

APPROVAL DRAWING

Bearing Monitoring System BDTCMS

Project name	
POR no.	Schulung
Ship owner	
Shipyard	
Engine no.	
Hull no.	
Horn part no.	900180; 26.01.2022; MR
Engine type	6S50ME-B9.3
Engine builder	Schulung
Propeller type	FPP
Quotation no.	220106

Content:

1. General
2. Scope of supply
3. Spare parts
4. Tools
5. Drawings of engine mounted equipment - inside of engine
6. Drawings of engine mounted equipment - outside of engine
7. ECR - Engine control room equipment
8. Wiring diagram
9. Appendix for brackets

1. General

Engine mounted equipment (inside of engine)

- 1 Distance sensors type IW000184 with flying cables type KSG03252-15 including connectors.
- 2 Splash oil temperature sensor TGL00921-1 with cable
- 3 Temperature sensor TGL00921-2-202 with cable
- 4 Cable gland for one cable
- 5 Cable gland for two cables
- 6 Cable gland for three cables
- 7 Cable gland for four cables
- 8 Temperature sensor TGL00921-2-207 with cable
- 9 Temperature sensor TGL00921-3-183 with cable
- 0 Temperature sensor TGL00921-3-203 with cable
- 1 Mounting accessories for Brackets
- 2 Cable fixing by use of gland plate type ZUG00426 (see drwg. ANG00833)
- 3 Cable fixing by use of magnetic cable clips type ZUG00441 (see drwg. ANG00834)

Engine mounted equipment (outside of engine)

- 1 Water in oil sensor type FRG00032-6_AW including 15m cable, shall be mounted behind the lube oil pump. (see drwg. ANG00509 and ANG00662).

ECR-Engine control room equipment

- 1 1 pc. Indication unit MDA3124013-4 for installation in control panel.

Wiring Diagram

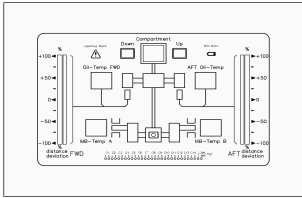
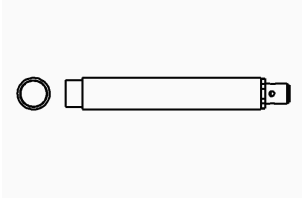
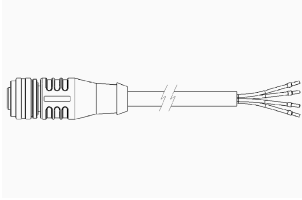
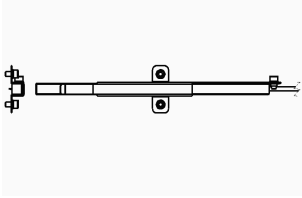
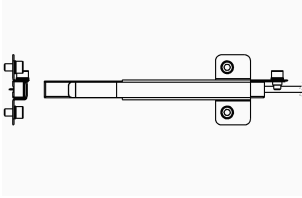
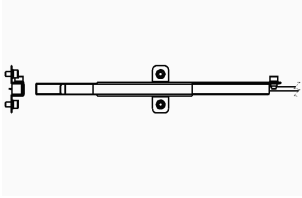
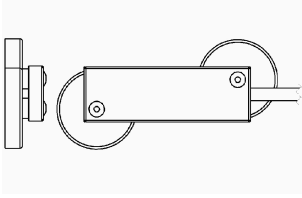
1. Wiring diagramm for terminal box and line converter box (see chapter 6)
2. Wiring diagramm for terminal box, line converter and indication unit in the ECR (see chapter 6)
3. Example schematic of distance sensor arrangement for 6 cylinders on engine and sensor placement in the engine (see chapter 6)

Cable

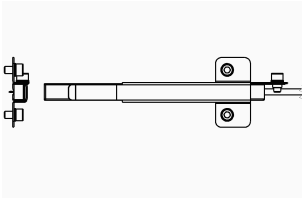
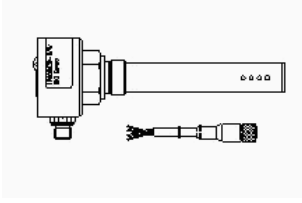
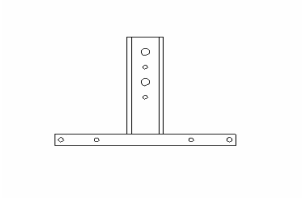
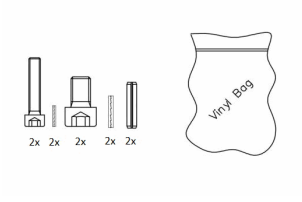
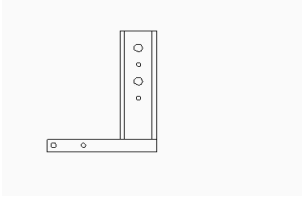
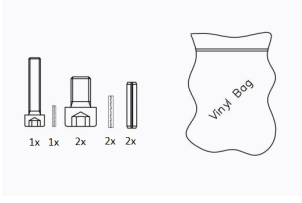
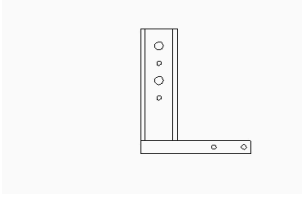
100 M bus cable type LT2004D0 for connection of Line converter box and Indication unit MDA312...

Modifications with similar function are subject to change.

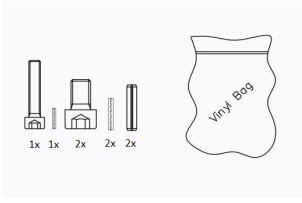
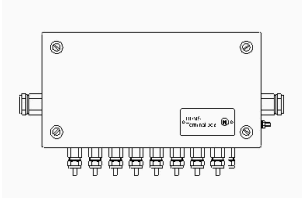
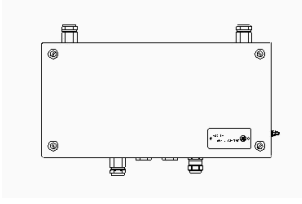
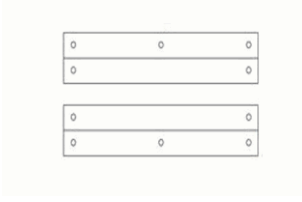
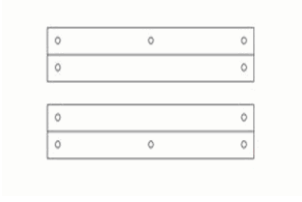
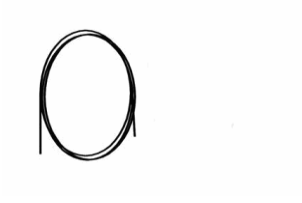
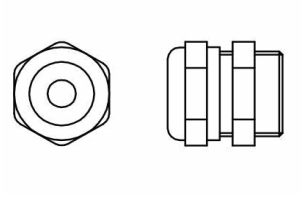
2. Scope of supply

No.	Name	Sketch	Part no.	Qty.	Qu	Remark
01	Indication unit BDTCMS 164x230		MDA3124013-4	1	ST	ECR
02	Distance sensor SCP		IW000184	12	ST	Engine side
03	Cable with connector 4-pin		KSG03252-15	12	ST	Engine side
04	Temperature sensor main bearing		TGL00921-2-207 for first bearing	1	ST	Engine side for first bearing
05	Temperature sensor bearing		TGL00921-3-183 for middle bearing	5	ST	Engine side for middle bearing
06	Temperature sensor main bearing AFT		TGL00921-2-202 for last bearing	1	ST	Engine side for last bearing
07	Temperature sensor splash oil		TGL00921-1 for splash Oil	6	ST	Engine side for splash Oil

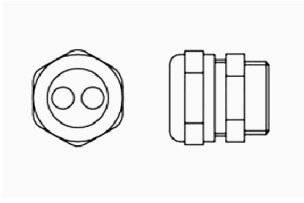
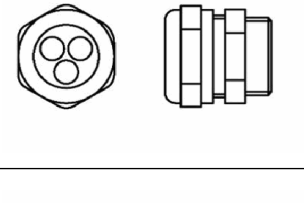
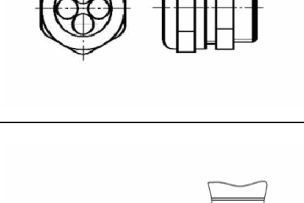


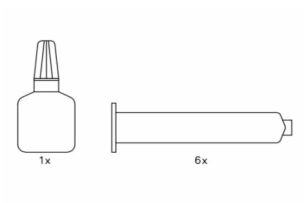
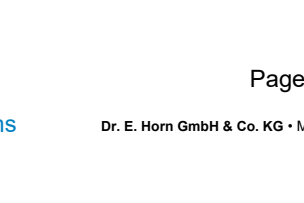
2. Scope of supply

No.	Name	Sketch	Part no.	Qty.	Qu	Remark
08	Temperature sensor bearing		TGL00921-3-203 for thrust bearing	1	ST	Engine side for thrust bearing
09	Water in oil sensor, 15m		FRG00032-6_AW	1	ST	Engine side
10	Bracket		HAG00441	5	ST	Engine side
11	Accessory Screws for Bracket		ZUG00421	5	ST	Needed for: HAG00...
12	Bracket left		HAG00441-L	1	ST	Engine side
13	Accessory Screws for Bracket left or right		ZUG00422	1	ST	Needed for: HAG00...-L, HAG00...-R
14	Bracket right		HAG00441-R	1	ST	Engine side



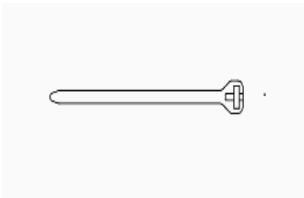
2. Scope of supply

No.	Name	Sketch	Part no.	Qty.	Qu	Remark
15	Accessory Screws for Bracket left or right		ZUG00422	1	ST	Needed for: HAG00...-L, HAG00...-R
16	Terminal box SCP 300x150x120 varnishes		GHG02621-3	2	ST	Mounted on BLG0040...
17	Box line converter SCP 400x200x120 varnishes IN 24VDC OUT 24VDC		GHG02611-4	1	ST	Mounted on BLG0040...
18	Supplies Wall fastening set GHG02621-3		ZUG00455	2	ST	Engine side
19	Supplies Wall fastening set GHG02611-4		ZUG00454	1	ST	Engine side
20	cable for connection of terminal box		LT2004F0	15	M	Engine side
21	Cable gland M20x1,5		KV000446	2	ST	Engine side

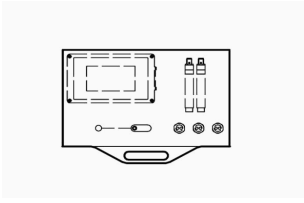

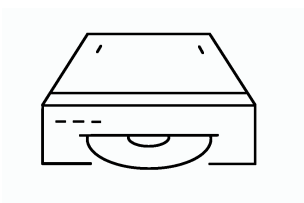
2. Scope of supply

No.	Name	Sketch	Part no.	Qty.	Qu	Remark
22	Cable gland M20x1,5		KV000481	2	ST	Engine side
23	cable gland M20x1,5		KV000483	2	ST	Engine side
24	cable gland M20x1,5		KV000484	10	ST	Engine side
25	Gland plate		ZUG00426 for Cable to IW000184	6	ST	Engine side for Cable to IW000184
26	Gland plate		ZUG00425 for Cable to IW000184	6	ST	Engine side for Cable to IW000184
27	Set of magnets		ZUG00441 for Cable to TGL00921...	12	ST	Engine side for Cable to TGL00921...
28	Mounting set silicone 4-7 cylinder		ZUG00451	4	ST	Engine side

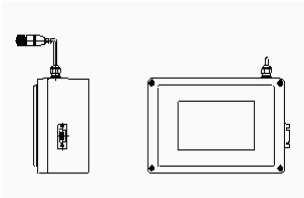

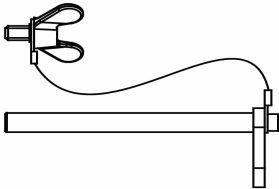
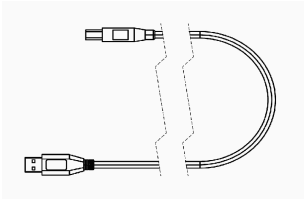
2. Scope of supply

No.	Name	Sketch	Part no.	Qty.	Qu	Remark
29	Cable 4x1x0,34mm ² d=7,5 CAN-BUS PUR high-flexible	 <p>Bus cable violett 4x1x0.34mm² for use at shipyard</p>	LT2004D0	100	M	Engine side (for use at shipyard)
30	cable		LT2016D0	10	M	ECR (for connection to AMS / safety system)
31	cable tie 4,8x360		CL000024	100	ST	Engine side

3. Spare parts

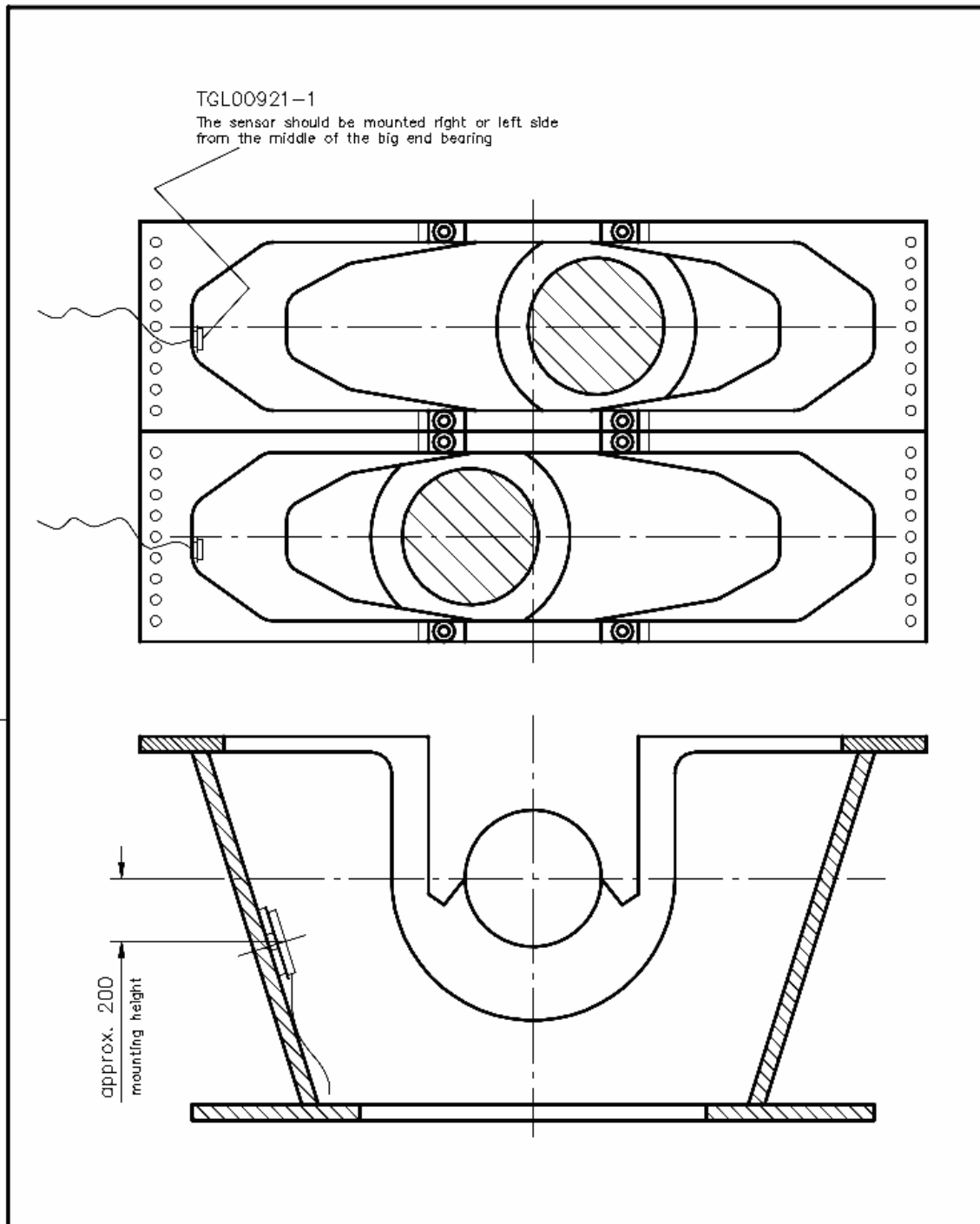
No.	Name	Sketch	Part no.	Qty.	Qu	Remark
01	Spare part and tool case		TAG00071-1	1	ST	Spare part
02	Glas fuse 3,15A		ZUG00453	1	ST	Spare part
03	Instruction manual BDMS/BTMS		DK002262	1	ST	

4. Tools


No.	Name	Sketch	Part no.	Qty.	Qu	Remark
01	User interface to MDA312... with cable		EV314013	1	ST	Tool
02	Distance plate		EM001040	1	ST	Tool
03	Sensor removal tool		SRT00103	1	ST	Tool
04	USB-Cable 5m		LTG01911	1	ST	Tool

5. Drawings of engine mounted equipment - Inside of engine

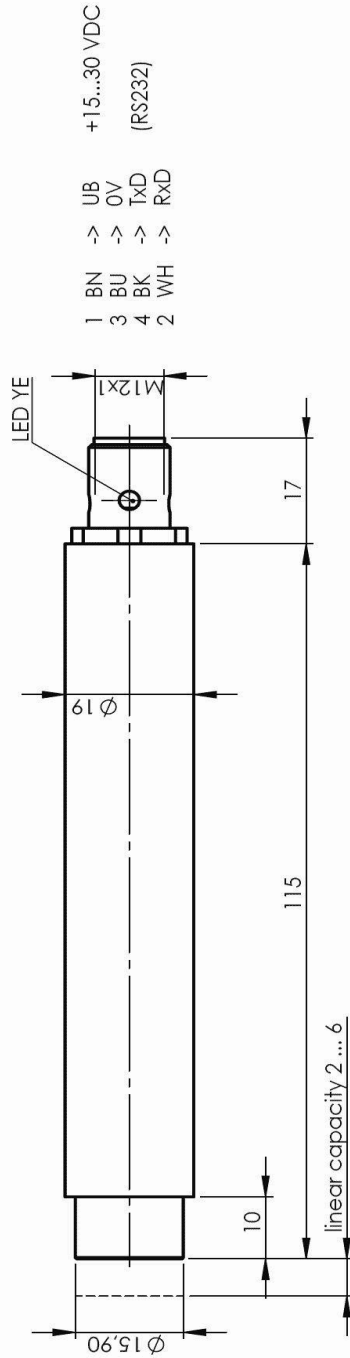
Splash Oil Sensor arrangement



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CAD Nr. ANG00813		Tag	Name	Z.-Nr.	Maßstab	
		Gez.	17.04.12	Schmied	ANG00813	
		Gepr.	17.04.12	Hamm		
		Norm			Benennung	
		 Dr. E. Horn GmbH & Co. KG D-71116 Gaertringen		Splash Oil Sensor arrangement		
e				Ersatz für		
d				Ersetzt durch		
c	Updated			19.12.18	Ghaz.	
b	Updated			27.03.17	Stengelin	
a	Updated	10.09.13	Schmied			
	Änderung	Tag	Name		X Y	

Distance sensor IW000184

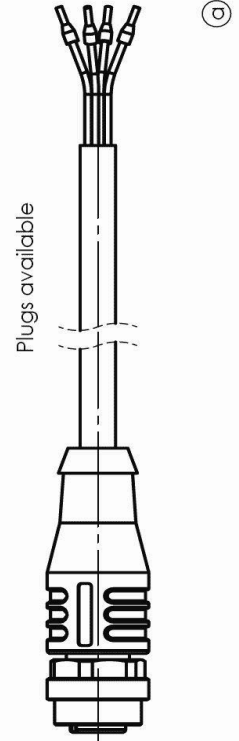


- 1 BN → UB +15...30 VDC
- 3 BU → OV (RS232)
- 4 BK → TXD
- 2 WH → RXD

Technical Data

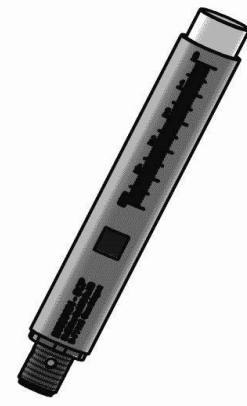
- Protection IP 67 DIN EN 60529
- Oscillator cover PEEK
- Housing material 1.4305
- Connection Connector M12
- Short circuit protection Yes
- Shock a. vibration acc to: EN 50008
- Operating voltage +15...30 VDC
- Current consumption 50 mA
- Linear capacity 2...6 mm
- Linearity ± 4 %*
- Temperature coefficient 2 %/K*
- Target 24x24x1mm S235JR
- Operating tem. 0...+70 °C

KSG03252-15	15 m
Connector	length
Cable diameter	Ø5,1 mm
min. bending radius (fixed)	30 mm
min. bending radius (repeated)	65 mm

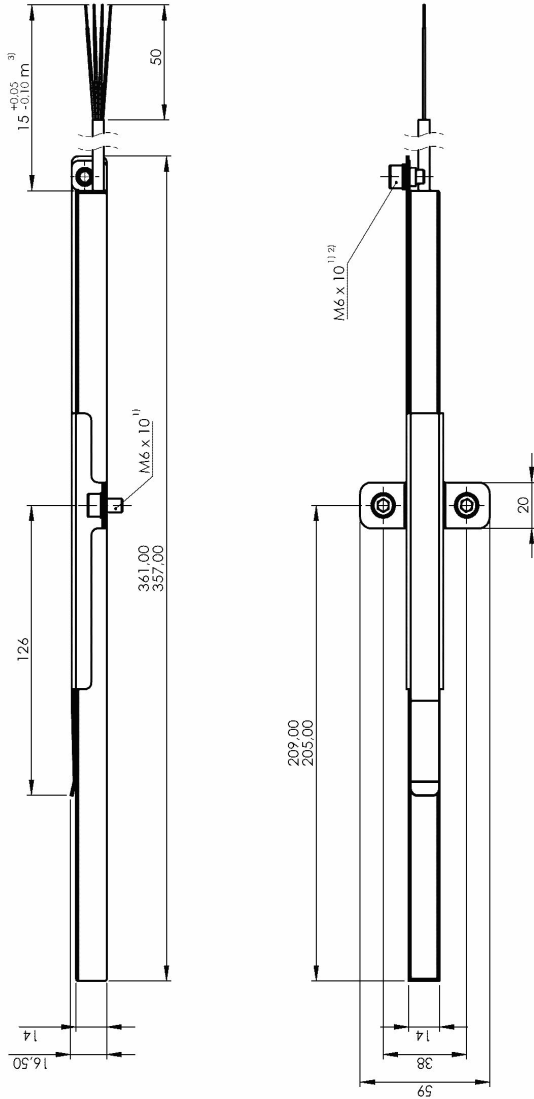


* Refer to total storke

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Fremdstückangaben nach DIN 1302 General Tolerance acc. DIN 2768m	Oberflächenangaben nach DIN 1302 Surface Specification acc. DIN 1302
Form- und Lagertoleranz nach DIN 1101 Geometric Tolerance per DIN 1101	metrisch/metric
Erstellte Geometrie Geprüft/Verified	Datum/Date 17.05.2016 Stengelin 17.05.2016 Schmiel
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bending radius added 25.03.2020 Mashtaler	Name Dr. E. Horn GmbH & Co. KG D-71116 Gaertringen Germany
Änderung/Revision Datum/Date Name	CAD.: IW000184SCP
Masse/Weight: Werkstoff/Material: Halbzeug/Semifinished: Distance sensor- SCP Distance sensor - SCP	
Maßstab/Scale 1:1	
Blatt 1 Sheet	



Temperature sensor TGL00921-2-207



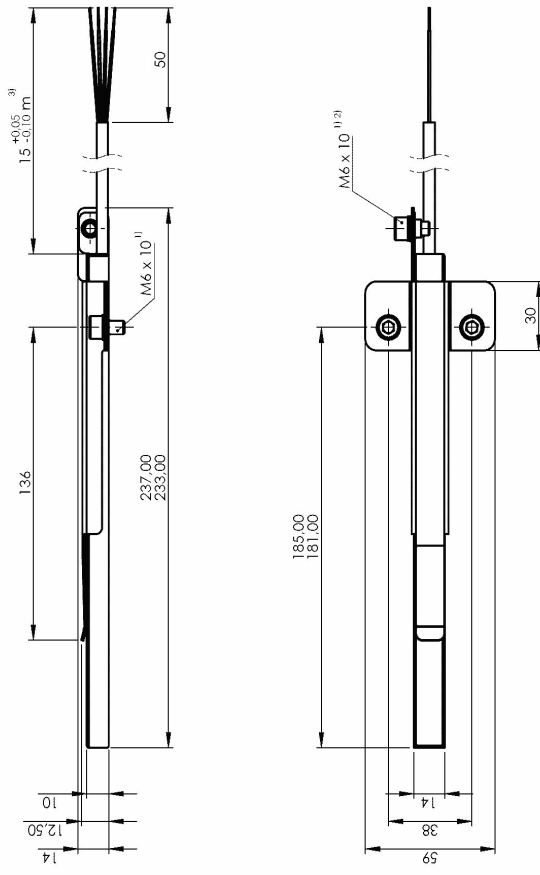
Connection:

- BN = brown -> 24 VDC
- WH = white -> R x D
- BK = black -> T x D
- BU = blue -> 0 V

Technical Data		-20 ... +85 °C	
Working temperature	IP 67 (DIN EN 60529)		
Protection degree	Yes		
Short circuit protection	+18 ... +24 (typ) ... +32 VDC		
Operating voltage	50 mA		
Current consumption max.	PUR: 4 x 0.34 mm ² ; screened		
Connection cable	Stainless steel		
Housing	1) tightening torque: 10.5 Nm 2) secured with Loctite 243 3) cable bending radius: ≥ 50 mm		

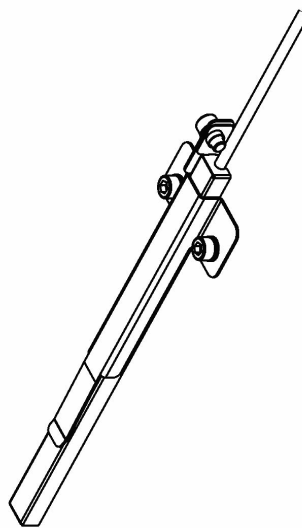
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Name: Mahtaler		Datum/Date: 22.09.2020		Mahtaler		TGL00921-2-207	
Name: Ghazouani		Datum/Date: 22.09.2020		Ghazouani		A3 Blatt Sheet 1	
Name: Dr. E. Horn GmbH & Co. KG		Datum/Date: D-71116 Gaertringen		Germany		CAD: TGL00921-2-207	

Temperature sensor TGL00921-3-183



Connection:

- BN = brown -> 24 VDC
- WH = white -> R x D
- BK = black -> T x D
- BU = blue -> 0 V



Technical Data		-20 ... +85 °C	
Working temperature	IP 67 (DIN EN 60529)		
Protection degree	Yes		
Short circuit protection	+18 ... +24 (typ) ... +32 VDC		
Operating voltage	50 mA		
Current consumption max.	PUR 4 x 0.34 mm ² ; screened		
Connection cable	Stainless steel		
Housing			

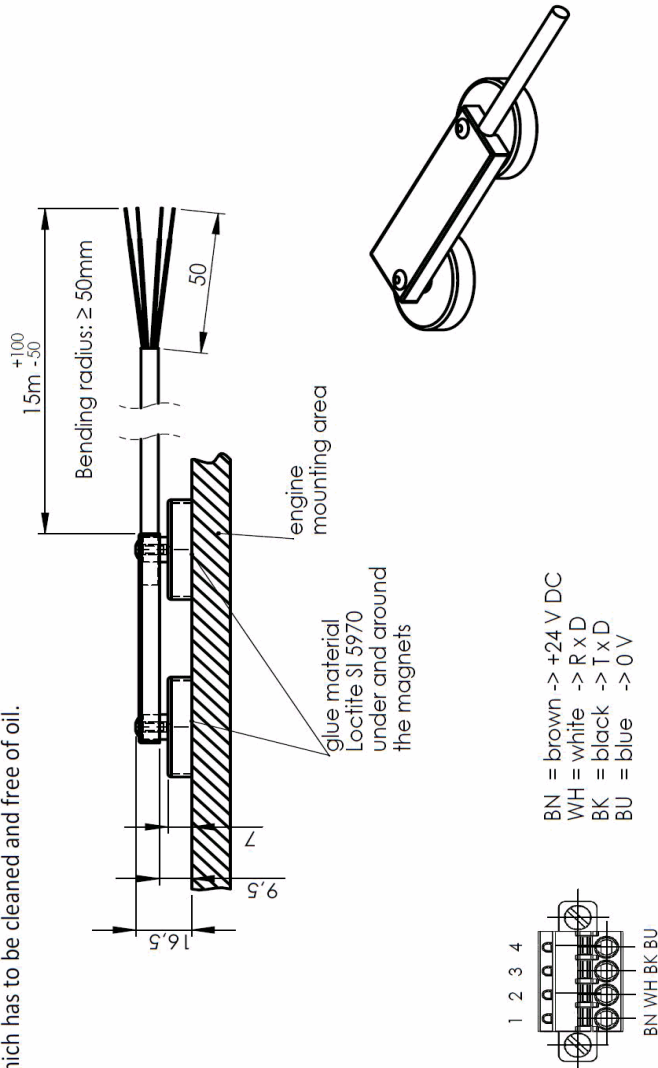
1) tightening torque 10.5 Nm	
2) secured with Loctite 243	
3) cable bending radius: ≥ 50 mm	

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Produktionsjahr Year of production	23.09.2020	Maßstab/Scale	1:2
Gezeichnet Drawn	Mashtaler	Werkstoff/Material	Halbzug/Semifinished:
Geprüft Checked	Ghazouani	Temperature sensor	
Datum/Date	23.09.2020	TGL00921-3-183	
Blatt Sheet	1	A3	

Splash oil sensor TGL00921-1

Mounting hint:

The sensor has to be fixed to a flat surface. Take care, that there is a good glue connection between the magnets and the flat engine surface which has to be cleaned and free of oil.

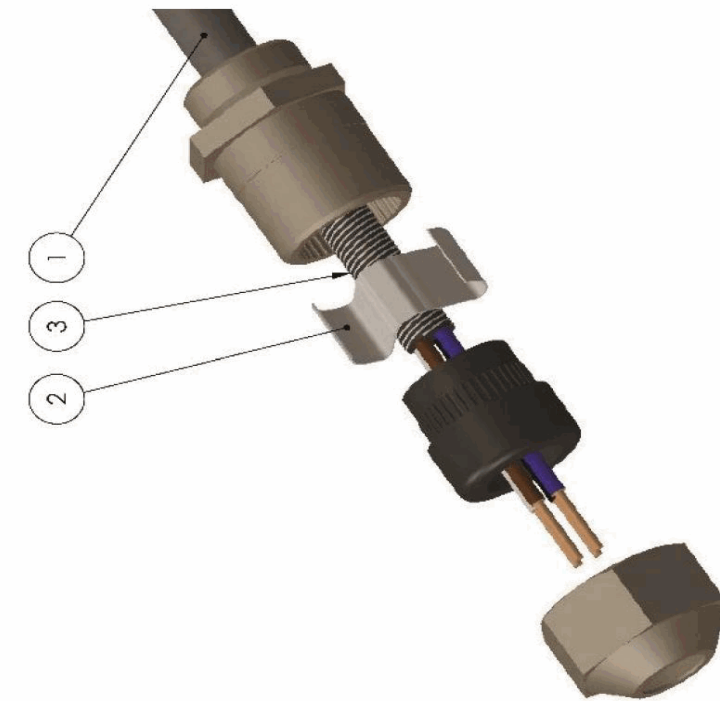


Technical Data		Technical modifications to third party or purchased parts require our prior permission. Colour variations are possible.	
Working temperature	-20 ... +85 °C	Maßstab/Scale	1:2
Protection degree	IP 67 (DIN EN 60529)	Werkstoff/Material:	Halbzug/Semifinished:
Short circuit protection	Yes	Temperature sensor	
Operating voltage	+18...+24(typ.)...+32V DC	TGL00921-1	
Current consumption max	50 mA		
Connection cable	PUR 4 x 0.34 mm ² , screened	A4 Blatt Sheet	
Housing	Stainless steel	CAD: TGL00921-1	

Freibleibungen nach DIN 1101 Geometric Tolerances acc. DIN 2768-01		Oberflächenangaben nach DIN 1302 Surface Specification acc. DIN 1302	
Form- und Lage-Toleranz nach DIN 1101	metrisch/metric	Symbol	Value
Datum/Date	Name	Erstellt	20.02.2017
Geprüft/Const.	Hartje	Geprüft/Const.	20.02.2017
Verifiziert/Verified	Ghazouani	Freigegeben/Released	04.07.2017
Freigegeben/Released	Mohr	Freigegeben/Released	04.07.2017
Freigegeben/Released	Schmidt	Dr. E. Horn GmbH & Co. KG D-71116 Gaertringen Germany	

Änderung/Revision	Datum/Date	Name
a	06.11.2018	Peinelt

EMC Cable gland assembly for connection at Terminal box GHG02621-3



EMC shield should contact the dismantled cable screen:

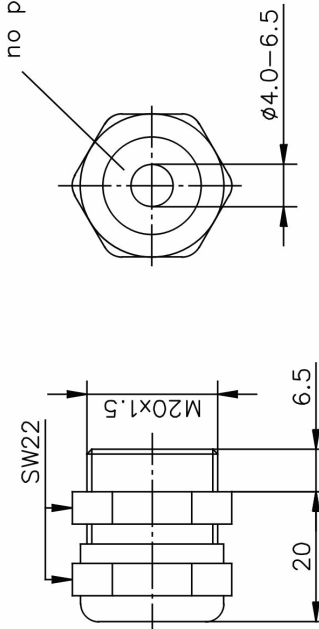
1. Make sure all cables (1) are placed correctly and the spring (2) is in contact with the dismantled screen (3).
2. For assembly compress the spring (2) slightly to insert it into the cable gland housing.
3. Turn the front cap/screw of each cable gland on the cable gland housing to tighten and fix the

Note:

! This type of cable gland should be used by engine manufacturer !

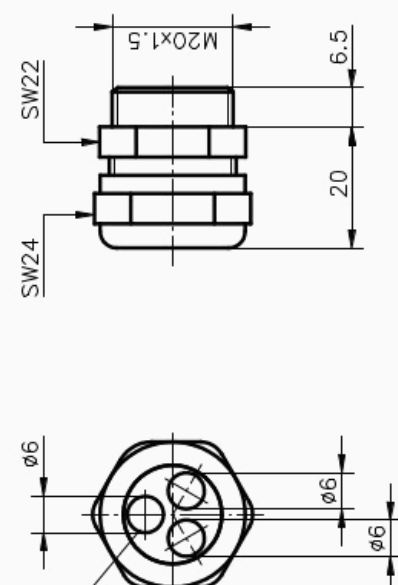

Cable gland (KV000446)

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<p>no polyvinyl chloride (PVC), oil resistant</p> 	<p>core drill diameter 18.5 Quantity see scope of supply.</p>	<p>Manufacturer/ Manufacturer: Fa. Pflitsch www.pflitsch.de</p>	<p>Updated 27.03.17 Stengelin Modification Date Name Date Name CAD Nr. KV000446</p>	<p>Dimensions DIN ISO Fit Dimensions without tolerance DIN ISO 2768 - mK</p>	<p>Dimensions mm</p>
<p>Dr. E. Horn GmbH & Co. KG D-71101 Schoenaiach</p>	<p>Gez. 26.08.08 Schmied Z.-Nr. Gepr. 03.01.13 Stengelin</p>	<p>Norm</p>	<p>Scale 1:1</p>	<p>KV000446</p>	<p>Kabelverschraubung Cable gland</p>
<p>DIN</p>	<p>ISO</p>	<p>Alternative for Replaced by</p>	<p>X Y</p>	<p>KV000446</p>	<p>Brass nickel plated</p>
<p>Drawing</p>	<p>Material</p>	<p>Sizes, Raw part</p>	<p>Material</p>	<p>Material</p>	<p>Material</p>

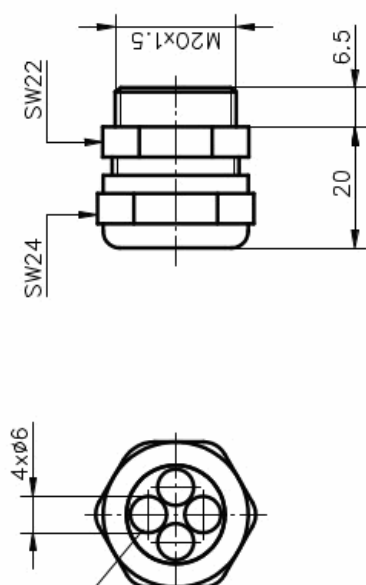

Cable gland (KV000483)

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KV000483		core drill diameter 18.5 Quantity see scope of supply.
no polyvinyl chloride (PVC), oil resistant		
Drawing	Brass nickel plated Material	Sizes, Raw part
All dimensions 5 mm		
DIN ISO		
		
Dr. E. Horn GmbH & Co. KG D-71116 Gaertringen		
Alternative for Replaced by		
X Y		
c Dimensions DIN ISO Fit mm		
b revised drawing Modification Date Name	10.04.17 Stengelh	
a Gez. Gepr. Norm	10.12.10 Schmid 10.12.10 Dr. Bernier	
CAD Nr. KV000483 Z.-Nr. KV000483 Scale 1:1		
Kabelverschraubung Cable gland		

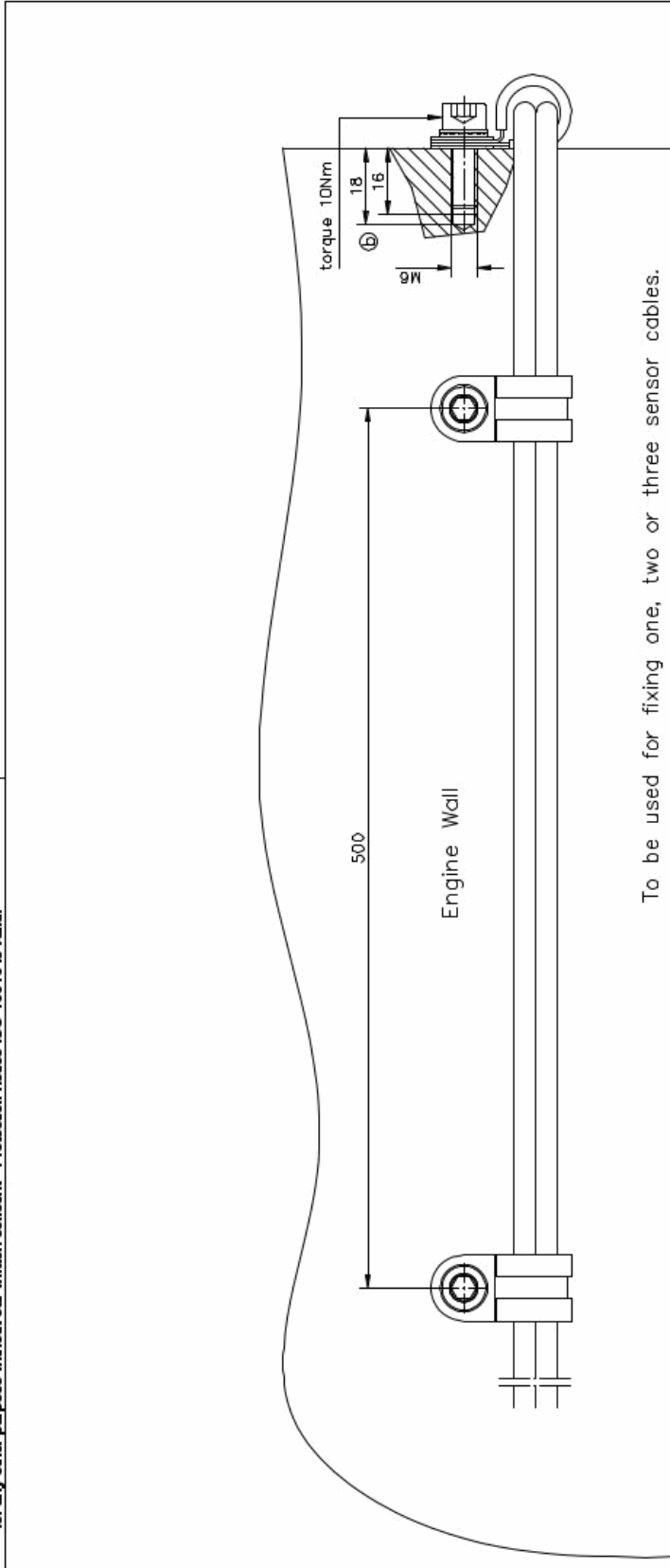
Cable gland (KV000484)

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KV000484		core drill diameter 18.5 Quantity see scope of supply.
no polyvinyl chloride (PVC), oil resistant		
Drawing	Brass nickel plated Material	Sizes, Raw part
All dimensions in mm		
DIN ISO		
		
Dr. E. Horn GmbH & Co. KG D-71116 Gaertringen		
H		
Gez. 27.08.12 Schmiel Gepr. 03.01.13 Stengel Norm	CAD Nr. KV000484 Z.-Nr. KV000484	Scale 1:1
a revised drawing Modification Date Name 10.04.17 Stengel	Dimensions Dimensions without tolerance DIN ISO 2768 - mK	DIN ISO Dimensions Fit Dimensions without tolerance DIN ISO 2768 - mK
c b a	Kabelverschraubung Cable gland	X Y
Alternative for Replaced by		

Schematics for gland plate type ZUG00426

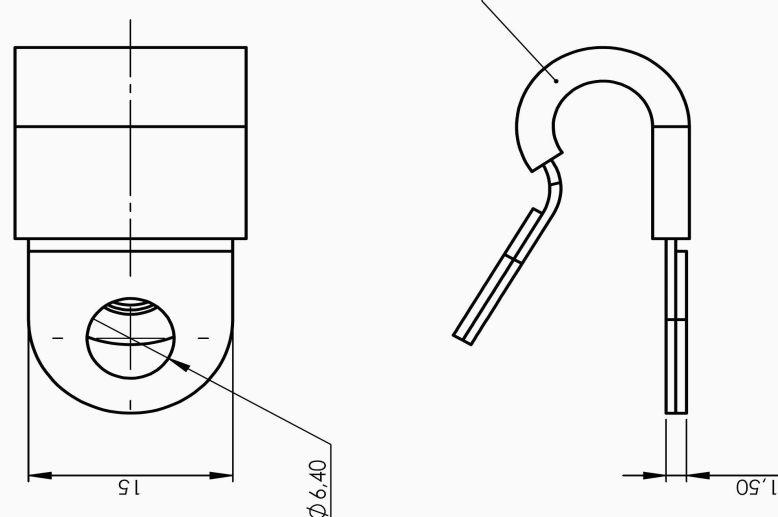
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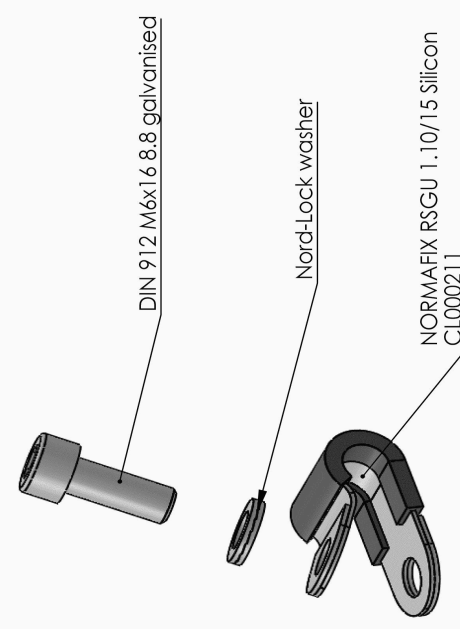
To be used for fixing one, two or three sensor cables.

all dimensions in mm	DIN	Benennung Schematic for placing and fixing of gland plate		DIN ISO Passung	Abmaße mm
	ISO	Maßstab ././		Maße Maße ohne Toleranz DIN ISO 2768-mK	
Zeichnung	Werkstoff	Dr. E. Horn GmbH & Co. KG D-71116 Gaertringen		Maßstab ././	
		Ersetzt durch		CAD Nr. ANG00833	
Rohmaße, Rohteil- zeichnung u.dgl.	Zeichnung	Z.-Nr. ANG00833		Maßstab ././	
		Gez. 03.01.13 Stengeln Gepr. 04.01.13 Schmied		Tag Name 27.03.17 Stengeln	
Änderung		Tag Name 03.01.13 Stengeln		Maßstab ././	
length: hole 16 in 18, thread 14 in 16		Tag Name 15.02.19 Mashtaler		Maßstab ././	
Updated		Tag Name 27.03.17 Stengeln		Maßstab ././	
c		Tag Name CAD Nr. ANG00833		Maßstab ././	

Details of gland plate type ZUG00425 and ZUG00426



Silicon-profile

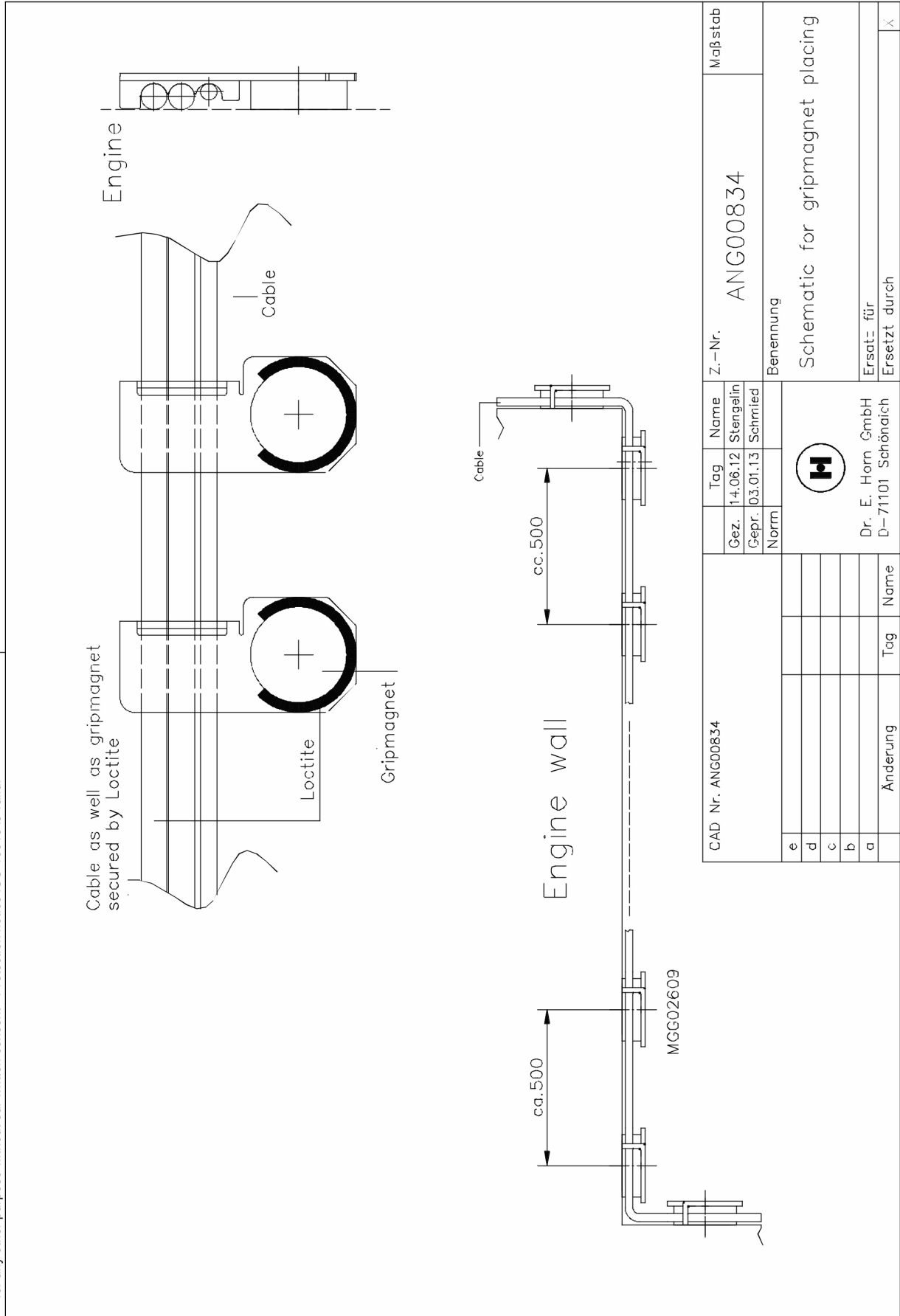


1:1

Technische Änderungen am Fremd-/Kaufteilen nur durch vorherige Genehmigung. Technical modifications to third party or purchased parts require our prior permission.		Maßstab/Scale 2:1 Werkstoff/Material: Halbzeug/Semifinished: Gland set (1x)												
Form- und Lagertoleranzen nach DIN 1507 General Tolerance acc. DIN 2768m	Oberflächeneigenschaften nach DIN 1027 Surface Specification acc. DIN 1302													
Form- und Lage-Toleranz nach DIN 1101 Geometrische Toleranzen per DIN 1101	metrisch/metric 													
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Erstellt	Datum/Date	Name												
Gespr.	12.07.2019	Ghazouani												
Geprüft	12.07.2019	Buchholz												
Verifiziert														
Änderung/Revision	Datum/Date	Name												
Dr. E. Horn GmbH & Co. KG D-71116 Gaertringen Germany		CAD.: ZUG00425												
		ZUG00425												
		A4 Blatt Sheet 1												

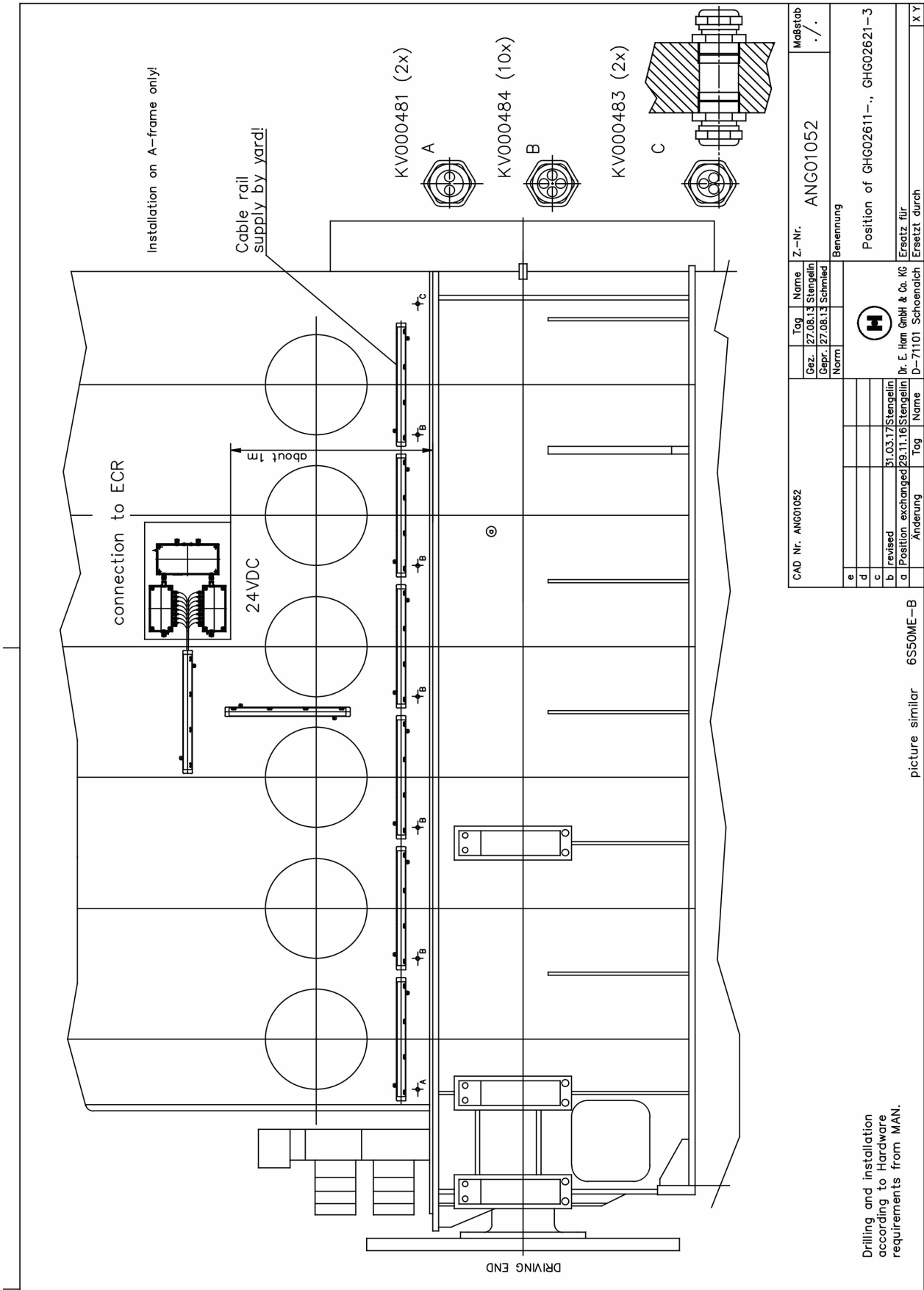
Schematics for fixing grip magnets type ZUG00441

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6. Drawings of engine mounted equipment - Outside of engine

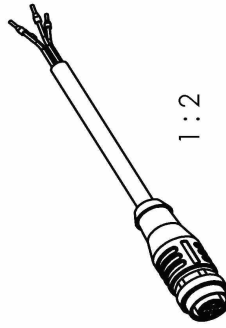
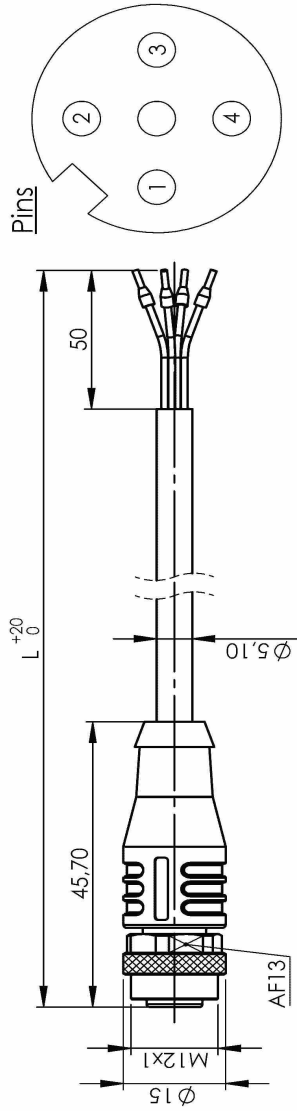
Position of GHG02611-4, GHG02621-3 incl. mounting bracket



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CAD Nr. ANGO1052		Z.-Nr. ANGO1052		Maßstab	
Gez. 27.06.13	Stengeln	Gepr. 27.06.13	Schmid	/./.	
Norm		Benennung		Position of GHG02611--, GHG02621-3	
e		H		Ersatz für	
d		Dr. E. Horn GmbH & Co. KG		Ersatz durch	
c revised 31.03.17		Stengeln		D-71101 Schoenaich	
a Position exchanged		29.11.16		Stengeln	
Anderung		Tag		Name	
6S50ME-B		picture similar		X Y	

Connection cable



* other dimensions available on demand

Technical data_body

Connector female, M12x1
 Number of pins 4
 Pin assignment 1-BN, 2-WH, 3-BU, 4-BK
 Coding A
 Rated voltage 250 V / 4 A
 Resistance $\leq 5 \text{ m}\Omega$
 Insulation resistance $\geq 10^8 \Omega$
 Temperature range -40°C ... +90°C (fixed mounting)
 Contact material Metal, CuSn, gold-plated
 Grip body material Plastic, TPU, BK
 Coupling nut material Metal, CuZn, nickel-plated
 Sealing material FPM/FKM
 Standards IEC 61076-2-101
 Degree of protection (mounted) IP67
 Mechanical life-cycle >100 mating cycles
 Cable end assembly open cable end
 Shielding with shielding

Technical data_cable

Material PUR
 Jacket color BK, similar RAL 9005
 Wire cross-section 4 x 0,34 mm²
 Wire insulation material PP
 Wire colors BN, WH, BU, BK
 Conductor structure 42 x 0,10 mm
 Bending radius (fixed) 5 x Ø-cable
 Bending radius (repeated) 12 x Ø-cable
 Temperature range (fixed) -40°C ... +90°C
 Halogen-free yes
 Torsion $\pm 360^\circ/\text{m}$, $\geq 2 \text{ Mio. cycles}$
 Rated voltage cable $\leq 300 \text{ V}$
 Shielding yes
 Special features flame retardand, LABS free, seawater-, ozone-, UV-, torsion-, oil- resistant, RoHS compliant, silicone free, hydrolysis proof, UL10493/20549, cULUS

KSG03252-30	30
KSG03252-25	25
KSG03252-20	20
KSG03252-15	15
KSG03252-2	2

Types available *

L, Cable length in m

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Formtoleranzen nach DIN 2768m	Form- und Lage-Toleranz nach DIN 1101	Geometrische Toleranzen nach DIN 1101	metrisch/metric
Überfahrangaben nach DIN 1502	Spezifikation nach DIN 1502		

Maßstab/Scale 1:1	Masse/Weight:
Werkstoff/Material: Halbzeug/Semifinished:	

Sensor cable with connector

Erstellt	Datum/Date	Name
Geprüft	19.03.2021	Mashtaler
Verifiziert	22.03.2021	Hamm

Dr. E. Horn GmbH & Co. KG
 D-71116 Gaertringen
 Germany

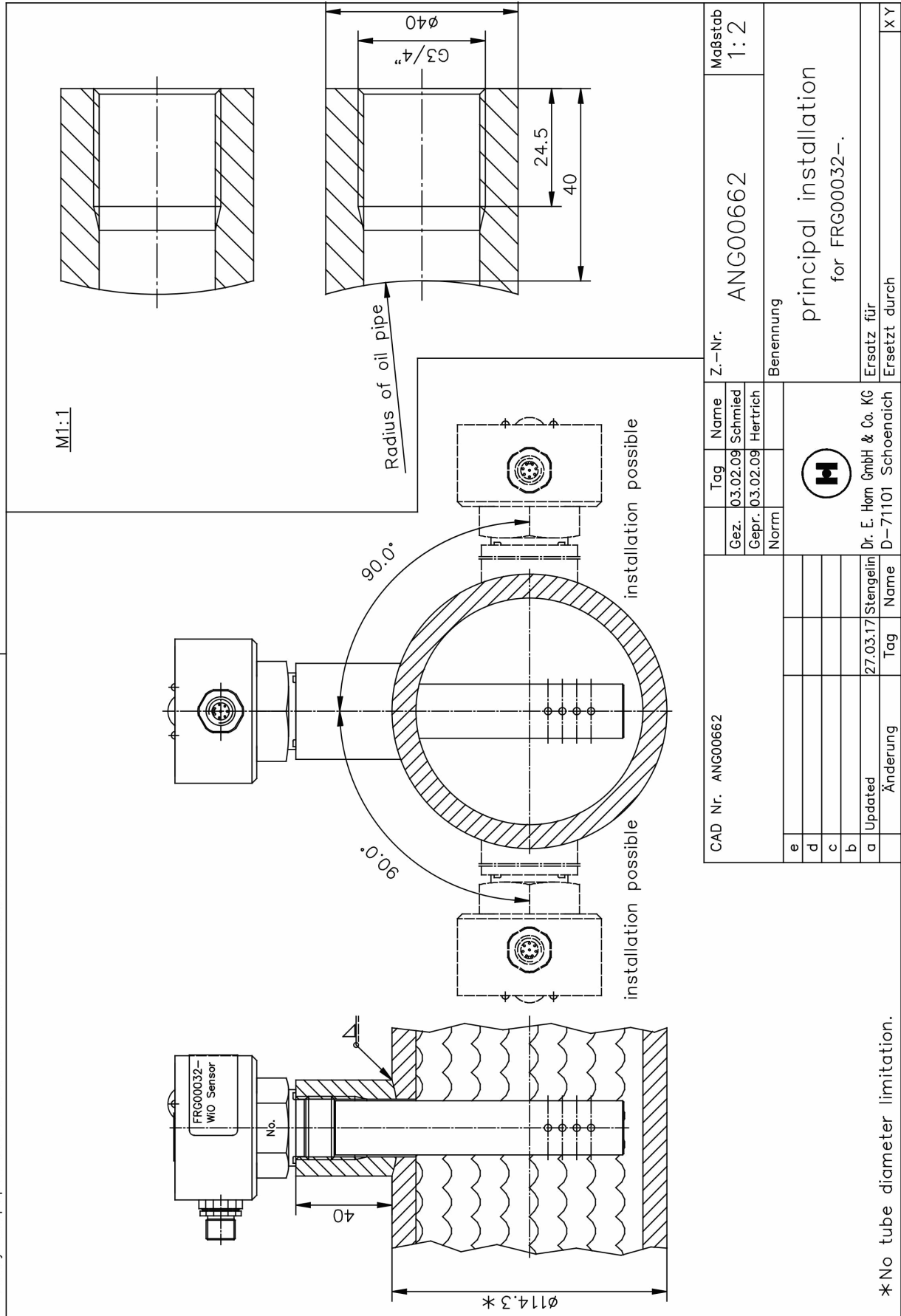
KSG03252-...

A4
 Blatt 1
 Sheet

Änderung/Revision Datum/Date Name CAD.: KSG03252

Installation of Water in Oil sensor

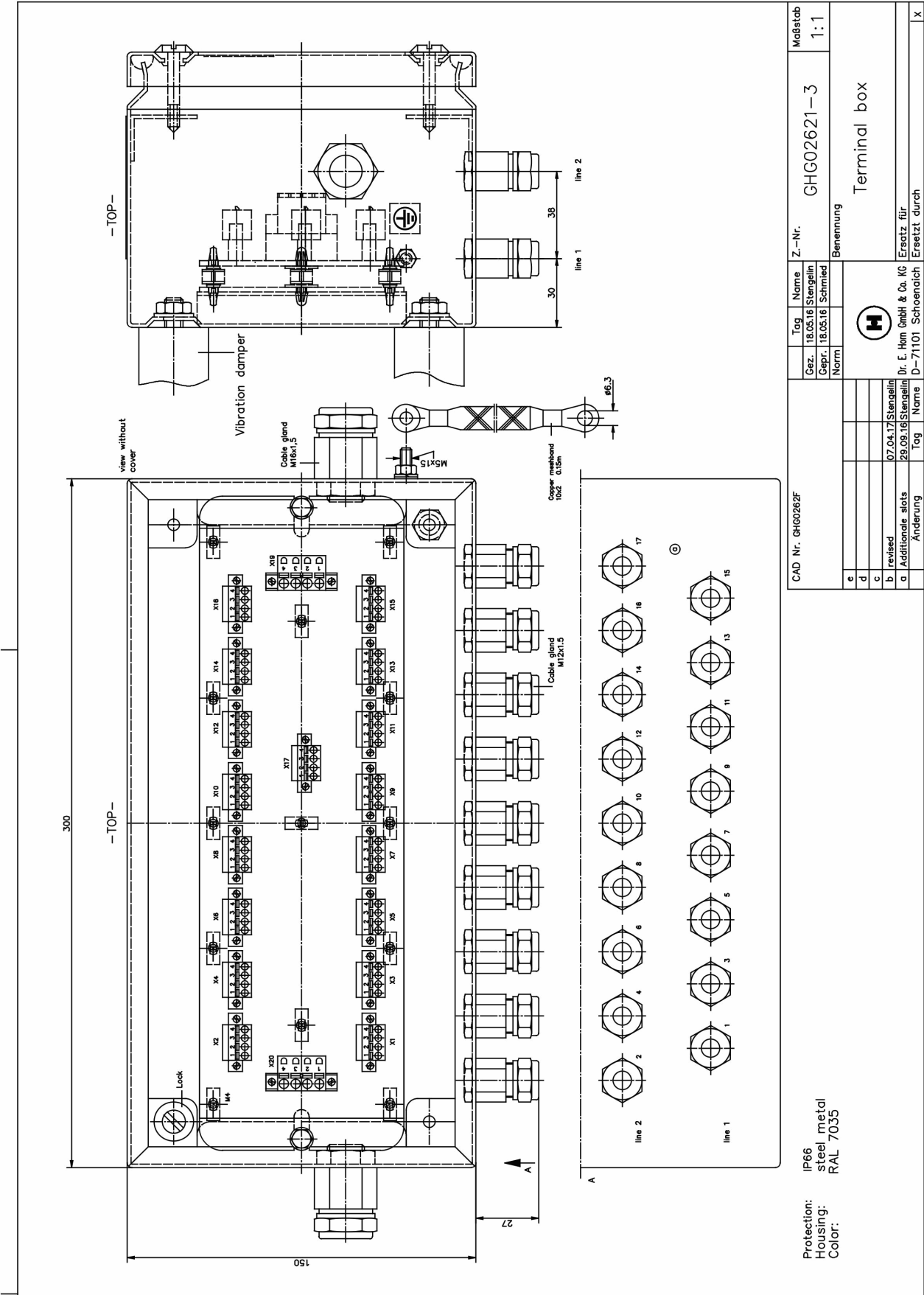
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CAD Nr. ANG00662		Z.-Nr. ANG00662		Maßstab 1:2	
Gez. 03.02.09	Name Schmied	Benennung			
Gepr. 03.02.09	Hertrich	principal installation for FRG00032-.			
Norm		Ersatz für			
		Ersetzt durch			
		Dr. E. Horn GmbH & Co. KG			
		D-71101 Schoenaich			
		Stengelin		Name	
a Updated		27.03.17		Tag	
b Änderung				XY	

*No tube diameter limitation.

Terminal box GHG02621-3

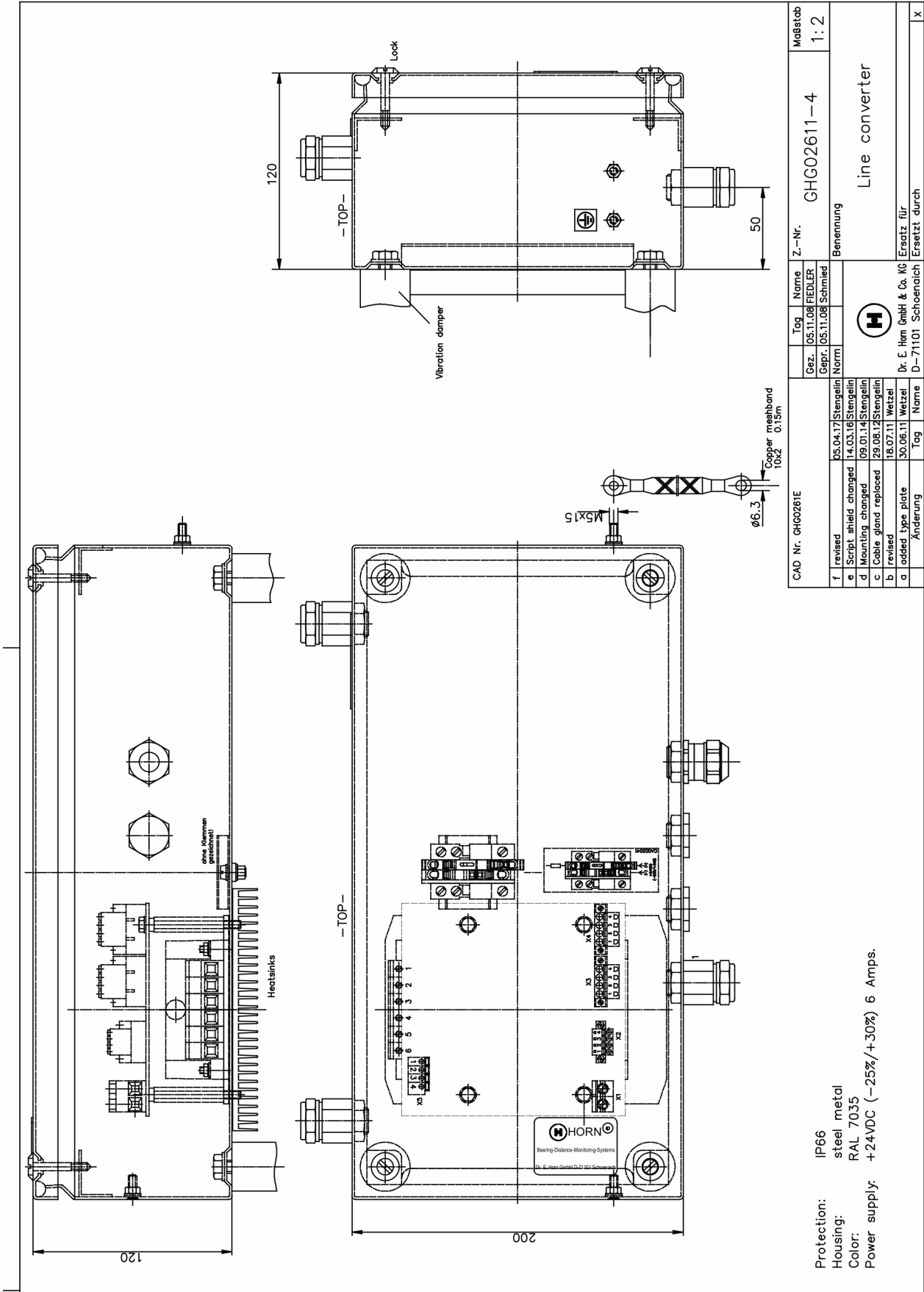



CAD Nr. GHG0262F		Z.-Nr. GHG02621-3		Maßstab 1:1	
Tag	Name	Gez.	Gepr.	Norm	Benennung
18.05.16	Stengelin	18.05.16	Schmid		Terminal box
Dr. E. Horn GmbH & Co. KG Ersatz für					
D-71101 Schoenach Ersetzt durch					
e					
d					
c					
b	07.04.17	Stengelin			
a	29.09.16	Stengelin			
Änderung					
Tag Name					
D-71101 Schoenach Ersetzt durch					

Protection: IP66
Housing: steel metal
Color: RAL 7035

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Line converter box GHG02611-4



CAD Nr. GHG0261E		Tag	Name	Z.-Nr.	Maßstab
		05.11.08	FIEDLER	GHG02611-4	1:2
		05.11.08	Schmid		
		Norm		Benennung	Line converter
		05.04.17	Stengelin	 Dr. E. Horn GmbH & Co. KG D-71101 Schoenaich Ersetzt durch	
f	revised	14.03.16	Stengelin		
e	Script shield changed	09.01.14	Stengelin		
d	Mounting changed	29.08.12	Stengelin		
c	Cable gland replaced	18.07.11	Wetzel		
b	revised	30.06.11	Wetzel	Ersetzt durch	
a	added type plate			Ersetzt durch	
Änderung		Tag	Name		

Protection: IP66
 Housing: steel metal
 Color: RAL 7035
 Power supply: +24VDC (-25%/+30%) 6 Amps.

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Connection plan for line converter box GHG002611-4

CA001925

c	Text hinzugefügt	16.03.15	Stengelin	DIN ISO	Abmaße
b	Größe und Hinweistext	03.02.15	Stengelin	Passung	mm
a	X6 in X1.1 geändert	01.02.11	Schmied	Maße ohne Toleranz	
	Änderung	Tag	Name	Maße ohne Toleranz	DIN ISO 2768 - mK
	Tag	Name	CAD Nr. CA001925		
	Gez.	09.09.08	Schmied	Z.-Nr.	CA001925
	Gepr.	09.09.08	Hertrich		
	Norm				

Material: Scotchcal 3650, weiß, PVC-Folie selbstklebend
 Grund: weiß
 Schrift: schwarz

CA001925			Benennung Connection plan Line Converter Box GHG02611-4	
Zeichnung	Werkstoff		Ersatz für	Maßstab
			Dr. E. Horn GmbH & Co. KG D-71101 Schoenaich	
			Ersetzt durch	X

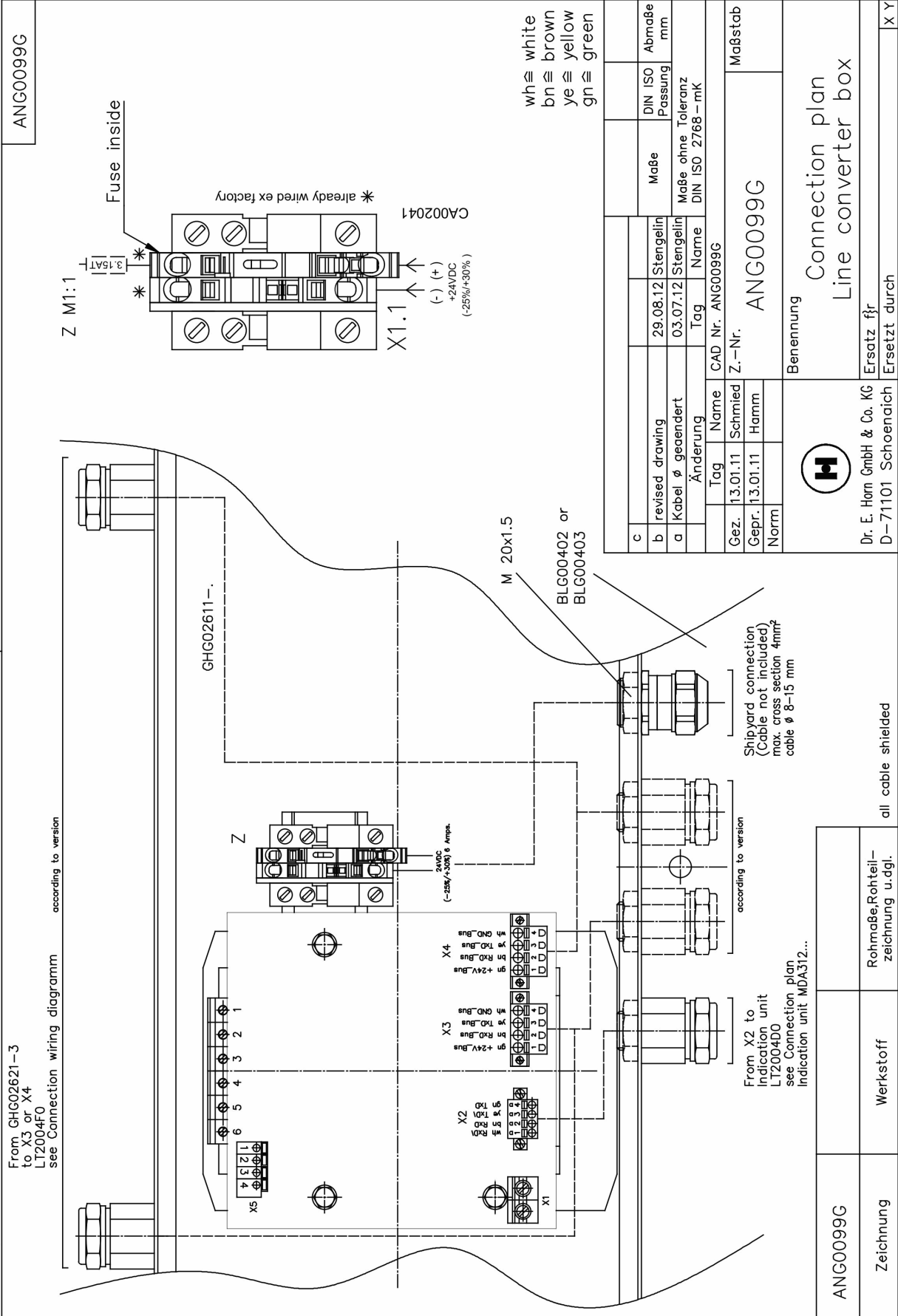
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Connection wiring diagramm

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From GHG02621-3
to X3 or X4
LT2004FO
see Connection wiring diagramm

according to version



ANG0099G

Z M1:1

Fuse inside

* already wired ex factory

CA002041
(-) (+)
+24VDC
(-25%/+30%)

wh ≙ white
bn ≙ brown
ye ≙ yellow
gn ≙ green

c	revised drawing	29.08.12	Stengelin	Maße	DIN ISO	Abmaße
b	Kabel ø geändert	03.07.12	Stengelin	Maße ohne Toleranz	Passung	mm
a	Änderung	Tag	Name	Maße ohne Toleranz	Maße ohne Toleranz	
		Tag	Name	DIN ISO 2768 - mK		
Gez.	13.01.11	Schmied	Z.-Nr.	Maßstab		
Gepr.	13.01.11	Hamm	ANG0099G			
Norm						
			CAD Nr. ANG0099G			
Benennung				Connection plan		
				Line converter box		
Dr. E. Horn GmbH & Co. KG				Ersatz für		
D-71101 Schoenaich				Ersetzt durch		
				X Y		

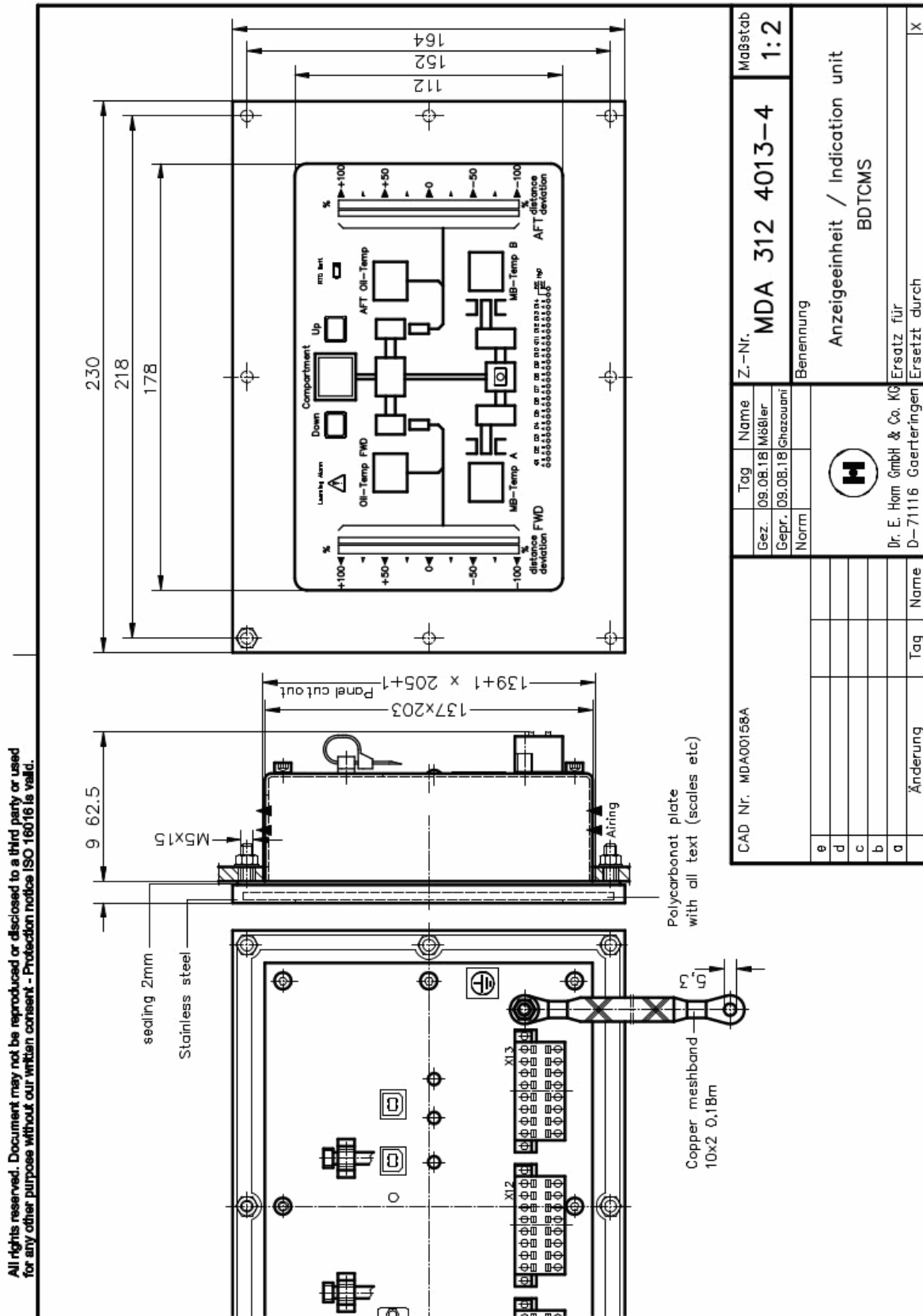
Shipyard connection
(Cable not included)
max. cross section 4mm²
cable ø 8-15 mm

From X2 to
Indication unit
LT2004DO
see Connection plan
Indication unit MDA312...

ANG0099G	Werkstoff	Rohmaße, Rohteil- zeichnung u.dgl.
Zeichnung		all cable shielded

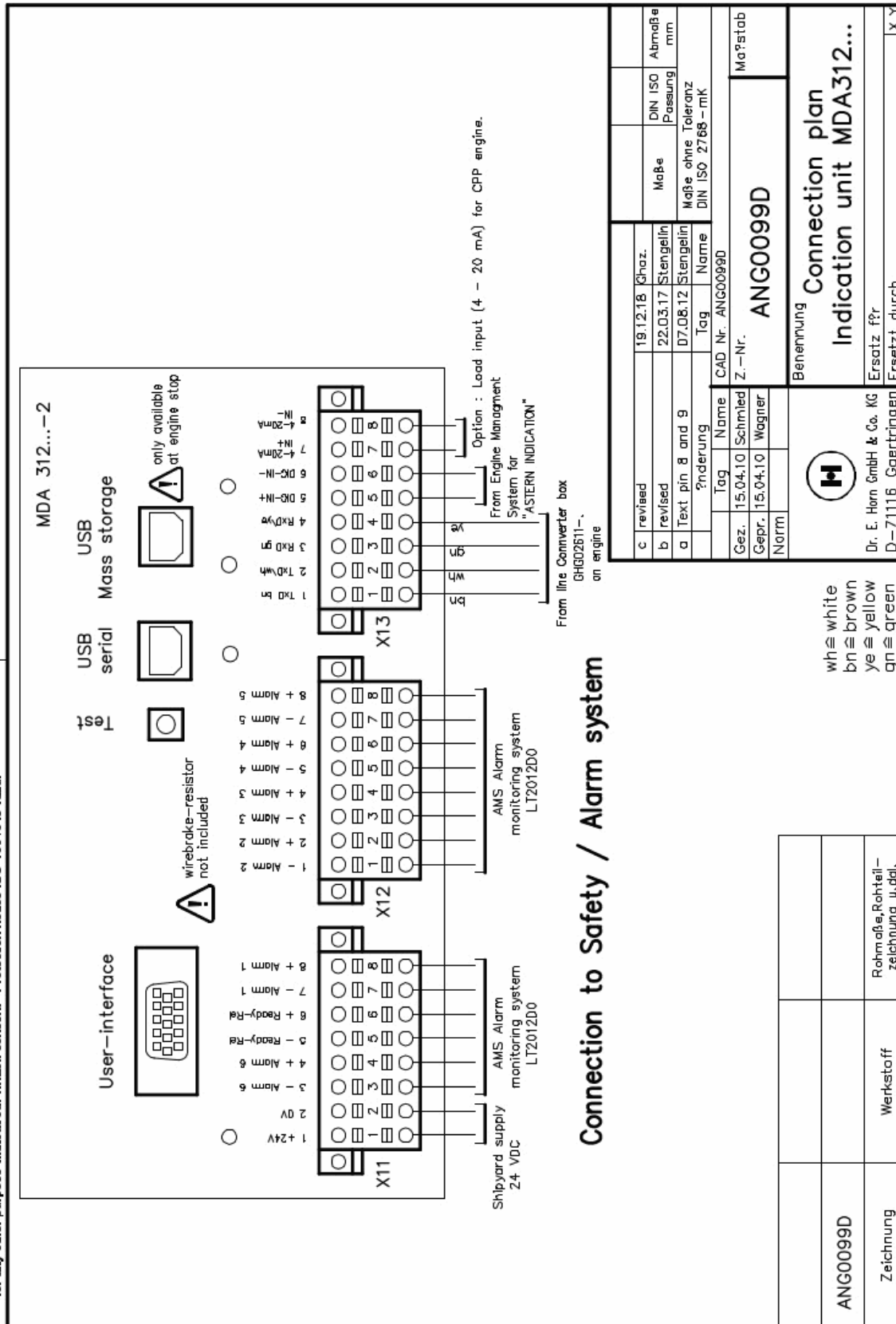
7. ECR - Engine control room equipment

Indication unit MDA3124013-4 for BDTCMS



Connection plan for indication unit

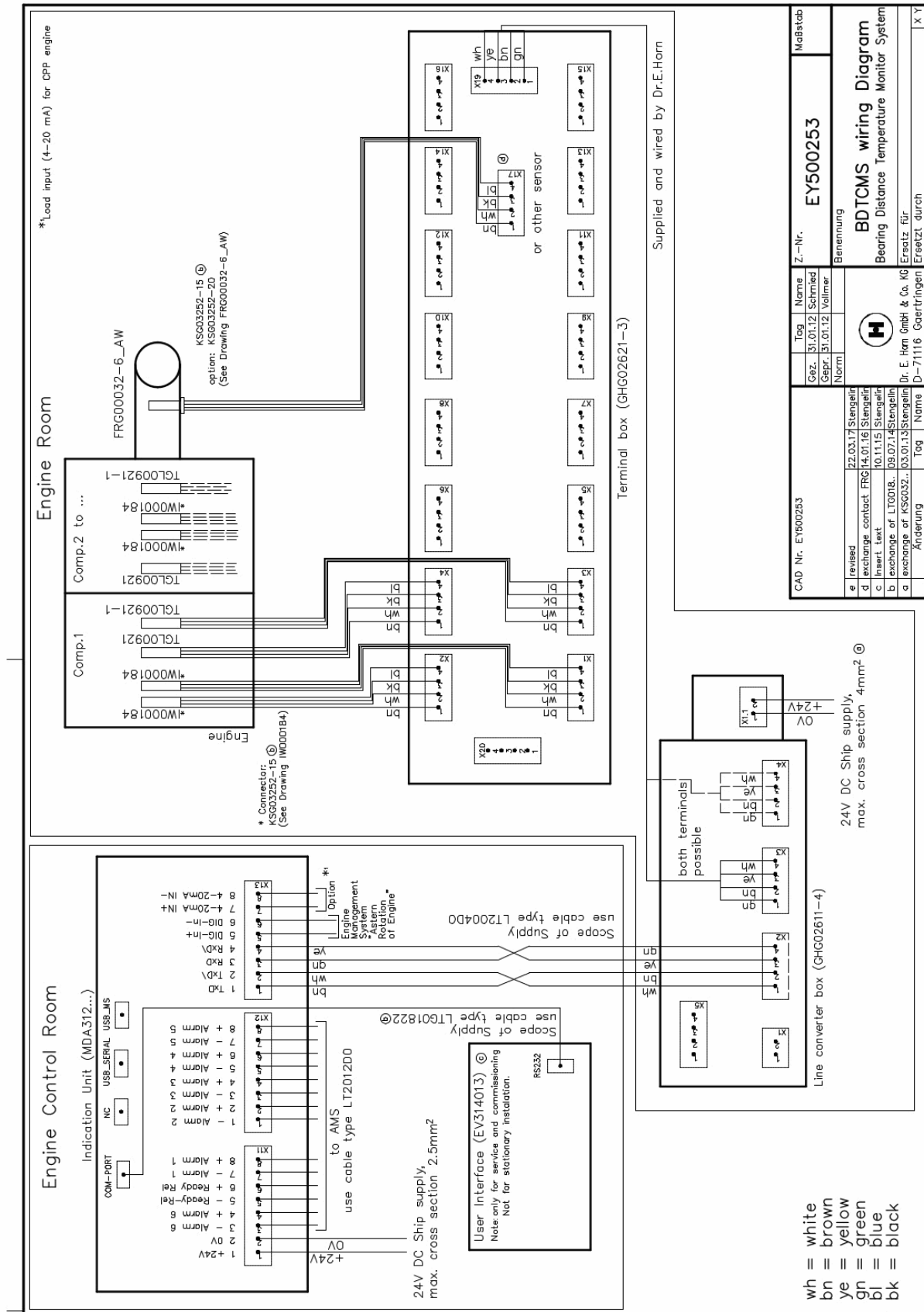
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Connecting to safety alarm system

Contact	Polarity ±	Relay Nr.	Connection to ship		Contact N.O./N.C.	Function/Alarm
			alarm system	safety system		
X11						
X11/1	+					24V DC
X11/2	-					0V DC
X11/3	-	6		X	N.O.	H2O Main-Alarm
X11/4	+	6		X	N.O.	H2O Main-Alarm
X11/5	-	Ready Relay	X		N.C.	MDA312 working/ready
X11/6	+	Ready Relay	X		N.C.	MDA312 working/ready
X11/7	-	1	X		N.O.	bearing wear alarm
X11/8	+	1	X		N.O.	bearing wear alarm
X12						
X12/1	-	2		X	N.O.	bearing wear slow down
X12/2	+	2		X	N.O.	bearing wear slow down
X12/3	-	3	X		N.O.	Temperature alarm (Main bearing, splash oil and crosshead temperature)
X12/4	+	3	X		N.O.	Temperature alarm (Main bearing, splash oil and crosshead temperature)
X12/5	-	4		X	N.O.	Temperature slow down (Main bearing, splash oil and crosshead temperature)
X12/6	+	4		X	N.O.	Temperature slow down (Main bearing, splash oil and crosshead temperature)
X12/7	-	5	X		N.O.	H2O Pre-Alarm
X12/8	+	5	X		N.O.	H2O Pre-Alarm
X13						
X13/1						TxD (cable colour BR(own), from line converter connector X2/1)
X13/2						TxD\ (cable colour WH(ite), from line converter connector X2/2)
X13/3						RxD (cable colour G(ree)N, from line converter connector X2/3)
X13/4						RxD\ (cable colour YE(llow), from line converter connector X2/4)
X13/5	+					Astern-IN (binary signal)
X13/6	-					Astern-IN (binary signal)
X13/7	+					CPP-IN, 4-20mA (propeller signal)
X13/8	-					CPP-IN, 4-20mA (propeller signal)

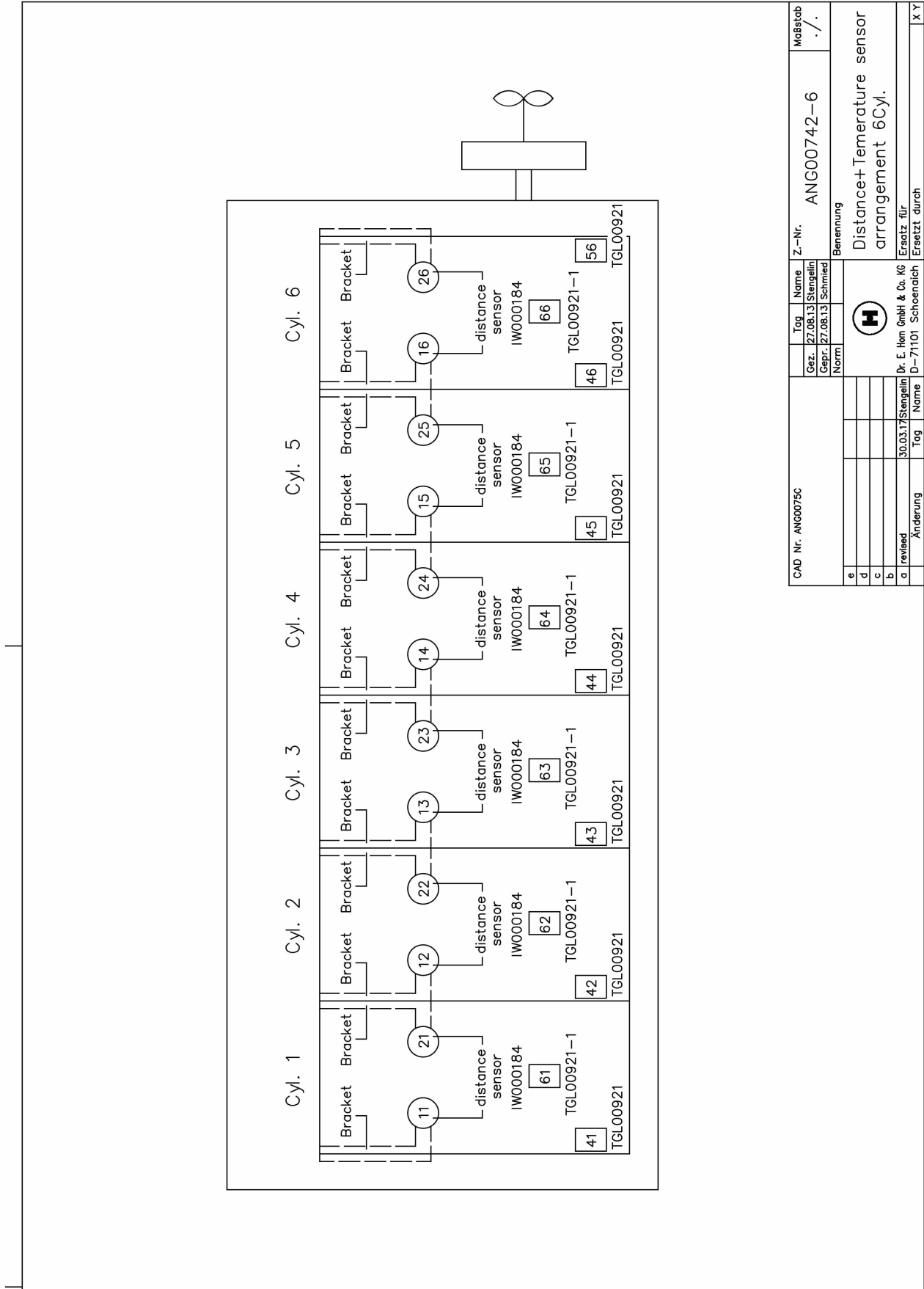
8. Wiring diagram



CAD Nr. EY500253		Tag	Name	Z.-Nr.	Maßstab
		Gez.	31.01.12	Schmid	EY500253
		Gepr.	31.01.12	Vollmer	
		Norm		Benennung	
		22.03.17		Stenglein	
e		revised		BDMCS wiring Diagram	
d		exchange contact FRG14.01.16		Bearing Distance Temperature Monitor System	
c		Insert Text		Dr. E. Horn GmbH & Co. KG	
b		exchange of LT0018.		Ersatz für	
a		exchange of KSG032.		Ersetzt durch	
Änderung		Tag	Name	X Y	
		03.01.13	Stenglein		
		09.07.14	Stenglein		
		10.11.15	Stenglein		
		03.01.13	Stenglein		

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Distance and temperature sensor arrangement



CAD Nr. ANG0075C		Tag	Name	Z.-Nr.	Maßstab
		Gez.	27.08.13 Stengelin	ANG00742-6	./.
		Gepr.	27.08.13 Schmiel		
		Norm		Benennung	
		Distance+ Temperature sensor arrangement 6Cyl.			
		Dr. E. Horn GmbH & Co. KG			Ersatz für
		30.03.17 Stengelin			D-71101 Schoenaich
		a revised			Ersetzt durch
		b			
		c			
		d			
		e			
		Änderung			X Y

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Connection user interface to indication unit MDA 312...

VIEW A

Dimensions: 200 (height), 110 (width), 66.80 (display width), 120 (display height), 83.1 (depth), 88 (width), 188 (height), 350 ±0.0 (cable length), 2 m ±0.05 (cable length).

Labels: 4pin plug connector for sensors, connector for MDA, 5" TFT-LCD with LED backlight 800x480 pixels touch panel display, Ø4.20 mounting holes (4x), LTG00973 scope of supply (M12x1, 4pin A-Coded connector for sensors), LTG01822 scope of supply (connector for MDA...).

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Dr. E. Horn GmbH & Co. KG D-71116 Gaertringen Germany		Name: Mashtaler		Name: Chazouani	
CAD: EV314013		Repl. for EV000129 f. 05.11.09		A3 Blatt Sheet	