

DC and AC motors

EN



Installation and Operating Instructions

CE



 **ESTAN**

1604V003

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Addresses



1 About this document

These installation and operating instructions represent a part of the unit. They correspond to the relevant version of the unit and the status of technology valid at the time of its market launch.



Failure to comply with the specifications of these installation and operating instructions means that ESTAN will not assume any guaranty or liability for the safe operation and reliable function of the unit.

This translation was prepared to the best of our knowledge. The original German language version of the manual is the definitive version. ESTAN is not responsible for any errors in translation.

1.1 Warnings and symbols

Warnings

The warnings in this document are intended to draw your attention to possible injury to persons or damage to machinery.

The following warning symbols are used:



General warning symbol



Warning – dangerous high voltage



Warning – hot surfaces



Warning - automatic start-up of the unit

The warnings are structured as follows:



SIGNAL WORD

Description of the type and source of danger

Here you will find the possible consequences of ignoring the warning

- Follow these measures to avoid the danger.

The signal word differentiates between four levels of danger:

- **DANGER**
Immediate danger of severe injury or death
- **WARNING**
Possible danger of severe injury or death
- **CAUTION**
Risk of minor injuries
- **NOTICE**
Risk of extensive material/property damage

Other symbols

These symbols are used in the document and on or in the unit:



Note, e.g. specific instructions regarding efficient and cost-effective use of the unit.



Comply with the specification in the accompanying documents.



CE labelling



Date of manufacture



Dispose of the unit properly and in accordance with applicable national, regional and local laws.



Monitor ambient conditions



Switch off and de-energise the device (e. g. unplug from mains).

1.2 Copyright information

All names of circuits, processes, names, software programs and units used in this document are protected by copyright.

The reproduction of the installation and operating instructions, even in extract, is only permitted upon written permission of ESTAN.

2 Safety

ESTAN has developed and constructed this unit in such a way as to rule out any danger given intended use. Nevertheless, residual risks can remain. You should therefore observe the following notes.

2.1 Intended use

The unit is used as a drive for commercial low-voltage systems. The unit has been designed for installation into systems and machines. It may only be commissioned after the manufacturer of the system/unit has ensured that all requirements requisite to safe operation have been fulfilled.

The unit has been designed for operation in dry, ventilated rooms. The unit must not be operated in a damp or wet environment.

2.2 Improper usage

Any other usage or usage beyond this scope is deemed to be improper. The manufacturer accepts no liability for damage resulting from such use. In such cases, the user/operator will bear the sole risk.



WARNING **Serious injury and material damage due to improper usage**

Use of the unit beyond its intended use can result in serious physical injury to persons and damage to property.

- › Use the unit for the intended application only
- › In areas with potentially explosive atmospheres, only units with ATEX marking may be used.

2.3 General safety information

- › When operating this unit, always observe all directives, laws, and other rules and regulations applicable at the site of operation.
- › Check the function and state of the unit prior to each use.
- › Do not convert or modify the unit.
- › Comply with the specifications of the Installation and Operating Instructions.
- › Ensure that the unit operator has access to the Installation and Operating Instructions at all times.

2.4 Qualified personnel

Operation

Unit operators must ensure safe and correct handling based on their training and knowledge.

- › Instruct or have every operator instructed in the handling of the unit.

Installation and repairs

- › Always arrange for any assembly work, readjustments, alterations, extensions, and repairs to be performed by ESTAN or by personnel authorised and trained by ESTAN. Qualified personnel has been trained by ESTAN; is familiar with the unit technology; and is aware of the dangers presented by the unit.

2.5 Protection from electric shock

- › Observe and comply with all the relevant electrical safety regulations when working on the unit.
- › Replace any damaged cables or plugs immediately.
- › Only allow qualified electricians to work on electrical systems.
- › Before operating the unit, switch off the power supply, secure it against reactivation and verify that there is no voltage present.
- › Keep moisture away from live parts.

2.6 Only use genuine parts

- › Only use original working and spare parts.



ESTAN assumes no liability for damage resulting from the use of any working parts or spare parts other than original parts.

2.7 Transportation and storage

The unit is delivered in a cardboard box filled with packing material. The original packaging provides optimum protection for the unit during transport. Wherever possible, always use the original packaging for transport and storage of the unit.

- Keep the packing materials out of the reach of children.

The unit may be stored in its original packaging

- in warm, dry and dust-free rooms;
- protected from contaminants.



If possible, retain the packaging material.

Ambient conditions during storage and transport

| | | |
|---------------|----|-----------|
| Temperature | °C | +5 to +60 |
| Rel. humidity | % | < 50 |

2.8 Disposal

Unit



Dispose of the unit properly and in accordance with applicable national, regional and local laws.

Packaging



Dispose of the packaging material in an environmentally responsible manner.

- Note current disposal routes.
- Keep the packing materials out of the reach of children.



3 Overview

ESTAN Product range:

- DC permanent-magnet motors
- DC and AC motors with excitation winding
- EC-motors with electronic controller
- 3-phase motors
- Single-phase ac motors
- Liquid-cooled asynchronous motors
- Gear motors

3.1 Working parts and spare parts

Contact our service department with any enquiries regarding working parts and spare parts (see "Addresses").

4 Technical data



The requisite technical data is specified on the respective model identification plates. This information is authoritative.

4.1 Type plate

The model identification plate is located on the unit housing and includes, among other things, the following information:

- Manufacturer
- Motor identification
- Performance data



The information on the model identification plate varies depending on the unit type.



Additional plates with more information can also be found on the unit.



Figure 1: Model identification plate example

4.2 EC Declaration of conformity

We hereby confirm that the products listed below comply with the indicated EC Directive, provided they bear a CE marking.

- Low Voltage Directive 2014/35/EU for units with nominal voltage $>75 V_{DC}$ and / or $>50 V_{AC}$
- RoHS directive 2011/65/EU
- Electromagnetic Compatibility (EMC) Directive 2014/30/EC

¹⁾ as far as interference has been eliminated on the factory side or procedure performed during use.

Units and systems with DC permanent-magnet motors require interference-suppression as specified in the Installation and Operating Manual. This can be performed using an interference suppression filter.

| | |
|-------------------------|---|
| Manufacturer's name: | ESTAN Elektromaschinen und Steuerungsbau GmbH |
| Manufacturer's address: | Burgunderstraße 6 D-79418 Schliengen |

| | | |
|----------------------|---|---|
| Type: | DC Motor DC Tachometer AC Motor (single-phase, three-phase) EC Motor (electronically commutated) | Type: GfmO, 550, GN, GS, 610, PF Type: tGH Type: EG, GK Type: ED, GD |
| Article designation: | DC motors, AC motors | |

The units are designed for installation in a machine/system or assembly with other parts. It is forbidden to commission the unit until you have ascertained that the machine/system in which our unit is to be installed complies with the provisions of the EC Machine Directive 2006/42/EC.

Compliance with this directive is contingent upon the correct installation / use of the products in accordance with the product documentation. The motor temperatures may exceed 60° C during normal operation, therefore, the danger of unintentional contact must be taken into account.

The following harmonized standards and other standards have been taken into account:

- DIN EN 60034-1:2011-02
- DIN EN 60034-5:2007-09
- DIN EN 60034-7:2001-12*
- DIN EN 60034-8:2008-04*
- DIN EN 60034-30-1:2014-12
- DIN EN 60034-14:2008-03
- DIN EN 60034-11:2005-04
- DIN EN 60034-9:2008-01
- DIN EN 60034-6:1996-08
- DIN EN 60034-2-1:2010-10
- DIN EN 61000-6-2:2011-06
- DIN EN 61000-6-3:2012-11
- DIN EN 61000-6-4:2011-09
- DIN EN 60204-1:2014-10

unless agreed otherwise

This declaration of conformity does not represent an assurance of properties in the sense of product liability.

Comply with the safety information specified in the product documentation.

Schliengen 04.12.2015

Saad Abusamra
Executive Board of ESTAN
Authorized representative for the documentation

Proof of signature in the
Original document at ESTAN

EN



5 Requirements

The room chosen for set up must fulfil the following requirements:

- Dry, well ventilated room
- Should not be a purpose-made room (e. g. boiler room or wet room)
- Set up the unit on a clean, level and sufficiently stable surface (take the weight of the unit into account).
- Units with feet must be set up on a solid foundation in order to avoid vibrations.
- The socket-outlet must be easily accessible.
- The model identification plate of the unit must be easily readable (also after installation).
- The unit must be easily accessible for operation and maintenance.
- Once the unit has been installed, the connecting terminals must be easily accessible when removing/opening housing access.
- Maintain sufficient distance from the wall (min. 30 mm to 40 mm).



NOTICE

Risk of overheating due to insufficient ventilation

The units generates heat. Possibility of heat damage and/or reduced service life of the unit.

- › Do not install the unit on a closed housing, for ventilation reasons.
- › Air must be able to flow in and out unobstructed.
- › Ventilation openings must be sufficiently large.
- › Installed units may require an independent ventilation system in unfavourable cases (applicable in case of installation inside a close housing).

6 Installation

Comply with the following points when assembling the unit:

- Fastening elements (walls, covers etc.) must be sufficiently dimensioned and stable
- The drive elements such as pulleys, couplings etc. have to be balanced dynamically with half a feather key before installation.
- Use a suitable tool for fitting and removing the pulleys, couplings etc. in order to prevent damage to the bearing.
- Verify that the shaft is parallel, align if necessary.
- Ensure that all drainage openings (if any) are facing downwards.
- Tighten all screw connections with the appropriate tightening torque.
- Observe the generally necessary measures for protection against touching the drive elements.

7 Electrical installation

7.1 Voltage, frequency and circuit

- Observe the wiring specifications on the model identification plate and wiring diagram in the terminal box.
- Compare the operating voltage with the power supply voltage.
- Choose the power cord with the current specified on the model identification plate.
- Voltage fluctuations of $\pm 10\%$, frequency fluctuations of $\pm 5\%$ and total fluctuations of $\pm 10\%$ for both are permissible.



DANGER

Danger to life due to faulty insulation

Insulation faults can result in life-threatening fault currents.

- › The normative threshold values of the insulation resistance must be observed.
- › Do not commission or shut down the unit if it has fallen below the critical insulation resistance value.



DANGER

Danger to life due to faulty earthing

Faulty earthing can result in life-threatening fault currents.

- › Check and ensure the specified earthing.

7.2 Electrical connection using a mains plug

- › The unit may only be connected to a correctly installed socket outlet.
- › Make sure that none of the electrical cables leading to the unit are under any mechanical tension.
- › The socket-outlet must be easily accessible.
- › Before commissioning, verify that the power supply voltage complies with the voltage specifications of the model identification plate.



DANGER

Risk of electric shock due to defective power cord

- › The power cord must not be allowed to come into contact with any hot surfaces on the unit.
- › Route power cords without mechanical tension.
- › Connect the mains plug to an earthed socket outlet.
- › The unit will start immediately after connection of the mains plug.

7.3 Electrical connection without a mains plug



DANGER

Connection to the power supply may only be performed by a qualified electrician.

- › Comply with the regulations from the local power supply companies.
 - › Connect the unit to a power supply source with a correctly installed protective earth conductor. (Exception: units with DC permanent-magnet motors.)
 - › Before commissioning, verify that the power supply voltage complies with the voltage specifications of the model identification plate. Ensure that the current circuit on the building side has appropriate fuse protection.
 - › After connecting, verify that there is no foreign matter in the terminal box.
 - › Close any open cable entries.
- If the unit is permanently connected to the power supply, a cut-off device (e.g. power circuit breaker) with a contact gap of at least 3 mm must be provided in the vicinity of the unit. The disconnecting device must comply with standard EN 60204-1:2006, 5.3.
- Comply with the information provided in the wiring diagrams, label or circuit diagram in the terminal box when making the electrical connection.

7.4 IP protection type



DANGER

Comply with the IP protection type for protecting the units against contact, foreign matter, and moisture

Failure to comply with this information can result in electric shock, personal injury, or material damage.

- The units must only be installed or used in accordance with their type of protection.
- The owner is to ensure that the unit is provided with the IP protection type in accordance with the purpose for which it is used.
- The IP protection type is determined by the complete system. With installed units, responsibility for determining the IP protection type lies with the manufacturer of the complete system.



The term "IP protection type" (International Protection) is defined by IEC/EN 60529 "Type of protection by housing (IP Code).

Units with a IP00 protection type provide no protection against contact, foreign matter, and moisture. The owner is responsible for ensuring that the units are only installed or used in accordance with their protection type.

A fixed electrical installation which complies with wiring regulations is required.

7.5 Direction of rotation

The direction of rotation for single-phase AC motors is preset.

The connection of the phases of a 3-phase motor in the sequence L1, L2, L3, will produce clockwise rotation (viewed from the motor shaft). The direction of rotation can be changed by swapping any two cables.

The direction of rotation of DC permanent-magnet motors is specified on the motor.



Depending on the unit, there is a plate with the direction of rotation on the motor.

7.6 Fuse protection of the supply current circuit



DANGER

Insufficient fuse protection of the units

Insufficient fuse protection of the units can result in fire, electric shock, personal injury or material damage.

- Protect the supply current circuits at all poles in accordance with the nominal current of the electric motors.
- In the case of unmonitored installations, overcurrent protection in accordance with EN 60204-1:2006, 7.2 must be provided.



We recommend the installation of a motor protection circuit breaker. A minimum of one line cable fuse with nominal current + 10% unless specified otherwise.

7.7 Motor protection - temperature

The units are partially equipped with protection devices such as temperature sensors, thermostats, thermistors, or other thermal protection devices. When connecting these protection devices, maximum safety must be ensured.



Units with a temperature switch start again automatically after they have cooled down.



DANGER

The temperature switch may suffer damage from a motor lockage or a short circuit in the motor winding

Insufficient fuse protection of the electric motors can result in fire, electric shock, personal injury or material damage.

- Installation of a circuit breaker.



DANGER

Insufficient fuse protection of the electric motors in unmonitored installations

Insufficient fuse protection of the electric motors can result in fire, electric shock, personal injury or material damage.

- Installation of a circuit breaker.
- The temperature switch must be connected to a suitable relay.

7.8 Circuit diagrams

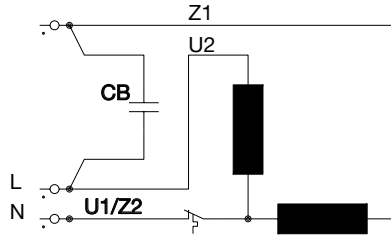


Figure 2: Single-phase ac motors

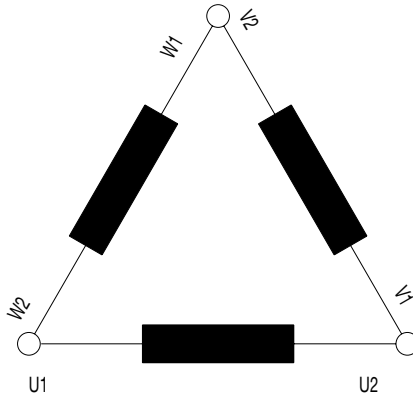


Figure 3: 3-phase motors, triangle connection

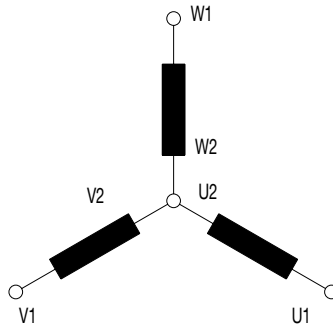


Figure 4: 3-phase motors, star connection

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DC permanent-magnet motors

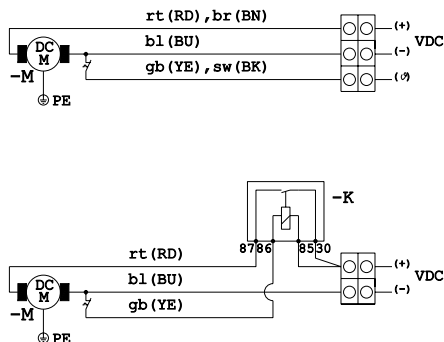


Figure 5: Motor connection with DC permanent-magnet motors

- M Motor
- K Relay

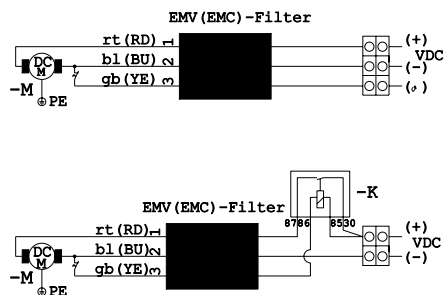


Figure 6: Connection of interference suppression filter with DC permanent-magnet motors

- M Motor
- K Relay

8 Commissioning and first start-up

Ambient conditions during operation

| | | |
|-----------------------------|----|-----------|
| Temperature | °C | +5 to +40 |
| Relative humidity | % | 10 to 90 |
| Maximum installation height | NN | ≤1000 m |



DANGER

Serious personal injury and damage to property from ejected feather key

Commissioning the unit without drive elements can result in ejection of the feather key

- › Remove or secure the feather key against being ejected prior to commissioning.

Comply with the following points before first commissioning:

- Compliance with minimum insulation resistances (check insulation resistance if necessary)
- Rotor rotates freely.
- Unit has been fitted and aligned correctly.
- Drainage openings (if any) are facing downwards and are open.
- Drive elements are suitable for the operating conditions and have been adjusted correctly (e.g. belt tension).
- Electrical connections, fixing screws and connecting elements have been installed and implemented in accordance with specifications.
- Protective conductor connections have been installed correctly.
- Compliance with all generally necessary measures for protection against contact with the drive elements.



The operating instructions of the complete system assume priority during the first commissioning of an installed unit.

Comply with the following points during commissioning:

- Check direction of rotation.
- Check running smoothness.
- Operate unit with nominal load and compare operating current with the model identification plate.



9 Operation

Once the units have been installed, the operating instructions of the complete system are binding. Information on operating the unit can be found in the Operating Instructions of the complete system

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10 Maintenance



CAUTION

Burns from hot surfaces

The surfaces of the unit are hot during operation

- › Allow surfaces to cool down before performing operating or maintenance work.



De-energise the unit prior to working on it or in the event of potential danger (e. g. pull the mains plug) and prevent it from being switched back on again.


10.1 Maintenance schedule

| Maintenance interval | Maintenance work |
|----------------------|---|
| Monthly | › Clean the surface of the unit with a non-fuzzing cloth. Keep the ventilation openings free from dust and impurities. |
| Monthly | › Check the condition of all connections, supply lines, and connecting elements (e.g. screws) for tightness and intactness. |

*Maintenance intervals depend on the unit type as well as the working and environmental conditions.

11 Taking out of use

11.1 Taking the unit out of use

 During shutdown of an installed unit, the operating instructions of the complete system are binding.

- › Switch off the unit.
- › Disconnect the mains plug.

11.2 Storage of the unit

- › Protect the unit against moisture, dirt and extreme temperatures during storage (refer to the section on "Ambient conditions").



12 Units for alternating current



Any repairs above and beyond routine maintenance must only be carried out by suitably qualified personnel or by one of our service technicians.



De-energise the unit prior to working on it or in the event of potential danger (e. g. pull the mains plug) and prevent it from being switched back on again.

| Problem | Probable cause | Solution |
|---------------------|---|---|
| Unit does not start | No power supply voltage | › Inform an electrician. Check mains fuse and if possible, switch on unit again. If the safety fuse is defective, replace it. |
| | Undervoltage or overvoltage | › Inform an electrician. Measure power supply voltage. |
| | Condensor defective | › Inform a service technician. Check condensor and replace if necessary. |
| | Motor defective | › Replace the unit. |
| | Temperature switch in the unit has tripped (not present in all units) | 1. Allow the unit to cool down. Ensure better cooling. Warning: unit restarts automatically. |
| | 1. High ambient temperature 2. Mechanical sluggishness | 2. Factory repair. |
| | Circuit breaker has switched off | › Inform an electrician. › Check the setting of the motor protection switch. › Determine cause. |
| | Bearing damaged | › Inform a service technician. |

13 Units for direct current



Any repairs above and beyond routine maintenance must only be carried out by suitably qualified personnel or by one of our service technicians.



De-energise the unit prior to working on it or in the event of potential danger (e. g. pull the mains plug) and prevent it from being switched back on again.

| Problem | Probable cause | Solution |
|-----------------------------------|--|---|
| Unit does not start | Operating voltage too low | › Inform an electrician. Charge or replace the battery, check the voltage supply. |
| | Voltage supply interrupted | › Inform an electrician. Check supply line. |
| | Defective relay | › Inform an electrician. Replace relay. |
| | Motor defective | › Replace the unit. |
| | Temperature switch in the motor (not fitted in all units) has switched off | 1. Allow the unit to cool down. Ensure better cooling. Warning: unit restarts automatically. |
| | 1. High ambient temperature | 2. Factory repair. |
| | 2. Mechanical sluggishness | 3. Factory repair. |
| | 3. Temperature switch defective | |
| | Carbon brushes worn down | › Factory repair or repair by electrician. (Follow the installation instructions included in the relevant spare parts set). |
| Commutator defective or worn down | › Factory repair. | |
| Mechanical sluggishness | › Factory repair. | |



Service / Spares ordering service

ESTAN Elektromaschinen
und Steuerungsbau GmbH
79418 Schliengen
Tel.: +49 7635-82456 -0
Email: info@estan.de

The following information is required when ordering spare parts:

- Type designation and item number
- Order number as appears on the spare parts list
- Quantity required
- Exact shipping address
- Shipping information

Repairs / Returns

Use the original packaging when returning units, if possible. Always pack the units in a plastic bag. Use recyclable packing material.

Return delivery address

ESTAN Elektromaschinen
und Steuerungsbau GmbH
Burgunderstraße 6
79418 Schliengen
-Germany-

Addresses ESTAN worldwide

www.estan.de

ESTAN Elektromaschinen
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