



FU Steering Control Unit (Handwheel)

Type 105 - 106 (NG004, NG005 NG006)

Type 105 - 106 (MOD128 Bridge)

Type 105-106 (NG 006 with

Wire Break Alarm Device, Type 148-620)

1 Description

2 Technical Data

3 First Putting into Operation

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Annex 1

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Wire Break Alarm Device	Wiring Diagram	148-620.HP008

Parts Catalogue



This equipment includes electromechanical devices such as relays, switches or potentiometers. Electromechanical devices are subject to wear and tear depending on operation cycles and environmental conditions.

FU STEERING CONTROL UNIT
Service Manual

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1 Description

The steering control unit (handwheel) - set into control desks or steering stands - serves as follow-up steering element on bridges (**FOLLOW UP**).
 To change the rudder angle to starboard (STBD) the handwheel must be turned clockwise; the handwheel automatically locks at the selected position.
 In the mechanical zero position the handwheel is slightly engaged.

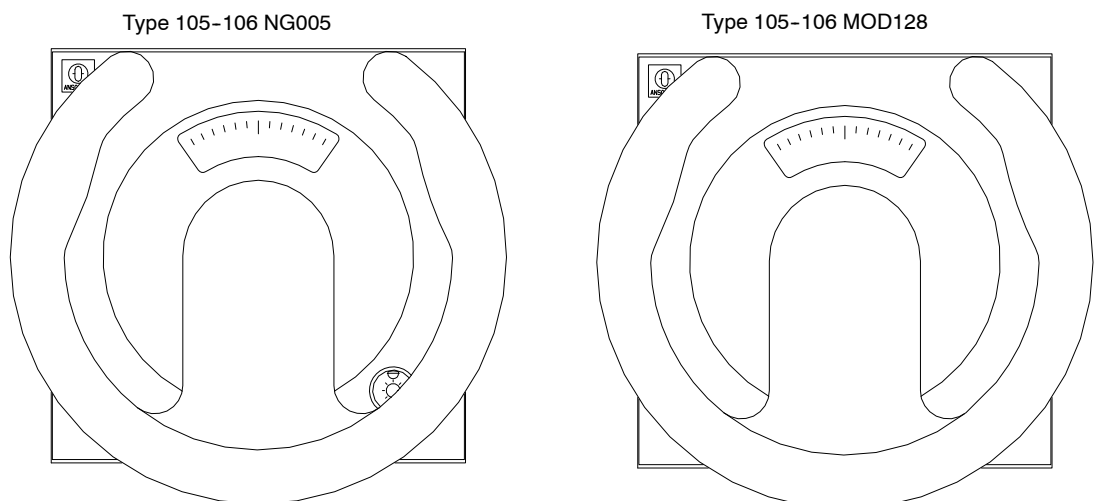
The scale is illuminated, and the brightness regulation is done by hand via a potentiometer (NG005).

The scale is illuminated, and the brightness regulation is done by hand via central dimmer (MOD128).

For possible scale divisions, see 'Technical Data'; the deflection angle of the handwheel is $\pm 150^\circ$.

When the follow-up steering control (FU) is selected via the steering mode selector switch, the illumination of the scale is switched on.

Depending on the application, single-, twin- or fourfold potentiometers are used.
 Optionally, return to zero position via springs is provided.

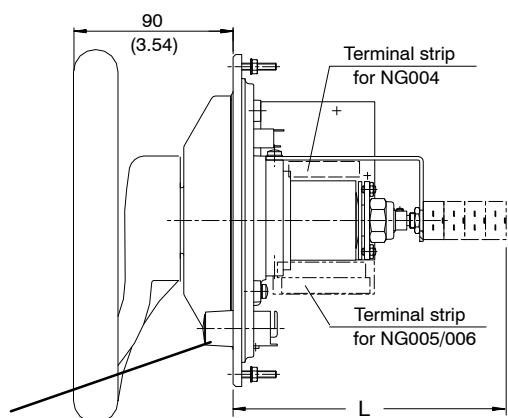


FU STEERING CONTROL UNIT

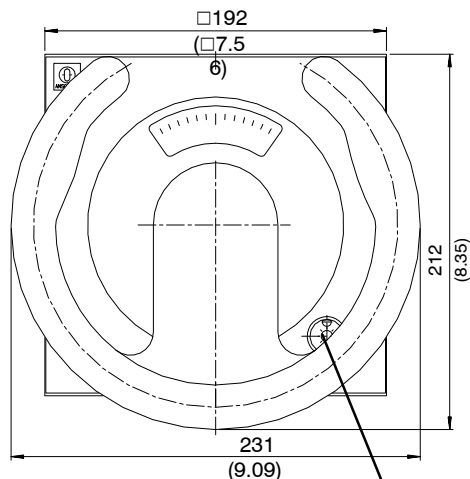
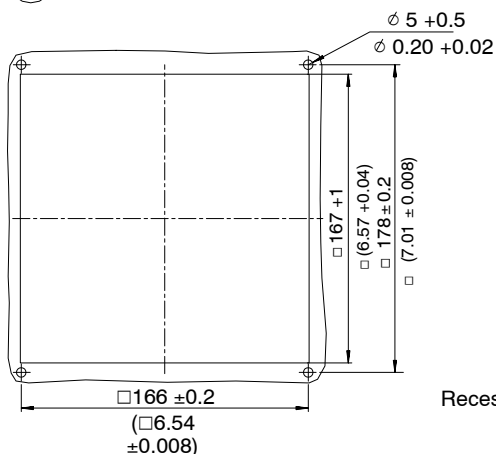
2

Technical Data

Dimensions:



(only Type NG005)



(only Type NG005)

	NG004	NG005	NG006
L:	123 (4.84)	135 (5.32)	159 (6.22)

Recess and drilling scheme

Weight:

approx. 8 kg

Scale range, linear:

±40°

other scales (optional):

±45°, ±60°, ±70°, ±90°

Supply voltage:

24 V DC

Steering potentiometer:

5 kΩ

Number of potentiometers, NG004:

1

NG005:

2

NG006:

4

NG006*:

4

max. wire cross section:

1.5 mm²

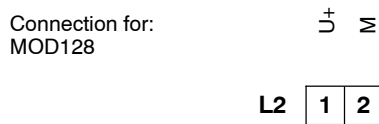
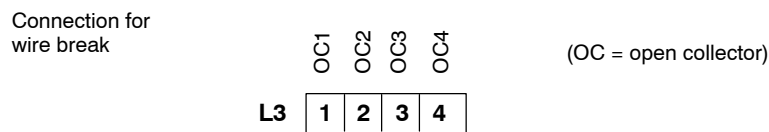
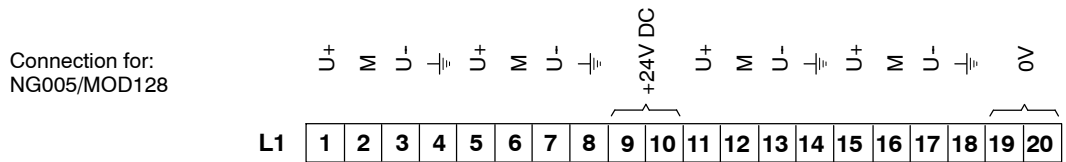
Type of enclosure:

IP 22 EN 60529 after installation

Zero adjustment and setting of the slope via subordinate trim potentiometer.

* NG006 with wire break function (Wire Break Alarm Device)

3 First Putting into Operation



Adjustment: NG004, NG005 and NG006

Offset / Zero:

Set handwheel to 0°; move zero-potentiometer until 0° is shown on the rudder position indicator as well.

Gain:

Set handwheel to 20° (PORT or STBD); move gain-potentiometer until 20° (PORT or STBD) is also shown on the rudder position indicator.

Symmetry:

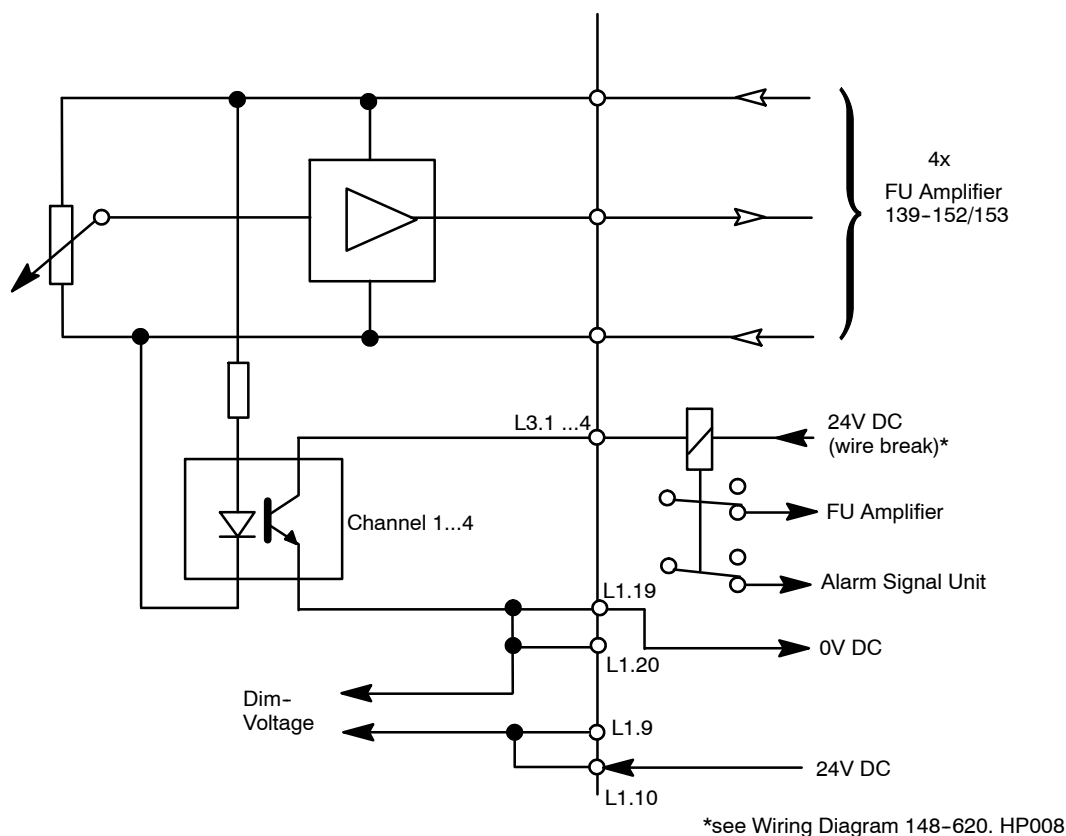
Adjust handwheel to max PORT (for example: 35°) and after that to max. STBD. If there is a difference between both rudder position indicators, then adjust the difference with the potentiometer "SYM".

Check ZERO and GAIN adjustment again.

If necessary repeat the a.m. procedure again.

FU STEERING CONTROL UNIT

Principle operation
(with wire break indication)



Handwheel setrudder 'wire break'

The potentiometer supply of each handwheel channel will be supervised by an optocoupler with a separate open collector transmitter output.

The transmitter output drives an external relay which is used to switch 24 V voltage to the Follow Up Amplifier 139-152/153 (input L5.7).

In case of wire break this 24V status stops the follow up steering and the rudder position is kept.

This avoids that the rudder moving hard-over if (+) or (-) voltage is lost due to a wire break.

Another relay contact is used to indicate the alarm situation.

Wire break of potentiometer wiper is not indicated as failure, rudder will move to mid-ships position.

Attention:

In case of handwheel failure the steering mode (Follow Up) has to be changed to (NFU).

Wire Break Alarm Device (148-620 E01):

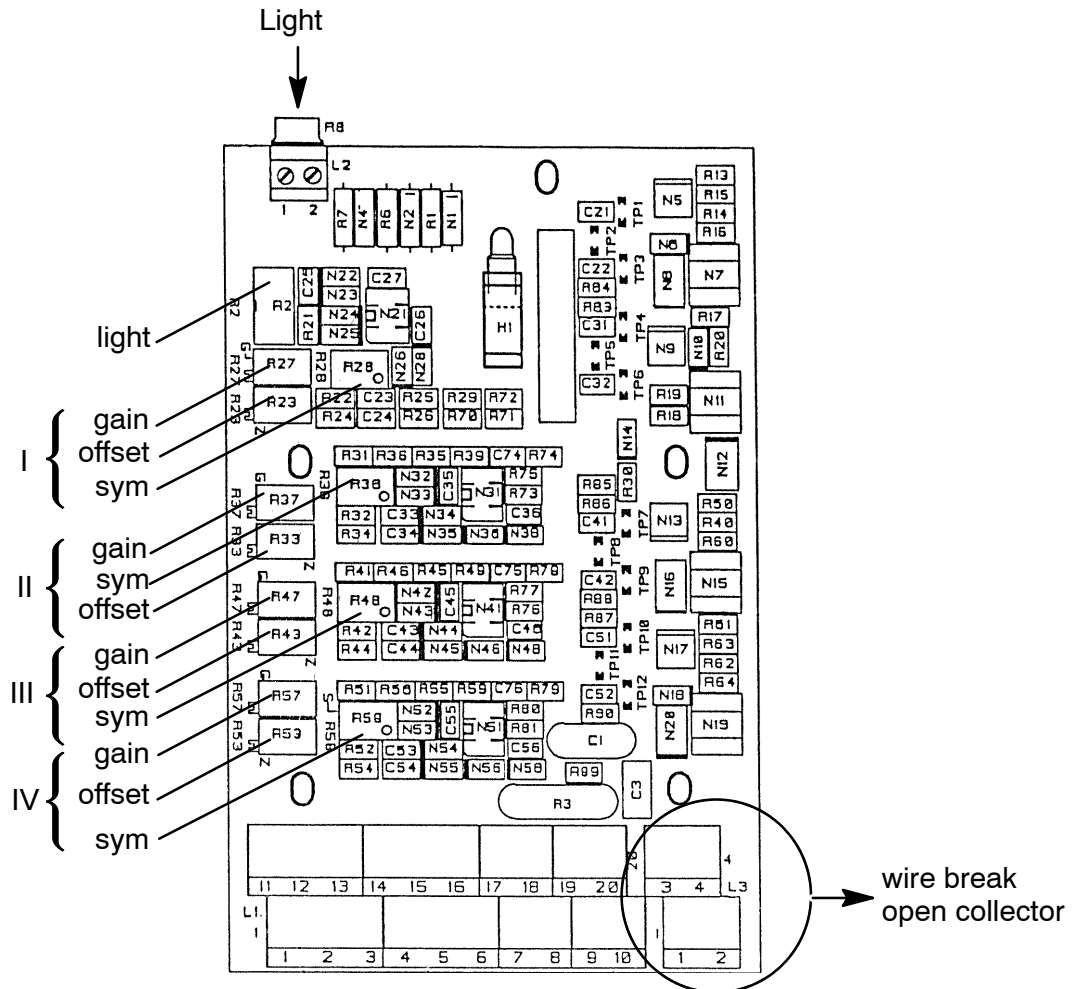
The Wire Break Alarm Device is used to manage the 'Follow Up - Amplifier' and to trigger the signal unit to indicate the wire break alarm.

FU STEERING CONTROL UNIT



Technical
Documentation

Position of the potentiometers on the PCB:



FU STEERING CONTROL UNIT

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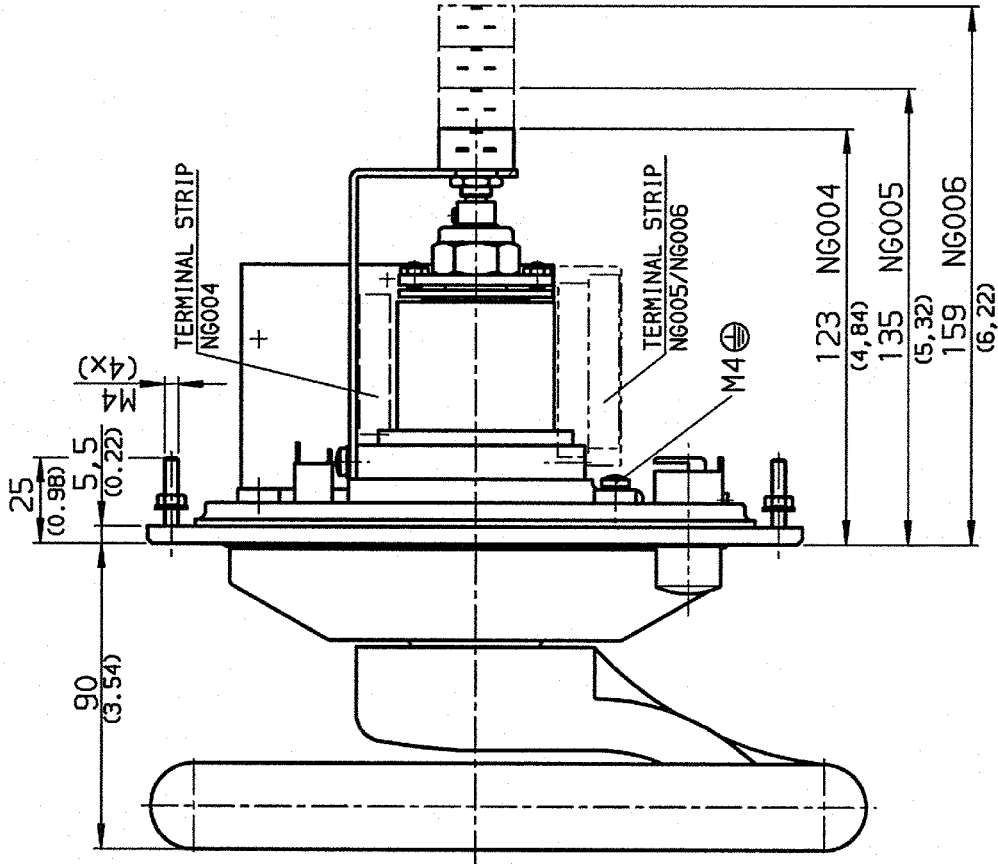
Version Type105-106 Mod 128:

The dimmer was removed from the FU steering control, Type 105-106 NG005. Dimming of the scale illumination is carried out via a central dimmer in the bridge desk. The FU steering control is therefore designated 105-106 Mod 128.

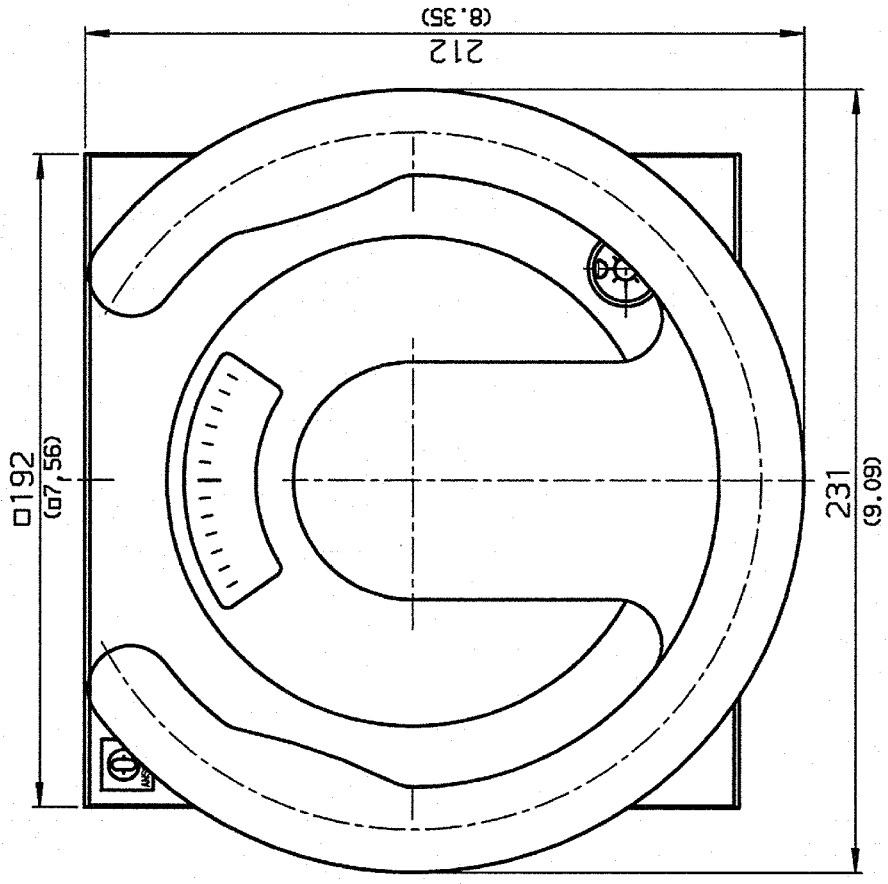
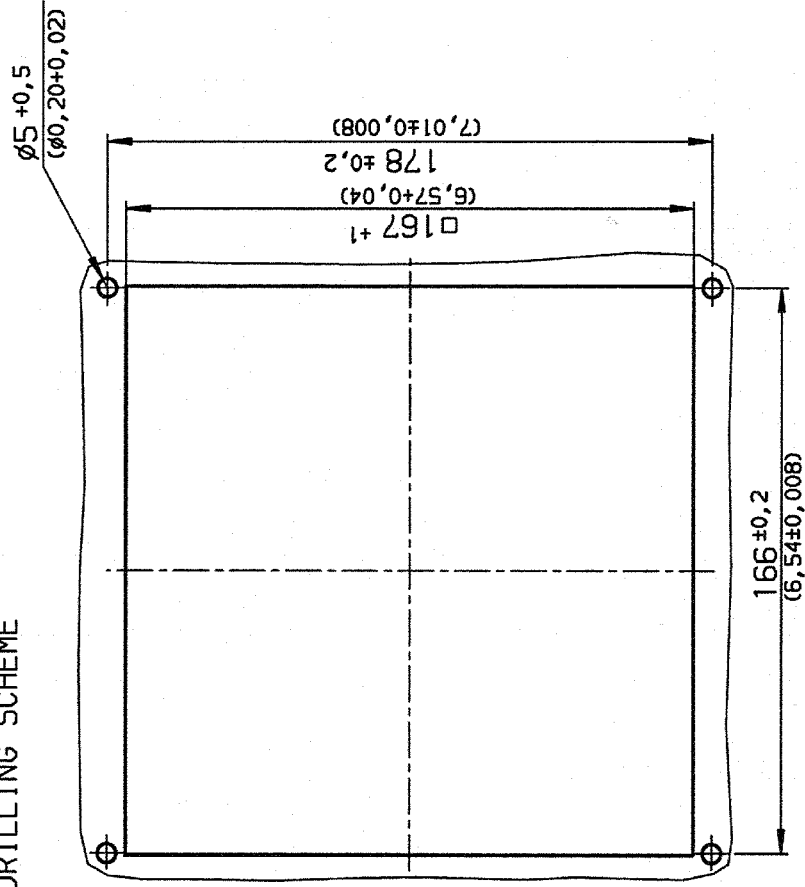
FU STEERING CONTROL UNIT

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- B, T.:
- NG004
- NG005
- NG006
- NG008
- SA005
- SA008
- SA016
- SA017
- SA018
- SA019
- SA020
- SA021
- SA022
- SA024
- SA027
- SA028



DRILLING SCHEME



105-106.HP011

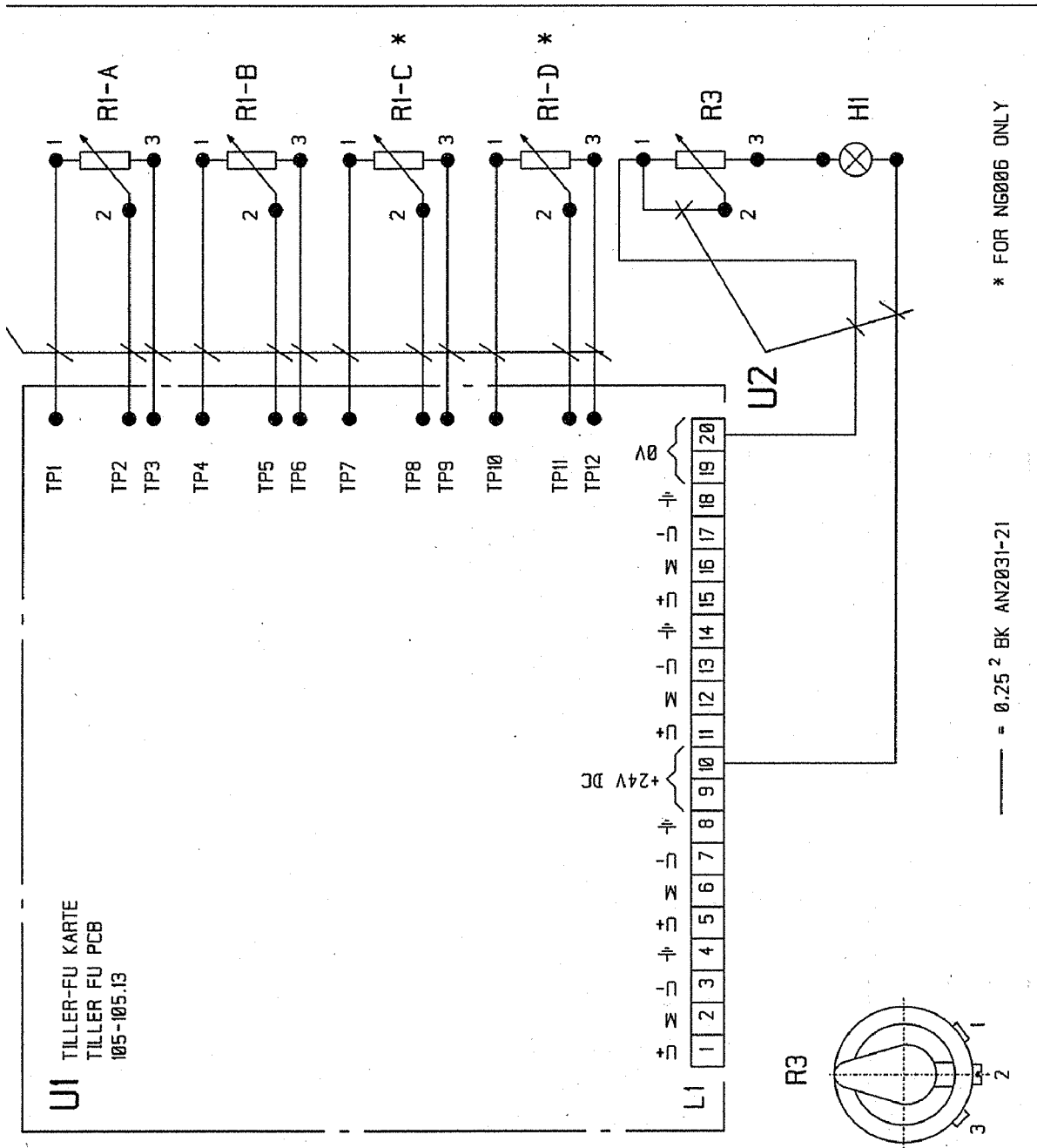


TYPE OF ENCLOSURE : EN 60529 IP22

DIMENSIONS WITHOUT TOLERANCES ARE MAXIMUM DIMENSIONS

CAD / APK

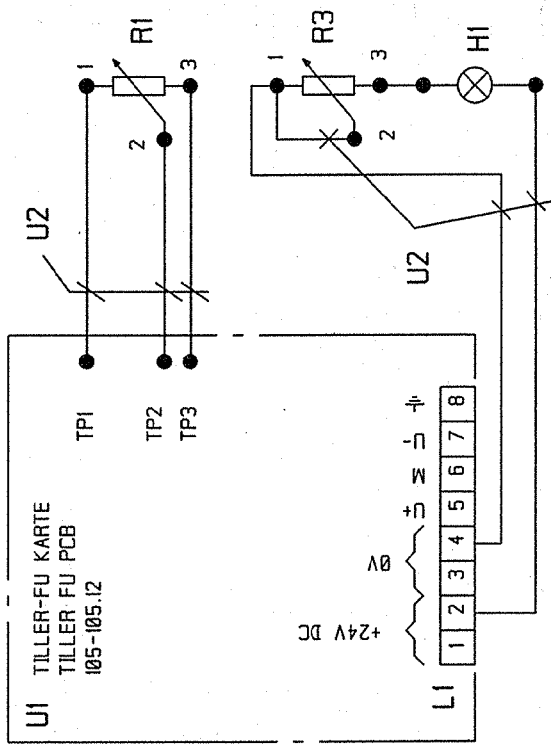
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STEERING CONTROL UNIT FU			
DIMENSIONAL DRAWING			
DRAWING NO.:			
105-106.HP011			SH. 1
			OF 1
1997		DATE	
DR.		NAME	
APPR.		DATE	
CHK.		DATE	
RELEASE:		DATE	
 Raytheon Marine GmbH Germany			
REV.	REVISIONS	DATE	NAME
A	2946.105	07.05.04	Haf



DIN CODE	BENENNUNG DENOMINATION	TYP / ZEICHNUNGS-NR. TYPE / DRAWING NO.	POS.NO.	AUS STOCKLISTE FROM PARTS LIST	GILT FÜR APPLICABLE TO
HI	LAMPE 28V 60MA	NB12-048.00-021	HI	105-106.NG005/NG006	
L1	KLEMMENLEISTE	MKKDSN 1.5 /2POL./3POL.	10, 11	105-105.13	
U1	TILLER FU - PCB	105-105.13	5	105-106.NG005/NG006	
U2	VERDRAHTUNG	105-105.05	4	105-106.NG005/NG006	
RI-A-D	DREHWIDERSTAND 4x20KO	FCP 22 EG	RI	105-106.NG006	NG006
RI-A-B	DREHWIDERSTAND 2x20KO	FCP 22 EG	RI	105-106.NG005	NG005
R3	DREHWIDERSTAND 470 OHM	NB07-001.00-026	R3	105-106.NG005/NG006	
TP1-TP12	LOTSTIFT	1016L MS-SNB	13	105-105.13	

[CAD]		CAD B 4329 F M 1:1		105-106.HP007	
		ALLEGEMENTOLERANZ ISO 2768 - mk		05000009	
		2004 DATUM NAME		BENENNUNG	
		BEARB 29.06. KE/KUM		STEUEREINSAZS FU /	
		GEPR 29.06. <i>Gepr</i>		STEERING CONTROL UNIT FU	
F	2952.105	290604 KUM NORM	6.7.04 <i>Gepr</i>	BAUSCHALTPLAN / WIRING DIAGRAM	
E	2896.105	081002 KE	FREIG 25.06.96 <i>Gepr</i>	ZEICHNUNGSNUMMER	
D	2817.105	120299 RAMM		105-106.HP007	
C	2811.105	301198 KE		BL. 1	
B	2804.105	020798 STE		VON 1	
ZUST	ANDERUNG	DATUM NAME		ERS.DURCH	
		Raytheon Raytheon Marine GmbH Germany		ERS.DURCH	

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— = 0,25² BK AN2031-21

DIN CODE	BENENNUNG DENOMINATION	TYP / ZEICHNUNGS-NR. TYPE / DRAWING NO.	POS.NO.	AUS STÜCKLISTE FROM PARTS LIST	GILT FÜR APPLICABLE TO
HI	LAMPE 28V 60MA	NB12-048.00-021	HI	105-106.NG004/NG008	
L1	KLEMMENLEISTE	MKDSN 1,5 /2POL./3POL.	10, 11	105-105.12	
U1	TILLER FU - PCB	105-105.12	5	105-106.NG004/NG008	
U2	VERDRAHTUNG	105-106.06	4	105-106.NG004/NG008	
RI	DREHWIDERSTAND 20KO	FCP 22 E	RI	105-106.NG004/NG008	
R3	DREHWIDERSTAND 470 OHM	NB07-001.00-026	R3	105-106.NG004/NG008	
TP1-TP3	LOTSTIFT	1016L M5-SN8	13	105-105.12	

CAD

105-106.HP008

05009044

ALLGEMEINTOLERANZ
ISO 2768 - mk

2004	DATUM	NAME
BEARB	29.06.	KE/KUM
GEPR	29.06.	<i>Leisner</i>
NORM	6.7.04	<i>Leisner</i>
FREIG	25.06.96	<i>Leisner</i>

BENENNUNG

STEUEREINSAZS FU /

STEERING CONTROL UNIT FU

BAUSCHALTPLAN / WIRING DIAGRAM

CAD B 4330 G M 1:1

ZEICHNUNGSNUMMER

105-106.HP008

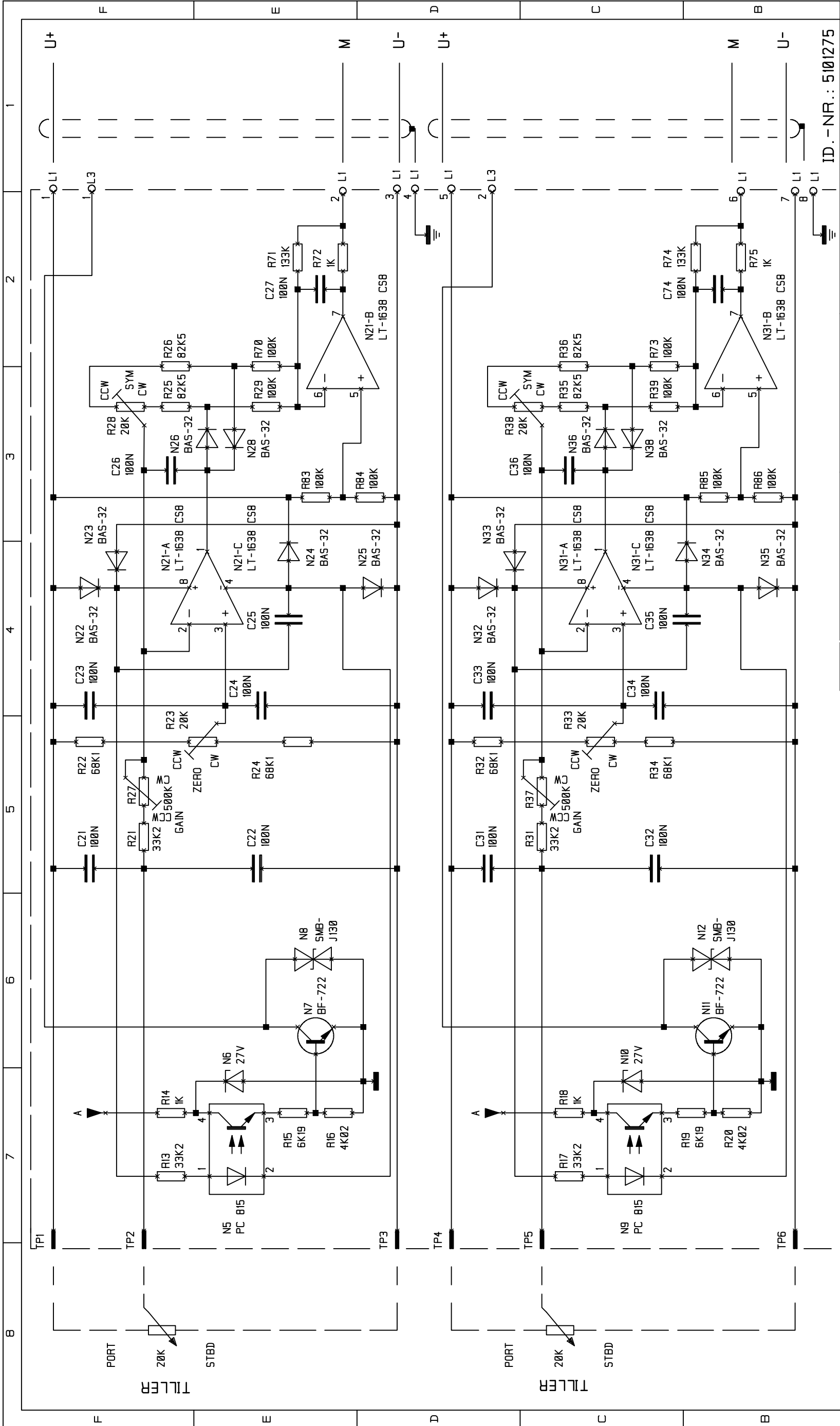
ERS. DURCH

Raytheon
Raytheon Marine GmbH
Germany

ERS. DURCH

BL. 1

VON 1



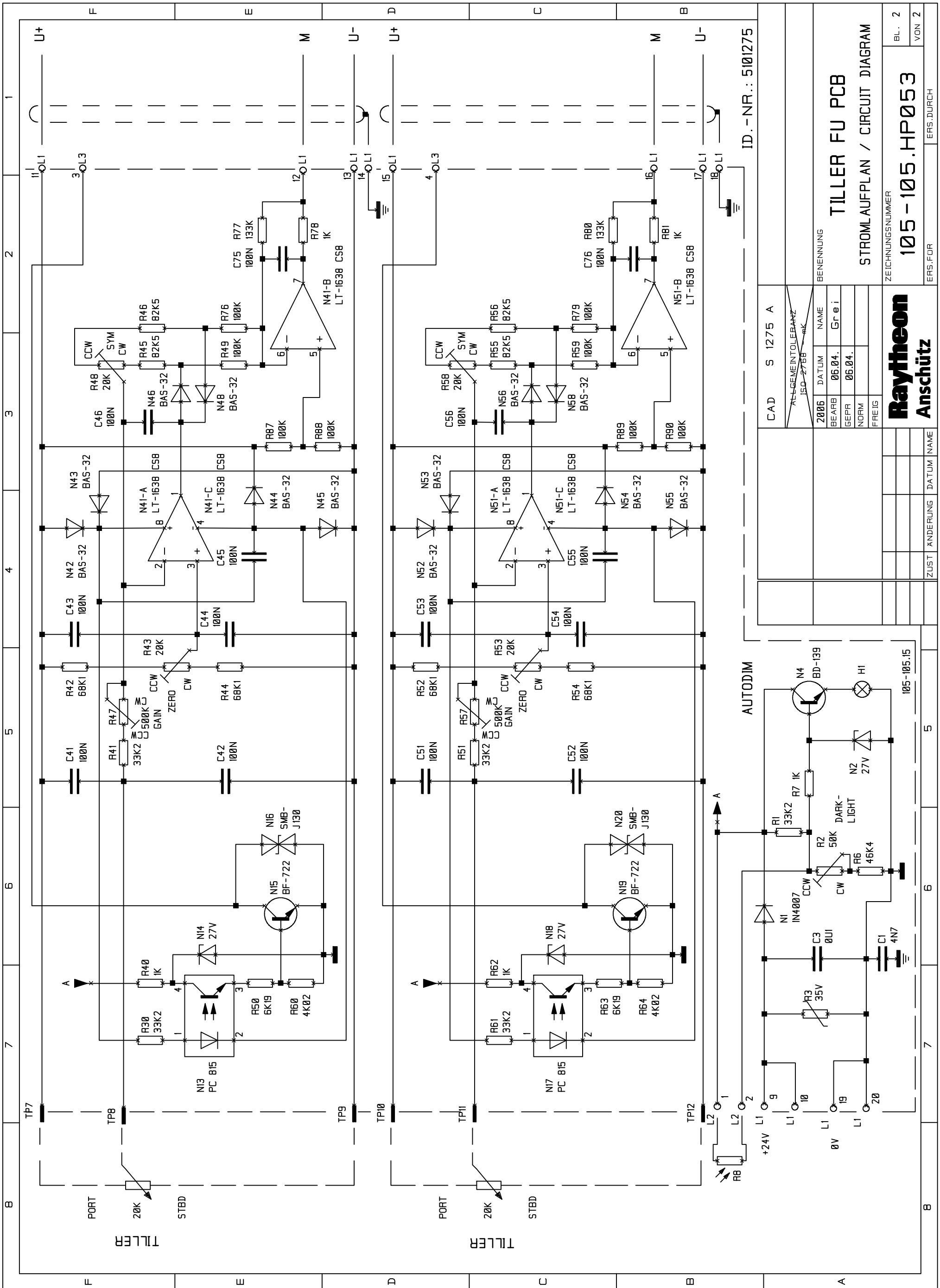
ID.-NR.: 5101275

CAD S 1275 A		BENENNUNG	
ALLGEMEINTOLERANZ ISO-2768-MK		TILLER FU PCB	
2006	DATUM	NAME	STRÖMLAUFPLAN / CIRCUIT DIAGRAM
BEARB	06.04.	Grei	
GEPR	06.04.		
NORM			
FREIG			

ZEICHNUNGSNUMMER		ERS.FÜR	
105-105.HP053		BL. 1 VON 2	

Raytheon		ANSCHÜTZ	
BLATT	ZUST	ÄNDERUNG	DATUM

105-105.15		5	
		6	
		7	
		8	



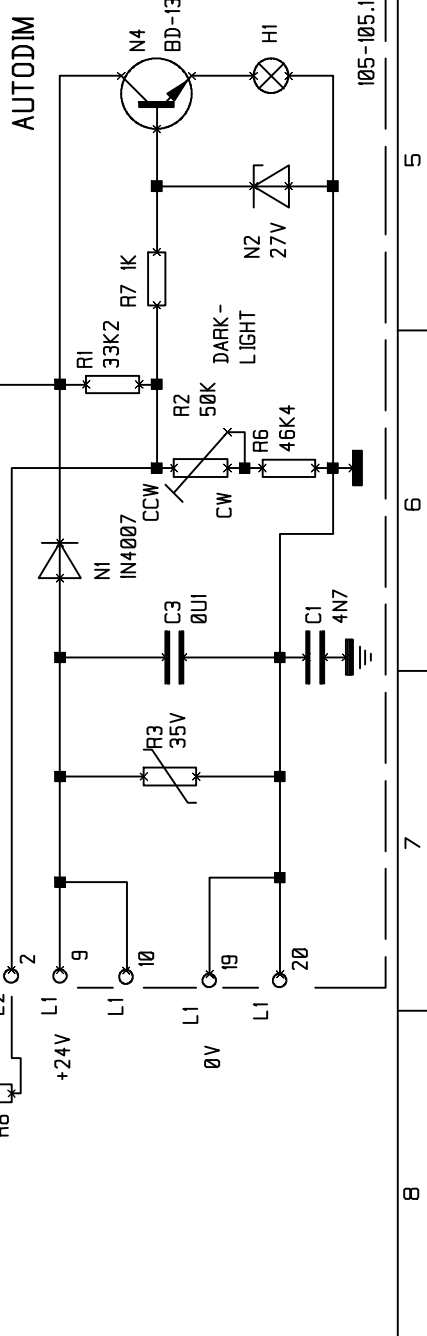
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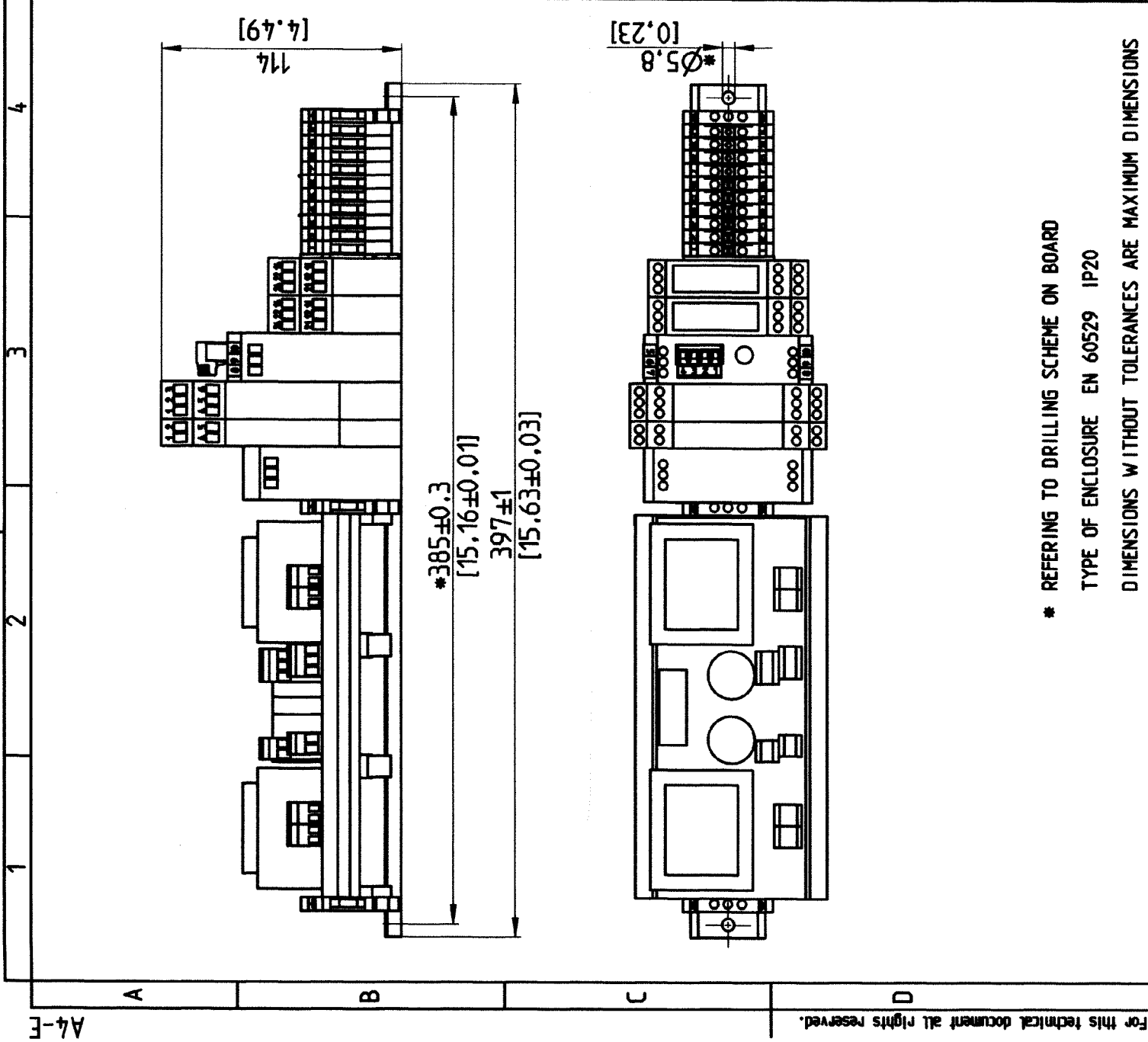
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ALL-GEWEMINTOLERANZ ISO-2788			
2006	DATUM	NAME	
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GEPR	06.04.		
NORM			
FREIG			

TILLER FU PCB
STROMLAUFPLAN / CIRCUIT DIAGRAM

ZEICHNUNGSNUMMER
105-105.HP053
ERS.FÜR
BL. 2
VON 2

Raytheon Anschütz		ZUST	ÄNDERUNG	DATUM	NAME





* REFERRING TO DRILLING SCHEME ON BOARD
 TYPE OF ENCLOSURE EN 60529 IP20
 DIMENSIONS WITHOUT TOLERANCES ARE MAXIMUM DIMENSIONS

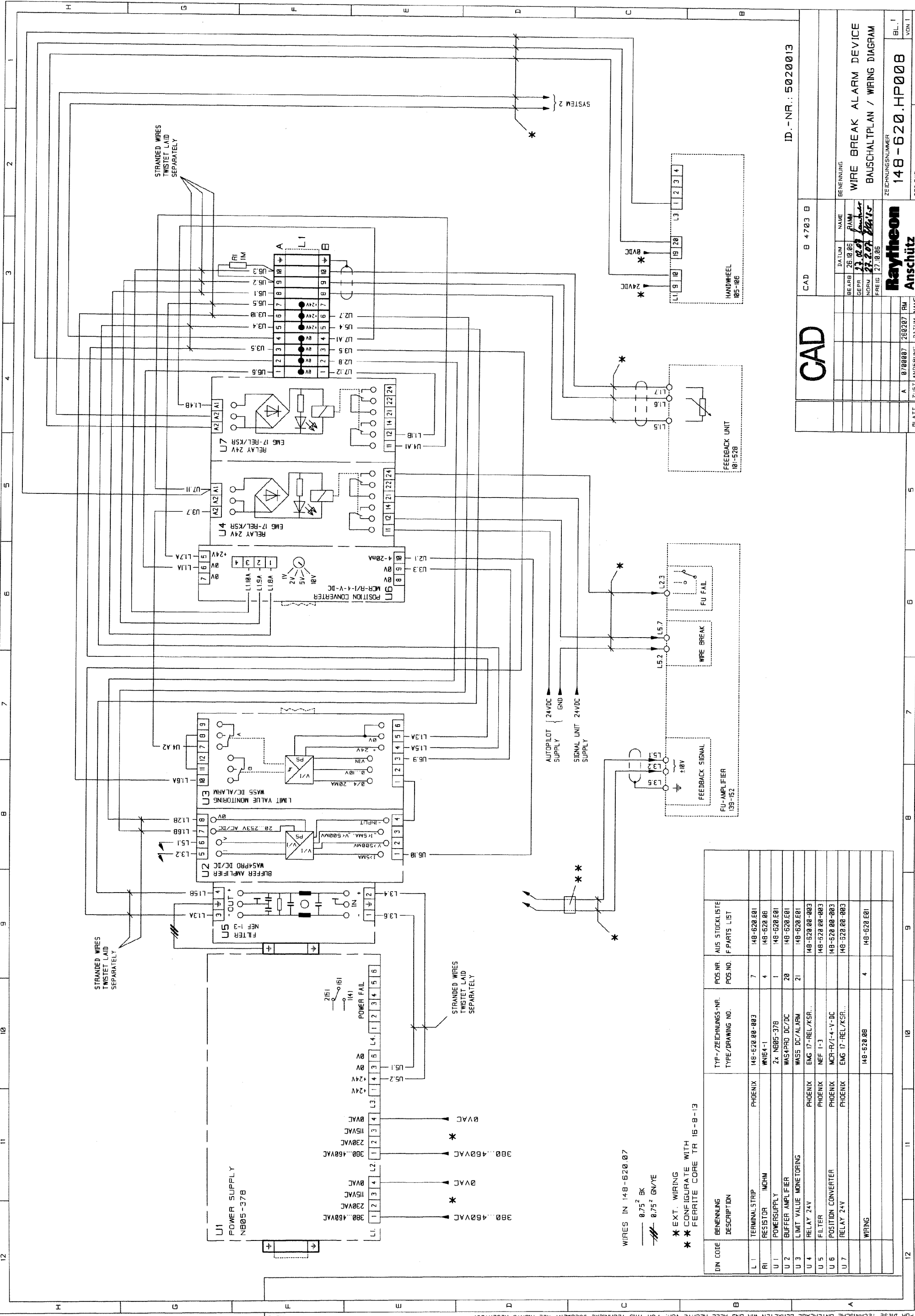
CAD 3D		Id.Nr. 5020015	
SCALE: -		WEIGHT: ca. 2 Kg	
DRAWING TITLE: WIRE BREAK ALARM DEVICE DIMENSIONAL DRAWING			
DRAWING NO.: 148-620.HP009			
SH. 1 OF 1			
DATE: 26.10.06		NAME: Zim	
DR.:		APPR. 24.1.07	
CHK. 25.1.07		RELEASE: 03.11.06	
REV. 0700031		DATE 24.01.07	
REVISIONS		DATE NAME	
A		Zim	

CAD

Raytheon
Anschütz

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A4-E



ID.-NR.: 5020013

CAD

DATE	26.10.85	NAME	FRAM
BEARB	27.10.85	NAME	FRAM
GEFR	27.10.85	NAME	FRAM
NOPM	27.10.85	NAME	FRAM
FREIG	27.10.85	NAME	FRAM

BENENNUNG
WIRE BREAK ALARM DEVICE
BAUSCHALTPLAN / WIRING DIAGRAM

ZEICHNUNGSNUMMER
148-620.HP008

BLATT
A 0700007 260207 RM

BLATT ZUSTÄNDIG
ANDERUNG DATUM NAME

ERS DURCH

BLATT

BLATT

BLATT

BLATT

DIN CODE	BENENNUNG DESCRIPTION	TYP-/ZEICHNUNGS-NR. TYPE/DRAWING NO.	POS.NR. POS.NO.	AUS STOCKLISTE F. PARTS LIST
L 1	TERMINAL STRIP	PHOENIX 148-620.00-003	7	148-620.001
RI	RESISTOR	W1064-1	4	148-620.00
U 1	POWERSUPPLY	2x NB05-378	1	148-620.001
U 2	BUFFER AMPLIFIER	WAS4PRO DC/DC	20	148-620.001
U 3	LIMIT VALUE MONITORING	WAS5 DC/ALARM	21	148-620.001
U 4	RELAY 24V	EMG 17-REL/KSR..	2	148-620.00-003
U 5	FILTER	PHOENIX NEF 1-3	1	148-620.00-003
U 6	POSITION CONVERTER	PHOENIX MCR-R/1-4-Y-DC	1	148-620.00-003
U 7	RELAY 24V	EMG 17-REL/KSR..	1	148-620.00-003
	WIRING	148-620.00	4	148-620.001

WIRES IN 148-620.07

0.75² BK

0.75² GVYE

* EXT. WIRING

* CONFIGURATE WITH

FERRITE CORE TR 16-B-13

STRANDED WIRES
TWISTED LAID
SEPARATELY

STRANDED WIRES
TWISTED LAID
SEPARATELY

STRANDED WIRES
TWISTED LAID
SEPARATELY

CAD B 4703 B

DATE 26.10.85
NAME FRAM

BEARB 27.10.85
NAME FRAM

GEFR 27.10.85
NAME FRAM

NOPM 27.10.85
NAME FRAM

FREIG 27.10.85
NAME FRAM

ERS DURCH

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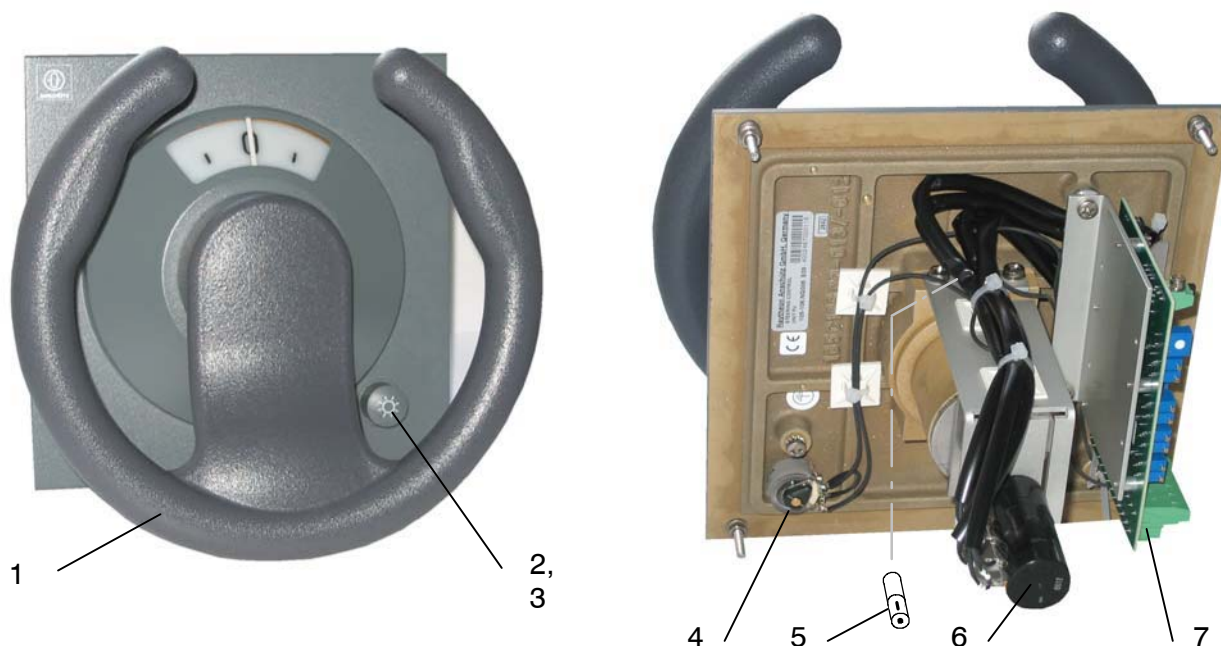
BLATT

BLATT

Steuereinsatz FU
Steering Control Unit FU
Type 105-106.NG...



Ersatzteilkatalog
SPARE PARTS
CATALOGUE



Pos.	Lager-Nr. Stock-No.	Benennung	Designation	Zeichnungs-Nr. Part-No.	Stck. in NG... Qty. In NG...				Herst.- Code MFRC	Versorgungs-Nr. NSN
					NG003 E02	NG004 E03	NG005 E05	NG006 E05		
1	3609375	Handrad	Hand Wheel	105-106.11	1	1	1	1	D2865	
2	3502706	DRRehknopf	Knob	105-106.00-035	1	1	1	1	D2865	
3	4004703	Dichtung	Gasket	NB02-349	1	1	1	1	D2865	
4	1770164	Drehwiderstand	Potentiometer	NB07-001.00-026 (470 Ohm 10% 5W)	1	1	1	1	D2865	5905-12-335-9883
5	1502620	Lampe	Lamp	NB12-048.00-021 (28V 0,06A BA7s)	1	1	1	1	D2865	6240-12-348-6669
6	1770026	Drehwiderstand	Potentiometer	FCP 22 E (4x5kOhm Lin=1% 1W)	1				D2865	5905-12-353-4857
	1770547	Drehwiderstand	Potentiometer	FCP 22 E (20kOhm Lin=1% 1W)		1			D2865	
	1770546	Drehwiderstand	Potentiometer	FCP 22 EG (2x20kOhm Lin=0,5% 1W)			1		D2865	
	1770544	Drehwiderstand	Potentiometer	FCP 22 EG (4x20kOhm Lin=0,5% 1W)				1	D2865	
7	3600313	Tiller FU-PCB	Tiller FU-PCB	105-105.11	1				D2865	
	3604100	Tiller FU-PCB	Tiller FU-PCB	105-105.12 E02		1			D2865	
	3609838	Tiller FU-PCB	Tiller FU-PCB	105-105.15			1	1	D2865	

All depicted items which are not mentioned in the text are not applicable for this unit. Since further development may necessitate making modifications to existing equipment, its conformity with the relevant illustrations and drawings is not always ensured. Raytheon Anschutz will be under no liability whatever that may arise from any such differences.

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