

Operating Instruction Eta-K

BA 154 EN - Edition 03/12

Translation

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These documents must be kept with the unit.

Further documentation can be found under

www.bauergears.com

1 Symbols

1.1.1 Purpose of the Manual

These Operating Instructions include safety regulations and are intended as a user's guide to ensure quick installation and commissioning of Eta-K motors. A detailed description of all parameters and the telegram format of the serial interface can be seen from the Design Guide.

1.1.2 Symbols

When reading these Operating Instructions, you will come across different symbols that require special attention. The symbols used are the following.



NB!

Indicates something to be noted by the reader.



Indicates a general warning.



Indicates a high-voltage warning.

*

Indicates default setting

2 Safety

2.1.1 High Voltage Warning



The voltage of the Eta-K is dangerous whenever the equipment is connected to the mains. Incorrect installation may cause equipment failure, serious personal injury or even death. Consequently, the instructions in this manual, as well as applicable national and international rules and safety regulations, must be complied with. Touching the electrical parts may be fatal - even after the equipment has been disconnected from mains. Wait at least 4 minutes.

- The installation must be properly protected and isolated.
- All covers must be in place.



NB!

The user or the electrician installing the equipment is responsible for ensuring that proper earthing and protection of the unit are carried out in accordance with applicable national and local regulations and standards.

2.1.2 Safety Regulations

1. The Eta-K must be disconnected from mains if repair work is to be carried out. Check that the mains supply has been disconnected and that the necessary time (4 minutes) has passed.
2. It is to be ensured that, in accordance with local and national regulations, correct earthing of the equipment is established, the user is protected against supply voltage, and the ETA-K is protected against overload. RFI-switch, protective multiple earthing or normal earthing can be used as extra protection, taking into account any applicable, local safety regulations. In the case of an earthing fault, a DC voltage content may develop in the fault current.
If RFI-switches are used, local regulations must be complied with. The relays used must be suitable for protection of three-phase AC units with bridge rectifier and for a short discharge upon power-up.
3. The earth leakage current is higher than 3.5 mA. Consequently, a permanent installation and extra protective earthing are required for the Eta-K.

2.1.3 Warning against Unintended Start

1. The motor can be brought to a stop by means of a digital command, a bus command or a setpoint, even if the Eta-K is still connected to mains. If, however, personal safety considerations make it necessary to ensure that no unintended start occurs, these stop functions are not sufficient.
2. During programming of the Eta-K, the motor may start without warning.
3. A motor that has been stopped may start if the electronics of the Eta-K are defective, or if a temporary overload or a fault in the supply voltage ceases.

2 Safety

2.1.4 General Warning



Touching the electrical parts may be fatal - even after the equipment has been disconnected from mains. Wait at least 4 minutes.



Installation at high altitudes:

At altitudes above 2000 m, please contact Danfoss Drives regarding PELV.

3 Installation

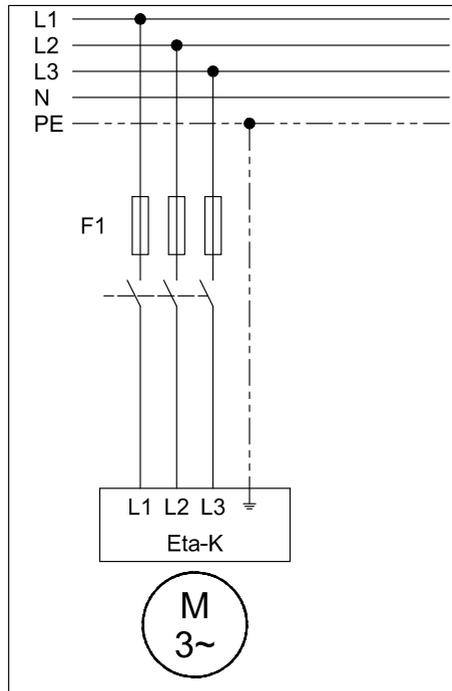
3.1 Mechanical Installation

To avoid overheating of the frequency converter, it must be ensured that the ambient temperature does not exceed 40° C and the 24-hour average temperature does not exceed 35° C. If the ambient temperature is in the range of 40-55° C, only a reduced output load is available for continuous operation. See also the section on derating in the Design Guide. If several Eta-K motors are installed close to each other, it is to be ensured that no recirculation of hot output air occurs.

3.2 Electrical Installation

All terminals are located in the converter housing, which can be accessed by removing the cover fastened by four screws. Remove the blind plug and feed the cable through the orifices. For correct cable and union sizes see Technical Data.

3.2.1 Connection Diagram, Power Section Mains



Mains Connection:

Mains terminals

L₁, L₂ und L₃

Mains voltage

3 x 380-480 V ± 10 %, 50/60 Hz

3 Installation

Connect the three mains phases to terminals L1, L2, and L3 and connect the earthing to the appropriate terminal.



NB!

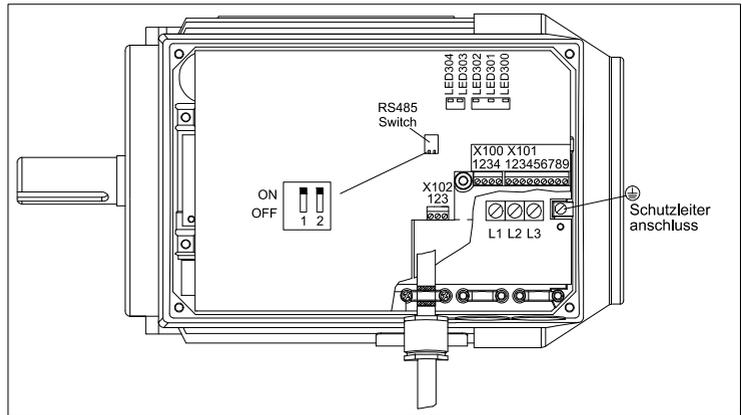
Reversing the direction of rotation of the motor by switching two phases is not possible. The motor shaft turns clockwise as standard (forward).



NB!

Eta-K motors are suitable for operation on TT, TN and IT mains. Where the version with radio interference filter 1B (Domestic) is used, operation on TT and TN mains is possible.

3.2.2 Connection of Terminals



3 Installation

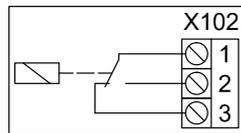
3.2.3 Control Section

| Terminal No. | Function | Technical data |
|--------------|-----------------------------------|------------------------------------------------------------|
| 1 | Analog current input | 0-20 mA, Ri approx. 300 Ω |
| 2 | Analog voltage/digital input | 0-10 V DC, Ri approx. 10 kΩ/ 0-24 V DC, Ri approx. 2 kΩ |
| 3 | Digital input | 0-24 V DC, Ri approx. 2 kΩ |
| 4 | Digital input | < 5 V = logic "0" |
| 5 | Digital input | > 10 V = logic "1" |
| 6 | 24 V DC supply for digital inputs | Max. 150 mA |
| 7 | 10 V DC supply for potentiometer | Max. 15 mA |
| 8 | 0 V DC for terminals 1-7 and 9 | |
| 9 | Analog current/digital output | 0-20 mA, max. 500 Ω / 0-24 V DC, max. 25 mA |

Table 3.1: X101: Terminal block for analog/digital control signals

| Terminal No. | Function | |
|--------------|-------------------------|-------------------------------------------------------------------|
| 1-2 | Make (normally open) | See parameter 323 (relay output) for programming of relay output. |
| 1-3 | Brake (normally closed) | |

Table 3.2: X102: Terminal block for relay output



| Terminal No. | Function | Description |
|--------------|----------|-----------------------------|
| 1 | P RS 485 | For connection to bus or PC |
| 2 | N RS 485 | |
| 3 | 5 VDC | Supply for RS |
| 4 | 0 VDC | RS 485 Bus |

Table 3.3: Serial interface X100: Terminal block for data communication

If connection is established via the serial communication interface RS 485, the bus must be closed at both ends by a resistor network. This can be obtained by setting both of the RS 485 switches to ON. For a description of the PRO-FIBUS version, see Danfoss Manual MG90.AX.YY for FCM 300 under www.danfoss.com

3 Installation

3.3 Status and alarm messages

3.3.1 Status Display

| LED | 300-304 | Message |
|-----|--------------|---------------|
| LED | 300 (red) | Fault trip |
| LED | 301 (yellow) | Warning |
| LED | 302 (green) | Power on |
| LED | 303-304 | Communication |

3.3.2 Reset after a fault

After correction of the fault the Eta-K must be reset by a signal to digital input (see 3.4 Standard connection control terminals) or by cutting off mains supply.



NB!

Certain faults are causing a trip lock. In these cases the Eta-K only can be reset by cutting off mains supply.

3.4 Standard connection control terminals

Eta-Ks have their parameters set in the factory, as shown in the connection diagram for operation in 2 directions of rotation with analogue reference by a voltage value of 0 to 10 V and reset after a fault via an external signal or by cutting off mains supply. To change these settings, use the optional control panel LCP2 or a PC with MCT 10 software (see 5. Accessories).

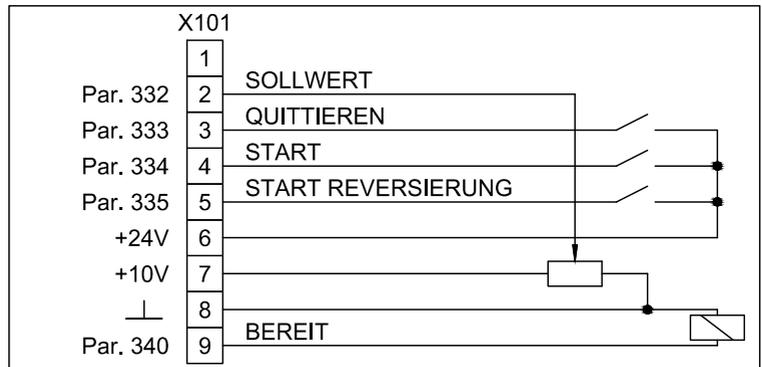


Illustration 3.1: The value of an external potentiometer for the reference must be between 1 kOhm and 5 kOhm.

3 Installation

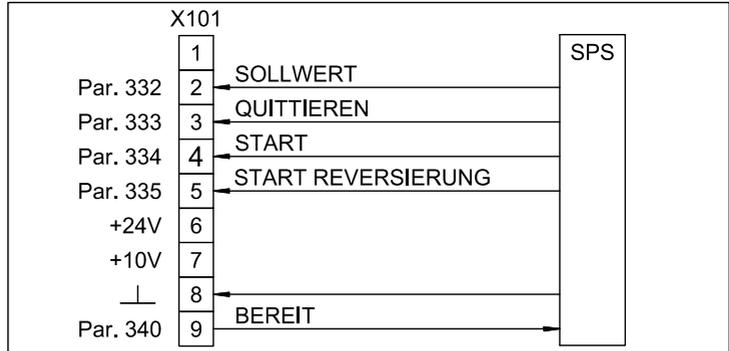


Illustration 3.2: Control signals from SPS

| Par.-No. | Value | Comment |
|----------|---------------------|-------------------------------------------------------------------|
| 200 | 132 Hz BOTH DIRECT. | Allows operation in both directions of rotation |
| 331 | NO OPERATION | |
| 332 | REFERENCE | 0 - 10 VDC |
| 333 | RESET | Short signal resets converter after fault trip back to ready mode |
| 334 | START | Logic "1" Terminal 4 Right rotation |
| 335 | START REVERSING | Logic "1" Terminal 5 Left rotation |
| 340 | UNIT READY | Eta-K ready (no fault) Output 24V DC |
| 405 | RESET AT POWER-UP | Automatic reset after fault trip at switching on mains supply |

3.5 EMC-correct Installation

To obtain EMC-correct electrical installation, the control cables must be screened/armoured. The screen/armour is to be earthed at both ends. Avoid installation with twisted screen ends (so-called pigtails), as this reduces the screening/armouring effect at high frequencies. Use cable clamps instead.

3 Installation

3.6 Technical Data

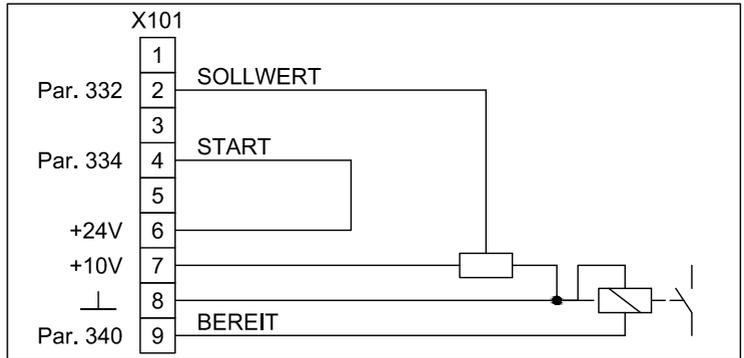
| Eta-K-type | | K305 | K307 | K311 | K315 | K322 | K330 | K340 | K355 | K375 |
|-----------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------|------|------|------|------|------|-------------------------|------|------|
| Output | | | | | | | | | | |
| Output voltage | V | 3 x 0 ... U _{MAINS} | | | | | | | | |
| Output frequency | Hz | 0 ... 132 | | | | | | | | |
| Ramp times, adjustable | s | 0.15 - 3600 | | | | | | | | |
| Input | | | | | | | | | | |
| Supply voltage | V | 3 x 380 ... 480 +/- 10 % | | | | | | | | |
| Input current at 380 V | A | 1.4 | 1.7 | 2.5 | 3.3 | 4.7 | 6.4 | 8.0 | 11.0 | 15.5 |
| Input current at 480 V | A | 1.1 | 1.3 | 2.0 | 2.6 | 3.7 | 5.1 | 6.3 | 8.7 | 12.3 |
| Supply frequency | Hz | 50/60 | | | | | | | | |
| Max. mains cable cross-section | mm ² | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 10 | 10 |
| Max. control cable cross-section | mm ² | 1.5 | | | | | | | | |
| Max. cable cross-section for serial interface | mm ² | 1.5 | | | | | | | | |
| Max. prefuse | UL ¹⁾ [A] | 10 | 10 | 10 | 10 | 10 | 15 | 15 | 25 | 25 |
| Max. prefuse | IEC ¹⁾ [A] | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Power factor / cos phi | | max. 0.9 / 1.0 at rated load | | | | | | | | |
| Switching on supply input | x/2 min. | approx. 1 | | | | | | | | |
| Enclosure | | | | | | | | | | |
| Enclosure | | IP 65 | | | | | | | | |
| Ambient temperature range | °C | (-10)...0 to +40 (24-hour average max. +35) for operation / -25 to +65/70 for storage/ transport | | | | | | | | |
| Relative humidity | % | max. 95 (IEC 68-2-3) for storage/transport/operation | | | | | | | | |
| Vibration test (IEC 68) | g | 1 | | | | | | | | |
| Gland sizes | | 3xM20x1,5 | | | | | | 1xM25x1,5, 2xM20x1,5 | | |

¹⁾Type gG prefuses must be used. If you want to maintain UL/cUL you must use prefuses of the type Bussmann KTS-R 500 V or Ferraz Shawmut, ATMR Class C (max. 30A). The fuses must be placed for protection in a circuit that is capable of supplying a maximum of 100,000 amps RMS (symmetrical), 500 V maximum.

4 Connection Examples

4.1.1 One direction of rotation with analogue reference (voltage) and reset via mains cut off

The direction of rotation of the motor can be changed by changing the start signal from terminal (motor shaft right rotation) to terminal 5 (motor shaft left rotation) or by re-programming Parameter 334 to „START REVERSING“



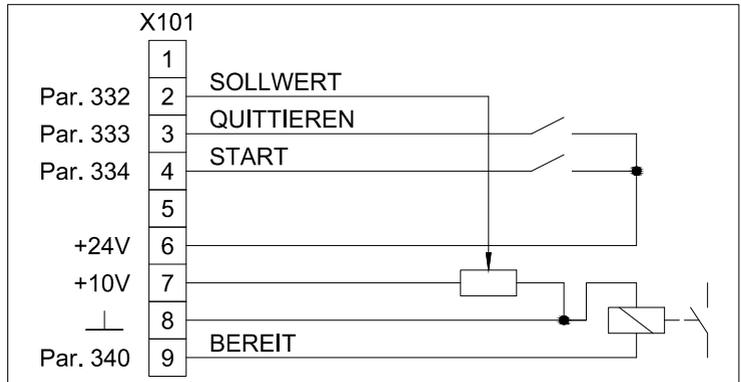
| Par.-No. | Value | Comment |
|----------|-------------------|-----------------|
| 331 | NO OPERATION | |
| 332 | REFERENCE | |
| 333 | NO OPERATION | |
| 334 | START | |
| 335 | START REVERSING | |
| 340 | UNIT READY | Eta-K ready |
| 405 | RESET AT POWER UP | Automatic reset |

In combination with the reference potentiometer (see 5.1.1), this connection variant is recommended as a replacement for mechanical adjustable gear motors. The motor is stopped by the supply of a reference of 0 or mains off.

4.1.2 One direction of rotation with analogue reference (voltage) and reset via terminal

The direction of rotation of the motor can be changed by changing the start signal from terminal 4 (motor shaft right rotation) to terminal 5 (motor shaft left rotation) or by re-programming Parameter 334 to „START REVERSING“.Eta-K Operating Instructions 4. Connection Examples MG.

4 Connection Examples



| Par.-No. | Value | Comment |
|----------|--------------|---------------------------|
| 331 | NO OPERATION | |
| 332 | REFERENCE | |
| 333 | RESET | |
| 334 | START | |
| 335 | NO OPERATION | |
| 340 | UNIT READY | |
| 405 | MANUAL RESET | Manual reset via terminal |

4.1.3 2 RPM values + 2 directions of rotation

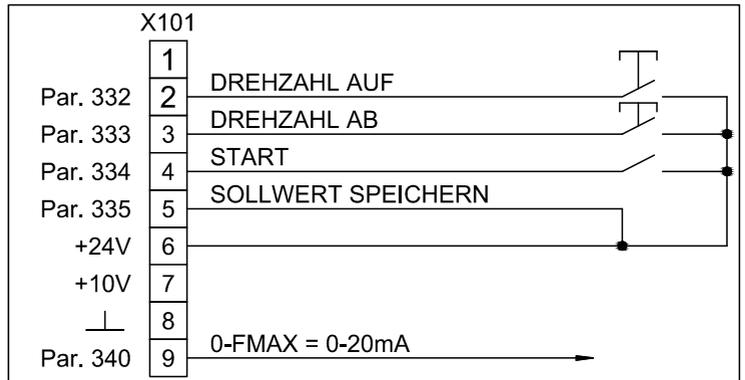
Right rotation or left rotation of the motor is obtained by a signal to terminal 4 or 5. With this connection variant, the drive can be used as a replacement for change pole motors.



4 Connection Examples

| Par.-No. | Value | Comment |
|----------|------------------|------------------------------------------------------------------------------------------------------------------|
| 331 | NO OPERATION | |
| 332 | PRESET REFERENCE | Logic "0" corresponds to preset reference 1 (par. 215) Logic "1" corresponds to preset reference 2 (par. 216) |
| 333 | RESET | |
| 334 | START | |
| 335 | START REVERSING | |
| 340 | UNIT READY | |

4.2.1 Motor Potentiometer



| Par.-No. | Value | Comment |
|----------|-------------------|---------------------------------------------------------------------------------------|
| 331 | NO OPERATION | |
| 332 | SPEED UP | A voltage pulse of min. 20ms and pause of min. 20ms will lead to a RPM change of 0.1% |
| 333 | SPEED DOWN | |
| 334 | START | |
| 335 | FREEZE REFERENCE | The current reference is stored |
| 340 | 0-FMAX = 0-20 mA | Output of an electrical signal proportional to the current frequency |
| 405 | RESET AT POWER UP | |

4 Connection Examples

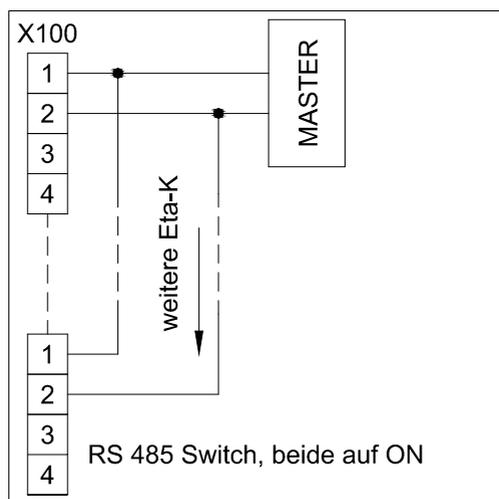
4.3.1 Profibus DP

In the Profibus version, the Eta-K has an integrated Profibus DP interface (max. baudrate: 3 or 12 Mbaud). You can download the GSD data file from the Internet: www.danfoss.com/BusinessAreas/DrivesSolutions → Software Downloads → Fieldbus Setup Files → Profibus. After the download choose the appropriate file for FCM 300.

| Par.-No. | Value | Comments |
|----------|-----------------|-----------------------|
| 904 | e.g. PPO TYPE 1 | depends on use |
| 918 | e.g. 6 | enter station address |



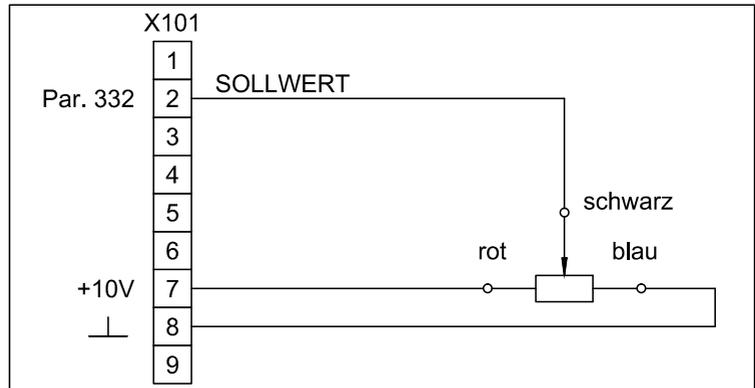
NB!
Description of the PROFIBUS version - see Danfoss manual MG.90.AX.YY for FCM 300.



5 Accessories

5.1.1 Reference Potentiometer

For local supply of the RPM reference, a potentiometer with enclosure IP 65 is available. The potentiometer is already mounted from outside in the middle gland of the converter and also complete wired at the factory. Resistance 1 kOhm, angle of rotation 270°.



5.2.1 PC Software - MCT 10

All Eta-K's are equipped with a serial communication port RS 485. For communication between PC and Eta-K a PC tool (MCT 10) is available on CD-ROM.

MCT 10 Setup Software

MCT 10 has been designed as an easy to use interactive tool for setting parameters in our frequency converters.

The MCT 10 Setup Software will be useful for:

- Planning a communication network off-line. MCT 10 contains a complete frequency converter database
- Commissioning frequency converters online
- Saving settings for all frequency converters
- Replacing a drive in a network
- Expanding an existing network
- Future developed drives will be supported

The MCT 10 Setup Software Modules

The following modules are included in the software package:

MCT 10 Setup Software

- Setting parameters
- Copy to and from frequency converters
- Documentation and print out of parameter settings incl. diagrams

SyncPos

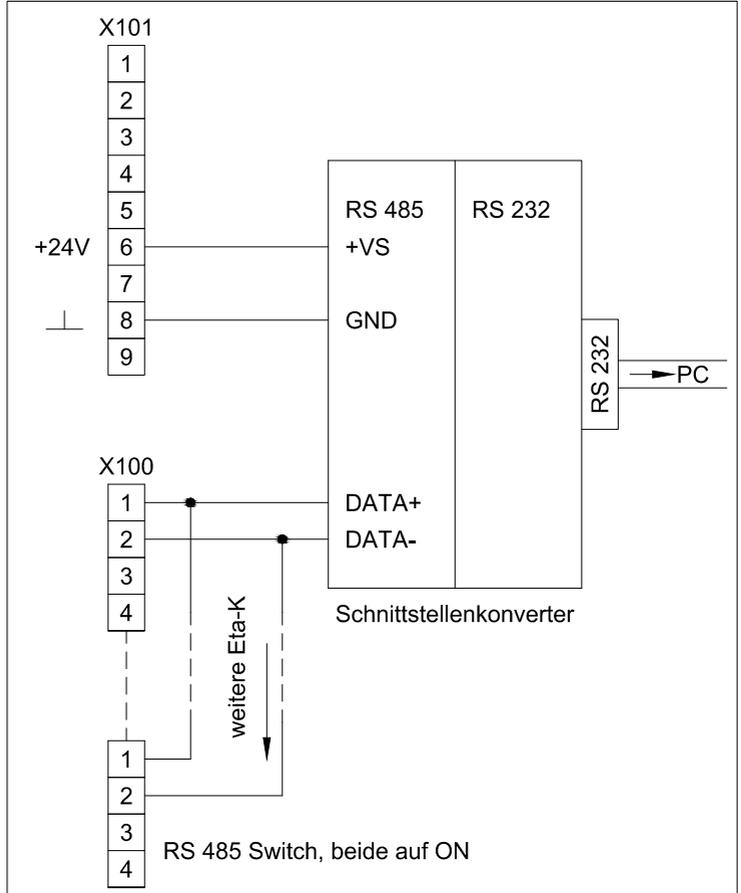
Creating SyncPos programme

5 Accessories



NB!

Please note that an interface converter (RS 232 PC interface to RS 485 converter interface) is required to connect a PC to the Eta-K.



Note: A light version of the MCT 10 software can be downloaded from the Internet: www.danfoss.com/BusinessAreas/DrivesSolutions → Software Downloads → MCT10

5 Accessories

5.3.1 Control panel (LCP 2)

Eta-K optionally features a Local Control Panel - LCP 2 which makes up a complete interface for operation and monitoring of the Eta-K. IP 65 on front.



NB!

The LCP from the VLT 5000 Series cannot be used for the Eta-K. However, the general LCP 2 can be used for both the FCM 300, Eta-K, VLT 2800 and the VLT 5000 Series.

LCP-installation

The LCP 2 is connected to the terminal X100, 1-4

5 Accessories

LCP functions

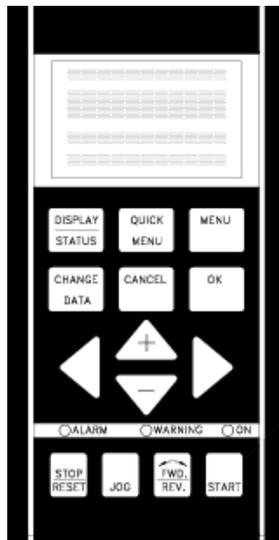
The functions of the control panel can be divided into three groups:

- display
- keys for changing program parameters
- keys for local operation

All data are indicated by means of a 4-line alpha-numeric display, which in normal operation is able to show 4 measurements and 3 operating conditions continuously. During programming, all the information required for quick, effective parameter Setup of the Eta-K will be displayed. As a supplement to the display, there are three LEDs for voltage, warning and alarm.

All program parameters of the Eta-K can be changed immediately from the control panel, unless this function has been blocked via parameter 018.

A detailed description of the LCP can be found in the Danfoss-Design Guide MG.03.HX.YY for FCM 300.



Two cable versions are available for connection to the Eta-K:

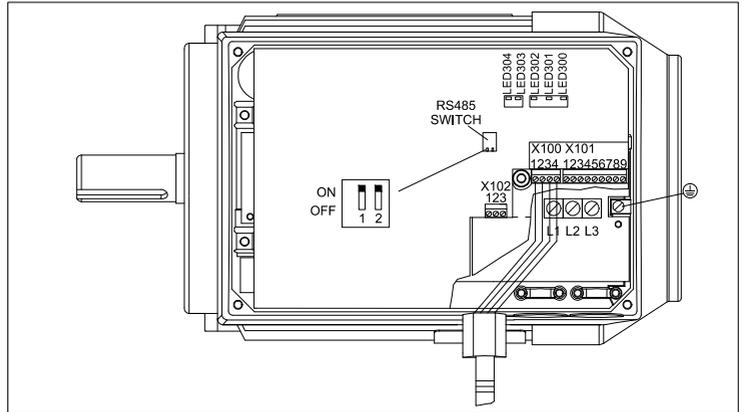
- Cable for direct connection of the LCP to terminal block X100.
- Cable for plug kit. Used together with plug kit (see 5.4) or service plug kit (see 5.7)

5 Accessories

5.4.1 Plug Kit

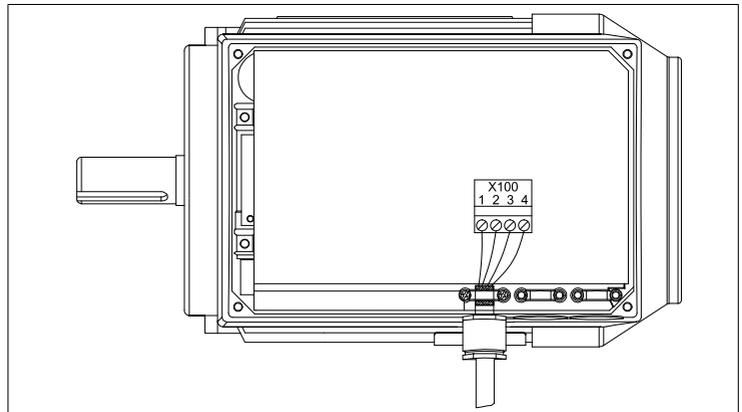
Purpose:

To make a plugable connection between LCP2 and Eta-K.
Used together with cable for plug kit (see 5.3).



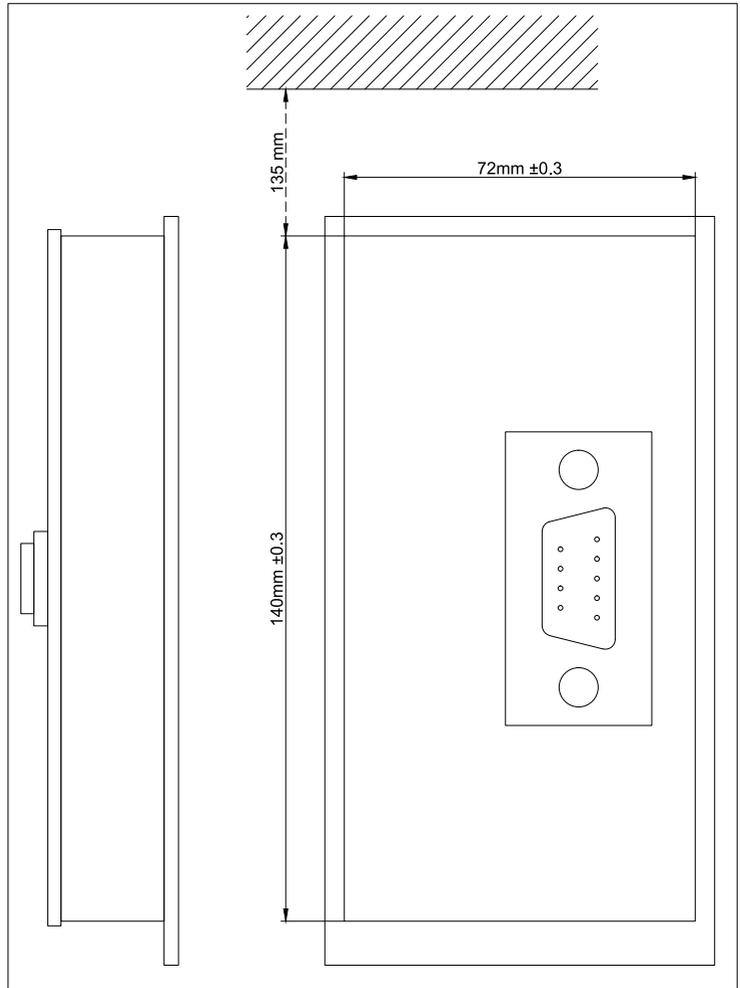
5.5.1 Remote Mounting Kit

Connections:

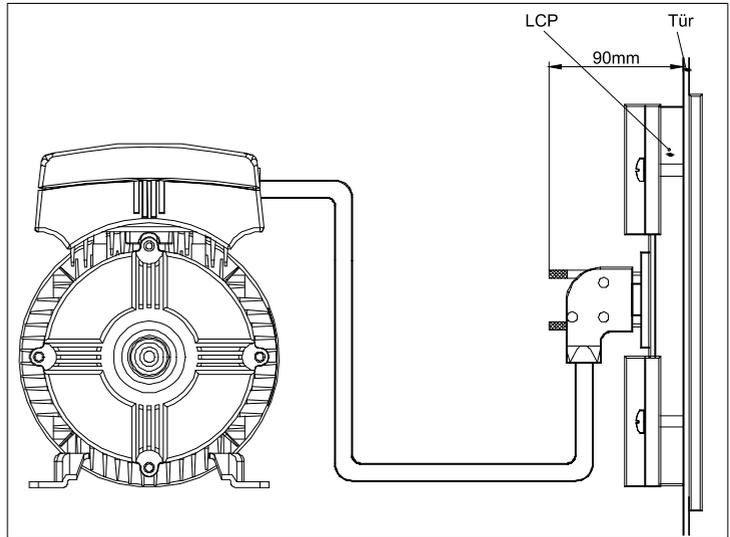


| Colour of wire/ | Terminal X100 | D-Sub-pin |
|-----------------|---------------|-----------|
| yellow | 1 | 8 |
| green | 2 | 9 |
| red | 3 | 2 |
| blue | 4 | 3 |

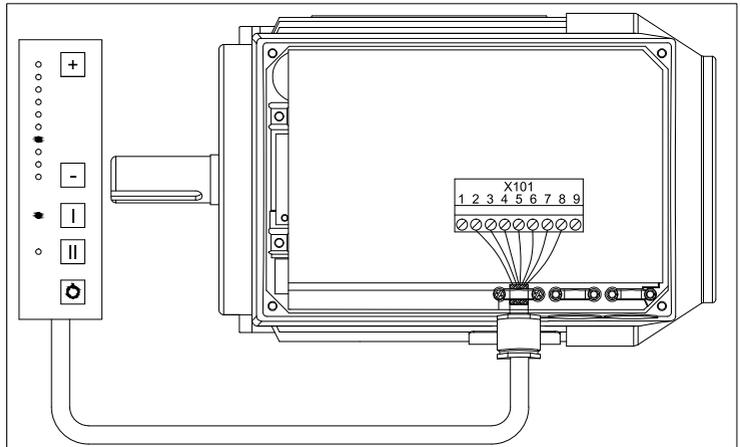
5 Accessories



5 Accessories



5.6.1 Local Operation Panel (LOP)



Use the +/- keys to set reference

5 Accessories

| Colour of wire | Terminal | Function |
|-----------------|----------|------------------------|
| White | 2 | Reference |
| Brown | 3 | Reset |
| Purple* or Grey | 4 | See table under key I |
| Green | 5 | See table under key II |
| Red | 6 | +24 V |
| Yellow | 7 | +10 V |
| Blue | 8 | Ground |

Table 5.1: Wiring

* Can be orange in some cables.

| Functions/Settings | Key I (Start) | Key II (Start) | Key (Stop) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------|-----------------------------|
| Functions/Settings Key I (Start) Key II (Start) Key (Stop) Default - Dual direction operation (connect grey wire) No changes to factory setting. | Run Forward | Run reverse | Stop (and reset* - if trip) |
| Function 2 - Dual mode operation (connect purple wire) Select desired modes of operation in Setups 1 and 2 (use par. 4-6) Parameter 335 = 18 (select Setup) | Run with Setup 1 | Run with Setup 2 | Stop (and reset* - if trip) |
| Function 3 - Dual speed operation (connect purple wire): Parameter 335 = 13 (Jog) | Run on set reference (+/-) | Run on 10 Hz** jog speed | Stop (and reset* - if trip) |

* If no reset is required, do not connect the brown wire

** or set parameter 213

At power up the unit will always be in stop mode. Set reference will be stored during power down. If permanent start mode is desired, connect terminal 6 to terminal 4 and do not connect purple/grey wire to terminal 4. This means the stop function on LOP is disabled.

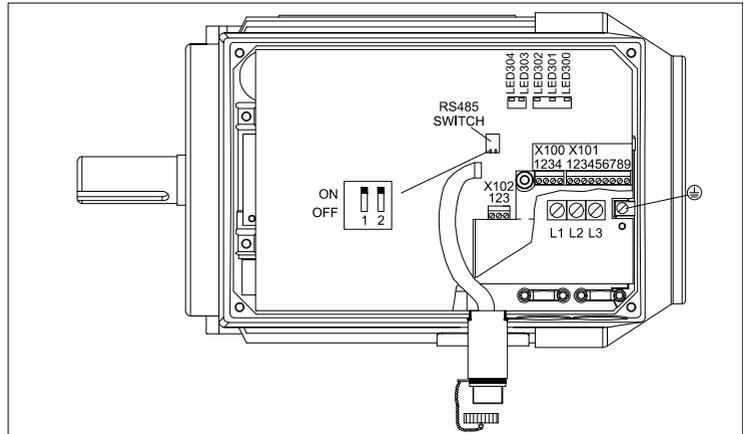
5 Accessories

5.7.1 Service Plug Kit Purpose:

To run LCP2 and PROFIBUS at the same time.

The service plug can be used with Eta-K of serial number 03Gxxx and software version as from 2.03.

Used together with cable for plug kit (see 5.3)



5.8.1 Brake Control

This external switching unit serves to supply and control a mechanical brake. For Eta-K 305-340 it is mounted in the left gland, for Eta-K 355-375 on the lid of the converter.

Control of the brake is carried out via the output of the converter by means of parameters 138 and 139. The output frequencies at which the brake is to be released or engaged can be set. The switching unit has 2 relay outputs for the messages „Eta-K ready“ (X4 contact closed) and „Fault brake control“ (X5 contact open). The output signal „Eta-K ready“ is no longer available at the control terminals of the converter when brake control is in use.

Through the rectifier of the switching unit, different braking voltages are generated that depend on the mains voltage. The corresponding values are given in the following table.

5 Accessories

| Mains voltage AC | Brake voltage DC |
|------------------|------------------|
| 380...420 V | 180 V |
| 440...480 V | 205 V |

Max. load of the relay contacts X4 and X5:

DC: 220 V, 2 A, 60 W

AC: 250 V, 2 A, 125 VA

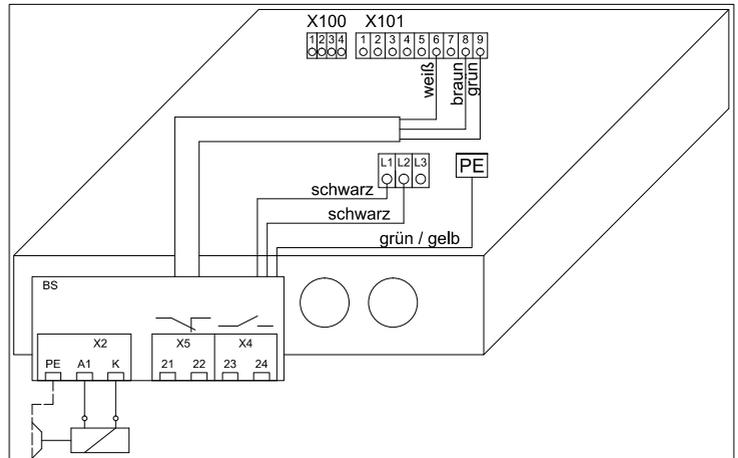
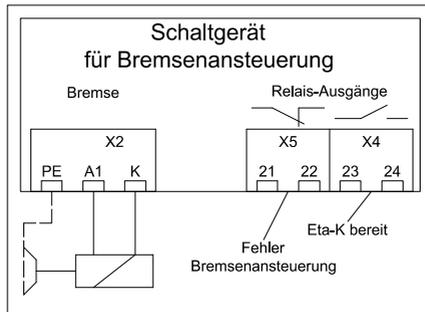


Illustration 5.1: Electrical connection of brake control to Eta-K

6 Parameter List

6.1.1 Operation and Display

| Parameter No. | Function | Range/number of settings/ value | Factory Setting |
|---------------|---------------------------------------|---------------------------------|-------------------------------|
| 001 | Language | 6 | German |
| 002 | Local/remote control | 2 | Remote control |
| 003 | Local reference | | 000.000 |
| 004 | Active Setup | 4 | Setup 1 |
| 005 | Programming Setup | 4 | Active setup |
| 006 | Copying of Setups | 4 | No copying |
| 007 | LCP copy | 4 | No copying |
| 008 | Display scaling of motor frequency | | 1.00 |
| 009 | Display line 2 | 24 | Frequenz [Hz] |
| 010 | Display line 1.1 | 24 | Reference [%] |
| 011 | Display line 1.2 | 24 | Motor current [A] |
| 012 | Display line 1.3 | 24 | Power [kW] |
| 013 | Local control/configuration | 5 | LCP digital control/ par. 100 |
| 014 | Local stop | 2 | Possible |
| 015 | Local jog | 2 | Not possible |
| 016 | Local reversing | 2 | Not possible |
| 017 | Local reset of trip | 2 | Possible |
| 018 | Lock for data change | 2 | Not locked |
| 019 | Operating state at power up, local c. | 3 | Forced stop, use saved ref. |

6.1.2 Load and Motor

| Parameter No. | Function | Range/number of settings/value | Factory Setting |
|---------------|---------------------------|--------------------------------|-----------------------|
| 100 | Configuration | 2 | Speed, open loop mode |
| 101 | Torque characteristics | 4 | Constant torque |
| 102 | Motor power | XX.XX kW - dep. on unit | |
| 103 | Motor voltage | XX.XX V - dep. on unit | |
| 104 | Motor frequency | XX.X Hz - dep. on unit | |
| 105 | Motor current | XX.XX A - dep. on unit | |
| 106 | Rated motor speed | XX rpm - dep. on unit | |
| 117 | Resonance damping | OFF - 100% | OFF % |
| 126 | DC braking time | 0.0 (off) - 60.0 sec. | 10.0 sec. |
| 127 | DC brake cut-in frequency | 0,0 Hz - f_{MAX} | 0,0 Hz |
| 128 | Motor thermal protection | 2 | Motor dependent |
| 132 | DC braking voltage | 0 - 100 % | 0 % |
| 133 | Start Voltage | 0,00 - 100,00 V | Motor dependent |
| 134 | Start compensation | 0.0 - 300.0 % | 80.0 % |
| 135 | U/f ratio | 0,00 - 20,00 V/Hz | Motor dependent |
| 136 | Slip compensation | -500.0 - +500.0 % | 100.0 % |
| 137 | DC holding voltage | 0 - 100 % | 0 % |
| 138 | Brake cut out frequency | 0,5 - 132 Hz | 3,0 Hz |
| 139 | Brake cut in frequency | 0,5 - 132 Hz | 3,0 Hz |

6 Parameter List

6.1.3 References and Limits

| Parameter No. | Function | Range/number of settings/ value | Factory Setting |
|---------------|--------------------------------------------|---------------------------------------------|-----------------------------|
| 200 | Rotation direction | 3 | Both directions, 0-132 Hz |
| 201 | Min. output frequency (f_{MIN}) | 0,0 Hz - f_{MAX} | 0,0 Hz |
| 202 | Max. output frequency (f_{MAX}) | f_{MIN} - f_{BEREICH} | f_{RANGE} (132 Hz) |
| 203 | Reference/feedback range | Min. - Max./-Max. - +Max. | Min. - Max. |
| 204 | Minimum reference | -100.000,000 - Ref _{MAX} | 0.000 |
| 205 | Maximum reference | Ref _{MIN} - 100.000,000 | as ordered from customer |
| 207 | Ramp-up time 1 | 0,15 - 3600,00 s | 3,00 s |
| 208 | Ramp-down time 1 | 0,15 - 3600,00 s | 3,00 s |
| 209 | Ramp-up time 2 | 0,15 - 3600,00 s | 3,00 s |
| 210 | Ramp-down time 2 | 0,15 - 3600,00 s | 3,00 s |
| 211 | Jog ramp time | 0,15 - 3600,00 s | 3,00 s |
| 212 | Quick stop ramp-down time | 0,15 - 3600,00 s | 3,00 s |
| 213 | Jog frequency | 0 Hz - f_{MAX} | 10,0 Hz |
| 214 | Reference function | 2 | Sum |
| 215 | Preset reference 1 | -100.00 % - +100.00 % | 0.00 % |
| 216 | Preset reference 2 | -100.00 % - +100.00 % | 0.00 % |
| 219 | Catch up/slow down value | 0.00 - 100.00 % | 0.00 % |
| 221 | Current limit for motor mode | Min.- max. limit in % of I _{RATED} | 160.0 % |
| 229 | Frequency bypass, bandwidth | 0 (off) - 100 % | 0 % |
| 230 | Frequency bypass 1 | 0,0 - 132 Hz | 0,0 Hz |
| 231 | Frequency bypass 2 | 0,0 - 132 Hz | 0,0 Hz |
| 241 | Reference preset 1 | -100.00 % - +100.00 % | 0.00 % |
| 242 | Reference preset 2 | -100.00 % - +100.00 % | 0.00 % |
| 243 | Reference preset 3 | -100.00 % - +100.00 % | 0.00 % |
| 244 | Reference preset 4 | -100.00 % - +100.00 % | 0.00 % |
| 245 | Reference preset 5 | -100.00 % - +100.00 % | 0.00 % |
| 246 | Reference preset 6 | -100.00 % - +100.00 % | 0.00 % |
| 247 | Reference preset 7 | -100.00 % - +100.00 % | 0.00 % |

6.1.4 Inputs and Outputs

| Parameter No. | Function | Range/number of settings/ value | Factory Setting |
|---------------|--------------------------------------|------------------------------------|-----------------|
| 317 | Time out | 1 -99 sec. | 10 sec. |
| 318 | Function after time out | Off/Stop and trip | Off |
| 323 | Terminal X102, relay function | 14 | No operation |
| 327 | Pulse reference/feedback, max. freq. | 100 - 70000 Hz | 5000 Hz |
| 331 | Terminal 1, analog input current | 3 | No operation |
| 332 | Terminal 2, analog -/digital input | 31 | Sollwert |
| 333 | Terminal 3, digital input | 31 | Reset |
| 334 | Terminal 4, digital input | 30 | Start |
| 335 | Terminal 5, digital input | 29 | Start Reversing |
| 336 | Terminal 1, min. scaling | 0,0 - 20,0 mA | 0,0 mA |
| 337 | Terminal 1, max. scaling | 0,0 - 20,0 mA | 20,0 mA |
| 338 | Terminal 2, min. scaling | 0,0 - 10,0 V | 0,0 V |
| 339 | Terminal 2, max. scaling | 0,0 - 10,0 V | 10,0 V |
| 340 | Output functions | 24 | Unit ready |

6 Parameter List

6.1.5 Special Functions

| Parameter No. | Function | Range/number of settings/ value | Factory Setting |
|---------------|-----------------------------------|---------------------------------|-----------------------------------|
| 400 | Brake function | Off/AC braking | AC braking |
| 403 | Sleep mode timer | 0 - 300 s | Off |
| 404 | Sleep frequency | 000,0 - par. 407 | 0,0 Hz |
| 405 | Reset function | 11 | Reset at power up |
| 406 | Boost setpoint | 1 - 200% | 100% |
| 407 | Wake up frequency | Par. 404 - f_{MAX} | 50 Hz |
| 411 | Switching frequency | 1,5 - 6,0 kHz | Unit dependent |
| 412 | Variable switching frequency | 3 | Temp. dep. sw. freq. |
| 413 | Overmodulation function | Off/On | On |
| 414 | Minimum feedback | -100000 - FB_{HIGH} | 0 |
| 415 | Maximum feedback | FB_{LOW} - 100,000 | 1500 |
| 416 | Reference/feedback unit | 42 | % |
| 437 | Process PID normal/inverse ctrl. | Normal/invers | Normal |
| 438 | Process PID anti windup | Disable/Enable | Enable |
| 439 | Process PID start frequency | f_{MIN} - f_{MAX} | f_{MIN} |
| 440 | Process PID proportional gain | 0.00 (off) - 10.00 | 0.01 |
| 441 | Process PID integral time | 0.01 - 9999 sec. (off) | 9999 sec. |
| 442 | Process PID differentiation time | 0.00 (off) - 10.00 sec. | 0.00 sec. |
| 443 | Process PID different. gain limit | 5 - 50 | 5 |
| 444 | Process PID lowpass filter time | 0.02 - 10.00 sec. | 0.02 sec. |
| 445 | Flying start | 4 | Disable |
| 446 | Switching pattern | 2 | SFAVM |
| 455 | Frequency range monitor | Disable/Enable | Enable |
| 461 | Feedback conversion | Linear or square root | 461 Feedback conversion Linear |

6 Parameter List

6.1.6 Serial Communication

| Parameter No. | Function | Range/number of settings/ value | Factory Setting |
|---------------|-----------------------------------------|------------------------------------|-----------------|
| 500 | Bus address | 0 - 126 | 1 |
| 501 | Baudrate | 300 - 9600 Baud | 9600 Baud |
| 502 | Coasting | 4 | Logic or |
| 503 | Quick-stop | 4 | Logic or |
| 504 | DC-brake | 4 | Logic or |
| 505 | Start | 4 | Logic or |
| 506 | Reversing | 4 | Logic or |
| 507 | Selection of setup | 4 | Logic or |
| 508 | Selection of speed | 4 | Logic or |
| 509 | Bus jog 1 | 0,0 - f_{MAX} | 10,0 Hz |
| 510 | Bus jog 2 | 0,0 - f_{MAX} | 10,0 Hz |
| 512 | Telegram profile | Profidrive/FC Drive | FC Drive |
| 513 | Bus time interval | | 1 sec. |
| 514 | Bus time interval function | 6 | Off |
| 515 | Data read-out: Reference | XXX,X | |
| 516 | Data read-out: Refer. unit | Hz/rpm | |
| 517 | Data read-out: Feedback | | |
| 518 | Data read-out: Frequency | Hz | |
| 519 | Data read-out: Frequency x scale | Hz | |
| 520 | Data read-out: Current | A | |
| 521 | Data read-out: Torque | % | |
| 522 | Data read-out: Power | kW | |
| 523 | Data read-out: Power | hp | |
| 524 | Data read-out: Motor voltage | V | |
| 525 | Data read-out: DC link voltage | V | |
| 527 | Data read-out: FC therm. | 0 - 100 % | |
| 528 | Data read-out: Digital input | | |
| 533 | Data read-out: External reference | -200.0 - +200.0 % | |
| 534 | Data read-out: Status word, binary | | |
| 537 | Data read-out: FC temperature | °C | |
| 538 | Data read-out: Alarm word, binary | | |
| 539 | Data read-out: Control word, binary | | |
| 540 | Data read-out: Warning word, 1 | | |
| 541 | Data read-out: Warning word, 2 | | |
| 542 | Data read-out: Terminal 1, analog input | mA | |
| 543 | Data read-out: Terminal 2, analog input | V | |
| 561 | Protocol | FC protocol/Modbus RTU | FC protocol |
| 570 | Modbus parity and message framing | 4 | Even/1stopbit |
| 571 | Modbus Communications timeout | 10-2000 ms | 100 ms |

6 Parameter List

6.1.7 Technical Functions

| Parameter No. | Function | Range/number of settings/value | Factory Setting |
|---------------|----------------------------------------|--------------------------------|-----------------------------|
| 600 | Operating data: Operating hours | 0 - 130.000,0 hours | No reset Normal function |
| 601 | Operating data: Hours run | 0 - 130.000,0 hours | |
| 603 | Operating data: Number of power-up's | 0 - 9999 | |
| 604 | Operating data: Number of overtemp. | 0 - 9999 | |
| 605 | Operating data: Number of overvoltages | 0 - 9999 | |
| 615 | Fault log, read-out: Error code | Index XX - XXX | |
| 616 | Fault log, read-out: Time | Index XX - XXX | |
| 617 | Fault log, read-out: Value | Index XX - XXX | |
| 619 | Reset of hours-run counter | No reset/reset | |
| 620 | Operation mode | 3 | |
| 621 | Nameplate: Eta-K type | Depends on unit | |
| 624 | Nameplate: Software version no. | Depends on unit | |
| 625 | LCP version | Depends on unit | |
| 626 | Nameplate: Database identification no. | Depends on unit | |
| 628 | Nameplate: Application option type | | |
| 630 | Nameplate: Communication option type | | |
| 632 | BMC software identification | | |
| 633 | Motor database identification | | |
| 634 | Unit identification for communication | | |
| 635 | Software part No. | | |
| 678 | Configure Control Card | | |



NB!

Changes in parameters can be made via the control panels LCP2, PC or Profibus. For a detailed description, see Danfoss Design Guide MG.03.HX.YY for FCM 300.

Notice

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