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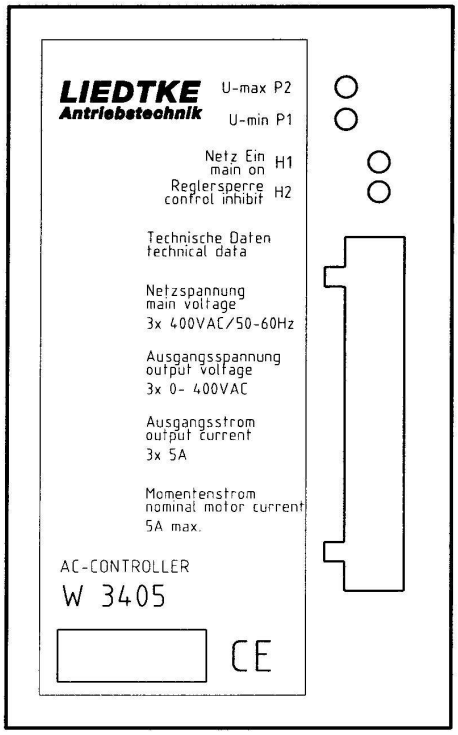
Technical device manual

AC power controller W3405



Before the installation and before putting into operation please read this technical device manual.
It contains important safety information regarding the protection of the user as well as information for the proper use of this device !

Caution Fitting note :
No strong power transmission to the housing rear.

Important safety information

The device may only be installed and connected by an electrically skilled person with the aid of this manual. National standards and safety regulations must be observed (see DIN V VDE V 0100534... or IEC 60364-5 534:...).
The device must be checked for external damage prior to installation. If any damage or other defects are detected in this check, the device must not be installed.
Its use is only permitted within the limits shown and stated in these manual. The device and the equipment connected to can be destroyed by loads exceeding the values stated. Opening or otherwise tampering with the device invalidates the warranty.

The manufacturer does not take over any responsibility for any consequences resulting from incorrect or negligent installation, change of existing parameters of the devices or the false combination with peripheral components.

A device-independent auto power ON/OFF must be guaranteed.
Fuses may only be replaced by fuses of the same type.
The operation of the device is only permitted with connected protective conductor.

In case of an error it might occur that for safety reasons the device shuts down by itself and causes the motor to stop. The removal of the defect can lead to an automatic restart of the drive.
If, for safety reasons, this is not permissible, then the operator of the system has to prevent an auto-restart by using appropriate measures.

For reference and actual lines you have to use shielded lines.
To this please also note the hints for an EMC-proper installation.

In the devices are used components which are sensitive to electrostatic discharges.
During the operation, installation and maintenance, measures have to be taken in order to avoid electrostatic discharges.

Lacquer-sealed potentiometers are basic settings of the device and may not be changed.
Lacquer-sealed screws serve for important safety functions and may not be opened.

Attention:
As a basic principle the device has to be made dead before any contact.
In case of non-observance there is the possibility of an electrical shock.

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1. Product description W3405

1.1 General description of the AC power controller

The AC power controller of the Type W3405 is a compact device to adjust the torque and the tensile force on the AC winder.

The device is designed for the installation in a switch-cabinet.
The device complies with the protection class IP20.

The output voltage can be adjusted steplessly variable through a three phase-angle control from an adjustable minimum voltage (main feature) up to the approximate mains voltage via a potential-free reference input (0...10VDC).
Via a further floating reference input it is possible to connect a correction voltage.

Potential free inputs for:
- control inhibit
- set point 1
- set point 2

Optionally the AC-Controller W3405 can be delivered with braking unit B270:

Type W3405 BR (AC-Controller with DC braking)
Function specification and adjustment see description – braking unit B270

1.2 Ambient conditions

Housing:	Switch-board installation, Protection class IP20
Operating environmental temperature:	**0 ... +40°C**
Performance-reduction:	Performance-reduction 2% per °C at environmental temperatures over +40°C.
Storage temperature range:	-25°C … +85°C
Transport temperature range:	-25°C … +85°C
Relative humidity:	min. 15% relative humidity max. 80% rel. humidity; not condensing A bedewing of the device is not permitted [1)]

Installation height:

Height	operating temperatures
1000m	+40°C
1500m	+36°C
1500m	+32°C
1500m	+28°C
1500m	+24°C

Installation position:	vertical; distance to other components always at least 30mm.
Air pollution degree:	1 acc. to IEC 664

1) In case of need use the heating of a switch-cabinet to avoid a condensation or use an aeration to avoid that the admissible operating environmental temperature range from 0° to +40°C will be exceeded. For this we recommend the installation of a frost / temperature controller.

1.3 Connecting data

Mains supply voltage:	3 x 400VAC* / +/-10% *Special voltages are possible on request
Mains frequency:	50-60Hz (automatic adaptation)

Electrical device data:

Motor voltage:	approx. 0V up to approx. 3 x 400VAC adjustable via a three phase-angle control

The motor voltage can be adjusted with the aid of two potentiometers to the minimum and maximum value; (The potentiometers are operable from the front).

Motor current:	approx. 0…5A
Control inhibit:	switched with internal or external +24VDC signal
Reference input 1:	0 up to +10VDC
Reference input 2:	0 up to +10VDC

Note: If you use both reference inputs then please make sure that the sum of the reference values does not exceed +10VDC.

1.4 Device protection

Note: In order to avoid damages to the device or to external components it is absolutely necessary only to use the type of fuse mentioned in the following.

The internal fuses are located in fuse retainers on the board and are thought for the protection of the internal electronics.

Fuse type: 1A MT - size 5 x 20 mm

Principally, the power supply has to be protected externally.

For the protection of the semiconductors the following fuse types have to be built in mains-sided:

The device may be protected at a maximum with semiconductor fuses of the type **6A FF** (3x) .

Below this value the mains-sided protection may be adjusted to the used motor.

2. Notes on connecting and wiring

2.1 Control terminals

Terminal strip: **X1** (potential free range)

Type of terminal: plug-in screw terminal – 10 poles
cable cross-section max. 2,5 mm²

Terminal-No.:	**Function:**	
Term. 11	Control inhibit (internal supply voltage +15VDC)	
Term. 12	(Variant 1)	Input for internal control inhibit (+15VDC via contact of terminal 11 make connection from terminal 13 to terminal 19).
	(Variant 2)	Input for the external control signal of the control inhibit (+24VDC external with external GND at terminal 13)
	Attention:	1-Signal corresponds to the controller release
Term. 13	GND in case of external control inhibit	
Term. 14	+10VDC	- potential free
Term. 15	Input for set point 1	
Term. 16	Device GND	- potential free
Term. 17	+10VDC	- potential free
Term. 18	Input for set point 2	
Term. 19	Device GND	- potential free
Term. 20	Device GND	- potential free

Note: If you use both set point inputs,
then the sum of the set points may not exceed +10VDC.

2.2 Power terminals

Terminal strip: **X2** (potential free range)

Type of terminal: plug-in screw terminal – 7 poles
cable cross-section max. 2,5 mm²

Terminal designation:	**Functions:**
Term. 1	Protective conductor **VERY IMPORTANT ! Essential connection ! Operation without protective conductor is not approved !**
Term. 2	Connection Phase L1
Term. 3	Connection Phase L2
Term. 4	Connection Phase L3
Term. 5	Motor connection U
Term. 6	Motor connection V
Term. 7	Motor connection W

2.3 General hints for an EMC-suitable installation

In order to observe the electromagnetic compatibility (EMC) please note the appropriate guidelines and instructions.
This applies especially to:
- installation
- earthing
- filtration
- shielding

For making deviating installations e.g.
- using unscreened cables,
- using of group filters instead of the assigned RFI filters,

the conformity to the EMC directive requires a check of the machine or system regarding the EMC-limit value.
The user is responsible for the observance of the EMC- guideline in case of industrial use. If all units / plant components comply with the CE- requirements for noise immunity, electromagnetic interferences will not occure.

2.4 Wiring hints for an EMC-suitable installation

If following measures are observed, it is be sure that the drive system will not cause any EMC problems when running the machine and the EMC directive is fulfilled.

Assembly
- Connect as much surface as possible of the inverter and RFI filter to the grounded mountig plate. Mounting plates with conductive surfaces (zinc-coated, cadmium-coated) allow permanent contact. If the mounting plates are painted, the paint must be removed from the mounting surface.
- When using several mounting plates:
  Connect as much surface as possible to the mounting plates (e.g. using copper bands)
- Ensure the separation of motor cable and signal or mains cable.
- Separate terminal strip for mains input and motor output
- Cable guides as close as possible to the reference potential, to avoid aerial effects.

Filters
RFI filters reduce high-frequency disturbances to a permissible value.
Please only use the recommended interference filter HDF 156-400/6.

Screens
- Connect the screen of the motor cable near to the inverter with as much surface possible to the mountig plate. Recommendation: For connection, use gound clamps on bare metal mounting surface.
- If contactors, motor protection switches or terminals are located in the motor cable:
  Connect the screens of the connected cable unified and also to the mounting plate with as much surface as possible.
- Connect the screen in the motor terminal box to PE
  Metal cable glands at the motor terminal box ensure a connection of the screen and the motor housing with as much surface as possible.
- If the mains cable between mains filter and inverter is longer than 300mm:
  Screen mains cables, connect the screen of the mains cable directly to the inverter and to the mains filter and connect it to the mounting plate with as much surface as possible.
- Screen the control cables:
  Connect one screen end of the analog signal cables to PE
  Connect the screen of the control cables to the mounting plate with as much surface as possible.

Grounding
Ground all metallically conductive components using suitable cables connected to a central point (PE-bar). Maintain the minimum cross-sctions prescribed in the safety regulations. For EMC, not the cable cross-section but the surface and the contact with a large surface is important.

3. Function setting

3.1 Trim potentiometer

Note: The potentiometers which are accessible from the outside, are – as their names applies – provided for the optimisation of the device.
They can be freely adjusted within their permitted adjustment ranges.
Please take note that the critical values for the device regarding output voltage and output current will not be exceeded. This can lead to damages at the device. The internal potentiometers are factory settings and may not be changed.
All potentiometers have their lowest value at the left end-stop or set the function to zero.

Potentiometer:	**Function:**
P1:	minimum voltage at the motor (=basic tension force)
P2:	rated voltage at the motor (=maximum tension force)

3.2 Adjusting the basic tension force

With the front-sided operable potentiometer **P1** a basic tension can be adjusted at set point zero (both set point potentiometers at left end-stop). For this the potentiometer **P1** will be turned until after the desired basic tension has been reached.

3.3 Adjusting the maximum tension force

With the front-sided operable potentiometer **P2** there can be adjusted the maximum tension force at set point +10V. For this the potentiometer **P2** will be turned until after the desired tension force has been reached. Hereby it has to be observed, that the max. output voltage may lie approx. 10…20V below the mains supply voltage.

Additionally it has to be secured, that the maximum device current of **5A** never will be exceeded. If necessary the output voltage will have to be reduced in order to adjust the current limit to the maximum permissible value.

4. Displays

4.1 Light-emitting diodes

Description:	**Function:**
H1 (green) mains ON	Lights if the mains voltage is switched in and the internal supply voltage is provided.
H2 (red) Control inhibit	Goes off if the controller has been released. Lights if the controller is blocked.