq$ 50	$\pm$ 1.5
50 < L $\leq$ 100	$\pm$ 2.5
100 < L $\leq$ 500	$\pm$ 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 WHICH IS NOT SPECIFIED.

8	抵抗 RESISTOR		1		3 k $\Omega$ 25W
7	銘板 NAMEPLATE		1		
6	銘板 NAMEPLATE		1		
5	コーミング COATING	CR	2		$\phi$ 15
4	端子盤 TERMINAL		1		
3	つまみ KNOB	PLASTIC	1		
2	ふた COVER	AC7A-F	1		
1	本体 CASE	AC7A-F	1		
品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. No.	摘要 REMARK

DRAWN	15/Dec/2016 T.YAMASAKI	TITLE	DS-F25
CHECKED	15/Dec/2016 H.MAKI	名称	調光器 (埋込装備)
APPROVED	16/Dec/2016 H.MAKI		外寸図
SCALE	1/2 MASS 0.8 $\pm$ 10% kg	NAME	DIMMER (FLUSH MOUNT)
DWG. No.	C7247-G16-A	REF. No.	XG10-16003-01
		OUTLINE DRAWING	



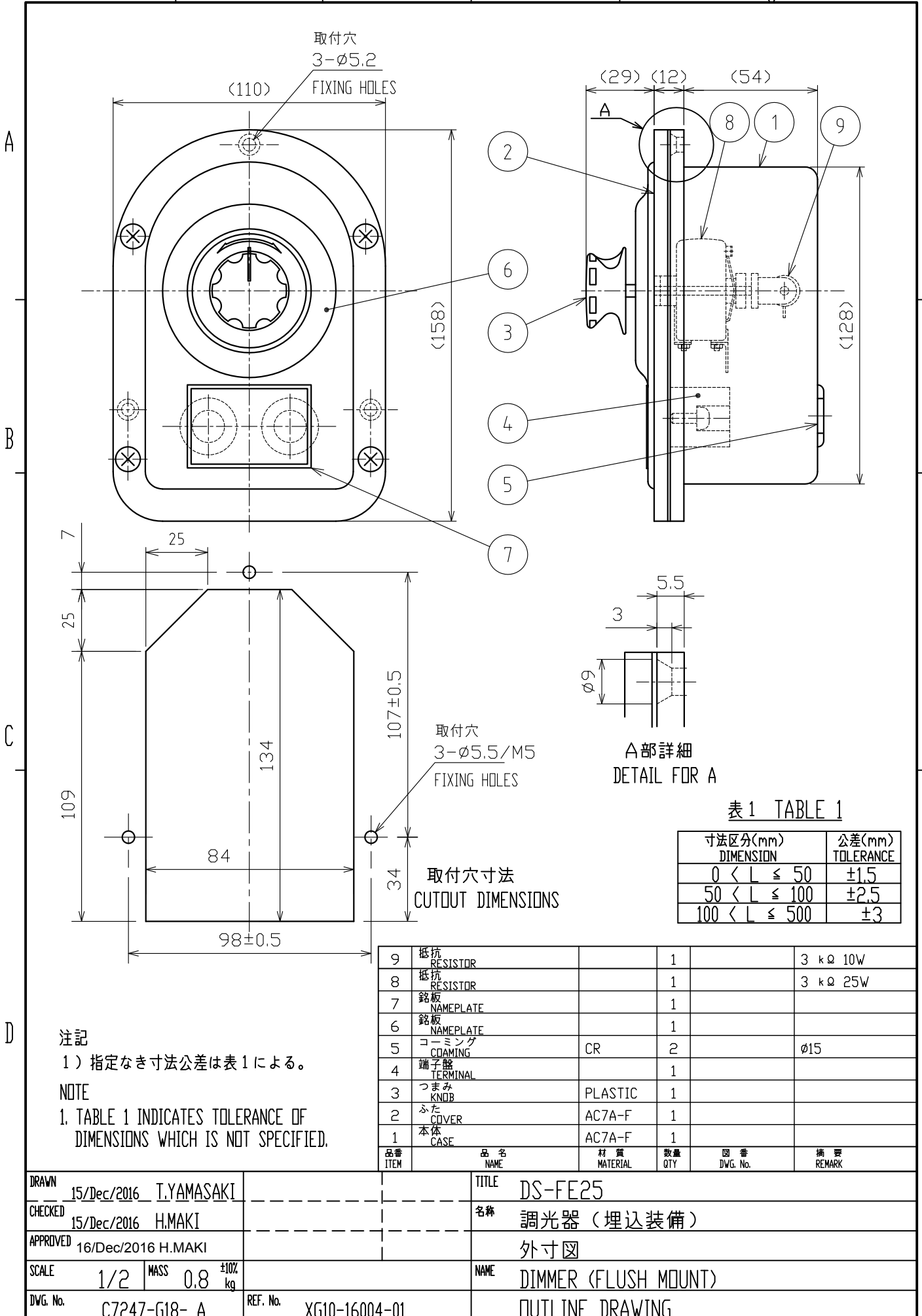
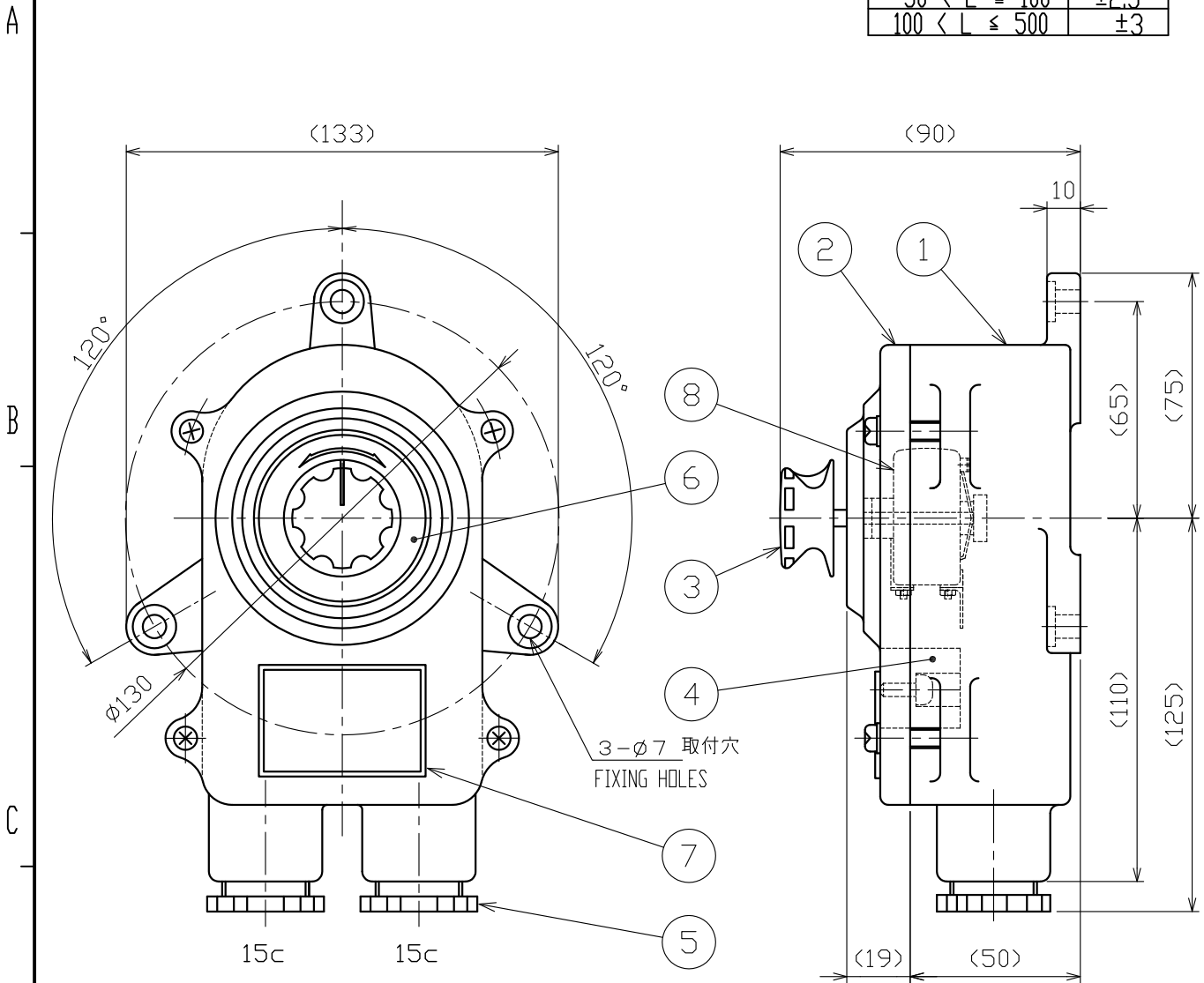


表1 TABLE 1

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

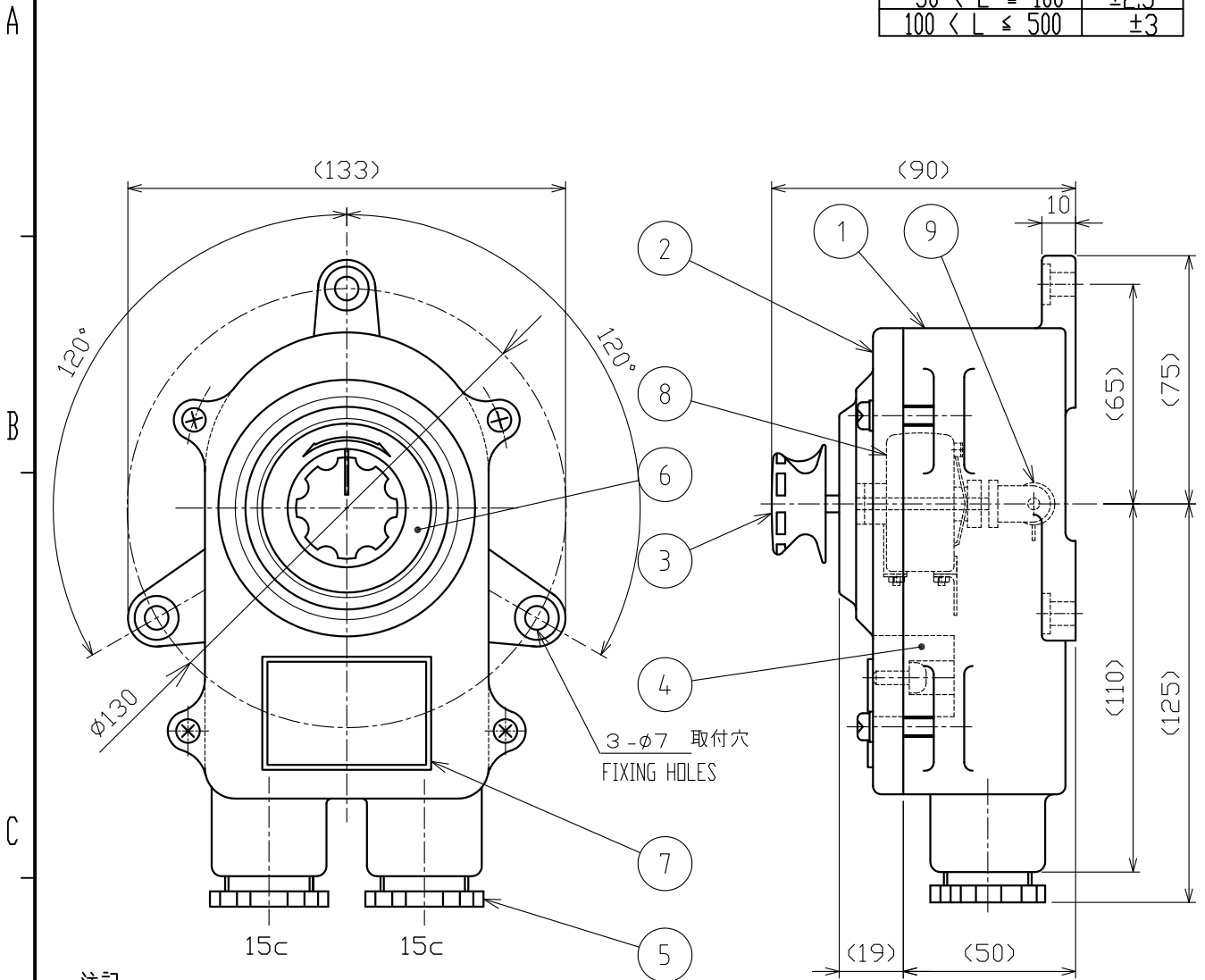
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

8	抵抗 RESISTOR		1		3 kΩ 25W
7	銘板 NAMEPLATE		1		
6	銘板 NAMEPLATE		1		
5	電線貫通金物 CABLE GLAND		2		
4	端子盤 TERMINAL		1		
3	つまみ KNOB	PLASTIC	1		
2	ふた COVER	AC7A-F	1		
1	本体 CASE	AC7A-F	1		
品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. No.	摘要 REMARK

DRAWN	15/Dec/2016 T.YAMASAKI	TITLE	DS-S25
CHECKED	15/Dec/2016 H.MAKI	名称	調光器 (壁掛装備)
APPROVED	21/Dec/2016 H.MAKI		外寸図
SCALE	1/2 MASS 1.1 ±10% kg	NAME	DIMMER (BULKHEAD MOUNT)
DWG. No.	C7247-G15- A	REF. No.	XG10-16001-01
		OUTLINE DRAWING	

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 WHICH IS NOT SPECIFIED.

9	抵抗 RESISTOR		1		3 kΩ 10W
8	抵抗 RESISTOR		1		3 kΩ 25W
7	銘板 NAMEPLATE		1		
6	銘板 NAMEPLATE		1		
5	電線貫通金物 CABLE GLAND		2		
4	端子盤 TERMINAL		1		
3	つまみ KNOB	PLASTIC	1		
2	ふた COVER	AC7A-F	1		
1	本体 CASE	AC7A-F	1		
品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. No.	摘要 REMARK

DRAWN	15/Dec/2016 T.YAMASAKI	TITLE	DS-SE25
CHECKED	15/Dec/2016 H.MAKI	名称	調光器 (壁掛装備)
APPROVED	21/Dec/2016 H.MAKI		外寸図
SCALE	1/2 MASS 1.1 ±10% kg	NAME	DIMMER (BULKHEAD MOUNT)
DWG. No.	C7247-G17- A	REF. No.	XG10-16002-01
		OUTLINE DRAWING	

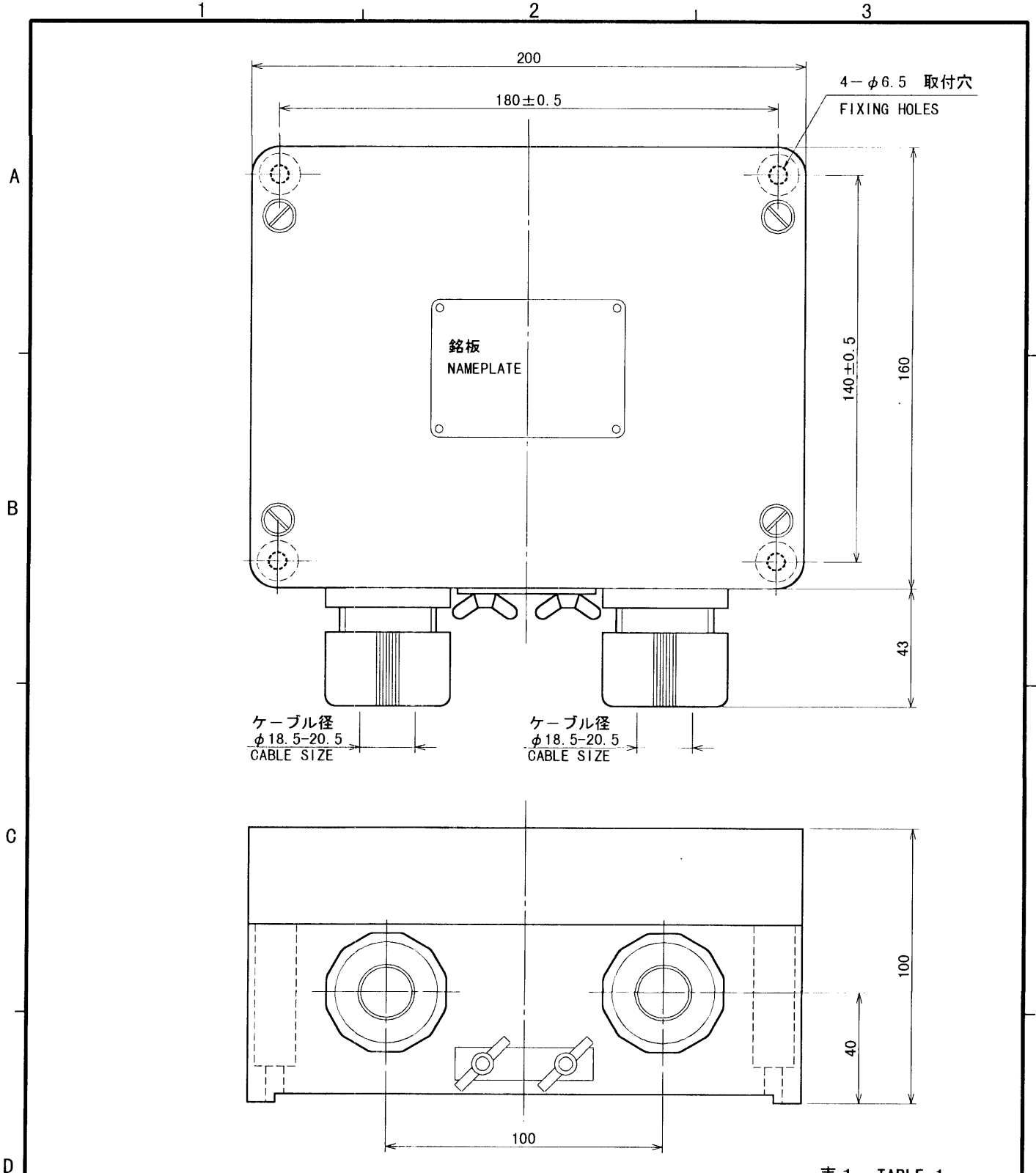


表 1 TABLE 1

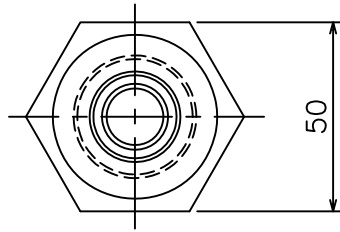
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$0 < L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$

注記 指定なき寸法公差は表 1 による。

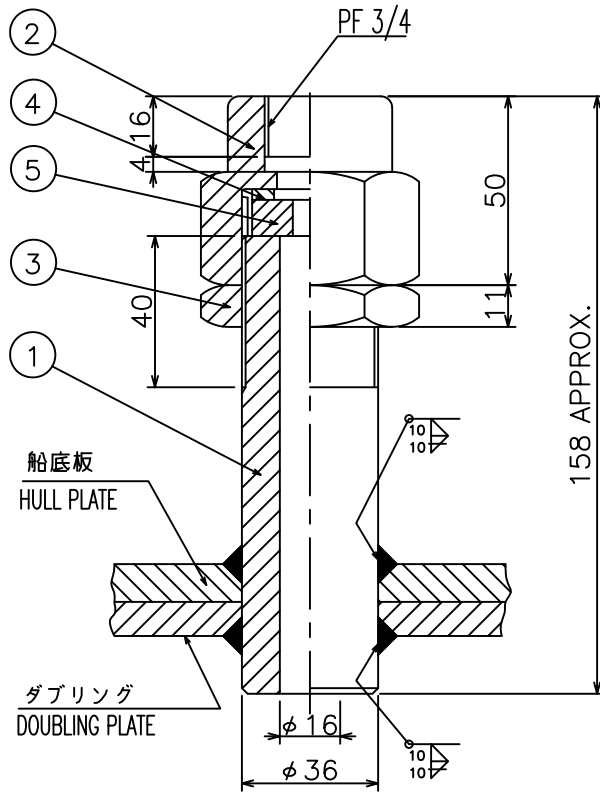
NOTE TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN Apr. 17 '00 T. YAMASAKI		TITLE CI-630	
CHECKED Apr. 17 '00 Y. Kim		名称 接続箱	
APPROVED Apr. 17 '00 Y. Kim		外寸図	
SCALE 1/2	MASS 2 $\pm 10\%$ kg	NAME JUNCTION BOX	
DWG. No. C7228-G03- D		OUTLINE DRAWING	

A



B



C

D

キャップナットの締め付け

1. 貫通金物用体 ① のネジ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. さらにスパナで二回転ほど確実に締め付ける。ただし、あまり強く締めると、防水ゴム 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 TWO 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.

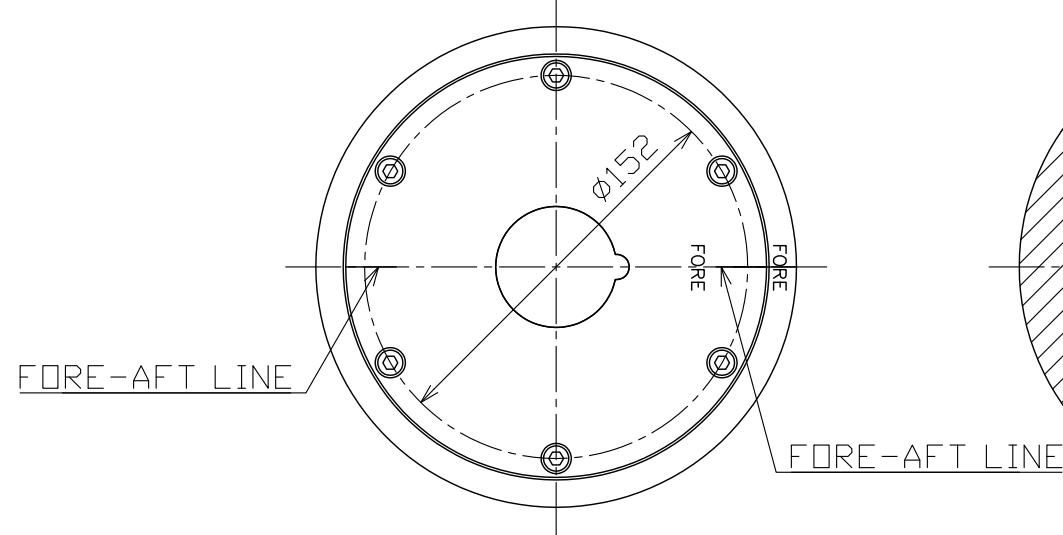
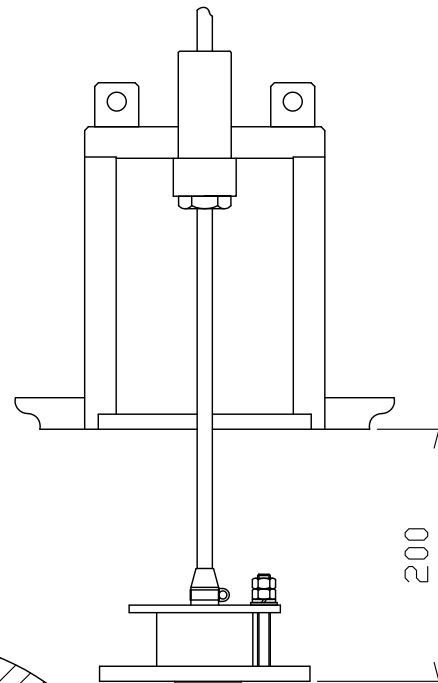
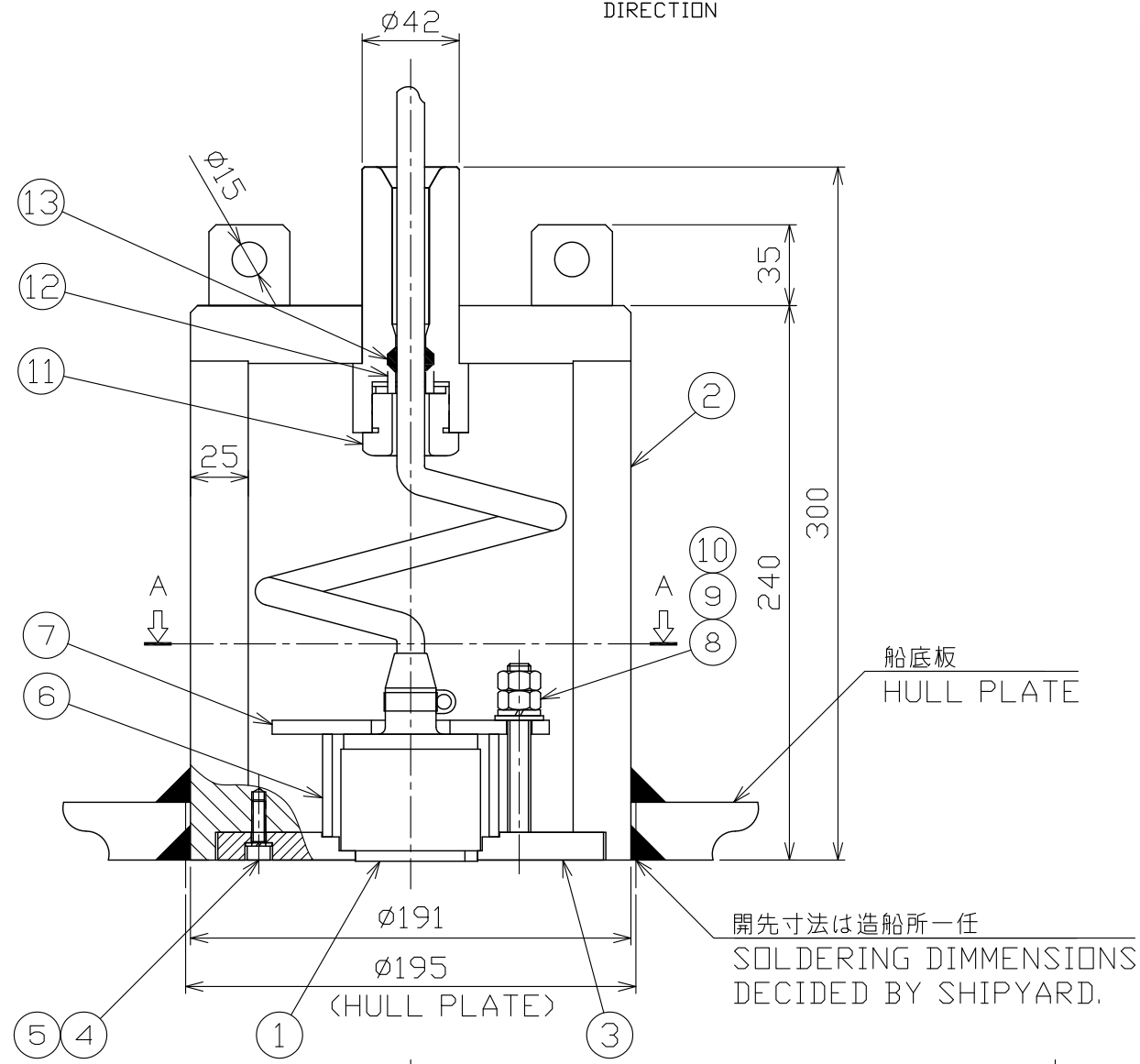
5	防水ゴム PACKING	CR	1	TPB-1-08	
4	座金 WASHER	SPCC	1	TPB-1-07	
3	止めナット LOCK NUT	SS400	1	TPB-1-04	
2	キャップナット CAP NUT	SS400	1	TPB-1-02	
1	貫通金物用体 PIPE	SS400	1	TPB-4-01	
品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. No.	摘要 REMARKS

DRAWN	14/Oct/08 T.YAMASAKI	TITLE	TFB-5000
CHECKED	14/Oct/08 T.TAKENO	名称	5号電線貫通金物 (1芯用)
APPROVED	23/Oct/08 R.Esumi		外寸図
SCALE	1/2 MASS 1.3 ±10% kg	NAME	THRU-HULL PIPE No.5 (FOR ONE CABLE)
DWG.No.	C2002-010-H		OUTLINE DRAWING

船首方向  
FORWARD  
DIRECTION

表1 (Table1)

寸法区分 (mm) Dimension	公差 (mm) Tolerance
L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3



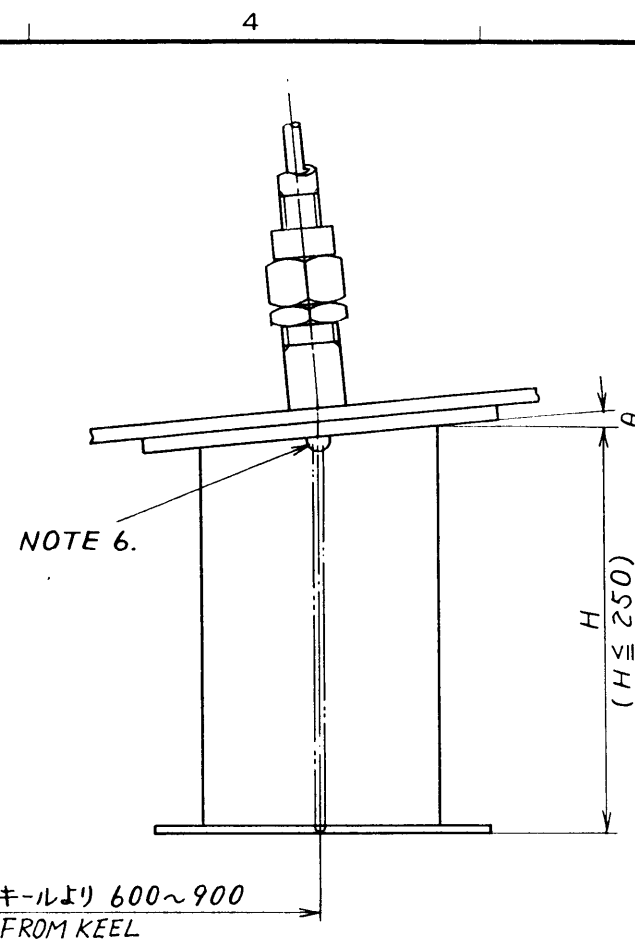
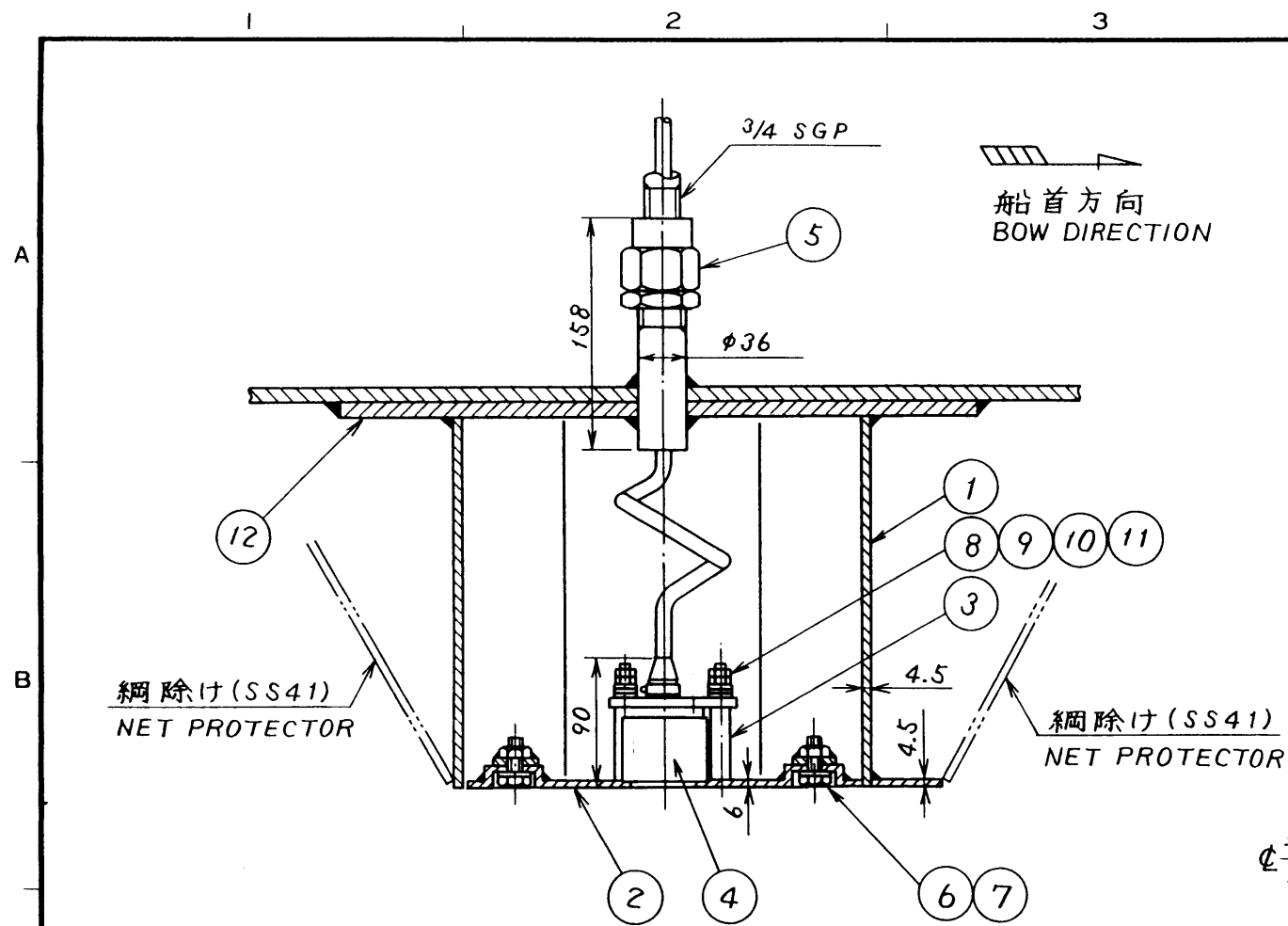
断面 A-A  
VIEW A-A

- 注記
1. タンク本体の板厚は標準25mmです。
  2. タンク本体の材質はNK (日本海事協会) 規格のKSTPG370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“取付フランジ”を必ず取り付けておいて下さい。
  6. 塗装の際、送受波器面を塗装しない様に注意して下さい。
  7. 締付ナットはタンク本体に当たるまで締め付けて下さい。
  8. 指定外の寸法公差は表1の通りです。

- Note
1. Nominal thickness of the casing is 25mm.
  2. Material of the casing is KSTPG370 accepted by NK (NIPPON KAIJI KYOKAI).
  3. The transducer tank should be welded flush with ship's hull plate.
  4. Orient bow mark of the casing in parallel with ship's fore-aft line and the top of the casing in parallel with water-line to an accuracy of 1 degree or better.
  5. To avoid distortion by heat. Put "FIXING FLANGE" (without transducer) onto casing while cutting and/or welding.
  6. Do not paint transducer face.
  7. Fasten the tightening nut until it touches the tank.
  8. Table 1 indicates tolerance of dimensions which is not specified.

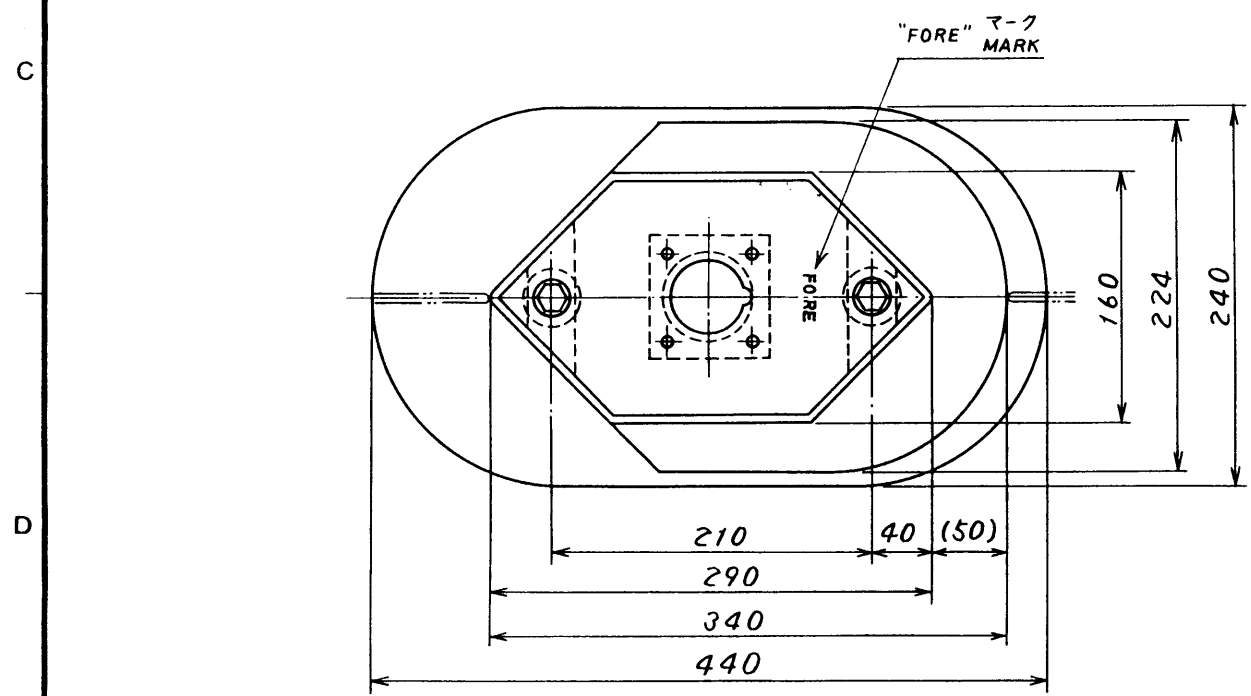
13	防水ゴム PACKING	CR	1	TWB-1009	
12	防水ゴム押え金具 WASHER	SUS316L	1	65-007-6006	
11	締付けナット TIGHTENING NUT	SUS316L	1	65-007-6005	
10	六角ナット HEX. NUT	SUS316L	6	M10	
9	バネ座金 SPRING WASHER	SUS316L	3	M10	
8	平座金 FLAT WASHER	SUS316L	3	M10	
7	押え板 FIXING PLATE EPOXY ZINC RICH PRIMER	SS400	1	65-007-6004	
6	スペーサ SPACER EPOXY ZINC RICH PRIMER	SGP	1	65-007-6003	
5	バネ座金 SPRING WASHER	SUS316L	6	M6	
4	六角穴付きボルト HEX. BOLT	SUS316L	6	M6×20	
3	取付フランジ FIXING FLANGE EPOXY ZINC RICH PRIMER	SS400	1	65-007-6002	
2	タンク本体 CASING EPOXY ZINC RICH PRIMER	KSTPG370	1	65-007-6001	船級認定材 CLASSIFICATION SOCIETY APPROVED MATERIAL
1	送波器 TRANSDUCER		1	DS-820	質量に含まず NOT INCLUDED IN MASS
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.No.	摘要 REMARKS

DRAWN	10/Apr/2019 T.YAMASAKI	TITLE	DS-850	
CHECKED	10/Apr/2019 H.MAKI	名称	船底タンク	
APPROVED	12/Apr/2019 H.MAKI	DS-80	送受波器装備図	
SCALE	1/3 MASS 31 ±10% kg	質量は送受波器を除く MASS W/D TRANSDUCER	NAME	HULL UNIT
DWG. No.	C7247-T01-E	REF. No.	65-007-600G-5	TRANSUCER INSTALLATION



NOTE

1.  $\theta$ 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 ( $\phi 10 \sim \phi 20$ 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-船尾方向の取付誤差は  $\pm 1^\circ$  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  $\pm 1^\circ$  以内になるよう振動子ケースを切断すること。



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		

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) FLAT WASHER (NOMI. 8)	P.C.	4		
7	バネ座金 SPRING WASHER (M10)	SUS304	2		
6	六角ボルト (M10x30) 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	
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

DRAWN Oct 13 '00 T. YAMASAKI		TYPE DS-781
CHECKED Oct 13 '00 Y. K...		名称 船底タンク (突出型)
APPROVED Oct 13 '00 Y. K...	DS-80 DS-70	送受波器装備図
SCALE 1/5	MASS 11 kg	APPLICABLE TO; (MODEL)
DWG NO. C7222-T05-C	BLOCK NO.	NAME SEACHEST (PROJECTION TYPE)
TRANSUCER INSTALLATION		

表 1 (Table 1)

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

注 記/ 装備手順

- ⑨ハンドルを持って運搬しないこと。はめ合い部を損傷する恐れがあります。
- ⑦六角ナットを外して②ゲートバルブより③船底フランジと④フランジ (①送受波器/⑤シャフト付き) を3個のブロックに分離する。
- ③船底フランジを船底に溶接する。この時③船底フランジ側面のFOREマーク及び基準線を確認する。なお基準線の船首-船尾方向の取り付け誤差は±1度以内とする。また吃水面に対する水平取り付け誤差も±1度以内とする。船底外側の溶接跡はグラインダー等で面一に仕上げる。
- キノワスタ (金属隙間腐食防止剤) ③船底フランジのシール面 (A面)、⑧ガスケットの両面、②ゲートバルブのフランジ面に塗布する。
- ②ゲートバルブを③船底フランジに取り付ける。ゲートバルブは45度毎に取り付けられる。
- キノワスタを④フランジのシール面 (B面) ⑧ガスケットの両面、②ゲートバルブのフランジ面に塗布する。
- ⑧ガスケットをゲートバルブのフランジ面に置く。
- ④フランジ (①送受波器/⑤シャフト付き) を②ゲートバルブに取り付ける。
- ⑪ロックリングの⑫締付ボルトを緩め、⑬ボルトを緩めて⑩回転保持金具を外してから⑤シャフトが上下することを確認する。
- ⑬ボルトで⑩回転保持金具を取り付ける。
- ⑨ハンドルを回し、③船底フランジに⑥ヘッドキャップが当たるまで⑤シャフトを降下させ、⑪ロックリングの⑫締付ボルトを締め付ける。
- 船底外側から送受波器面が船底フランジの面より24mm突出していることを確認する。
- 指定外の寸法公差は表1による。

NOTE/INSTALLATION PROCEDURE

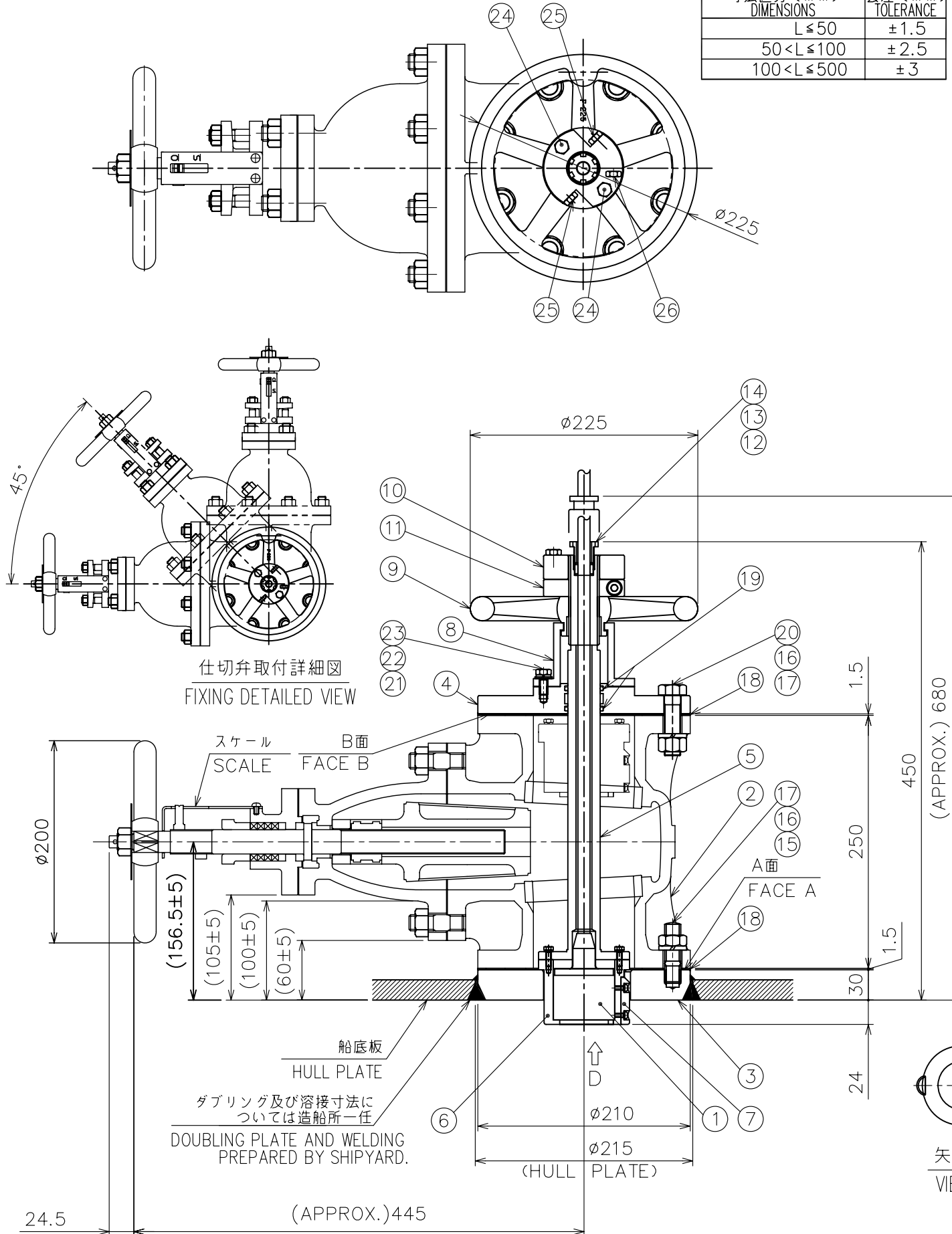
- DO NOT CARRY BY HOLDING ⑨HANDLE, TO PREVENT DAMAGE TO JOINT. SEPARATE ③HULL FLANGE AND ④FLANGE (WITH ①TRANSDUCER/ ⑤SHAFT) FROM ②GATE VALVE BY REMOVING ⑦HEX NUT.
- WELD ③HULL FLANGE TO HULL PLATE. CONFIRM "FORE" AND REFERENCE MARKS SO THAT FORE-AFT INSTALLATION ERROR IS WITHIN ±1 DEGREE. ALSO FACE OF ③HULL FLANGE SHOULD BE ALIGNED IN PARALLEL WITH DRAFT LINE (WITHIN ±1 DEGREE), USING A GRINDER OR SIMILAR TOOL. FINISH OUTSIDE OF HULL FLANGE SO THAT IT IS SMOOTH.
- APPLY KINORUSTER (ANTI-CREVICE CORROSIVE SEALANT) TO FACE "A" OF ③HULL FLANGE AND TO BOTH FACE OF ⑧GASKET AND FLANGE OF ②GATE VALVE.
- PUT ⑧GASKET ONTO ③HULL FLANGE.
- FASTEN ②GATE VALVE TO ③HULL FLANGE. DIRECTION OF ②GATE VALVE CAN BE ATTACHED IN ANY DIRECTION IN 45° PITCH. (STANDARD DIRECTION OF HANDLE : AFT)
- APPLY KINORUSTER TO FACE B OF ④FLANGE AND TO BOTH FACES OF ⑧GASKET AND FLANGE OF ②GATE VALVE.
- PUT ⑧GASKET ONTO FLANGE OF ② GATE VALVE.
- FASTEN ④FLANGE (WITH ①TRANSDUCER/ ⑤SHAFT) TO ②GATE VALVE.
- FOR TESTING MOVEMENT OF ⑤SHAFT, RAISE AND LOWER IT AFTER LOOSENING ⑪ ⑫ HEX BOLTS AND HEX BOLT OF ⑩ LOCK RING.
- OF FASTEN ⑬ HEX BOLT OF ⑩ LOCK RING.
- LOWER TRANSDUCER BY TURNING HANDLE UNTIL ⑥ TRANSDUCER CASE CONTACTS ③HULL FLANGE.
- CONFIRM THAT FACE OF TRANSDUCER PROJECTS 24mm.
- TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

船底フラット時

- 上記1~12は同様。
- ⑨ハンドルを回し、⑨ハンドルの上面と⑪ロックリングの間に⑩スペーサ (24mm) が入るまで⑤シャフトを上昇させる。
- ⑨ハンドルと⑪ロックリングの間に⑩スペーサを入れ、⑨ハンドルが止まるまで回す。
- 船底外側から送受波器面が面一になっていることを確認する。

FOR FLUSH MOUNTING:

- FOR STEPS 1) TO 12), FOLLOW ABOVE PROCEDURE.
- RAISE ⑤SHAFT BY TURNING ⑨HANDLE UNTIL ⑩SPACER (24mm) IS INSERTED BETWEEN TOP OF ⑨HANDLE AND ⑪LOCK RING.
- PUT ⑩SPACER BETWEEN ⑨HANDLE AND ⑪LOCK RING, AND LOWER ⑤SHAFT.
- CONFIRM THAT FACES OF HULL PLATE AND TRANSDUCER ARE EVEN.



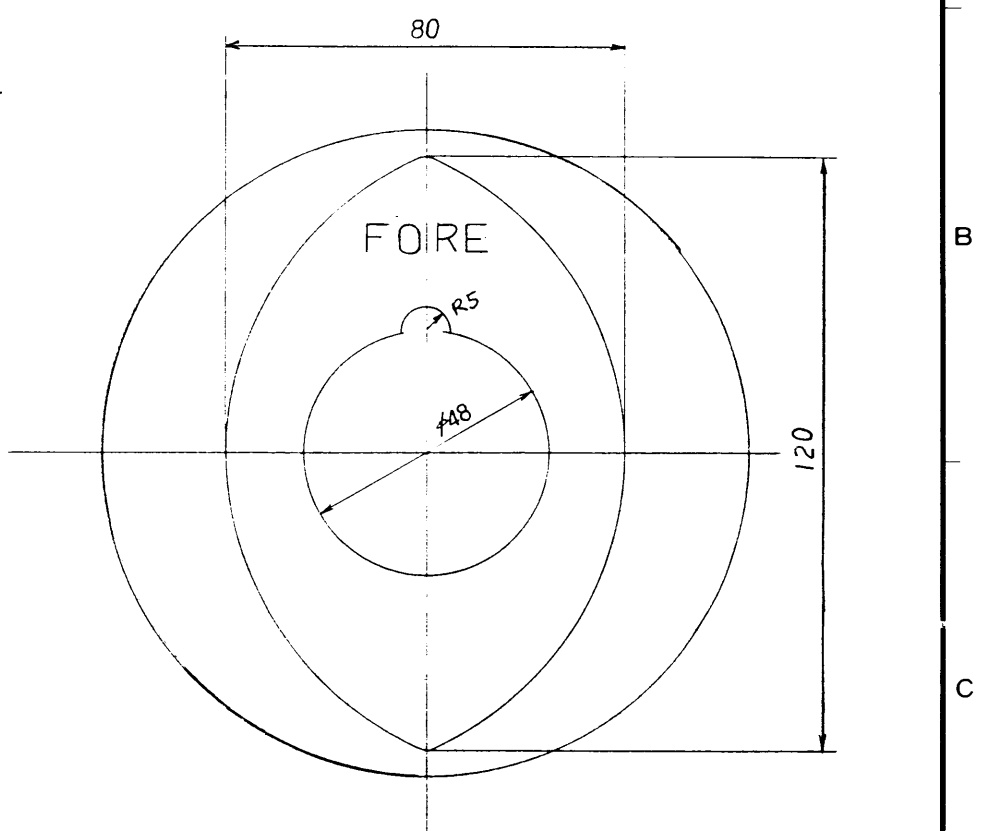
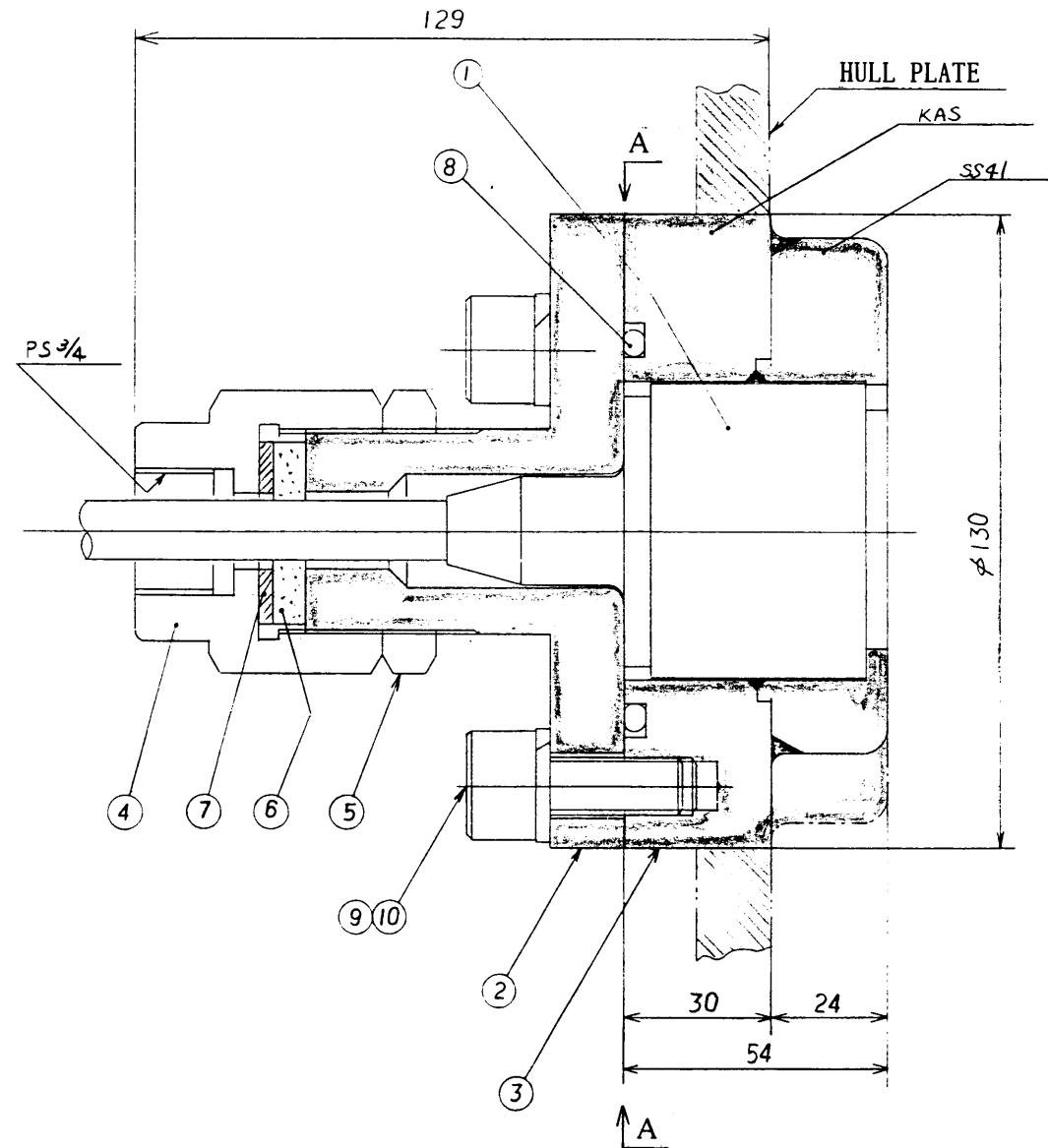
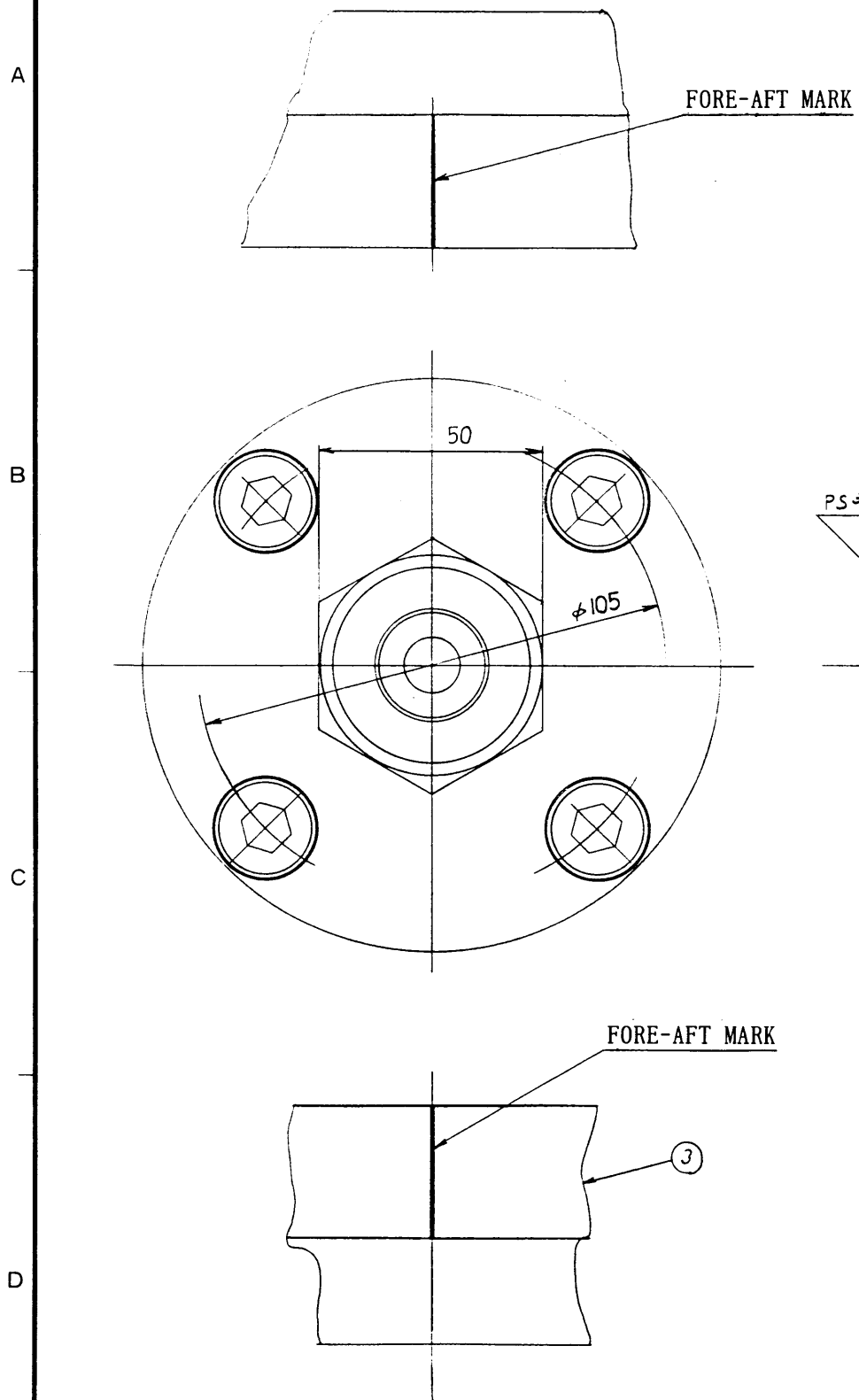
26	六角穴付ボルト HEX SOCKET HEAD BOLT	SUS316L	1	M8×30	
25	六角穴付ボルト HEX SOCKET HEAD BOLT	SUS316L	2	M8×30	
24	六角穴付ボルト HEX SOCKET HEAD BOLT	SUS316L	2	M8×30	
23	六角ボルト HEX BOLT	SUS316L	4	M8×20	
22	バネ座金 SPRING WASHER	SUS316L	4	M8	
21	平座金 FLAT WASHER	SUS316L	4	M8	
20	六角ボルト HEX BOLT	SUS316L	8	M16×60	
19	Oリング O-RING	NBR	2	JISB2401-1A-P32	
18	ガスケット GASKET	JOINT SHEET	2	JIS-10K 全面座 100A-1.5	
17	六角ナット HEX NUT	SUS316L	16	M16 1種	
16	バネ座金 SPRING WASHER	SUS316L	16	M16	
15	挿入ボルト STUD BOLT	SUS316L	8	M16×40	
14	挿付グランド CABLE GLAND	C3604	1	JISF8801 15用	
13	座金 SECURE RING	SPC	2	65-003-9306	
12	ガスケット GASKET	CR	1	65-003-9305	
11	ロックリング LOCK RING	SS41	1	65-003-9304	
10	スペーサ SPACER	ジュフロン RESIN	2	65-003-9708	
9	ハンドル HANDLE	FC200	1	65-003-9707	
8	回転保持金具 LOCK RING	C3604B	2	65-003-9706	
7	キー TURNING STOPPER	SUS316L	1	65-003-9705	
6	ヘッドキャップ TRANSDUCER CASE	SUS316L	1	65-003-9704	
5	シャフト SHAFT	SUS316L	1	65-003-9703	
4	フランジ FLANGE	SUS316L	1	65-003-9702	
3	船底フランジ HULL FLANGE RUST PREVENTIVE OIL	KA	1	65-003-9701	船級認定材 CLASSIFICATION SOCIETY APPROVED MATERIAL
2	船用錆鋼仕切弁 GATE VALVE ZINC RICH PRIMER	SC480	1	65-003-9711	船級認定品 CLASSIFICATION SOCIETY APPROVED
1	送受波器 TRANSDUCER			DS-785/820	
品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS

DRAWN	MAY 18, '06 E. MIYOSHI	TITLE	DS-782
CHECKED	TAKAHASHI, T	名称	ゲートバルブ式送受波器タンク
APPROVED	Y. Hatai	送受波器装備図	
SCALE	1/5 MASS 75.0 ±10% kg	質量は送受波器を含まず。 TRANSDUCER IS NOT INCLUDED IN MASS.	NAME SEACHEST TYPE (W/GATE VALVE)
DWG No.	C7222-T02-D	REF No.	65-003-970G-5
		TRANSUCER INSTALLATION	



**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 washer ⑦. (It is not necessary to draw the cap nut completely out from the cable.)
- 2 Unscrew hex. socket head bolts ⑩ (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-ring ⑧ carefully so as not to damage it.
- 3 Weld hull flange ③ 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 ±1 degree. The hull flange ③ 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 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 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 the top of the flange and tighten cap nut ④ securely with a wrench (hex. size: 50mm). 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	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

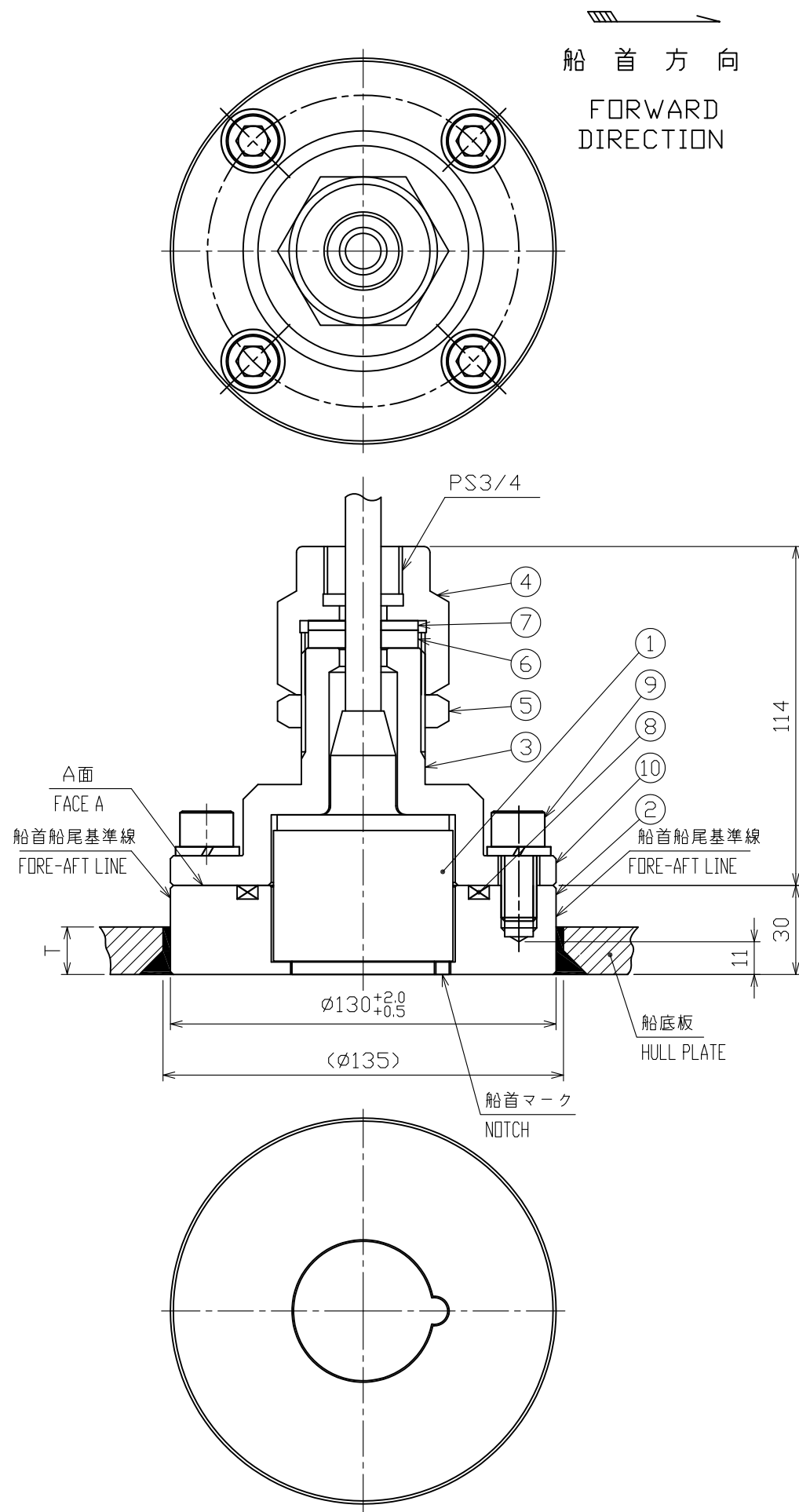
DRAWN <i>Oct 13 '00 TYAMASAKI</i>				TYPE DS-783
CHECKED <i>Oct 17 '00 Y.K.</i>				名称
APPROVED <i>Oct 17 '00 Y.K.</i>	DS-80 DS-70			送受波器装備図
SCALE /	MASS 5.6 kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME SEACHEST (FLUSH MOUNT TYPE)
DWG NO. E7222-T03- B				TRANSDUCER INSTALLATION

A

B

C

D



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50mmスパナを使用のこと）。
- ④キャップナットを②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座金を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10mm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。⑩ボルト、⑩ばね座金、⑩O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-船尾方向に合わせて溶接する。（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 付属のキノラスク（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振動子の突起を合わせること。）
- 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50mm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PS3/4ねじを利用すること。

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 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: 10mm). Separate flange ③ and transducer ① from hull flange ②. 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 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 ±1 degree. The hull flange ② 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 flange ②, 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 ② so that the alignment nipple on the transducer face fits into the notch on the hull flange.
- 8 Settle flange ③ on the hull flange ②.
- 9 Tighten hex. socket bolts ⑨ with a socket screw wrench.
- 10 Put gasket ⑥ and flat washer ⑦ on the top of the flange and tighten cap nut ④ securely with a wrench (hex. size: 50mm). 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.

10	バネ座金 SPRING WASHER	SUS316L	4	M12	
9	六角穴付きボルト SOCKET HEAD SCREW	SUS316L	4	M12x25	
8	Oリング O-RING	NBR	1	JISB2401-1A-P75	
7	平座金 FLAT WASHER	SPC	1	65-003-9106	
6	ガスケット GASKET	CR	1	65-003-9105	
5	六角ナット HEX. NUT	SS400	1	65-003-9104	
4	キャップナット CAP NUT	SS400	1	65-003-9103	
3	振動子フランジ (L) FLANGE LB	SS400	1	65-003-9101	
2	船底フランジ HULL FLANGE LB	KAS	1	65-003-9102	船級認定材 CLASSIFICATION SOCIETY APPROVED MATERIAL
1	送受波器 TRANSDUCER			DS-785/820	
品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. No.	摘要 REMARKS

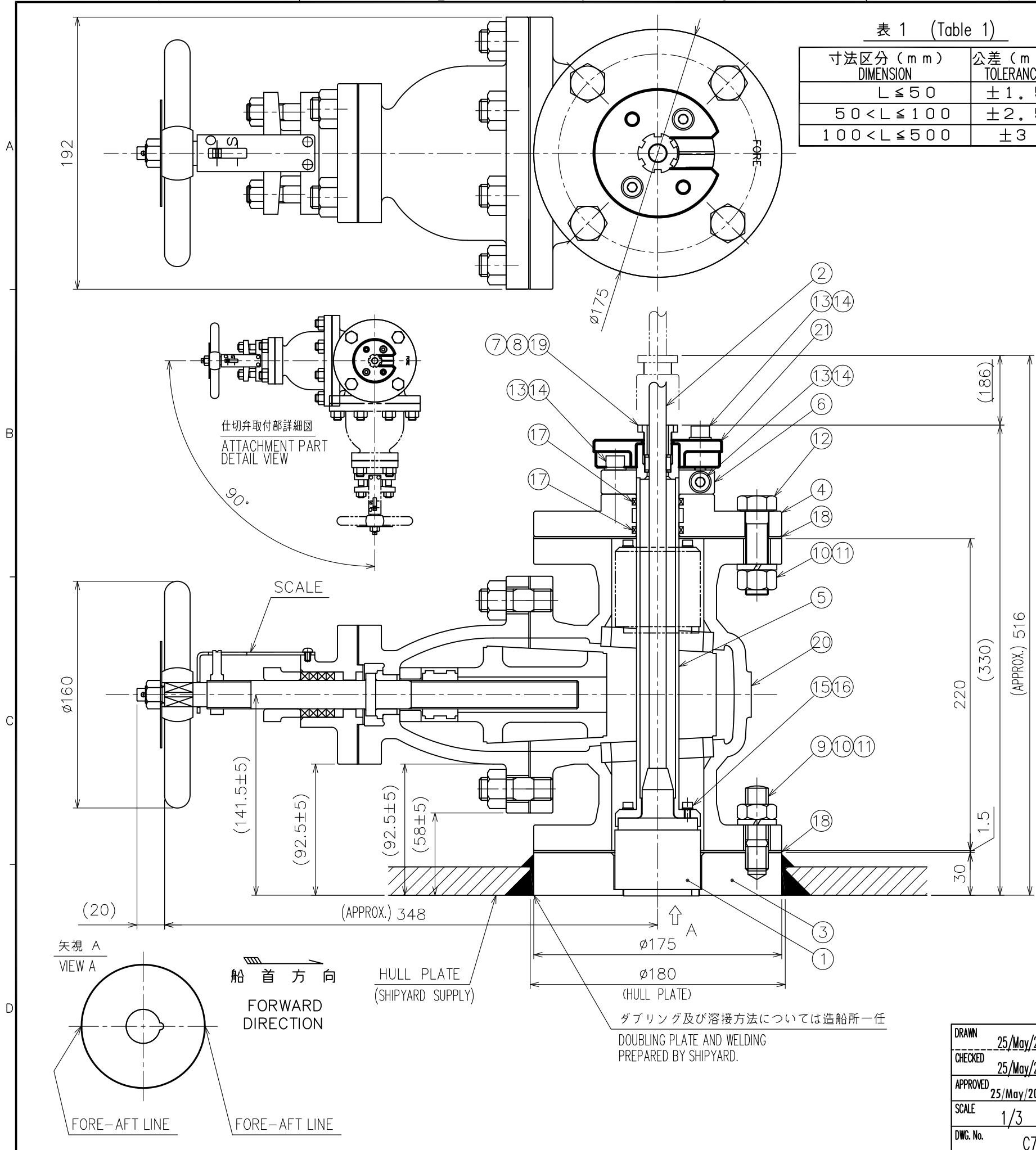
DRAWN	16/Nov/2016 T.YAMASAKI	TITLE	DS-784	
CHECKED	16/Nov/2016 H.MAKI	名称	船底タンク（埋込型）	
APPROVED	17/Nov/2016 H.MAKI	DS-70/80	送受波器装備図	
SCALE	1/2	質量は送受波器を含まず。 MASS DOES NOT INCLUDE TRANSDUCER.	NAME	SEACHEST (FLASH TYPE)
DWG. No.	C7222-T06-E	REF. No.	65-003-910G-2	TRANSDUCER INSTALLATION

表 1 (Table 1)

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

- 注記
- フランジ③を船底に溶接する際、船首-船尾方向、水平方向の各取付誤差は±1度以内として下さい。
  - 金属スキマ腐食防止剤(キノラスタ)を、フランジ③④のシール面、ガスケット⑬の両面、ゲートバルブ⑳のフランジ面に塗布して下さい。
  - ゲートバルブ⑳を取付ける際はナット⑩の回り止め対策として、ボルト⑨⑫およびナット⑩を脱脂後、ロックタイト#271を塗布して完全に締めて下さい。
  - フランジ④、シャフト⑤を組み込む際は、FOREマークを合せること。
  - ゲートバルブ⑳以外の部分は  $4.9 \times 10^5$  Pa の水圧試験がされています。
  - ゲートバルブ⑳は、90°ピッチで任意の方向に取付け可能です。
  - 指定外の寸法公差は表1の通りです。

- NOTE
- WHEN WELDING HULL FLANGE ③ TO SHIP'S HULL PLATE, FORE-AFT AND HORIZONTAL ATTACHMENT ERROR SHOULD BE LESS THAN ±1 DEGREE.
  - APPLY ANTI-CREVICE CORROSIVE SEALANT (KINORUSTER) TO SEAL FACE OF FLANGE ③④ AND TO BOTH FACES OF GASKET ⑬ AND FLANGE OF GATE VALVE ⑳.
  - PRIOR TO SECURE NUTS ⑩, CLEAN BOLTS ⑨⑫ AND NUTS ⑩ WITH SOLVENT AND APPLY LOCTITE #271 TO THREADS OF THEM.
  - ALIGN "FORE" MARK WITH BOW, WHEN INSTALLING UPPER FLANGE④ AND SHAFT⑤.
  - PARTS EXCEPT GATE VALVE ⑳ IS TESTED UNDER  $4.9 \times 10^5$  Pa PRESSURE.
  - GATE VALVE ⑳ CAN BE ATTACHED IN ANY DIRECTION IN 90° PITCH.
  - TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.



品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. No.	摘要 REMARKS
21	押え板 FIXING PLATE	S45C	1	65-003-9307	
20	ゲートバルブ GATE VALVE ZINC RICH PRIMER	SC480	1	65-003-9311 (JIS F 7366-65S)	船級認定品 CLASSIFICATION SOCIETY APPROVED
19	グラウンド FIXING GRAND	BRASS	1	JIS F8801E15	
18	ガスケット GASKET	JOINT SHEET	2	JIS 10K65A1.5mm	
17	リング O-RING	NBR	2	JIS B2401-P30	
16	座金 WASHER	SUS/NBR	4	M4	
15	六角穴付きボルト HEX. S.H.C. SCREW	SUS316L	4	M4×16	
14	バネ座金 SPRING WASHER	SUS316L	5	M8	
13	六角穴付きボルト HEX. S.H.C. SCREW	SUS316L	5	M8×30	
12	ボルト BOLT	SUS316L	4	M16×60	
11	バネ座金 SPRING WASHER	SUS316L	8	M16	
10	ナット NUT	SUS316L	8	M16	
9	植込みボルト STUDS	SUS316L	4	M16×40	
8	座金 WASHER	SPC	2	65-003-9306	
7	ガスケット GASKET	CR	1	65-003-9305	
6	ロックリング ROCK RING	SS400	1	65-003-9304	
5	シャフト SHAFT	SUS316L	1	65-003-9303	
4	フランジ FLANGE	SUS316L	1	65-003-9302	
3	船底フランジ FLANGE RUST PREVENTIVE OIL	KA	1	65-003-9301	船級認定材 CLASSIFICATION SOCIETY APPROVED MATERIAL
2	ケーブル TRANSDUCER CABLE				φ11.8
1	送波器 TRANSDUCER		1		DS-785/820

DRAWN	25/May/2011 J.YAMASAKI	TITLE	DS-786
CHECKED	25/May/2011 H.MAKI	名称	ゲートバルブ式送波器タンク
APPROVED	25/May/2011 Y.NISHIYAMA	図番	DS-70/80
SCALE	1/3 MASS 40.0 ±10% kg	質量は送波器を含まず。 MASS W/O TRANSDUCER.	送波器装備図
DWG. No.	C7222-T04-H	REF. No.	65-003-930G-6
		NAME	TRANSDUCER TANK (SEACHEST TYPE W/ GATE VALVE)
			TRANSDUCER INSTALLATION

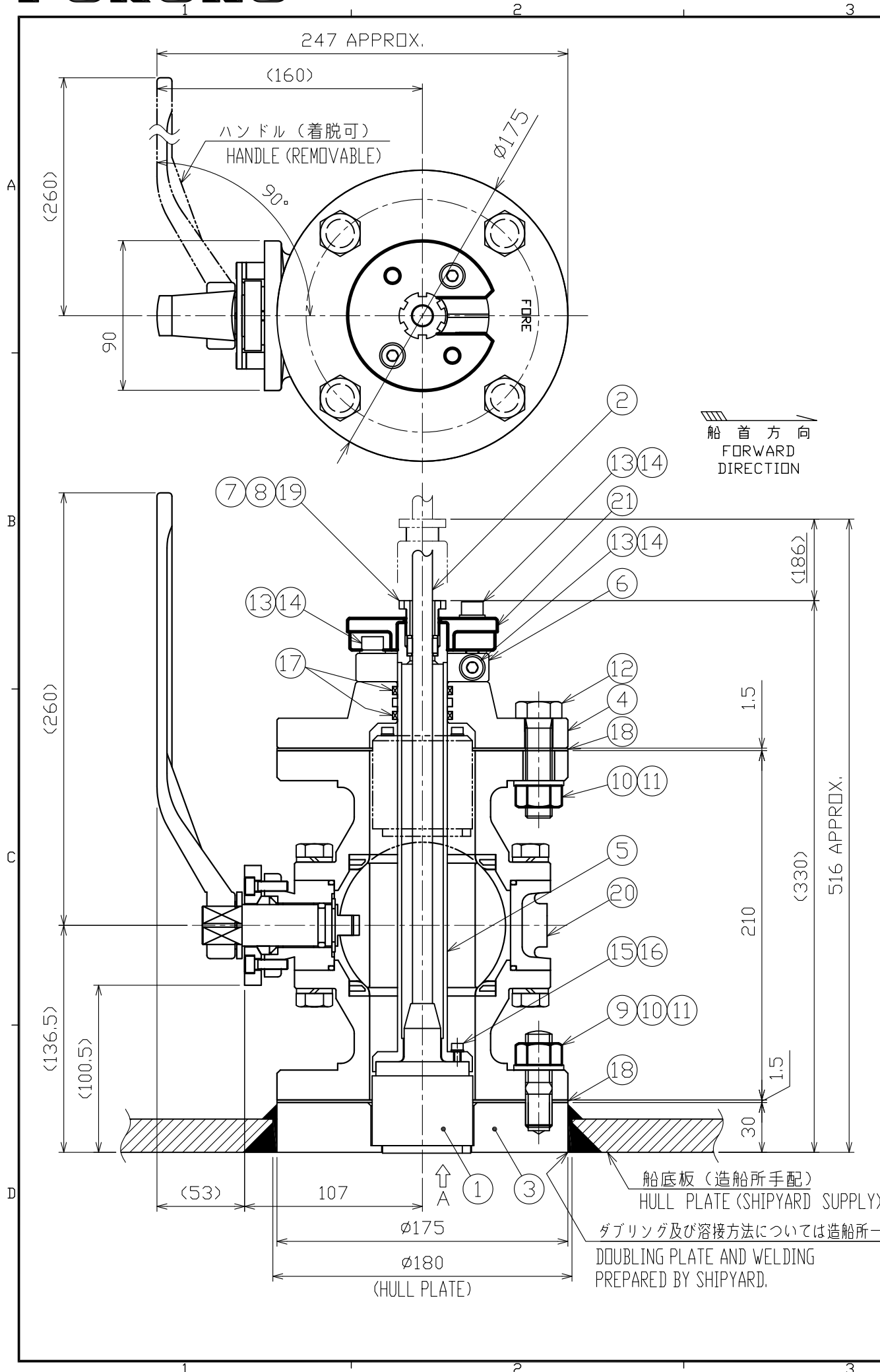


表1 (Table1)

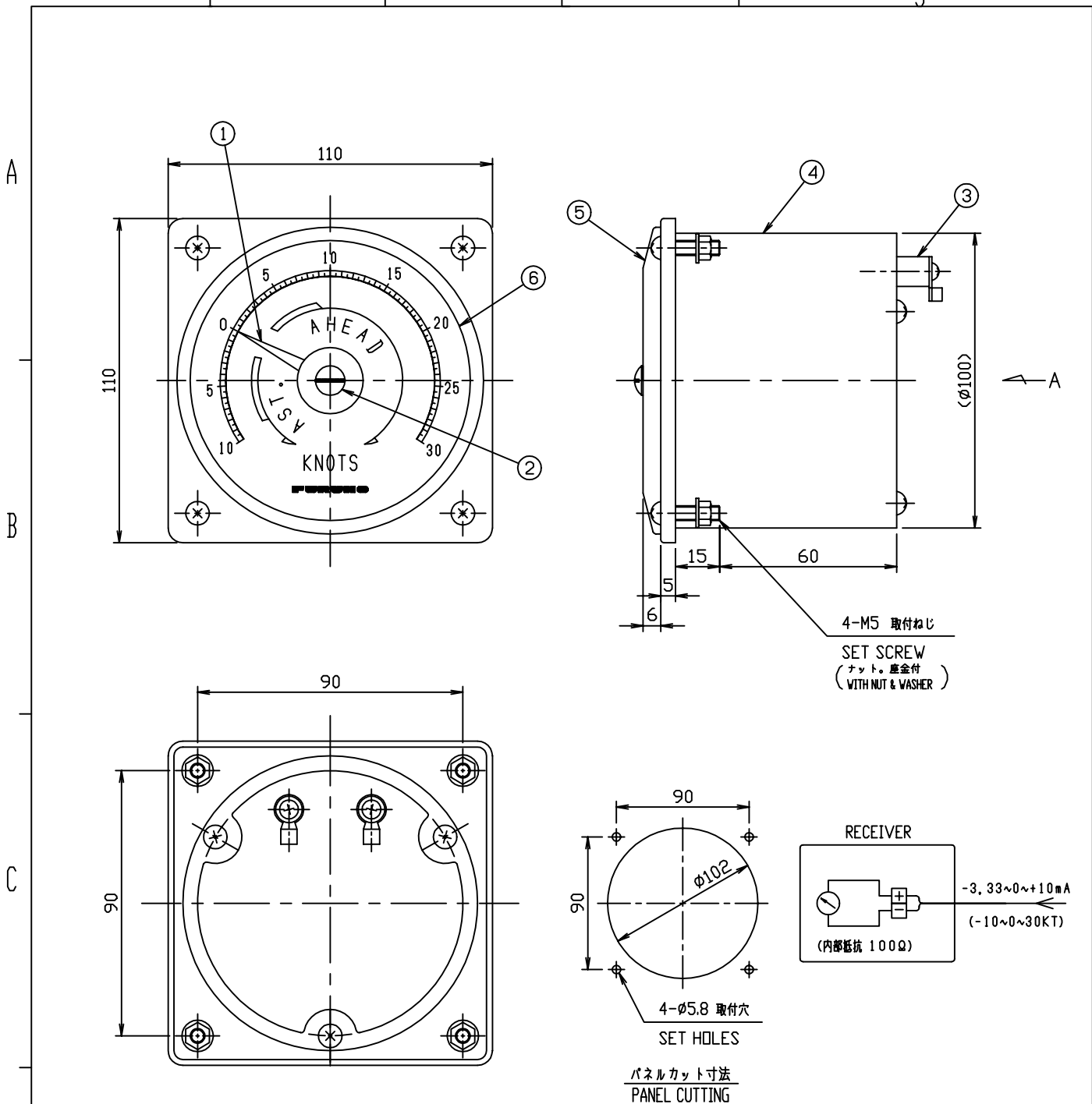
寸法区分 (mm) Dimension	公差 (mm) Tolerance
L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3
500 < L ≤ 1000	±4

- 注記 1. フランジ③を船底に溶接する際、船首-船尾方向、水平方向の各取付誤差は±1度以内としてください。  
 2. 液状ガスケットTB1121を、フランジ③④のシール面、ガスケット⑱の両面、ボールバルブ⑳のフランジ面に塗布してください。  
 3. フランジ④、シャフト⑤を組み込む際は、FOREマークを合せること。  
 4. ボールバルブ⑳は、90°ピッチで任意の方向に取付可能です。  
 5. 指定外の寸法公差は表1の通りです。

- NOTE 1. THE FLANGE③ SHOULD BE WELDED TO SHIP'S HULL PLATE, FORE-AFT AND HORIZONTAL ERROR WITHIN ±1 DEGREE.  
 2. APPLY LIQUID GASKETS TB1121 TO THE FACES OF FLANGE③④, BOTH FACES OF GASKET⑱ AND THE FACES OF BALL VALVE⑳ FLANGE.  
 3. ORIENT "FORE" MARKS OF FLANGE④ AND SHAFT⑤ TOWARD FORE DIRECTION.  
 4. BALL VALVE⑳ CAN BE ATTACHED IN THE ARBITRARY DIRECTION IN 90° PITCH.  
 5. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
21	押え板 FIXING PLATE	S45C	1	65-003-9307	
20	ボールバルブ BALL VALVE ZINC RICH PRIMER	FCD-S	1	65-003-9801 (JIS 10K 65)	船級認定品 CLASSIFICATION SOCIETY APPROVED
19	グラウンド FIXING GRAND		1	JIS F8801φ15	
18	ガスケット GASKET	JOINT SHEET	2	JIS 10K65A1.5mm	
17	Oリング O-RING	NBR	2	JIS B2401-P30	
16	座金 WASHER	SUS/NBR	4	M4	
15	六角穴付きボルト HEX. S.H.C. SCREW	SUS316L	4	M4×16	
14	バネ座金 SPRING WASHER	SUS316L	5	M8	
13	六角穴付きボルト HEX. S.H.C. SCREW	SUS316L	5	M8×30	
12	ボルト BOLT	SUS316L	4	M16×60	
11	平座金 WASHER	SUS316L	8	M16	
10	ナット NUT	SUS316L	8	M16	
9	植込みボルト STUD	SUS316L	4	M16×40	
8	座金 WASHER	SPC	2	65-003-9306	
7	ガスケット GASKET	CR	1	65-003-9305	
6	ロックリング ROCK RING	SS400	1	65-003-9304	
5	シャフト SHAFT	SUS316L	1	65-003-9303	
4	フランジ FLANGE	SUS316L	1	65-003-9802	
3	船底フランジ FLANGE RUST PREVENTIVE OIL	KA	1	65-003-9301	船級認定材 CLASSIFICATION SOCIETY APPROVED MATERIAL
2	ケーブル TRANSDUCER CABLE				φ11.8
1	送受波器 TRANSDUCER		1		DS-785/820

DRAWN	1/Apr/2020 T.YAMASAKI	TITLE	DS-854
CHECKED	1/Apr/2020 H.MAKI	名称	船底タンク (ボールバルブ式)
APPROVED	15/May/2020 H.MAKI	図番	DS-80/85
SCALE	1/3 MASS 27 ±10% kg	NAME	送受波器装備図
DWG. No.	C7288-T01-A	REF. No.	65-003-980G-0
		TRANSDUCER TANK (W/ BALL VALVE)	
		TRANSDUCER INSTALLATION	



A 矢视图  
A VIEW

6	目盛板 DIAL PLATE		1		
5	フタ COVER	PLASTIC	1		
4	ケース本体 CASE		1		
3	端子盤 TERMINAL BOARD		2		
2	0調整 ZERO ADJUSTER		1		
1	指針 POINTER		1		
品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. NO.	摘要 REMARKS

DRAWN Jun. 27' 01 T. YAMASAKI

CHECKED Jun. 27' 01 Y. KIMURA

APPROVED Jun. 27' 01 Y. KIMURA

SCALE 1/2 MASS  $\pm 10\%$   
1.2 kg

DWG.No. C7213-G02-C

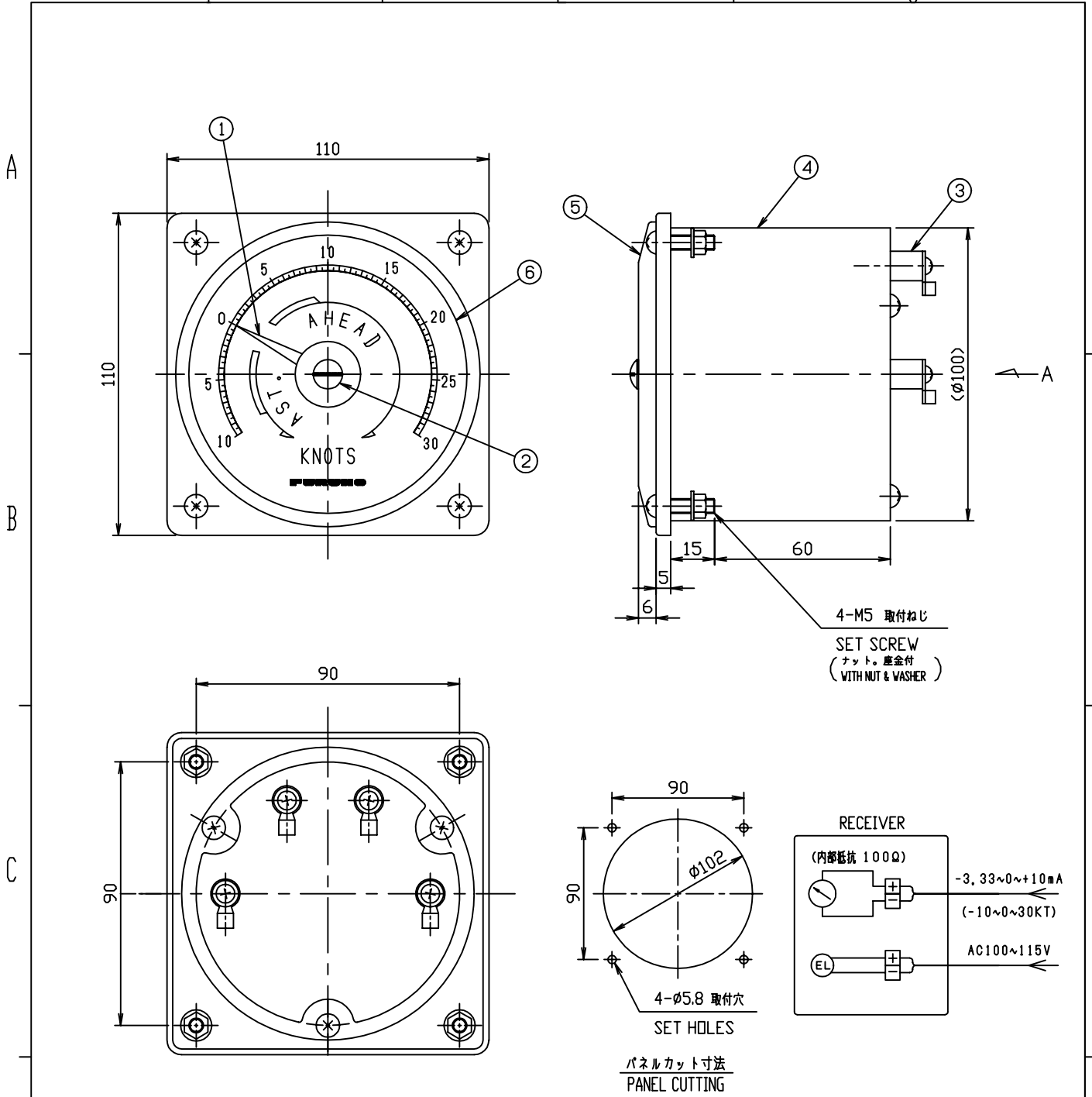
TITLE FE-90

名称 アナログ指示器 (パネル埋込型)

外寸図

NAME ANALOG DISPLAY (FLUSH MOUNT)

OUTLINE DRAWING



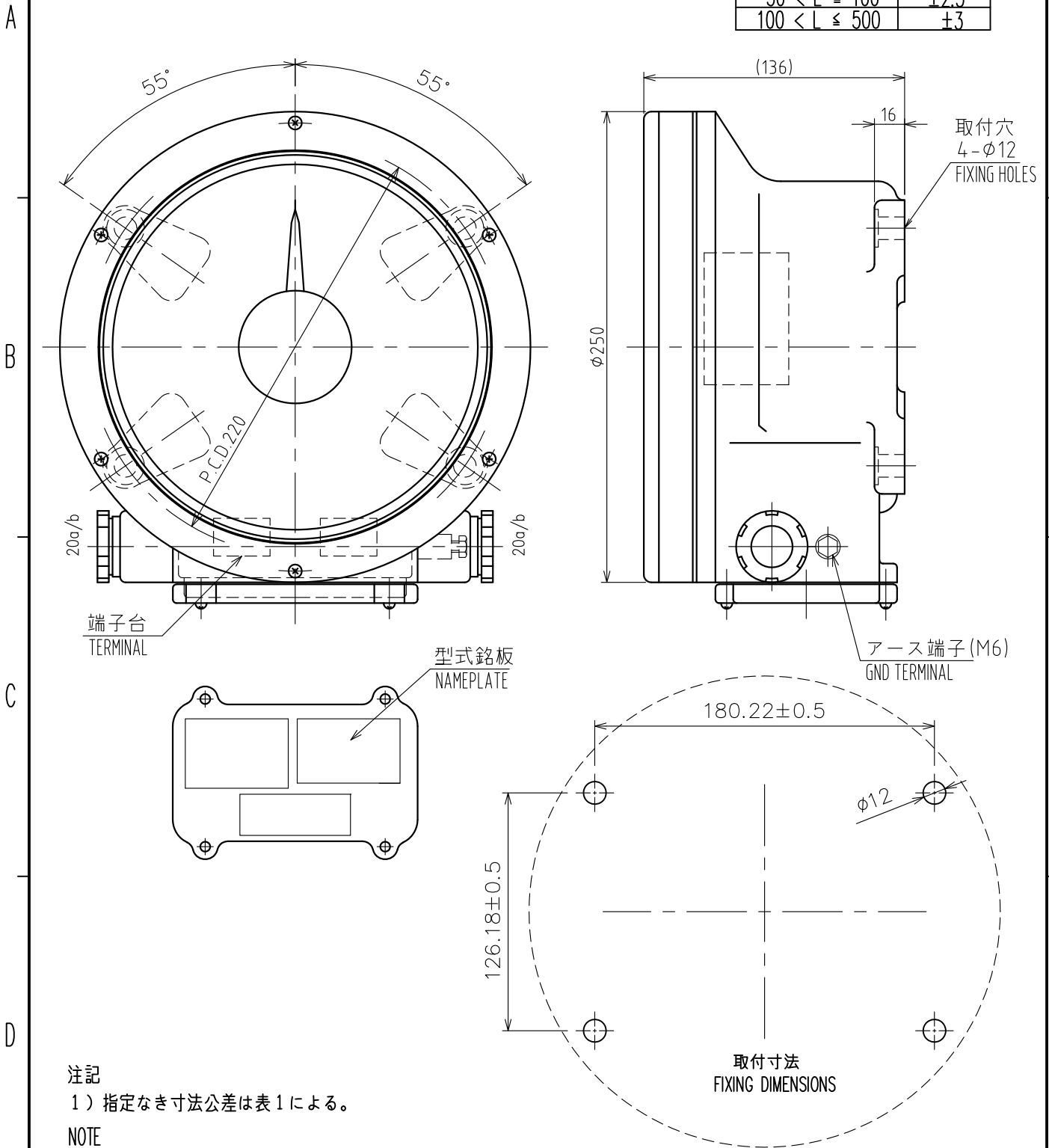
A 矢视图  
A VIEW

6	目盛板 DIAL PLATE		1		
5	フタ COVER	PLASTIC	1		
4	ケース本体 CASE		1		
3	端子盤 TERMINAL BOARD		2		
2	0調整 ZERO ADJUSTER		1		
1	指針 POINTER		1		

品番 ITEM	品名 NAME	材質 MATERIAL	数量 QTY	図番 DWG. NO.	摘要 REMARKS
DRAWN Jun. 27' 01	T. YAMASAKI	TITLE	FL-90		
CHECKED Jun. 27' 01	Y. KIMURA	名称	アナログ指示器 (パネル埋込型)		
APPROVED Jun. 27' 01	Y. KIMURA		外寸図		
SCALE	1/2	NAME	ANALOG DISPLAY (FLUSH MOUNT)		
	MASS ±10% 1.4 kg		OUTLINE DRAWING		
DWG.No.	C7213-G03-B				

表1 TABLE 1

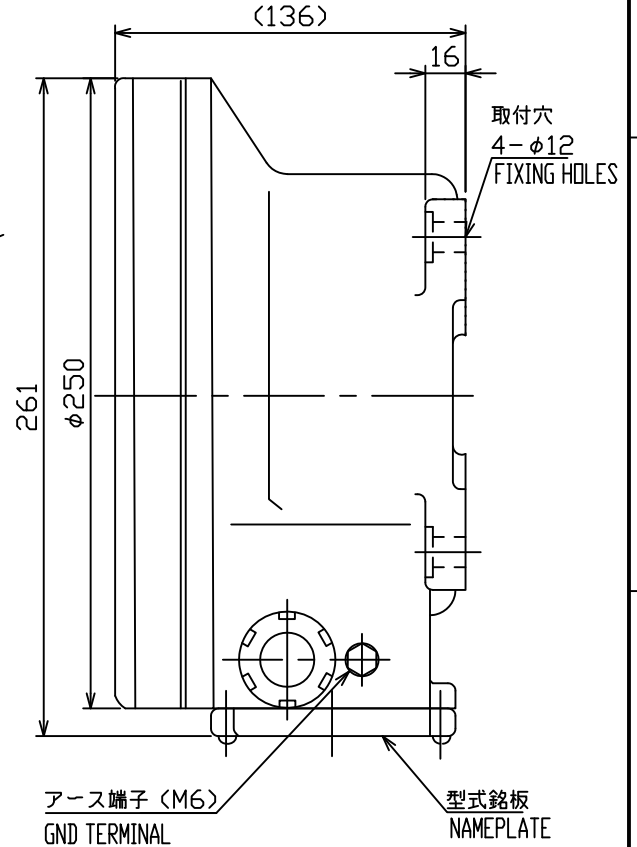
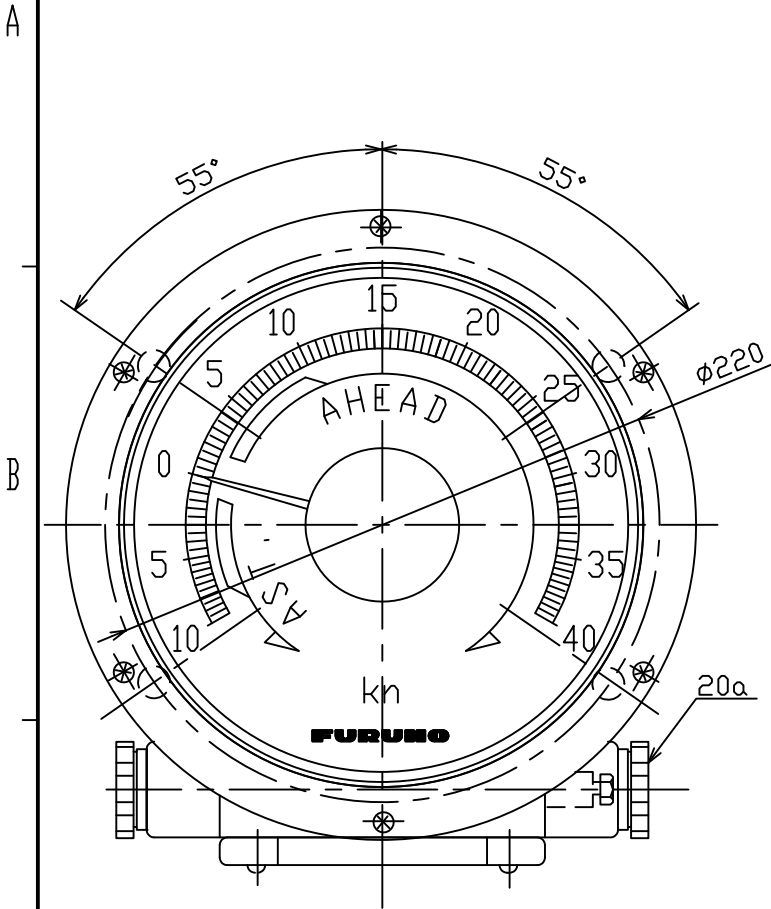
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
$0 < L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$



DRAWN 9/May/2020 T.YAMASAKI		TITLE SL-200-3/5/5W
CHECKED 11/May/2020 H.MAKI		名称 アナログ指示器 (壁掛装備)
APPROVED 13/May/2020 H.MAKI		外寸図
SCALE 1/3	MASS 5.8 $\pm 10\%$ kg	NAME ANALOG INDICATOR (BULKHEAD MOUNT)
DWG. No. C7247-G20-B	REF. No. XG05-12010-01	OUTLINE DRAWING

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

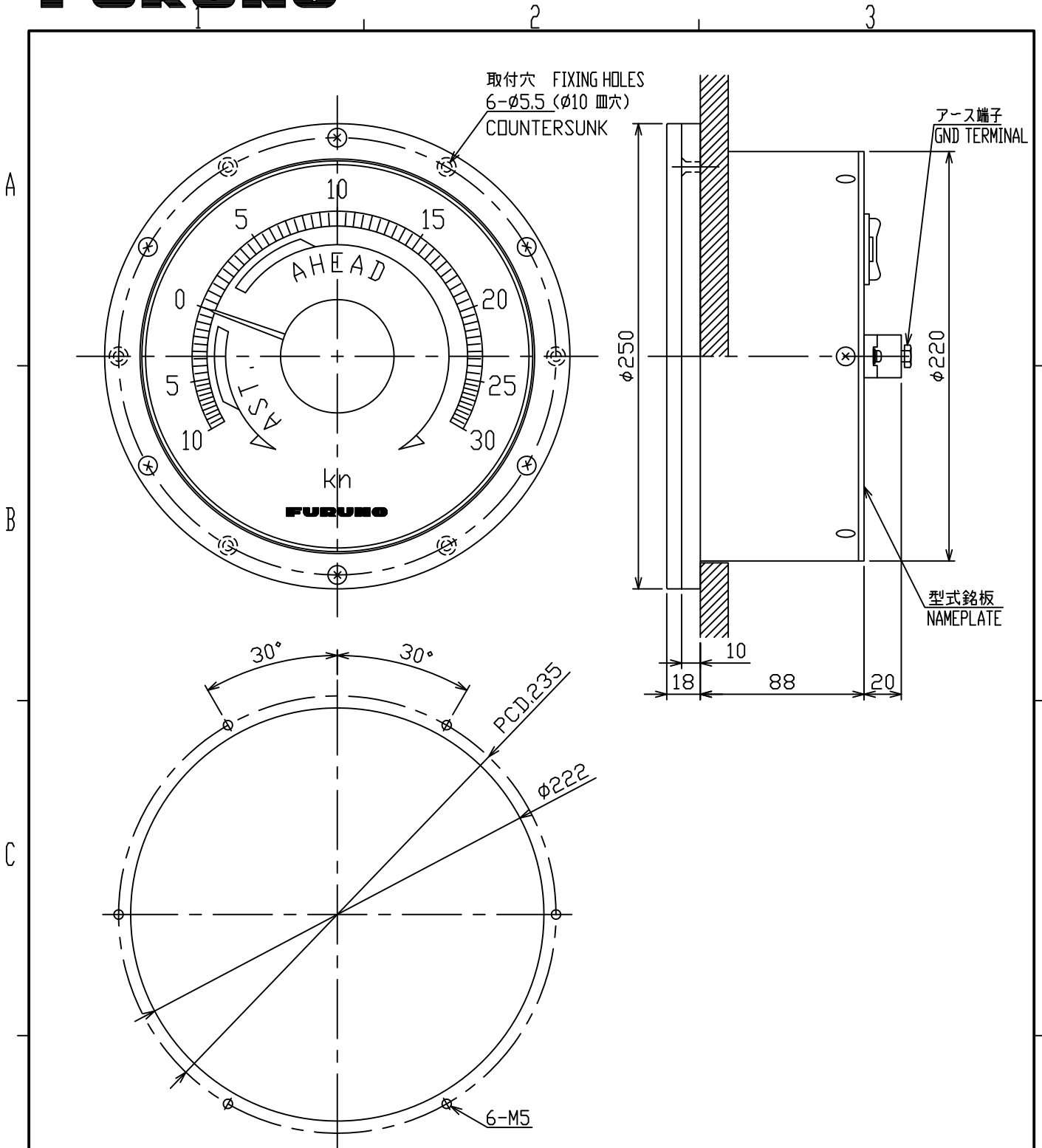
- 1) 指定なき寸法公差は表1による。
- 2) 取付にはM10ボルトを使用のこと。

NOTE

- 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
- 2. USE M10 BOLTS FOR FIXING THE UNIT.

DRAWN	28/Oct/2011 T.YAMASAKI	TITLE	SL-200-2
CHECKED	28/Oct/2011 H.MAKI	名称	アナログ指示器 (壁掛装備)
APPROVED	1/Nov/2011 Y.NISHIYAMA	DS-30/50/60/80	外寸図
SCALE	1/3	MASS	5.8 ±10% kg
DWG. No.	C7236-G31-B	REF. No.	XG05-08026-01
		NAME	
		ANALOG INDICATOR (BULKHEAD MOUNT)	
		OUTLINE DRAWING	




**注記**

- 1) 指定なき寸法公差は表1による。
- 2) 取付にはM5皿ネジを使用のこと。

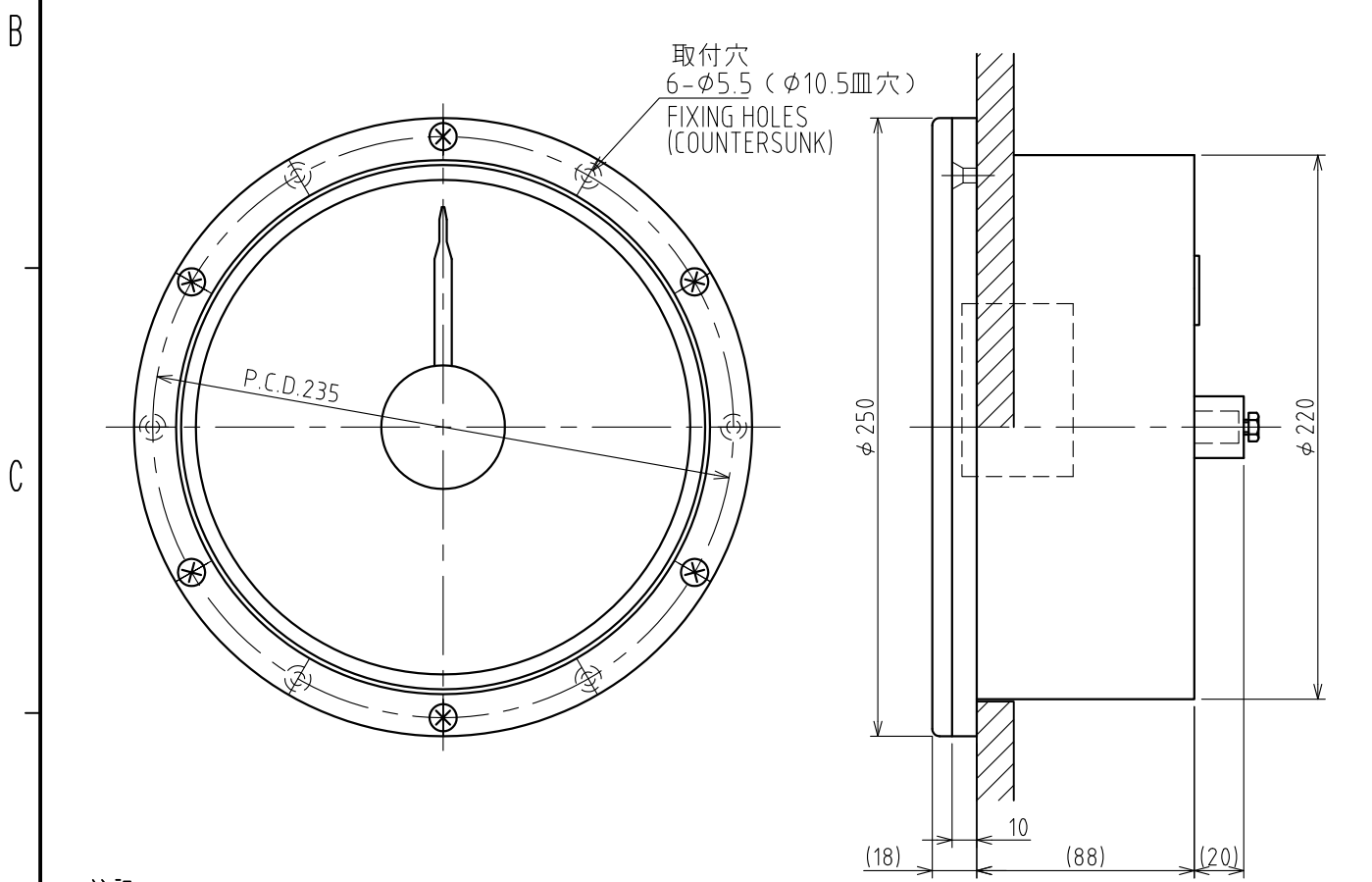
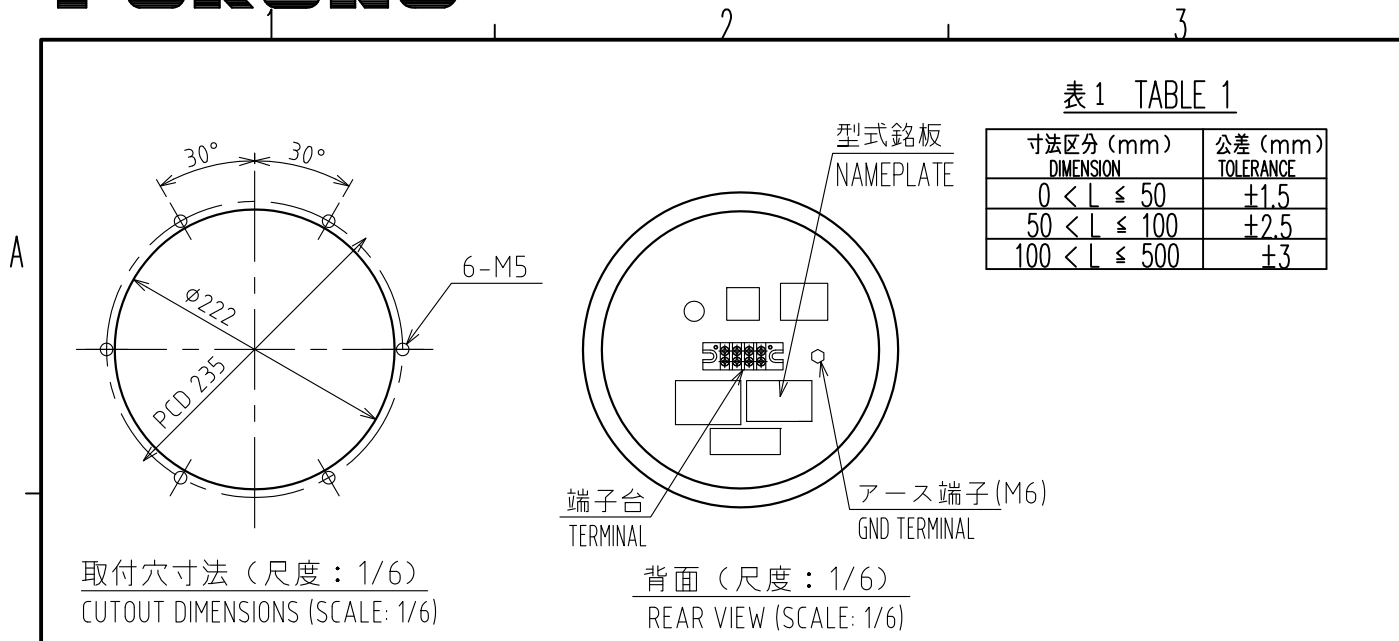
**NOTE**

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE COUNTERSUNK SCREWS M5 FOR FIXING THE UNIT.

**取付穴寸法  
CUTOUT DIMENSIONS**
**表1 TABLE 1**

寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
$0 < L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$

DRAWN 28/Oct/2011 T.YAMASAKI		TITLE FL-200S-1
CHECKED 28/Oct/2011 H.MAKI		名称 アナログ指示器(埋込装備)
APPROVED 1/Nov/2011 Y.NISHIYAMA	DS-30/50/60/80	外寸図
SCALE 1/3	MASS 3.6 $\pm 10\%$ kg	NAME ANALOG INDICATOR (FLUSH MOUNT)
DWG. No. C7236-G28-B	REF. No. XG05-08009-01	OUTLINE DRAWING

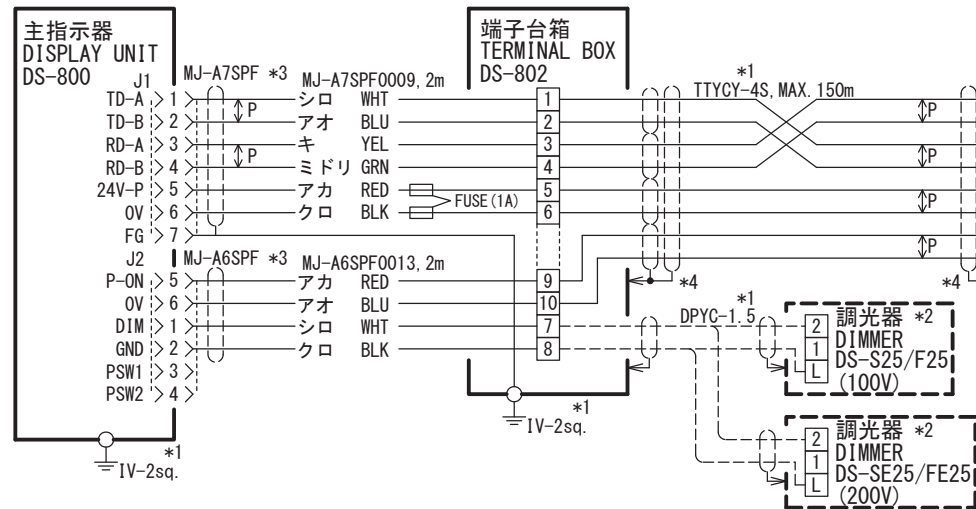


注記  
1) 指定なき寸法公差は表1による。  
2) 取付には皿ネジ $\phi 5$ を使用のこと。

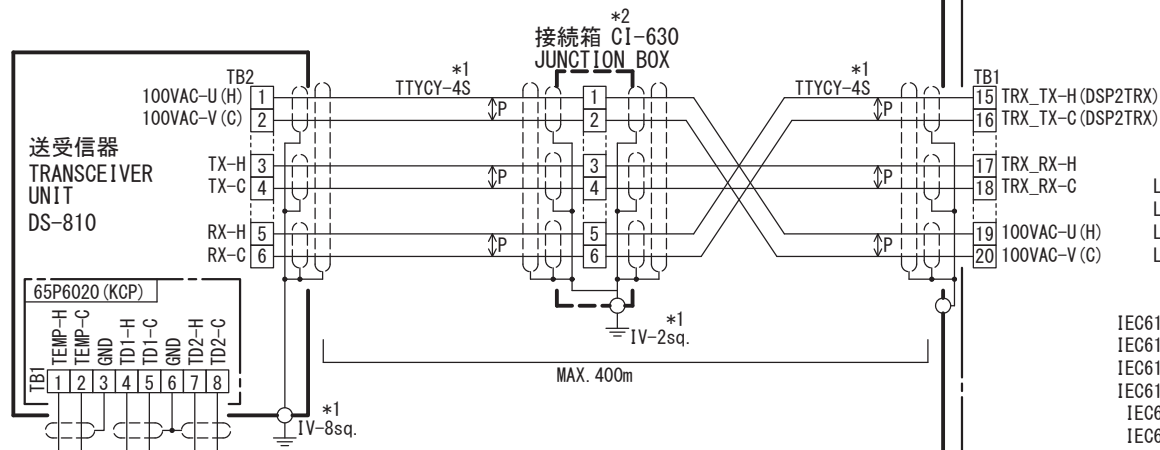
NOTE  
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.  
2. USE CONTERSUNK SCREWS  $\phi 5$  FOR FIXING THE UNIT.

DRAWN 16/Dec/2016 T.YAMASAKI		TITLE FL-200S-1W
CHECKED 16/Dec/2016 H.MAKI		名称 アナログ指示器 (埋込装備)
APPROVED 22/Dec/2016 H.MAKI		外寸図
SCALE 1/3	MASS 3.6 $\pm 10\%$ kg	NAME ANALOG INDICATOR (FLUSH MOUNT)
DWG. No. C7247-G19-A	REF. No. XG05-10011-01	OUTLINE DRAWING

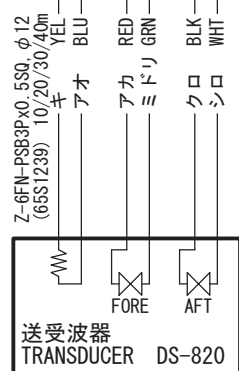
A



B



C

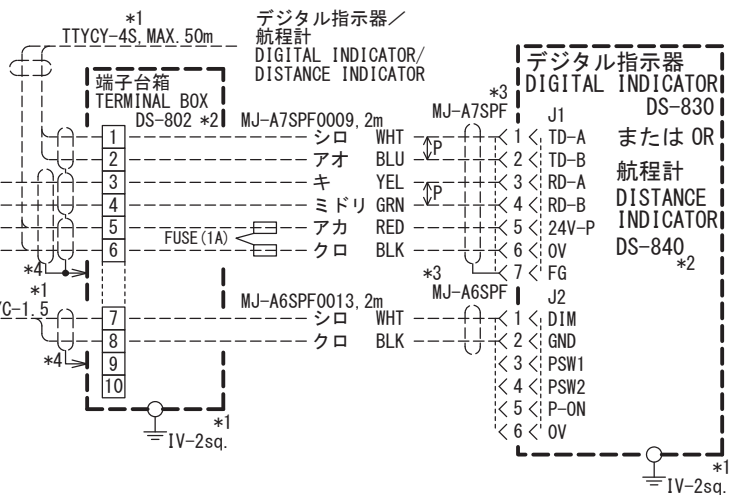
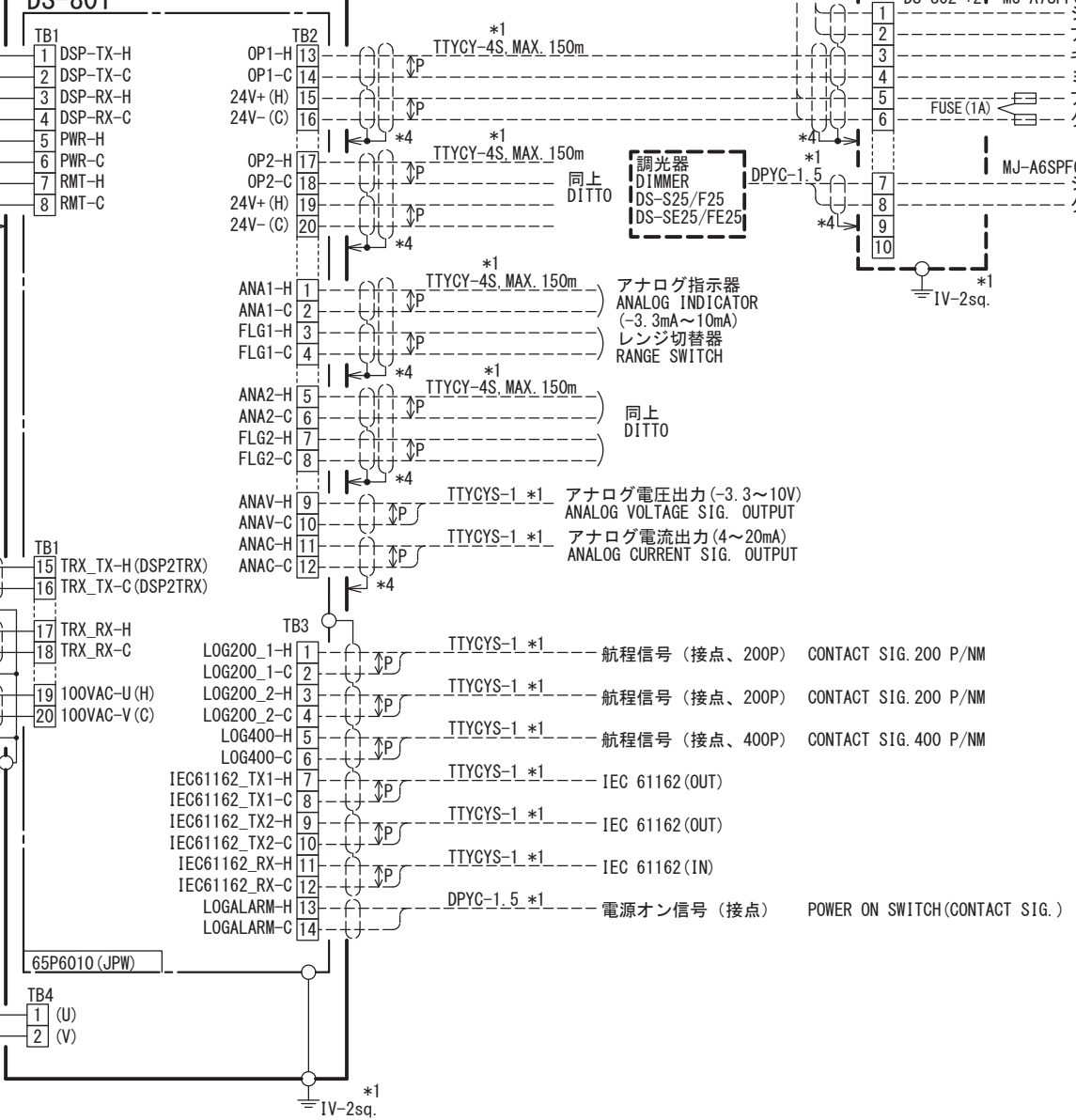


D

- 注記
- \* 1) 造船所手配。
  - \* 2) オプション。
  - \* 3) コネクタは工場にて取付済み。
  - \* 4) ケーブルクランプでアースする。

- NOTE
- \*1: SHIPYARD SUPPLY.
  - \*2: OPTION.
  - \*3: CONNECTOR PLUG IS FITTED AT FACTORY.
  - \*4: GROUNDING THRU CABLE CLAMP.

## 分配器 DISTRIBUTOR DS-801



DRAWN	17/Nov/2020 T. YAMASAKI	TITLE	DS-80
CHECKED	17/Nov/2020 H. MAKI	名称	ドップラスピードログ
APPROVED	19/Nov/2020 H. MAKI		相互結線図
SCALE	MASS	NAME	DOPPLER SPEED LOG
DWG. No.	C7247-C01-Q	REF. No.	INTERCONNECTION DIAGRAM

