

FURUNO

OPERATOR'S MANUAL

DIGITAL TEMPERATURE INDICATOR

MODEL T-2000



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NISHINOMIYA, JAPAN

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(ETMI)

PUB. No. OME-43220
T-2000

-Your Local Agent/Dealer

Initial : FEB 1988
K : MAY 27, 1996





SAFETY INSTRUCTIONS

"**DANGER**", "**WARNING**" and "**CAUTION**" notices appear throughout this manual. It is the responsibility of the operator of the equipment to read, understand and follow these notices. If you have any questions regarding these safety instructions, please contact a FURUNO agent or dealer.



DANGER

This notice indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

This notice indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

This notice indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage.

WARNING

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

Turn off the power immediately if water leaks into the equipment, or the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire or electrical shock.

Do not place liquid-filled containers on the top of the equipment.

Fire or electrical shock can result if a liquid spills into the equipment.

Keep heater away from equipment.

Heat can alter equipment shape and melt the power cord, which can cause fire or electrical shock.

Do not operate the unit with wet hands.

Electrical shock may result.

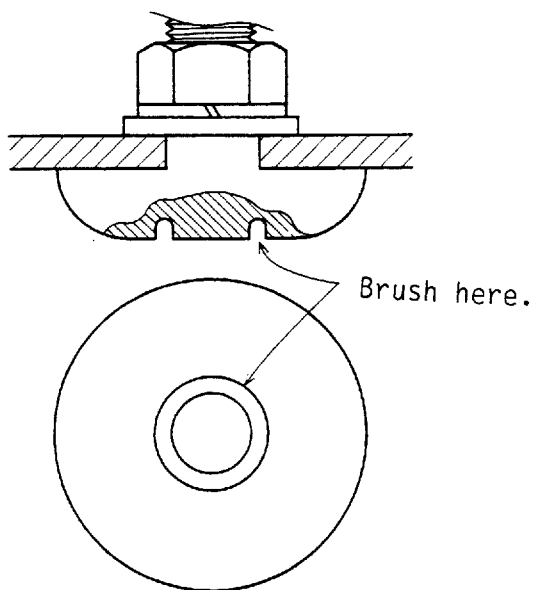
CAUTION

Power the equipment with the proper power supply.

Powering the equipment with a wrong power supply can cause permanent equipment damage.

HANDLING PRECAUTION

1. Do not hit the keys on the front panel with a sharp object such as a ballpoint pen.
2. When cleaning the unit, do not use chemical solvent (alcohol, benzene, etc.). Neutral detergent thinned with water is recommended.
3. Performance of this unit greatly depends on the sensor. Be careful not to damage it when dry-docking. Do not paint the sensor head. (Cover it when painting the hull bottom.)



INTRODUCTION

The T-2000 is designed for water temperature measurement, and it may be used as a stand-alone thermometer or as one of the sensor devices for a nav-aid, video sounder, etc.

All fish species have their respective inhabitable water temperature ranges as shown on page AP-1. If the temperature of the area is far out of the range for the targeted fish, one can not expect a good catch. This unit incorporates a TEMPERATURE ZONE ALARM which alerts you when the boat has entered into the preset temperature zone.

Current rips, which usually develop along the sea streams/currents or at their junctions, often gather fish schools. The rip can be detected by carefully watching for ripples or coloration of the sea surface, or by observing plankton layers on the echo sounder. However, it is more accurate and easier to find it by detecting a sudden change of the sea water temperature. The TEMPERATURE SHEAR ALARM incorporated in this unit alerts you when the sea water temperature has changed at the rate exceeding the preset value.

C O N T E N T S *****

OPERATION

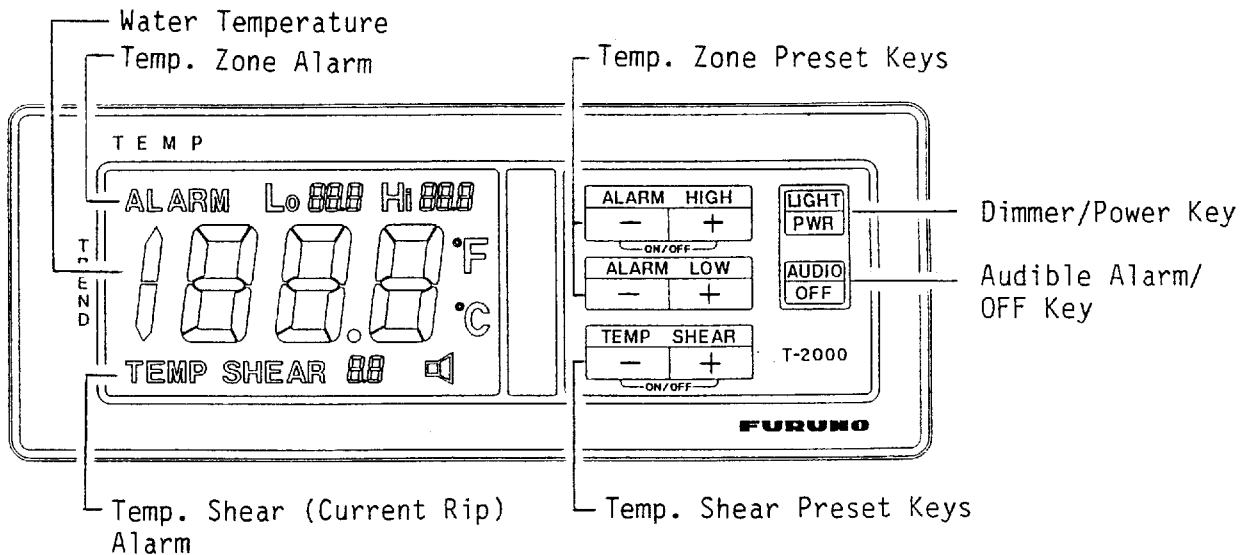
| | |
|---|---|
| Front Panel Layout ----- | 1 |
| Power on/off Procedure ----- | 1 |
| Turning on/off Panel Backlight ----- | 1 |
| Temperature Readout & Trend Indicator ----- | 2 |
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|--|------------|
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OPERATION

Front Panel Layout



All the operation of this unit is conducted through the keyboard. When a key is hit properly, a short beep will follow for the acknowledgement and the indication on the LCD display will change accordingly. Some operations require two keys to be pressed simultaneously. In this case hold down the two keys for about 1 second until a beep is heard.

Power on/off Procedure

When [LIGHT/PWR] is hit; (1) power is applied to the unit and (2) the temp. readout on the middle line changes through "11.1" -- "22.2" -- "33.3" --- ----"99.9" in sequence, and finally the water temperature is indicated. Now the unit is in operating condition.

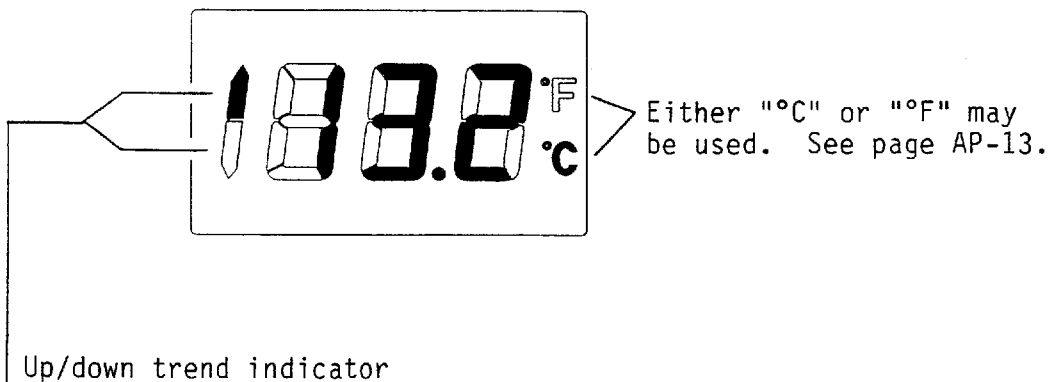
To turn off the unit press both [LIGHT/PWR] and [AUDIO/OFF] simultaneously.

Turning on/off Panel Backlight

Each hit of [LIGHT/PWR] alternately turns on and off the LCD/Keyboard backlight.

Temperature Readout & Trend Indicator

Three-digit temperature readout is always available on the middle line, and the temperature up/down trend is indicated to its left.



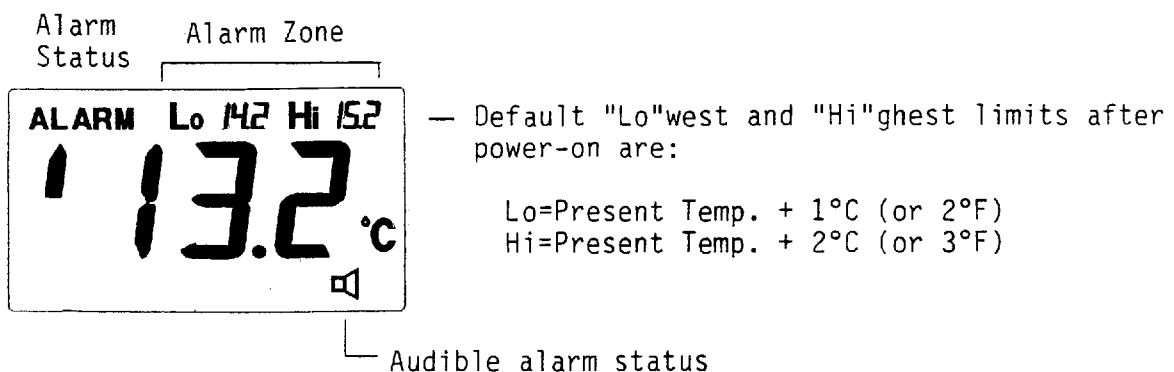
Upward/downward trend of the temperature is indicated here. If the temperature at the present moment is higher (lower) than it was 10 seconds ago, the upper (lower) segment is lit.

Temperature Zone Alarm

You may preset a temperature zone. When the boat enters the preset zone, visual and audible alarms are released.

Activating the alarm function

To activate the alarm, press both [ALARM HIGH -] and [ALARM HIGH +] simultaneously. You will see the top and bottom lines light up as shown below.



Changing the alarm zone

With the alarm is activated as shown on the preceding page, you may change the alarm zone by hitting the following keys.

| | |
|--------|------|
| ALARM | HIGH |
| - | + |
| ON/OFF | |

-- Lower (-) or raise (+) the highest limit.

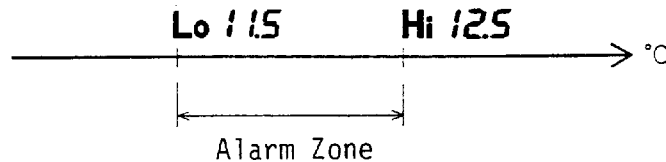
| | |
|-------|-----|
| ALARM | LOW |
| - | + |

-- Lower (-) or raise (+) the lowest limit.

Each time you hit the above keys, the preset value changes by 0.1 degree step. (For repeated change, keep pressing the key.)

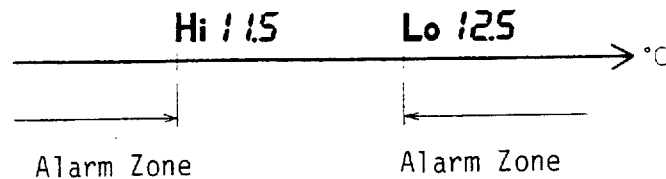
Usually, the highest limit is set higher than the lowest limit as shown below. This setting is for mid. temperature zone alarm.

$Lo < Hi$ ---- mid. temperature alarm



If you want the alarm to be generated when the temperature goes out of the mid. temperature range, set the highest and lowest limits contrariwise as shown below.

$Lo > Hi$ --- upper & lower temperature alarm



Visual and audible alarms

While the temperature remains in the above-mentioned alarm zone, the "ALARM" indication blinks and audible alarm (repeated beep) sounds.

Turning off the alarm function

Press both [ALARM HIGH-] and [ALARM HIGH+] simultaneously, and you will see the alarm zone and the "🔊" indications disappear. ("🔊" will keep illuminating if another alarm is activated e.g., the TEMP SHEAR ALARM.)

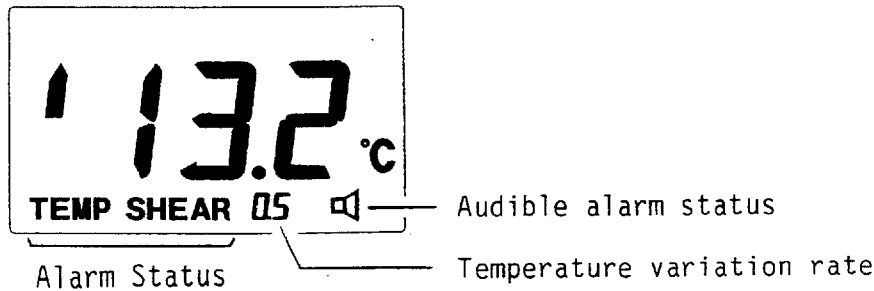
Even though the alarm zone indication disappears it is memorized internally, and will be recalled on the display when the alarm is activated the next time. (The information is lost when the unit is turned off.)

Temperature Shear (Current Rip) Alarm

You may preset a rate of temperature variation. When a sudden temperature change exceeding the preset rate is detected, visual/audible alarms are triggered.

Activating the alarm function

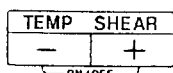
Press both [TEMP SHEAR-] and [TEMP SHEAR+] simultaneously, and you will see the bottom line light up as shown below.



Default preset rate after power-on is 0.5°C or 1.0°F per minute.

Each time the temperature has changed suddenly (up or down) at the rate exceeding the preset value (degree/minute), the "TEMP SHEAR" indication blinks and a beep sounds for 15 seconds.

Changing the temperature variation rate preset



--- Lower (-) or raise (+) the temp. variation rate by 0.1 degree step between 0.1 and 9.9 degrees/min.

Turning off the alarm function

Press both [TEMP SHEAR -] and [TEMP SHEAR +] simultaneously, and you will see the bottom line indication disappear. ("🔊" will keep lighting if the TEMP ZONE alarm is active.)

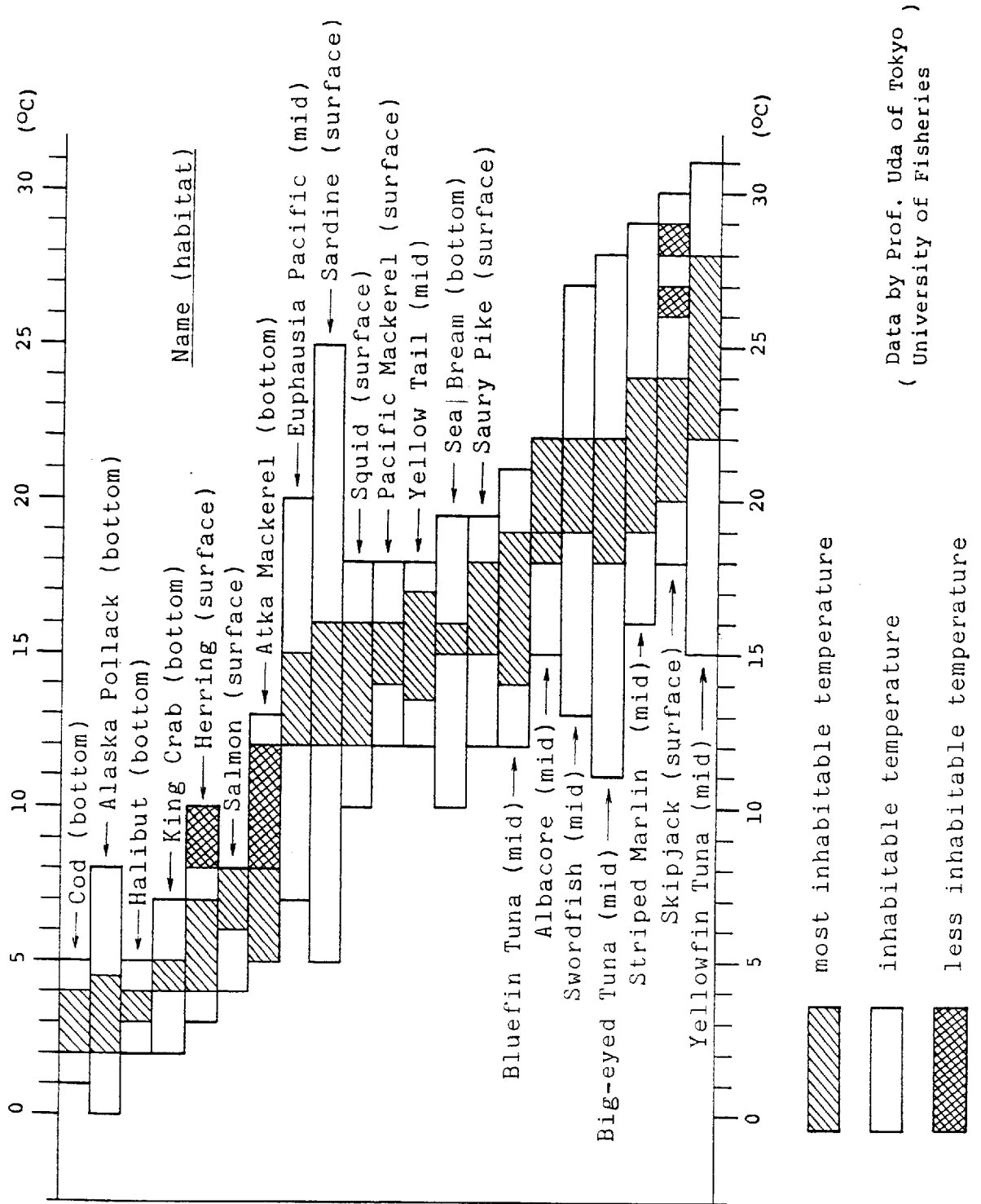
The preset value is memorized internally until the unit is turned off.

Silencing Audible Alarm

When either the TEMP ZONE or TEMP SHEAR alarm is triggered, an audible alarm (beep) is released. To silence it hit [AUDIO/OFF]. The alarm will stop sounding and the "🔊" indication will disappear (unless both the TEMP ZONE and TEMP SHEAR alarms are activated simultaneously). However the audible alarm is not turned off completely. It will be re-activated automatically ("🔊" will light up) when the cause of the alarm is removed. For example, even if you silence the audible TEMP ZONE alarm by hitting [AUDIO/OFF], it will be activated automatically when the temperature goes out of the alarm zone. The audible alarm will be released again at the next-time violation of the alarm zone.

Note that hit of [AUDIO/OFF] is valid only while the alarm is sounding, i.e., you can not prevent the audible alarm.

OPTIMUM WATER TEMPERATURE SPECTRA OF IMPORTANT FISH SPECIES



Data by Prof. Uda of Tokyo
(University of Fisheries)

SPECIFICATIONS OF T-2000

1. Display
LCD display 3.1"(W)x1.6"(H), backlit
2. Measuring Range
-5 to +35°C or +23 to +95°F
3. Accuracy
+0.2°C or +0.4°F (in the 0.0°C to +25.0°C range)
4. Display Resolution
0.1°C or 0.1°F
5. Trend Monitor
Compares latest data and that obtained 10 seconds ago and, presents up or down arrow depending on whether the temperature is rising or falling.
6. Alarm

Shear Alarm

Alarm is given when the temperature changes by more than preset value in one minute.

Preset Value: 0.1 to 9.9° in 0.1° steps (F or C)

Temperature Alarm

Alarm is given when the temperature goes upward or downward from the preset value (single set point). Alarm is also given when the temperature is outside or inside of the preset temperature zone (double point).

Preset Value: -5.0 to +35.0°C in 0.1°C steps or
+23.0 to +95.0°F in 0.1°F steps

7. Interface
Temperature data output on FURUNO CIF or NMEA0183 format

\$YCMTW,-XX.X,C,XX.X,F(CR)(LF)
8. Sensor Characteristic
Response Time: less than 20 seconds
9. Power Supply
10-15 VDC, less than 1.5W

EQUIPMENT LIST

(Standard)

- | | |
|---|--------|
| 1. Display Unit (specify whether bracket or panel type) | 1 Unit |
| 2. Temperature Sensor (with 8m cable) | 1 Unit |

NOTE: The Display Unit and selected Sensor are factory-calibrated for use with each other.

- | | |
|---|-------|
| 3. Spare Parts and Installation Materials | 1 Set |
|---|-------|

(Option)

- | | |
|--|--|
| 1. CIF/NMEA Interface Cable (22S-0021-2), 5m | |
|--|--|

FURUNO

| | | |
|----------|-------------|-------------|
| CODE No. | 000-040-050 | 22AB-X-9501 |
| TYPE | FP22-00200 | |

| 付属品表 ACCESSORIES | | T-2000 デジタル水温計 DIGITAL TEMPERATURE INDICATOR | | | |
|---------------------|--|---|-------------------------|------------|--------------------|
| 番号 No. | 名称 NAME | 略図 OUTLINE | 型名 / 規格 DESCRIPTIONS | 数量 Q'TY | 用途 / 備考 REMARKS |
| 1 | ハンガ - BRACKET | | 12-003-3301-0 | 1 | |
| | | | CODE No. | | |
| 2 | ⊕ナベタッピンUIネジ TAPPING SCREW | | 6x20 SUS304 1種 | 2 | |
| | | | CODE No. | | |
| 3 | ハンガ - ゴム RUBBER WASHER | | 12-003-3302-0 | 2 | |
| | | | CODE No. | | |
| 4 | ノブ KNOB BOLT | | 12-003-3303-0 | 2 | |
| | | | CODE No. | | |
| 5 | フラッシュマウント プレート FLUSH MOUNT PLATE | | 22-003-2001 | 2 | |
| | | | CODE No. | | |

FURUNO

| | | |
|----------|-------------|--|
| CODE No. | 000-040-049 | |
| TYPE | CP22-00100 | |

| 工事材料表 INSTALLATION MATERIALS | | T-2000 デジタル水温計 DIGITAL TEMPERATURE INDICATOR | | | |
|---------------------------------|-----------------------------|---|-------------------------|------------|--------------------|
| 番号 No. | 名称 NAME | 略図 OUTLINE | 型名 / 規格 DESCRIPTIONS | 数量 Q'TY | 用途 / 備考 REMARKS |
| 1 | 電源コ - ド POWER CABLE ASSY | | 22S0019 | 1 | |
| | | | CODE No. | | |

* MOUNTING DISPLAY UNIT *

Mounting Location

The display unit is carefully constructed to be able to withstand the humidity and corrosive atmosphere common in the marine environment, but it is not designed to be used outside, directly exposed to that environment. Salt water spray will most assuredly cause damage to the sensitive components inside. Keep these and the following factors in mind when planning the installation of the display unit.

CAUTION

Furuno will assume no responsibility for the damage caused by exposure to either fresh or salt water.

1. Many owners will undoubtedly use the T-2000 on small boats, many with center consoles. The display unit must be mounted inside an enclosed cabinet, completely shielded from salt water spray, and from fresh water spray if the boat is usually hosed down after a day's outing. Most small center console board are equipped with such an enclosed cabinet behind the wheel, and most have clear doors so that equipment may be seen behind them.
2. Even though the LCD screen is legible in direct sunlight, it is recommended to keep the display unit out of direct sunlight or at least shaded because of heat that can build up inside the cabinet.
3. Consideration should be made to provide space for access to the mounting hardware on the side and connectors behind the display unit. Also allow at least a foot or so of "service loop" in the cables to allow the unit to be pulled forward for servicing or internal adjustment.
4. The display unit should be mounted apart from equipment(s) emitting heat.

Mounting Procedure

Tabletop Mount (See the drawing on page AP-5.)

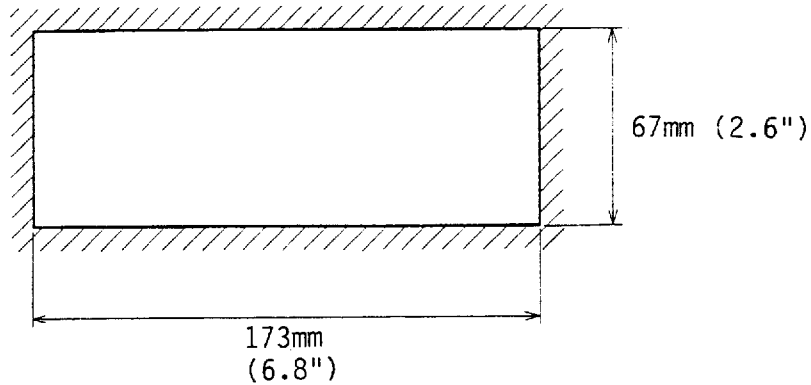
1. Mark the screw locations by using the bracket as a template.

NOTE: 4 screw holes are arranged on the bracket, and it is fixed on a table by using two holes (outer or inner two). As was stated before, make sure you allow enough clearance both to get to the connectors behind the unit and to allow you to get your hands in on both sides to loosen or tighten the mounting knobs. Make sure you leave at least a foot or so of "service loop" of cables behind the unit so that it can be pulled forward for servicing or easy removal of the connectors.

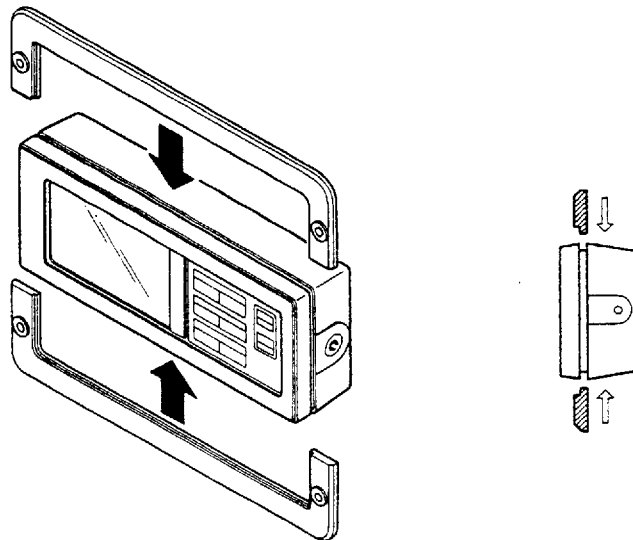
2. Fix the bracket to the planned position using the two tapping screws supplied.
3. Fit knobs and rubber washers to the display unit.
(The rubber washers should be fit to the inside i.e. unit side of the bracket.)
4. Install the display unit in the bracket. Tighten the knobs.

Flush Mount (See the drawing on page AP-6.)

1. Make the following hole on the wall.



2. Attach the two pieces of the flush mount plates to the display unit as shown below.

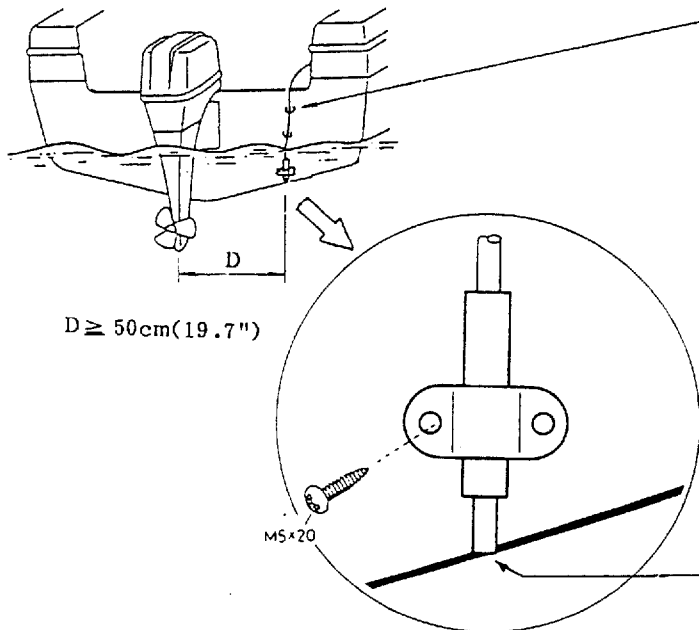


3. Fix the display unit with the flush mount plates onto the bulkhead by using 4 screws (local supply).

* MOUNTING SENSOR *

Transom Type (T-02MTB)

Mounting Location and Method



Fix the sensor cable at a proper position by the binder (locally prepared).

If the cable is required to lead in from the transom board, make a hole of approx. 17mm dia. to pass the connector. After passing the cable, fill the hole with a sealant.

The sensor part should be mounted flush with the hull-bottom.

Thru-hull Type (T-02MSB, T-03MSB)

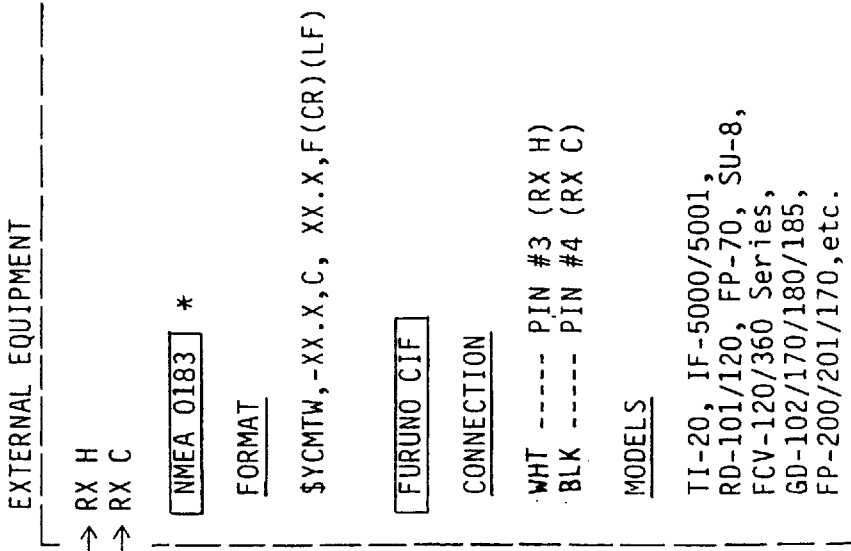
Mounting Location

1. Select a mid-boat, flat position. The sensor does not have to be installed perfectly perpendicular. The sensor must not be damaged in dry-docking operation.
2. Select a place apart from the equipment generating heat.
3. Select a place in the forward direction viewing from the drain hole for cooling water.
4. Select a place free from vibration.

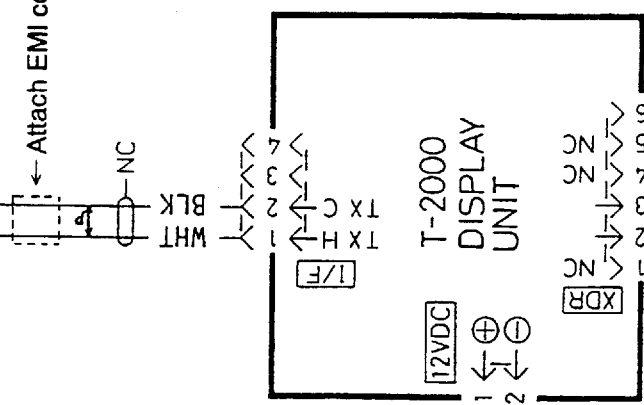
Mounting Procedure

| T-02MSB | T-03MSB |
|---|---|
| <ol style="list-style-type: none"> 1) Dry-dock the boat. 2) Make a hole of approx. 21mm (0.8") dia. on the hull bottom. 3) Run the sensor cable through the hole. 4) Pass the cable through the rubber packing, the washer and the lock nut as shown below. 5) Apply high-grade sealant to the sensor flange as shown below. 6) Fix the sensor by turning the lock nut. Do not tighten the nut excessively. (600kg-cm max.) 7) After the launching, check for water leakage around the sensor. | <ol style="list-style-type: none"> 1) Dry-dock the boat. 2) Make a hole of approx. 25mm (1") dia. on the hull bottom. 3) Apply high-grade sealant to the holder guide flange and pass the holder guide through the hole. 4) Fix the holder guide to the hull bottom using the rubber packing, the washer and the lock nut. Do not tighten the nut excessively. (600kg-cm max.) 5) Insert the sensor holder to the holder guide and tighten by the nut. 6) After the launching, check for water leakage around the sensor. |
| <p style="text-align: center;">21mm(0.8")</p> <p style="text-align: center;">Rubber Packing Washer Lock Nut</p> <p style="text-align: center;">Apply sealant.</p> | <p style="text-align: center;">Sensor Holder</p> <p style="text-align: center;">Lock Nut</p> <p style="text-align: center;">Lock Nut Washer Rubber Packing</p> <p style="text-align: center;">ϕ25mm</p> <p style="text-align: center;">Apply sealant.</p> <p style="text-align: center;">Holder Guide</p> <p>Note: 1) For the boat of more than 25mm hull plate, this sensor is impossible to install.</p> <p>2) When the sensor seems to be deteriorated, the check, cleaning or replacement can be carried out without dry-dock.</p> |

 * T-2000 CABLING DIAGRAM *



22S0021, 5m
 (OPTIONAL)



SHIP'S SUPPLY

10-15VDC 22S-0019, 3m
 1.5W

NOTE

All the connectors shown in this diagram are soldered to the cable ends at the factory.

CAUTION

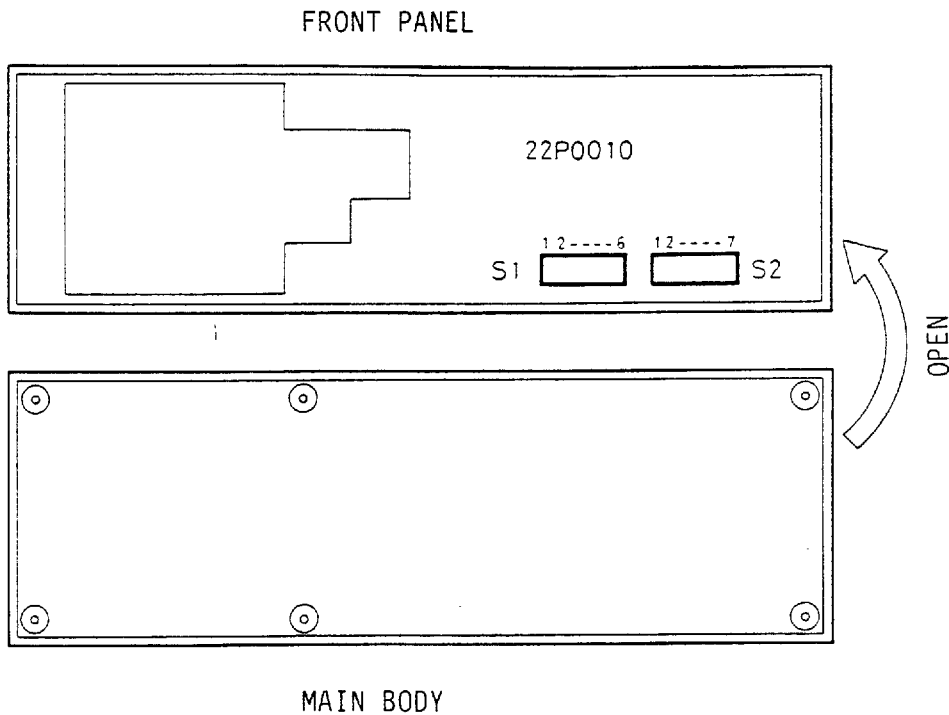
Do not change cable length.

SENSOR
 8
 TRANSM : T-02MTB
 THRU-HULL : T-02MSB
 T-03MSB (with CAP)

DWG Number E4322-C01-B

* DIP SWITCH SETTING *

After loosening the six screws from the rear of the unit, open the front panel as shown below. Specification of the unit can be changed by the two DIP switches (S1 and S2) on the 22P0010 board.



Selecting the Serial Data Format

S2 #1 : ON = Furuno CIF (factory-setting)
OFF= NMEA#0183

Selecting the Temperature Unit

S2 #2 : ON = °C (factory-setting)
OFF= °F

Giving offset to the Temperature Readout

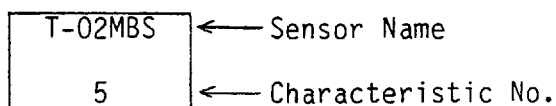
| S2 | #4 | #5 | #6 | #7 | °F | °C |
|----|-----|-----|-----|-----|------|------|
| | ON | ON | ON | ON | 0.0 | 0.0 |
| | ON | ON | ON | off | +0.1 | +0.1 |
| | ON | ON | off | ON | +0.2 | +0.1 |
| | ON | ON | off | off | +0.3 | +0.2 |
| | ON | off | ON | ON | +0.4 | +0.2 |
| | ON | off | ON | off | +0.5 | +0.3 |
| | ON | off | off | ON | +0.6 | +0.3 |
| | ON | off | off | off | +0.7 | +0.4 |
| | off | ON | ON | ON | 0.0 | 0.0 |
| | off | ON | ON | off | -0.1 | -0.1 |
| | off | ON | off | ON | -0.2 | -0.1 |
| | off | ON | off | off | -0.3 | -0.2 |
| | off | off | ON | ON | -0.4 | -0.2 |
| | off | off | ON | off | -0.5 | -0.3 |
| | off | off | off | ON | -0.6 | -0.3 |
| | off | off | off | off | -0.7 | -0.4 |

NOTE: S2 #3 is not used.

S2 #4 to #7 are factory-calibrated.

Sensor Calibration (factory-calibrated)

The sensor characteristic is classified into 23 types, and each piece of the sensor is labeled on the lock nut as shown below.



When the sensor is replaced locally, set the DIP switch (S1) in accordance with the new characteristic number:

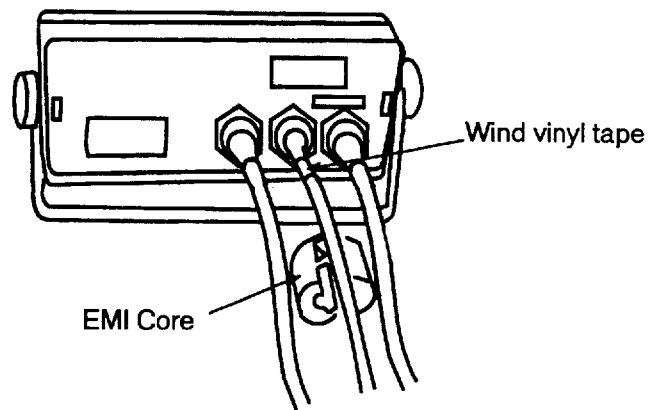
| S1 | #6 | #5 | #4 | #3 | #2 | #1 | Characteristic No. |
|----|----|-----|-----|-----|-----|-----|--------------------|
| | ON | ON | ON | ON | ON | off | 1 |
| | ON | ON | ON | ON | off | ON | 2 |
| | ON | ON | ON | ON | off | off | 3 |
| | ON | ON | ON | off | ON | ON | 4 |
| | ON | ON | ON | off | ON | off | 5 |
| | ON | ON | ON | off | off | ON | 6 |
| | ON | ON | ON | off | off | off | 7 |
| | ON | ON | off | ON | ON | ON | 8 |
| | ON | ON | off | ON | ON | off | 9 |
| | ON | ON | off | ON | off | ON | 10 |
| | ON | ON | off | ON | off | off | 11 |
| | ON | ON | off | off | ON | ON | 12 |
| | ON | ON | off | off | ON | off | 13 |
| | ON | ON | off | off | off | ON | 14 |
| | ON | ON | off | off | off | off | 15 |
| | ON | off | ON | ON | ON | ON | 16 |
| | ON | off | ON | ON | ON | off | 17 |
| | ON | off | ON | ON | off | ON | 18 |
| | ON | off | ON | ON | off | off | 19 |
| | ON | off | ON | off | ON | ON | 20 |
| | ON | off | ON | off | ON | off | 21 |
| | ON | off | ON | off | off | ON | 22 |
| | ON | off | ON | off | off | off | 23 |

S1 #1 to #6 are factory-adjusted to conform to the sensor which accompanies the unit.

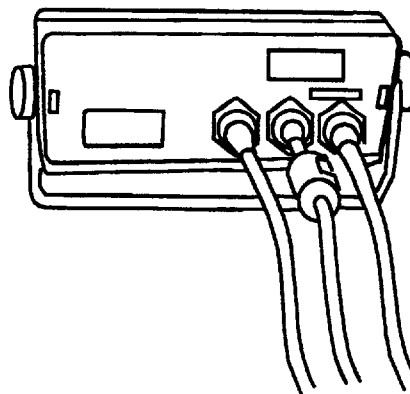
Attaching EMI Core

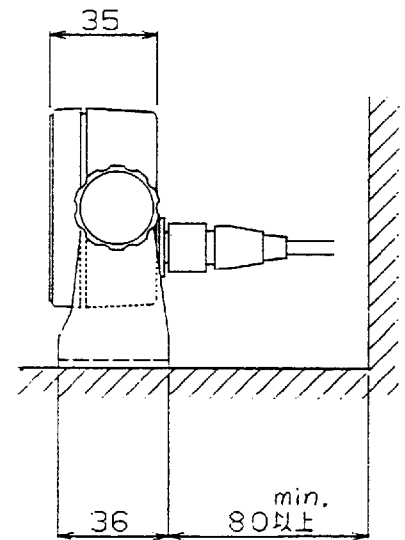
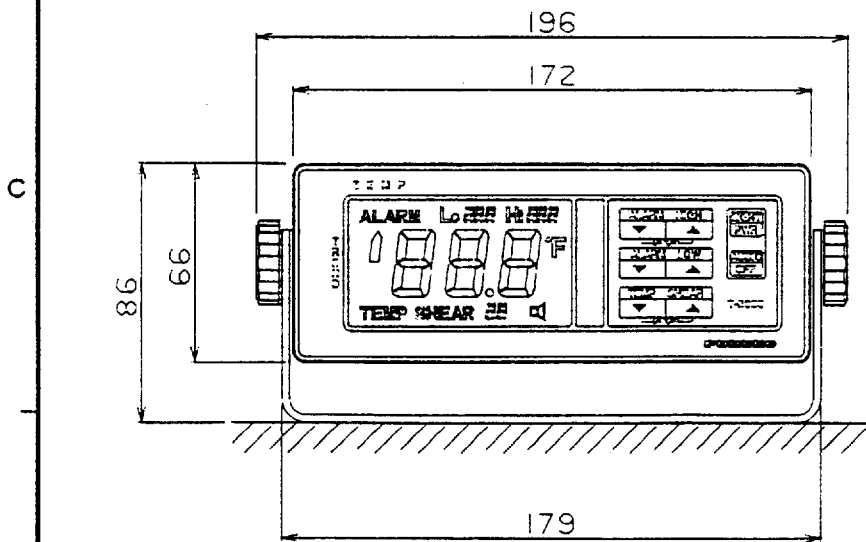
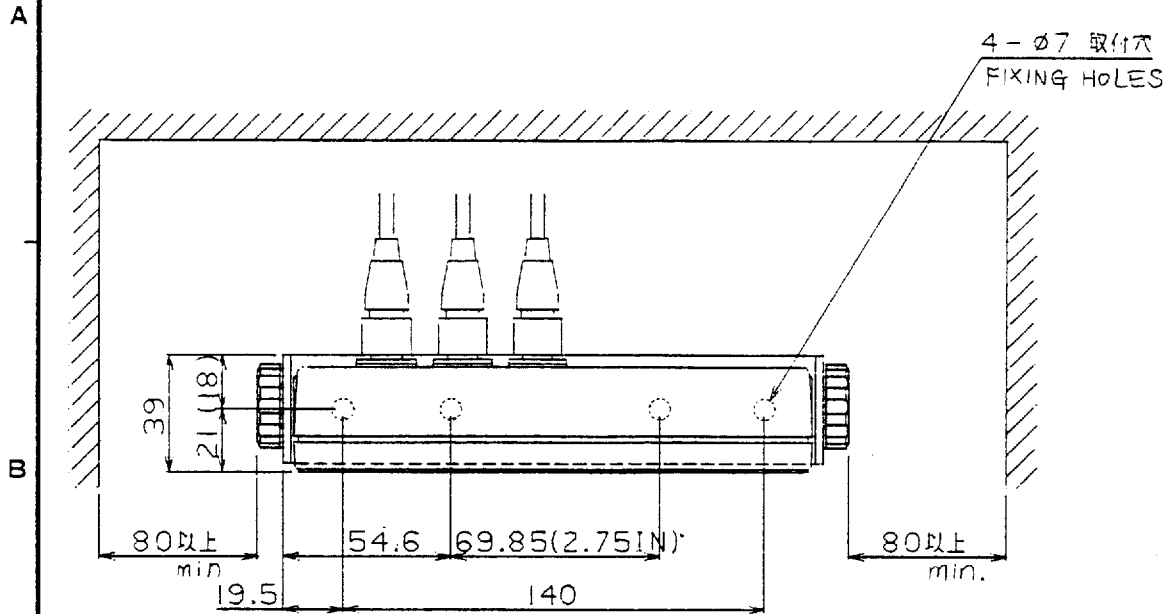
To comply with EMC directive, attach EMI core to signal cable as shown below when a external equipment is connected. EMI Core is supplied with optional cable.

1. Wind vinyl tape close to the connector on the signal cable. This is to prevent EMI cores from slipping.

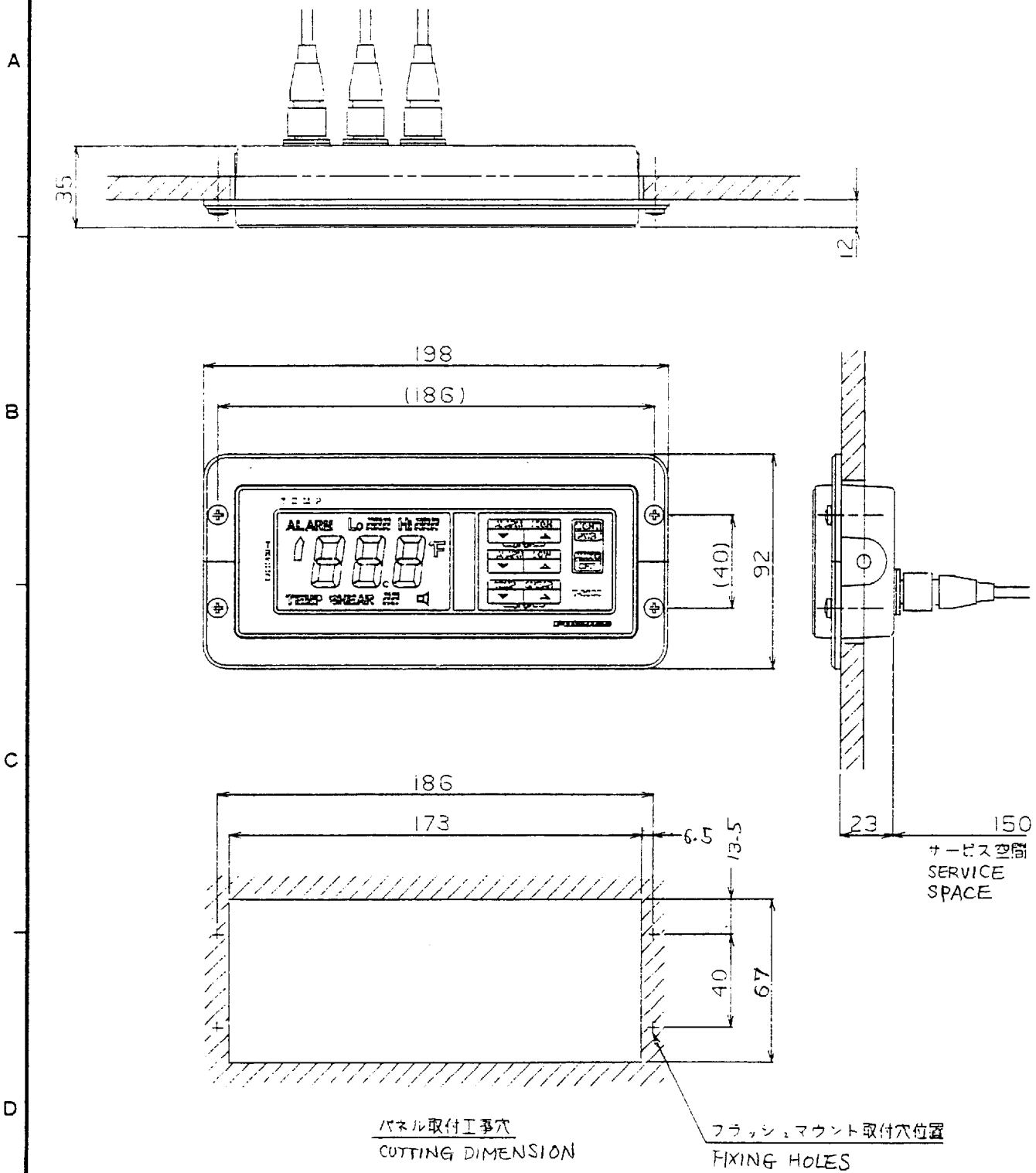


2. Attach EMI cores where vinyl tape lies.

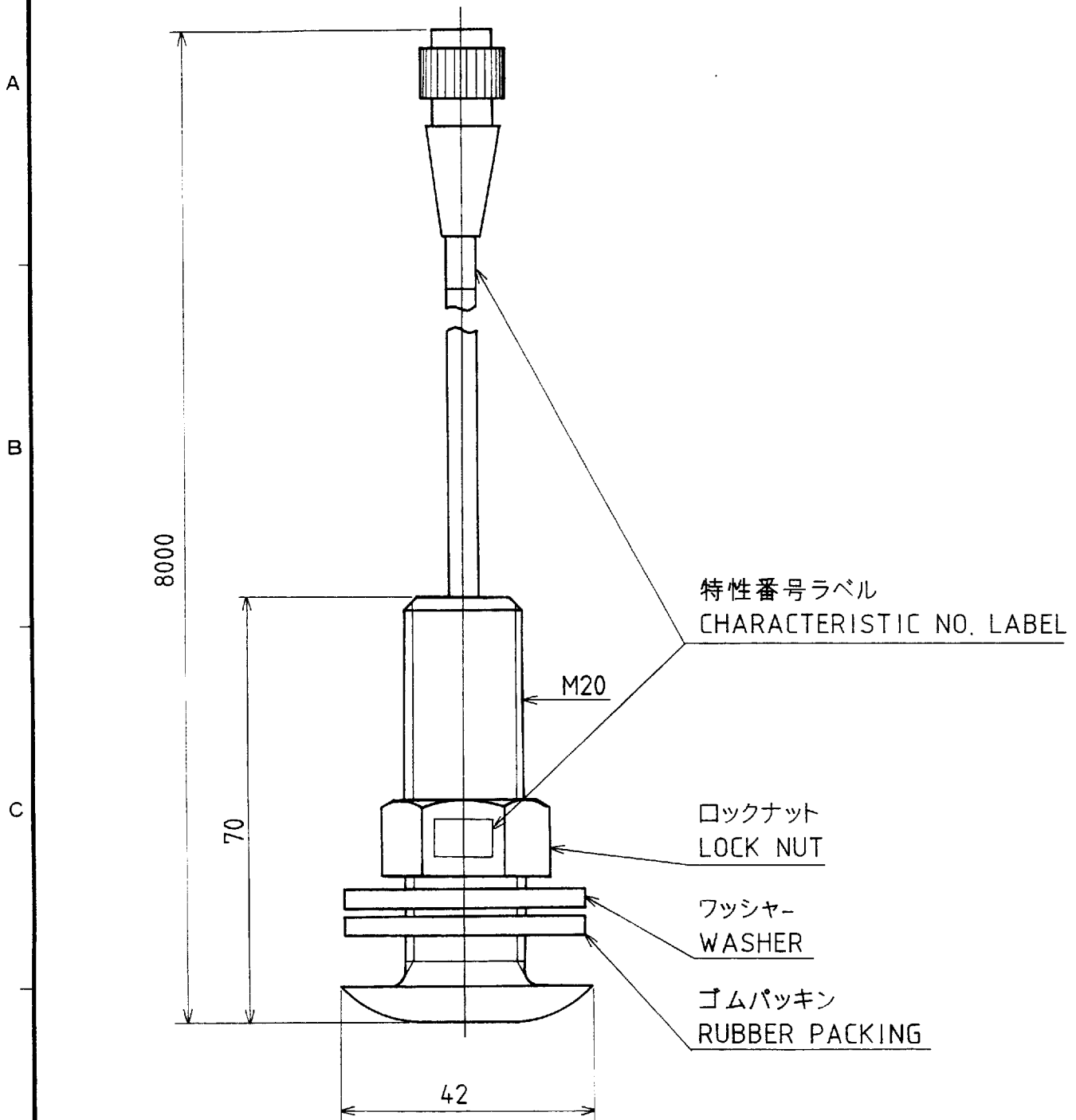




| 品番 ITEM | 品名 NAME | 材質 MATERIAL | 数量 Q'TY | 図番 DWG.NO. | 摘要 REMARKS |
|----------------|---------------------------|-------------------------------|------------|---------------|---------------------|
| 承認 APPROVED | JUL. 6 '87 H. Nagata | 三角法 THIRD ANGLE PROJECTION | | 名称 TITLE | 据付型 BRACKET TYPE |
| 検図 CHECKED | JUL. 6 '87 H. magosini | 尺度 SCALE | 1 / 2.5 | T-2000 | |
| 製図 DRAWN | JUL. 3 '87 M. Oda | 重量 WEIGHT | 0.35 kg | 図番 DWG.NO. | C4322-003-A |

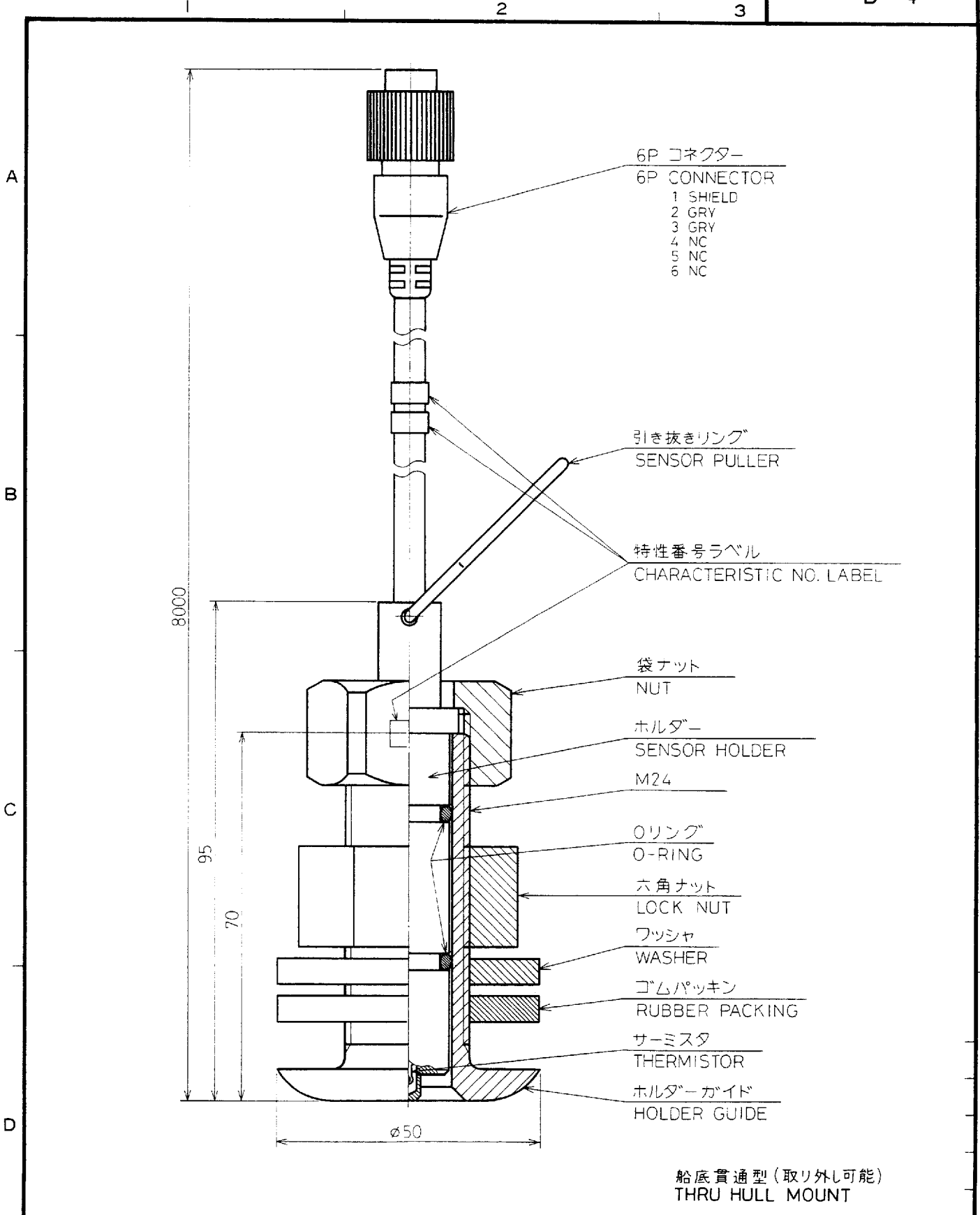


| 品番 ITEM | 品名 NAME | 材質 MATERIAL | 数量 Q'TY | 図番 DWG.NO. | 摘要 REMARKS |
|----------------|---------------------------|-------------------------------|------------|---------------|---------------|
| 承認 APPROVED | JUL. 6. '87 M. Nagata | 三角法 THIRD ANGLE PROJECTION | | 名称 TITLE | 埋込型 T-2000 |
| 検 CHECKED | JUL. 6. '87 H. Magoshi | 尺 SCALE | 1 / 2.5 | PANEL TYPE | |
| 製 DRAWN | JUL. 3. '87 M. Oda | 重 WEIGHT | 0.33 kg | 図 DWG.NO. | C4322-004-A |



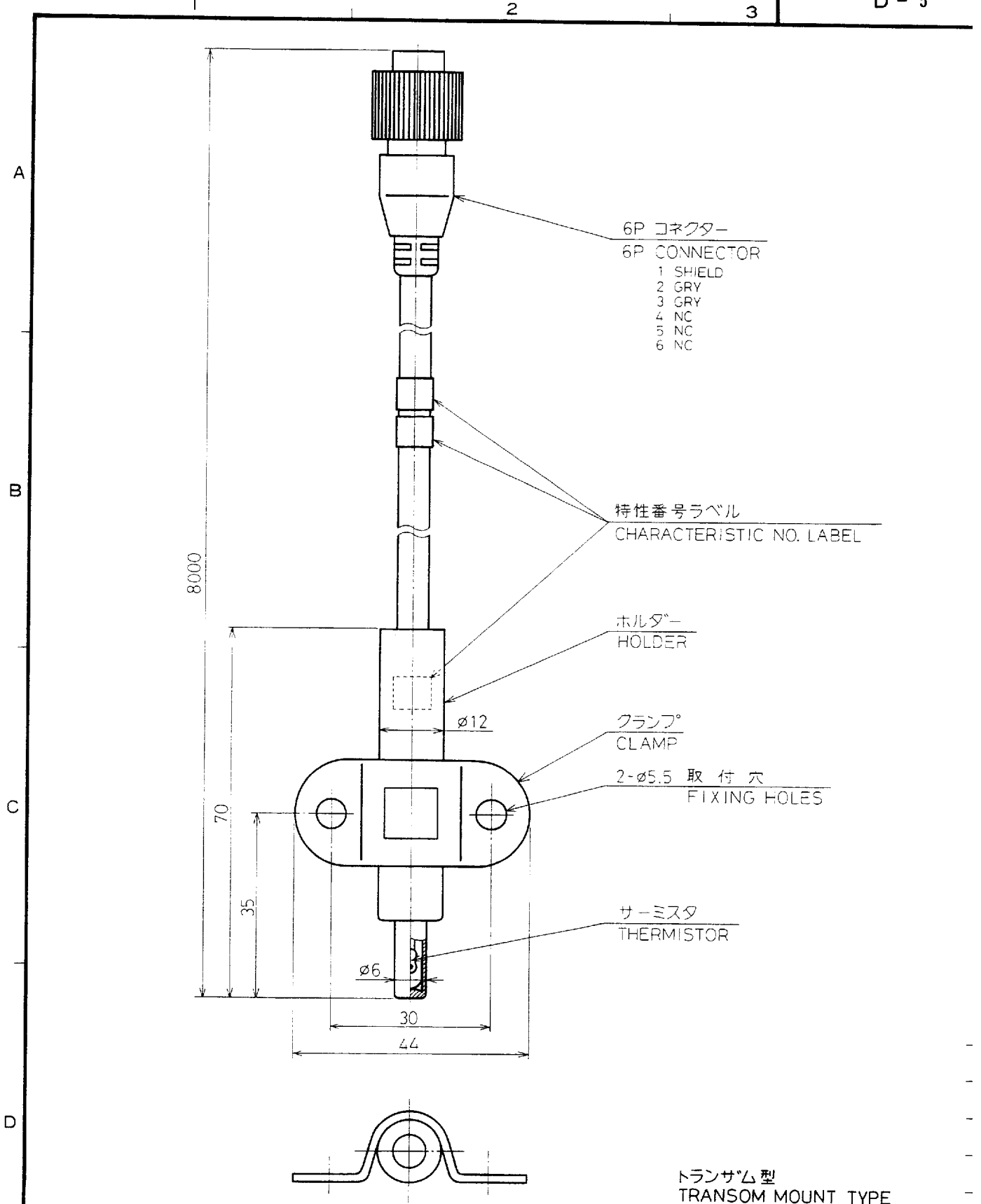
船底穴径=21mm
HULL BOTTOM CUTTING DIA = 21mm
(0.8")

| T-2000 | | 品番 ITEM | 品名 NAME | 材質 MATERIAL | 数量 Q'TY | 図番 DWG.NO. | 摘要 REMARKS |
|----------------|-------------------------|-------------------------------|------------|----------------|------------|------------------------------------|---------------|
| 承認 APPROVED | JUN 3 '88 M. TABUCHI | 三角法 THIRD ANGLE PROJECTION | | 名称 TITLE | | T-02MSB 水温センサー THERMO SENSOR | |
| 検 CHECKED | JUN 2 '88 I. AMANO | 尺 SCALE | 1 / 1 | | | | |
| 製 DRAWN | JUN 2 '88 T. YUYAMA | 重 WEIGHT | 0.5 kg | 図番 DWG.NO. | | C4322-007-A | |

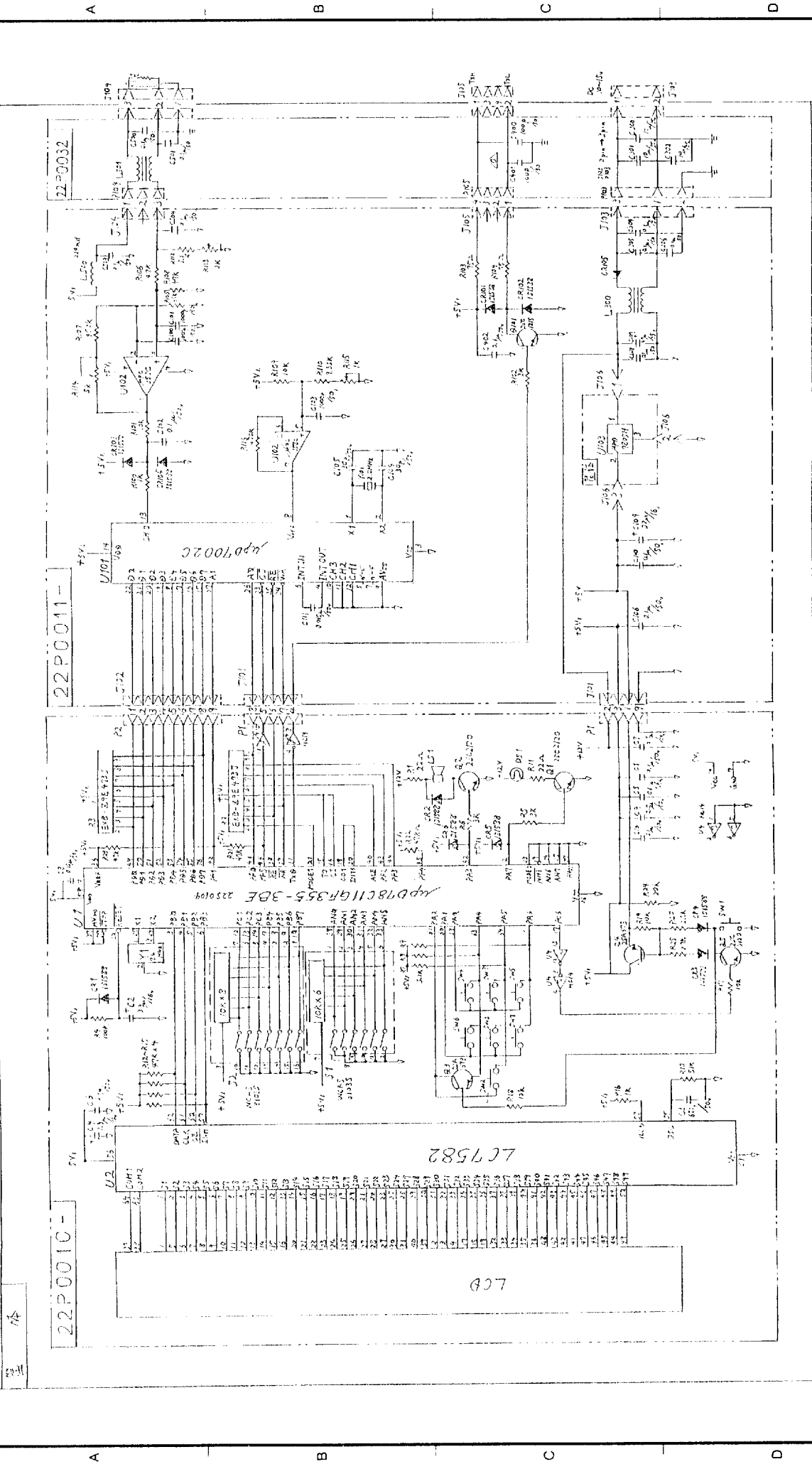


船底貫通型 (取り外し可能)
THRU HULL MOUNT

| 品番 ITEM | 品名 NAME | 材質 MATERIAL | 数量 Q'TY | 図番 DWG.NO. | 摘要 REMARKS |
|----------------|----------------------------|-------------------------------|-------------|---|---------------|
| 承認 APPROVED | FEB. 28. '89 T. WAKAJO | 三角法 THIRD ANGLE PROJECTION | 名称 TITLE | T-03MSB 水温センサー TEMPERATURE SENSOR | |
| 検図 CHECKED | Feb. 28. '89 T. KODA | 尺度 SCALE | 1/1 | | |
| 製図 DRAWN | Feb. 28. '89 T. MIYOSHI | 重量 WEIGHT | kg | 図番 DWG.NO. | C2317-G02-A |



| 品番 ITEM | 品名 NAME | 材質 MATERIAL | 数量 Q'TY | 図番 DWG.NO. | 摘要 REMARKS |
|----------------|--------------------------|-------------------------------|-------------|------------------------------|---------------|
| 承認 APPROVED | FEB.28.'89 T. NAKANO | 三角法 THIRD ANGLE PROJECTION | 名称 TITLE | T-02MTB | |
| 検図 CHECKED | Feb.28.'89 T. KODAI | 尺度 SCALE | 1/1 | 水温センサー TEMPERATURE SENSOR | |
| 製図 DRAWN | Feb.28.'89 T. MIYOSHI | 重量 WEIGHT | kg | 図番 DWG.NO. | C2317-G01-A |



名称 水温計回路図
 TITLE DIGITAL TEMPERATURE INDICATOR
 T-2000
 図番 C4322 - 006 - C
 DWG.NO