1FT7 Synchronous Motors

Operating Instructions · 09/2009

SIEMENS

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1FT7 synchronous motors

Operating Instructions

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09/2009
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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠DANGER
indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠WARNING
indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠CAUTION
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE
indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation for the specific task, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be adhered to. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of the Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction 1

1.1 About these operating instructions

These operating instructions describe the motor and explain how to handle the motor from the delivery to the disposal stage.

Before you start using the motor, you must read these operating instructions to ensure safe, problem-free operation and to maximize the service life.

These operating instructions complement the relevant SIEMENS configuration manual.

Siemens strives continually to improve the quality of information provided in these operating instructions. If you find any mistakes or would like to offer suggestions about how this document could be improved, please contact the Siemens Service Center.

Always follow the safety instructions and notices in these operating instructions. The warning notice system is explained on the rear of the inside front.

Text format features

In addition to the safety-related notices and instructions which you must read, you will find the text in these operating instructions is formatted in the following way:

1. Handling instructions are always formatted as a numbered list. Always perform the steps in the order given.

- Lists are formatted as bulletted lists.
  - Lists on the second level are hyphenated.

Note

A Note is an important item of information about the product, handling of the product or the relevant section of the document. Notes provide you with help or further suggestions/ideas.

Safety information 2

2.1 General safety information

Safety and commissioning information for converter-fed low-voltage three-phase motors

⚠ DANGER
All activities associated with transporting, connecting, commissioning, and maintaining the motors must be carried out by properly trained, responsible personnel (DIN EN 50110-1; note IEC 60364). Failure to follow proper procedures may result in injury or material damage.

Special versions and construction variants may differ with respect to certain technical aspects. If in doubt, you are strongly advised to contact the manufacturer, specifying the type designation and serial number (see rating plate), or arrange for any maintenance work to be carried out by the SIEMENS Service Center.

Systems and machines with converter-fed low-voltage three-phase motors must fulfill the protective requirements of the EMC Directive.

The machine manufacturer is responsible for ensuring that installation is carried out properly. The signal and power cables to the motor must be shielded.

The information provided by the converter manufacturer regarding EMC-compliant installation must be observed.

Proper usage

These motors are designed for use in industrial or commercial systems. They comply with the EN 60034-1 standards and the relevant associated sections.

⚠ WARNING
It is forbidden to install them in hazardous areas unless they are explicitly designed for this.

If more stringent requirements are necessary in special cases (e.g. shock-hazard protection in non-commercial applications where children are likely to be present), the customer must implement the relevant measures to ensure that these requirements are fulfilled.

Any alternative requirements specified on the rating plate must be taken into account. The on-site conditions must comply with the rating plate specifications.

The motors are designed for use in sheltered areas under normal climatic conditions, such as those found in production halls.

2.2 Safety and operating instructions

The safe use of electrical machines

⚠ WARNING

Rotating or live parts

Rotating or live parts are dangerous.

Fatal or severe injuries and substantial material damage can occur if the required covers are removed or if the machines are not handled, operated, or maintained properly.

Covers must only be removed and the motor operated in accordance with the relevant regulations. The motor must be maintained on a regular basis.

Qualified personnel

These operating instructions only contain the information necessary for ensuring that the motor is operated by properly trained personnel in accordance with its intended purpose.

Those responsible for plant safety must ensure the following:

- The basic planning work for the system and all work relating to transportation, assembly, installation, commissioning, maintenance and repairs is carried out by qualified personnel and checked by responsible, suitably skilled personnel.
- The operating instructions and the motor documentation are available at all times.
- The technical data and specifications relating to installation, connection, ambient and operating conditions are taken into account at all times.
- The system-specific installation and safety regulations are observed.
- Personal protective equipment is used.
- Unqualified persons must not work on or in the vicinity of these motors at any time.
- If the motors are used outside industrial areas, the installation site must be protected against unauthorized access by means of suitable protection facilities (e.g. safety fences and warning signs).

Note

Siemens Service Center

You are advised to contact your nearest Siemens Service Center to request their services and support for maintenance activities.

Observing the five safety rules

For your personal safety and to prevent material damage when working on the machine, always observe the safety instructions and the following five safety rules. Apply the five safety rules in the order stated before starting work on the machine.

1. Disconnect the system

   You must also make sure that the auxiliary circuits are disconnected too.
2. Protect against reconnection
3. Make sure that the equipment is de-energized
4. Ground and short-circuit
5. Cover or enclose adjacent components that are still live

When work has been completed, remove/cancel these measures in reverse order.

Thermal hazard

⚠ CAUTION

The surface temperature of the motors can exceed 100 °C.

Do not touch hot surfaces.

Temperature-sensitive components (electric cables and/or electronic components) must not be placed on hot surfaces. If the motors overheat, this can destroy the windings/bearings and the permanent magnets may become demagnetized.

Only operate the motors in conjunction with effective temperature control.

Information about electromagnetic fields

⚠ WARNING

Electromagnetic fields

Electromagnetic fields are generated by the operation of electrical power engineering installations such as transformers, drives, or motors.

Electromagnetic fields can interfere with electronic devices, causing them to malfunction. For example, the operation of heart pacemakers can be impaired, potentially leading to personal harm or even death. It is therefore forbidden for persons with heart pacemakers to enter these areas.

The plant operator is responsible for taking appropriate measures (labels and hazard warnings) to adequately protect operating personnel and others against any possible risk.

- Observe the relevant nationally applicable health and safety regulations. In Germany, "electromagnetic fields" are subject to regulations BGV B11 and BGR B11 stipulated by the German statutory industrial accident insurance institution.
- Display adequate hazard warning notices.
- Place barriers around hazardous areas.
- Take measures, by using shields, for example, to reduce electromagnetic fields at their source.

Description

3

3.1 Product description

1FT7 synchronous motors are permanent-magnet-excited motors with compact dimensions and a rugged construction. Their design supports easy mounting.

With full digital control for drive systems and encoder technology, they meet the most stringent requirements in terms of dynamic response, speed setting range, radial eccentricity, and positioning accuracy. The motors are designed for use with high-performance machine tools and machines with high requirements as regards dynamic response and precision (e.g. packaging and printing machines).

3.2 Technical features

Table 3- 1 Technical features

Motor type	Permanent-magnet synchronous motor
Magnet material	Rare-earth magnetic material
Insulation of the stator winding according to EN 60034–1 (IEC 60034–1)	Temperature class 155 (F) for a winding overtemperature of ΔT = 100 K at an ambient temperature of +40 °C (naturally cooled) or a coolant temperature of +30 °C (liquid-cooled)
Cooling	Natural cooling, forced ventilation, and liquid cooling
Installation altitude according to EN 60034–1 (IEC 60034–1)	≤ 1000 m above sea level, otherwise power derating
Type of construction according to EN 60034–7 (IEC 60034–7)	IM B5 (IM V1, IM V3)
Degree of protection according to EN60034–5 (IEC 60034–5)	IP65
Temperature monitoring in accordance with EN 60034-11 (IEC 60034-11)	KTY 84 temperature sensor in stator winding
Paint finish	Pearl dark gray (similar to RAL 9023)
Drive shaft end according to DIN 748-3 (IEC 60072-1)	Smooth shaft (without keyway)
Radial eccentricity, concentricity, and axial eccentricity acc. to DIN 42955 (IEC 60072-1)	Tolerance N (normal)
Vibration severity grade according to EN 60034–14 (IEC 60034–14)	Grade A is observed up to rated speed
Sound pressure level acc. to DIN EN ISO 1680 Tolerance + 3 dB(A)	Natural cooling: 1FT703□ to 1FT706□: 65 dB(A) 1FT708□ to 1FT710□: 70 dB(A) Forced ventilation: 73 dB(A) Water cooling: 1FT706□: 65 dB(A) 1FT708□ to 1FT710□: 70 dB(A)
Built-in encoder system for motors without DRIVE-CLiQ interface	• Incremental encoder, sin/cos 1 Vpp, 2,048 S/R [1)] with C and D track (encoder IC2048S/R) • Absolute encoder, 2,048 S/R [1)] singleturn, 4096 revolutions multiturn, with EnDat interface (encoder AM2048S/R)
Built-in encoder system for motors with DRIVE-CLiQ interface	• Incremental encoder, 22-bit (resolution 4,194,304, internal encoder 2,048 S/R [1)]) + commutation position, 11-bit (encoder IC22DQ) • Absolute encoder, 22-bit, singleturn (resolution 4,194,304, internal encoder 2,048 S/R [1)]) + 12-bit multiturn (traversing range: 4,096 revolutions) (AM22DQ)

Connection	Connectors for signals and power, can be rotated
Options	• Flange 1 (compatible with 1FT6) • Drive shaft end with feather key and keyway (half-key balancing) • Integrated holding brake • Degree of protection IP64, IP67 • Sealing air connection (only in conjunction with IP67) • Vibration severity grade R • Radial eccentricity, concentricity and axial eccentricity: Tolerance R • Planetary gearbox, built-on

[1] S/R = Signals/revolution

3.3 Rating plate

The rating plate contains the technical data relevant to the motor. A 2nd rating plate is enclosed with the motor when it is supplied.

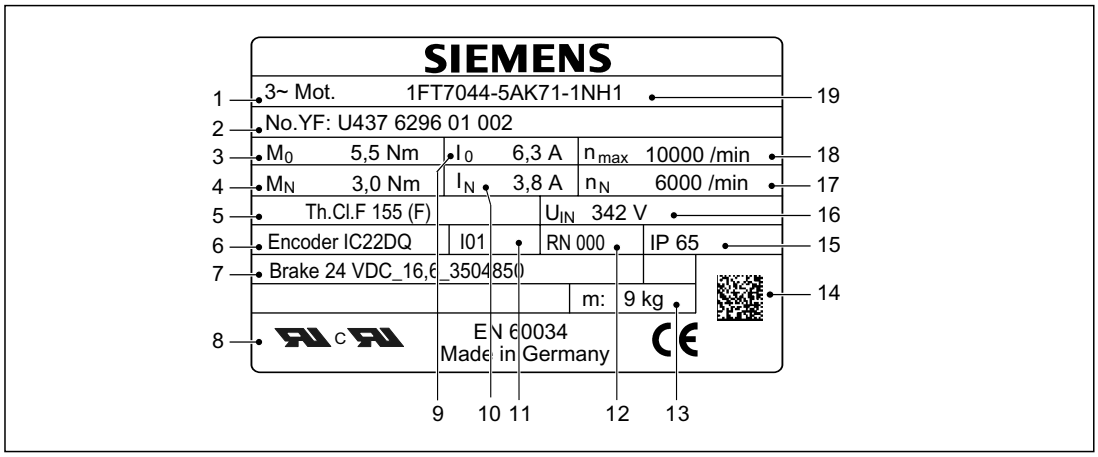


Figure 3-1 Schematic layout of rating plate

Table 3- 2 Description of the rating plate data

Position	Description / Technical data
1	Motor type: Synchronous motors
2	ID no., serial number
3	Stall torque M_0 [Nm]
4	Rated torque M_N [Nm]
5	Temperature class
6	Code, encoder type
7	Holding brake data: Typical, voltage, power consumption
8	Standards and regulations
9	Stall current I_0 [A]
10	Rated current I_N [A]
11	Encoder version
12	Motor version
13	Motor weight m [kg]
14	2D code
15	Degree of protection
16	Induced voltage at rated speed V_{IN} [V]
17	Rated speed n_N [rpm]
18	Maximum speed n_{max} [rpm]
19	SIEMENS motor type/order number

3.4 Structure

3.4.1 Regulations

The motors comply with the following regulations acc. to IEC/EN 60034:

Table 3- 3 Regulations that have been applied

Characteristic	Standard
Dimensions and operating performance	IEC/EN 60034-1
Degree of protection (1)	IEC/EN 60034-5
Type of construction (1)	IEC/EN 60034-7
Terminal markings	IEC/EN 60034-8
Noise emission	IEC/EN 60034-9
Temperature monitoring	IEC/EN 60034-11
Vibration severity grades	IEC/EN 60034-14
(1) The degree of protection and type of construction of the motor are stamped on its rating plate.	

The three-phase motors comply with the relevant sections of EN 60034 and EN 60204-1. Three-phase motors comply with Low-Voltage Directive 2006/95/EC. Motors which have "UR" stamped on their rating plates comply with UL regulations.

Low-voltage motors are components designed for installation in machines in accordance with the Machinery Directive. They must not be commissioned until it has been verified that the end product complies with this directive (also take EN 60204-1 into account).

Note

Make sure that your end product is in compliance with all of the applicable legislation! The applicable national, local, and system-specific regulations and requirements must be taken into account.

3.4.2 Types of construction

The motor is designed as an IM B5 (IM V1, IM V3) type of construction.

3.4.3 Degree of protection

1FT7 motors can be designed to give IP64, IP65, or IP67 degree of protection. The degree of protection of the motor is specified on the rating plate.

The fans for forced-ventilation motors are designed to give IP54 degree of protection.

3.4.4 Environmental conditions

The following temperature ranges apply for natural-cooled and forced-ventilation motors.

- Permissible temperature range during operation: T = -15 °C to +40 °C
- Permissible temperature range during storage: T = -20 °C to +70 °C

For deviating conditions (ambient temperature > 40 °C or installation altitude > 1,000 m above sea level) the permissible torque/power must be derived from the table below. Ambient temperatures and installation altitudes are rounded-off to 5 °C or 500 m respectively.

Table 3- 4 Power derating as a function of the installation altitude and ambient temperature

Installation altitude above sea level [m]	Ambient temperature in °C				
	< 30	30 - 40	45	50	55
1,000	1.07	1.00	0.96	0.92	0.87
1,500	1.04	0.97	0.93	0.89	0.84
2,000	1.00	0.94	0.90	0.86	0.82
2,500	0.96	0.90	0.86	0.83	0.78
3,000	0.92	0.86	0.82	0.79	0.75
3,500	0.88	0.82	0.79	0.75	0.71
4,000	0.82	0.77	0.74	0.71	0.67

3.4.5 Cooling

Natural cooling

The rated data only applies when the ambient temperature does not exceed 40 °C (104 °F) as a result of the installation conditions.

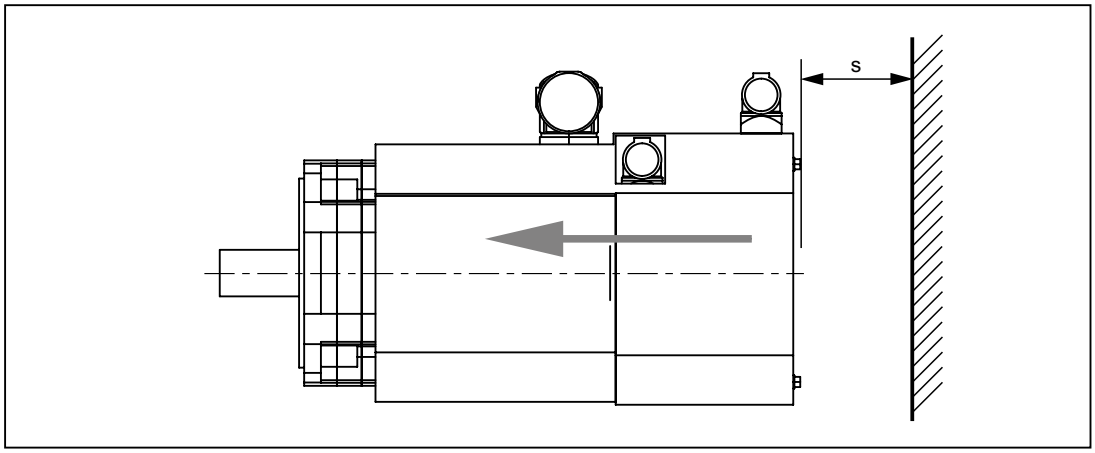
To ensure sufficient cooling, a minimum clearance of 100 mm from adjacent components must be observed on three sides.

Forced ventilation

This cooling method is implemented by means of a separate ventilation module equipped with a ventilator that operates independently of the motor. The fan is available with degree of protection IP54.

NOTICE
Steps must be taken to ensure that the motor is always operated in conjunction with the separately driven fan.

The motors must be arranged in such a way that the cooling air can flow in and out without obstruction and that the minimum clearance s between the inlet/outlet air openings and adjacent components is maintained (see "Minimum clearance" diagram below).



s A minimum clearance of 30 mm applies for AH 63 and AH 80.
A minimum clearance of 50 mm applies for AH 100.

Figure 3-2 Minimum clearance s

Steps must be taken to ensure that hot outlet air cannot be drawn back into the system. The direction of air flow is from the non-drive end (NDE) to the drive end (DE). The fan may only be operated with normal ambient air, as air containing chemical or conductive impurities could cause the fan to fail prematurely. Deposits from contaminated air could result in poor heat transfer at the motor or could cause the cooling-air duct to become clogged, leading to an overheated motor.

⚠ WARNING
Danger of being drawn into the machine
There is a danger of being drawn into the machine (by means of hair, ties, loose items, etc.) at the air inlet. Suitable protective measures must be taken to guard against this: wear a hairnet, take off ties, keep clear of the intake area, etc.

Water cooling

The motor can only be operated in a closed cooling-water circuit with a cooling unit. The motor is connected to the cooling circuit by means of two female threads at the rear of the motor. The inlet and outlet connections can be freely selected.

Table 3- 5 Technical data relating to water cooling

Cooling water connection		G1/4"
Cooling water flow	1FT706x	3 l/min
	1FT708x	4 l/min
	1FT710x	5 l/min
Max. pressure at inlet		Max. 6 bar
Pressure drop between inlet and outlet	1FT706x	< 0.3 bar for minimum cooling water flow
	1FT708x	< 0.3 bar for minimum cooling water flow
	1FT710x	< 0.25 bar for minimum cooling water flow
Minimum cooling water inlet temperature		$T_{cooling} > T_{ambient} - 5$ K
Maximum cooling water inlet temperature		< 30 °C, higher values will cause derating

Only water with an appropriate quantity of additives to protect against corrosion and minimize the growth of algae can be used as a coolant. Other coolants (e.g. cooling-lubricating medium, water-oil mixtures with 10% oil and higher) may result in derating.

If there is a risk of frost, preventive measures must be taken during operation, storage, and transportation (anti-freeze, emptying the cooling circuit and blowing it out with air, etc.). Use and concentration of the anti-freeze according to information provided by the manufacturer. Different anti-freeze agents should not be mixed.

A filter (100 µm) must be installed in the inlet pipe to protect the motor against contamination. Pipes and valves can be made out of brass, stainless steel, or plastic. However, if different materials are used in close proximity to one another, then the insulation rating must be taken into account, which is why zinc must not be used in cooling circuits.

If a restrictor is needed to limit the flow of coolant, it is best to install it downstream of the motor. It must not be installed directly in front of the inlet because the effects of cavitation may damage the motor.

The values specified for the cooling water correspond to the requirements for a closed cooling circuit. Not all of the specified concentrations will occur in the cooling water at the same time.

Table 3- 6 Water specifications for coolant

	Quality of the water used as coolant for motors with aluminum, stainless steel tubes + cast iron or steel jacket
Chloride ions	< 40 ppm, can be achieved by adding deionized water.
Sulfate ions	< 50 ppm
Nitrate ions	< 50 ppm
pH value	6 to 9 (for aluminum 6 to 8)
Electrical conductivity	< 500 µS/cm
Total hardness	< 170 ppm

Note

It is recommended to use deionized water with reduced conductivity (5 to 10 µS/cm) (if necessary, ask the water utility for the values). According to Directive 98/83/EC, drinking water may contain up to 2,500 ppm of chloride!

Manufacturers of chemical additives can provide support when analyzing the water that is available on the plant side.

Table 3- 7 Coolant quality

	Coolant quality
Cooling water	According to the table "Water specifications for cooling water"
Corrosion protection	0.2 to 0.25% inhibitor, Nalco TRAC100 (previously 0GE056)
Anti-freeze protection	When required, 20 - 30% Antifrogen N (from the Clariant company)
Dissolved solids	< 340 ppm
Size of entrained particles	< 100 µm

Note

The inhibitor is not required if it is ensured that the concentration of Antifrogen N is > 20%.

Derating is not required for an anti-freeze protection component < 30%.

NOTICE

Storing or transporting the motor

The cooling circuit must be emptied when storing the motor, when the motor is out of service for a long period, and when the motor is being transported.

3.4.6 Noise emission

When operated in the speed range 0 to rated speed, 1FT7 motors can reach the following measuring-surface sound pressure level Lp(A):

Table 3- 8 Sound pressure level

Cooling method	Shaft height	Measuring-surface sound pressure level Lp(A)
Natural cooled	1FT703 to 1FT706 1FT708 to 1FT710	65 dB(A) + 3 dB tolerance 70 dB(A) + 3 dB tolerance
Forced ventilation	1FT706 to 1FT710	73 dB(A) + 3 dB tolerance
Water cooled	1FT706 1FT708 to 1FT710	65 dB(A) + 3 dB tolerance 70 dB(A) + 3 dB tolerance

The motors are certified for a wide range of installation and operating conditions. These conditions, such as rigid or vibration-isolated foundation design, influence noise emission, sometimes significantly.

Preparations for use

4

4.1 Shipment and packaging

Checking the delivery for completeness

The drive systems are assembled on an individual basis. Upon receipt of the delivery, check immediately whether the items delivered are in accordance with the accompanying documents. Siemens will not accept any claims relating to items missing from the delivery and which are submitted at a later date.

- Report any apparent transport damage to the delivery agent immediately.
- Report any apparent defects/missing components to the appropriate Siemens office immediately.

A second rating plate is included in the scope of delivery and can be positioned in the vicinity of the motor as an additional means of making the motor data available.

4.2 Transportation and storage

4.2.1 Transporting

Use suitable load suspension devices when transporting and installing the motor. Country-specific regulations must be observed.

If the motor is not to be commissioned immediately following delivery, it must be stored in a dry, dust-free room that is not susceptible to vibration (see the chapter titled "Storage").

⚠ WARNING

Hazards when lifting and transporting!

Devices and tools that are badly designed, unsuitable, or damaged can result in personal injury and/or material damage.

Lifting devices, ground conveyors, and load suspension devices must comply with regulations. Pay attention to the maximum capacity of the hoisting gear. Do not attach any additional loads. To lift the motor, use suitable cable-guidance or spreading equipment (particularly if additional components are mounted in or on the motor). The weight of the motor is specified on the rating plate.

⚠ WARNING

Transporting and lifting the motor by means of the lifting eyebolts

Only lift the motor using the lifting eyebolts on the end shields. Lifting eyebolts must not be attached to the shaft extension. The motor must not be lifted or transported by means of the power connector, signal connector, or Sensor Module.

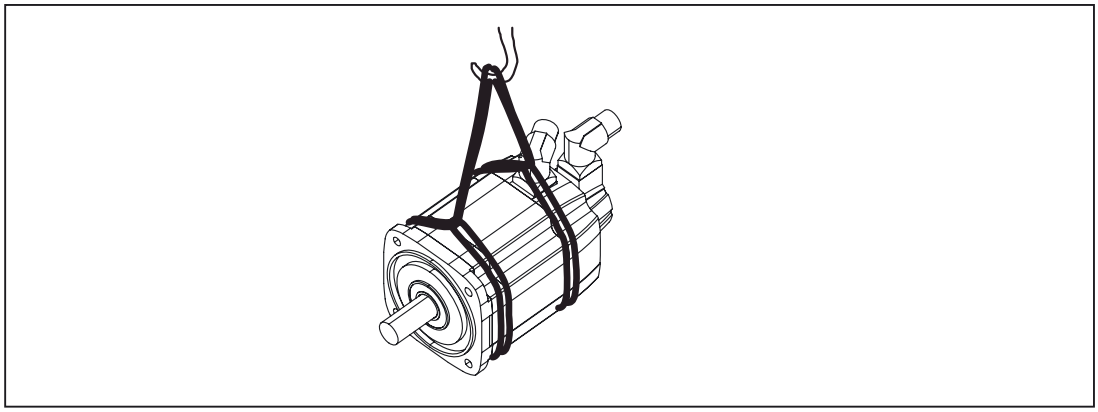


Figure 4-1 Lifting and transporting the motor with suspension bands

4.2.2 Storing

The motors should be stored indoors in dry, dust-free rooms that are not susceptible to vibration (v_{rms} < 0.2 mm/s). The motors should not be stored for longer than two years at room temperature (+5 °C to +40 °C) to maintain the service life of the grease.

CAUTION
Bearing damage when the motor is not operational If the motors are stored incorrectly there is a risk of bearing damage such as brinelling, for example as a result of vibration.

Storing indoors

- Apply a preservation agent (e.g. Tectyl) to bare, external components (e.g. shaft extensions) if this has not already been carried out in the factory.
- Store the motor in an area that fulfills the following requirements:
  - Dry, dust-free, frost-free, and vibration-free. The relative atmospheric humidity should be less than 60% and the temperature should not drop below -15 °C (in accordance with EN 60034-1).
  - Well ventilated
  - Offers protection against extreme weather conditions
  - The air in the storage area must not contain any harmful gases.
- Protect the motor against shocks and humidity.
- Make sure that the motor is covered properly.
- Avoid contact corrosion.

Mounting

5

5.1 Installing

⚠ CAUTION

Temperature-sensitive parts

Some parts of the electrical motor enclosure can reach temperatures that exceed 100 °C. Temperature-sensitive components, e.g. cables, etc., can be damaged if they come into direct contact with the motor enclosure.

When locating temperature-sensitive components, ensure that they do not come into contact with the motor enclosure.

CAUTION

Shaft extension

When installing and mounting the motor, ensure that the shaft extension is protected against impact and pressure.

Note

Observe the technical data on the labeling plates on the motor enclosure.

The following must be taken into account when installing motors

- Observe the data on the rating plate, as well as the warning and information plates on the motor.
- Observe permissible radial and axial forces (refer to the configuration manual). Axial forces are not permitted for motors with an integrated brake.
- Check that the motors comply with the conditions (e.g. temperature, installation altitude) at the installation location.
- Their use is prohibited in hazardous zones and areas.
- Ensure that the shaft extension is completely free of any anti-corrosion protection (use a commercially available solvent).
- For natural-cooled motors, it must be ensured that thermal losses can be properly dissipated (see the chapter titled "Cooling").
- If the motor is installed vertically with the shaft extension facing up, ensure that no liquid can enter into the upper bearing.
- Screwed-in lifting eyebolts can be removed following installation.
- Ensure that the flange joint sits evenly; try to avoid warping fixing screws during tightening. Use hexagon socket head cap screws with a minimum property class of 8.8. Observe the tightening torques for the fixing screws of the motor flange.

Table 5- 1 Tightening torques

Motor	Screw DIN 7984	Washer ISO 7092 [mm]	Tightening torque for screws (not for electrical connections)
1FT703	M6	6 (d2 = 11)	8 Nm
1FT704	M6	6 (d2 = 11)	8 Nm
1FT706	M8	8 (d2 = 15)	20 Nm
1FT708	M10	10 (d2 = 18)	35 Nm
1FT710	M12	12 (d2 = 20)	60 Nm

5.2 Fitting output elements

NOTICE

Do not subject the motor's shaft and bearings to impact. Do not exceed the permissible axial and radial forces at the shaft extension, as defined in the configuration specifications. Axial forces are not permitted for motors with an integrated holding brake.

Suitable equipment (see figure) must be used when fitting and removing output elements (e.g. coupling, gear wheel, belt pulley).

- Use a threaded hole in the shaft extension.
- If necessary, heat up the output elements.
- When removing output elements, use a washer to maintain the centering in the shaft extension.
- If necessary, fully balance the motor with output elements in accordance with ISO 1940.

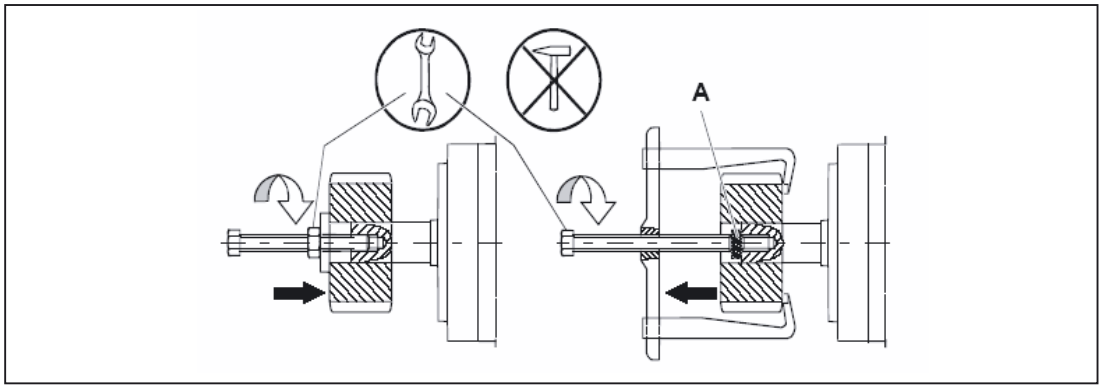


Figure 5-1 Fitting and removing output elements; A = washer (for maintaining the centering in the shaft extension)

5.3 Vibration response

Motors with a keyway are balanced with a half feather key by the manufacturer. The vibration response of the system at the location of use is influenced by output elements, any built-on parts, the alignment, the installation, and external vibrations. As a result, the motor's vibration values may change.

The motors conform to vibration severity grade A in accordance with EN 60034-14 (IEC 60034-14).

The values indicated refer only to the motor. These values can be increased at the motor due to the overall vibration characteristics of the complete system after the drive has been installed.

The vibration complies with the severity grade up to rated speed (nN).

Standard: Vibration severity grade A

Option: Vibration severity grade R (compliance with vibration severity grades A and R up to n_N)

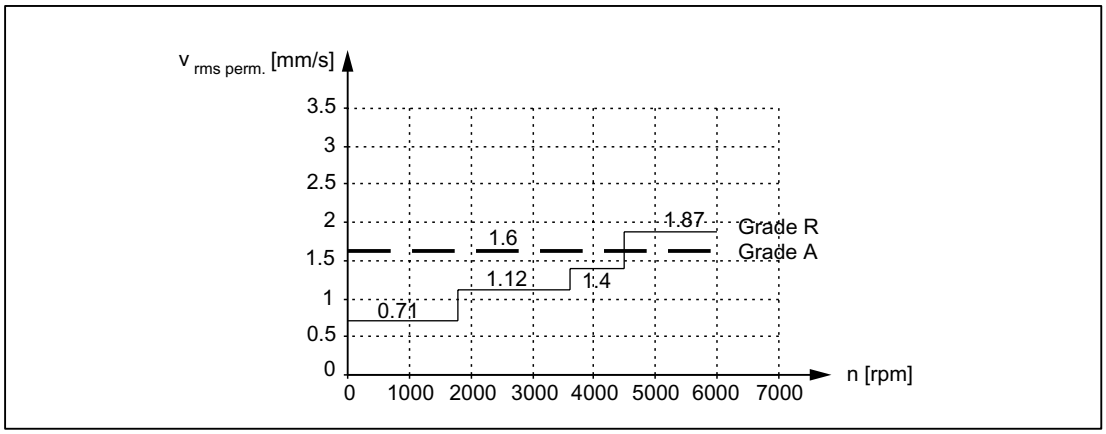


Figure 5-2 Vibration severity grades

Connection

6

6.1 Mechanical connection of water cooling system

The motor is connected to the cooling circuit by means of two female threads at the rear of the motor. The inlet and outlet connections can be freely selected.

1. Make sure that the cooling water fulfills the required cooling water specification, see the chapter titled "Cooling".
2. Make sure that the appropriate volume of cooling water is available (see the rating plate).
3. Screw the cooling water pipes into the 1/4" female threads.
4. Make sure that the maximum permissible operating pressure does not exceed 6 bar.

6.2 Electrical connection

6.2.1 Safety guidelines

⚠ DANGER
Risk of electric shock
When the rotor is turning, a voltage of around 300 V is present at the motor terminals.
All work performed on electrical components must be carried out when the motor is at a standstill! This also applies to auxiliary circuits (e.g. separately driven fan).
Converters and connectors must only be installed by qualified personnel!
Regulations regarding work carried out in electrical installations must be observed.
The connectors may only be installed or removed when the power is off.

CAUTION
Electrostatic sensitive devices
The motor contains electrostatic sensitive devices. Touching signal connections with electrostatically charged hands or tools can cause malfunctions.
Note the ESD protective measures.

Safety rules for work performed in electrical installations to EN 50110-1 (DIN VDE 0105-100):

- Disconnect the system.
- Protect against reconnection.
- Make sure that the equipment is de-energized.
- Ground and short-circuit.
- Cover or enclose adjacent components that are still live.

6.2.2 Circuit diagram

Information about wiring and connecting the motor winding is provided on the circuit diagram.

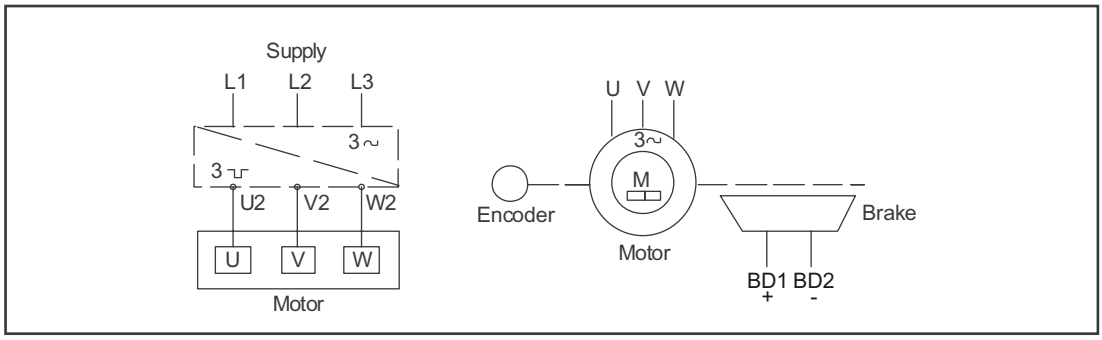


Figure 6-1 Circuit diagram

6.2.3 Motor connection

⚠ DANGER

Warning regarding motor damage!

The motor will be destroyed if it is directly connected to the three-phase line supply.

Only operate the motors with the appropriately engineered converters!

Ensure the correct phase sequence is used!

Encoder systems and temperature sensors are electrostatic sensitive devices (ESD).

Do not touch the connections with either hands or tools that could be electrostatically charged!

- We recommend that SIEMENS prefabricated cables are used (not included in the scope of delivery).
- These cables reduce installation costs and increase operational reliability (see the Configuration Manual).
- The manufacturer of the plant/machine is responsible for the ensuring that the installation is performed correctly.
- Observe the data on the rating plate and the circuit diagrams.
- Adapt the connecting cables in accordance with the type of use and the voltages and currents that arise.
- When fed from a converter, high-frequency current and voltage oscillations in the motor feeder cables can cause electromagnetic interference. Use shielded power cables and signal lines. Carefully observe the EMC information of the converter manufacturer.
- Make sure that the inside of the connector is clean and free of cable cuttings and moisture.
- Avoid protruding cable ends.
- Check seals and sealing surfaces of the connector to ensure that the degree of protection is maintained.
- Take measures to ensure that connecting cables cannot rotate, are not subject to strain and pushing forces, and also provide anti-kink protection. It is not permissible to subject the connector to continuous force.
- The coding groove of the plug-in connection must be inserted so that it is aligned in the socket connector and the screw cap must be tightened by hand as far as it will go.

⚠ CAUTION

High thermal stress

For high thermal stresses, e.g. overload when the motor is stationary, the protective function with integrated temperature sensor may not be adequate. In these cases, apply additional protective measures, e.g. i^2t monitoring.

Connector types

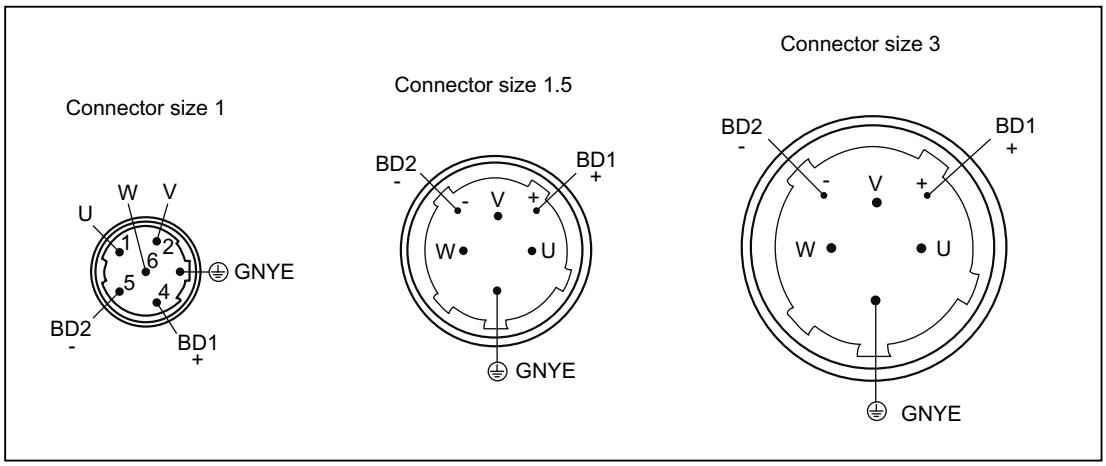


Figure 6-2 Power connector

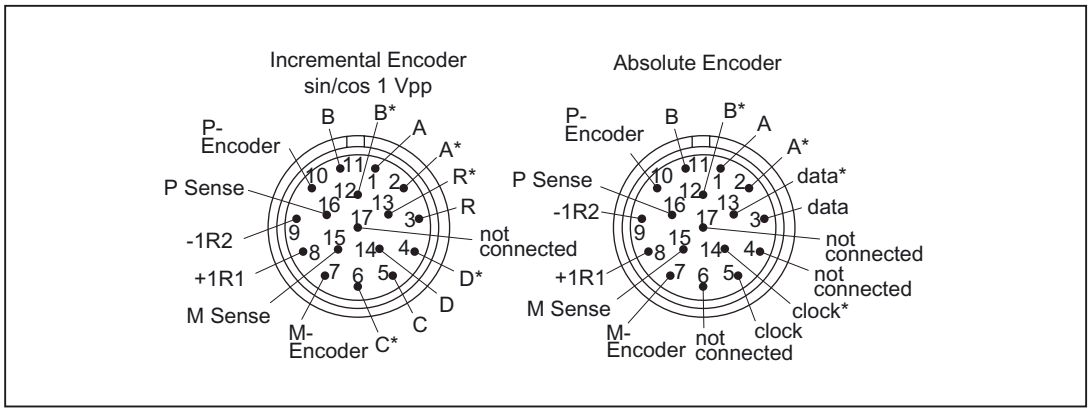


Figure 6-3 Signal connector (motor without DRIVE-CLiQ interface)

Current-carrying capacity for power and signal cables

The current-carrying capacity of PVC/PUR-insulated copper cables is specified for routing types B1, B2, and C under continuous operation conditions in the table with reference to an ambient air temperature of 40°C. For other ambient temperatures, the values must be corrected by the factors from the "Derating factors" table.

Table 6- 1 Cable cross-section and current-carrying capacity

Cross-section	Current-carrying capacity rms; AC 50/60 Hz or DC for routing type		
[mm²]	B1 [A]	B2 [A]	C [A]
Electronics (to EN 60204-1)			
0.20	-	4.3	4.4
0.50	-	7.5	7.5
0.75	-	9	9.5
Power (to EN 60204-1)			
1,50	13,5	13,1	15,2
2,50	18,3	17,4	21
4	24	23	28
6	31	30	36
10	44	40	50
16	59	54	66
25	77	70	84
35	96	86	104
50	117	103	125
70	149	130	160

Table 6- 2 Derating factors for power and signal cables

Ambient air temperature [°C]	Derating factor to EN 60204-1, table D1
30	1.15
35	1.08
40	1.00
45	0.91
50	0.82
55	0.71
60	0.58

6.2.4 Rotating the connectors

Power connector, signal connector, and DRIVE-CLiQ can, to some extent, be rotated. A suitable socket connector can be used to rotate the angle plug. Make sure that the socket connector is completely secure to avoid damaging the pin contacts.

NOTICE

- It is not permissible to exceed the specified rotation range.
- In order to guarantee the degree of protection, max. 10 revolutions are permissible.
- Connectors should be rotated using the matching mating connector located on the connector thread. Only rotate the Sensor Module by hand. The use of pipe wrenches, hammers, or similar is not permitted.

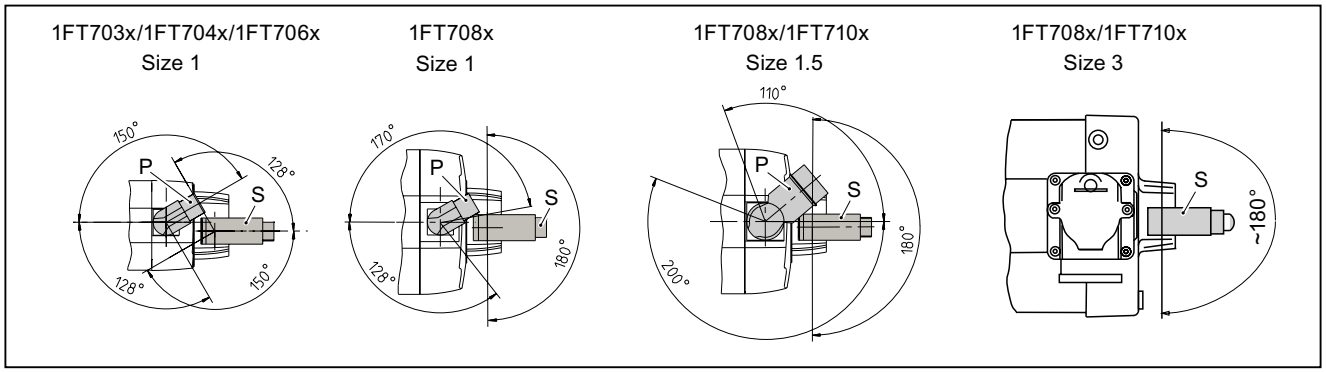


Figure 6-4 Ability to rotate the connectors (P = power connector, S = signal connector)

Table 6- 3 Maximum rotating torques that occur

Connector	M_{max}
Power connector, size 1	12 Nm
Power connector, size 1.5	20 Nm
Signal connector	12 Nm
DRIVE-CLiQ (connector)	8 Nm

The size 3 power connector cannot be rotated.

NOTICE

Cable outlet direction

If the direction of the cable outlet is not changed correctly, this can damage the connecting cables. The direction of the cable outlet must not be changed since this renders all warranty claims invalid.

6.2.5 Motors with DRIVE-CLiQ interface

Motors designed for SINAMICS drive systems are equipped with an internal Sensor Module, which contains an encoder and temperature evaluation system as well as an electronic rating plate. The Sensor Module is installed in place of the signal connector and is equipped with a 10-pin RJ45plus socket, which is the DRIVE-CLiQ interface. The pin assignment is independent of the motor-internal encoder.

NOTICE
The Sensor Module is in direct contact with electrostatic sensitive devices. Steps must be taken to ensure that operators cannot touch the connections either with their hands or with tools that could be electrostatically charged.

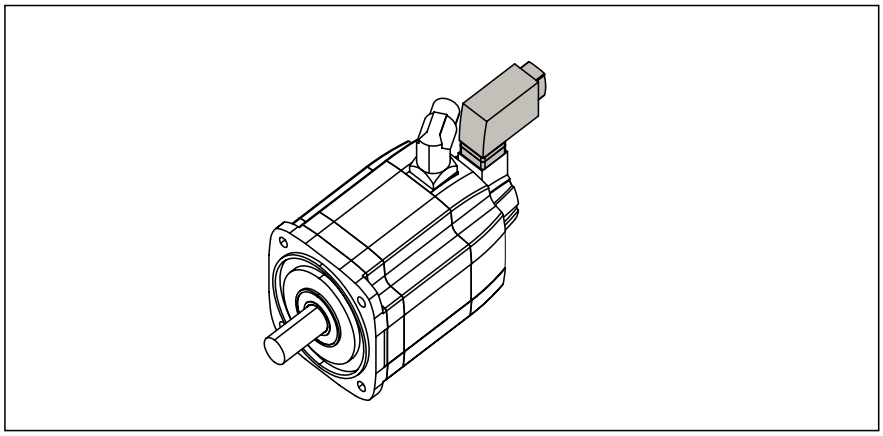


Figure 6-5 Motor with DRIVE-CLiQ interface (example)

The signal connection between the motor and Motor Module is established by means of a MOTION-CONNECT DRIVE-CLiQ cable. The DRIVE-CLiQ cable connector must be inserted far enough so that the catch springs engage.

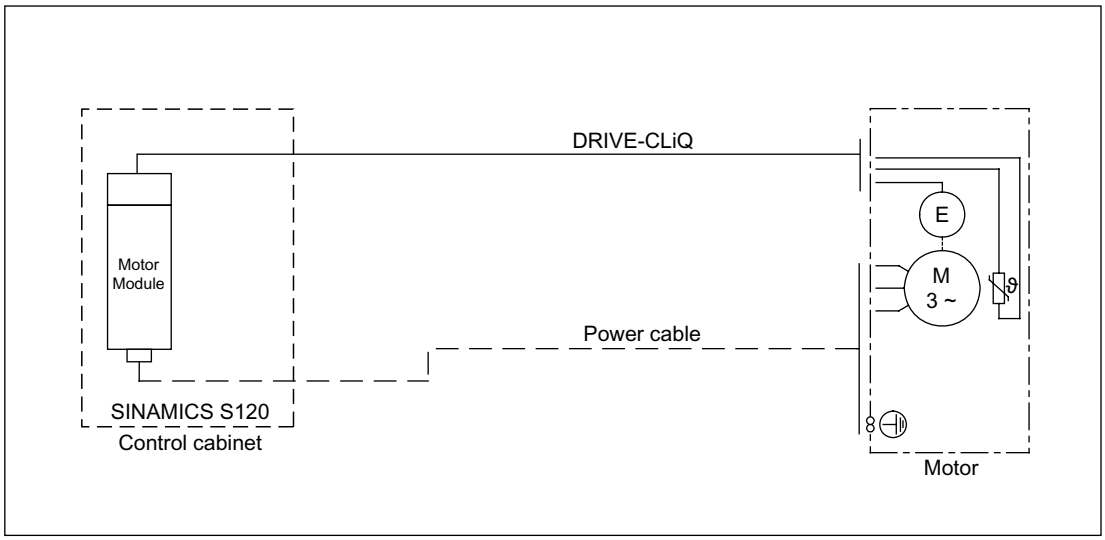


Figure 6-6 Encoder interface with DRIVE-CLiQ

6.2.6 Motors without DRIVE-CLiQ interface

If a motor is not equipped with a DRIVE-CLiQ interface, the speed encoder and temperature sensor are connected via a signal connector.

Motors that are not equipped with DRIVE-CLiQ require a Sensor Module Cabinet-Mounted (SMC) or a Sensor Module External (SME) when operated with SINAMICS S120. The motor is connected to the SMC or SME via the signal line. The SMC or SME is connected to the motor via a MOTION-CONNECT DRIVE-CLiQ cable.

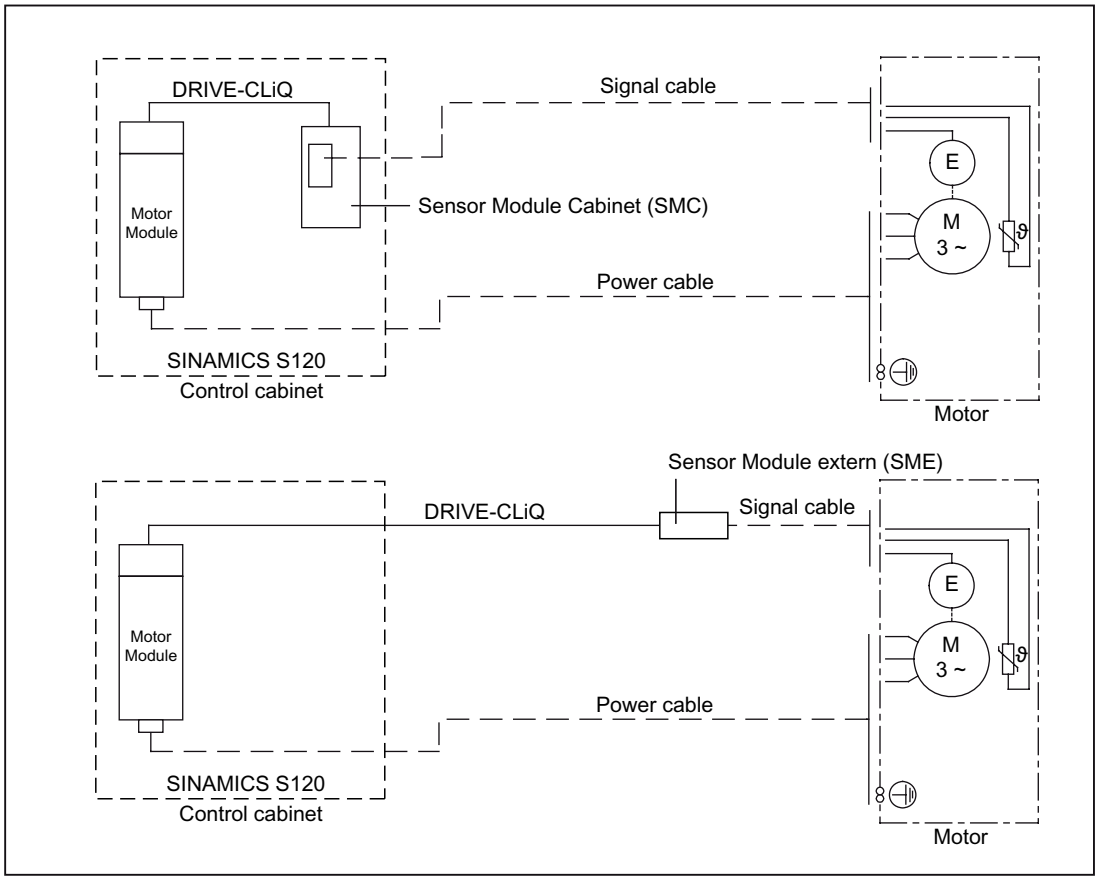


Figure 6-7 Encoder interface without DRIVE-CLiQ

6.2.7 Connecting the temperature sensor

The temperature sensor is connected to the signal connector together with the speed encoder signal.

6.2.8 Connecting a forced-ventilation 1FT7 motor

The fan is attached via a connector.

Table 6- 4 Connection specifications for separately driven fans (1FT7)

Shaft height	Max. current consumption at:	
	230 V/50 Hz 1AC (±10%)	230 V/60 Hz 1AC (+5%/-10%)
63	< 0.1 A	< 0.1 A
80 to 100	0.40 A	0.45 A

Note the following information regarding connections:

- Only use cables that comply with the relevant installation regulations regarding voltage, current, insulation material, and load-carrying capacity.
- Before connecting the device, make sure that the line voltage matches the device voltage.
- Check whether the data on the fan rating plate matches the connection data.
- Connection cables must not be subject to excessive tensile stress.
- Connect the protective conductor (PE).
- Make sure that the fan is switched on when the motor is running.

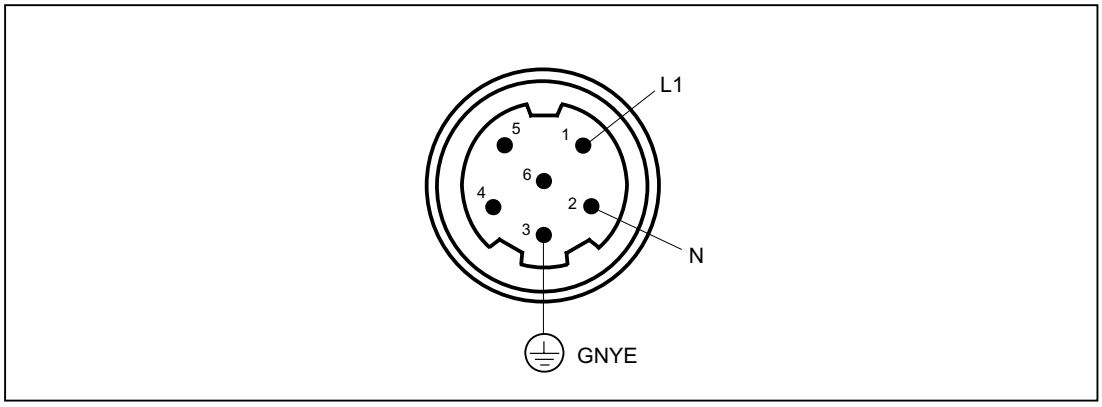


Figure 6-8 Connecting the separately-driven fan by means of the connector

Connecting the signal lines

1. Release the four screws (1) on the hood-type cover (3) and the two lifting eyebolts (2).
2. Remove the hood-type cover (3).
3. Align the signal connector (4), 90° to the motor axis on the left or right.
4. Connect the signal connector (4).
5. Reattach the hood-type cover (3) with the screws (1) and secure the lifting eyebolts, if necessary.

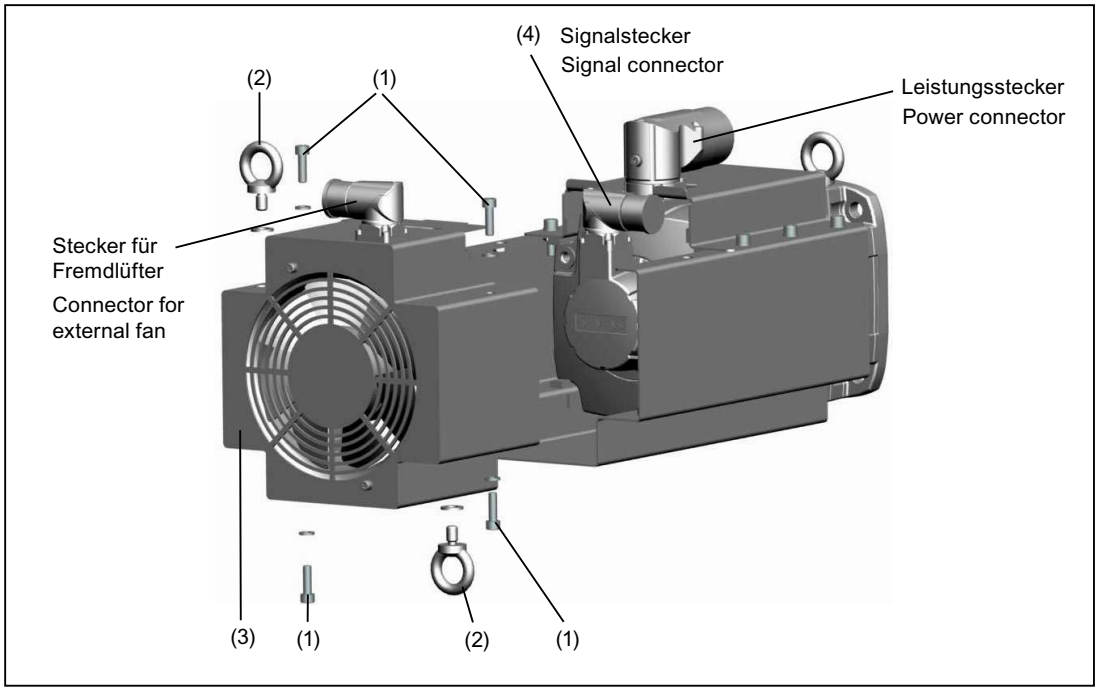


Figure 6-9 Connecting the signal lines

6.2.9 Connecting to a converter

Selecting and connecting the cable

To connect the motor to a converter, use MOTION-CONNECT cables or shielded connection cables. The protective braided shield, made up of as many strands as possible, must have a high electrical conductivity. Braided shields made of copper or aluminum are well suited to this purpose.

The shield must be connected at both ends to the motor and the converter; unshielded cable ends must be kept as short as possible.

To ensure good discharging of high-frequency currents, provide contacting over a large surface area: as 360° contacting at the converter.

Commissioning

7

7.1 Measures prior to commissioning

Before commissioning the system, check that it is properly installed and connected. The drive system must be commissioned as described in the operating instructions for the converter/inverter.

Note

This list below does not claim to be complete. It may be necessary to perform additional checks and tests in accordance with the specific situation on-site.

⚠ DANGER

Risk of electric shock!

When commissioning/operating electric motors, parts of the motor are always at a dangerous voltage. If this motor is not correctly handled/operated, this can result in death or severe personal injury as well as significant material damage. All of the warning information on the product must be carefully observed!

⚠ WARNING

Danger from rotating rotor.

Provide touch protection for output elements.

Mechanical connection

Make sure that:

- Touch protection measures are in place for moving and live parts.
- The motor has been assembled and aligned properly.
- The rotor can spin without coming into contact with other parts and components.
- The operating conditions correspond to the data specified on the rating plate.
- All fixing screws, connecting elements, and electrical connections are tight and have been attached properly.
- The output elements have the proper setting conditions according to type, for example:
  - Couplings are aligned and balanced.
  - The belt tension is properly adjusted if a belt drive is used.
  - Gear tooth flank play and gear tooth tip play as well as radial play are properly adjusted if a gear drive is used.

Electrical connection

Make sure that:

- The grounding and equipotential bonding connections have been established correctly.
- The brake is operating correctly.
- The indicated speed limit n_{max} is not exceeded during operation on a converter.

Monitoring equipment

Make sure that:

- Appropriately configured control and speed monitoring functions ensure that the motor cannot exceed the permissible speeds specified on the rating plate.
- Any supplementary motor monitoring devices and equipment have been correctly connected and are fully functional.

Forced ventilation

All safety and functional issues must be checked prior to commissioning. A checklist, which does not claim to be exhaustive, is provided below to help you in this regard.

Make sure that:

- The data for the forced ventilation unit matches the connection data. The forced ventilation unit must not be connected if the connection data differs from the data for the forced ventilation unit in any way that would result in overload.
- The electrical installation (e.g. protective conductor fitting) of the forced ventilation unit (including accessories) has been performed correctly.
- The mounting and electrical installation of safety-related components such as motor circuit breakers, protective grilles, etc., have been performed correctly.

CAUTION
Always operate the motor with the separately driven fan switched on. If the separately driven fan fails or the motor is operated for a short time without forced ventilation, this can cause it to overheat. This can result in material damage or destroy the motor completely.

Water cooling

Make sure that:

- The cooling water supply is connected and ready for operation.
- The cooling water circulation (flow rate, temperature) complies with requirements.

CAUTION
Never operate the motor without the cooling water supply being switched on. Monitor the permissible water inlet temperatures. If the cooling water supply fails or the motor is operated for a short time without water cooling, this can cause it to overheat. This can result in material damage or destroy the motor completely.

Brake (optional)

Make sure that:

- Applying the operating voltage causes the brake to release.
- The brake functions (releases/engages) properly.

7.2 Switching on

Before you switch on the motor, ensure that the parameters of the frequency converter have been assigned correctly.

Use appropriate commissioning tools (e.g. "Drive ES" or "STARTER").

CAUTION

Uneven running or abnormal noise

The motor can be damaged by improper handling during transport, storage, or assembly. If a damaged motor is operated, this can damage the windings or bearings and could even completely destroy the motor.

If the motor is not running smoothly or is making abnormal noises, switch it off and determine the cause of the fault as the motor coasts down.

⚠ CAUTION

Pay attention to the maximum speed

The maximum speed n_{max} is the highest permissible operating speed. The maximum speed is specified on the rating plate.

Exceeding speed n_{max} can result in material damage or could even completely destroy the motor. An appropriately configured control or an active speed monitoring function in the drive should be used to ensure that the motor cannot exceed the permissible speeds.

Operation

8

8.1 Safety guidelines during operation

⚠ WARNING

Do not remove covers when motor is running

Rotating or live parts are dangerous. Death, severe personal injury, or material damage can result if the required covers are removed.

All covers that prevent personnel from coming into contact with active or rotating parts, ensure compliance with the required degree of protection, or ensure proper air guidance and, in turn, effective cooling must not be opened/removed during operation.

⚠ WARNING

Faults during operation

Deviations from normal operation (e.g. increased power consumption, temperature, or vibration levels, unusual noises or odors, tripping of monitoring equipment, etc.) indicate that the machine is not functioning properly. This can cause faults that can result in eventual or immediate death, severe personal injury, or material damage.

Immediately inform maintenance personnel. If in doubt, shut down the motor immediately, taking into account the plant-specific safety regulations.

⚠ CAUTION

Risk of burns

The temperature of certain parts of the motor can exceed 100 °C. Physical contact with the machine could cause serious burns.

Check the temperature of the parts before touching them and take appropriate protective measures if necessary.

8.2 Faults

Note

Damage to the machine caused by faults

Correct the cause of the fault as specified in the remedial measures section. Repair any damage to the machine/motor.

Note

When operating the motor with a converter, refer also to the operating instructions of the frequency converter if electrical faults occur.

If there are deviations from normal operation or if faults occur, initially proceed according to the following list. In this regard, observe the relevant chapters in the documentation associated with the components of the complete drive system.

Even in test operation, never disable protective functions or devices.

Table 8- 1 Possible faults

Fault	Cause of fault (see key table)																
Motor does not start up	A	B															
Motor starts up slowly	A		C		F												
Humming noise when starting			C		F												
Humming noise during operation	A		C		F												
Overheating during no-load operation				D		G	H	I									
Overheating when under load	A		C			G	H	I									
Overheating of individual winding sections					F												
Uneven running									J	K							
Grinding sound, running noise											L						
Radial vibrations												M	N	O	P		R
Axial vibrations														O		Q	R
Water is leaking																	S

Table 8- 2 Key to causes of faults and remedial measures

No.	Cause of fault	How to remedy
A	Overload	Reduce load
B	Interruption of a phase in the supply cable/motor winding	Check the frequency converter and supply cables/measure the winding resistances and insulation resistances, repair after consultation with manufacturer
C	Interruption of a phase in the supply cable after switching on	Check the frequency converter and supply cables/check the winding resistances
D	Converter output voltage too high, frequency too low	Check the settings on the frequency converter, perform automatic motor identification
F	Winding short circuit or phase short circuit in stator winding	Measure the winding resistances and insulation resistances, repair after consultation with manufacturer
G	Cooling water not connected/switched off	Check cooling water connection/switch on cooling water
	Water connection/pipes defective	Locate leaks and seal as necessary, or consult the manufacturer
H	Cooling water flow rate too low	Increase cooling water flow rate
	Inlet temperature too high	Set correct inlet temperature
I	Heat dissipation impeded by deposits	Clean the surface of the drives and ensure that the cooling air can flow in and out unimpeded
	Cooling air inlet and/or outlet is blocked by foreign bodies	Remove the blockage and ensure that the cooling air can flow in and out unimpeded
	Fan motor does not start up	Make sure that the fan motor works properly
J	Insufficient shielding for motor and/or encoder cable	Check the shielding and grounding
K	Drive controller gain too high	Adjust the controller
L	Rotating parts are grinding	Determine cause and adjust parts
	Foreign bodies in the motor	Send to manufacturer for repair
	Bearing damage	Send to manufacturer for repair
M	Rotor not balanced	Decouple rotor and rebalance
N	Rotor out of true, shaft bent	Consult the manufacturer
O	Poor alignment	Align motor unit, check coupling
P	Coupled machine not balanced	Re-balance coupled machine
Q	Shocks from coupled machine	Check coupled machine
R	Imbalance originating from gearing	Adjust/repair gearing
S	Cooling water pipes/water connection defective	Locate leaks and seal as necessary, or consult the manufacturer

If the fault still cannot be resolved after applying the measures specified above, please contact the manufacturer or the Siemens Service Center.

8.3 Stoppages

Measures when motors are at a standstill and ready for operation

- If the motor is out of service for extended periods of time, run it at regular intervals (roughly once a month) or at least spin the rotor.
- Refer to the section titled "Switching on" before switching on the motor to re-commission it.

NOTICE
Damage due to improper storage The motor can be damaged if it is not stored properly. If the motor is out of service for extended periods of time, implement suitable anti-corrosion and preservation measures and ensure that the motor is kept dry. When re-commissioning the motor after a long non-operational period, carry out the measures recommended in the chapter titled "Commissioning".

Servicing

9

9.1 Inspection and maintenance

9.1.1 Safety information

If you are unclear about anything, consult the manufacturer, specifying the motor type and serial number, or arrange for the maintenance work to be carried out by one of the Siemens Service Centers.

⚠DANGER

Risk of electric shock when touching live parts

Electrical parts and components are at hazardous voltages. Touching these parts will result in an electric shock,

which in turn causes death or serious injury.

Before starting work on the machines, make sure that the plant or system has been disconnected in a manner that is compliant with the appropriate specifications and regulations. In addition to the main currents, make sure that supplementary and auxiliary circuits, particularly in heating devices, are also disconnected.

⚠WARNING

Risk of burns

Some parts of the frame of electrical motors can reach temperatures in excess of 100°C.

Touching components when the machine is in operation can cause severe burns.

Do not touch frame parts while the machine is in operation or immediately after machine operation. Allow parts of the frame to cool down before starting any work.

Safety regulations

Before starting any maintenance work, always observe the five safety rules:

1. Disconnect the system
2. Protect against reconnection.
3. Make sure that the equipment is at zero voltage
4. Ground and short-circuit
5. Cover or enclose adjacent components that are still live

9.1.2 Maintenance intervals

General information

Careful and regular maintenance, inspections, and overhauls are essential for detecting and eliminating faults in good time before they can cause any consequential damage.

NOTICE
Inspection if there are faults or unusual conditions Unusual conditions or faults that place undue electrical or mechanical stress on the three-phase motor (e.g. overload, short-circuit, etc.) can cause consequential damage to the machine. If faults or any unusual conditions occur (e.g overload or short-circuit, etc.), the machine must be inspected immediately.

Measures, inspection/maintenance intervals

Operating conditions and performance can vary widely. For this reason, only general maintenance intervals for problem-free operation can be specified here.

- Maintenance intervals should therefore be scheduled to suit the on-site conditions (fouling, switching frequency, load, etc.).
- Perform the following measures after the operation time or the interval specified in the table below elapses.

Table 9- 1 Measures after operation times or intervals

Measures	Operation times and intervals
Replace the bearings	After the recommended bearing replacement intervals (see the chapter titled "Bearing replacement intervals")
Replace the radial shaft sealing rings	Approximately every 10,000 operating hours with oil lubrication

9.1.3 Bearing replacement intervals

The bearings are subject to wear and must be replaced after a defined number of operating hours. At an average load, the bearings should be replaced after around 25,000 hours.

The lifetime can be extended if the motor is operated under favorable conditions (e.g. low or medium speeds, low radial forces (transverse forces), vibration load).

NOTICE
Harsh operating conditions If the motor is subject to harsh operating conditions (e.g. continuous operation at n_{max}, high vibration/shock loads, frequent reversing duty etc.), the bearing replacement intervals t_{LW} can decrease by up to 50%.

9.2 Corrective maintenance

9.2.1 Safety guidelines

Qualified personnel

This machine must be commissioned and operated by qualified personnel only. For the purpose of the safety information in these Operating Instructions, a "qualified person" is someone who is authorized to energize, ground, and tag equipment, systems, and circuits in accordance with established safety procedures.

Safety notes

⚠ WARNING

Rotating or live parts

Rotating or live parts are dangerous. Death, serious injury, or material damage can result if the required covers are removed or if the device is not operated properly.

Before starting work on the motor and, in particular, before opening the covers of live parts, make sure that the motor or system is properly isolated.

⚠ WARNING

Transportation in accordance with proper procedures

Only transport the motor in accordance with the transport guidelines. Death, serious injury, or material damage can result if the motor is not transported properly.

Whenever you have to transport the motor, follow the instructions provided in the section "Transport and storage".

9.2.2 Removing/Installing the encoder

CAUTION
Electrostatically sensitive devices Electronic modules contain components that can be destroyed by electrostatic discharge. These modules can be easily destroyed if they are not handled properly. To protect your equipment against damage, follow the instructions given in the chapter ESD Guidelines.

Removal

1. Disconnect the motor
2. Remove the four encoder fixing screws
3. Remove the encoder

Installation

1. Attach the coupling element onto the encoder shaft
2. Align the coupling element with the coupling half on the motor
3. Attach the encoder at this position on the motor shaft
4. Secure the encoder with four screws (tightening torque: 0.8 to 1.2 Nm)

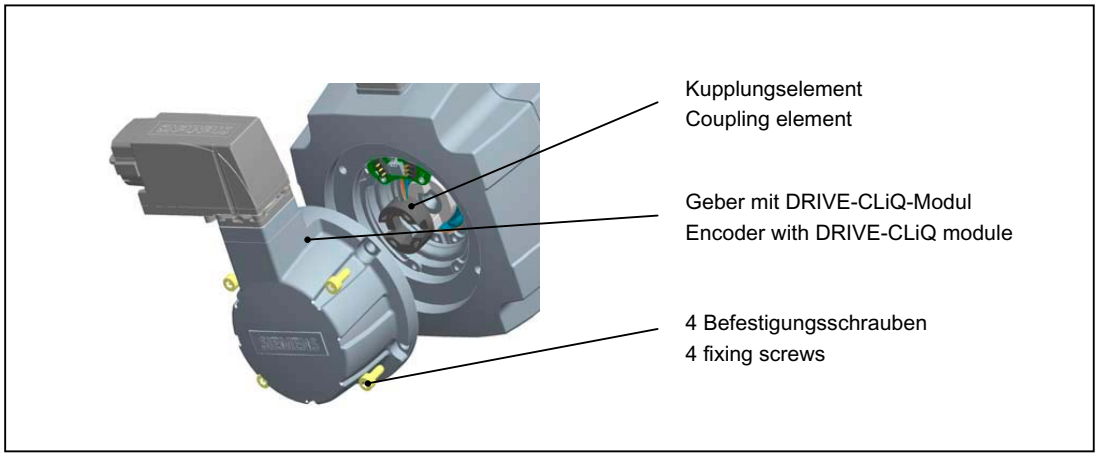


Figure 9-1 Removing/Installing the encoder

Note

When replacing the encoder, the coupling element needs to be replaced too.

Motors with DRIVE-CLiQ

NOTICE
Motor data (electronic rating plate) You must ensure that the new encoder contains the correct motor data. If it does not, the motor may perform uncontrolled motions, leading to considerable material damage.

You can purchase a preprogrammed encoder module from the Siemens Service Center by quoting the relevant order number and serial number. If your encoder module is not preprogrammed, it must be programmed with the correct motor data prior to use.

Decommissioning and disposal 10

10.1 Decommissioning

10.1.1 Preparing for disassembly

Disassembly of the machine must be carried out and/or supervised by qualied personnel with appropriate expert knowledge.

1. Contact a certified waste disposal organization in your vicinity. Clarify what is expected in terms of the quality of dismantling the machine and provision of the components.
2. Follow the five safety rules.
3. Disconnect all electrical connections.
4. Remove all liquids such as oil, water, …
5. Remove all cables.
6. Deatch the machine fixings.
7. Transport the machine to a suitable location for disassembly.

Refer also to the information in the section headed "Maintenance".

10.1.2 Dismantling the motor

Dismantle the machine using the general procedures commonly used in mechanical engineering.

⚠ WARNING
Machine parts can fall The machine is made up of heavy parts. These parts are liable to fall during dismantling. This can result in death, serious injury, or material damage. Secure the machine parts being dismantled to prevent them falling.

The motors must be disposed of in accordance with national and local regulations as part of the standard recycling process or they can be returned to the manufacturer.

10.2 Disposal

Protecting the environment and preserving its resources are corporate goals of the highest priority for us. Our worldwide environmental management system to ISO 14001 ensures compliance with legislation and sets high standards in this regard. Environmentally friendly design, technical safety and health protection are always firm goals even at the product development stage.

Recommendations for the environmentally friendly disposal of the machine and its components are given in the following section. Be sure to comply with local disposal regulations.

Components

Sort the components for recycling according to whether they are:

- Electronics waste, e.g., sensor electronics
- Iron to be recycled
- Aluminum
- Non-ferrous metal, e.g., motor windings
- Insulating materials

Process materials and chemicals

Sort the process materials and chemicals for recycling according to whether they are:

- Oil

  Dispose of the spent oil as special waste in accordance with the spent oil ordinance.
- Grease
- Solvents
- Cleaner solvent
- Paint residues

Do not mix solvents, cleaner solvents and paint residues.

Appendix

A

A.1 Ordering data

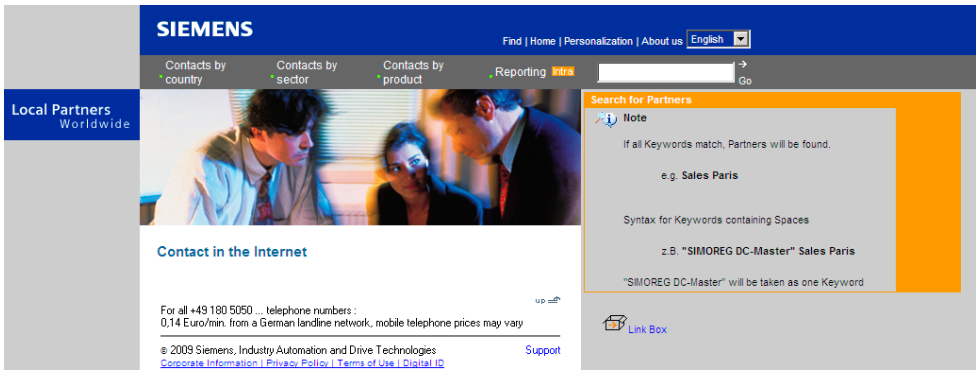
"1FT7 Synchronous Motors" Configuration Manual, German

- Order no. (MLFB) for SINAMICS S120: 6SN1197-0AD13-0AP2
- Order no. (MLFB) for SIMODRIVE: 6SN1197-0AC13-0AP2

"1FT7 Synchronous Motors" Configuration Manual, English

- Order no. (MLFB) for SINAMICS S120: 6SN1197-0AD13-0BP2
- Order no. (MLFB) for SIMODRIVE: 6SN1197-0AC13-0BP2

A.2 Siemens Service Center



At

http://www.siemens.com/automation/partner

you can find Siemens contacts worldwide for information about specific technologies.

Wherever possible, you will find a local contact partner for:

- Technical support,
- Spare parts/repairs,
- Service,
- Training,
- Sales or
- Technical support/engineering.

You start by selecting

- a country,
- a product or
- a sector.

Once the remaining criteria have been laid down, the required contact will be shown along with the associated area of expertise.

A.3 Declaration of conformity

SIEMENS

EG-Konformitätserklärung
EC Declaration of Conformity

No. 664.20034.21

Hersteller: *Manufacturer:*	**Siemens Aktiengesellschaft**
Anschrift: *Address:*	**Siemens AG; A&D MC EWN** Industriestraße 1 97615 Bad Neustadt a. d. Saale Germany
Produktbezeichnung: *Product description:*	**Drehstrom – Synchronmotor, Servoantrieb Typ 1FT7...** *AC – synchronous servo - motor, type 1FT7...* Achshöhen / *shaft heights* 36, 48, 63, 80, 100

Die bezeichneten Produkte stimmen in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinie überein:
The products described above in the form as delivered are in conformity with the provisions of the following European Directive:

73/23/EWG	Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen (geändert durch 93/68/EWG). *Council Directive on the approximation of the laws of the Member States related to electrical equipment designed for use within certain voltage limits (amended by 93/68/EEC).*

Die Konformität mit der Richtlinie wird nachgewiesen durch die Einhaltung folgender Normen:
Conformity to the Directive is assured through the application of the following Standards:

EN 60204-1 : 2006 EN 60034-1*): 2004
) mit allen relevanten Teilen / *with all relevant parts

Die Sicherheitshinweise und Betriebsanleitungen sind zu beachten.
The safety and manual documentation have to be considered in detail.

CE - Kennzeichnung: 2006 / *CE marking: 2006*

EG-Herstellererklärung nach Art.4 Abs.2 der EG-Richtlinie 98/37/EG.
Die gelieferten Produkte erfüllen die Anforderungen der Norm EN 60204-1.
Die gelieferten Produkte sind ausschließlich zum Einbau in eine Maschine bestimmt. Die Inbetriebnahme ist solange untersagt, bis die Konformität des Endproduktes mit der Richtlinie 98/37/EG festgestellt ist. Alle Sicherheitshinweise der zugehörenden Produktdokumentation sind zu beachten sowie dem Endanwender zur Kenntnis zu geben.
Diese Erklärung stellt keine Beschaffenheits- und Haltbarkeitsgarantie gemäß § 443 BGB dar.

EU Manufacturer's Declaration according to Article 4 Paragraph 2 of the EU Directive 98/37/EU.
The products supplied fulfill the requirements of standard EN 60204-1.
The products supplied are intended exclusively for installation in a machine. Commissioning is prohibited until it has been established that the end product conforms with the Directive 98/37/EU. All safety instructions in the associated product documentation must be observed and given to the end user for his/her information.
This declaration contains no condition and durability guarantee to § 443 BGB.

Bad Neustadt, den 13.11.2006

Siemens Aktiengesellschaft

Dr. Hans Peter Zerbes,
Leiter Elektromotorenwerk
Elektromotorenwerk Bad Neustadt

Dr. Jan Dainat,
Leiter der Abteilung Technik (KT)

Diese Erklärung bescheinigt die Übereinstimmung mit der genannten Richtlinie, ist jedoch keine Zusicherung von Eigenschaften.
This declaration certifies the conformity to the specified Directive, but contains no assurance of properties.
Siemens AG, A&D MC EWN **Ausgabestand / Status: 11/2006**
Erstausgabe: 11/2006

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