RE 15350/02.2021
Replaces: 02.2017

rexroth
A Bosch Company

Speed sensor Hägglunds SPDC

Valid for:

- Hägglunds CA
- Hägglunds CA with BICA
- Hägglunds CB
- Hägglunds CBp
- Hägglunds CBm
- Hägglunds CBm with BICA

Note: Ensure correct motor serial number before ordering.

Features

- Slim design fully integrated in motor
- Magnetic sensor
- Non-contact, wear-free sensing system
- Radial sensor positioning
- Frequence to analogue converter is available as option
- Possibility for redundant speed sensor functionality

Recommendation

Order the SPDC speed sensor mounted on the motor at factory.

Contents

1 Preface

Safety messages
This documentation includes safety messages placed before sequential operating procedures that may involve the risk of personal or property damage. The described precautionary measures must be observed.

Safety messages are structured as shown below:

⚠ SIGNAL WORD

Type and source of risk
Consequences if disregarded
- ▶ Precautionary measures
- ▶ <listing>

Warning sign:	Draws attention to the risk
Signal word:	Identifies the hazard level
Type and source of risk:	Identifies the type and source of the hazard
Consequences:	Describes what occurs when the safety messages are not complied with
Precautions:	Indicates how the hazard can be avoided

The signal words have the following meaning:

Warning sign, signal word	Meaning
⚠ DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates potential property damage: the product or the environment may be damaged.

2 Ordering code

In order to identify Hägglunds equipment exactly, the following ordering code is used. These ordering codes should be stated in full in all correspondence e.g. when ordering spare parts.
Example: Hägglunds SPDC

SPD	C		CA--		0		01856		00		00
01	02		03		04		05		06		07

01	**Speed sensor**	
		SPD

02	**Type / Version**	
		C

03	**Mounting set for motor type**	
	CA, CBP 140	**CA--**
	CB	**CB--**
	CBP	**CBP-**
	CBM	**CBM-**
	CA with BICA	**BICA**

04	**Motor type**	
	Standard hollow shaft	**0**
	With through hole kit	**H**

05	**Pulse rate**	
	1856 pulse / rev. CA, CA with BICA, CB	**01856**
	2976 pulse / rev. CBP	**02976**
	4544 pulse / rev. CBM	**04544**

06	**Modification**	
		00

07	**Design**	
	Standard	**00**
	CBM with BICA	**01**
	Special index *)	**01-99**

Note!
When ordering the SPDC speed sensor, it must be added in free text in the order form that the sensor shall be mounted on the motor at the factory. If not added, the SPDC sensor will be sent separately..

Note!
Redundancy possible for some motor/brake/SPDC-combinations (recommended for e.g. CBm with BICA) – please contact Hägglunds Technical Helpdesk for further information.

3 Functional description

Speed sensor, Hägglunds SPDC, is a digital incremental encoder using magnetic sensing technology.

The sensor generates two square wave signals with 90° phase shift for detection of speed and direction of rotation.

4 Technical data

Mechanical specification, Speed sensor	
Sensor head	Material ID: R939058059
Axial tolerance	± 2 mm (between sensor and magnetic strip)
Radial tolerance	1 mm nominal 0,1... 2,0 mm (air gap)
Protection class	IP67 acc. to DIN EN 60529
Operating temperature	-40... +80 °C
Vibration	≤ 100 m/s², sine 50Hz - 2kHz DIN EN 60068-2-6
Shock	≤ 1000 m/s², half sine 11 ms DIN EN 60068-2-27

Electrical specification, Speed sensor		
Supply voltage +Ub	+ 24 VDC (10-30 VDC)	
Current consumption at no-load	≤ 30 mA	
Output voltage	low	0... 2 V
	high	Ub-2 V
Outputs	Short circuit protected HTL	
Cable length max	200 m at 50 kHz	
EMC approval	Immunity DIN EN 61000-6-2 Emission DIN EN 61000-6-3	

Specification, Female cable connector (included in delivery)	
Cable connector	Material ID: R911340372
Type	Female M12 A-coded IEC 610 76-2-101
Connection	8 pin screw terminals
Cable diameter	Ø 6-8 mm
Conductor cross section	0,25-0,75 mm² AWG 24-18

Specification, Optional cable		
Connecting cable	Material ID	
	5 m	R901423218
	10 m	R901423220
	25 m	R901423237
Connector type	Female M12 A-coded	
Connection customer	Free cable end	
Cable type	PUR, Halogen-free	
Cable diameter	Ø 6 mm	
Conductor	8 x 0,25 mm²	
Shielding	Tinned copper braided shield	

Specification, Pulse rate	
SPDC CA / SPDC CA with BICA	1856 ppr
SPDC CB	1856 ppr
SPDC CBP	2976 ppr
SPDC CBm / SPDC CBm with BICA	4544 ppr

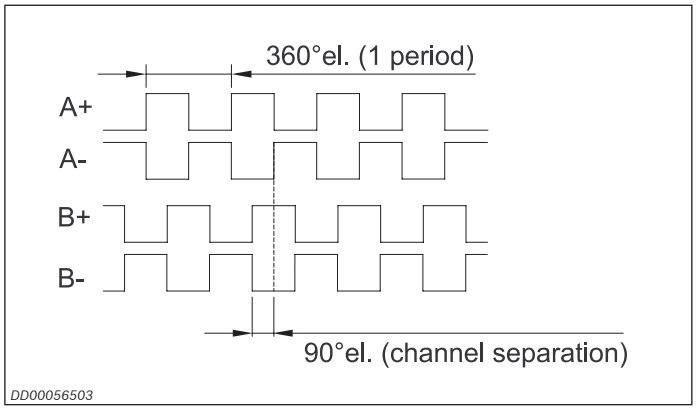

Fig. 1: Sequence for clockwise direction of rotation

Specification, Pin out		
Pin #	**Signal**	**Colour (optional cable)**
1	0 V	White
2	+Ub	Brown
3	A+	Green
4	A-	Yellow
5	B+	Grey
6	B-	Pink
7	-	Blue
8	-	Red

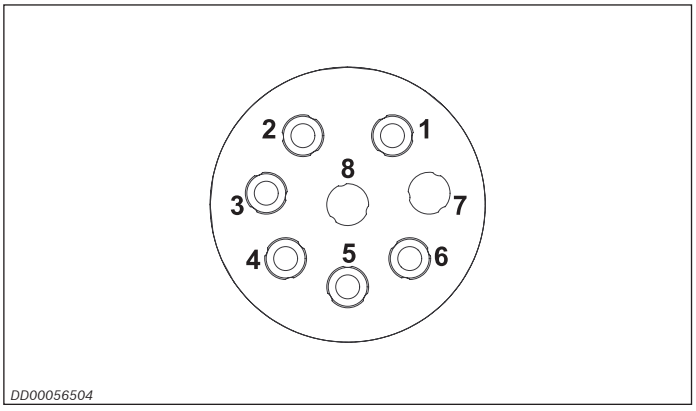

Fig. 2: Connection female cable connector, seen from connecting side

5 Material ID Hägglunds SPDC

At separate order of the Hägglunds SPDC, carefully follow the instructions in *"Table 1: Material ID for speed sensor"*.

Table 1: Material ID for speed sensor

Speed sensor	Material ID	Ordering code	Valid for Hägglunds motor / BICA from serial number	
			Hägglunds product	**Serial number**
SPDC CA	R939058584	SPDC CA-- 0 01856 00 00	Hägglunds CA 50 - CA 210	All
			Hägglunds CBP 140	All
SPDC CA H	R939058585	SPDC CA-- H 01856 00 00	Hägglunds CA 50 H - CA 210 H	All
			Hägglunds CBP 140 H	All
SPDC CB	R939058586	SPDC CB-- 0 01856 00 00	Hägglunds CB 280	A28P 01965
			Hägglunds CB 400	A40P 02611
			Hägglunds CB 560	A56P 01674
			Hägglunds CB 840	A84P 01654
			Hägglunds CB 1120	A112P 00271
SPDC CB H	R939058587	SPDC CB-- H 01856 00 00	Hägglunds CB 280	A28P 01965
			Hägglunds CB 400	A40P 02611
			Hägglunds CB 560	A56P 01674
			Hägglunds CB 840	A84P 01654
			Hägglunds CB 1120	A112P 00271
SPDC CBp	R939058590	SPDC CBP- 0 02976 00 00	Hägglunds CBP 280	P28P 00209
			Hägglunds CBP 400	P40P 00306
			Hägglunds CBP 560	P56P 00323
			Hägglunds CBP 840	P84P 00230
SPDC CBp H	R939058591	SPDC CBP- H 02976 00 00	Hägglunds CBP 280	P28P 00209
			Hägglunds CBP 400	P40P 00306
			Hägglunds CBP 560	P56P 00323
			Hägglunds CBP 840	P84P 00230
SPDC CBm	R939058588	SPDC CBM- 0 04544 00 00	Hägglunds CBM 2000	M200P 00119
			Hägglunds CBM 3000	M300P 00115
			Hägglunds CBM 4000	M400P 00103
SPDC CBm H	R939058589	SPDC CBM- H 04544 00 00	Hägglunds CBM 2000	M200P 00119
			Hägglunds CBM 3000	M300P 00115
			Hägglunds CBM 4000	M400P 00103
SPDC CA with BICA	R939062607	SPDC BICA 0 01856 00 00	Hägglunds BICA 13	K013A 0589
			Hägglunds BICA 24	K024A 0620
			Hägglunds BICA 37	K037A 0635
SPDC CBm with BICA	R939061237	SPDC CBM- 0 04544 00 01	Hägglunds BICA 90	All
			Hägglunds BICA 134	All
			Hägglunds BICA 160	All

H = Motor with through-hole unit

Note!

When ordering the SPDC speed sensor, it must be added in free text in the order form that the sensor shall be mounted on the motor at the factory. If not added, the SPDC speed sensor will be sent separately.

Unlike the former SPDB1 sensor, there is not a need to dismount the SPDC speed sensor from the motor, when the motor shall be mounted on the customer shaft. The SPDC speed sensor can therefore be mounted at the factory.

It shall be noted that there are several valuable advantages to have the SPDC speed sensor mounted at the factory, as some parts of the motor must be dismounted and exchanged by new parts if the sensor is mounted afterwards and not at the factory.

6 Main parts in the Hägglunds SPDC

6.1 Hägglunds CA, CBp 140

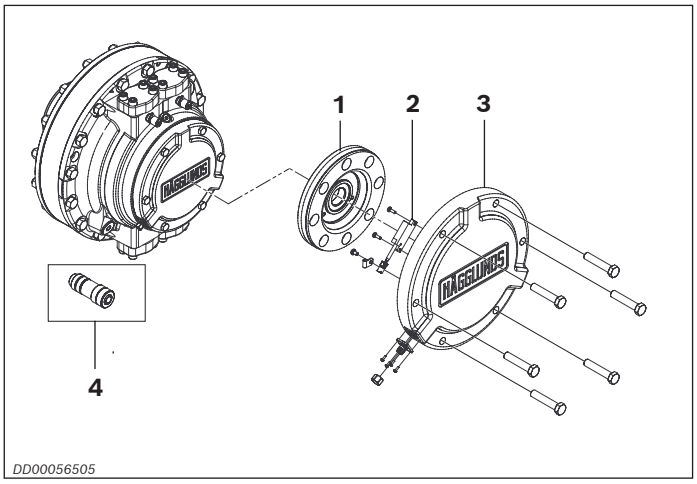

Fig. 3: Parts in the Hägglunds SPDC for Hägglunds CA and CBp 140

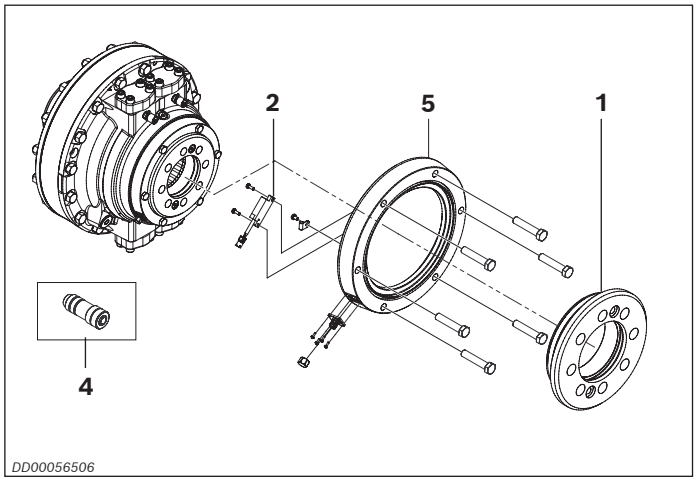

Fig. 4: Parts in the Hägglunds SPDC for Hägglunds CA and CBp 140 with through hole

6.2 Hägglunds CB

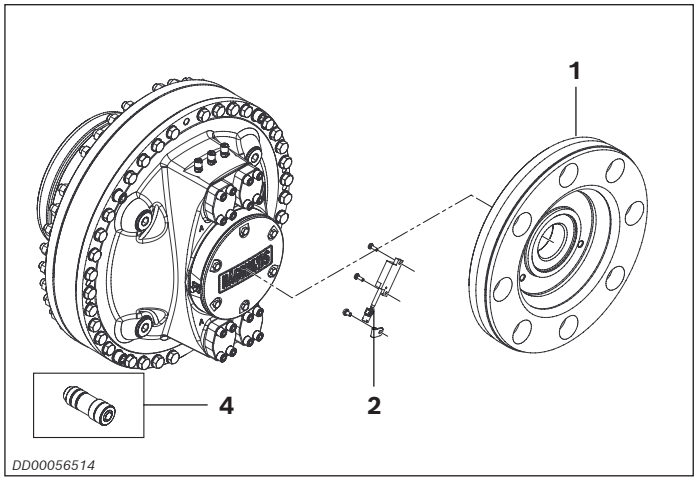

Fig. 5: Parts in the Hägglunds SPDC for Hägglunds CB

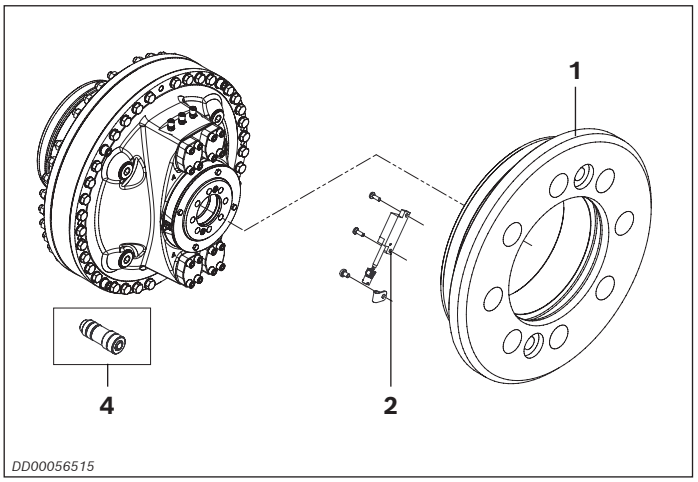

Fig. 6: Parts in the Hägglunds SPDC for Hägglunds CB with through hole

6.3 Hägglunds CBP

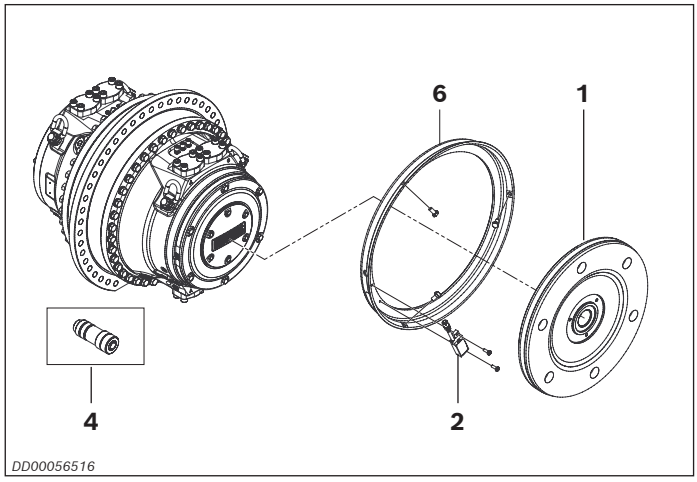

Fig. 7: Parts in the Hägglunds SPDC for Hägglunds CBP

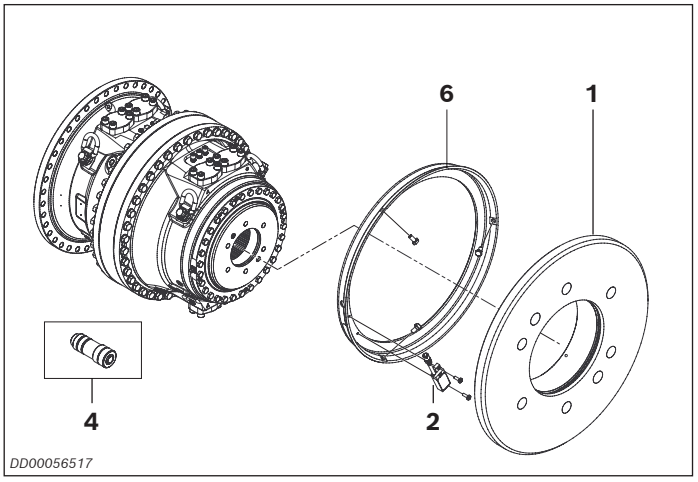

Fig. 8: Parts in the Hägglunds SPDC for Hägglunds CBp with through hole

6.4 Hägglunds CBm

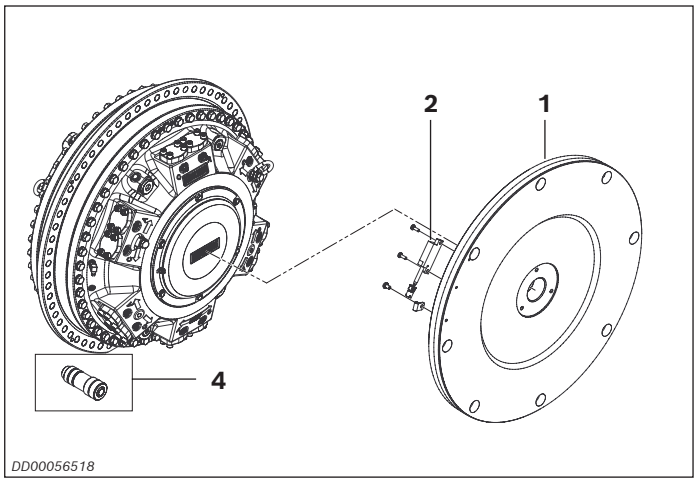

Fig. 9: Parts in the Hägglunds SPDC for Hägglunds CBm

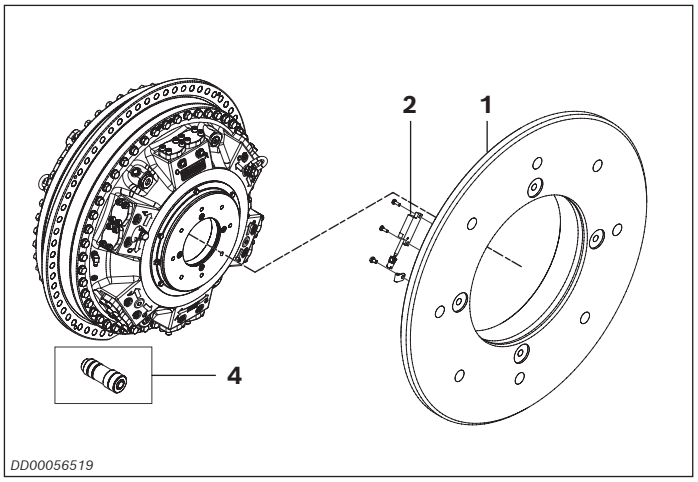

Fig. 10: Parts in the Hägglunds SPDC for Hägglunds CBm with through hole

6.5 Hägglunds CA with BICA

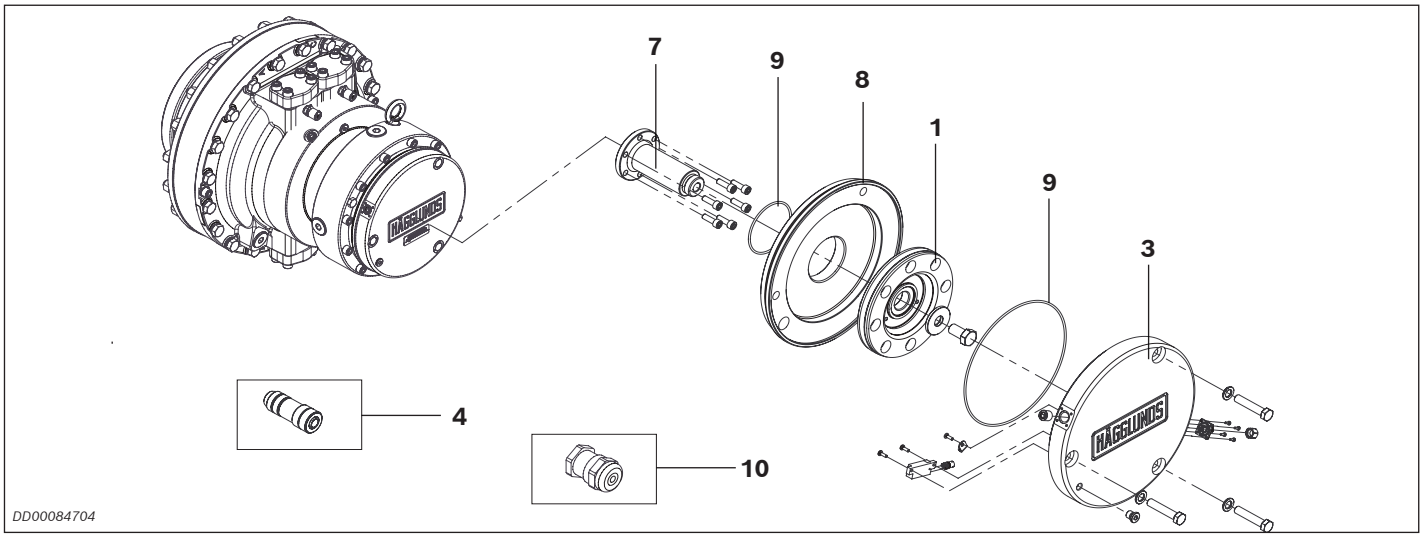

Fig. 11: Parts in Hägglunds SPDC for Hägglunds CA with BICA

6.6 Hägglunds CBm with BICA

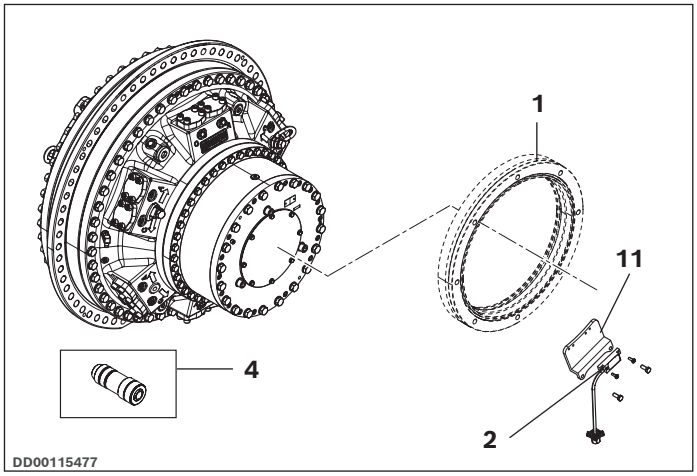

Fig. 12: Parts in the Hägglunds SPDC for Hägglunds CBm with BICA

1. Magnetized bearing holder (Included in BICA for CBm motor)
2. Sensor head
3. Cover
4. Cable connector for customer cable (included in delivery)
5. Outer ring
6. Adapter ring
7. Carrier
8. Spacer
9. O-ring
10. Cable gland for on-off sensor (included in delivery)
11. Support

7 F/A Converter

Functional description

The F/A Converter converts a single puls train to a 4-20 mA output signal.

The output is based on an internal reference frequency selectable in 16 steps. This gives a full output at 16 different pulse rates.

The F/A Converter is optional and must be mounted externally.

Material ID

Material ID: R939004770

Technical data

Technical data	
Supply voltage	24 V (12-50 V)
Power consumption	3 W
Operating temperature	-20° C... +60° C
Humidity	0-90 % RH, non condensing
Temperature coefficient	< 0,01 % / ° C
Accuracy	better than 0,3 %
Resolution	0,1 %
Mounting	NS35 DIN rail
Size	w45 x d70 x h117 mm

Electrical connections	
Pulse input:	
– Input high	V_{in} >15 V
– Input low	V_{in} < 6 V
4-20 mA output	Max. output load 500 Ω
EMC approval	EN 50081-1, EN 50082-2
Safety	EN 60730

Settings of SW1 for different type of speed sensors and rpm range

SW1	1856 ppr	2976 ppr	4544 ppr	
0	0 - 0,05	0 - 0,03	0 - 0,02	rpm
1	0 - 0,11	0 - 0,07	0 - 0,04	rpm
2	0 - 0,27	0 - 0,17	0 - 0,11	rpm
3	0 - 0,54	0 - 0,34	0 - 0,22	rpm
4	0 - 1,08	0 - 0,67	0 - 0,44	rpm
5	0 - 2,69	0 - 1,68	0 - 1,10	rpm
6	0 - 5,39	0 - 3,36	0 - 2,20	rpm
7	0 - 10,78	0 - 6,72	0 - 4,40	rpm
8	0 - 3,23	0 - 2,02	0 - 1,32	rpm
9	0 - 6,47	0 - 4,03	0 - 2,64	rpm
A	0 - 16,16	0 - 10,08	0 - 6,60	rpm
B	0 - 32,33	0 - 20,16	0 - 13,20	rpm
C	0 - 64,66	0 - 40,32	0 - 26,41	rpm
D	0 - 161,64	0 - 100,81	0 - 66,02	rpm
E	0 - 323,28	0 - 201,61	0 - 132,04	rpm
F	0 - 646,55	0 - 403,23	0 - 264,08	rpm

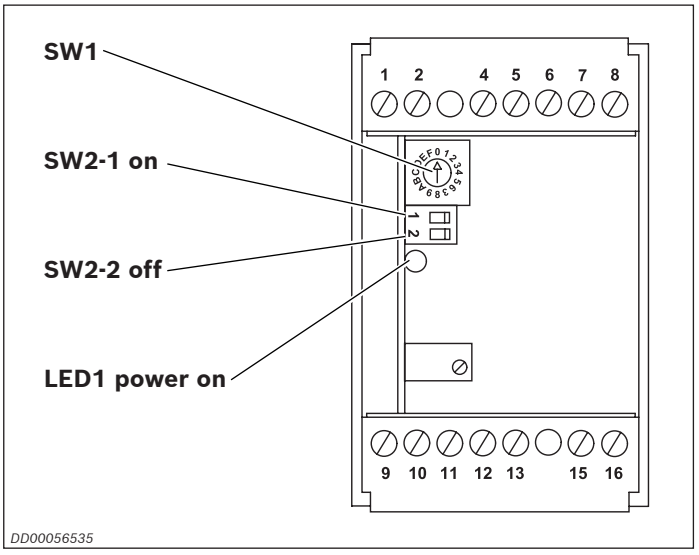

Fig. 13: F/A converter, details

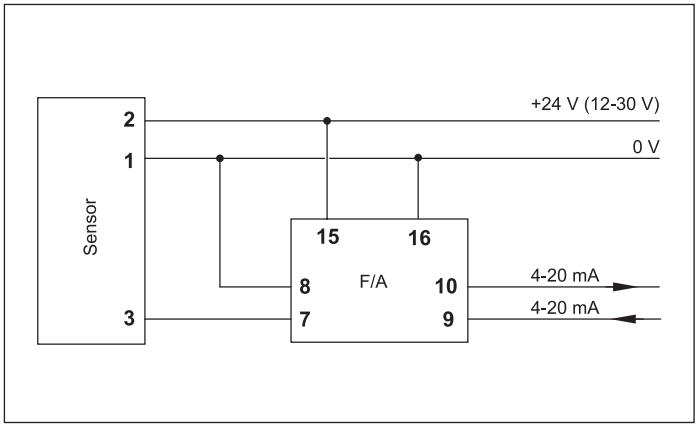

Fig. 14: Connection diagram

8 Installation

8.1 Hägglunds CA, CBp 140

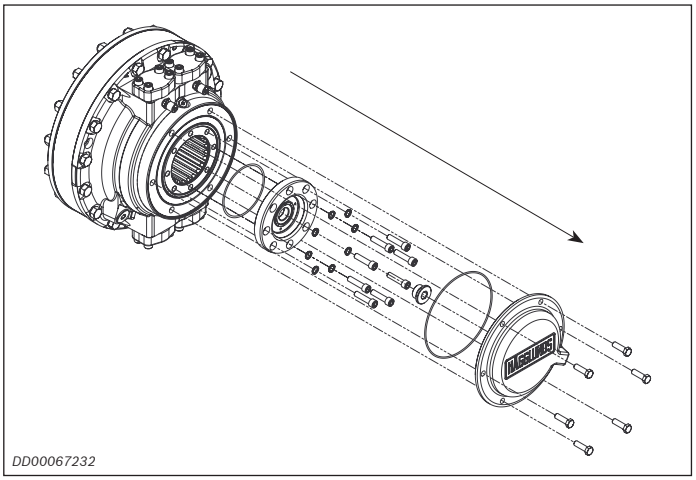

Fig. 15: Dismounting of Hägglunds CA and CBp 140

1. Dismount cover and bearing holder.

Note! Save screws, washers, plugs and O-rings for reassembling.

2. Assemble contact and flange housing on SPDC cover . See *"8.11 Contact and flange housing", page 19*

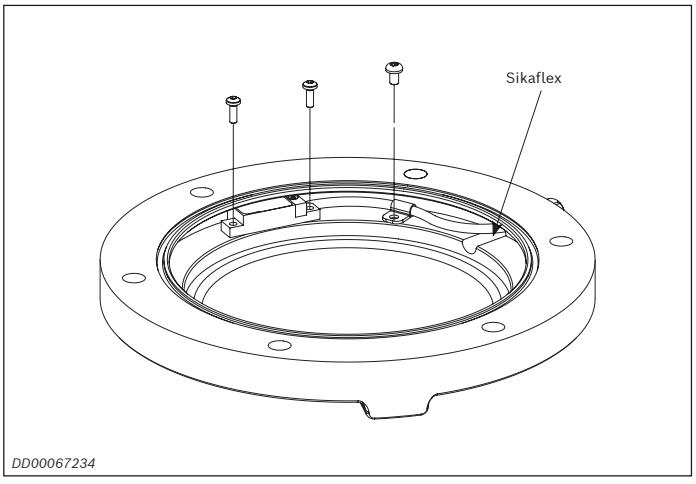

Fig. 16: Sensor head and cable grip in SPDC cover

3. Seal of the cable passage with Sikaflex-11 FC (or similar jointing compound) and mount sensor head together with cable grip.

Note! Use Loctite 2700 (or similar glue) for the screws!

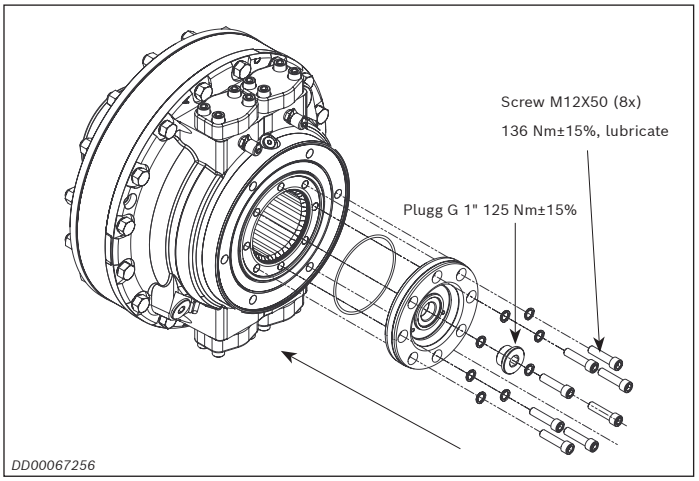

Fig. 17: SPDC magnetized bearing holder

4. Mount SPDC magnetized bearing holder.

NOTICE

External magnetic fields

Bearing holder damage

- Keep magnetized bearing holder away from magnetic fields!

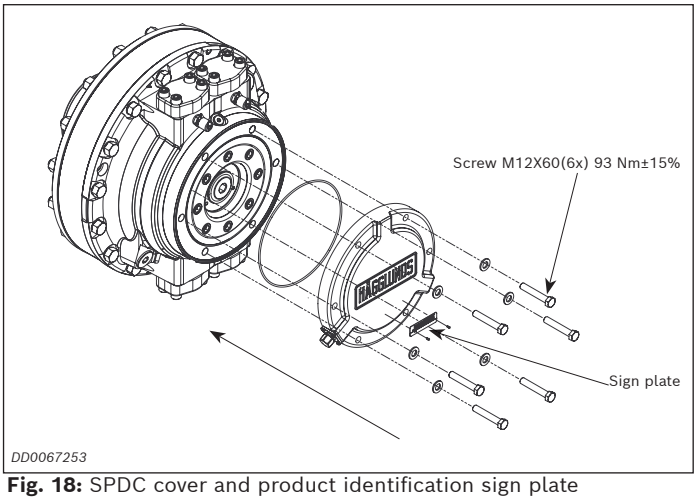

Fig. 18: SPDC cover and product identification sign plate

5. Mount SPDC cover. Attach the sign plate on the cover by using the drive screws (2 mm. holes is needed).

NOTICE

Uncontrolled positioning of cover

Sensor damage

- Use steel dowels to secure positioning!

8.2 Hägglunds CA and CBp 140 with through hole

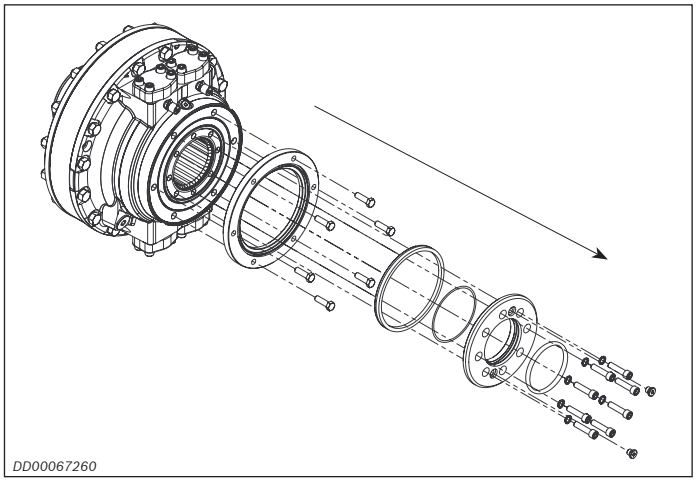

Fig. 19: Dismounting of Hägglunds CA and CBp 140 with through hole

1. Dismount outer ring and bearing holder.

Note! Save screws, washers, plugs and O-rings for reassembling:

2. Assemble contact and flange housing on SPDC outer ring. See *"8.11 Contact and flange housing", page 19*

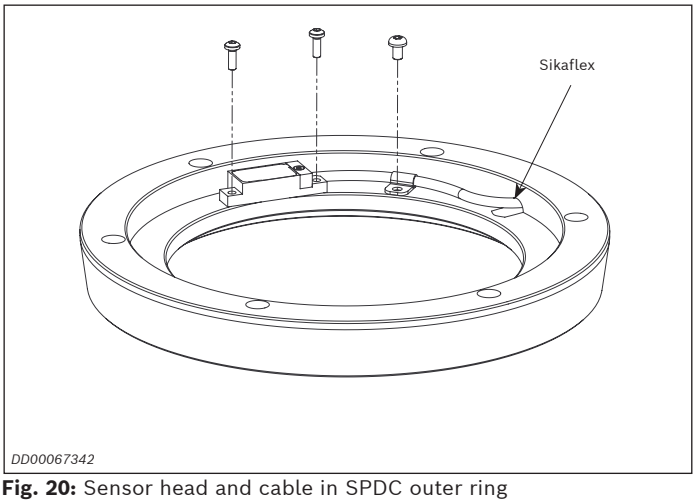

Fig. 20: Sensor head and cable in SPDC outer ring

3. Seal of the cable passage with Sikaflex-11 FC (or similar jointing compound) and mount sensor head together with cable grip.

Note! Use Loctite 2700 (or similar glue) for the screws!

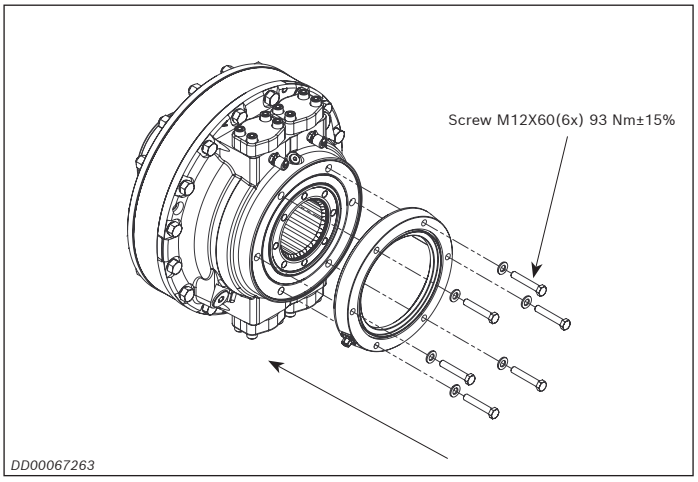

Fig. 21: SPDC Outer ring

4. Mount SPDC outer ring.

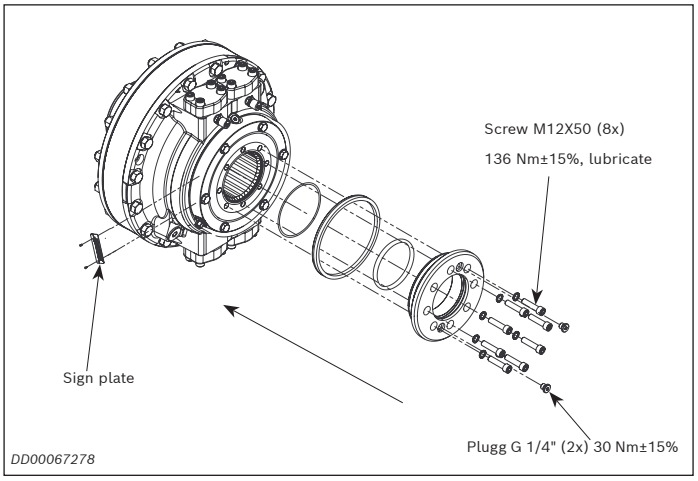

Fig. 22: SPDC magnetized bearing holder and sign plate

5.Mount SPDC magnetized bearing holder. Attach the sign plate on the outer ring by using the drive screws (2 mm. holes is needed).

NOTICE

External magnetic fields

Bearing holder damage

- Keep magnetized bearing holder away from magnetic fields!

8.3 Hägglunds CB

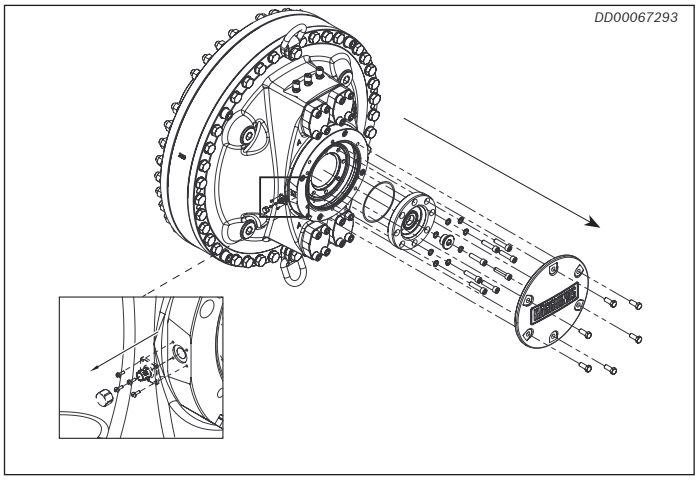

Fig. 23: Dismounting of Hägglunds CB

1. Dismount cover, bearing holder and flange housing.

Note! Save screws, washers, plugs and O-rings for reassembling.

2. Assemble contact and flange housing on sealing fastener. See *"8.11 Contact and flange housing", page 19*

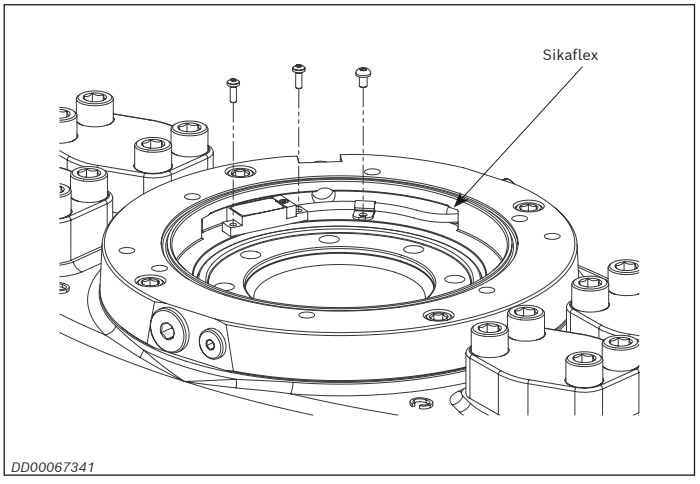

Fig. 24: Sensor head and cable in sealing fastener

3. Seal off the cable passage with Sikaflex-11 FC (or similar joiting compound) and mount sensor head together with cable grip in sealing fastener.

Note! Use Loctite 2700 (or similar glue) for the screws!

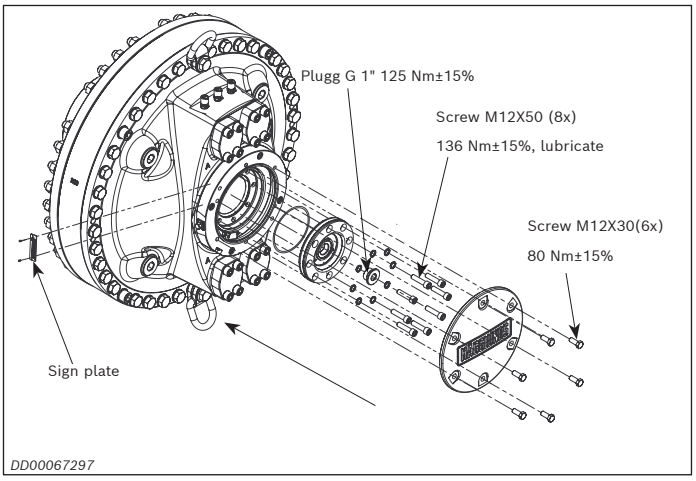

Fig. 25: SPDC magnetized bearing holder, sign plate and cover

4. Mount SPDC magnetized bearing holder and cover. Attach the sign plate on the sealing fastener by using the two drive screws (2 mm. holes is needed).

NOTICE

External magnetic fields

Bearing holder damage

- Keep magnetized bearing holder away from magnetic fields!

8.4 Hägglunds CB with through hole

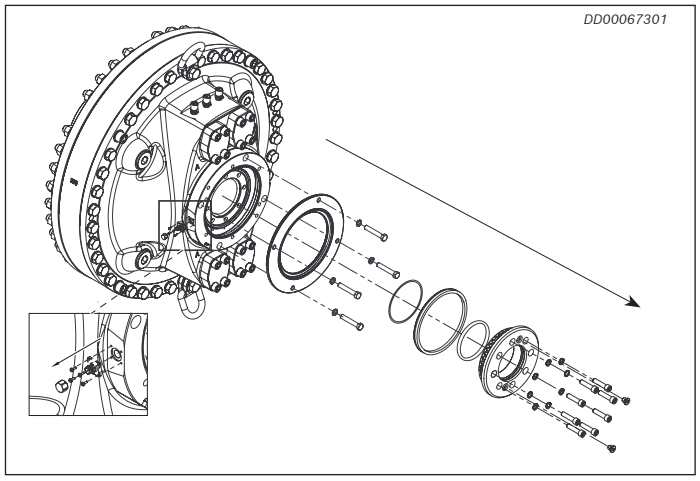

Fig. 26: Dismounting of Hägglunds CB with through hole

1. Dismount bearing holder, outer ring and flange housing.

Note! Save screws, washers, plugs and O-rings for reassembling.

2. Assemble contact and flange housing on sealing fastener. See *"8.11 Contact and flange housing", page 19*

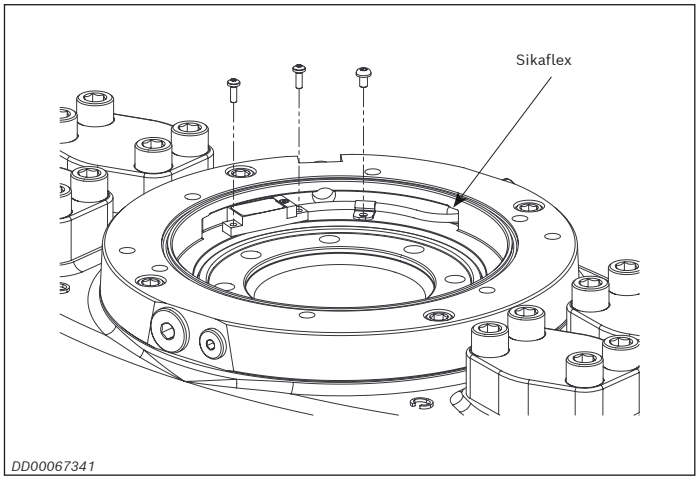

Fig. 27: Sensor head and cable in sealing fastener

3. Seal of the cable passage with Sikaflex-11 FC (or similar joiting compound) and mount sensor head together with cable grip in sealing fastener.

Note! Use Loctite 2700 (or similar glue) for the screws!

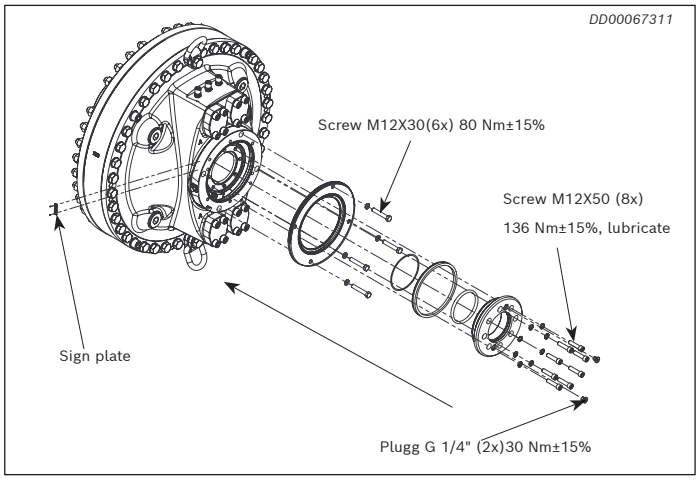

Fig. 28: Outer ring, sign plate and SPDC magnetized bearing holder

4. Mount outer ring and SPDC magnetized bearing holder. Attach the sign plate on the sealing fastener by using the two drive screws (2 mm. holes is needed).

NOTICE

External magnetic fields

Bearing holder damage

- Keep magnetized bearing holder away from magnetic fields!

8.5 Hägglunds CBP

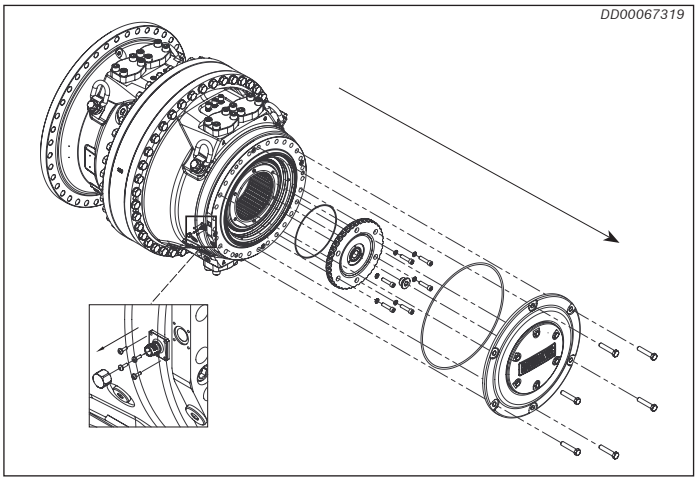

Fig. 29: Dismounting of Hägglunds CBP

1. Dismount cover, bearing holder and flange housing.

Note! Save screws, washers, plugs and O-rings for reassembling.

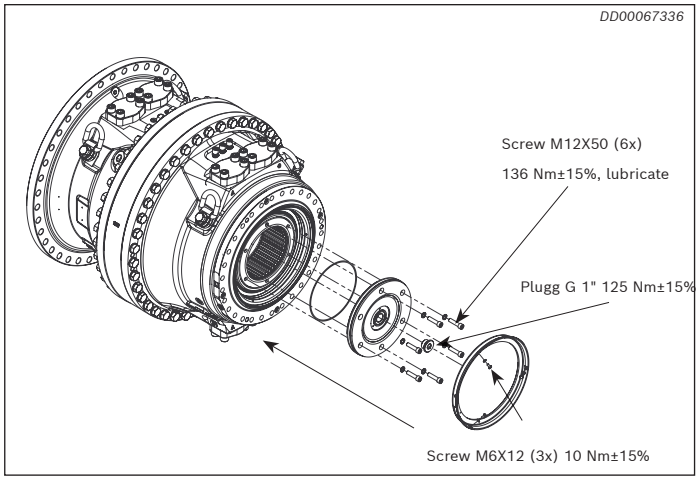

Fig. 30: SPDC magnetized bearing holder and adapter ring

2. Mount SPDC magnetized bearing holder and adapter ring.

Note! Use Loctite 2700(or similar glue) for SPDC adapter ring!

3. Assemble contact and flange housing in SPDC adapter ring.
See *"8.11 Contact and flange housing", page 19*

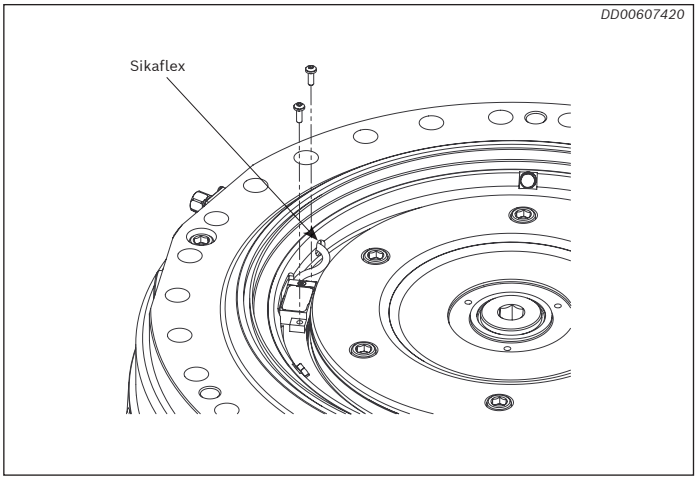

Fig. 31: Sensor head in adapter ring

4. Seal of the cable passage with Sikaflex-11 FC (or similar jointing compound) and mount sensor head together with cable grip in adapter ring.

Note! Use Loctite 2700 (or similar glue) for the screws

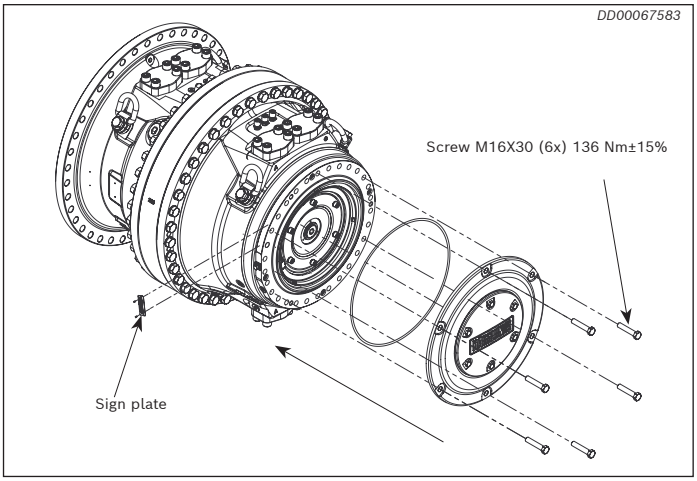

Fig. 32: Cover and sign plate

5. Mount cover. Attach the sign plate on the sealing fastener by using the two drive screws (2 mm. holes is needed).

NOTICE

External magnetic fields

Bearing holder damage

- Keep magnetized bearing holder away from magnetic fields!

8.6 Hägglunds CBp with through hole

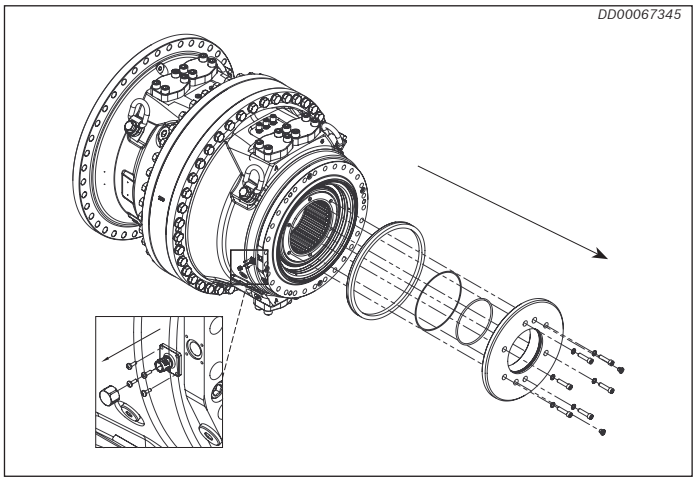

Fig. 33: Dismounting of Hägglunds CBp with through hole

1. Dismount bearing holder and flange housing.

Note! Save screws, washers, plugs and O-rings for reassembling.

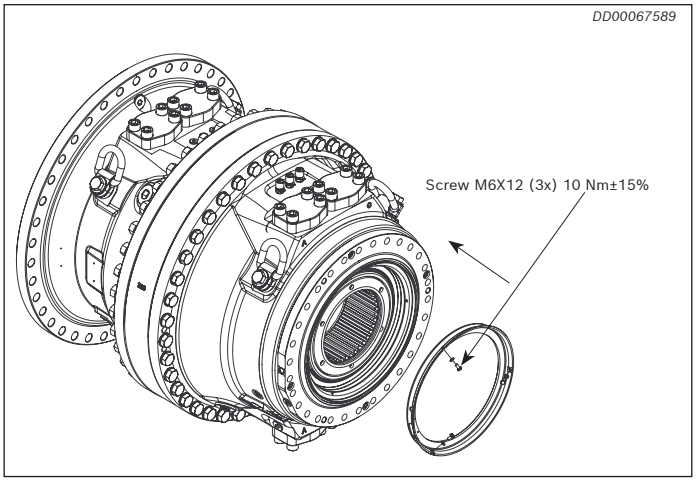

Fig. 34: Adapter ring

2. Mount adapter ring.

Note! Use Loctite 2700(or similar glue)

3. Assemble contact and flange housing in adapter ring.
See *"8.11 Contact and flange housing", page 19*

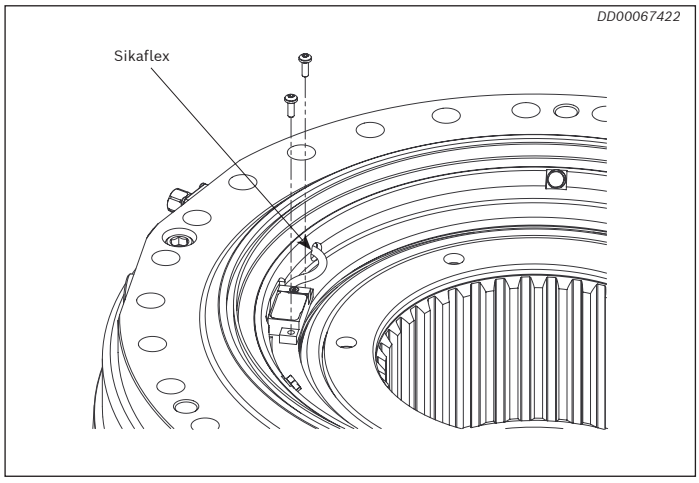

Fig. 35: Sensor head in adapter ring

4. Seal off the cable passage with Sikaflex-11 FC (or similar jointing compound) and mount sensor head together with cable grip in adapter ring.

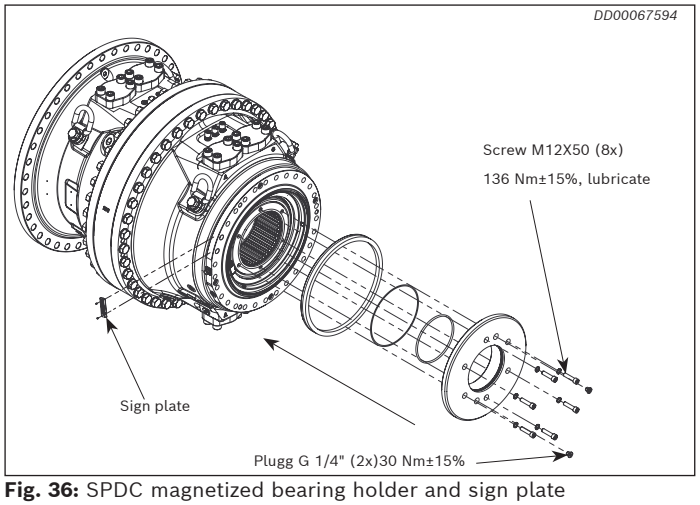

Fig. 36: SPDC magnetized bearing holder and sign plate

5. Mount SPDC magnetized bearing holder.

Note! Use Loctite 2700 (or similar glue) for the screws!

Attach the sign plate on the sealing fastener by using the two drive screws (2 mm. holes is needed).

NOTICE

External magnetic fields

Bearing holder damage

- Keep magnetized bearing holder away from magnetic fields!

8.7 Hägglunds CBm

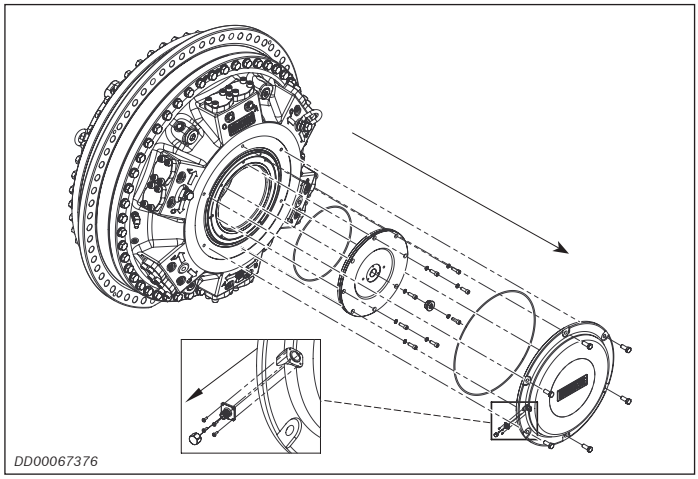

Fig. 37: Dismounting of Hägglunds CBm

1. Dismount cover, bearing holder and flange housing.

Note! Save screws, washers, plugs and O-rings for reassembling

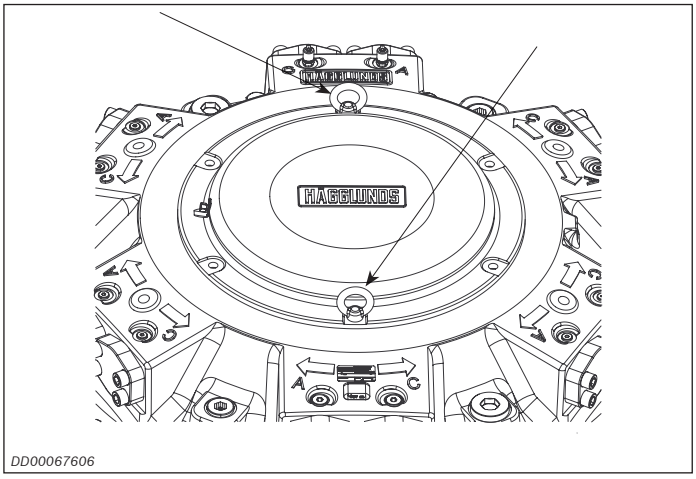

Fig. 38: Lifting eye bolts

CAUTION

Falling cover!
Personal injuries
- Use lifting equipment when handling cover!

2. Assemble contact and flange housing on cover.
See *"8.11 Contact and flange housing", page 19*

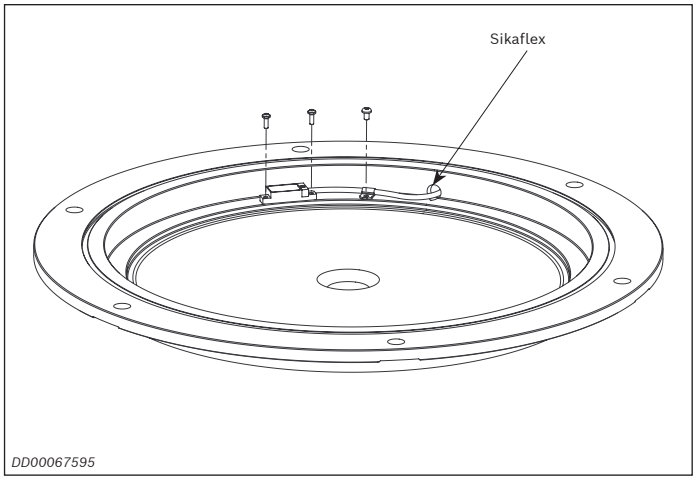

Fig. 39: Sensor head and cable grip in cover

3. Seal the cable passage with Sikaflex-11 FC (or similar) and mount sensor head together with cable grip in cover.

Note! Use Loctite 2700 (or similar) for the screws

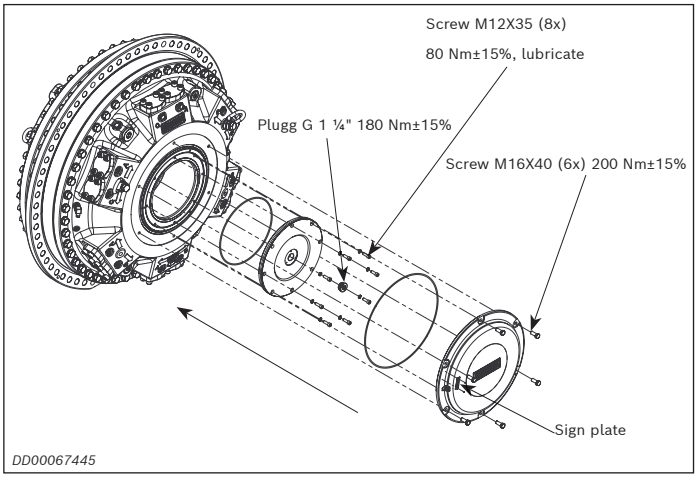

Fig. 40: SPDC magnetized bearing holder, sign plate and cover

4. Mount SPDC magnetized bearing holder and cover. Attach the sign plate on the cover by using the two drive screws (2 mm. holes is needed).

NOTICE

External magnetic fields
Bearing holder damage
- Keep magnetized bearing holder away from magnetic fields!

Uncontrolled positioning of cover
Sensor damage
- Use steel dowels to secure positioning!

8.8 Hägglunds CBm with through hole

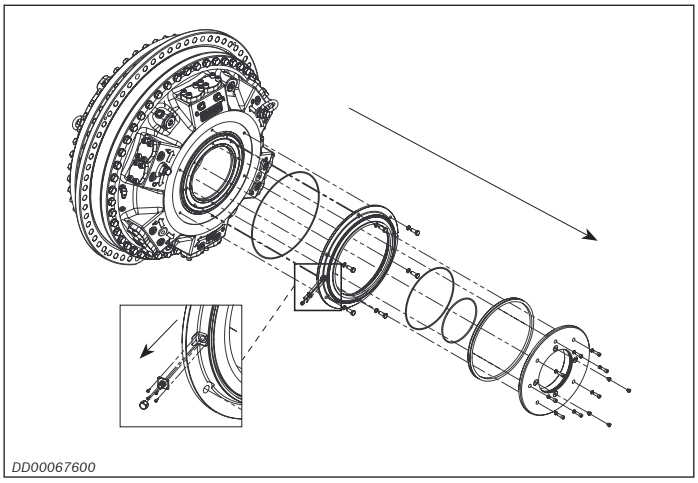

Fig. 41: Dismounting of Hägglunds CBm with through hole

1. Dismount bearing holder, outer ring and flange housing.

Note! Save screws, washers and O-rings for reassembling

2. Assemble contact and flange housing on outer ring . See *"8.11 Contact and flange housing", page 19*

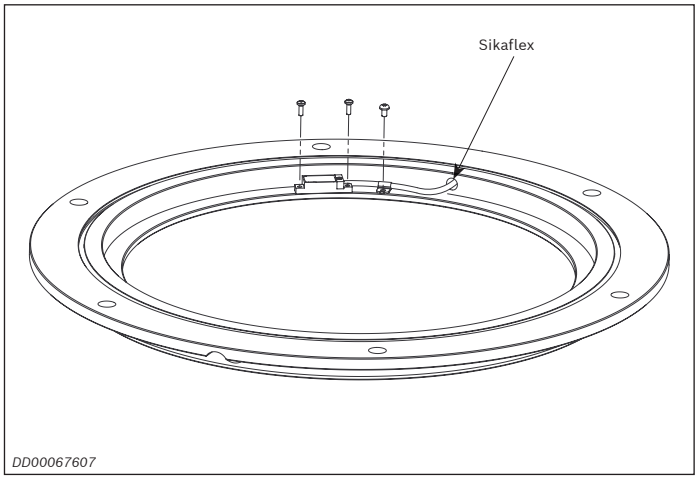

Fig. 42: Sensor head and cable grip in outer ring

3. Seal off the cable passage with Sikaflex-11 FC (or similar) and mount sensor head together with cable grip in outer ring.

Note! Use Loctite 2700 (or similar) for the screws.

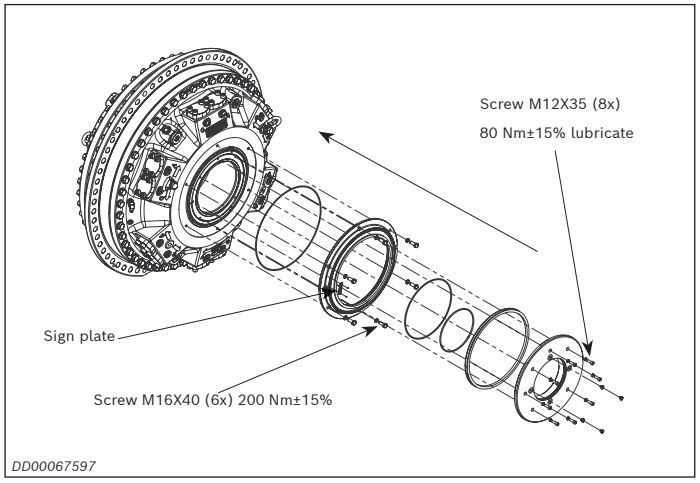

Fig. 43: Outer ring, sign plate and SPDC magnetized bearing holder

4. Mount outer ring and SPDC magnetized bearing holder. Attach the sign plate on the outer ring by using the two drive screws (2 mm. holes is needed).

NOTICE

External magnetic fields

Bearing holder damage

- Keep magnetized bearing holder away from magnetic fields!

8.9 Hägglunds CA with BICA

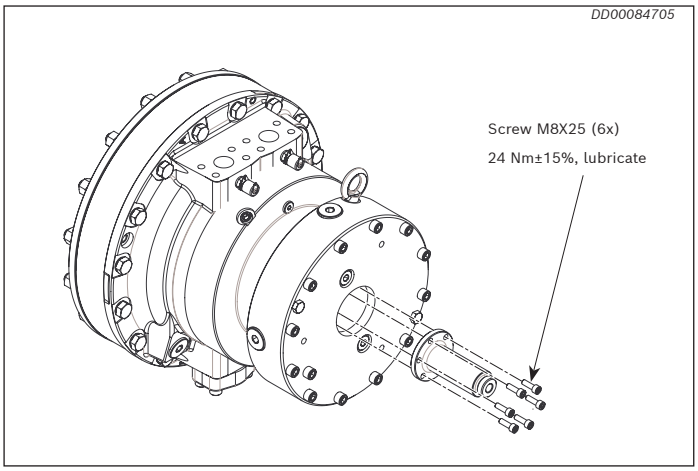

Fig. 44: Carrier

1. Remove the small cover on BICA by loosen the 4 x M8X16 and mount carrier inside of BICA.

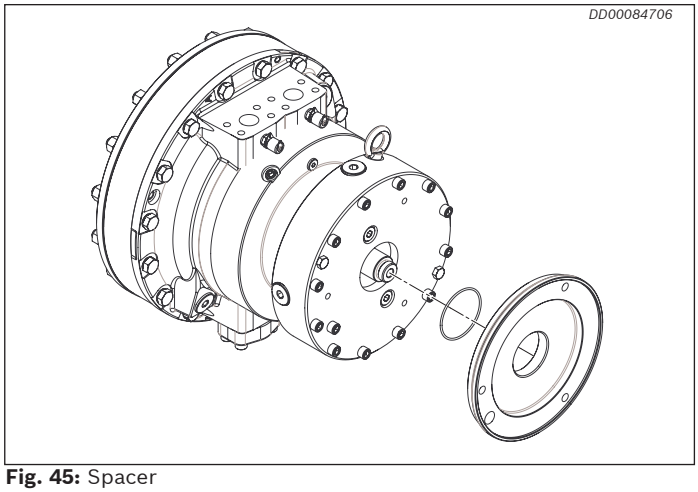

Fig. 45: Spacer

2. Place o-ring on spacer and then mount spacer on BICA.

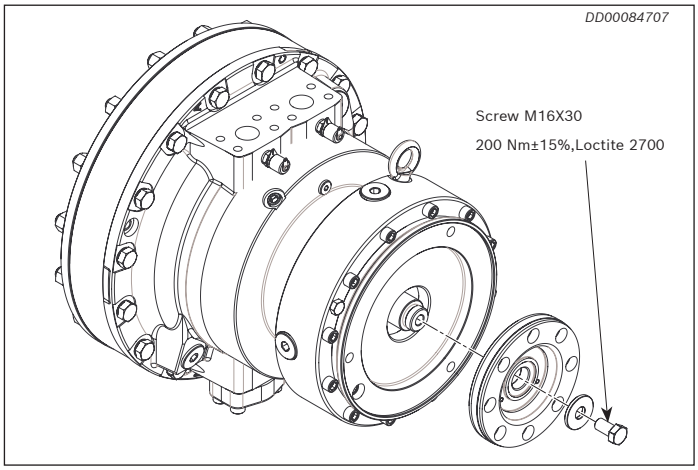

Fig. 46: SPDC magnetized bearing holder

3. Mount SPDC magnetized bearing holder on BICA and fix it with washer and screw. Lock screw with Loctite 2700.

4. Assemble contact and flange housing on SPDC cover. See *"8.11 Contact and flange housing", page 19*

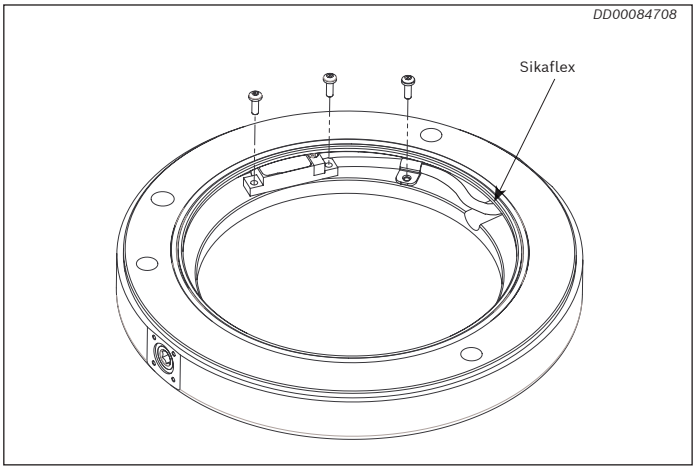

Fig. 47: Sensor head and cable grip in SPDC cover

5. Seal the cable passage with Sikaflex-11 FC (or similar) and mount sensor head together with cable grip in SPDC cover.

Note! Use Loctite 2700 (or similar) for the screws

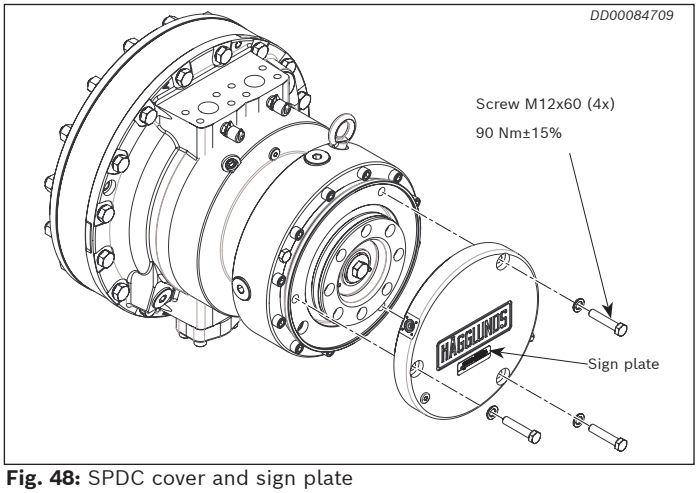

Fig. 48: SPDC cover and sign plate

6. Mount SPDC cover on spacer. Attach the sign plate on SPDC cover by using the two drive screws (2 mm holes is needed).

NOTICE

External magnetic fields

Bearing holder damage

- Keep magnetized bearing holder away from magnetic fields!

8.9.1 Hägglunds CA with BICA and on-off sensor

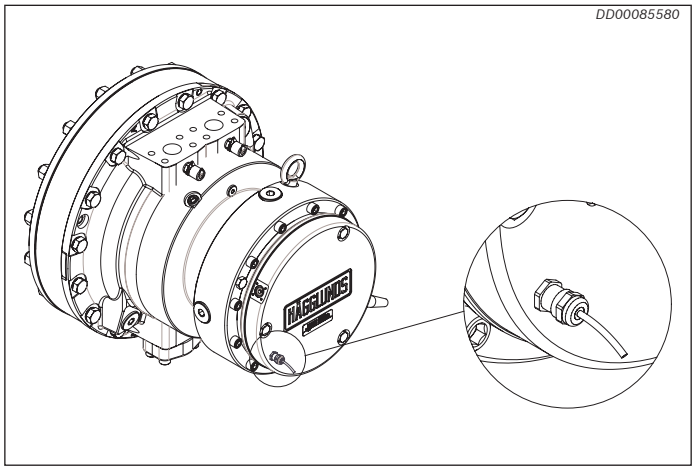

Fig. 49: Hägglunds CA with BICA and on-off sensor

1. Cable gland is used instead of plug when the BICA has an on-off sensor

8.10 Hägglunds CBm with BICA

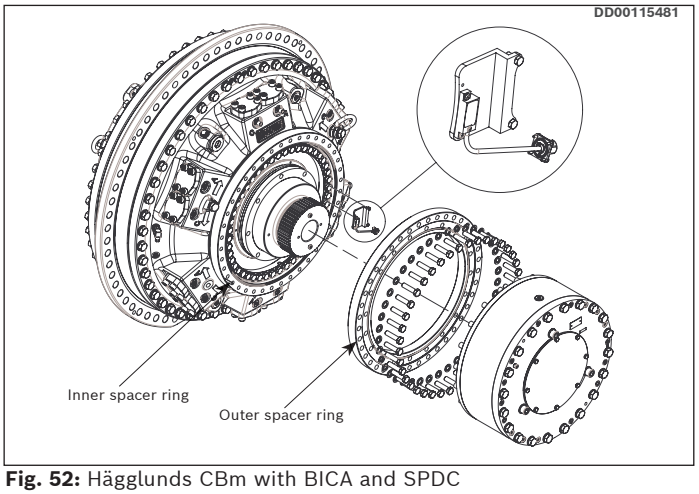

Fig. 52: Hägglunds CBm with BICA and SPDC

1. Dismount the BICA brake from the motor see RE 15366-WA or contact Hägglunds technical helpdesk.
2. Remove the outer spacer ring from the motor
3. Assemble contact and flange housing on inner spacer ring. See *"8.11 Contact and flange housing", page 19*
4. Mount the sensor unit to the predrilled screwholes on the inner spacer ring.
5. Mount the BICA on the motor see RE 15366-WA or contact Hägglunds technical helpdesk.

8.11 Contact and flange housing

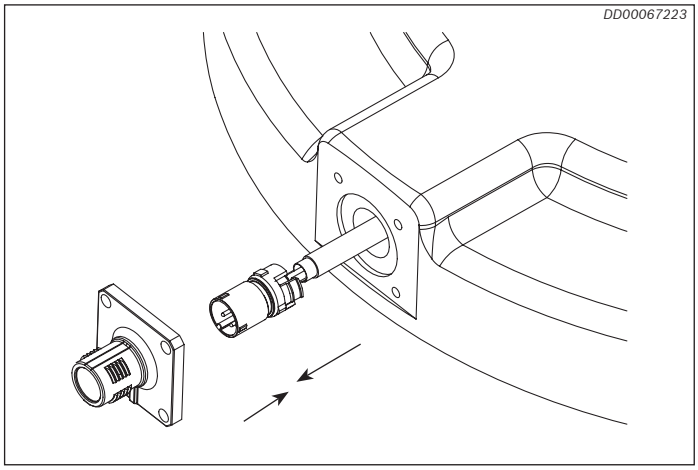

Fig. 50: Contact

1. Assemble contact with flange housing (It will ”click” when it’s properly mounted).

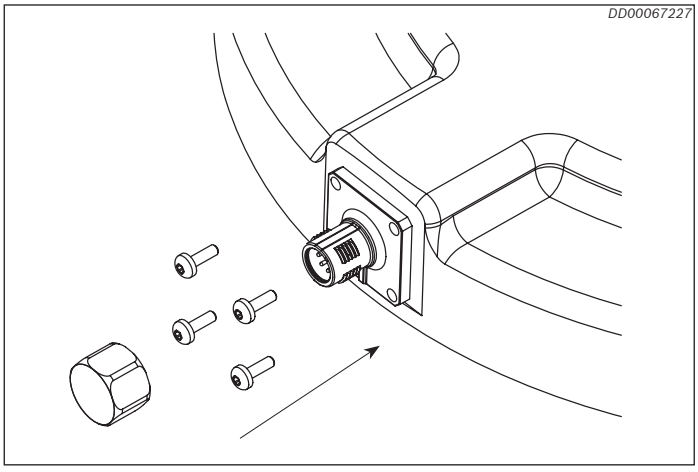

Fig. 51: Flange housing

2. Assemble flange housing on SPDC cover / outerring / spacer ring sealing fastener, together with cap.

Note! Use Loctite 2700 (or similar glue) for the M3 screws

9 Additional documentation

	Title	Document no	Document type
🕮	Hägglunds Rotational speed sensing unit CA	078 2896	Dimension drawing
🕮	Hägglunds Rotational speed sensing unit CB	078 2897	Dimension drawing
🕮	Hägglunds Rotational speed sensing unit CBp	078 2898	Dimension drawing
🕮	Hägglunds Rotational speed sensing unit CBm	078 2899	Dimension drawing
🕮	Hägglunds Rotational speed sensing unit CA with BICA	078 4658	Dimension drawing
🕮	Hägglunds Rotational speed sensing unit CBm with BICA	————	Dimension drawing

Documents only available for Bosch Rexroth employes on MyRexroth. Contact your Bosch Rexroth representative for information.

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