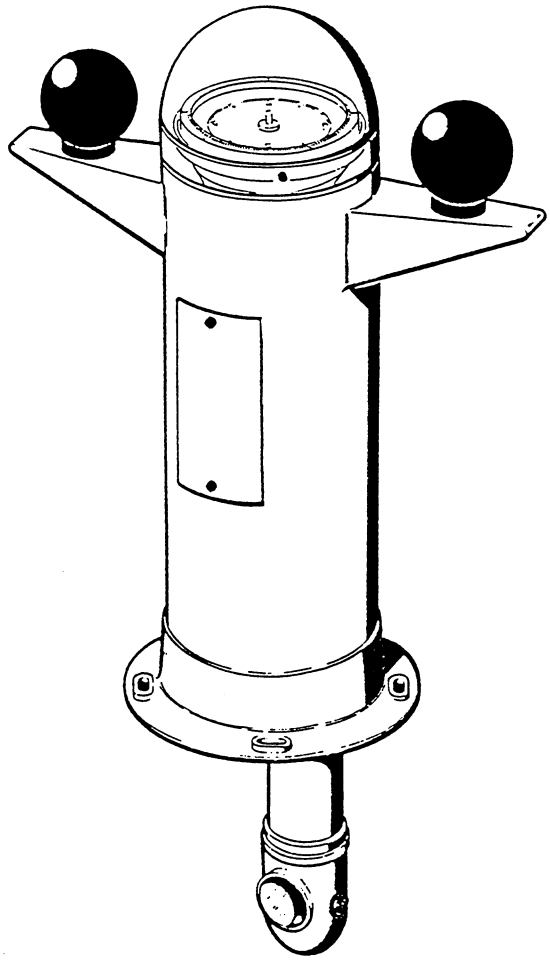
C. PLATH
NAVIGATION · AUTOMATION

056012
1-73

DESCRIPTION AND INSTALLATION



NAVIPOL

Aluminium Binnacles

NAVIPOL I (4054), II (4085), III (4105)
IM (4297), IS (4090), T (4091)

20 NOV 96 REV C

Head Office and Freight: Stueckenstrasse 1-3, D-22081 Hamburg, Germany
Correspondence Address: P.O.Box 760 860, D-22058 Hamburg, Germany
Tel. ++49 - 40 - 2 99 00-0; Fax. ++49 - 40 - 29 90 02 98; Telex 215 202 a plat d

C. PLATH
NAVIGATION · AUTOMATION

Table of Contents

1 DESCRIPTION

1.1 General

The Aluminum NAVIPOL binnacle is designed to accept the JUPITER type magnetic reflector compass with a 180 mm diameter compass card. A hood fitted to the binnacle will protect the compass from the elements.

The NAVIPOL III binnacle has a glass window in the hood to view the compass. The NAVIPOL I binnacle has a reflector tube fitted to allow the compass reading to be viewed from below decks.

The reflector tube is an optional fitting for the NAVIPOL IM and IS binnacles. The binnacle contains all the compass correction facilities that are required by the authorities.

1.2 The Binnacle and Hood

The binnacle is manufactured of Aluminum. The Aluminum has been anodized and electrostatic coated as protection against seawater corrosion. The hood is manufactured in plastic and attached to the binnacle with two knurled screws.

1.3 Compass Illumination

There are two systems of compass illumination - normal and emergency. The brightness of the normal illumination can be varied by using the dimmer switch. All electrical connections are made in a watertight terminal box located at the base of the binnacle.

1.4 Compass Corrections - NAVIPOL I, II, III, IM only

The compass corrections are located inside or on the binnacle. The B-C corrections are made by rod magnets which can be inserted into 13 bores, inside the binnacle, from the port, starboard and aft sides. The heeling error corrector is suspended by chain inside the bucket tube located on the center axis of the binnacle.

D correction is realized by two soft iron spherical quadrantal correc-ors located on two arms at the port and starboard sides of the binna-le. The quadrantal correctors can be moved towards and away from the compass. The soft iron (Flinders) bar case is attached to the fore side of the binnacle. The case will accept the various lengths of Flinders bars and PVC tube sections.

1.5 Compass Corrections - NAVIPOL IS and T only

The B and C corrections for the NAVIPOL IS and T is achieved by two pairs of magnets. One pair is for B correction, the other pair for C correction. The magnetic field strength can be adjusted infinitely over a 20° deviation. The direction of the magnetic fields can be reversed.

The heeling error correction is realized by corrector magnets that may be fixed at infinitely variable heights. The heeling error tube is located vertically below the B and C corrections.

1.6 D Compass Correction - NAVIPOL T only

There are no D spherical quadrantal correctors fitted to the NAVIPOL T binnacle. D correction is done on the compass itself and is an optional fitting.

1.7 Compass Reflector

A 15° section, on both sides of the lubber line, of the compass card can be viewed through the reflector tube from below decks. The maximum length of the reflector tube is two meters. The viewing mirror angle can be varied and is double sided. The reverse side of the viewing mirror is a darkened mirror for night observation of the compass reading. A second fixed viewing mirror is positioned opposite the variable viewing mirror to allow a second person to observe the compass reading. The reflector tube is fitted to the NAVIPOL I binnacle and is an optional fitting on the NAVIPOL IM and IS binnacles.

1.8 Clinometer (optional)

A clinometer can be attached to the aft side of the binnacle. This is an optional fitting.

1.9 Technical Data

Binnacle dimensions		
Overall height	1320 mm	NAVIPOL I, II, III
	1050 mm	NAVIPOL IM
	550 mm	NAVIPOL IS
	430 mm	NAVIPOL T
Compass card height	1140 mm	NAVIPOL I, II, III
	870 mm	NAVIPOL IM
	370 mm	NAVIPOL IS
	260 mm	NAVIPOL T
Base diameter	520 mm	NAVIPOL I, II, III, IM, IS
	310 mm	NAVIPOL T
Support arm width	1075 mm	NAVIPOL I, II, III, IM, IS
Overall width with Flinders bar case	570 mm	
Reflector tube dimensions		
Viewing length	2000 mm	max.
Tube diameter	140 mm	
Mirror housing diameter	170 mm	
Lens diameter	150 mm	
Focal length f	670 mm	± 10 mm

Compass illumination - NAVIPOL I, II, III, IM, IS only

Normal	Ba15d, 25 W lamp	voltage dependant on ship's power supply (24V, 110V or 220V)
Emergency	Ba15d, 25 W lamp	voltage dependant on ship's emergency power supply

Compass illumination - NAVIPOL T only

Normal	Ba15d, 25 W lamp	24V only
Emergency	Ba15d, 25 W lamp	24V only

2 INSTALLATION

2.1 Installation Procedure - NAVIPOL I, II, III, IM, IS only

NOTE: *For installation of NAVIPOL II and III binnacles, disregard steps 1 thru 5 and 16. The installation position is to be prepared in accordance with the installation drawing 4054-0112-01.*

1. NAVIPOL I only - cut the reflector tube to the required length. See installation drawing 4054-0112-01.

2. NAVIPOL I only - drill and tap six M6 holes in the deck for attachment of the reflector tube flange.

3. NAVIPOL I only - lower the reflector tube, complete with rubber seal, through the pre-cut hole in the deck until it rests on the upper flange.

4. NAVIPOL I only - secure the reflector tube to the deck with six M6 bolts.

5. NAVIPOL I only - from below decks, slide the second flange over the reflector tube and secure it to ceiling with six M6 bolts.

6. Drill four M20 attachment holes in the deck. See installation drawing 4054-0112-01.

7. Connect the illumination power supply cables to the terminal box in the base of the binnacle.

8. Place the binnacle over the reflector tube and loosely secure it to the deck with the washers and bolts supplied.

9. Position the compass, with its journals, over the journal bearings in the binnacle. Apply a downwards pressure to engage the journals into the journal bearings.

10. Secure the compass with the clips and M4 screws supplied.

11. Align the binnacle parallel to the fore/aft line of the ship by using a straight line between the 360° and 180° points on the external compass bearing ring, or between the center boss on the top verge glass and the forward lubber line.

12. Secure the binnacle to the deck with the mounting bolts already fitted.

13. Fit the hood to the binnacle and secure with the knurled retaining screws. NAVIPOL III only - the window in the hood is to face aft.

14. Fit the quadrantal correctors to their supports on each side of the binnacle. The key on the base of the corrector to be positioned in the slot of the support and pointing towards the binnacle.

15. Secure the quadrantal correctors with the M12x30 bolts and washers supplied.

16. NAVIPOL I only - fit the mirror housing to the end of the reflector tube.

NOTE: *If the magnetic compass is to be used in conjunction with the NAVITRANS transmitting magnetic compass system, a plug connector has to be fitted to the binnacle. For this purpose, an attachment bracket with a 29 mm dia hole and four 3,2 mm dia holes is provided below the level of the compass. The plug connector is also provided with screws, nuts and cable binders. The cable for the NAVITRANS is to be attached inside the binnacle the same way as the illumination supply cable.*

2.2 Installation Procedure - NAVIPOL T only

NOTE: *The Installation position is to be prepared in accordance with installation drawing 4091-0112-01.*

1. Drill one 27 mm minimum diameter hole in the table to take the heeling error corrector tube.

2. Drill two M8 attachment holes in the table. See drawing 4091-0112-01.

3. Connect the illumination power supply cables to the terminal block in the base of the binnacle.

4. Place the binnacle on the table and loosely secure it with the bolts and washers supplied. Make sure the heeling error corrector tube enters the 27 mm dia hole.

5. Position the compass, with its journals, over the journal bearings in the binnacle. Apply a downwards pressure to engage the journals into the journal bearings.

6. Secure the compass with the clips and M4 screws supplied.

7. Align the binnacle parallel to the fore/aft line of the ship by using a straight line between the 360° and 180° points on the external compass bearing ring, or between the center boss on the top verge glass and the forward lubber line.

8. Secure the binnacle to the table with the mounting bolts already fitted.

9. Fit the hood to the binnacle and secure with the knurled retaining screws.

2.3 B-C Compass Correction - NAVIPOL I, II, III, IM only

The B correction rod magnets are housed in two vertical rows of horizontal holes that are parallel to the fore/aft line of the ship. The C correction rod magnets are housed in a single vertical row of horizontal holes that are parallel to the athwart ships line of the ship. The magnets are held in place by spring pressure. There are thirteen holes in each row, with No.1 at the bottom and No.13 at the top. The distance from the center of the compass to the bottom hole (No.1) is 530 mm. The distance from the center of the compass to the top hole (No.13) is 290 mm. The binnacle is provided with six powerful magnets and six weak magnets. The north seeking ends of the magnets are identified by red markings. Access to the B-C correctors is through the access door on the aft side of binnacle.

The specification for the six powerful magnets is as follows:

Magnet material	Al Ni Co 500
Length	50 mm
Diameter	6 mm
Magnetic moment	1.1 Am^2

The specification for the six weak magnets is as follows:

Magnet material	Al Ni Co 500
Length	50 mm
Diameter	6 mm
Magnetic moment	0.35 Am^2

2.4 B-C Compass Correction - NAVIPOL IS, T only

The B-C compass corrections are achieved by using two pairs of magnets. They are located below the compass and concentric about the compass's vertical axis. One pair creates a magnetic field on the fore / aft line of the ship for B correction. The second pair creates a magnetic field on the athwart ships line of the ship for C correction. The magnetic field strength can be varied infinitely by using the two screws. The two screws are identified. The direction of the magnetic field can be reversed by turning the screws more than ten revolutions. The specification for each magnet is as follows:

Magnet material	Al Ni Co 500
Length	16 mm - 01 mm
Diameter	3.3 mm
Magnetic moment	0.11 Am^2 per magnet
Correction value	from 0° to 22.5°

If B-C correction cannot be accomplished, additional rod magnets can be fitted to the corrector housing. The north poles of these rod magnets are identified with red markings. The specification of these additional rod magnets is as follows:

Magnet material	Al Ni Co 500
Length	50 mm ±0.1 mm
Diameter	4.1 mm
Magnetic moment	0.45 Am^2 ±0.05 Am^2

Correction value

Normal plus one rod magnet	42.5°
Normal plus two rod magnets	56°

2.5 Heeling Error Compass Correction - NAVIPOL I, II, III only

The heeling error corrector is fitted with an eye at each end. It is suspended inside the bucket tube, on the vertical center axis of the binnacle, by the chain. The chain is numbered every five links. No.1 puts the corrector at the lowest position. No.6 puts the corrector at the top position.

The distance from the center of the compass to the lowest (No.1) position is 995 mm. The distance from the center of the compass to the top (No.6) position is 280 mm.

The corrector material is Al Ni Co 500. The corrector magnetic moment is 18Am ±2Am. Access to the corrector is through the access door on the aft side of the binnacle.

2.6 Heeling Error Correction - NAVIPOL IM only

Due to the shortened height of the NAVIPOL IM binnacle, there are two heeling error corrector magnets supplied. The magnetic field strengths of the two corrector magnets are different to allow heeling error correction to be accomplished.

The larger heeling error corrector magnet has a vertical magnetic field strength from 75µT to 28µT.

The smaller corrector magnet has a vertical magnetic field strength from 36µT to 5µT.

2.7 Heeling Error Correction - NAVIPOL IS, T only

The heeling error corrector magnets are located in a tube vertically below the B-C correctors. One large and two small magnets are supplied so heeling error correction can be accomplished. Either one large magnet, or two small magnets, or one small magnet can be used. The position of the magnets is infinitely variable.

The specification of the corrector magnets is as follows:

Large magnet

Magnet material	Al Ni Co 500
Length	54 mm ±0.1 mm
Diameter	10 mm
Magnetic moment	3.4 Am^2 ±0.5 Am^2

Small magnet

Magnetic material	Al Ni Co 500
Length	18 mm ±0.1 mm
Diameter	10 mm
Magnetic moment	0.4 Am^2 ±0.05 Am^2

2.8 D Compass Correction

NOTE: *The level of the compass magnet is 22 mm below the level of the compass card on the same center line as the D correctors.*

Two soft iron, hollow quadrantal correctors are used to facilitate the D correction. They are mounted on supports on the port and starboard side of the binnacle. The correctors can be moved towards or away from the compass, but not rotated. The distance to the center of the compass is marked on each support. The minimum distance from the center of the corrector to the center of the compass is 270 mm. The maximum distance from the center of the corrector to the center of the compass is 520 mm.

The specification of the corrector is as follows:

Corrector material	GGG-40 DIN1693
Outside diameter	175 mm
Inside diameter	155 mm
Weight of one corrector	8 kg

2.9 D Correction - NAVIPOL T only

There are NO soft iron quadrantal D correctors fitted to the NAVIPOL T binnacle. D correction is achieved on the compass and is an optional fitting.

2.10 Flinders Bar

The Flinders bar case is attached in a central, vertical position on the forward side of the binnacle. It has a length of 600 mm and a diameter of 78 mm. The distance between the center of the Flinders bar case and the center of the compass is 285 mm ±3 mm. The top end of the case is 25 mm above the level of the compass card. The Flinders bars are cylindrical, hollow and flat ended.

They are protected against corrosion. The Flinders bars have a diameter of 75 mm - 1 mm and supplied in various lengths. One 300 mm in length. One 150 mm in length. Two 75 mm in length. PVC spacer tubes are supplied so the pole of the Flinders bars can be positioned level with the compass magnet.

3 OPERATION

3.1 Operation

1. The hood can be removed by loosening the two knurled retaining screws.
2. By loosening the screw on the port side of the mirror housing, the viewing angle of the mirror can be adjusted by turning the knob on the starboard side of the mirror housing.
3. The access door, on the aft side of the binnacle, can be removed after loosening the retaining screws. This will permit access to the compass illumination, the reflector lens and the compass corrections.

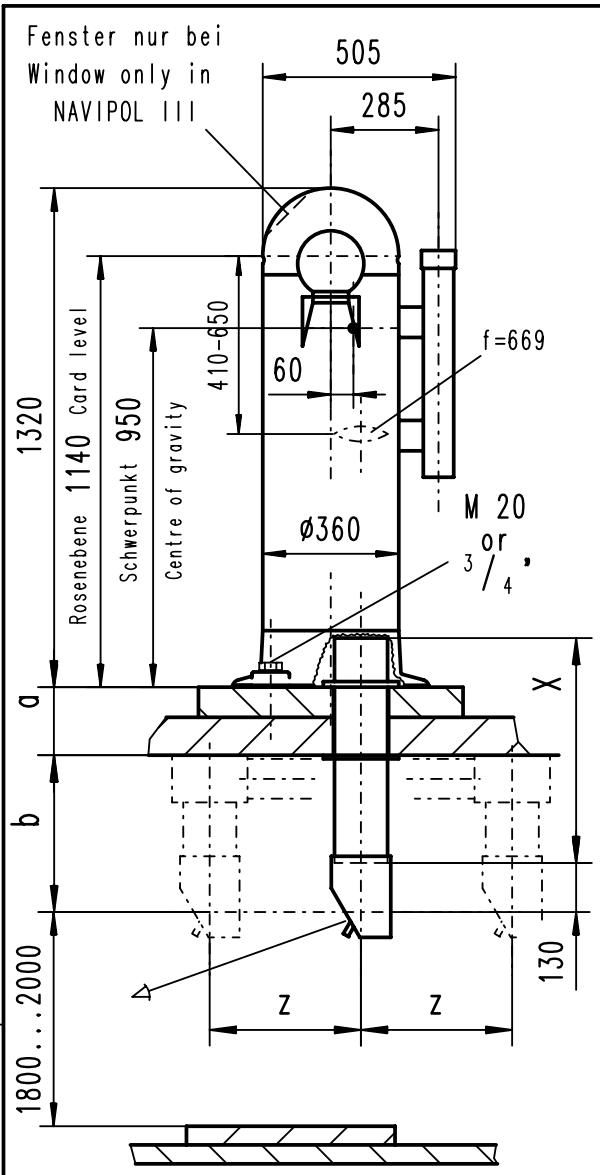
This page intentionally left blank

4 MAINTENANCE

4.1 Maintenance

The NAVIPOL binnacle does not require regular maintenance. It is recommended that the viewing mirror, reflector lens, top verge glass and the hood window are cleaned at regular intervals with a damp chamois leather.

This page intentionally left blank



Bei Bestellung bitte angeben:
Please state with order:

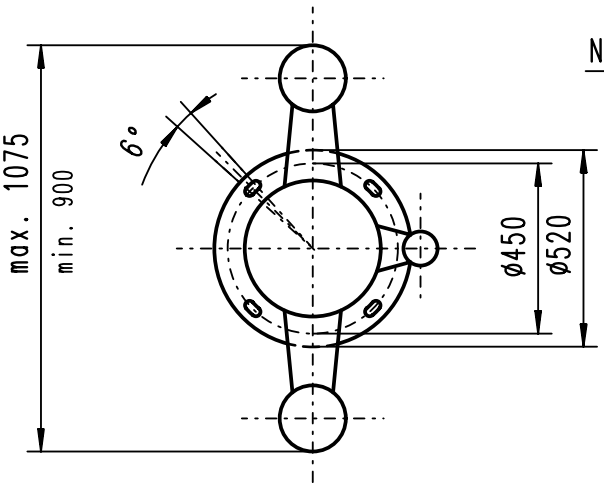
Netzspannung	230 V	☐
Mains Voltage	115 V	☐
	24 V	☐
Notspannung	230 V	☐
Emergency Voltage	115 V	☐
	24 V	☐

NAVIPOL I — Regel-Peilkompaßanlage
Lager-Nr./Stock-No. 73295 — mit Reflexionsablesung ☐
Standard reflector binnacle

Länge Reflexionsrohr	X <= 1000 mm	☐
Length of reflector tube	X = 1000...1500	☐
X = a + b	X = 1500...2000	☐

NAVIPOL II — Regel- Peilkompaßanlage
Lager-Nr./Stock-No. 73302 — Standard binnacle ☐

NAVIPOL III — Steuerkompaßanlage
Lager-Nr./Stock-No. 73305 — Steering binnacle ☐



NAVIPOL IU — Regel-Peilkompaßanlage mit Reflexionsablesung und Umlenkung ☐
Standard reflector binnacle
with bypass
a + b + z = max 4000mm — a= ☐ b= ☐
z min = 410mm — z= ☐

Siehe Bl.3 / See page 3

Gewicht:
Weight: 60 kg

REV	ECO-No.	DATE	NAME
AF	98866	22.01.02	Ho.
AE	99996	09.03.99	Ho.
AD	99803	30.09.97	Kie
AC	99685	20.08.96	Ho.
AB	99495	23.10.95	Ho.
AA	99230	20.07.94	Ho.

Maßstab/SCALE: /

	DATE	NAME
DRAWN	20.07.94	Ho.
CHD	see ECO	
DOS	4054-0112-011	

Zeichnungs Nr./Drawing No.: 4054-0112-01

NORTHROP GRUMMAN Electronic Systems — Sperry Marine

Lager Nr./STOCK NO. –

Maßzeichnung / DIMENSION DRAWING

Kompaßstand
Binnacle

NAVIPOL I,II,III,IU

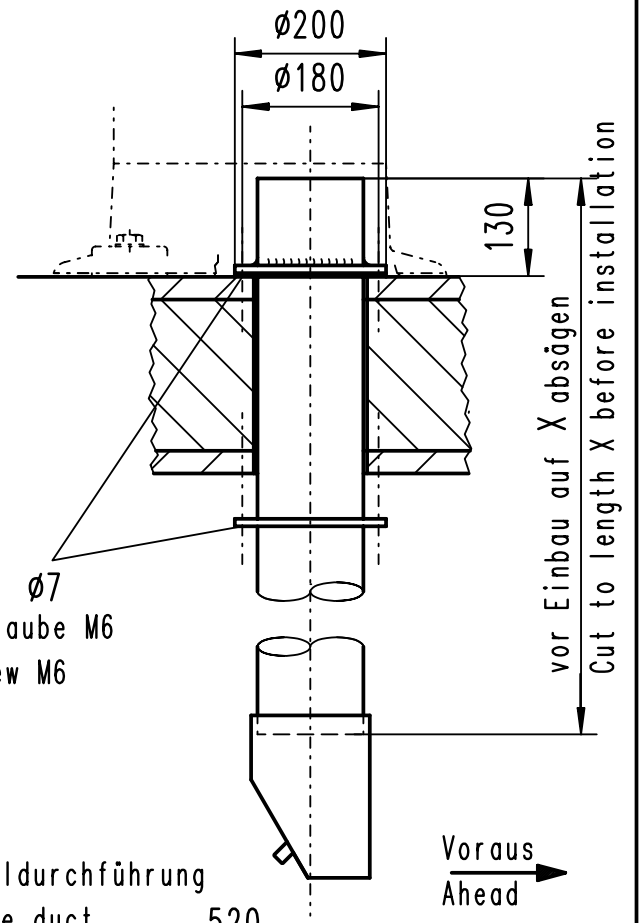
REPLACEMENT FOR: Rev.02

CAD

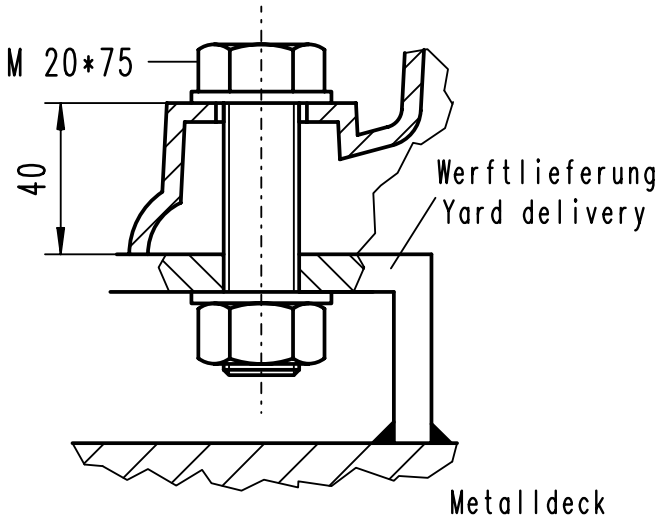
Blatt SHEET 1

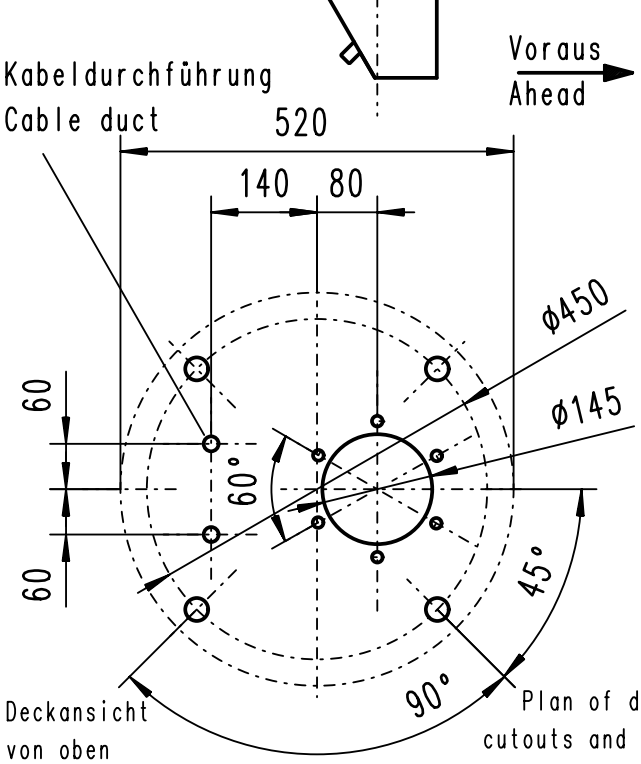
Blattz. SHEETS 3

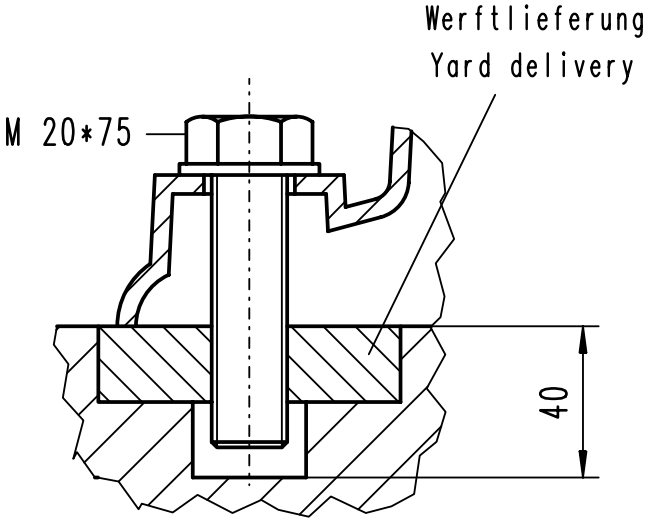
Reflexionsrohr nur bei NAVIPOL I
Reflector tube only in



Vorschlag für Decksbefestigung
Proposal for attachment to deck







REV	ECO-No.	DATE	NAME
AF	98866	22.01.02	Ho.
AE	99996	09.03.99	Ho.
AD	99803	30.09.97	Kie
AC	99685	20.08.96	Ho.
AB	99495	23.10.95	Ho.
AA	99230	20.07.94	Ho.

Maßstab/SCALE: /

	DATE	NAME
DRAWN	20.07.94	Ho.
CHD	see ECO	
DOS	4054-0112-012	

Zeichnungs Nr./Drawing No.: 4054-0112-01

NORTHROP GRUMMAN Electronic Systems — Sperry Marine

Lager Nr./STOCK NO. –

Maßzeichnung / DIMENSION DRAWING

Kompaßstand Binnacle

NAVIPOL I,II,III,IU

REPLACEMENT FOR: Rev.02

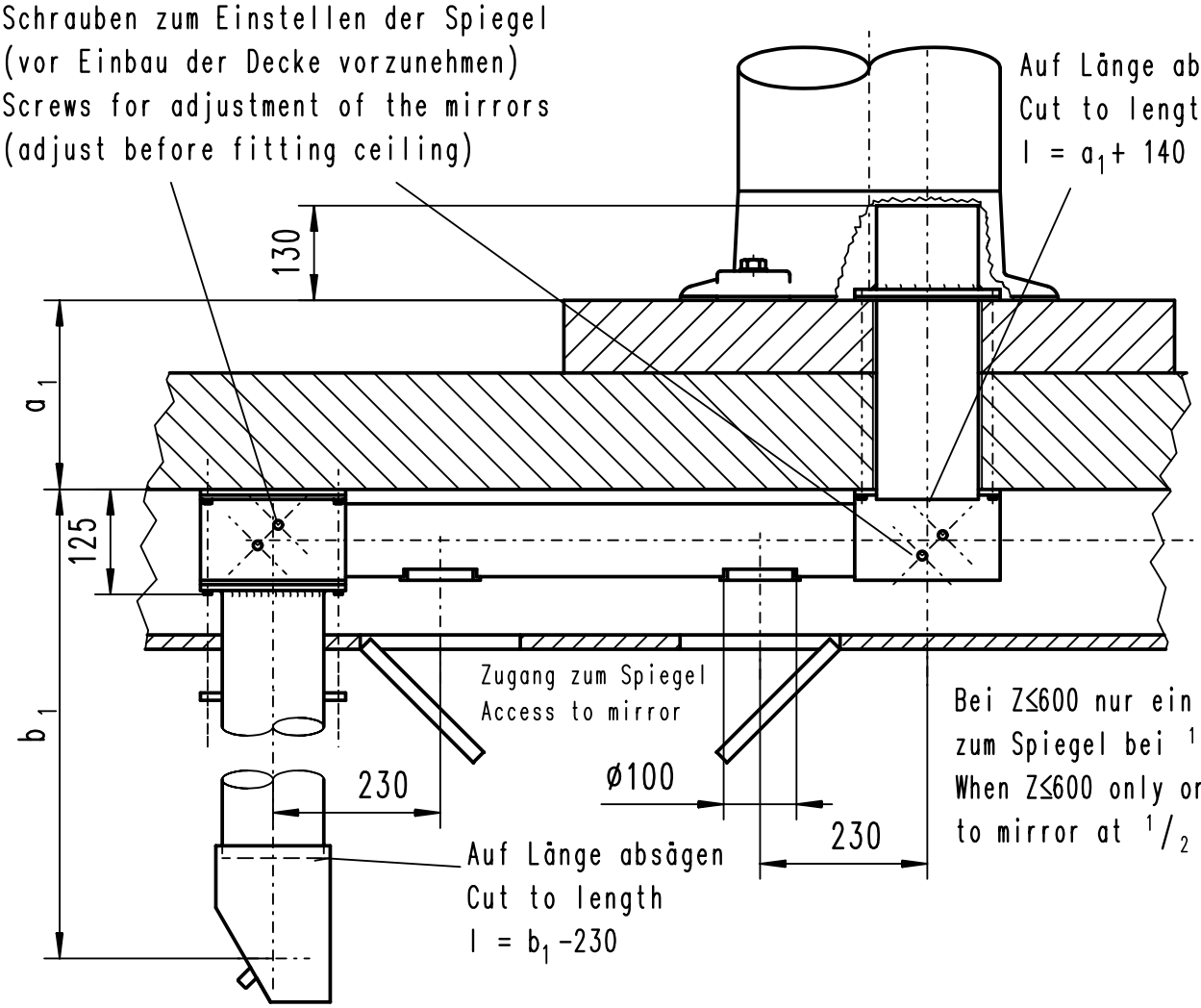
CAD

Blatt SHEET 2

Blattz. SHEETS 3

Schrauben zum Einstellen der Spiegel
(vor Einbau der Decke vorzunehmen)
Screws for adjustment of the mirrors
(adjust before fitting ceiling)

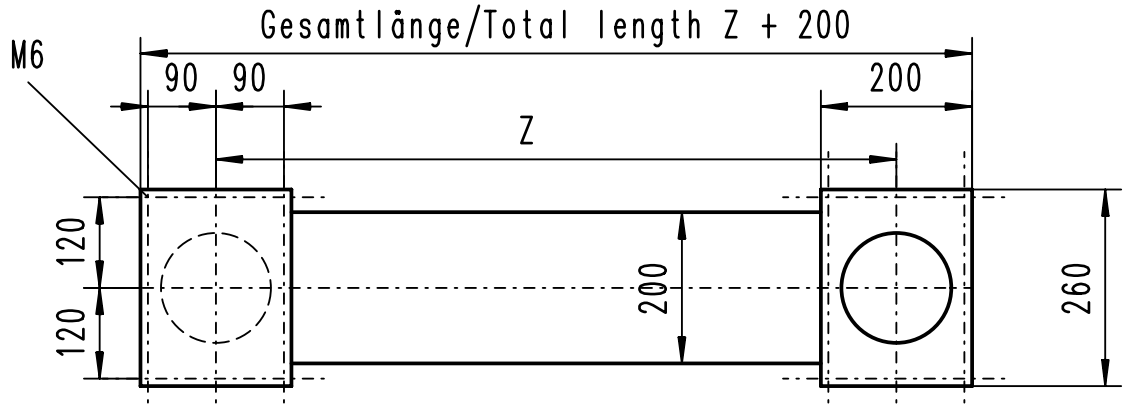
Auf Länge absägen
Cut to length
$l = a_1 + 140$



Bei Z≤600 nur ein Zugang zum Spiegel bei $^1/_2$ Z
When Z≤600 only one access to mirror at $^1/_2$ Z

Umlenkung muß parallel zur Mittschiffslinie verlaufen
Bypass must be installed parallel to the center line of the ship

für
for



Befestigung der Umlenkung
Fixture of the bypass

Umlenkung für
Bypass for
NAVIPOL IU

REV	ECO-No.	DATE	NAME
AF	98866	22.01.02	Ho.
AE	99996	09.03.99	Ho.
AD	99803	30.09.97	Kie
AC	99685	20.08.96	Ho.
AB	99495	23.10.95	Ho.
AA	99230	20.07.94	Ho.

Maßstab/SCALE: /

	DATE	NAME
DRAWN	20.07.94	Ho.
CHD	see ECO	
DOS	4054-0112-013	

Zeichnungs Nr./Drawing No.
4054-0112-01

NORTHROP GRUMMAN Electronic Systems — Sperry Marine

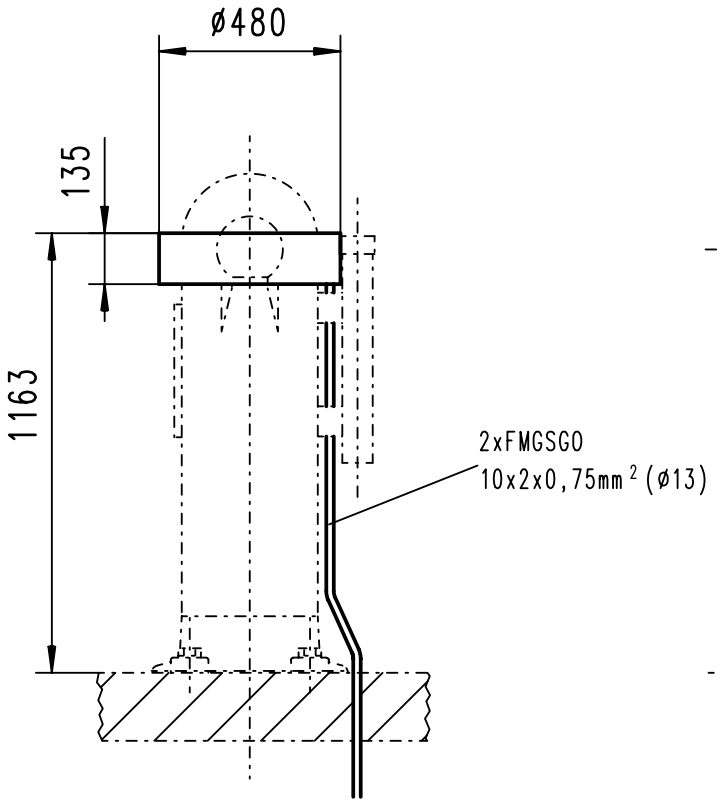
Lager Nr./STOCK NO. –

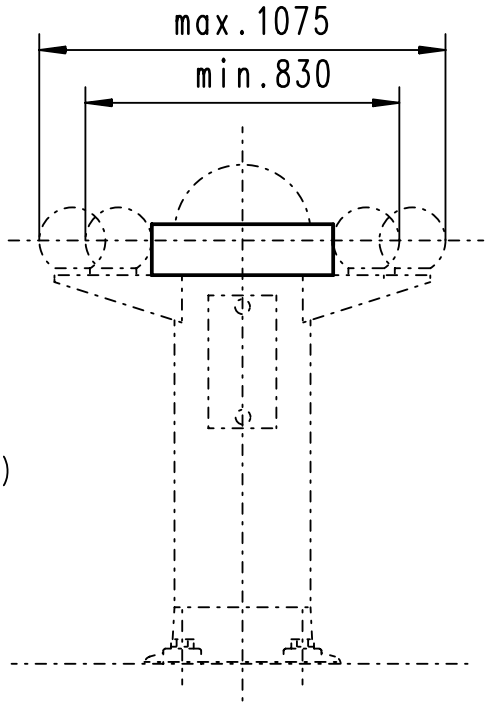
Maßzeichnung / DIMENSION DRAWING
Kompaßstand
Binnacle
NAVIPOL IU

REPLACEMENT FOR: Rev.02

CAD

Blatt SHEET 3
Blattz. SHEETS 3





Standardkabellänge = 5 m oder nach Angabe
Standard length of cable 5 m or to be specified

☐ m

Fehlende Maße siehe 4054-0112-01
For all other dimensions see drawing 4054-0112-01

Lg.Nr. Sto.No.	
38483	115V
29292	10V

REV	ECO-No.	DATE	NAME
AA	98866	22.01.02	Ho.
00	-	24.01.85	RP

Maßstab/SCALE: /

	DATE	NAME
DRAWN	21.01.02	Ho.
CHD	see ECO	
DOS	4054-0112-02	

Zeichnungs Nr./Drawing No.: 4054-0112-02

NORTHROP GRUMMAN Electronic Systems — Sperry Marine

Lager Nr./STOCK NO. see above

Maßzeichnung / DIMENSION DRAWING

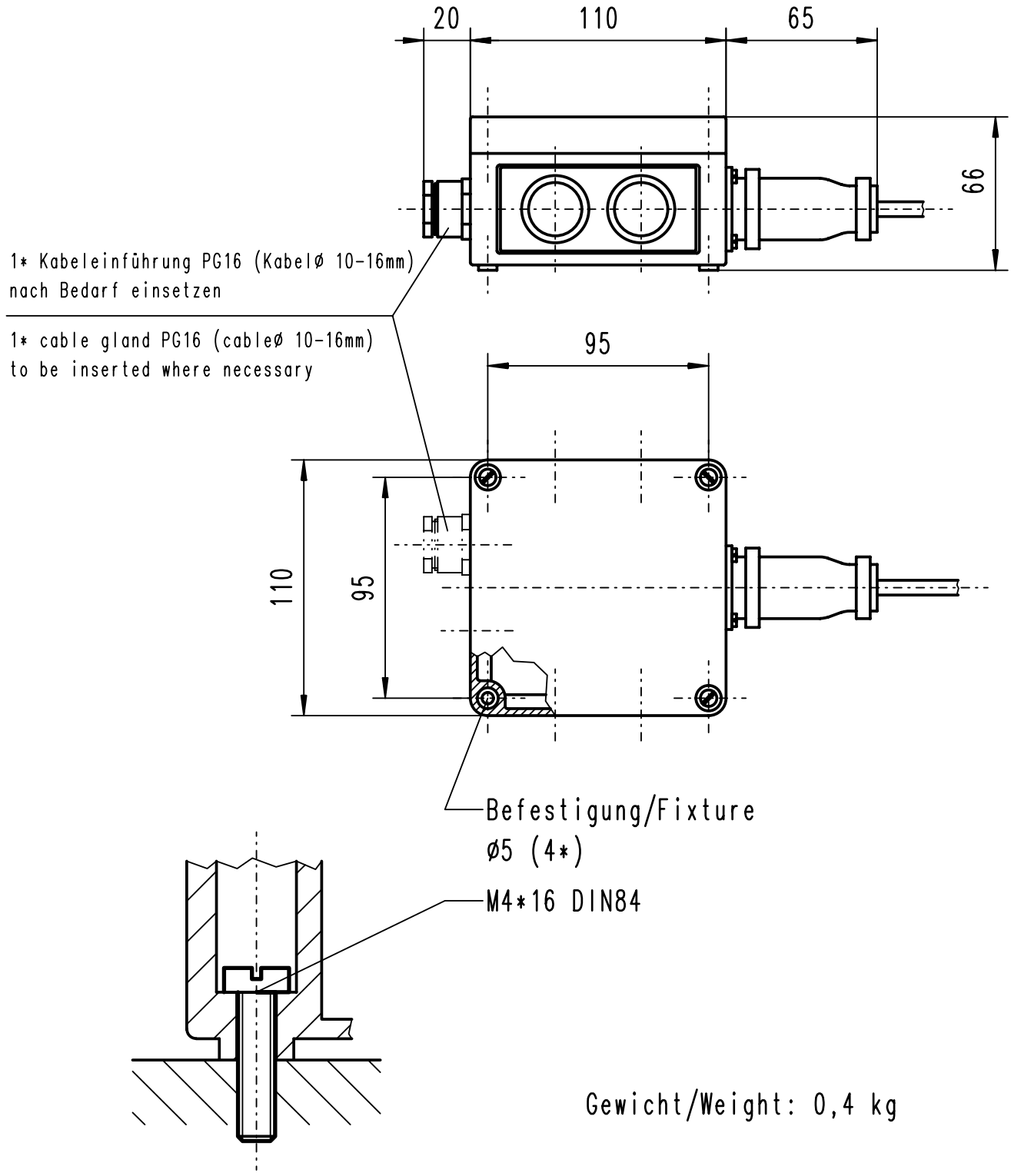
EK-Spule
für NAVIPOL I, II oder III

Degaussing coil
for NAVIPOL I, II or III

REPLACEMENT FOR: Rev.00

CAD

Blatt SHEET 1
Blattz. SHEETS 1



Gewicht/Weight: 0,4 kg

REV	ECO-No.	DATE	NAME
01	65/91	15.01	Kie

Maßstab/SCALE: /

	DATE	NAME
DRAWN	15.01.91	Kie
CHD	see ECO	
DOS	4054-0112-03	

Zeichnungs Nr./Drawing No.: 4054-0112-03

NORTHROP GRUMMAN Electronic Systems — Sperry Marine

Lager Nr./STOCK NO. 75862

Maßzeichnung / DIMENSION DRAWING

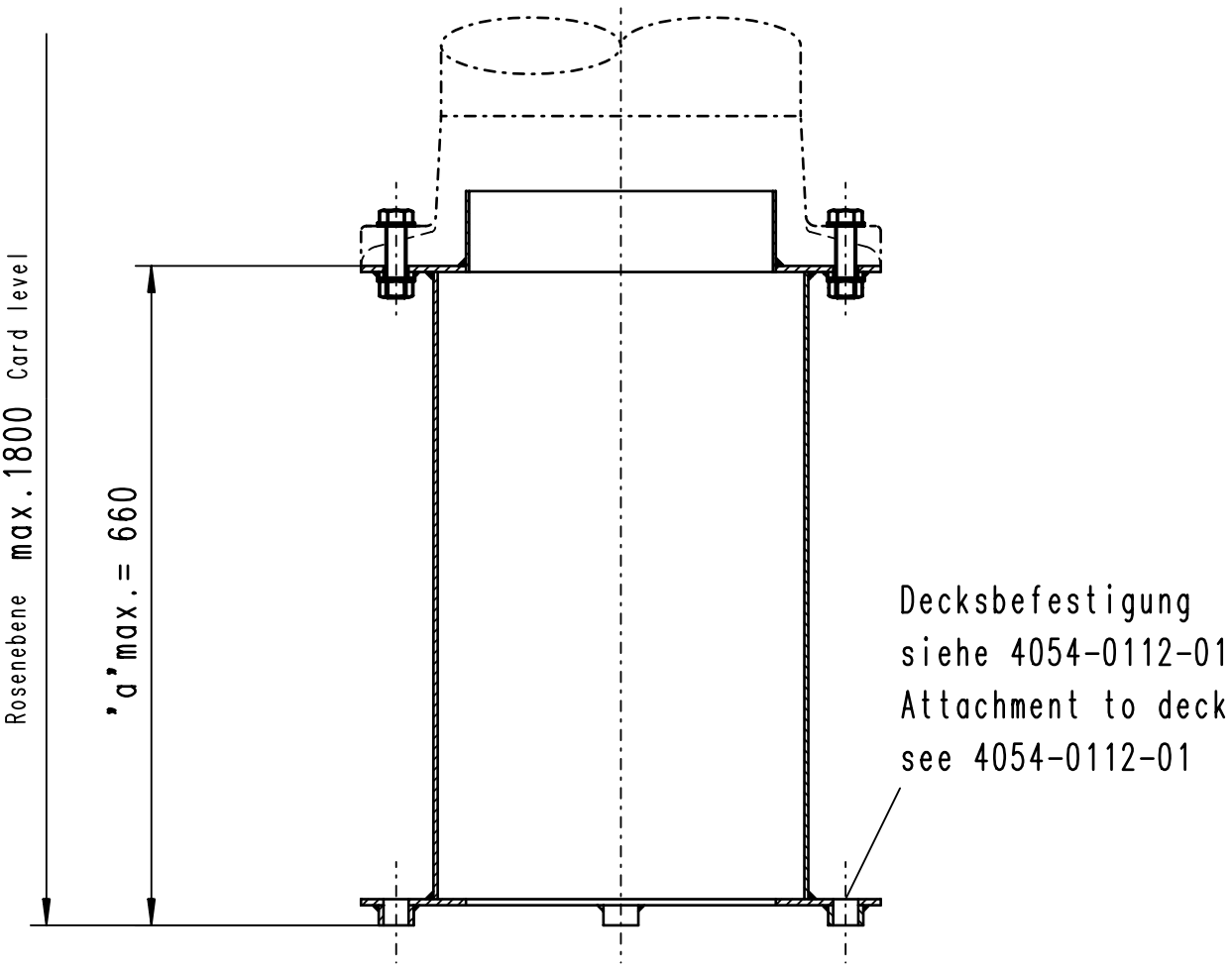
Anschlusskasten
Connection box

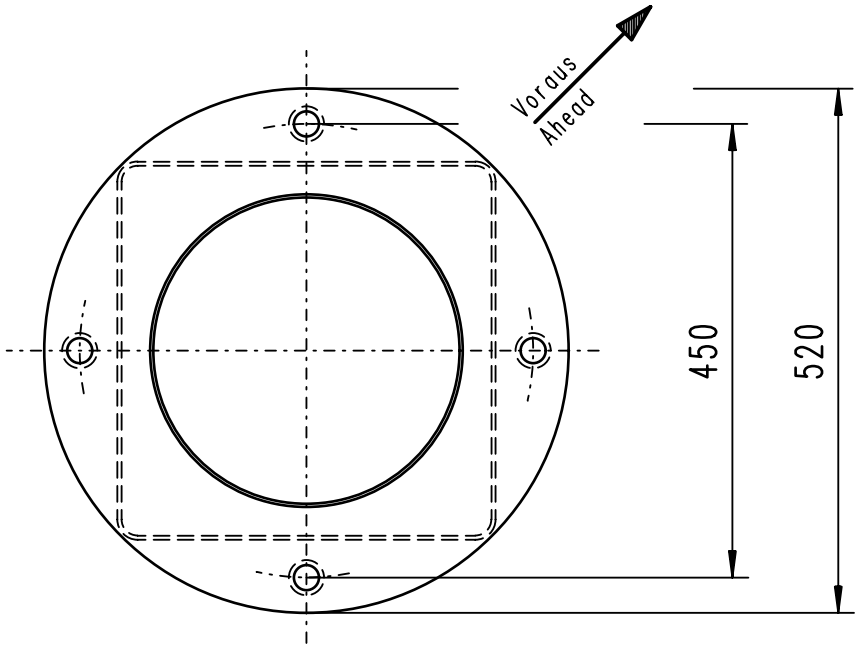
REPLACEMENT FOR: Rev.00

CAD

Blatt SHEET 1

Blattz. SHEETS 1





REV	ECO-No.	DATE	NAME
AA	98866	22.01.02	Ho.

Maßstab/SCALE: /

	DATE	NAME
DRAWN	27.05.99	Ho.
CHD	see ECO	
DOS	4054-0112-05	

Zeichnungs Nr./Drawing No.: 4054-0112-05

NORTHROP GRUMMAN Electronic Systems — Sperry Marine

Lager Nr./STOCK NO. 30639

Maßzeichnung / DIMENSION DRAWING

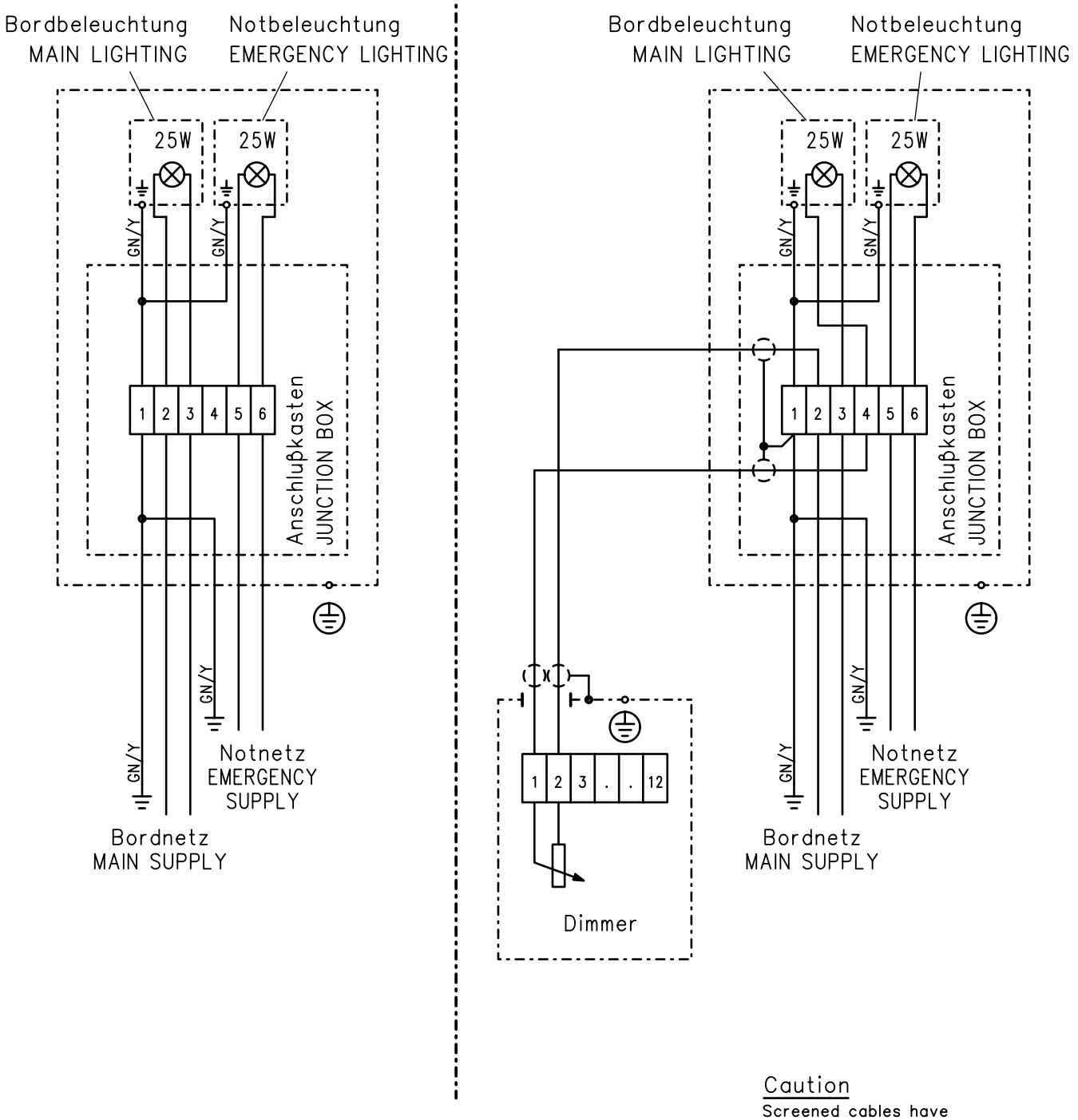
Kompaßstand Verlängerung Binnacle Extension NAVIPOL I,II,II,IU

REPLACEMENT FOR:

CAD

Blatt SHEET 1

Blattz. SHEETS 1



Caution
Screened cables have to be grounded through cable glands.

Rev	ECO-No.	Date	Name
AA	99822	25.04.96	Geisler
02	127/87	25.02.87	Krügel

NORTHROP GRUMMAN Electronic Systems
Sperry Marine

	Date	Name
Drawn	25.04.1996	Geisler
Design		
Chd ECO		

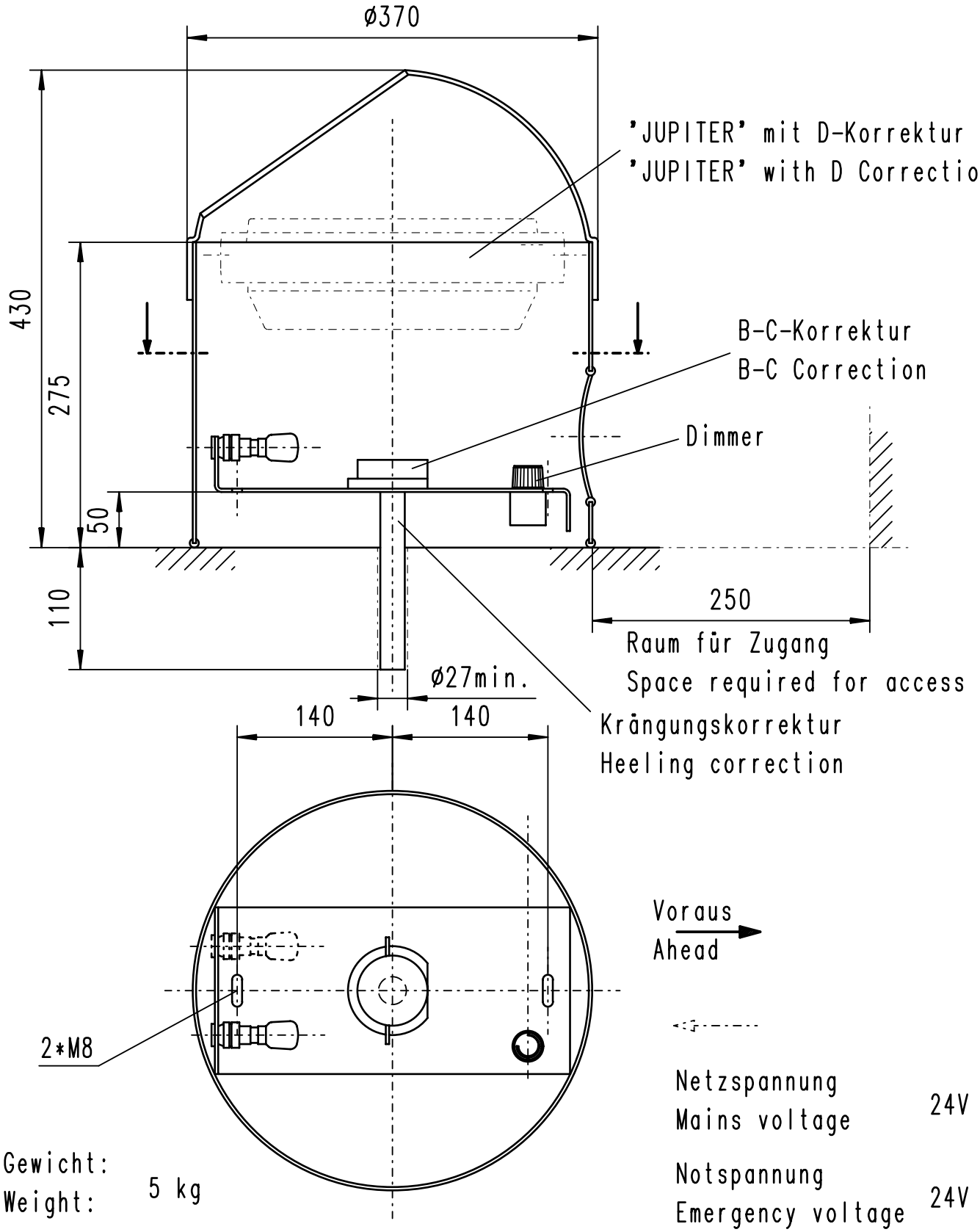
Benennung/TITLE
NAVIPOL I,II,III
Beleuchtung

Zeichnungs-Nr/DRAWING No.
4054-0115-01

Blatt SHEET 1
Blattz. SHEETS 1

Lager-Nr.
STOCK No.

DOS 0115\405401S1



REV	ECO-No.	DATE	NAME
AA	99996	09.03.99	Ho.

Maßstab/SCALE: /

	DATE	NAME
DRAWN	05.03.99	Ho.
CHD	see ECO	
DOS	4091-0112-01	

Zeichnungs Nr./Drawing No.: 4091-0112-01

NORTHROP GRUMMAN Electronic Systems — Sperry Marine

Lager Nr./STOCK NO. 73297

Maßzeichnung / DIMENSION DRAWING

Tischaufsatz
Table binnacle

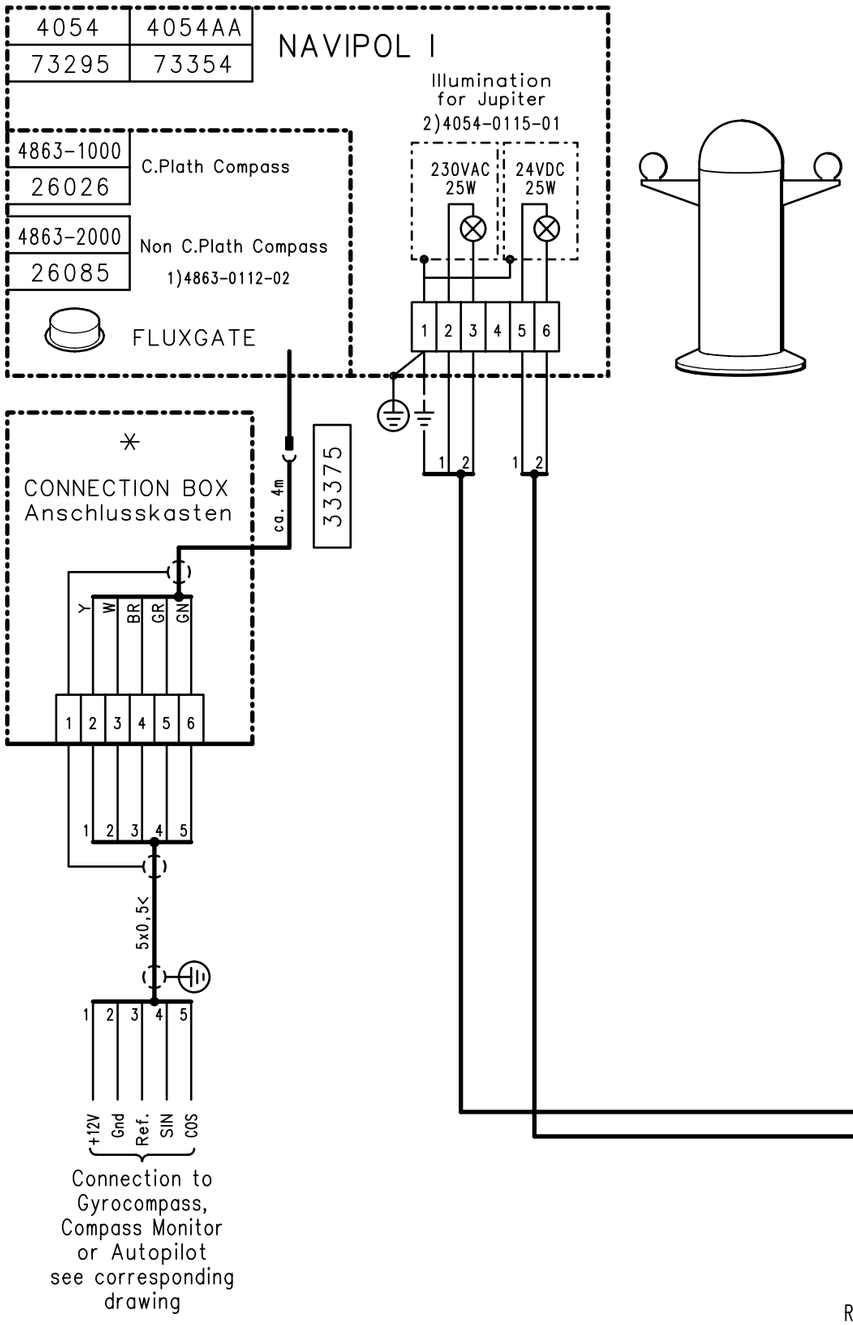
NAVIPOL T

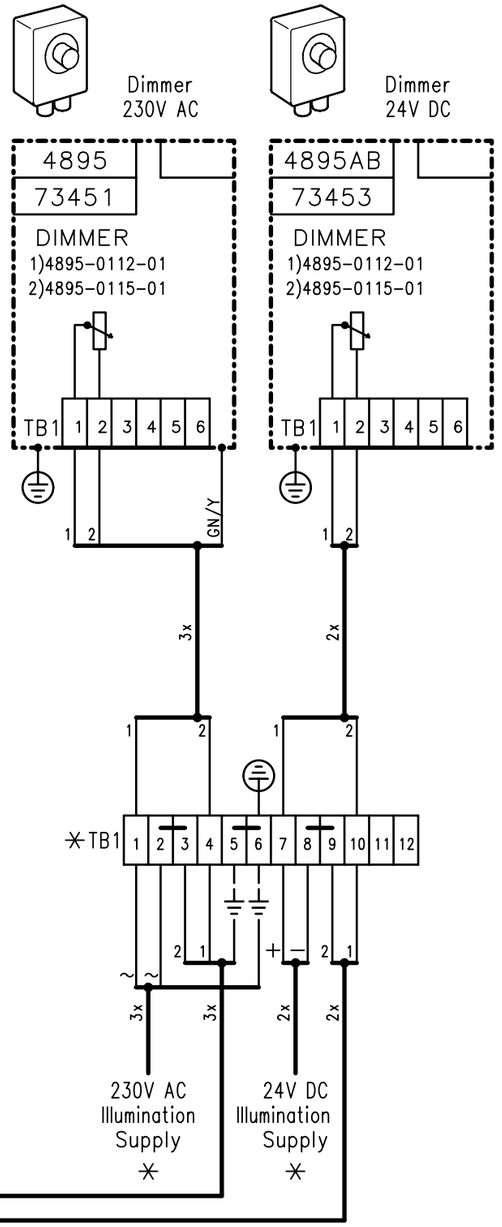
REPLACEMENT FOR: Rev.00

CAD

Blatt SHEET 1

Blattz. SHEETS 1





Revision history:
AA: initial

Rev	ECO-No.	Date	Name
AA	980 544	10.12.02	Keller

NORTHROP GRUMMAN Electronic Systems
Sperry Marine

	Date	Name
Drawn	10.12.2002	Keller
Design	10.12.2002	Blome
Chd ECO	10.12.2002	Preuss

Benennung/TITLE
MAGNETIC COMPASS
BINNACLE NAVIPOL I

Zeichnungs-Nr/DRAWING No.
4054-0153-11 /AA

Blatt SHEET 1
Blattz. SHEETS 1

Lager-Nr.
STOCK No.

DOS 4054\11S01