

Operating manual

Asynchronous Motors



This operating manual contains information on the transport, installation and commissioning of STÖBER asynchronous motors as components of the STÖBER MGS system (modular gear system); see the current MGS catalog.

In the event of any unclear points, we recommend that you contact STÖBER with the model designation and serial number, or have the installation and maintenance work carried out by a STÖBER service partner.

1 Operation in accordance with its intended use

The motors may be used only for the operation of machinery and equipment, and under certain conditions also in combination with frequency converters. It is necessary to comply with the mechanical and electrical limits defined by the technical data. The motors may not be used in explosive atmospheres. If the motors are to be used for lifting or holding loads, the machine design engineer must determine whether additional safety measures are necessary.

On grounds of operational safety, the motors may be used only for the purpose for which they were configured (see configuration aids in the STÖBER catalogs). Any overload to the drives is deemed non-intended use.

The fulfillment of any warranty claims requires exact compliance with the information and instructions in this operating manual. Modifications to the motors will void the warranty.

Observe the safety and hazard information in this operating manual and all supplementary documents on motors and other components, such as gear units and drive controllers!

2 Technical data

The technical data for the motors or geared motors and the drive controllers used is specified on the respective rating plates. Further technical data and dimensional drawings can be found in the resp. catalog. The relevant standards and regulations are listed in the EC Declaration of Conformity, ID 441454. A delivery based on special regulations (e.g. classification regulations, regulations for explosion protection) is possible.

Acceleration / shock load in operation:

The following value for the shock load indicates the value up to which the motor can be operated without loss of functionality: 50 m/s² (5 g), 6 ms (maximum value as per DIN EN 60068-2-27).

Brace the motor connection cable close to the motor so that vibrations of the cable are not transferred to the motor.

When connecting the motors to drive units such as gear units or pumps, take into consideration the permissible shock loads and tilting torques of the units.



Information

If brakes are installed, the holding torques may be reduced by the shock load!

2.1 Protection type

The protection type for the motors is specified on the rating plate. Auxiliary equipment that is connected may have a different protection type than the motor. Please take this into account when installing the motors.

Motors installed outdoors must be protected against direct exposure to weather conditions. (e.g. freezing of the fan through direct exposure to rain, snow and ice).

2.2 Designs

The design of the motor is specified in the order confirmation. Take measures to prevent foreign objects from falling into the fan cover, especially in case of mounting positions with a perpendicular shaft.

2.3 Thermal winding protection

STÖBER asynchronous motors can be equipped with thermal winding protection on request. Note the information in the MGS catalog!

For PTC thermistors, the regulations of DIN 44081 and DIN 44082 apply, in addition to the instructions of the manufacturers of triggering devices used. The thermistor is a low-voltage sensor with a maximum supply voltage of 7.5 VDC. Higher voltages will destroy the thermistor and the motor winding.




CAUTION!
Overheating of the motor!

If the thermal winding protection is not connected, the motor may overheat as a result.

Possible consequences: destruction of the motor, danger of fire.

- ▶ You must also take precautions to ensure that no hazard could occur after the thermal winding protection has responded and the motor has then cooled off by unintentional automatic switching on of the motor again!

Always connect to the thermal winding protection. If the thermal winding protection is not connected, the warranty is rendered void!

2.4 Encoder systems

Incremental encoders and multi-turn absolute encoders (SSI) are connected via separately attached plug connectors.

For the pin configuration, see the motor connection diagram. Further information can be found in the operating manual for the incremental encoder. Further information on multi-turn absolute encoders can be found in the Heidenhain operating manual.

NOTICE

This product contains components that can be damaged or destroyed by electrostatic discharges.

- ▶ Do not touch the pin contacts with your fingers!

2.5 Brake

The brake operates according to the closed-circuit principle: interruption of the circuit results in braking, and closing the circuit releases the rotors. The rectifier located in the terminal box (model 160 and higher) or in the switch cabinet is connected with the excitation coil of the brake on the DC side. Depending on the number of circuits in the brake, the working air gap must be checked regularly and adjusted, if necessary. See the separate operating manual "Asynchronous motor brakes". When the brake lining has worn down to the minimum thickness, it is no longer possible to adjust the air gap and the brake has to be replaced.

Always keep brake linings and friction surfaces free of grease and oil.


CAUTION!

Check the function of the brake before operating the motor!

2.6 External cooling

External cooling is optional and can be retrofitted, due to the modular design, so that drive units can be optimized at a later time. For technical data, see the rating plate and catalog.

NOTICE

Lack of cooling, for example due to accumulation of dirt or a breakdown of the fan, causes overheating of the motor, which can damage or destroy the winding.

- ▶ Therefore, check the function of the external fan during commissioning and at regular intervals thereafter.

2.7 Motors with integrated drive controller (e.g. compact drives VEM300)

Power connection: Always use a 4-wire, shielded cable for connection to the power supply. This cable must have the correct dimension, with the following specification: copper wire, class 1, 75 °C.

In addition, the operating manuals / technical documentation for the respective drive controller and their options apply.

3 Safety information

In addition to the information in this operating manual, you must also comply with the applicable national, local and facility-specific regulations.


WARNING!

- Danger of electrical shock if unpainted parts conducting voltage are touched.

- Moving and rotating parts can cause injuries

- Touching the gear unit and motor housing may cause burns (surface temperatures of over 100°C are possible)

- ▶ The machine manufacturer must provide suitable protective measures. The connector or terminal box cover of the motor must remain closed during operation. All work on the drive must only be performed when no current is present.

3.1 Personnel requirements

All work on the electrical equipment of the drive units must be performed by qualified electricians. Installation, maintenance and repairs of mechanical parts must be performed by fitters, industrial mechanics or persons with comparable qualifications.



3.2 In the event of disruptions

NOTICE

Changes compared to normal operation indicate that the function has been impaired. This includes:

- Higher power consumption, temperatures or vibrations
- unusual noises or odors
- Leaks on the gear unit
- Monitoring devices responding

- ▶ If any of these occur shut down the machine as quickly as possible and notify the responsible qualified specialist without delay.

3.3 Safety during installation and maintenance

NOTICE

Damage to the motor.

- ▶ Prevent undue force on the motor such as impact, shock, pressure or high acceleration.

Before switching on the motor, ensure that

- all safety regulations are observed
- the machine is properly installed and aligned
- all mounting parts and earthing connections are tight
- the auxiliary and supplementary devices are functioning and correctly connected
- the fitting keys of a second shaft end are secured against spinning off

If the motor is disconnected from the power supply or drive controller for maintenance, take special care to ensure that any auxiliary power circuits (e. g. stand-by heaters, external fans, brakes) are also disconnected from the power supply.

If it is necessary to dismantle the motor for maintenance

- remove the sealing compound on the centering shoulders
- use a suitable motor sealing compound (e.g. Curil T) during assembly
- replace existing copper gaskets with new ones and always make sure not to omit them

3.4 Safe function and EMC of the drive system

The motors were checked as dependant components for conformity with the EMC standards. Ensure that machines or equipment as a whole comply with the relevant standards for electromagnetic compatibility.

The motor, cables and drive controllers, if applicable, must be matched. Each product has its own electrical properties that affect the other components. If not properly matched, excessive voltage peaks can occur in the motor and drive controller, resulting in destruction of the motor and malfunction of the system. Furthermore, the statutory regulations for EMC (electromagnetic compatibility) must be observed.

In order to ensure this compliance, STÖBER offers matched cables with suitable shielding technology and cable construction for the power connection and the various encoder systems.

The use of other connecting cables or drive controllers can void the warranty.

4 Transport, storage and preservation

The motors must not be exposed to acceleration levels or working times of more than 300 m/s² (30 g) as an individual shock load during transport as per EN 60 068-2-27. The values for operation apply to long-term shock loads.

When transporting the motors make certain not to damage the shafts and bearings with impacts.

The motors may only be stored in enclosed, dry rooms. Storage in open air areas with a roof is only permitted for brief periods. Protect the motors from all damaging environmental effects and mechanical damage.

Avoid extreme temperature fluctuations with high relative humidity when the motors are being stored temporarily to prevent formation of water from condensation. If long-term storage is planned, protect the bare parts of the motor against corrosion. Before placing a motor in operation again, have the winding checked for its insulation resistance by an electrical specialist.

Do not use the fan cover for transport or storage of the motors. For transport, use the eyebolts on the motors, together with suitable slings.

Eyebolts are provided only for lifting the motor without additional attachments. When you remove the eyebolts after installation, the threaded holes must be permanently closed corresponding to the protection type of the motors.

4.1 Removing the transport safeguard

- For motors with a transport safeguard (roller bearing), loosen the hexagon bolt securing the transport safeguard and remove it together with the transport safeguard.
- Then screw the bearing cap bolt (packed in a bag in the terminal box) into the bearing cap.

For some motors, a lock washer is included in the bag:

- Insert the washer on the bearing cap bolt before inserting the bolt.

5 Mounting

Completely remove all corrosion protection on the shaft ends prior to installation.

NOTICE

The lip seals of the shaft seal rings can be damaged by the use of solvents.

- ▶ When removing the corrosion protection, make sure that the lip seals of the shaft seal rings do not come into contact with solvents.

Do not fasten or allow contact of temperature-sensitive parts to the motors.

For models IMB14 and IMB34, do not exceed the following maximum screw-in depth (otherwise, the winding will be damaged!):

Size	max. screw-in depth IMB14/34 [mm]	min. clearance for cooling air [mm]
63	6.5	14
71	7.0	14
80	8.0	16
90	10.0	16
100	10.0	20
112	10.0	20
132	-	35
160	-	35
180	-	35
200	-	35
225	-	40

Keep the ventilation openings free and maintain the specified minimum clearances in order not to disrupt the flow of the cooling air (see above). Make sure that the blown-out, heated coolant is not sucked in again.

The fitting key in the shaft end is secured by the shaft sleeve only for transport and storage. Commissioning or a test run in this condition is strictly prohibited, due to the danger of the fitting key spinning out!

Use mounting tools when mounting the power transmission element (such as coupling, pinion or pulley) or heat the part to be mounted. For mounting, the shaft ends have centering devices with threaded holes according to DIN 332, Part 2.

NOTICE

Damage to the bearing race.

- ▶ Avoid all impacts to the output shafts.

Carefully balance all elements to be mounted on the shaft end, corresponding to the balancing system of the motor (whole or half fitting key). The rotors of the motors are balanced with half fitting keys.

If directly coupled with the driven machine, make sure to align the components exactly. The axes of both machines must be aligned. Adjust the shaft center height by shimming the driven machine.

The relatively high radial forces of belt drives strain the motor. When dimensioning belt drives, do not exceed our specifications for the maximum radial force through belt pull and pre-tension on the shaft end of the motor (note maximum forces in the catalog). (Also observe the regulations and calculation programs of the belt manufacturers). During installation, set the belt tension exactly according to the specifications of the belt manufacturer.

5.1 Draining condensation water

Always position the condensation water openings at the lowest point of the motor.

In installation locations where condensation water in the interior of the motor is to be expected, it must be ensured that the liquid can drain unhindered.

The protection type can be limited by the permanently open condensation water holes. However, this will not affect the function of the motor.

NOTE: If motors are designed with closed condensation water holes, they have to be opened occasionally to allow drainage of any condensation water that has accumulated!

6 Commissioning

Electrical connections provided by the customer must comply with applicable regulations.

Note:

The electrical connection diagram and safety regulations are with the delivery documents of the motor. Comply exactly with the information and safety regulations therein.



WARNING!

Danger of injury from moving parts.

Before commissioning the drive unit, ensure that...

- ▶ no one will be endangered by startup of the machine.
- ▶ all protective guards and safety equipment have been properly installed, also for a test run!
- ▶ the drive unit is not blocked.
- ▶ the brakes have been bled.
- ▶ the direction of rotation is correct.
- ▶ components mounted on the power take-off end are sufficiently secured against centrifugal force (e.g. fitting keys, coupling elements, etc.)

First compare the voltage and frequency of the mains power supply with the data on the rating plate of the motor. Adapt the dimensions of the connecting wires to the rated currents of the motor.

The designation of the connecting points of the motor corresponds to DIN EN 60034, Part 8. For the connection of auxiliary and protective devices (e.g. stand-by heating), an additional terminal box can be provided, for which the same regulations apply as for the main terminal box.

Operate the motors with overcurrent protection that is set according to the rated data of the motor. Otherwise, damage to the winding will not be covered by the warranty. Check the motor for the correct direction of rotation. If the power connections with the phase sequence L1, L2 and L3 are connected to the connecting points U, V, W, the motor will rotate clockwise when looking at the end of the shaft. You can change the direction of rotation by switching the connections of 2 phases. The maximum torques for the terminal board bolts are listed in the following table:



Terminal board	Connecting bolts thread	max. torque [Nm]
16 A	M4	1,2 +0,5
25 A	M5	2,5 ±0,5
63 A	M6	4,0 ±1
100 A	M8	7,5 ±1,5

Before closing the terminal box, always make sure that

- connections correspond to the wiring diagram
- all terminal box connections are tight
- all minimum values for the air gaps have been maintained (> 8 mm up to 500 V, > 14 mm up to 1000 V)
- the inside of the terminal box is clean and free of foreign objects
- unused cable entries are closed and the plug screws with gasket are tight
- the gasket in the terminal box lid is clean and tight.

6.1 Insulation inspection and replacement of grease/bearings

During the first commissioning and especially after extended storage, measure the insulation resistance of the winding to ground and between the phases. The maximum applied voltage is 500 V. Dangerous voltages occur at the terminals during and directly after the measurement. Never touch the terminals. Consult the operating manual of the insulation measuring instrument!

Maintain the following minimum values, based on the rated voltage U_N at a winding temperature of 25 °C:

Rated power P_N [kW]	Insulation resistance in relation to rated voltage kΩ/V
$1 < P_N \leq 10$	6,3
$10 < P_N \leq 100$	4,0
$100 < P_N$	2,5

Dry the winding properly if the values fall below the minimum values, until the insulation resistance corresponds to the required value. The motors are equipped with sealed bearings. Replace the bearings with new ones of the same type after a storage period of four years.

7 Maintenance

7.1 Bearings, lubrication and seal

The roller bearings of the standard motors are lubricated at the factory, those with covered bearings by the bearing manufacturer, using roller bearing grease.

If the bearings need to be replaced due to wear, use only replacement bearings of the quality specified by the motor manufacturer.

Motors for MGS gear units are equipped with an FKM shaft seal ring. If replacement is necessary, the bearing surface of the shaft must be inspected and, if necessary, polished smooth. Use only sealing rings from the motor manufacturer.

7.2 Cleaning

Clean all parts of the motor regularly in order to maximize the effect of the cooling air. Usually it is sufficient to blow out the motor with compressed air that is free of water or oil. Especially the ventilation openings and spaces between the fins should be kept clean. We recommend that the electric motors be included in regular inspections of the driven machine.

8 Troubleshooting

In the event of a malfunction of the drive unit, call the STÖBER service department at 07231 582-1190 (-1191, -1224, -1225) in order to locate the nearest STÖBER service partner for further action.

In urgent cases outside of normal business hours, you can call the STÖBER 24-hour service hotline at 01805 786323 / 01805 STOEBER

9 Spare parts

Include the following when ordering replacement parts:

- item no. of the part according to the replacement parts list
- model designation according to the rating plate
- serial number according to rating plate

You can reach the STÖBER replacement parts service by phone: 07231 582-1190 (-1191, -1224, -1225), or fax: 07231 582-1010.

Important notice: The replacement parts lists are not assembly instructions! They are not binding for assembly of the gear unit. Use only original replacement parts from Stöber. Otherwise we will provide no guarantee and will assume no liability for resulting damages!

10 Disposal

This product contains recyclable materials. Observe local applicable regulations for disposal.