

Reflector Compass Equipment

Type REFLECTA 1, 2 and 3

- 1 Description**
- 2 Operating Instructions**
- 3 Care and Maintenance**
- 4 -**
- 5 -**
- 6 Installation and First Putting into Operation**

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Preliminary Remark

The documentation describes the system or the device incl. variations, functional extensions and special types.

An NG... designation behind the type number of a device refers to different variations listed at the beginning of the description.

Possible functional extensions are also stated at the beginning of the description and are designated in the description as a functional extension module (FEM).

If there are customer demands for modifications or complements, you will find them described in the Annex.

The contract for delivery is binding.

The first of the two reference numbers quoted in brackets (before the point) in the following description denotes the illustration, the second the individual part.

The hyphenated numbers in the following description are found again in the diagrams.

The devices or systems may differ from the illustrations, diagrams and drawings in minor details.

The right of alterations due to further technical development is reserved. The documentation delivered is not subject to the alteration service.

Should an additional expert guidance be required, the RAYTHEON ANSCHÜTZ service stations throughout the world are at your disposal.

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REFLECTA 1, 2 and 3

1

Description

The Reflector Compass Equipment is a magnetic standard compass, class A.

A floating magnetic compass (1-1.1) is gimbal-mounted in a compass binnacle made of glass fibre reinforced plastic (1-1.3). The helmsman is provided with a sector of the magnetic compass card which is reflected into the wheelhouse via optical components (1-1.4/5/6). If the steering stand is not arranged below the compass binnacle, use is made of a horizontal optical by-pass facility (1-1.5).

An azimuth device for taking bearings of terrestrial objects is located in an wooden box.

The compass equipment is fitted with corrector facilities (1-1.2) to ensure compensation of the coefficients B, C and D as well as with a heeling adjuster and a Flinders' bar.

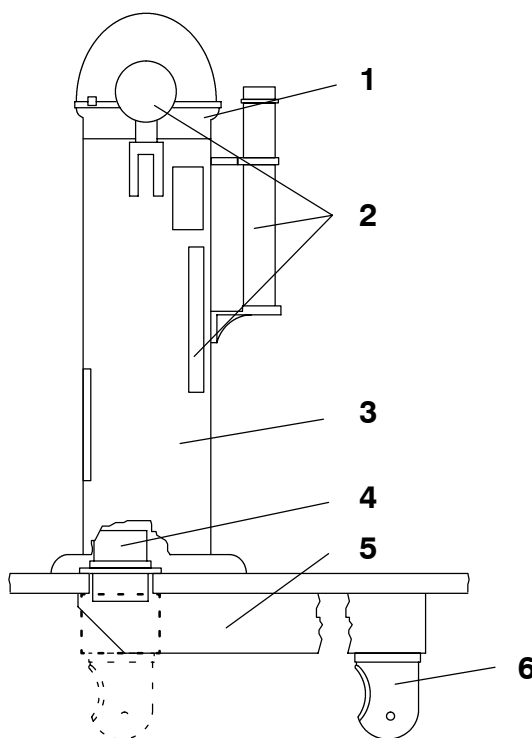


Fig. 1-1: Reflector Compass REFLECTA 1, 2, 3 - Construction

- 1 Magnetic compass
- 2 Corrector facilities
- 3 Compass binnacle made of glass fibre reinforced plastic
- 4 Reflection tube
- 5 By-pass facility
- 6 Mirror head

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The brightness of the card image can be varied steplessly by means of electric dimmers installed in the wheelhouse.

If equipped with a magnetic compass sonde (option), the reflector compass equipment can be used as a course sensor for navigation systems.

The individual compass systems REFLECTA 1, 2 and 3 differ from one another concerning their compass card diameters and as to their maximum horizontal by-pass possibilities:

Reflector compass	Diameter of compass card	Horizontal optical by-pass possibility
REFLECTA 1	180 mm	up to 2 m
REFLECTA 2	180 mm	2 m to 6 m
REFLECTA 3	160 mm	up to 2 m

Technical Data

Dimensions	see Annexes 1 and 2
Weight (without Flinders' bar and optical facility)	approx. 60 to 80 kg (dependent on height and type)
Voltage supply	1) 110/220V AC ship's mains for main illumination 2) 24V DC emergency supply for emergency lighting
Power consumption	1) and 2) 40W each
Temperature range	-30° to +60° C
Colour	light gray (RAL 7035)

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2 Operating Instructions

2.1 Adjusting the Reflector Compass

The viewing hole should be adjusted by the helmsman in such a way that the lower edge of the mirror head is approx. 5 to 10 cm above eye level.

The mirror is then to be turned into an adequate position. At night, use is to be made of the black mirror; in the daytime, the light one is to be used. Electric dimmers permit brightness adjustment of the image.

2.2 Taking Bearings

- Remove the compass hood by turning it slightly.
- Take the azimuth device out of the box and place it on the centering pin of the compass.
- Taking bearings. In order to illuminate the compass adequately, the mechanical shade can be turned.
- After taking bearings, put the azimuth device always back into the box, and mount the compass hood again.

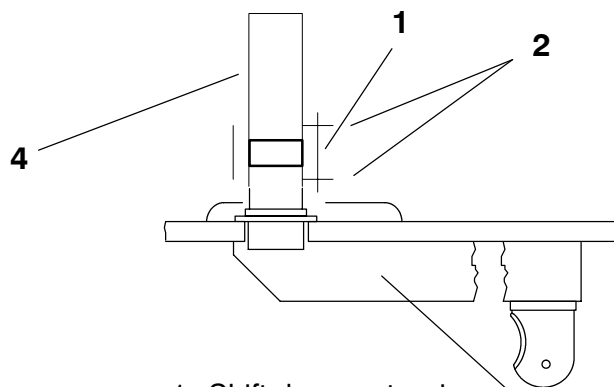
3 Care and Maintenance

3.1 Cleaning

The components of the optical facility are to be cleaned from time to time by means of a soft cloth.

3.1.1 Cleaning of Lower Glass Cover

1. Remove ceiling wheelhouse below location of compass binnacle.
2. Remove worm screws as indicated (see Fig. 3-1).
3. Shift ring downward and take out both ring and glass cover and clean it.
4. Reinstall, shift ring upward and fix it by screws.



- 1 Shift down outer ring
Take out ring with glass cover.
- 2 Loosen screws.
- 3 Horizontal by-pass channel
- 4 Reflection tube, lead-in tube

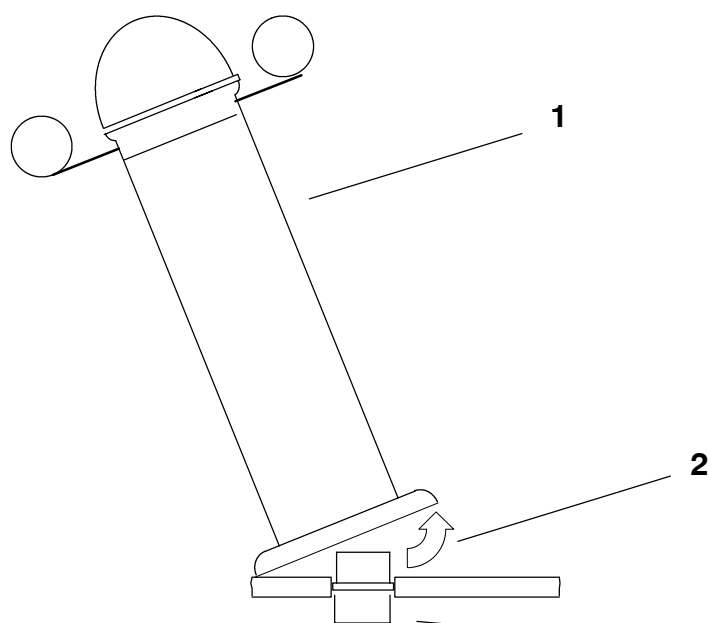
Fig. 3-1 Cleaning of Lower Glass Cover

Reflexionskompaß-Anlage

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3.1.2 Cleaning of the Upper Glass Cover of Reflection Tube

1. Mark position of binnacle base on the deck.
2. Loosen fixing screws of binnacle and jack up as shown below (see Fig. 3-2).
3. The glass cover will be visible below the binnacle base.
Loosen the worm screws and lift up the cover.
4. Clean it and put it on the reflection tube again.
5. Move binnacle in it's original position according to marking and fix it again.



- 1 Binnacle column
- 2 Incline binnacle column for free access to glass cover and unscrew worm screws to remove glass cover.
- 3 Reflection tube.

Fig. 3-2 Cleaning of the Upper Glass Cover of Reflection Tube

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3.2

Greasing

Bearing and bearing pin of the magnetic compass are to be greased (grease acc. to MIL-G-3278A or the like).

6 Installation and First Putting into Operation



The compass must be installed in the ship's fore-and-aft line, as, otherwise, errors may occur that cannot be compensated.

The rules for the minimum distance from magnetic material (see Annex 3) are to be adhered to.

If the order does not indicate the dimensions of deck thickness, height of wheelhouse etc., a CUTUBE reflection tube will be added. The tube must be adapted by the shipyard to the prevailing conditions on board ship, see Section 6.3.

6.1 Installing the Equipment on a Wooden Deck

- 1) Prepare a hole for the reflection tube. **Pay attention to different position for REFLECTA 2 and REFLECTA 1, 3! See Fig. 6-1.**
- 2) Prepare a hole for the light cable, see Fig. 6-1; diameter 20 to 30 mm, sufficient for the light cables and for the cable of the magnetic sonde (option).

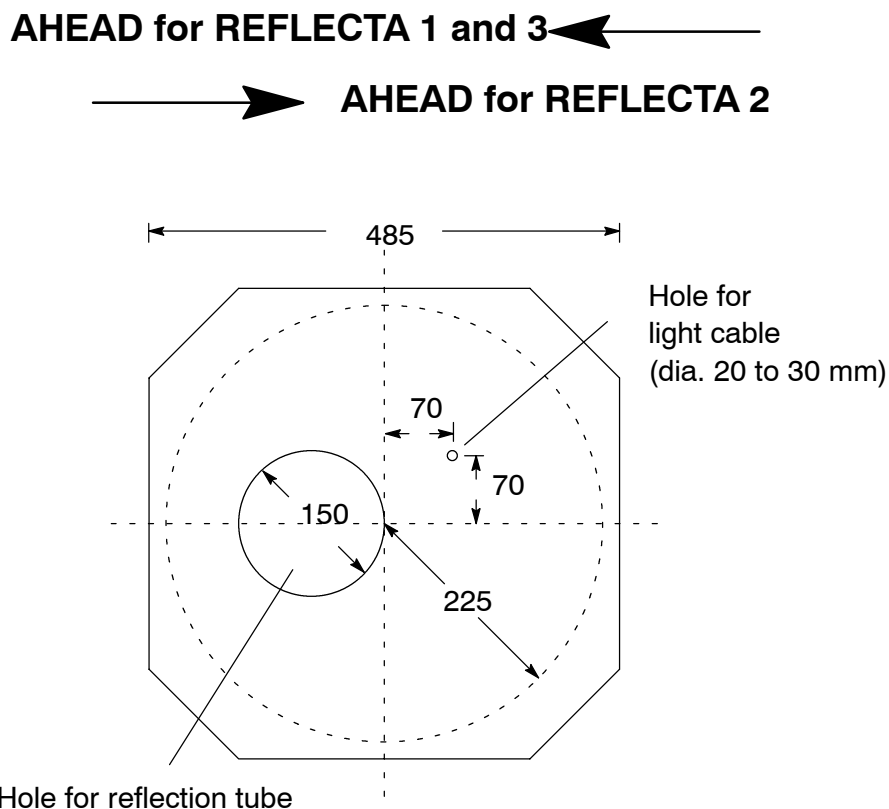


Fig. 6-1: Position of the Holes for Reflection Tube and Light Cable

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- 3) Screw off the mirror head from the reflection tube (not required for compass systems with optical by-pass).
- 4) Remove the underdeck flange (plastic).
- 5) Lower the reflection tube through the prepared hole, and screw it on with suitable wood screws, see Fig. 6-2. The ahead direction has been marked.
- 6) For sealing the deck opening, in addition apply silicone to the flange.

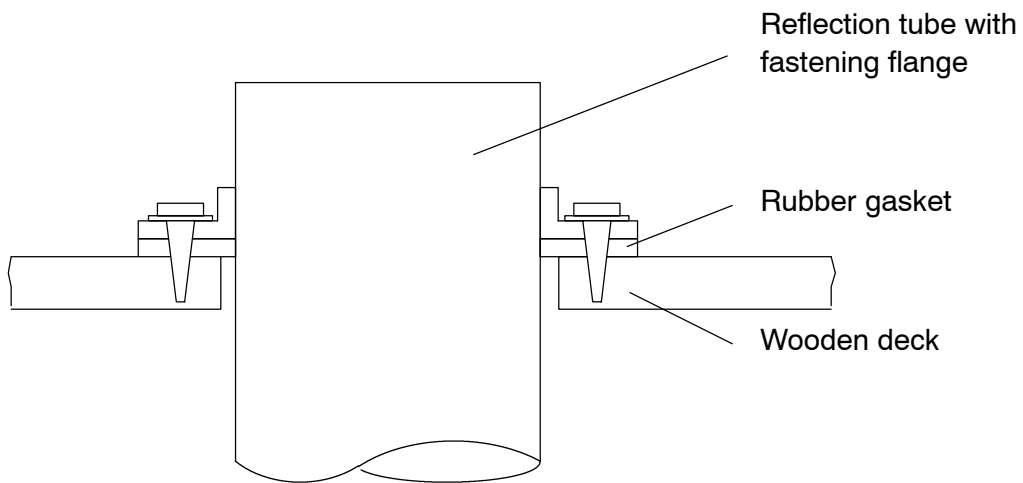


Fig. 6-2: Mounting the Reflection Tube

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- 7) Screw the nuts with flange for the compass binnacle by means of 4 wood screws each (dia. 6 mm) down to the deck, see Fig. 6-3.

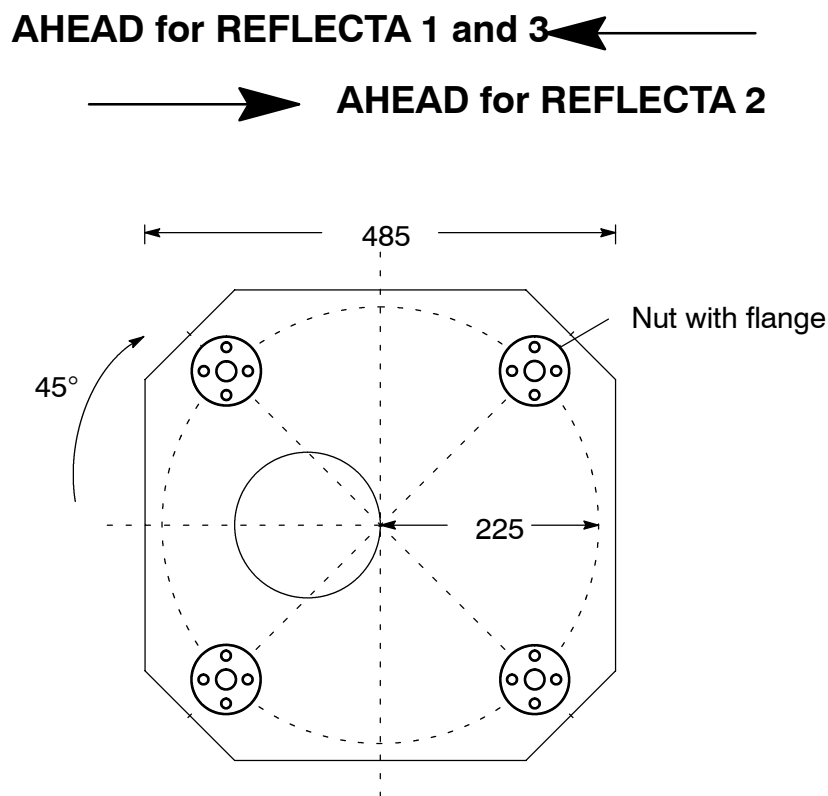


Fig. 6-3: Mounting the Nuts with Flange

- 8) Place the compass binnacle on wooden blocks off approx. 150 mm thickness over its intended position.
- 9) Run 2 three-core cables for illumination and emergency illumination and the cable for the magnetic sonde (option) through the provided hole to the wheelhouse; let protrude a length of approx. 50 cm to perform the connection.
- 10) Seal the cable passage with silicone.
- 11) Connect the two light cables in a watertight junction box to the cables of the compass binnacle, see Section 6.4.
- 12) Run the cable of the magnetic sonde to the base of the compass binnacle and connect it there - in a watertight junction box - to the cable for the wheelhouse (for connection see description "Magnetic Sonde").
- 13) Remove the wooden blocks.

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- 14) Screw on the compass binnacle, see Fig. 6-4.

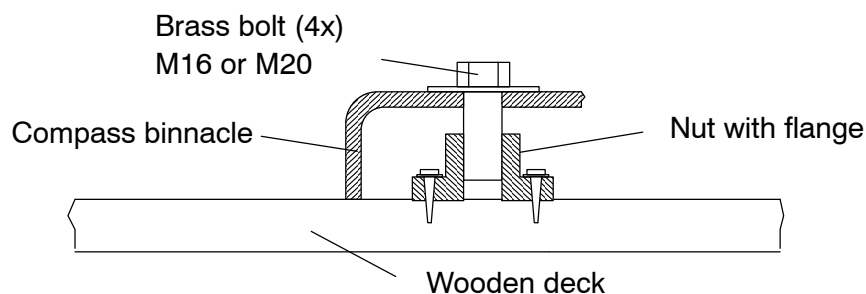


Fig. 6-4: Mounting the Compass Binnacle

- 15) Hang up the magnetic compass.
- 16) Screw on the fixing plates for the magnetic compass.
- 17) In the wheelhouse, seal the deck opening by means of the underdeck flange.
- 18) Equipment without by-pass: Mount the mirror head in such a way that the viewing hole is directed sternwards.
- 19) Equipment with by-pass: Fasten the by-pass by means of suitable U-bends or directly on the ceiling. For direct fastening, open the by-pass and fasten it from inside and with suitable screws to the ceiling.

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6.2

Installing the Equipment on a Metal Deck

- 1) Prepare a hole for the reflection tube. **Pay attention to different position for REFLECTA 2 and REFLECTA 1, 3 ! See Fig. 6-5.**
- 2) Prepare a hole for the light cable, see Fig. 6-5; diameter 20 to 30 mm, sufficient for the light cables and for the cable of the magnetic sonde (option).

AHEAD for REFLECTA 1 and 3 ←

→ **AHEAD for REFLECTA 2**

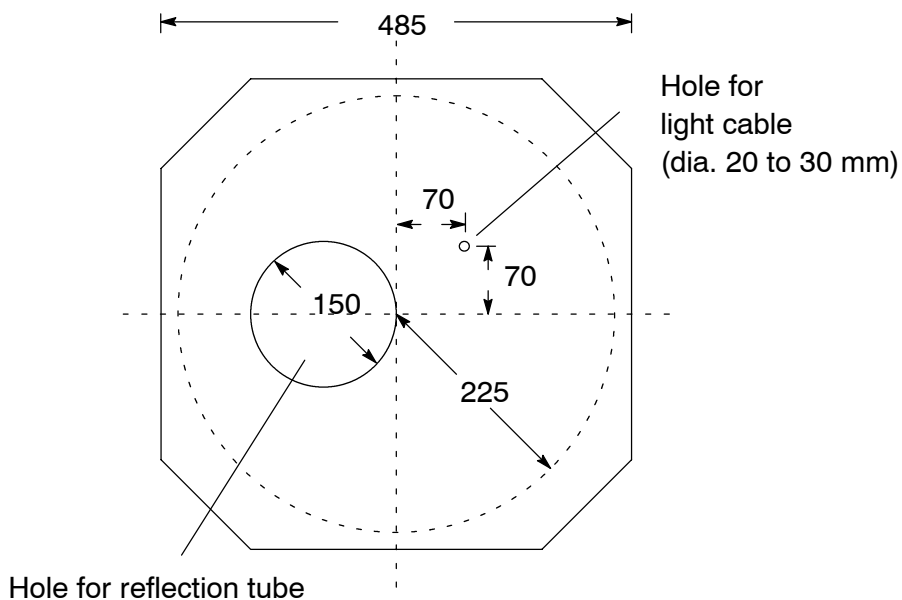


Fig. 6-5: Position of the Holes for Reflection Tube and Light Cable

Reflector Compass Equipment

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- 3) Carry out the flange acc. to the following drawing, Fig. 6-6.

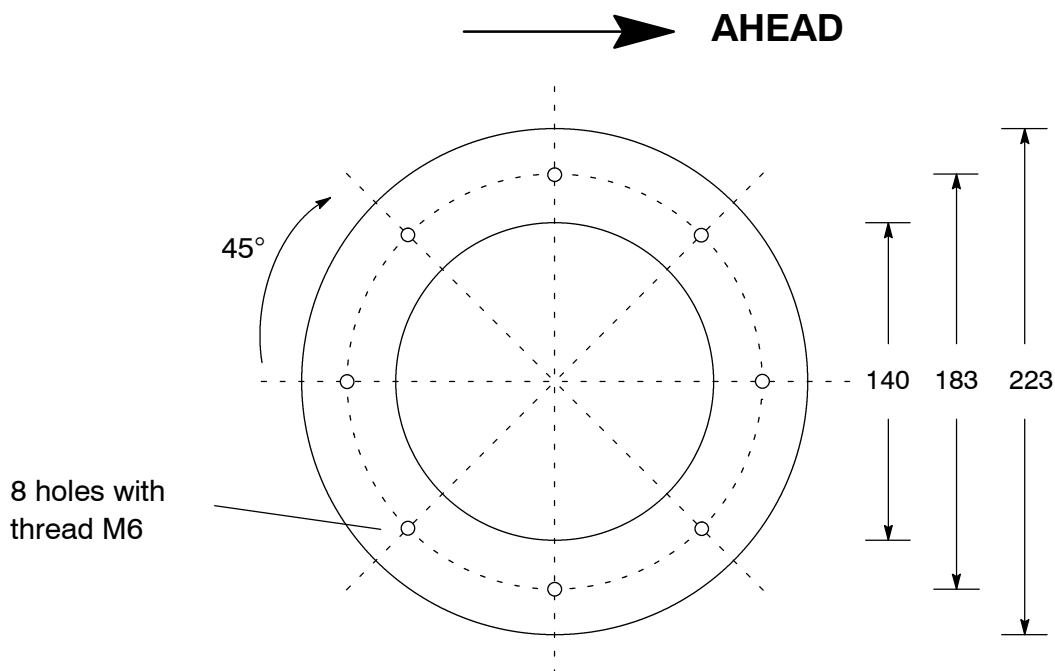


Fig. 6-6: Flange for Reflection Tube for Fastening on Metal Deck

- 4) Weld the flange - centred to the hole for the reflection tube- on to the deck, see Fig. 6-7. Pay attention to position of holes.
- 5) Screw off the mirror head from the reflection tube (not necessary for compass systems with by-pass).
- 6) Remove the underdeck flange (plastic).
- 7) Lower the reflection tube through the prepared hole and screw it down, see Fig. 6-7. The ahead direction has been marked.
- 8) For sealing the deck opening, in addition apply silicone to the flange.

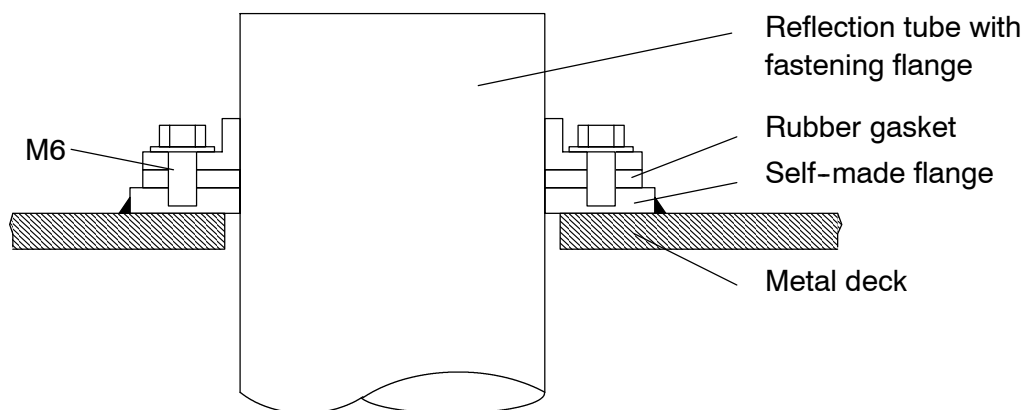


Fig. 6-7: Mounting the Reflection Tube

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- 9) Prepare the base (approx. 5 cm in height) for the compass binnacle. The base must show the holes for reflection tube and light cable as given in Fig. 6-5. Furthermore, it must be open at the side in order that access is given to the brass bolts for fastening the compass binnacle (see Fig. 6-8).
- 10) Weld the base on to the deck.
- 11) Place the compass binnacle on wooden blocks of approx. 150 mm thickness over its intended position.
- 12) Run 2 three-core cables for illumination and emergency illumination and the cable for the magnetic sonde (option) through the provided hole to the wheelhouse; let protrude a length of approx. 50 cm to perform the connection.
- 13) Seal the cable passage with silicone.
- 14) In a watertight junction box, connect the two light cables to the cables of the compass binnacle, see Section 6.4.
- 15) Run the cable of the magnetic sonde to the base of the compass binnacle and connect it there - in a watertight junction box - to the cable for the wheelhouse (for connection see description "Magnetic Sonde").
- 16) Remove the wooden blocks.
- 17) Screw on the compass binnacle, see Fig. 6-8.

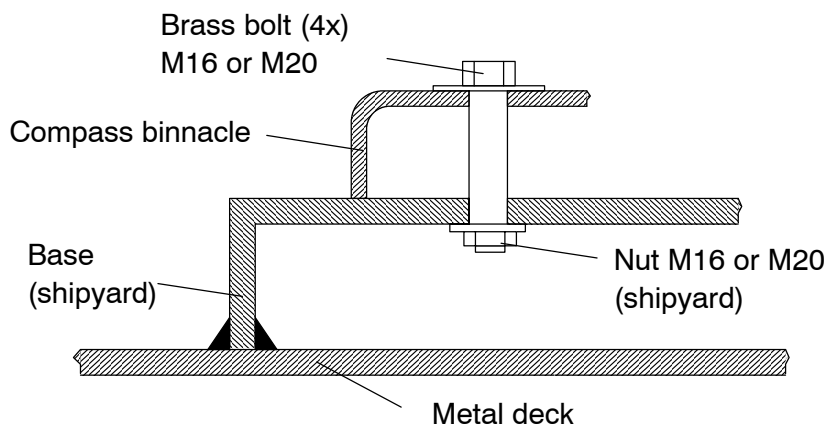


Fig. 6-8: Mounting the Compass Binnacle

- 18) Hang up the magnetic compass.
- 19) Screw on the fixing plates for the magnetic compass.
- 20) In the wheelhouse, seal the deck opening by means of the underdeck flange.
- 21) Equipment without by-pass: Mount the mirror head in such a way that the viewing hole is directed sternwards.
- 22) Equipment with by-pass: Fasten the by-pass by means of suitable U-bends or directly on the ceiling. For direct fastening, open the by-pass and fasten it from inside and with suitable screws to the ceiling.

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6.3 Installation with CUTUBE Reflection Tube

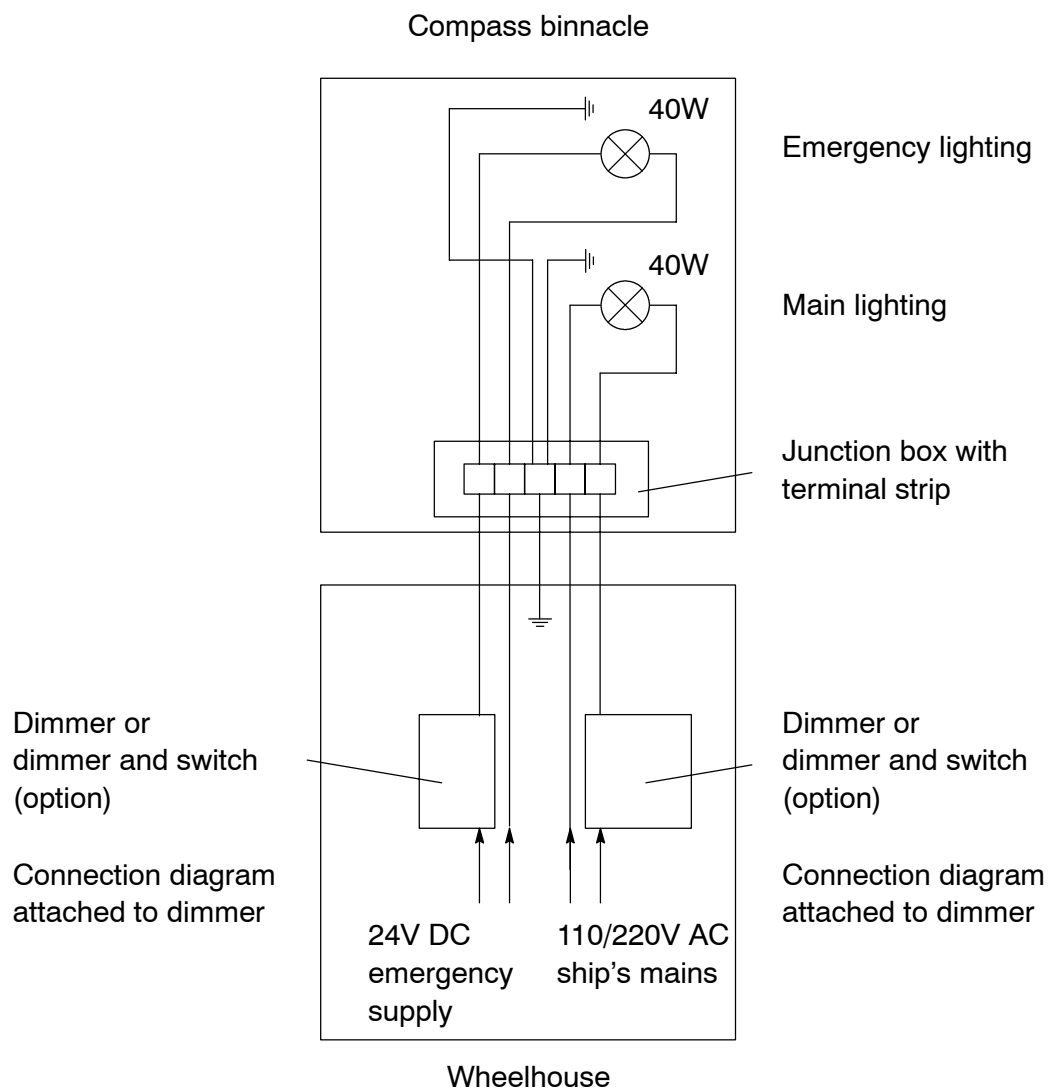
Note:

In case of installation with CUTUBE reflection tube, no horizontal by-pass can be made !

- 1) For wooden deck, proceed as described in Section 6.1, Steps 1) to 2).
For metal deck, proceed as described in Section 6.2, Steps 1) to 4).
- 2) Remove the fastening flange from the reflection tube and - as described in Section 6.1 or 6.2 - screw it on to the deck or on to the self-made flange.
- 3) Push the reflection tube from below through the deck opening until the lower edge of the mirror head will be approx. 5 to 10 cm higher than the helmsman's eye level.
- 4) Saw off the protruding reflection tube at a height of approx. 70 mm above the deck.
- 5) Fix the reflection tube with the clamping screws provided laterally on the fastening flange.
- 6) For wooden deck, continue with Section 6.1, Step 6).
For metal deck, continue with Section 6.2, Step 8).

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6.4 Connecting the Illumination



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6.5 Adjusting the Compass Equipment

The compass binnacle and the reflection optic have been adjusted at the works. Generally, no further work is required.

Equipment with by-pass

If, notwithstanding - particularly for reflection compass systems with by-pass - adjustment should be required, proceed as follows:

- Open the inspection flaps at the ends of the by-pass.
- Loosen the locking screws of the mirrors in the by-pass by means of a screw driver.
- Look into the mirror head and turn the by-pass mirror above the mirror head in such a way that the by-pass channel will be visible centred in the field of view.
- Tighten the locking screws of the mirror.
- Now turn the by-pass mirror below the compass binnacle in such a way that the compass card is visible centred in the field of view.
- Tighten the locking screws of the mirror.
- Close the inspection flaps of the by-pass.

6.6 Carrying out the Adjustment

The compass binnacle has been equipped with the correctors required:

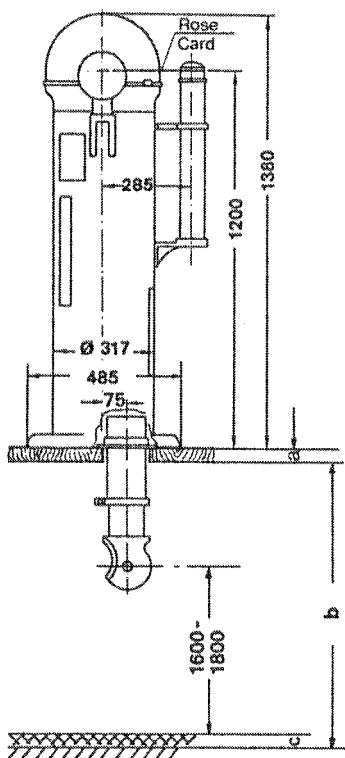
- 4 bar magnets, 10 mm dia., 200 mm long, for coefficients B_1 and C (permanent fore-and-aft and thwartship fields).
- 1 heeling magnet with chain for the permanent vertical field.
- 2 spheres, movable on brass consoles, for coefficient D (induced fields).
- 1 Flinders' bar of 570 mm total length - divided into 4 different parts with appropriate pieces of wood - for coefficient B_2 (latitude-dependent part of the fore-and-aft field).



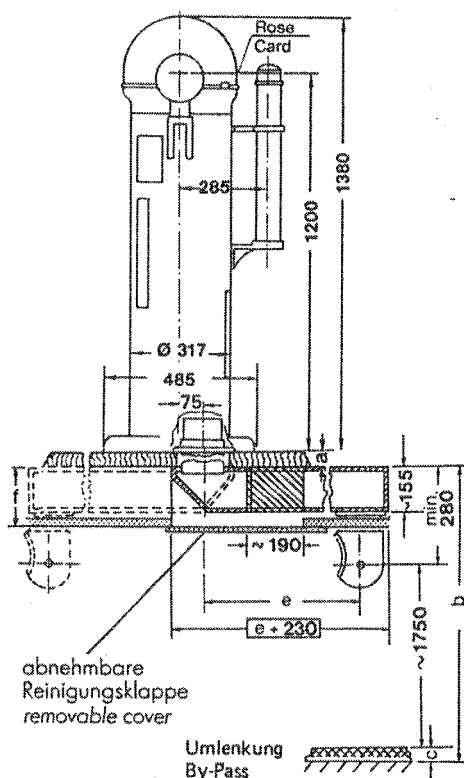
The adjustment itself is carried out in accordance with the service instructions of the supervisory authority concerned.

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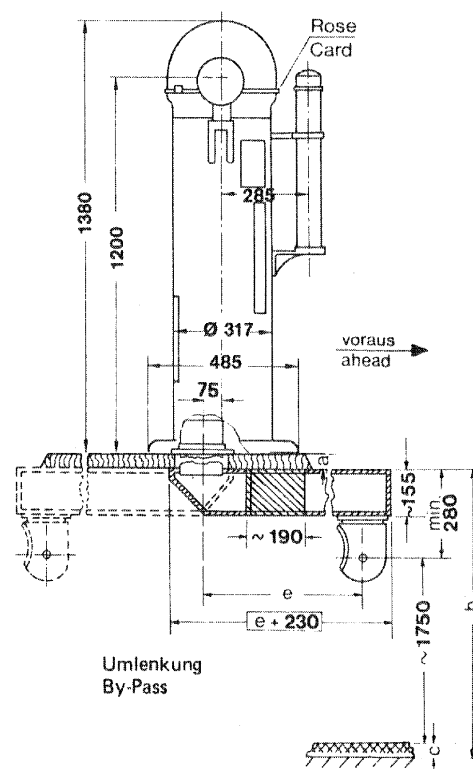
Dimensional Drawings and Aids for Placing an Order



REFLECTA 1



REFLECTA 1



REFLECTA 2

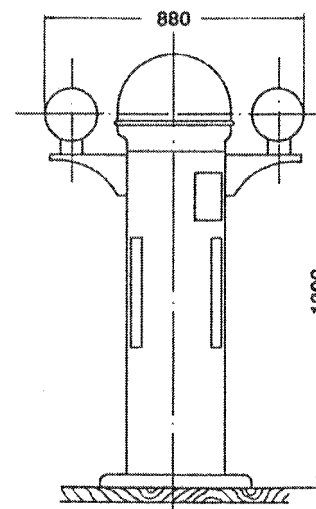
When placing an order please state:

- a) Thickness of deck and foundation _____ mm
- b) Height of wheelhouse _____ mm
- c) Grating _____ mm
- d) Ship's mains voltage _____ V
- Emergency voltage _____ V
- e) Optical by-pass _____ mm
- f) Ceiling _____ mm

Note:

If the data a), b), c) and f) are not available, it is recommended to use an CUTUBE reflection tube. The length is 1500 mm. The tube can be shortened by the yard, thus being adapted to conditions on board ship.

On using CUTUBE, no by-pass can be made!

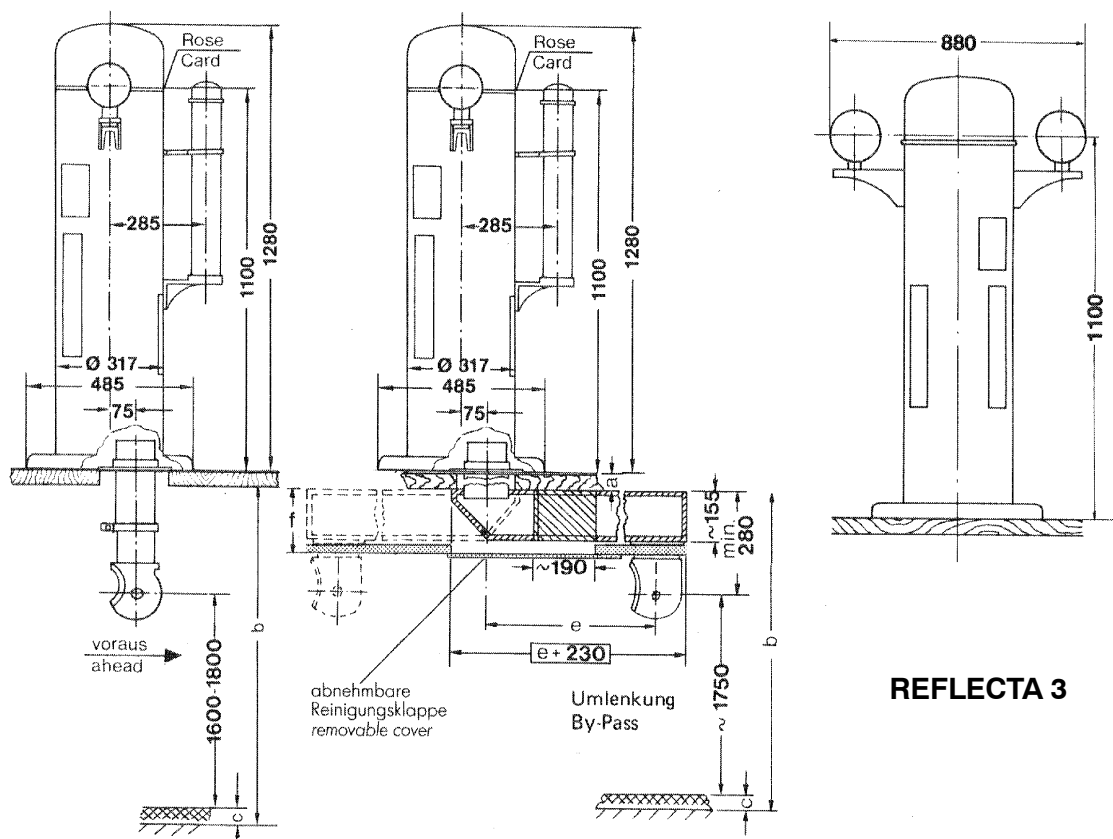


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Dimensional Drawings and Aids for Placing an Order



REFLECTA 3

When placing an order please state:

- a) Thickness of deck and foundation _____ mm
- b) Height of wheelhouse _____ mm
- c) Grating _____ mm
- d) Ship's mains voltage _____ V
- Emergency voltage _____ V
- e) Optical by-pass _____ mm
- f) Ceiling _____ mm

Note:

If the data a), b), c) and f) are not available, it is recommended to use an CUTUBE reflection tube. The length is 1500 mm. The tube can be shortened by the yard, thus being adapted to conditions on board ship.

On using CUTUBE, no by-pass can be made!

Recommendation for Minimum Distance from Magnetic Material (acc. to IMO):

