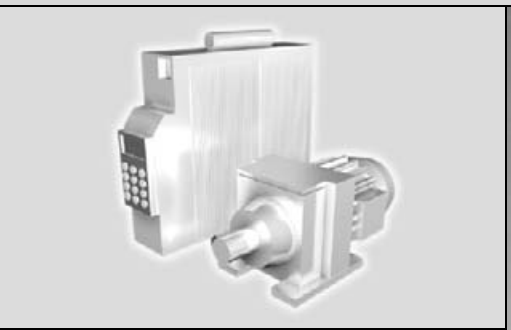
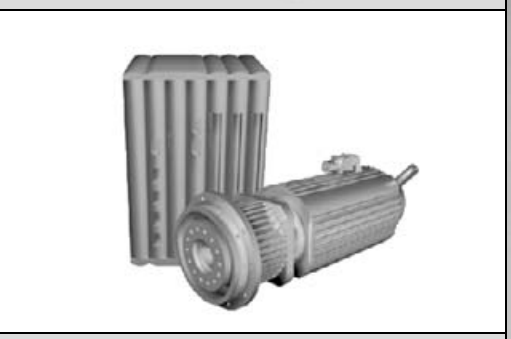
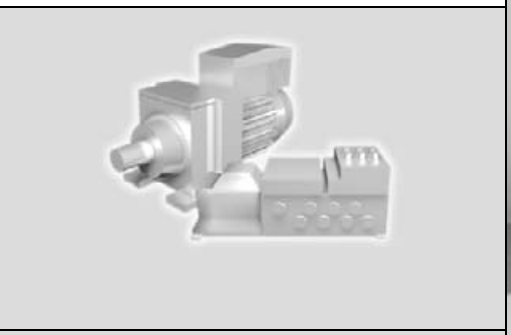
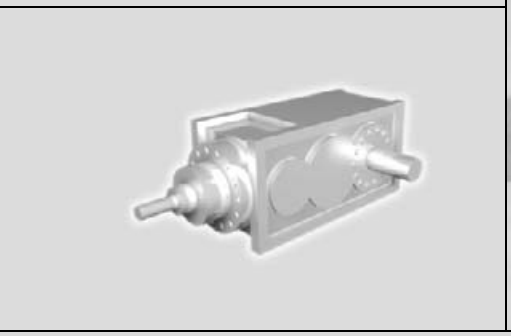
SEW EURODRIVE









CMS Electric Cylinders

GB290000

Edition 04/2006

11438215 / EN

Operating Instructions

SEW
EURODRIVE

1 Important Notes on the Operating Instructions

1.1 Important notes and designated use

Integral part of the product

The operating instructions are an integral part of the CMS electric cylinder and contain important information for operation and service. The operating instructions are written for assembly, installation, startup and service employees who are involved in the installation and maintenance of CMS electric cylinders.

Designated use

The designated use refers to the procedure specified in the operating instructions.

Series CMS electric cylinders are units run by motors for industrial and commercial systems. Motor utilization other than that specified and areas of application other than industrial and commercial systems can only be used after consultation with SEW-EURODRIVE.

Do not start up the unit (take it into operation in the designated fashion) until you have established that the machine complies with the EMC Directive 89/336/EEC and that the conformity of the end product has been determined in accordance with the Machinery Directive 89/392/EEC (with reference to EN 60204).

Qualified personnel

CMS electric cylinders represent a potential hazard for persons and material. Consequently, assembly, installation, startup and service work may only be performed by trained personnel who are aware of the potential hazards.

Employees must be appropriately qualified for the task in hand and must be familiar with the assembly, installation, startup and operation of the product. The personnel must read the operating instructions, in particular the safety notes section, carefully and ensure that they understand and comply with them.

Liability for defects

Incorrect handling or any action performed that is not specified in these operating instructions could impair the properties of the product. In this case, you lose any right to claim under limited warranty against SEW-EURODRIVE GmbH & Co KG.

Product names and trademarks

The brands and product names in these operating instructions are trademarks or registered trademarks of the titleholders.

Waste disposal

This product consists of:

- Iron
- Aluminum
- Copper
- Plastics
- Electronic components

Dispose of all components in accordance with applicable regulations.

1.2 Explanation of symbols

Electrical hazard
Possible consequences: Severe or fatal injuries.

Hazard
Possible consequences: Severe or fatal injuries.

Hazardous situation
Possible consequences: Slight or minor injuries.

Harmful situation
Possible consequences: Damage to the drive and the environment.

Tips and useful information.

2 Safety Notes

Safety functions

Series CMS electric cylinders may not execute any safety functions without master safety systems.

Use higher-level safety systems to ensure protection of equipment and personnel!

General information

- Read the safety notes carefully. Please also consider the supplementary safety notes in the individual sections of these operating instructions.
- Check the delivery for transport damage. If damage is found, advise your supplier.
- Consult the supplied operating instructions.
- The CMS electric cylinder fulfills the requirements of article 4 of the EMC directive 89/336/EEC.
- SEW-EURODRIVE is not liable for modifications, changes, additions and / or alterations to the product.
- Use only spare parts and accessories manufactured according to SEW-EURODRIVE specifications.
- Read the installation and operating instructions completely and carefully prior to installation, use or repair of the CMS electric cylinder.
- All work related to transport, putting into storage, setting up/mounting, connection, startup, maintenance and repair is to be carried out by trained personnel only.
- Note the system-specific guidelines and requirements.
- Note the operating and assembly instructions of the screw drive.
- Never remove or disable protection devices.
- If you notice unusual behavior of the electric cylinder during operation, such as increased operating temperatures or unusual motor noise, immediately deactivate the electric cylinder.
- Perform work on the electric cylinder only when it is at standstill. Safeguard the electric cylinder against unintentional power-up!

Operational environment

The following uses are prohibited unless the units are expressly designed for the purpose:

- Use in potentially explosive areas.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc. You will find a list of the approved materials in the appendix.
- Use in non-stationary applications that are subject to mechanical vibration and shock loads in excess of the requirements in EN 50178.

Transport / putting into storage

Inspect the shipment for any damage in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup.

Use suitable, sufficiently rated handling equipment if necessary. Remove any transportation fixtures prior to startup.

Operating notes

Burns hazard!

Touching the CMS electric cylinder when it has not been cooled can result in burns. The CMS electric cylinder can have a surface temperature of over 65 °C.

To prevent burns:

- Never touch the CMS electric cylinder during operation or in the cool down phase once it has been switched off.

In hoist applications, note that the load torque of the application to be held must be less than the holding torque of the brake used. The ball screw used is not self-locking.

Crushing hazard!

Incorrect use, installation or operation represents a crushing hazard due to the vertical movement of the ball screw.

Mechanical installation

Follow the instructions in Sec. "Mechanical Installation."

Inspection / maintenance

Follow the instructions in Sec. "Inspection and Maintenance."

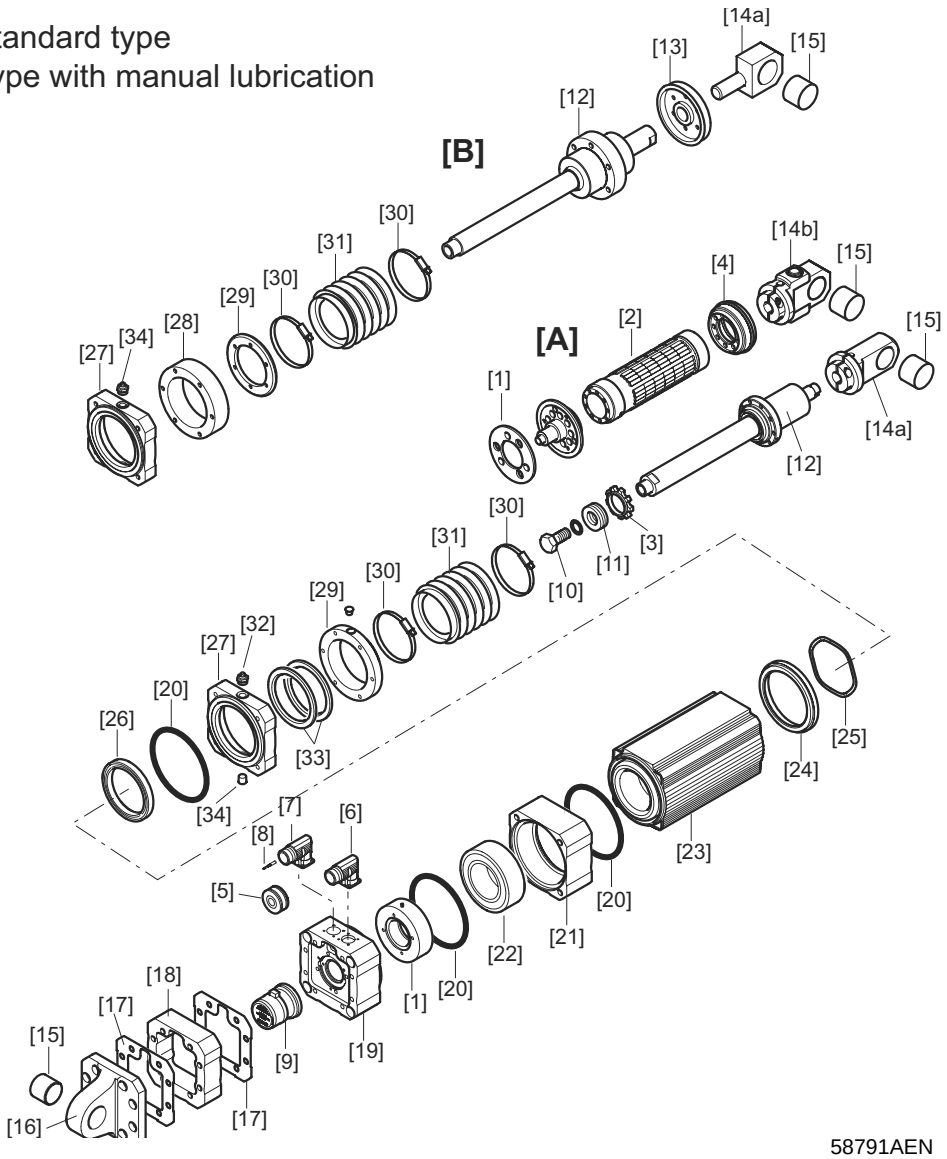
3 Motor Design

3.1 Basic structure of the CMS electric cylinder

Size CMS71

The following illustration is intended to explain the general structure of the unit. It serves as an assignment aid to the spare parts list. Discrepancies are possible depending on the size and version!

[A] = Standard type
[B] = Type with manual lubrication



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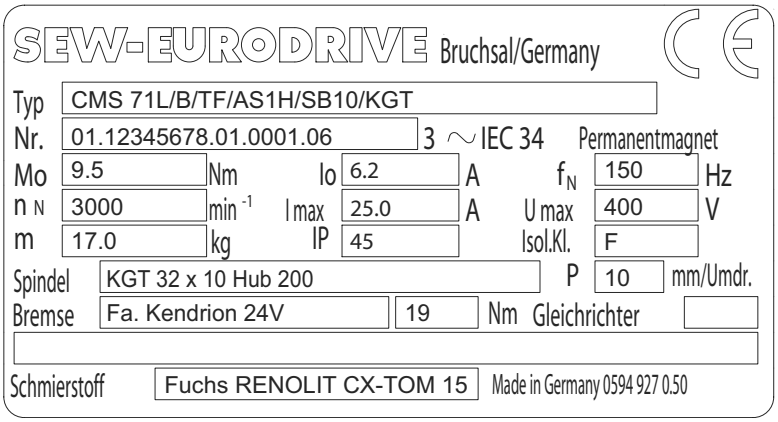
[1] Brake	[10] Hex head bolt	[18] Spacer	[27] Cover disc
[2] Rotor with magnet	[11] Disc spring package	[19] Encoder housing	[28] A-end cover
[3] End stop	[12] Threaded spindle	[20] O-ring	[29] Disc
[4] Adapter flange	[13] Connecting flange	[21] Non drive-end bearing shield	[30] Hose clamp
[5] Resolver	[14a] Joint head, rigid (standard)	[22] Angular contact ball bearing	[31] Bellows
[6] Signal plug connector	[14b] Joint head cardan joint	[23] Complete stator	[32] Greasing nipple
[7] Power plug connector	[15] Socket	[24] Clamping ring	[33] 2 oil seals
[8] Pin contact	[16] B-end cover	[25] Equalizing ring	[34] Closing plug
[9] Absolute encoder	[17] Flat gasket	[26] Grooved ball bearing	

3.2 Nameplate, unit designation

Nameplate

Example: CMS71L electric cylinder



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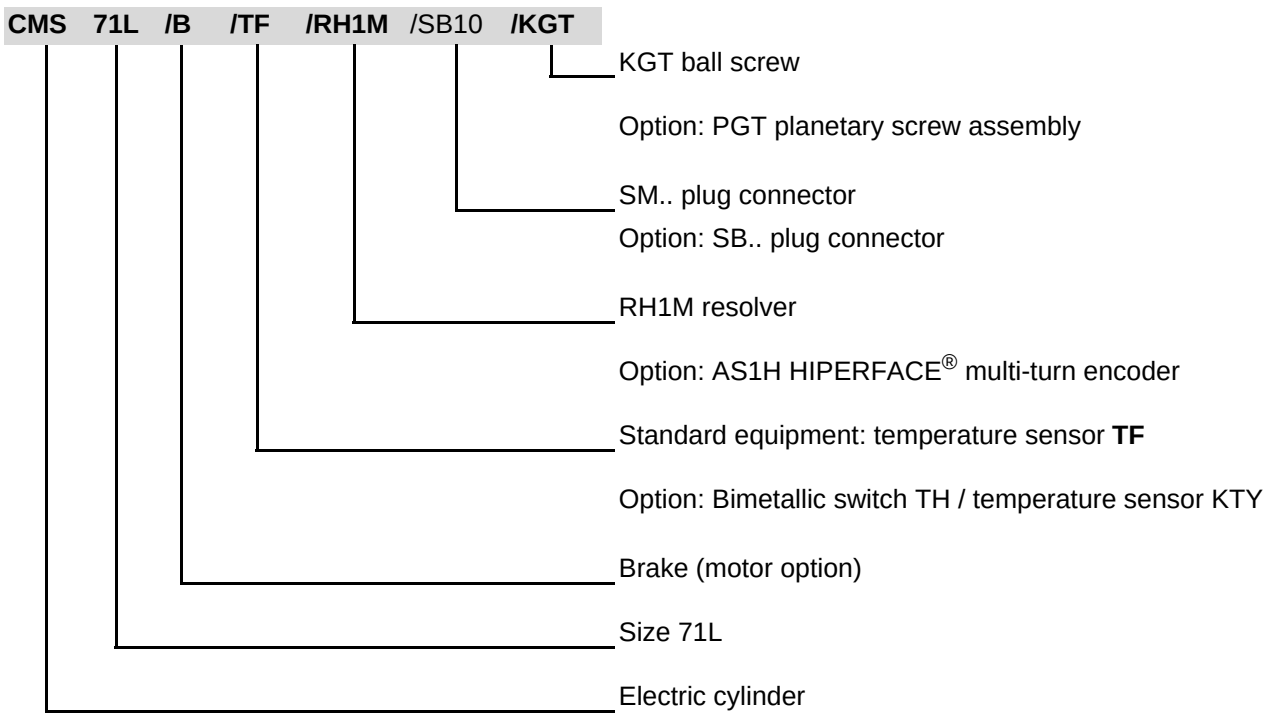
Unit designation

Example: CMS71L electric cylinder



4 Mechanical Installation

It is essential to comply with the safety notes in Section 2 during installation!

4.1 Before you start

The drive may only be installed if:

- The entries on the nameplate of the drive or the output voltage of the frequency inverter match the voltage supply system.
- The drive is undamaged (no damage caused by transportation or storage)
- It is certain that the following requirements have been met:
  - Ambient temperature between –20 °C and +40 °C.
  - No oil, acid, gas, vapors, radiation, etc.
  - Installation altitude max. 1000 m above sea level.
  - Special design: Drive configured in accordance with the ambient conditions.

4.2 Preliminary work

Extended storage of electric cyclinders

- Please note the reduced grease utilization period of the ball bearings and the threaded spindle after storage periods exceeding one year.

4.3 Installing the electric cylinder

Burns hazard!

Touching the CMS electric cylinder when it has not been cooled can result in burns. The CMS electric cylinder can have a surface temperature of over 65 °C.

Provide preventive measures against inadvertent contact.

Protect the bellows and ball screw against mechanical damage!

The fine thread is not allowed to strike against hard edges. Only put the ball screw down on soft padded surfaces.

Do not butt or hammer the ball screw end.

Installation on site

The ball screw is not allowed to be subjected to overhung loads.

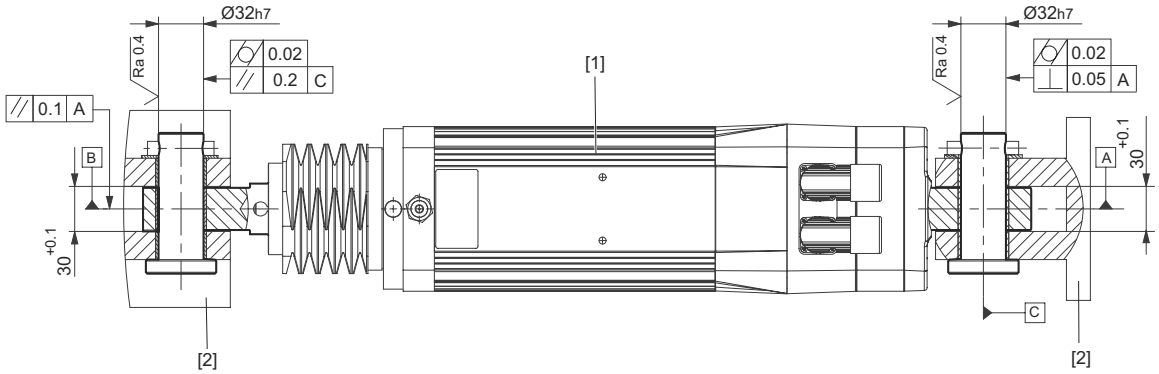
Carefully align the electric cylinder and the driven machine, to avoid placing any unacceptable strain on the ball screw (observe permissible axial thrust data!).

The electric cylinder must be installed on a level, vibration damping and torsionally rigid support structure.

Make sure the customer's counter-bearing is unobstructed and can move freely.

4.4 Installation tolerances

CMS71L The below figure shows the mounting situation for both installation sides of the drive.



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[1] CMS electric cylinder
[2] Customer supplied parts

The max. axial offset between A-B is 0.2 mm

The customer supplied parts have to fulfill the requirements described above.

Please contact SEW-EURODRIVE if the installation tolerances cannot be complied with. An electric cyclinder with cardan joint might be the better choice for the relevant mounting situation.

5 Electrical Installation

- **It is essential to comply with the safety notes in Section 2 during installation!**
- **Use switch contacts in utilization category AC-3 to EN 60947-4-1 for connecting the brake.**
- **When electric cylinders are powered from inverters, the wiring instructions issued by the inverter manufacturer must be adhered to. It is essential to observe the operating instructions for the servo controller.**

5.1 Wiring notes

Protecting brake control systems against interference

Do not route unshielded brake cables alongside switched-mode power cables, since there is a risk of disrupting brake controllers.

Switched-mode power cables include in particular:

– Output cables from frequency inverters and servo controllers, converters, soft start units and brake units

– Supply cables to braking resistors and similar.

Protecting motor protection devices against interference

Install the connecting lead of the KTY separately from other power cables, maintaining a distance of at least 200 mm. The cables can only be routed together if either the KTY cable or the power cable is shielded.

To protect motor protection devices (temperature sensors TF or KTY) against interference:

– Route separately shielded supply cables together with switched-mode power lines in one cable

– Do not route unshielded supply cables together with switched-mode power lines in one cable

EMC measures

SEW-EURODRIVE electric cylinders are designed for use as components for installation in machinery and systems. The designer of the machine or system is responsible for complying with the EMC Directive 89/336/EEC. You will find detailed information on this topic in the SEW publications **"Practical Drive Engineering, Project planning for drives" and in "Practical Drive Engineering volume 9, EMC in Drive Engineering".**

5.2 Connecting electric cylinders and encoder systems using SM.. / SB.. plug connectors

Electric cylinders are supplied with the SM.. / SB.. plug connector system.

In the basic version, SEW-EURODRIVE delivers electric cylinders with flange-mounting socket on the motor end and without mating connector.

The encoder system is connected using a 12-pin round plug connector.

The plug connectors supplied as standard are rotatable connectors. The plug connectors can be rotated to match the customer's installation requirements.

Prefabricated cables

Prefabricated cables from SEW-EURODRIVE are available for connection with the SM.. / SB.. plug connector system. The cables used with the electric cylinder correspond to the brake motor cables of DFS motors. The core designation and contact assignment are listed in the following tables.

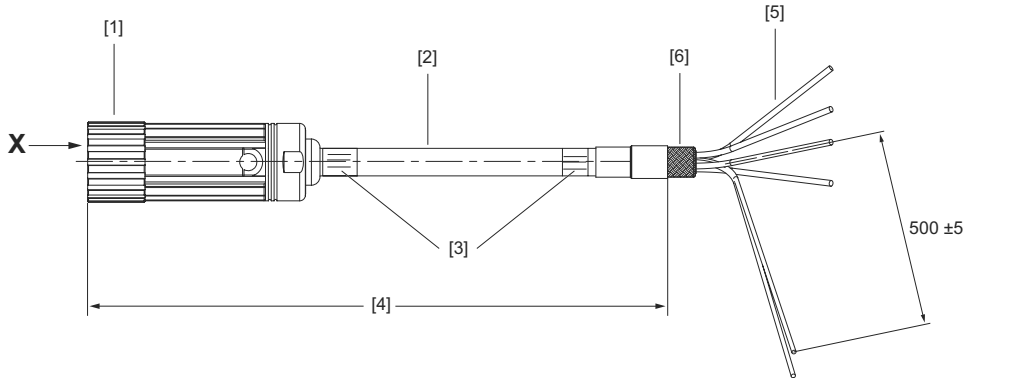
The plug connectors are depicted with the connector assignment on the cable at the connection side (back).

If you are fabricating your cables yourself:

- Sec. "Appendix" describes the installation of the power plug connectors and signal plug connectors.
- The socket contacts for the motor connection are implemented as crimping contacts. Only use suitable tools for crimping.
- Strip the insulation off the leads according to the installation description for power plug connectors or signal plug connectors in Sec. "Appendix". Apply shrink tubing to the connectors.
- Use only suitable removal tools to remove incorrectly installed socket contacts.

5.3 Structure of the power cables

Motor cables



[1] Connector: Intercontec BSTA 078
[2] SEW-EURODRIVE logo printed on cable
[3] Nameplate
[4] Cable length ≤ 10 m: Tolerance +200 mm
Cable length ≥ 10 m: Tolerance +2 %
Permitted cable length according to the technical documents
[5] Prefabricated cable end for inverter
Required loose parts are supplied with the cable
[6] Shielding 20 mm, pulled back approximately + 5 mm

Prefabricated cables for motor end

The power cables on the motor end consist of an 8-pin plug connector and socket contacts.

The shield is connected in the connector housing according to EMC requirements. All plug connectors seal the plug on the cable end with a lamellar seal and ensure cable relief according to EN 61884.

Prefabricated cables for inverter end

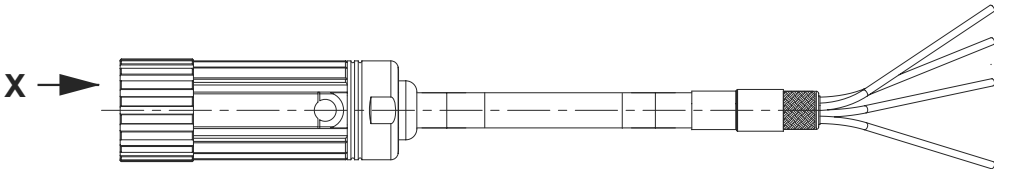
The individual cable cores of the power and brake power cables are exposed and the shield is prepared for connection in the control cabinet. The cable for the inverter end has yet to be assembled. The loose parts required are supplied with the cable in a separate bag.

Loose parts

The following loose parts are supplied in accordance with the core cross sections for connection to the power terminals on the inverter:

Bag no.	Contents
1	4 x conductor end sleeves 1.5 mm^2 , insulated 4 x M6 U-shaped cable lugs 1.5 mm^2

Motor cables



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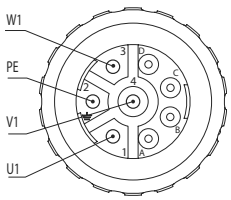
Pin assignment of the motor cable

plug connector	Pin	Core identification	Assigned	Extra
BSTA 078  **View X**	1	Black with white lettering U, V, W	U	Bag of loose parts
	4		V	
	3		W	
	2	Green/yellow	PE	

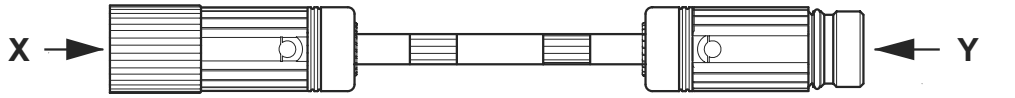
Plug connector type	Number of cores and line cross section	Part number	Routing type
SM 11	**4 ×1.5 mm² (AWG 16)**	0590 454 4	Fixed installation
SM 11	**4 ×1.5 mm² (AWG 16)**	0590 477 3	Cable carrier installation

Alternative plug connector CMS

Power Standard				
Type	**Part no.**	**Possible connection cross section**	**∅ Cables**	**Comment**
CMS71L	**0 198 674 0**	3 x 1 mm² 4 x 1.5...2.5 mm²	9...14 mm	
CMS71L	**0 199 163 9**	3 x 1 mm² 4 x 4 mm²	14...17 mm 12...14 mm	Reducer disc for clamping area 12...14 mm enclosed loose

Power Increased clamping area for training cable				
Type	**Part no.**	**Possible connection cross section**	**∅ Cables**	**Comment**
CMS71L	**0 198 919 7**	3 x 1 mm² 4 x 1.5...2.5 mm²	9...17 mm	
CMS71L	**0 199 163 9**	3 x 1 mm² 4 x 4 mm²	14...17 mm 12...14 mm	Reducer disc for clamping area 12...14 mm enclosed loose

Motor extension cable



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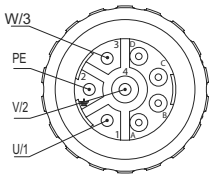
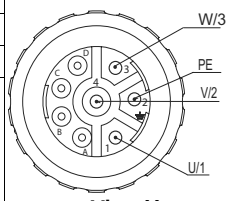
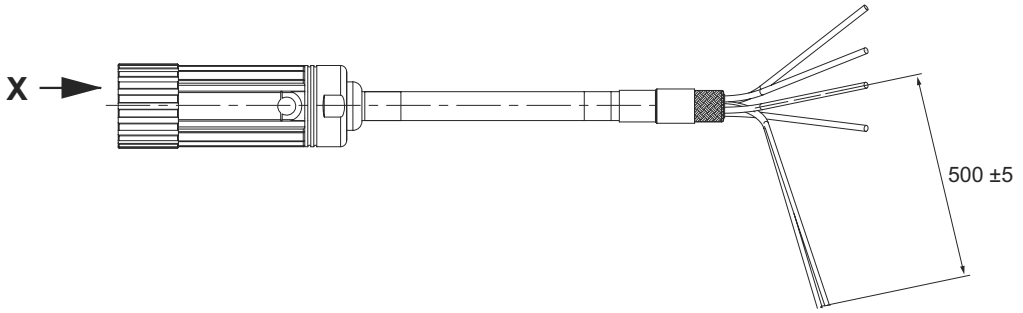
Pin assignment of motor extension cable

Plug connector	Pin	Core identification	Assigned	Pin	Plug connector
BSTA 078  **View X**	1	Black with white lettering U, V, W	U	1	**BKUA 199**  **View Y**
	4		V	4	
	3		W	3	
	2	Green/yellow	PE	2	

Plug connector type	Number of cores and cable coss section	Part number	Routing type
SM11	**4 ×1.5 mm^2 (AWG 16)**	0590 361 0	Cable carrier installation

Brake motor cable



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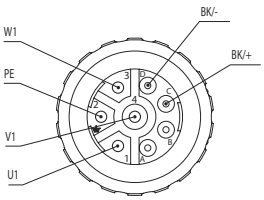
Pin assignment of brake motor cable

Plug connector	Pin	Core identification	Assigned	Extra
BSTA 078  **View X**	1	Black with white lettering U, V, W	U	Bag of loose parts
	4		V	
	3		W	
	2	Green/yellow	PE	
	A	–	n.c.	
	B	–	n.c.	
	C	Black with white lettering 1, 2, 3	2	
	D		1	

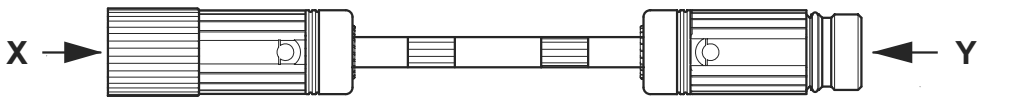
Plug connector type	Number of cores and cable coss section	Part number	Routing type
SB 11	**4 ×1.5 mm² (AWG 16)** **3 ×1 mm² (AWG 17)**	1332 485 3	Fixed installation
SB 11	**4 ×1.5 mm² (AWG 16)** **3 × 1 mm² (AWG 17)**	1332 486 1	Cable carrier installation
SB 12	**4 × 2.5 mm² (AWG 16)** **3 × 1 mm² (AWG 17)**	1333 213 9	Fixed installation
SB 12	**4 × 2.5 mm² (AWG 16)** **3 × 1 mm² (AWG 17)**	1333 215 5	Cable carrier installation
SB 14	**4 × 4.0 mm² (AWG 12)** **3 × 1 mm² (AWG 17)**	1333 214 7	Fixed installation
SB 14	**4 × 4.0 mm² (AWG 12)** **3 × 1 mm² (AWG 17)**	1333 216 3	Cable carrier installation

Alternative plug connector CMS

Power Standard				
Type	**Part no.**	**Possible connection cross section**	**∅ Cables**	**Comment**
CMS71L/B	**0 198 674 0**	3 x 1 mm^2 4 x 1.5...2.5 mm^2	9...14 mm	
CMS71L/B	**0 199 163 9**	3 x 1 mm^2 4 x 4 mm^2	14...17 mm 12...14 mm	Reducer disc for clamping area 12...14 mm enclosed loose

Power Increased clamping area for trailing cable				
Type	**Part no.**	**Possible connection cross section**	**∅ Cables**	**Comment**
CMS71L/B	**0 198 919 7**	3 x 1 mm^2 4 x 1.5...2.5 mm^2	9...17 mm	
CMS71L/B	**0 199 163 9**	3 x 1 mm^2 4 x 4 mm^2	14...17 mm 12...14 mm	Reducer disc for clamping area 12...14 mm enclosed loose

Brake motor extension cable



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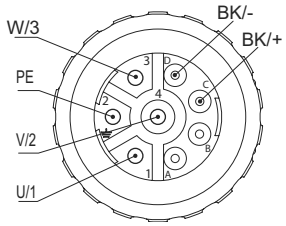
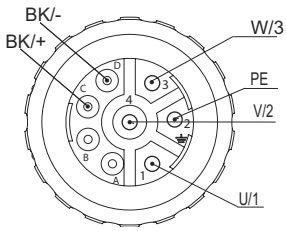
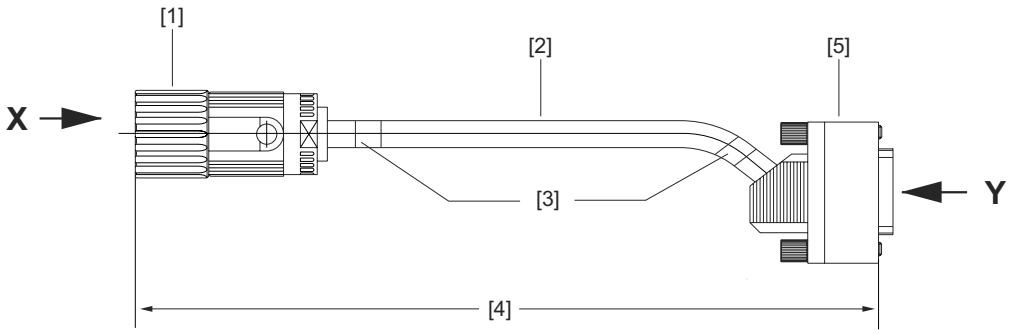
Pin assignment of brake motor extension cable

Plug connector	Pin	Core identification	Assigned	Pin	Plug connector
BSTA 078  **View X**	1	Black with white lettering U, V, W	U	1	**BKUA 199**  **View Y**
	4		V	4	
	3		W	3	
	2	Green/yellow	PE	2	
	A		n.c.	A	
	B		n.c.	B	
	C	Black with white lettering 1, 2, 3	2	C	
	D		1	D	

Plug connector type	Number of cores and cable coss section	Part number	Routing type
SB11	**4 × 1.5 mm² (AWG 16)**	0593 650 0	Cable carrier installation

5.4 Structure of the feedback cables

Resolver plug connector



[1] Connector: Intercontec ASTA
[2] Printed on connector: SEW-EURODRIVE
[3] Nameplate
[4] Cable length ≤ 10 m: Tolerance +200 mm
Cable length ≥ 10 m: Tolerance +2 %
Permitted cable length according to the technical documents
[5] Sub D plug

Prefabricated cables for motor end

A 12-pin EMC signal plug connector from Intercontec with socket contacts is used on the motor end for RH.M/AS1H. The shield is connected in the connector housing according to EMC requirements. All plug connectors seal the plug on the cable end with a lamellar seal.

Prefabricated cables for inverter end

A commercial sub-D EMC connector with pin contacts is used on the inverter end. A 9-pin or 15-pin connector matching the inverter is used.

Hybrid cables

The outer cable sheath on the motor and inverter end bears a nameplate with part number and logo of the prefabricated cable manufacturer. The ordered length and permitted tolerance are interrelated as follows:

- Cable length ≤ 10 m: Tolerance 200 mm
- Cable length ≥ 10 m: Tolerance + 2 %

Refer to the system manual of the inverter for determining the maximum cable length.

Make sure that an EMC-compliant environment is maintained during project planning.

Resolver cable plug connector MOVIDRIVE® MDX..B

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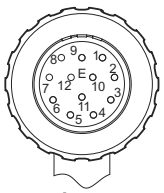
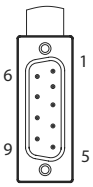
Type	Installation	Part number
DFS/CFM	Fixed installation	199 487 5
DFS/CFM	Cable carrier installation	199 319 4

Pin assignment of RH.M resolver cable

Pin assignment of resolver cable RH1M						
Motor connection end					**Connection MOVIDRIVE® MDX..B**	
Plug connector	**Contact no.**	**Description**	**Cable core colors**	**Description**	**Contact no.**	**Plug connector**
ASTA021FR **198 673 2** 12-pin with socket contacts  **View X**	1	R1 (reference +)	Pink (PK)	R1 (reference +)	3	**Sub-D 9-pin**  **View Y**
	2	R2 (reference -)	Gray (GY)	R2 (reference -)	8	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	2	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	7	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	1	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	6	
	7	n.c.	-	–	–	
	8	n.c.	-	–	–	
	9	TF/KTY +	Brown (BN) / violet (VT)	TF / (KTY+)	9	
	10	TF / KTY –	White (WH) / black (BK)	TF/ (KTY-)	5	
	11	n.c.	-	–	–	
	12	n.c.	-	n.c.	4	

Alternative plug connector CMS

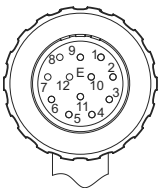
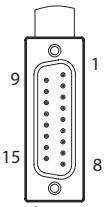
Encoder			
Type	**Part no.**	**Possible connection cross section**	**∅ Cables**
CMS71L/AS1H **CMS71L/RH1M**	**0 198 673 2**	10 x 0.14...1.0 mm^2	6...10 mm

Resolver cable plug connector MOVIAXIS® MXA

54629AXX

Type	Installation	Part number
DFS/CFM	Fixed installation	1332 742 9
DFS/CFM	Cable carrier installation	1332 743 7

Pin assignment of RH.M resolver cable

Pin assignment of resolver cable RH1M						
Motor connection end					**Connection MOVIAXIS® MXA**	
Plug connector	**Contact no.**	**Description**	**Cable core color**	**Description**	**Contact no.**	**Plug connector**
ASTA021FR **198 673 2** 12-pin with socket contacts  **View X**	1	R1 (reference +)	Pink (PK)	R1 (reference +)	5	Sub-D 15-pin  **View Y**
	2	R2 (reference -)	Gray (GY)	R2 (reference -)	13	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	2	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	10	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	1	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	9	
	7	n.c.	-	n.c.	3	
	8	n.c.	-	n.c.	4	
	9	TF/KTY +	Brown (BN) / violet (VT)[1)]	TF/KTY +	14	
	10	TF/KTY -	White (WH) / black (BK)[1)]	TF/KTY -	6	
	11	n.c.	-	n.c.	7	
	12	n.c.	-	n.c.	8	
		–	–	n.c.	11	
		–	–	n.c.	12	
		–	–	n.c.	15	

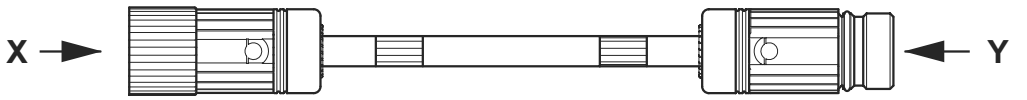
1) Double assignment to increase cross section

All connectors are shown with view onto the pins.

Alternative plug connector CMS

Encoder			
Type	**Part no.**	**Possible connection cross section**	**∅ Cables**
CMS71L/AS1H **CMS71L/RH1M**	**0 198 673 2**	10 x 0.14...1.0 mm^2	6...10 mm

Extension cable for resolver RH.M



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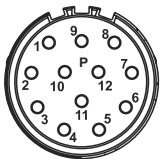
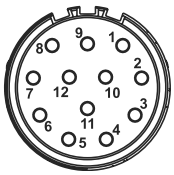
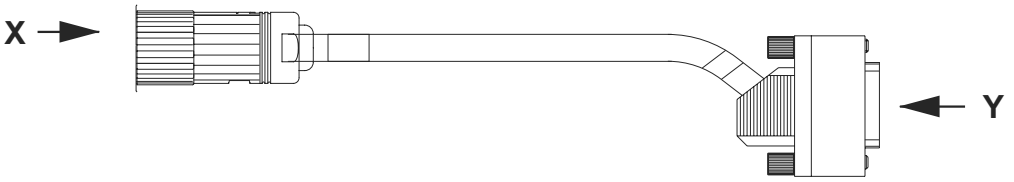
Type	Installation	Part number
DFS/CFM	Fixed installation	199 542 1
DFS/CFM	Cable carrier installation	199 541 3

Pin assignment of extension cable for RH.M resolver						
Plug connector	**Contact no.**	**Description**	**Cable core colors**	**Description**	**Contact no.**	**Plug connector**
ASTA021FR **198 673 2** 12-pin with socket contacts  **View X**	1	R1 (reference +)	Pink (PK)	R1 (reference +)	1	AKUA020MR **199 647 9** 12-pin with pin contacts  **View Y**
	2	R1 (reference -)	Gray (GY)	R1 (reference -)	2	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	3	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	4	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	5	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	6	
	7	Unassigned	-	Unassigned	7	
	8	Unassigned	-	Unassigned	8	
	9	TF/KTY +	Brown (BN) / violet (VT)[1)]	TF/KTY +	9	
	10	TF/KTY -	White (WH) / black (BK)[1)]	TF/KTY -	10	
	11	Unassigned	-	Unassigned	11	
	12	Unassigned	-	Unassigned	12	

1) Double assignment to increase cross section

The extension cable has the same pin assignment as all other contacts.

HIPERFACE® encoder cable for plug connector MOVIAXIS® MXA, MOVIDRIVE® MDX..B



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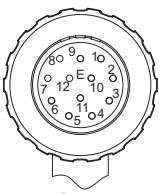
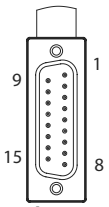
Type	Installation	Part number
DFS/CFM	Fixed installation	1332 453 5
DFS/CFM	Cable carrier installation	1332 455 1

Pin assignment of cable for HIPERFACE® encoders AS1H / ES1H / AV1H

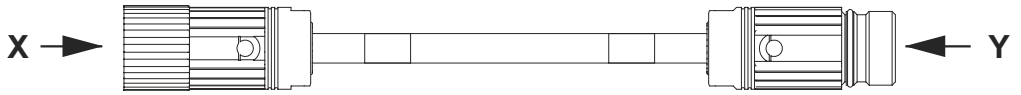
Pin assignment of cable for HIPERFACE® encoders AS1H / ES1H / AV1H						
Motor connection end					**Connection MOVIAXIS® MXA MOVIDRIVE®MDX..B**	
Plug connector	**Contact no.**	**Description**	**Cable core color**	**Description**	**Contact no.**	**Plug connector**
ASTA021FR **198 673 2** 12-pin with socket contacts  **View X**	1	Unassigned	Unassigned	Unassigned	3	Sub-D 15-pin  **View Y**
	2	Unassigned	Unassigned	Unassigned	5	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	1	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	9	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	2	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	10	
	7	DATA -	Violet (VT)	DATA -	12	
	8	DATA +	Black (BK)	DATA +	4	
	9	TF/KTY +	Brown (BN)	TF/KTY +	14	
	10	TF/KTY -	White (WH)	TF/KTY -	6	
	11	GND	Gray/pink (GY/PK)[1)]	GND	8	
	12	U_S	Red/blue (RD/BU)[1)]	U_S	15	
		–	–	Unassigned	7	
		–	–	Unassigned	11	
		–	–	Unassigned	13	

1) Double assignment to increase cross section

Alternative plug connector CMS

Encoder			
Type	**Part no.**	**Possible connection cross section**	**∅ Cables**
CMS71L/AS1H **CMS71L/RH1M**	**0 198 673 2**	10 x 0.14...1.0 mm^2	6...10 mm

Extension cable for HIPERFACE® encoder AS1H



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Type	Installation	Part number
DFS/CFM	Fixed installation	199 539 1
DFS/CFM	Cable carrier installation	199 540 5

Pin assignment of extension cable for HIPERFACE® encoder AS1H / ES1H / AV1H

Pin assignment of extension cable for RH.M resolver						
Plug connector	**Contact no.**	**Description**	**Cable core color**	**Description**	**Contact no.**	**Plug connector**
ASTA021FR **198 673 2** 12-pin with socket contacts	1	n.c.	-	n.c.	1	AKUA020MR **199 647 9** 12-pin with pin contacts
	2	n.c.	-	n.c.	2	
	3	S1 (cosine +)	Red (RD)	S1 (cosine +)	3	
	4	S3 (cosine -)	Blue (BU)	S3 (cosine -)	4	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	5	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	6	
	7	DATA -	Violet (VT)	DATA -	7	
	8	DATA +	Black (BK)	DATA +	8	
	9	TF/KTY +	Brown (BN)	TF/KTY +	9	
	10	TF/KTY -	White (WH)	TF/KTY -	10	
	11	GND	Gray/pink (GY/PK) / pink (PK)	GND	11	
View X	12	U_S	Red/blue (RD/BU) / gray (GY)	U_S	12	**View Y**

The extension cable has the same pin assignment as all other contacts.

5.5 Cable specification

Fixed installation of the power cables

Routing type		Fixed				
Cable cross sections		**4 x 1.5 mm²**	**4 x 2.5 mm²**	**4 x 4 mm²**	**4 x 6 mm²**	**4 x 10 mm²**
Manufacturer		**Lapp**				
Manufacturer designation		TPE/CY				
Operating voltage Vo/	[VAC]	600/1000				
Temperature range	[°C]	Fixed installation -10 to +90				
Max. temperature	[°C]	90	90	90	90	90
Min. bending radius	[mm]	44	48	56	61	84
Diameter D	[mm]	9.3 ± 0,3	10 ± 0.3	12.3 ± 0,3	13.6 ± 0.4	17.0 ± 0.6
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange, similar to RAL 2003				
Approval(s)		DESINA / VDE / UL				
Capacitance core/shielding	[nF/km]	135	140	150	155	155
Capacitance core/core	[nF/km]	75	85	90	95	95
Halogen free		No				
Silicone free		Yes				
CFC free		No				
Inner insulation (core)		TPE				
Outer insulation (sheath)		PVC				
Flame-inhibiting/self-extinguishing		No				
Conductor material		Cu				
Shielding		Tinned Cu				
Weight (cable)	[kg/km]	196	254	371	472	825

Cable carrier installation of power cables

Routing type		Cable carrier				
Cable cross sections		**4 x 1.5 mm²**	**4 x 2.5 mm²**	**4 x 4 mm²**	**4 x 6 mm²**	**4 x 10 mm²**
Manufacturer		**Nexans**				
Manufacturer designation		PSL11YC11Y-J 4 x ... mm²				
Operating voltage Vo/	[VAC]	600 / 1000				
Temperature range	[°C]	- 20 to + 60				
Max. temperature	[°C]	+ 90 (on conductor)				
Min. bending radius	[mm]	100	120	130	155	180
Diameter D	[mm]	9.9 ± 0.2	11.6 ± 0,3	13.1 ± 0,4	15.3 ± 0,4	17.7 ± 0,5
Maximum acceleration	[m/s²]	20				
Max. velocity	[m/min]	200 at max. travel distance of 5 m				
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA / VDE / UL / cULus				
Capacitance core/shielding	[nF/km]	170	170	170	170	170
Capacitance core/core	[nF/km]	95	95	95	95	95
Halogen free		Yes				
Silicone-free		Yes				
CFC-free		Yes				
Inner insulation (core)		TPM				
Outer insulation (sheath)		TPU (PUR)				
Flame-inhibiting/self-extinguishing		Yes				
Conductor material		E-Cu blank				
Shielding		Braided tinned Cu shield (optically covered > 85 %)				
Weight (cable)	[kg/km]	160	240	320	420	640

Fixed installation of brake power cables

Routing type		**Fixed**				
Cable cross sections		**4 x 1.5 mm² + 3 x 1 mm²**	**4 x 2.5 mm² + 3 x 1 mm²**	**4 x 4 mm² + 3 x 1 mm²**	**4 x 6 mm+ 3 x 1.5 mm²**	**4 x 10 mm² + 3 x 1.5 mm²**
Manufacturer		**Lapp**				
Manufacturer designation		TPE/CY				
Operating voltage Vo/	[VAC]	600 /1000				
Temperature range	[°C]	Fixed installation: -10 to + 90				
Max. temperature	[°C]	90	90	90	90	90
Min. bending radius	[mm]	54	57	64	72	92
Diameter D	[mm]	11.8 ± 0,4	13.4 ± 0,5	15.0 ± 0.5	17.0 ± 0.6	20.0 ± 0.5
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA / VDE / UL				
Capacitance core/shielding	[nF/km]	135	145	150	155	155
Capacitance core/core	[nF/km]	75	85	90	95	95
Halogen free		No				
Silicone free		Yes				
CFC free		No				
Inner insulation (core)		TPE				
Outer insulation (sheath)		PVC				
Flame-inhibiting/self-extinguishing		No				
Conductor material		Cu				
Shielding		Tinned Cu				
Weight (cable)	[kg/km]	300	370	476	625	1024

Cable carrier installation brake power cables

Routing type		**Cable carrier**				
Cable cross sections		**4 x 1.5 mm² + 3 x 1 mm²**	**4 x 2.5 mm² + 3 x 1 mm²**	**4 x 4 mm² + 3 x 1 mm²**	**4 x 6 mm+ 3 x 1.5 mm²**	**4 x 10 mm² + 3 x 1.5 mm²**
Manufacturer		**Nexans**				
Manufacturer designation		PSL11YC11Y-J 4x... +3A.../C				
Operating voltage Vo/	[VAC]	600 / 1000				
Temperature range	[°C]	- 20 to + 60				
Max. temperature	[°C]	+ 90 (conductor)				
Min. bending radius	[mm]	125	140	155	175	200
Diameter D	[mm]	12.3 ± 0.4	13.7 ± 0.4	15.3 ± 0.5	17.4 ± 0,5	20.5 ± 0.5
Maximum acceleration	[m/s²]	20				
Max. velocity	[m/min]	200 at max. travel distance of 5 m				
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA / VDE / UL / cULus				
Capacitance core/shielding	[nF/km]	170	170	170	170	170
Capacitance core/core	[nF/km]	95	95	95	95	95
Halogen free		Yes				
Silicone free		Yes				
CFC free		Yes				
Inner insulation (cable)		TPM				
Outer insulation (sheath)		TPU (PUR)				
Flame-inhibiting/self-extinguishing		Yes				
Conductor material		E-Cu blank				
Shielding		Braided tinned Cu shield (optically covered > 85 %)				
Weight (cable)	[kg/km]	220	310	410	540	750

Fixed installation of accessory cables

Routing type		**Fixed**	
Accessory designation		**AS1H**	**RH.M**
Cable cross sections		**6 x 2 x 0.25 mm²**	**5 x 2 x 0.25 mm²**
Manufacturer		**Lapp**	
Manufacturer designation		TPE/CY	
Operating voltage Vo/	[VAC]	300	
Temperature range	[°C]	- 10 to + 80	
Max. temperature	[°C]	+ 80	
Min. bending radius	[mm]	41.5	37.5
Diameter D	[mm]	8.3 ± 0,3	7.5 ± 0,3
Core identification		DIN 47 100	
Sheath color		Green, similar to RAL 6018	
Approval(s)		DESINA / VDE / c UL us	
Capacitance core/shielding	[nF/km]	110	
Capacitance core/core	[nF/km]	83	
Halogen free		No	
Silicone free		Yes	
CFC free		No	
Inner insulation (core)		TPE	
Outer insulation (sheath)		PVC	
Flame-inhibiting/self-extinguishing		No	
Conductor material		Cu blank	
Shielding		Braided tinned Cu	
Weight (cable)	[kg/km]	131	103

Cable carrier installation of accessory cable:

Routing type		**Cable carrier**	
Accessory designation		**AS1H**	**RH.M**
Cable cross sections		**6 x 2 x 0.25 mm²**	**5 x 2 x 0.25 mm²**
Manufacturer		**Nexans**	
Manufacturer designation		SSL11YC11Y ... x 2 x 0.25	
Operating voltage Vo/	[VAC]	300	
Temperature range	[°C]	-20 to + 60	
Max. temperature	[°C]	+90 (on conductor)	
Min. bending radius	[mm]	100	95
Diameter D	[mm]	9.8 ± 0.2	9,5 ± 0.2
Maximum acceleration	[m/s²]	20	
Max. velocity	[m/min]	200	
Core identification		WH/BN, GN/YE, GY/PK, BU/RD, BK/VT, GY-PK/RD-BU	WH/BN, GN/YE, GY/PK, BU/RD, BK/VT
Sheath color		Green similar to RAL 6018	
Approval(s)		DESINA / VDE / c UL us	
Capacitance core/shielding	[nF/km]	100	
Capacitance core/core	[nF/km]	55	
Halogen free		Yes	
Silicone free		Yes	
CFC free		Yes	
Inner insulation (core)		PP	
Outer insulation (sheath)		TPE-U	
Flame-inhibiting/self-extinguishing		Yes	
Conductor material		E-Cu blank	
Shielding		Braided tinned Cu	
Weight	[kg/km]	130	120

5.6 Brake

The brake is released electrically. The brake is applied mechanically when the voltage is switched off.

Comply with the applicable regulations issued by the relevant employer's liability insurance association regarding phase failure protection and the associated circuit/circuit modification!

In view of the DC voltage to be switched and the high level of current load, it is essential to use either special brake contactors or AC contactors with contacts in utilization category AC-3 to EN 60947-4-1.

The mechanical brake is not used as service brake but as emergency brake or holding brake for general machine standstill (**CMS71: holding brake only**).

Observe the notes in the relevant operating instructions for servo controllers concerning the switching sequence of motor enable and brake control during standard operation.

Motor size CMS71

The standard voltage supply of the brake is DC 24 V and it operates with a constant braking torque of 19 Nm. The brake cannot be retrofitted and operates without brake rectifier or brake control unit. When connecting the brake, make sure that the brake power supply 24 V / 800 mA is connected using an additional relay. The maximum load on the brake output X10.3 is only 150 mA. The overvoltage protection must be implemented by the customer, for example using varistors.

Speed classes

Brake B of the CMS71 can be used in all speed classes.

5.7 Motor protection

Connect the supplied optional equipment according to the enclosed wiring diagrams. The wiring diagrams can also be found in Sec. "Appendix".

TF temperature sensor

Do not apply voltage!

The positive temperature coefficient (PTC) thermistors comply with DIN 44082.

Resistance measurement (measuring instrument with V ≤ 2.5 V or I < 1 mA):

- Standard measured values: 20...500 Ω, thermal resistance > 4000 Ω

TH thermostat

The thermostats are connected in series and open when the permitted winding temperature is exceeded.

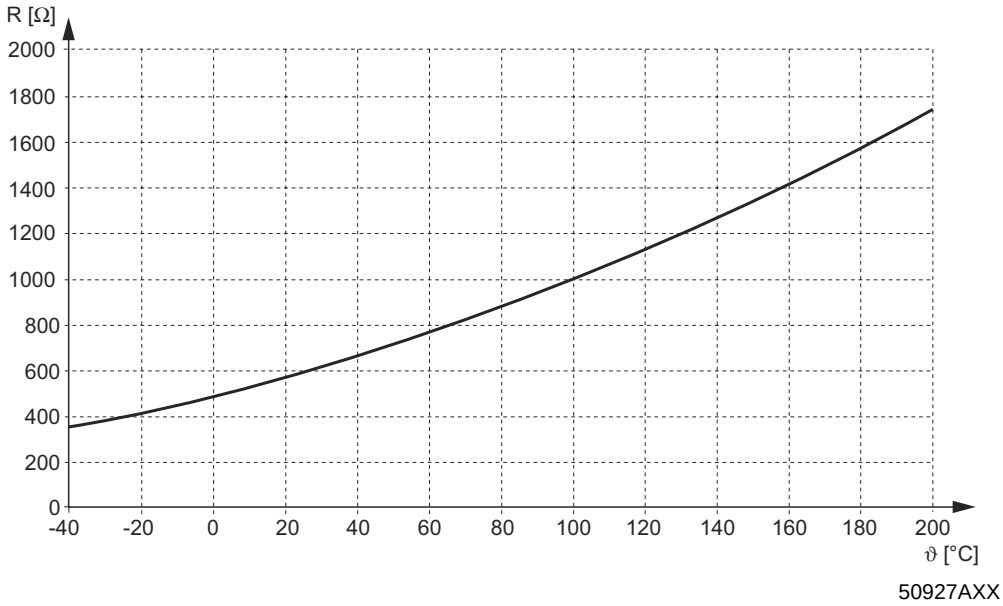
TH data	AC	DC	
Max. voltage	AC 60 V[1)]	DC 60 V	DC 24 V
Current (cos φ = 1.0)	AC 2.5 A	DC 1.0 A	DC 1.6 A
Current (cos φ = 1.0)	AC 1.6 A		

1) AC 250 V is permitted in version with terminal boxes

Temperature sensor KTY

- It is essential to observe the correct connection of the KTY to ensure correct evaluation of the temperature sensor.
- Avoid currents > 4 mA in the circuit of the KTY since high self-heating of the temperature sensor can damage its insulation and the motor winding.

The characteristic curve in the following figure shows the resistance curve with a measuring current of 2 mA.



Observe the polarity!

6 Startup

6.1 Prerequisites for startup

- **For startup, make sure you comply with the safety notes in the previous sections.**
- **The technical data specified in section 9 must be observed.**

Before startup, make sure that:

- The ball screw is secured against turning (→ Installing the electric cylinder in the application).
- The drive is undamaged and not blocked.
- The measures stipulated in Sec. "Preliminary work" are performed after extended storage.
- All connections have been made properly
- The direction of rotation of the electric cylinder is correct. Note the ball screw position and direction of rotation of the electric cylinder.
- All protective covers have been installed correctly.
- All motor protection devices are active
- The brake works perfectly in hoist applications.
- There are no other sources of danger present
- The motor is running correctly (no overload, no speed fluctuation, no loud noises, etc.).
- The correct braking torque is set according to the specific application (→Sec. "Technical Data").
- In case of problems (→ Sec. "Malfunctions").

7 Faults

7.1 Motor problems

Fault	Possible cause	Remedy
Electric cylinder does not start	Interruption in supply cable	Check connections, correct if necessary
	Fuse has blown	Replace fuse
	Motor protection has triggered	Check motor protection for correct setting, correct error if necessary.
Incorrect direction of rotation	Electric cylinder connected incorrectly	Check servo controller, check setpoints
Electric cylinder hums and has high current consumption	Drive is blocked	Check drive
	Brake does not release	→ Sec. "Brake problems"
	Fault on encoder cable	Check encoder cable
Electric cylinder heats up excessively (measure temperature)	Overload	Measure power, use larger motor or reduce load if necessary
	Insufficient cooling	Correct cooling air supply or clear cooling air passages, retrofit forced cooling fan if necessary
	Ambient temperature is too high	Comply with permitted temperature range
	Rated operation type (S1 to S10, DIN 57530) exceeded, e.g. through excessive starting frequency	Adjust rated operation type of motor to required operating conditions; if necessary call in a specialist to determine correct drive
Running noise on motor	Bearing damage	Contact SEW-EURODRIVE customer service
Spindle		See separate operating instructions (enclosed)

7.2 Special aspects when operating with a servo controller

The symptoms described in Sec. "Motor problems" may also occur when the motor is operated with a servo controller. Please refer to the servo controller operating instructions for the meaning of the problems that occur and to find information about rectifying the problems.

Please have the following information to hand if you require the assistance of our customer service:
- Nameplate data (complete)
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Assumed cause

7.3 Brake faults

Fault	Possible cause	Remedy
Brake does not release	Incorrect operating voltage on the brake	• Apply correct voltage • Reversed polarity
	Max. permitted working air gap exceeded because brake lining worn down.	Contact SEW-EURODRIVE customer service
	Voltage drop on supply cable > 10%	Provide for correct connection voltage; check cable cross section
	Brake coil has interturn fault or short circuit to exposed conductive part	Contact SEW-EURODRIVE customer service
Motor does not brake	Brake lining worn down.	Contact SEW-EURODRIVE customer service
	Incorrect braking torque.	Contact SEW-EURODRIVE customer service
Noises in vicinity of brake	Pulsating torques due to incorrectly set servo controller	Check correct setting of frequency inverter according to operating instructions

8 Inspection/Maintenance

- **It is essential to comply with the safety notes in the previous sections during inspection / maintenance!**
- **Components may be subject to mechanical loads. Support and secure the customer's structure before removing the electric cylinder.**
- **Electric cylinders can become very hot during operation – danger of burns!**
- **Before starting work, isolate the electric cyclinder and brake from the power supply. Safeguard the electric cylinder against unintentional power-up!**
- **Use only genuine spare parts in accordance with the valid parts list!**

8.1 General maintenance work

The electric cylinder is maintenance-free except for the threaded spindle. Replace defective parts if possible.

Remove any traces of dirt, chips, dust, etc. from the bellows with a soft cloth (depending on the environmental conditions).

Note that mobile cables are subject to wear. They have to be checked for external changes on a regular basis.

8.2 Lubricating the threaded spindle size CMS71L

Lubricant loss occurs in threaded spindles between nut and spindle. Also the lubricant properties deteriorate due to operation and ageing. This means lubrication is required at regular intervals.

Lubrication for threaded spindles has to be specified accurately in terms of type, quantity and relubrication intervals. These factors are dependent on

- Load
- Velocity
- Cyclic duration factor
- Type of threaded spindle (ball screw or planetary screw assembly)
- Ambient temperature
- Pollution degree caused by dust, humidity, etc.

The following information is intended as recommendation. They do not replace the need for individual configuration of each specific application.

Permanent relubrication (for example through connection to central lubrication) is basically the preferred solution over lubrication at certain intervals.

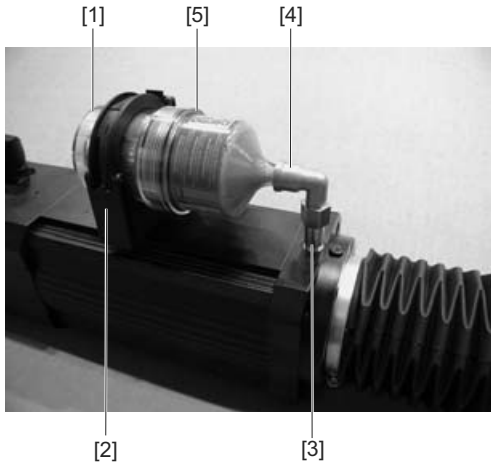
Relubrication at certain intervals is generally not recommended for planetary screw assemblies because they require approximately 2-5 times the lubrication of ball screws.

Permanent relubrication

Permanent relubrication through connection to central lubrication system or decentral lubricator.

Fitting on motor G1/4.

The below figure depicts the electric cylinder with decentral lubricator [1] (e.g. by Perma) → not included in the scope of delivery



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You can order the depicted parts of the lubricator system from Perma:

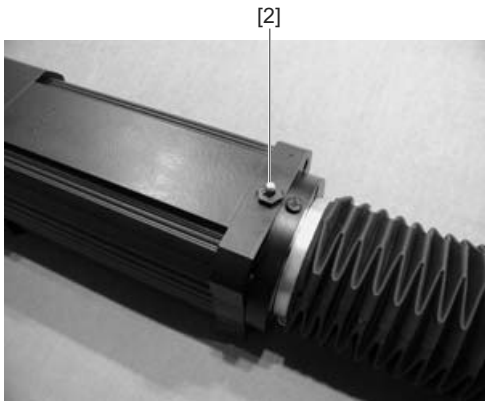
Designation	Order number
[1] Star Vario drive unit	
[2] Retaining clip A105	26 001 105
[3] Extension G1/4 A350	26 0011 350
[4] Angle G1/ A700	26 0011 700
[5] Lubricant container LC unit S60 (filled with lubricant, see section 8.3)	

The electric cylinder comes equipped with the fastening threads required for the retaining clip.

The parts of the lubricator system can be ordered directly from SEW-EURODRIVE as of the middle of 2006.

Relubrication intervals

The motor comes equipped with a cone type lubricating nipple DIN71412 [2] as standard for manual relubrication with grease gun.



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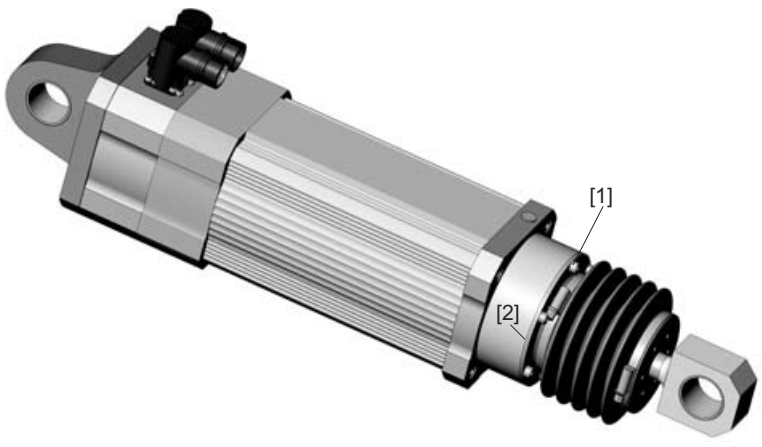
The lubricating grease discharged into the electric cylinder accumulates in the inside of the drive. The used-up lubricants have to be removed from the inside of the motor after five years at the latest.

Service work must be performed by SEW employees only. Service work includes removing the spindle and the old lubricant from the spindle surface.

Type with manual relubrication

The point of relubrication of this type is in the inside of the motor.



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Comply with the following procedure when re-lubricating:

1. Loosen the six screws [1]
2. Remove the cover [2] of the ball screw nut
3. Place the grease gun on the grease nipple and pump in the grease.
4. Install in reverse order

8.3 Selecting the lubricating grease

The following lubricating greases are suitable for a temperature range from –20 °C to +40 °C.

Ball screw:

- Lubricating grease according to DIN51825 - KP2K-20
- Base oil viscosity ISO-VG100/150, NLGI class 2
- Upper service temperature > 120 °C

The ball screws are greased at the factory as standard:

RENOLIT CX-TOM 15	Fuchs

Planetary screw:

- Lubricating grease according to DIN 51825, barium/calcium complex soap greases based on synthetic oil - KPE2K-30
- Base oil viscosity ISO-VG22/32, NLGI class 2
- Upper service temperature > 120 °C

Lubricating greases according to DIN 51825

The planetary screws are greased at the factory as standard:

Klübersynth GE 14-151	Klüber Lubrication

8.4 Regreasing intervals

- The drive must be regreased at least once a year.
- The following information only applies to the described application examples.
- Always select the regreasing quantity that matches the individual application.
- Insufficient lubrication means the lubricant film is interrupted, which reduces the service life.
- Excessive lubrication increases the friction and results in heat generation.
- Make sure that surfaces are clean when regreasing.
- No dirt in the lubricant!
- Clean greasing nipple with a cloth before using the grease gun.
- Make sure there is no trapped air in the lubricant or lubricant supply lines.

Planetary screw:

Example: CMS71L, 10 mm/spindle pitch revolution

- 0.2 m travel distance
- Mean traveling velocity 0.2 m/s
- 4000 N load

Permanent relubrication 0.8 cm^3/100 km = 0.008 cm^3/1 km

Relubrication intervals Relubrication quantity 2 cm^3

- after a travel distance of 250 km

or

- 25 million revolutions of the threaded spindle nut

Planetary screw:

Example: CMS71L, 5 mm/spindle pitch revolution

- 0.2 m travel distance
- Mean traveling velocity 0.2 m/s
- 4000 N load

Permanent relubrication 2 cm^3/100 km = 0.02 cm^3/1 km

Relubrication interval (not recommended) Relubrication quantity 2.5 cm^3

- after a travel distance of 50 km

or

- 10 million revolutions of the threaded spindle nut

9 Technical Data

9.1 CMS electric cylinder

Electrical data

Rated speed n_N			2000 min^{-1} CMS71L	3000 min^{-1} CMS71L	4500 min^{-1} CMS71L
Static torque	M_0	[Nm]	9.5	9.5	9.5
Standstill current	I_0	[A]	4.2	6.2	9.6
Max. torque	M_{DYN}	[Nm]	31.4	31.4	31.4
Max. current	I_{max}	[A]	16.8	25	38
Mass moment of inertia of the motor	J_{mot}	[10^{-4} kgm^2]	37.3	37.3	37.3
Braking torque	M_B	[Nm]	19	19	19
Inductance	L_1	[mH]	24	11	4.9
Ohmic resistance	R_1	[m]	2500	1120	446
Rotor voltage	V_{p0}	[V/1000 min^{-1}]	152	102	65

Mechanical data

Rated speed n_N		2000 min^{-1} CMS71L		3000 min^{-1} CMS71L		4500 min^{-1} CMS71L	
		KGT	PGT	KGT	PGT	KGT	PGT
Spindle pitch [mm]	H	10	5	10	5	10	5
Spindle diameter [mm]	D	32	24	32	24	32	24
Maximum permanent feed force [1] [N]	F	3500	5500	3500	5500	3500	5500
Peak feed force [2] [N]	F_{max}	17000	20000	17000	20000	17000	20000
Rated stroke [mm]		200		200		200	
Weight, variant without brake [kg]	m	16		16		16	
Weight, variant with brake [kg]	mB	17		17		17	

1) At a speed of 5-50 rpm

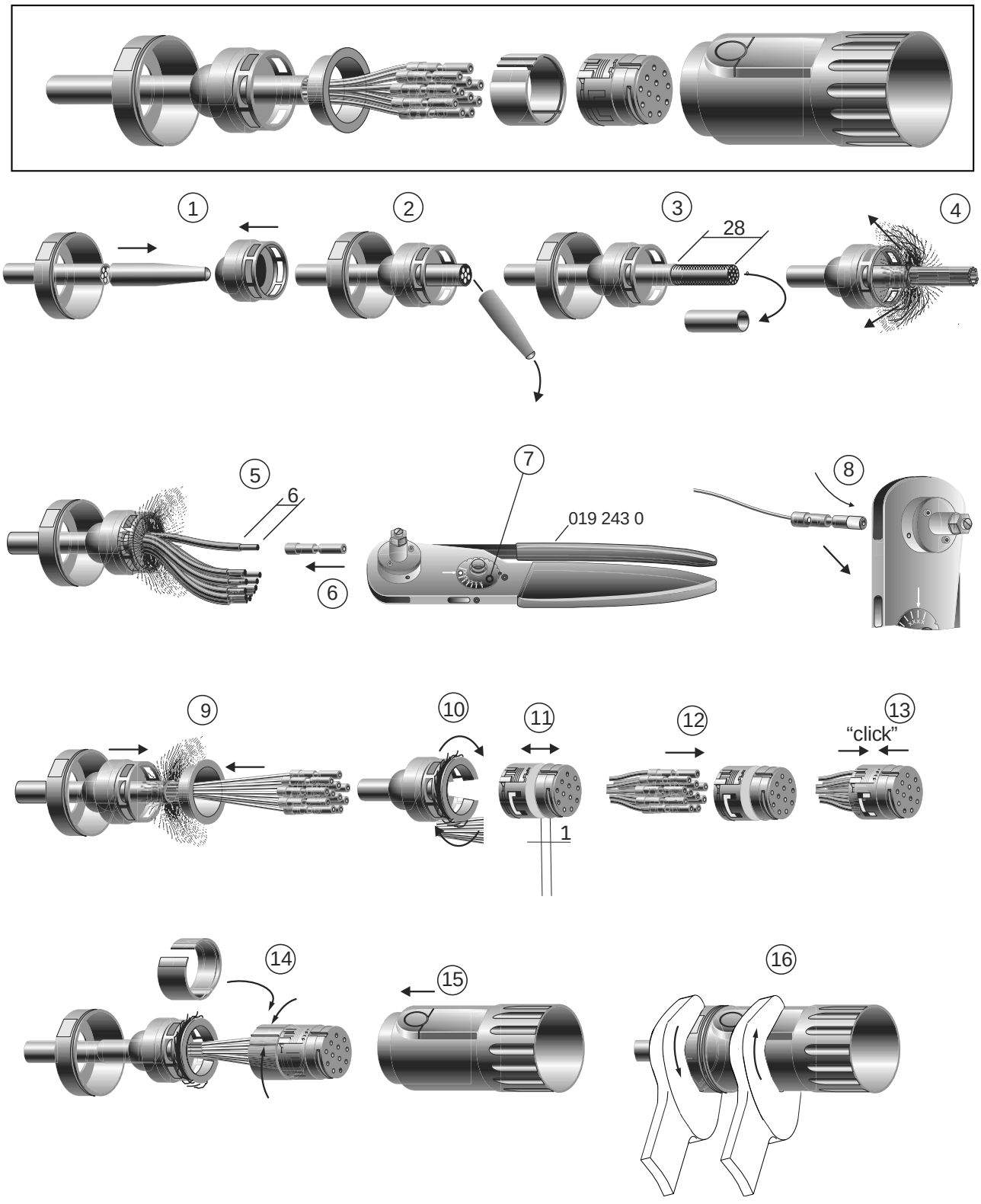
2) Depending on max. amplifier current, dynamic or static load of ball screw; prior to project planning with maximum force please contact SEW-EURODRIVE.

Brake

Voltage	V_{DC}	24 V
Brake holding torque at 20 °C	$M_{br\ 20\ °C}$	19 Nm

10 Appendix

10.1 Installation of signal plug connector



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Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Service **Competence Center**	**Central** Gear units / Motors	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte-gm@sew-eurodrive.de
	Central Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-mitte-e@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
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France			
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	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
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Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
	Townsville	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at

Belgium			
Assembly **Sales** **Service**	**Brüssel**	SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 4322-99 Fax +237 4277-03

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.reynolds@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 www.sew-eurodrive.cl ventas@sew-eurodrive.cl

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	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@net.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Luzna 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 220121234 Fax +420 220121237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30, P.O. Box 100 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Mustamäe tee 24 EE-10620Tallin	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 2 7960477 + 79604654 Fax +852 2 7959129 sew@sewhk.com

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
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Technical Offices	**Bangalore**	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bangalore	Tel. +91 80 22266565 Fax +91 80 22266569 salesbang@seweurodriveinindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 lirazhandasa@barak-online.net

Italy			
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Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Toyoda-cho**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 sewjapan@sew-eurodrive.co.jp

Korea			
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Latvia			
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Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com

Lithuania			
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Luxembourg			
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Malaysia			
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Mexico			
Assembly **Sales** **Service**	**Queretaro**	SEW-EURODRIVE MEXIKO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrail Queretaro C.P. 76220 Queretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 22618372 Fax +212 22618351 richard.miekisiak@premium.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 241-020 Fax +47 69 241-040 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Lodz	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucuresti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 849 47-70 Fax +221 849 47-71 senemeca@sentoo.sn

Serbia and Montenegro			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 dipar@yubc.net

Singapore			
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Slovakia			
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	Zilina	SEW-Eurodrive SK s.r.o. ul. Vojtecha Spanyola 33 SK-010 01 Zilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-97411 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk

Slovenia			
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South Africa			
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South Africa			
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 9 4431 84-70 Fax +34 9 4431 84-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 http://www.sew-eurodrive.se info@sew-eurodrive.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chon Buri**	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 7, rue Ibn EI Heithem Z.I. SMMT 2014 Mégrine Erriadh	Tel. +216 1 4340-64 + 1 4320-29 Fax +216 1 4329-76 tms@tms.com.tn

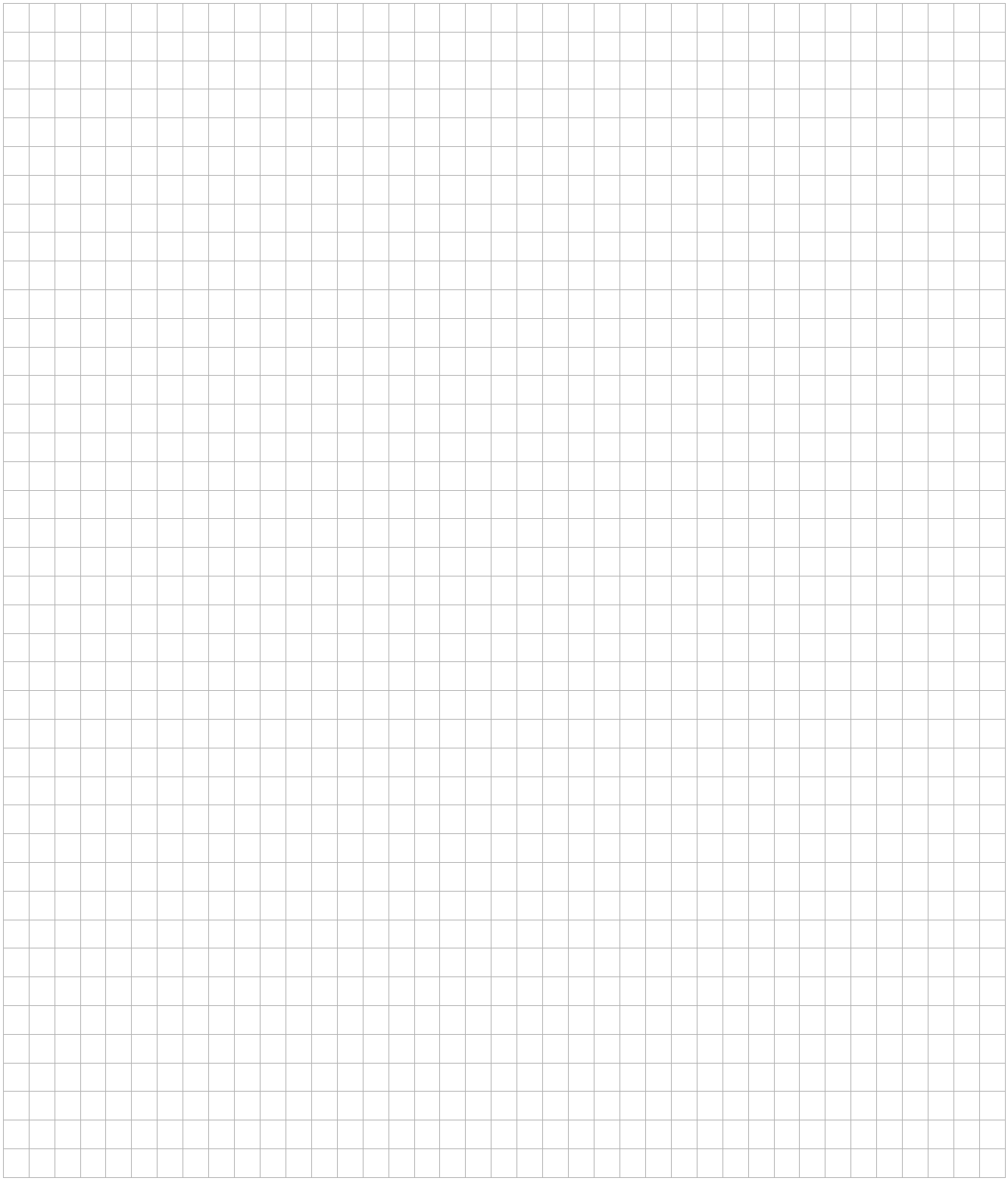
Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 164 3838014/15 Fax +90 216 3055867 sew@sew-eurodrive.com.tr

Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

USA			
Production **Assembly** **Sales** **Service**	**Greenville**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com

USA			
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6381 cshayward@seweurodrive.com
	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve sewventas@cantv.net sewfinanzas@cantv.net



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