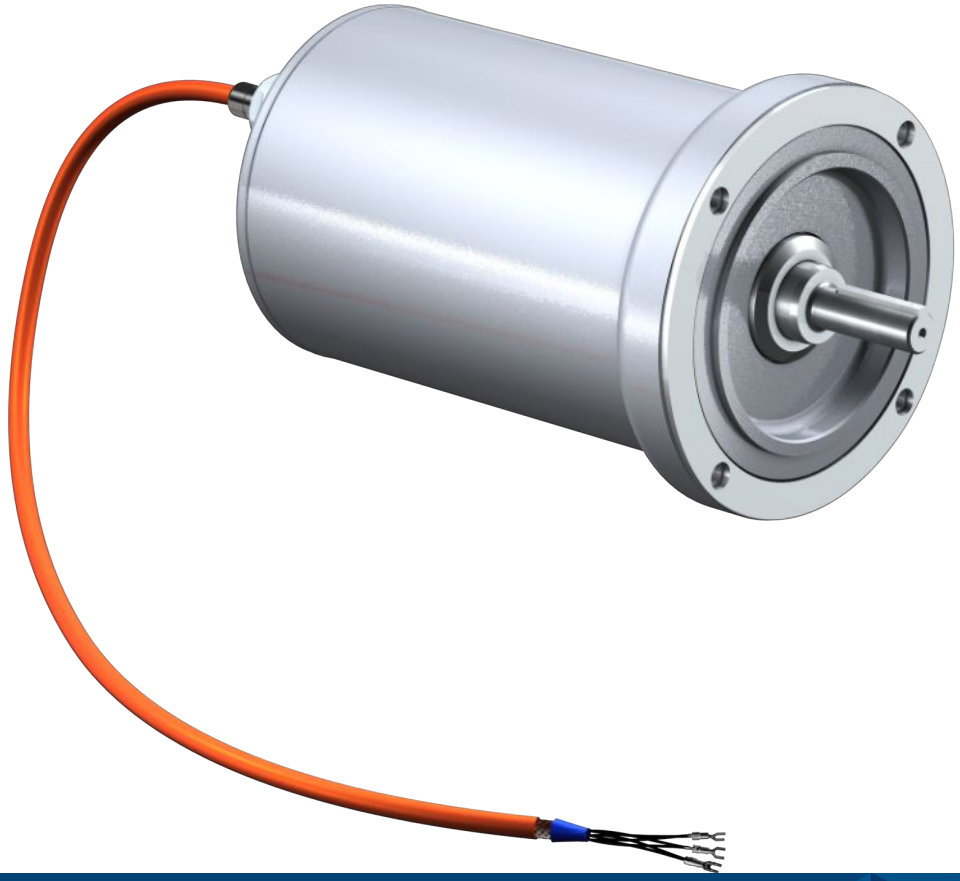

CLM cLEAN motors
Operating manual

en-US
03/2026
ID 443443_en.01

STÖBER

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1 Foreword

The servomotors of the CLM cLEAN series are made of high-quality stainless steel and are designed for use in humid and hygienically sensitive environments. They combine high energy efficiency with a robust, fully encapsulated, easy-to-clean design. Flexible encoder options and an optional holding brake enable precise adaptation to the respective application and support easy installation and low-maintenance operation.

Features

- Robust, compact and fully encapsulated design
- Ideal for humid and hygienically sensitive environments
- Energy efficiency class IE5
- IP68/IP69K-certified
- Meets EHEDG hygiene requirements
- UL-certified
- Flexible feedback options: without encoder, with encoder for position and speed detection
- Optionally available with holding brake
- Simple assembly and disassembly via BOWEX coupling system

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2 Information on this documentation

This documentation helps you handle the motor safely and properly – from transportation, storage, installation and commissioning to servicing and disassembly. It describes the intended use, indicates residual hazards and contains clear instructions for the protection of persons and property.

2.1 Storage and transfer

As this documentation contains important information for handling the product safely and efficiently, it must be stored in the immediate vicinity of the product until product disposal and be accessible to qualified personnel at all times.

Also pass on this documentation if the product is transferred or sold to a third party.

2.2 Timeliness

Check whether you have the latest version of this documentation. The latest document versions for our products are available for download on our website:
https://www.stober.com/downloads/.

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2.3 Limitation of liability

This documentation was created taking into account the applicable standards and regulations as well as the current state of technology.

No warranty or liability claims for damage shall result from failure to comply with the documentation or from use that deviates from the intended use of the product. This is especially true for damage caused by individual technical modifications to the product or the project configuration and operation of the product by unqualified personnel.

2.4 Formatting conventions

Orientation guides in the form of signal words, symbols and special text markups are used to emphasize specific information so that you are able identify it in this documentation quickly.

2.4.1 Display of warning messages and information

Warning messages are identified with symbols. They indicate special risks when handling the product and are accompanied by relevant signal words that express the extent of the risk. Furthermore, useful tips and recommendations for efficient, error-free operation are specially highlighted.

ATTENTION!

Attention

This indicates that damage to property may occur

- if the stated precautionary measures are not taken.

⚠ CAUTION!

Caution

This word with a warning triangle indicates that minor personal injury may occur

- if the stated precautionary measures are not taken.

⚠ WARNING!

Warning

This word with a warning triangle means there may be a considerable risk of fatal injury

- if the stated precautionary measures are not taken.

⚠ DANGER!

Danger

This word with a warning triangle indicates that there is a considerable risk of fatal injury

- if the stated precautionary measures are not taken.

Information

Information indicates important information about the product or serves to emphasize a section in the documentation that deserves special attention from the reader.

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2.4.2 Distinction of text elements

Certain elements of the continuous text are distinguished as follows.

Important information	Words or expressions with a special meaning
Interpolated position mode	Optional: File or product name or other name
Detailed information	Internal cross-reference
http://www.samplelink.com	External cross-reference

2.5 Note on trademark and property rights

Product names protected by trademark law are not marked separately in this documentation.

All applicable property rights (patents, trademarks, utility models, etc.) remain unaffected and must be observed.

2.6 Copyright notice

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3 Safety

There are risks associated with the product described in this documentation that can be prevented by complying with the safety notes and the general technical rules and regulations.

3.1 Qualified personnel

In order to be able to perform the tasks described in this documentation, the persons instructed to perform them must have the appropriate professional qualification and be able to assess the risks and residual hazards when handling the products. For this reason, all work on the products as well as their operation and disposal may be performed only by professionally qualified personnel.

Qualified personnel are persons who have acquired the authorization to perform these activities either through training to become a specialist and/or instruction by specialists.

Furthermore, valid regulations, legal requirements, applicable basic rules, this documentation and the safety notes included in it must be carefully read, understood and observed.

3.2 Intended use

The CLM cLEAN motors are designed for use in commercial and industrial machines and systems.

The following circumstances in particular constitute improper use:

- Overload or exceeding the maximum permitted speed
- Use under ambient conditions that differ from the conditions described in this manual
- Modifications, conversions or other changes to the motors
- Direct connection to the three-phase network
- Operation in a potentially explosive atmosphere

Commissioning of the machine in which the motors or geared motors are installed is only permitted after it has been ensured that the machine complies with the applicable local laws and regulations.

Please observe the following guidelines:

- (Low Voltage) Directive 2014/35/EU
- (RoHS) Directive 2011/65/EU

3.3 General safety notes

⚠ WARNING!

Dangerous motion of machine parts

Working on moving machine parts can lead to serious injuries or death.

- Make sure that there are no persons in the danger zone.
- Switch off the machine using the main switch before carrying out any work.
- Secure the main switch to prevent it from being switched on again.

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⚠ WARNING!

Lowering or falling of gravity-loaded axes or vertical axes after switching off the motor

Falling gravity-loaded axes or vertical axes can cause serious injuries or death.

✓ The holding brake of the motor does not provide sufficient protection for persons in the danger zone.

- Move the axes to their lowest position.
- Lock or support the axes mechanically before persons enter the danger zone.

⚠ CAUTION!

Hot motor surface exceeding 100 °C during operation

Skin contact with the hot surface of the motor can lead to severe skin burns.

- Avoid touching the motor during and immediately after operation.
- Allow the motor to cool down sufficiently before carrying out any work on it.
- Wear appropriate protective gloves when working on the motor.

3.4 Activity-specific safety notes

3.4.1 Transport

⚠ WARNING!

Suspended loads

Loads that become loose and fall during the lifting process can cause serious injuries or even death.

- Cordon off the danger zone and ensure that no one stands under the suspended loads.
- Wear safety shoes.

⚠ WARNING!

Damaged power cable or damaged cable gland

Contact with live parts can lead to electric shock and life-threatening injuries.

- Do not pull or lift the motor by the cable.
- Make sure the cable is not kinked or mechanically damaged.

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3.4.2 Installation

3.4.2.1 Warning symbols on the motor

Warning symbols are attached to the motor housing. Make sure that the warning symbols are clearly visible and legible at all times.

Warning symbol	Meaning
	Warning of crushing due to being pulled into moving machine parts. Only perform work on the motor when the motor shaft is at a standstill.
	Warning of risk of fatal or serious injuries. Plug connections are under high electrical voltage. Only disconnect or connect the plug connections when the motor is de-energized!
	Warning of burns. The motor surface can reach very high temperatures during operation. Therefore, do not touch the motor during operation or immediately afterwards!

3.4.3 Electrical connection

⚠ WARNING!

High electrical voltage on the motor

Touching live parts can lead to death or serious injuries.

✓ Please note that only electrically skilled persons are permitted to connect the motor.

- Before carrying out any electrical work, switch off the power supply to the machine using the main switch.
- Secure the main switch to prevent it from being switched on again.
- Only connect the motor using cables supplied or approved by STOBER.
- Do not open the motor housing.

⚠ WARNING!

Incorrect installation of the motor disconnecting switch

Failure to disconnect the power supply before disconnecting the motor cables can lead to electric arcs in the motor disconnecting switch and cause personal injury and material damage.

- Install the motor disconnecting switch properly with a lagging auxiliary contact, which can be used to de-energize the power cables of the drive controller before disconnecting the motor lines.

ATTENTION!

Direct connection of the motor to the three-phase network

Direct or improper connection of the motor can lead to an overload, overheating or short-circuit in the motor.

- Only connect the motor in accordance with the instructions in this documentation.
- Do not operate the motor directly on the three-phase network.

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ATTENTION!

Use of connection cables that are not compatible with the motor

Connection cables that are not compatible with the motor can damage the motor or the plug connectors. In addition, they may result in non-compliance with legal EMC requirements and invalidate warranty claims.

- Only use connection cables that have been supplied or approved by STOBER.
- When connecting to drive controllers from other manufacturers, only the original cables from the respective manufacturer may be used.

ATTENTION!

Unsuitable extension cables or plug connectors

The use of unsuitable cables or connectors can result in damage to the motor due to voltage peaks, thermal damage to plug connectors and non-compliance with legal regulations concerning electromagnetic compatibility. In addition, it voids any warranty claims.

- Only use cables and plug connectors supplied or approved by STOBER.

ATTENTION!

Temperature sensor not connected

If the temperature sensor is not connected and monitored, the motor may be damaged. In addition, it voids any warranty claims.

- Connect the temperature sensor.
- Activate the thermal winding protection in the drive controller.

ATTENTION!

Lack of motor temperature monitoring

If the motor temperature in the drive controller is not monitored via the i2t model, this may lead to damage to the motor. In addition, it voids any warranty claims.

- To protect the thermal winding protection of the motor, monitor the motor temperature.

3.4.4 Commissioning

⚠ WARNING!

Electric arcs when disconnecting plug connections during motor operation

Disconnecting plug connectors during motor operation can cause electric arcs, which can lead to serious injuries or death.

- Only disconnect or connect the plug connectors when the motor is de-energized.

⚠ WARNING!

Unsecured feather keys or drive elements

The rotating input shaft can cause serious injuries if metal parts are thrown off.

- Install all drive elements correctly.
- Remove feather keys before a test run.

3.4.5 Servicing

⚠ WARNING!

Damage to the drive due to stepping on it

A damaged drive can cause electric shocks or injuries.

- Do not step on the drive during maintenance.
- Use suitable climbing aids if necessary.

ATTENTION!

Improper cleaning procedures

Improper cleaning procedures can damage the motor.

- Maintain a water temperature < 80 °C.
- Maintain a pressure < 100 bar.
- Maintain a distance > 10 cm between the emitter and the motor.
- Only use solvents that are compatible with FKM seals.

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3.5 Transport and storage

The packaging type of the STOBER products depends on the size and the respective transport method.

Inspect the delivery for any transport damage immediately after you receive it. Notify the transport company of any damage immediately. Do not put a damaged product into operation.

Store the products in a dry and dust-free room if you do not install them immediately.

Transport and store the products in the original packaging and protect the products from mechanical impacts and vibrations. Observe the transport and storage conditions recommended in the technical data.

3.5.1 Transport

Lifting and transporting the motor or geared motor may require lifting gear (e.g. a crane), depending on the weight. The weight of your motor or geared motor is specified in the accompanying delivery documents.

Lift and transport the motor as follows:

- Use lifting gear with a sufficient lifting capacity for the weight of the motor and attached loads.
- On motors without eyebolts, run hoist slings directly around the motor housing and secure the hoist slings from slipping.
- Fasten loads attached to the motor such as gearboxes or output units as well and make sure that there is no diagonal pull.

In order to prevent falling or damage to the motor during transport, do not lift or fasten the motor on the output shaft or cable.

3.5.2 Storage

Store the motor in its original packaging in closed, dry spaces.

Over the course of a prolonged storage period, moisture can collect on the inside of the motor. Therefore, have the insulation resistance of the motor winding checked by an electrically skilled person before commissioning.

3.6 Visual inspection

Perform regular visual inspections for damage to the motor and connection cable according to the following checklist. Determine the inspection interval according to the expected operating conditions of the motor, but every 12 months at the latest. Clean the motor before the visual inspection.

Checklist

- If the connection cable is damaged, replace it.
- If a cable extension is used, check whether the plug connector nut is tightened correctly.
- If the motor is damaged, decommission the machine and replace it.

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4 cLEAN-Motor CLM

This chapter contains information on available equipment variants as well as typical motor details for installation, commissioning and servicing. The technical data of your motor can be found in the corresponding order confirmation.

4.1 Motor components

The illustration shows the structure of the CLM cLEAN motor series using the example of motor type CLM503.

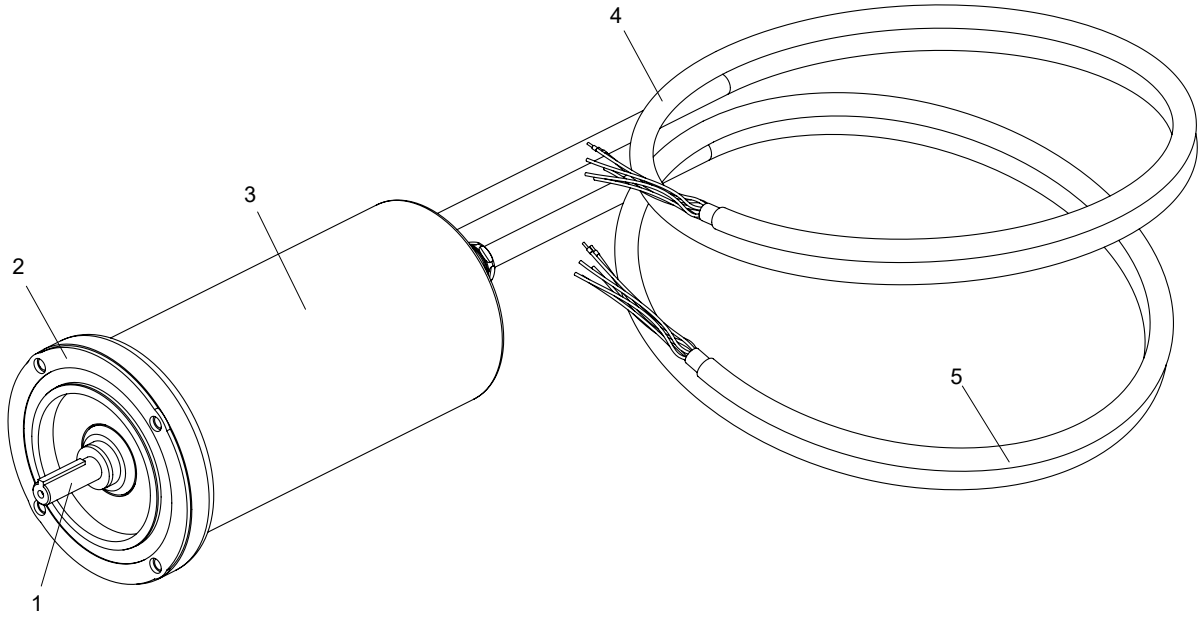

Fig. 1: Structure of a CLM503 motor

1	Output shaft	2	Output flange
3	Motor housing	4	Connection cables
5	Encoder cable (optional)		

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4.2 Type designation

Example code

CLM	5	0	2	U	S	HF	R0	P	201	R	/140

Explanation

Code	Designation	Design
CLM	Type	cLEAN motor
5	Size	5
0	Generation	0
2	Length	1 HP
3		2 HP
5		3 HP
U	Cooling	Convection cooling
S	Design	Standard
HF	Drive controller	MH300
HG		Third-party drive controller
00	Encoder	Without encoder
R0		Resolvers
O	Brake	Without holding brake
P		Permanent magnet holding brake
201	Voltage constant K_{EM}	201 V/1000 rpm (example)
S	Cable design	Straight
R		Angle
/050	NEMA size	56C
/140		143/145TC
/180		182/184TC

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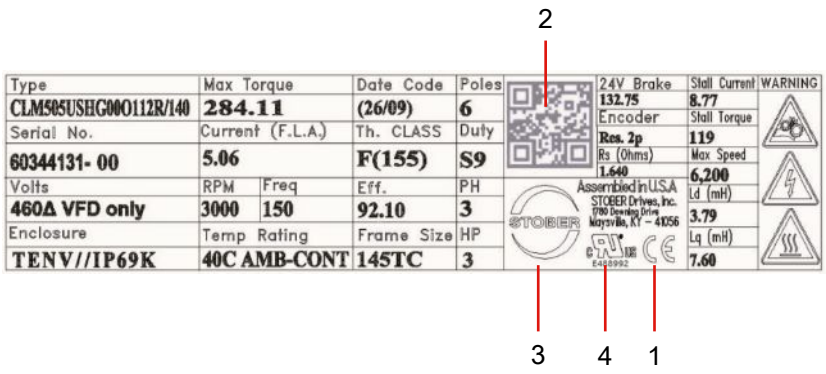
4.3 Nameplate

An example nameplate of an CLM505 motor is explained in the figure below.



Field/Position	Value	Description
Type	CLM505USHG00O112R/140	Type designation
Max Torque	284.11	Maximum torque/force
Date code	(26/09)	Date of manufacture (year/week)
Poles	6	Number of poles
Serial No.	60344131-00	Serial number of the motor
Current (F.L.A.)	5.06	Nominal current (depending on the circuit)
Th. CLASS	F(155)	Thermal class
Duty	S9	Nominal operating mode
Volts	460Δ VFD only	Supply voltage and circuit Operation only permitted on a drive controller
RPM	3000	Nominal speed (depending on the circuit)
Freq	150	Nominal frequency (depending on the circuit)
Eff.	92.10	Efficiency (depending on the circuit)
PH	3	Number of phases
Enclosure	TENV//IP69K	Protection class
Temp rating	40C AMB-CONT	Maximum surrounding temperature
Frame size	145TC	NEMA size
HP	3	Nominal power
1	CE	CE mark
2	QR code	Link to product information
3	STOBER	Name and address of the manufacturer
4	cURus	cURus test symbol
24V Brake	132.75	Permanent magnet brake
Stall Current	8.77	Stall current

Field/Position	Value	Description
Warning		Explanation of the warning symbols in the chapter Warning symbols on the motor [▶ 10].
Encoder	Res. 2p	Resolver, 2-pole
Stall Torque	119	Stall torque
Rs (Ohms)	1,640	Phase resistance
Max Speed	6.200	Maximum speed
Ld (mH)	3.79	Inductance of D-axis
Lq (mH)	7.60	Inductance of Q-axis

4.4 General features

Feature	Description
Design	Sensorless synchronous motor with interior permanent magnets
Design	IM B5, IM V1, IM V3 in accordance with EN 60034-7
Protection class	IP69K
Thermal class	155 (F) in accordance with EN 60034-1 (155 °C, heating $\Delta\vartheta$ = 100 K)
Surface	SAE 304 stainless steel
Cooling	IC 410 convection cooling
Bearing	Rolling bearing with lifetime lubrication and non-contact sealing
Sealing	Radial shaft seal rings made of FKM (A side)
Shaft	Shaft with feather key, diameter quality k6
Radial runout	Normal tolerance class in accordance with IEC 60072-1
Concentricity	Normal tolerance class in accordance with IEC 60072-1
Axial runout	Normal tolerance class in accordance with IEC 60072-1
Vibration intensity	A in accordance with EN 60034-14
Noise level	Limit values in accordance with EN 60034-9

4.5 Electrical features

Feature	Description
DC link voltage	DC 540 V (max. 776 V) or DC 270 V (max. 310 V) to MH300 drive controller
Winding	Three-phase
Circuit	Delta (AC 230 V, AC 460 V or AC 575 V supply voltage) Star (AC 460 V or AC 575 V supply voltage)
Protection class	I (protective grounding) in accordance with EN 61140
Number of pole pairs	3

4.5.1 Temperature sensor

A PTC thermistor is installed as standard in the CLM cLEAN motors as a temperature sensor for thermal winding protection. This is a triple thermistor with which the temperature of each winding phase can be monitored.

The motors can optionally be equipped with a Pt1000 temperature sensor. This is a temperature-dependent resistor with a linear resistance characteristic that enables measurements of the winding temperature. However, these measurements only relate to one phase of the motor winding. To reliably prevent the motor from exceeding the maximum permitted winding temperature in order to protect it, set up temperature monitoring in the drive controller via an i^2t model.

Information about connecting the temperature sensor can be found in chapter Electrical connection [▶ 24].

4.5.2 Holding brake

CLM cLEAN motors can be equipped with a backlash-free permanent magnet holding brake in order to secure the motor shaft when it is at a standstill. The holding brake engages automatically if the voltage drops.

The holding brake is designed for a high number of operations (B_{10} = 10 million operations, B_{10d} = 20 million operations).

Nominal voltage of permanent magnet holding brake: DC 24 V ± 5%, smoothed.

Information about connecting the holding brake can be found in the chapter Electrical connection [▶ 24].

4.5.3 Resolver

In this chapter, you can find detailed technical data for the resolver that can be installed as an encoder in a STOBER motor.

Feature	Description
Code	R0
Number of poles	2
Input voltage U_{1eff}	7 V ± 5%
Input frequency f_1	10 kHz
Output voltage $U_{2,S1-S3}$	$K_{tr} \cdot U_{R1-R2} \cdot \cos \theta$
Output voltage $U_{2,S2-S4}$	$K_{tr} \cdot U_{R1-R2} \cdot \sin \theta$
Transformation ratio K_{tr}	0.5 ± 5%
Electrical fault	±10 arcmin
MTTF	> 100 years
PFH	$\leq 10^{-9}$

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4.6 Ambient conditions

Standard ambient conditions for transport, storage and operation of the motor are described in this chapter.

Feature	Description
Surrounding temperature for transport/storage	−30 °C to +85 °C
Surrounding temperature for operation	−15 °C to +40 °C
Installation altitude	≤ 1000 m above sea level
Shock load	≤ 50 m/s^2 (5 g), 6 ms in accordance with EN 60068-2-27

Notes

- CLM cLEAN motors are not suitable for potentially explosive atmospheres in accordance with (ATEX) Directive 2014/34/EU.
- Support the connection cables close to the motor so that vibrations on the cable do not place impermissible loads on the cable gland.
- Note that the braking torques of the holding brake (optional) may be reduced by shock loading.
- Also take into consideration the shock load of the motor due to output units (such as gearboxes and pumps) which are coupled with the motor.

To prevent damage, protect the motor from the following influences:

- Environments with harmful oils, acids, gases, vapors, dust or radiation
- Shaking, impacts, vibrations and high acceleration
- Sparks or heat

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5 Installation

Check the motor and cable for damage caused by transportation or storage before installation. If the motor or the cable is damaged, do not install the motor. Please contact the STOBER Service Department instead. Make sure that the requirements for ambient conditions at the assembly location are met.

You will need the following tools for assembly:

- If required (depending on the total weight): hoist with suitable lifting gear with sufficient load-bearing capacity
- Standard tools
- Torque wrench
- Mounting device for power transmission elements

5.1 Assembly tolerances

Observe the following tolerances when installing the motor.

Tolerances for solid shafts in accordance with DIN 748-1

Diameter [mm]	Tolerance
≤ 50	ISO k6
> 50	ISO m6

Tab. 1: Tolerances – Solid shafts

Tolerances for the centering diameter on the motor flange in accordance with EN 50347

Centering diameter [mm]	Flange size [mm]	Tolerance
≤ 230	65 – 300	ISO j6
> 230	350 – 500	ISO h6

Tab. 2: Tolerances – Motor flange

5.2 Mounting the motor on a gearbox

The professional installation of a CLM cLEAN motor on a STOBER KSS series gearbox with an MSR motor adapter and a **curved tooth coupling** is crucial to ensure a secure connection, optimum power transmission and reliable operation of the drive.

Information

When a STOBER geared motor is used, the motor and gearbox are already preassembled; the assembly steps described in this chapter are not required.

Installation

Perform the following steps in the specified order.

1. In the table XL dimension/tightening torque for installing the coupling hub [▶ 22], read off the XL dimension that corresponds to your motor adapter type.

2. Pull the motor-side coupling hub (4) onto the motor shaft (2) such that the XL dimension is complied with. If the coupling hub is difficult to fit on the motor shaft, do not use force and instead heat the coupling hub to about 80 °C before fitting.
3. Secure the coupling hub (4) with the set screw (5) and tighten it to the tightening torque specified in the table XL dimension/tightening torque for installing the coupling hub [▶ 22].
4. If possible, position the gearbox such that the motor can be mounted in a horizontal position.
5. Connect the coupling sleeve (6) to the gearbox side coupling hub (9).
6. Turn the motor in an axial position to the gearbox so that the nameplates are on the same side, if possible, and can also be read after installation in the machine.
7. Carefully place the motor on the motor adapter such that the motor-side coupling hub (4) is inserted into the coupling sleeve (6) centered and the curved teeth of the coupling hub easily mesh with the internal teeth of the coupling sleeve.
8. The contact surfaces of the motor flange and motor adapter flange must fit together without a gap. If this is not the case, do not use force and instead check the dimensions of the motor.
9. Mount the motor with supplied stainless steel hex head screws (10) on the motor adapter. Use the supplied plug seals (8).
10. Tighten the hex head screws with a torque wrench to a tightening torque of 22 Nm.

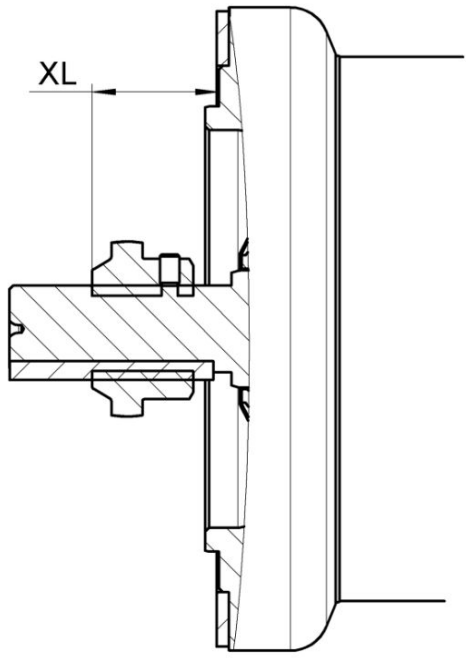

Fig. 2: XL dimension – coupling hub, motor shaft

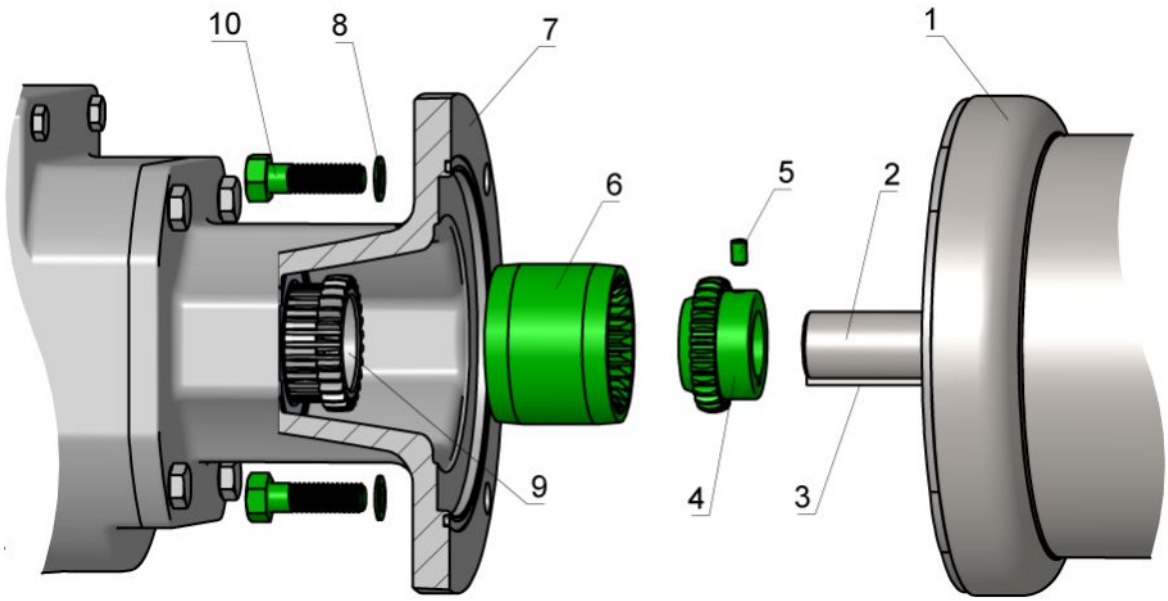

Fig. 3: Installation steps – CLM cLEAN motor on KSS series gearboxes

1	Motor	2	Motor shaft
3	Feather key	4	Coupling hub (motor side)
5	Set screw	6	Coupling sleeve
7	Motor adapter flange	8	Plug seal
9	Coupling hub (gearbox side)	10	Hex head screw

Motor adapters	NEMA size	XL (+0.04 / -0.00) [inch]	XL (+1.0 / -0.0) [mm]	Tightening torque [Nm]
MS1R/050	56C	0.94	24	2
MS2R/050	56C	1.02	26	2
MS2R/140	143TC	1.14	29	2
MS3R/050	56C	0.94	24	2
MS3R/140	143TC	1.14	29	2
MS3R/180	182TC	1.42	36	10
MS4R/050	56C	0.94	24	2
MS4R/140	143TC	1.14	29	2
MS4R/180	182TC	1.42	36	10

Tab. 3: XL dimension/tightening torque for installing the coupling hub

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5.3 Mounting the motor on the machine

Correct installation of the motor on the machine ensures safe operation and reliable functioning of the drive system.

Prerequisites

- The dimensional tolerances for the mounting point in the machine correspond to the requirements in the chapter Tolerances for motor assembly.
- There is sufficient distance between the side surfaces of the motor and neighboring machine components for air heated by the motor to rise up unobstructed.

Installation

Perform the following steps in the specified order.

1. Completely remove the corrosion protection from the flange contact surfaces of the motor and degrease the mounting point in the machine.
2. Transport the motor to the mounting point.
3. Fit the output flange of the motor onto the mounting point and fasten the motor with 4 hex head screws.
4. Carefully align the motor to the output units.
5. Ensure even contact of the output flange at the mounting point.
6. Tighten the screws using tightening torques in accordance with the following table without torsional stress.

Thread	Tightening torque M_A [Nm]	Tightening torque M_A [ft-lbs]
3/8”-16X7/8” UNC-18-8	26.7	19.6
1/2”-13X1” UNC-18-8	58.3	43.0

Tab. 4: Tightening torques for hex head screws

6 Electrical connection

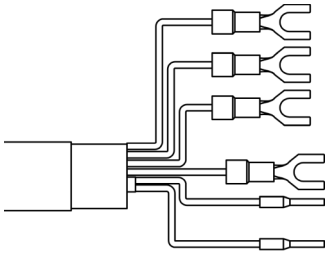
Before carrying out the electrical connection of the motor, check whether the following prerequisites are fulfilled:

- The mechanical assembly of the motor is completed.
- The plug connectors (optional) of the supplied cable are free of internal contamination or moisture.

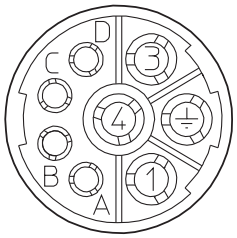
6.1 Terminal assignment for power

As standard, the CLM cLEAN motor is delivered with a connected cable. The cable is either open or equipped with a plug connector with screw cap.

Flying lead – cross-section: AWG 14 (2.5 mm²)

Connection diagram	Designation	Color	Connection
	U/L1/C/L+	Black	U/T1
	V/L2	Black	V/T2
	W/L3/D/L-	Black	W/T3
		Greenyellow	PE (grounding conductor)
		Black	1BD1 (brake +)/1TP1 (temperature sensor +)
		White	1BD2 (brake –)/1TP2 (temperature sensor -)

Plug connector size con.23

Connection diagram	Pin	Connection
	1	1U1 (U phase)
	⏚	PE (grounding conductor)
	3	1V1 (V phase)
	4	1W1 (W phase)
	A	1BD1 (brake +)/1TP1 (temperature sensor +)
	B	1BD2 (brake –)/1TP2 (temperature sensor –)
	C	
	D	

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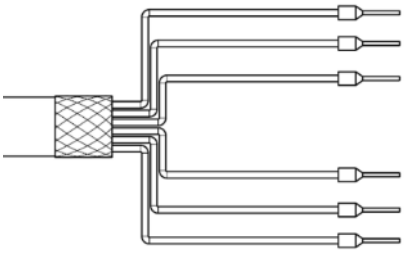
6.2 Terminal assignment for encoder

The CLM cLEAN motor can be optionally equipped with a resolver. Connect the corresponding cable to the drive controller according to the following pin assignment. Correct wiring guarantees reliable transmission of analog signals for precise position and speed information.

Resolvers

Connection diagram	Color	Pair	Connection	Terminal
	Blue	Blue/white		S1
	White	Blue/white		S3
	White	Yellow/white		S4
	Yellow	Yellow/white		S2
	Red	Red/white		R1
	White	Red/white		R2
	Green	Green/white		
	White	Green/white		

6.3 Connecting the motor to the drive controller

A CLM cLEAN motor is operated as standard in combination with a drive controller from the cLEAN Drive series (MH300). The associated power cable is preassembled and can be connected directly.

During normal operation on a cLEAN Drive, leakage currents of more than 10 mA occur. To protect against electric shock, connect the ground conductor of the motor to the grounding conductor system of the machine via the drive controller.

You can connect the motor to the drive controller either directly or via a motor disconnecting switch.

6.3.1 Connection without motor disconnecting switch

Depending on the design – with holding brake, with temperature sensor or with encoder – connect the motor to the drive controller in accordance with the corresponding connection plan below. Connect the ground conductor and both cable shields to the ground terminals as shown.

Information

Connecting a temperature sensor in addition is not possible for motors with a holding brake.

Motor with holding brake

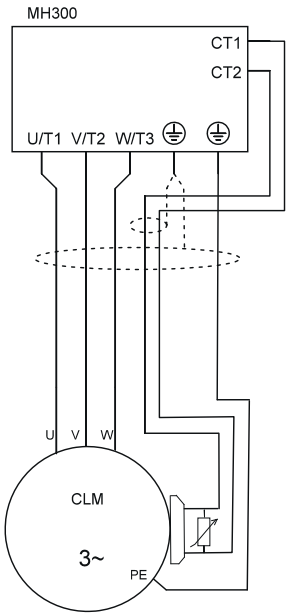


Fig. 4: Connection plan – motor with holding brake

Motor with temperature sensor

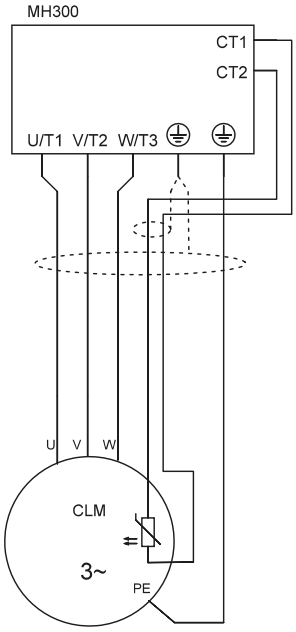


Fig. 5: Connection plan – motor with temperature sensor PTC

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Motor with resolver

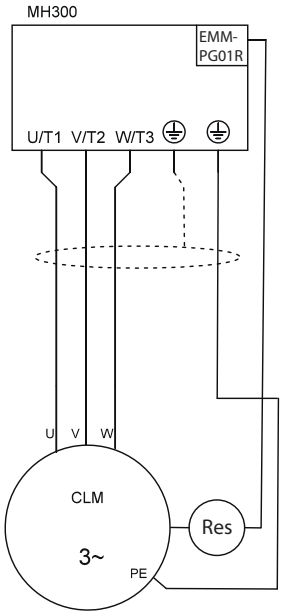

Fig. 6: Connection plan – motor with resolver

CLM	cLEAN motor	MH300	Drive controller
CT1/CT2	Encoder connections of the drive controller	EMM-PG01R	Option module for resolver evaluation
Res	Resolvers		

6.3.2 Connection with motor disconnecting switch

Information

Only connect motors with a holding brake, temperature sensor or encoder directly to the drive controller; no motor disconnecting switch is provided.

The cable from the motor disconnecting switch to the drive controller must be supplied by the customer.

Connect the motor to the motor disconnecting switch and drive controller in accordance with the following connection plan. Make sure that the ground conductors and cable shields are connected to the ground terminals as specified.

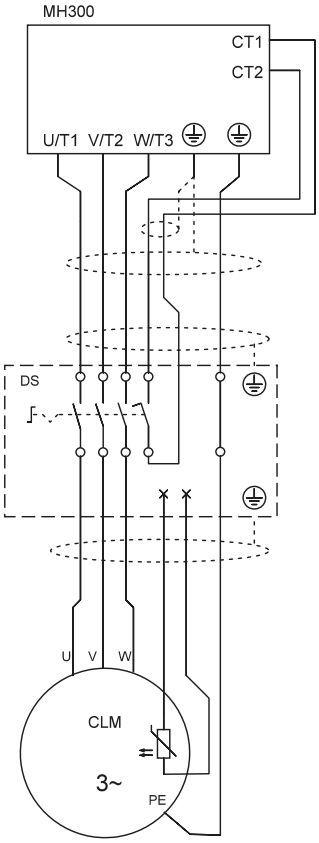

Fig. 7: Connection plan – motor via motor disconnecting switch

MH300	Drive controller	CLM	cLEAN motor
CT1/CT2	Encoder connections of the drive controller	DS	Motor disconnecting switch with lagging auxiliary contacts

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6.4 Connecting the extension cable

If the power cable has a plug connector at the end, you can connect a STOBER extension cable.

On the drive controller side, the extension cable has an open end with the same terminal assignment as the power cable (see chapter Terminal assignment for power [▶ 24]).

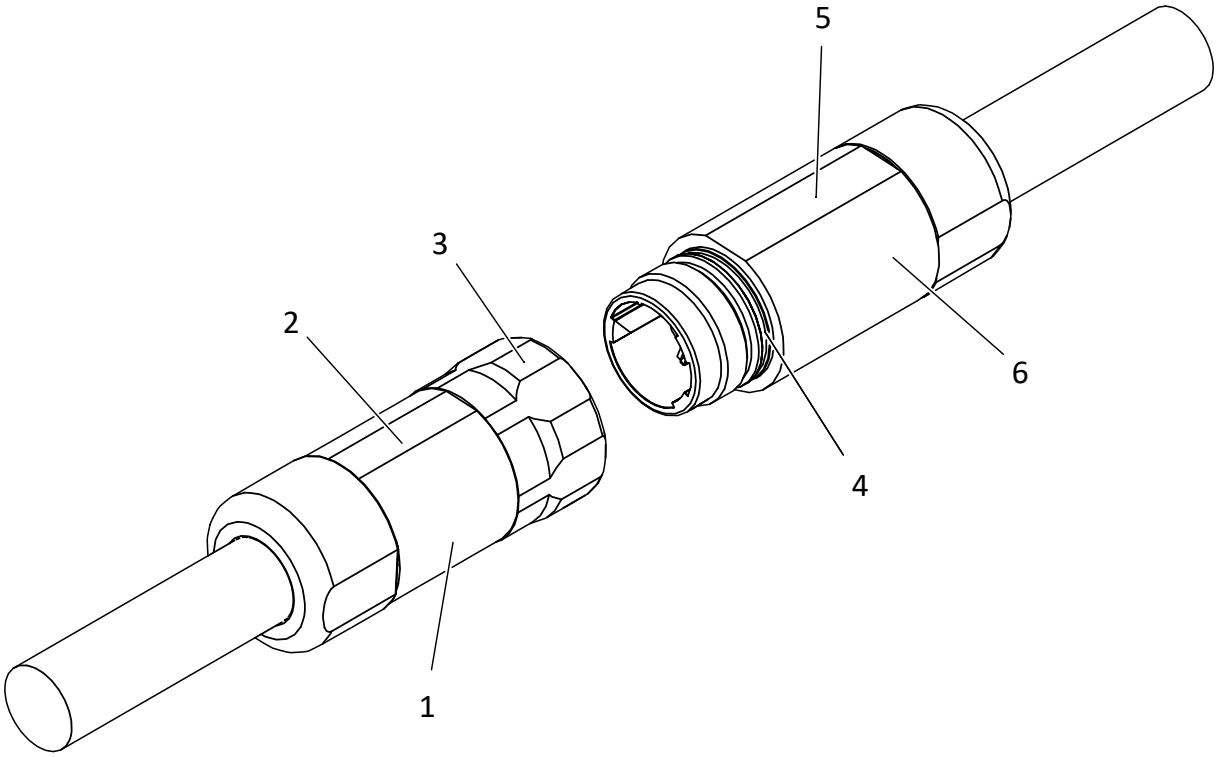

Fig. 8: Connection – STOBER extension cable

Cable connection

Perform the following steps in the specified order.

1. Make sure that the machine is de-energized and the motor shaft is at a standstill.
2. Align the plug connectors so that the flat portion (5) on the plug connector of the power cable (6) and flat portion (2) on the plug connector of the extension cable (1) are opposite each other.
3. Connect the two plug connectors.
4. Turn the nut (3) clockwise until the O-ring (4) is covered by the nut.

Cable routing

Route the cable to the machine so that it does not touch the motor housing during operation, as this gets hotter than 80 °C and can damage the insulation.

7 Commissioning

Observe the following measures before and during commissioning of the drive.

7.1 Before commissioning

Before commissioning the motor, make sure that the following prerequisites are met:

- The motor is undamaged.
- The mechanical assembly and electrical connection of the motor has been completed.
- The drive controller is ready for operation.
- The drive is not blocked.
- The feather key of the motor shaft has been secured from sliding off.
- All protective devices have been assembled properly.
- Heat-sensitive components (e.g. cables) have been routed so that the they do not touch the motor surface.
- The motor surface is not covered with any heat-insulating materials.
- No persons are in the danger area.

7.2 Parameterizing the motor

All the required motor parameters are stored in the MH300 drive controllers supplied by STOBER. This ensures that just a few parameters have to be adapted. Make sure that thermal winding protection is activated. You can find more information in the documents that are specified in chapter Further information [▶ 35].

7.3 During commissioning

During commissioning, check the following:

- Is the direction of rotation of the motor or drive correct?
- When the motor is running, does any overload, unwanted speed fluctuations or unusual noises occur?

If the motor is equipped with a holding brake, perform a brake test (see the chapter Testing the holding brake [▶ 31]).

In case of faults, observe the chapter Troubleshooting [▶ 33].

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8 Servicing

8.1 Maintenance

The maintenance tasks described in this chapter are necessary in order to maintain the functionality of the motor. The rolling bearings of the motor are maintenance-free.

8.1.1 Cleaning

If the motor surface is dirty, sufficient heat dissipation through the surrounding air is no longer possible. As a result, the lifespan of the motor bearings may be reduced since the motor bearing lubricant breaks down in the event of impermissibly high temperatures. Furthermore, the thermal winding protection may force a shut-down of the motor before the motor has reached its nominal values.

Determine the cleaning interval according to the expected operating conditions, but it should be every 12 months at the latest. Clean the motor according to the following instructions.

8.1.2 Review during operation

Check the motor for deviations regularly during operation. Determine the inspection interval according to the expected operating conditions of the motor. Before commissioning, make sure that no persons are put at risk and no property damage occurs as a result. Pay attention in particular to the following deviations from normal operation:

- Increased motor vibrations
- Unusual motor noises
- Burning odors in the vicinity of the motor
- Diagnostic and error messages from the drive controller

In case of deviations from normal operation or in case of faults, proceed according to the instructions in chapter Troubleshooting [▶ 33].

8.1.3 Testing the holding brake

This chapter applies to motors that are equipped with a holding brake.

Gravity-loaded axes / vertical axes

If you use the motor for driving gravity-loaded axes or vertical axes, you must take measures to minimize the risk of unwanted lowering of the axis. One of these measures can be a cyclical brake test. Additional information on the cyclical brake test can be found in the DGUV information sheet No. 005 Gravity-loaded axes (vertical axes) at www.dguv.de.

When dimensioning the motor current for the cyclical brake test, be aware that, even at a standstill, the load of the vertical axis exerts torque on the motor and the holding brake.

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Other applications

Test the holding brake regularly by measuring the braking torque and comparing it to the nominal braking torque. Determine the inspection interval according to the expected operating conditions of the motor, however every 12 months at the latest.

Test the holding brake as follows:

1. Make sure that no persons are put at risk and no property damage occurs due to this process.
2. Stop the motor.
3. Close the holding brake.
4. Allow the motor to work against the holding brake with a torque corresponding to the nominal braking torque.
5. Check whether the holding brake holds the motor shaft in place or whether the motor shaft also turns.
6. Condition the holding brake is the nominal braking torque if not reached (see the chapter Conditioning the holding brake).

Technical data for the holding brake can be found on the nameplate.

8.1.4 Condition the holding brake

This chapter applies to motors that are equipped with a holding brake. Although the holding brake is largely maintenance-free, the braking torque might gradually decrease depending on the operating conditions. This can be caused by initial deposits of rust on the friction surfaces or slight material warpage due to large temperature fluctuations.

If you determine that the nominal braking torque is no longer reached during a brake test, condition the holding brake as follows:

1. Make sure that no persons are put at risk and no material damage occurs due to this process.
2. Lift the holding brake.
3. Allow the motor to run at 100 rpm and with a torque that is greater than the nominal braking torque.
4. Close the holding brake for 0.5 sec.
5. Release the holding brake for 0.5 seconds.
6. Repeat steps 4 and 5 a total of 4 times.
7. Change the direction of rotation of the motor.
8. To do this, repeat steps 4 to 6.
9. Carry out a brake test.
10. If the nominal braking torque is now reached, the conditioning of the holding brake is complete. Otherwise, contact the STOBER Service Department.

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8.2 Troubleshooting

In the following table, you can find information for remedying motor faults.

Faults	Possible causes	Measures for remedying
Motor does not start	Enable by drive controller not present	Activate enable in the drive controller
	Error in the drive controller	Remedy error according to the drive controller documentation
	Power supply missing	Check connection and power supply
	Cable connected incorrectly	Connect cable correctly
	Drive blocked mechanically	Eliminate the blockage
	Holding brake (if present) not released	Check connection and actuation of the holding brake
	Motor defective	Contact the STOBER Service Department
Increased operating temperature or activation of thermal winding protection	Motor housing heavily contaminated	Clean motor housing
	Intake or discharge of cooling air blocked by foreign object	Ensure unimpeded intake and discharge of cooling air
	Motor overloaded by the application	Reduce load or check layout
	Holding brake (if present) does not lift entirely	Contact the STOBER Service department
Increased vibrations during operation	Motor or geared motor assembled tightly	Check the assembly of the motor or geared motor
	Fastening screws loose	Tighten the fastening screws correctly
Running noises	Revolving parts dragging	Determine and remedy cause
	Bearing damage	Contact the STOBER Service department
Sporadic failure of the motor	Cable break	Replace connection cable
Holding brake does not build up nominal braking torque or slips	Wear of friction surfaces	Condition the holding brake
	Contamination of the friction surfaces	Condition the holding brake
Holding brake does not open	Input voltage too high or too low	Set the correct input voltage
	Polarity of the connections reversed	Connect with the correct polarity

8.3 Repairs

Have the necessary repair work carried out on the motor by the STOBER Service Department or by STOBER service partners. Be aware that improper repairs may cause material damage and may void the manufacturer's warranty.

Only use replacement parts delivered by STOBER. Specify the type designation and serial number of the motor when ordering replacement parts. These can be found on the nameplate of the motor.

The contact data from the STOBER Service Department can be found on the last page of this documentation.

9 Removal and disposal

9.1 Removal

Remove the motor as follows:

1. Disconnect the connection cable from the motor (see chapter Electrical connection [▶ 24]).
2. Remove the power transmission elements connected to the motor shaft such as belts, chains, couplings.
3. Fasten the motor with suitable fastening elements (see the chapter Transport and storage).
4. Unscrew the screws used to mount the motor to the machine or gearbox.
5. Pull the output flange of the motor off of the machine or gearbox.
6. Transport the motor according to chapter Transport and storage.

9.2 Disposal

Dispose of the component parts of the motor according to applicable regulations and when doing so, observe the following information:

- The motor predominantly consists of stainless steel, copper, brass, plastics and permanent magnets (rare earth metal).
- The motor does not contain any hazardous materials.
- Permanent magnets must be properly demagnetized before disposal.

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10 Appendix

10.1 Further information

The documentation listed below provides you with further relevant information on STOBER motors and geared motors. The current status of the documentation can be found in our download center at:
https://www.stober.com/downloads/.
Enter the ID of the documentation in the search.

Title	Documentation	ID
cLEAN Drive (MH300) Configuration with cLEAN Motor	Manual	442806
Gearboxes Installation and Troubleshooting	Manual	442900

Additional information and sources that form the basis of this documentation or are referenced by the documentation:

Manual – Delta MH300
https://downloadcenter.deltaww.com/en-US/DownloadCenter?v=1&dataType=2&q=MH300%20Series&sort_expr=cdate&sort_dir=DESC.

11 Contact

11.1 Consultation, service and address

We would be happy to help you!

We offer a wealth of information and services to go with our products on our website:
http://www.stoeber.de/en/service

For additional or personalized information, contact our consultation and support service:
http://www.stoeber.de/en/support

If you need our system support:
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systemsupport@stoeber.de

If you need a replacement device:
Phone: +49 7231 582-1128
replace@stoeber.de

Call our 24-hour service hotline:
Phone: +49 7231 582-3000

Our address is:
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75177 Pforzheim, Germany

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If you want to contact us for a specific reason, we would be happy to receive an e-mail from you at:
documentation@stoeber.de

Thank you for your interest.
Your STOBER editorial team

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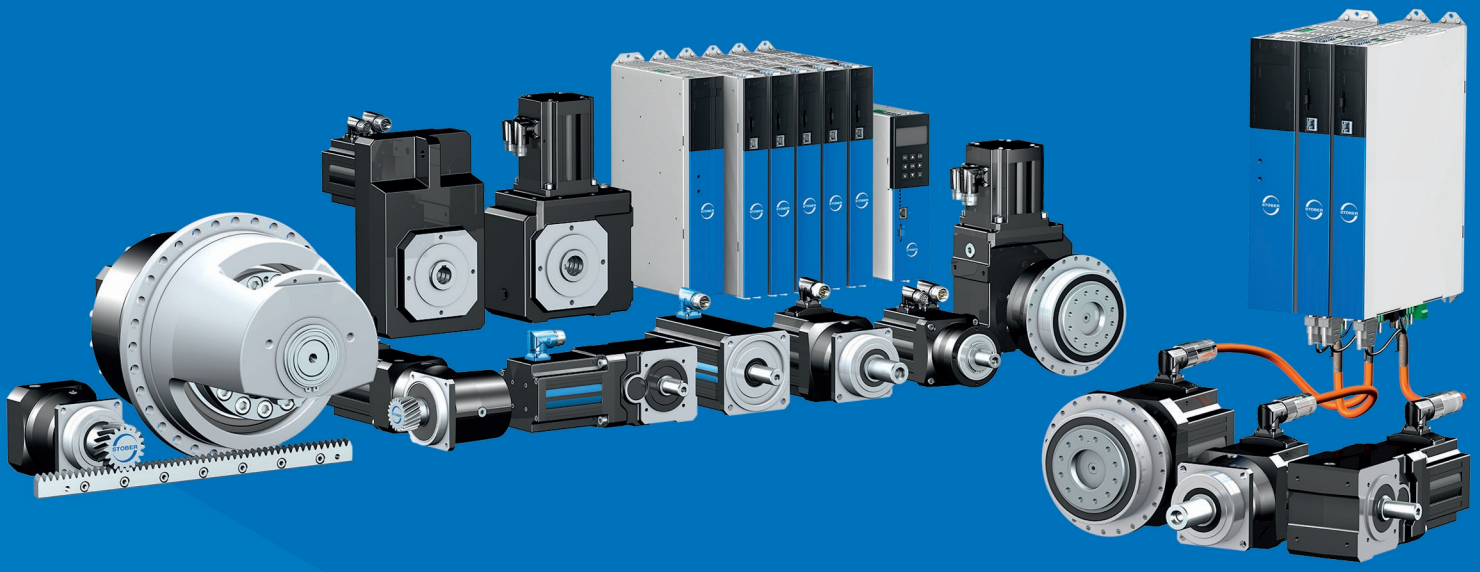

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