>pDRIVE<

# Operating instructions Profibus

>pDRIVE< MX eco 4V

**>pDRIVE< MX pro 4V**

>pDRIVE< MX pro 6V

>pDRIVE< MX multi-eco

**>pDRIVE< MX multi-pro**

PROFI® PROCESS FIELD BUS BUS

# General remarks

The following symbols should assist you in handling the instructions:

Advice, tip !

General information, note exactly !

The requirements for successful commissioning are correct selection of the device, proper planning and installation. If you have any further questions, please contact the supplier of the device.

### Capacitor discharge !

Before performing any work on or in the device, disconnect it from the mains and wait at least 15 minutes until the capacitors have been fully discharged to ensure that there is no voltage on the device.

### Automatic restart !

With certain parameter settings it may happen that the frequency inverter restarts automatically when the mains supply returns after a power failure. Make sure that in this case neither persons nor equipment is in danger.

### Commissioning and service !

Work on or in the device must be done only by duly qualified staff and in full compliance with the appropriate instructions and pertinent regulations. In case of a fault contacts which are normally potential-free and/or PCBs may carry dangerous voltages. To avoid any risk to humans, obey the regulations concerning "Work on Live Equipment" explicitly.

### Terms of delivery

The latest edition "General Terms of Delivery of the Austrian Electrical and Electronics Industry Association" form the basis of our deliveries and services.

### Specifications in this instructions

We are always anxious to improve our products and adapt them to the latest state of the art. Therefore, we reserve the right to modify the specifications given in this instructions at any time, particular those referring to measures and dimensions. All planning recommendations and connection examples are non-binding suggestions for which we cannot assume liability, particularly because the regulations to be complied depend on the type and place of installation and on the use of the devices.

### Regulations

The user is responsible to ensure that the device and its components are used in compliance with the applicable regulations. It is not permitted to use these devices in residential environments without special measures to suppress radio frequency interferences.

### Trademark rights

Please note that we do not guarantee that the connections, devices and processes described herein are free from patent or trademark rights of third parties.

# Option Profibus DP for the frequency inverters *>pDRIVE< MX pro*

**This instructions describe the functions software version APSpro_B00_02 and higher**



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The instructions in hand cover the topics operation, parameterization and diagnostics of the Profibus DP option PBO11. Moreover, the principles of the Profibus architecture and their main components are explained in detail.

Use this instructions additionally to the device documentation "Description of functions" and "Mounting instructions".

The slave-specific configuration file pDMX09F9.gsd (8783448) is required for parameterization and configuration of the DP master. It is provided on the CD-ROM which is attached to each inverter as well as under www.pdrive.com.

In order to address an inverter via fieldbus also during mains cut-off (line contactor control, disconnecting switch, ...) the *>pDRIVE< MX pro* has to be supplied with an external 24 V buffer voltage.

# Profibus DP

# PBO11 / Profibus DP function

The fieldbus system Profibus DP is coupled with the *>pDRIVE< MX pro* frequency inverter by installing the fieldbus option *>pDRIVE< PBO11* at the front side of the device (see also chapter "Hardware").

The data exchange between "DP master" and "DP slave (MX)" is designed in accordance with the specifications for the Profibus DP as defined in the standard DIN EN 50170.

## Principle function

The serial fieldbus concept "Profibus" is structured as a logical TokenRing bus. It physically represents an asynchronous, half-duplex RS485 system. Several Profibus masters can exist on the bus at the same time. The master authorization (Token) is handed over to the next master after each telegram cycle. A conflict of bus access is prevented because only that master which holds the Token has write access for the bus.

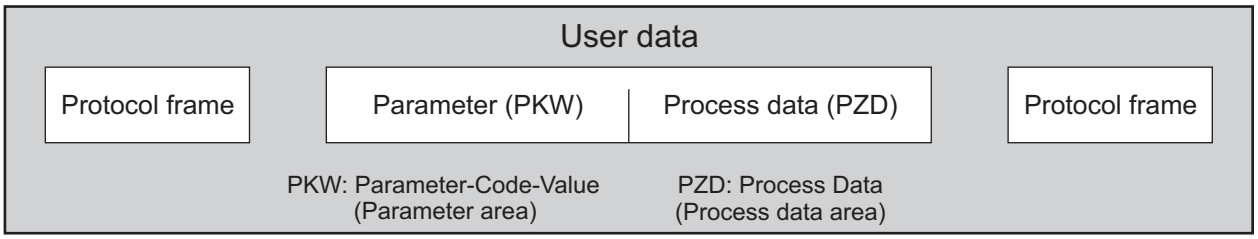
After each telegram sent by the master, the addressed slave confirms the message and sends a response telegram to the master. The telegrams are processed cyclically (continuous) (DPV0).

The different types of protocols FMS, DP and PA are based on this system.

In the area of drive engineering, the Profibus DP (Decentralized Periphery) profile is mostly used. This is a fast operating system with a definite hierarchy.

## Structure of the Profibus DP user data / Drive profile

The structure of the user data is arranged according to the profile for variable speed drives and is described in the VDE Directive 3689 Sheet 1.

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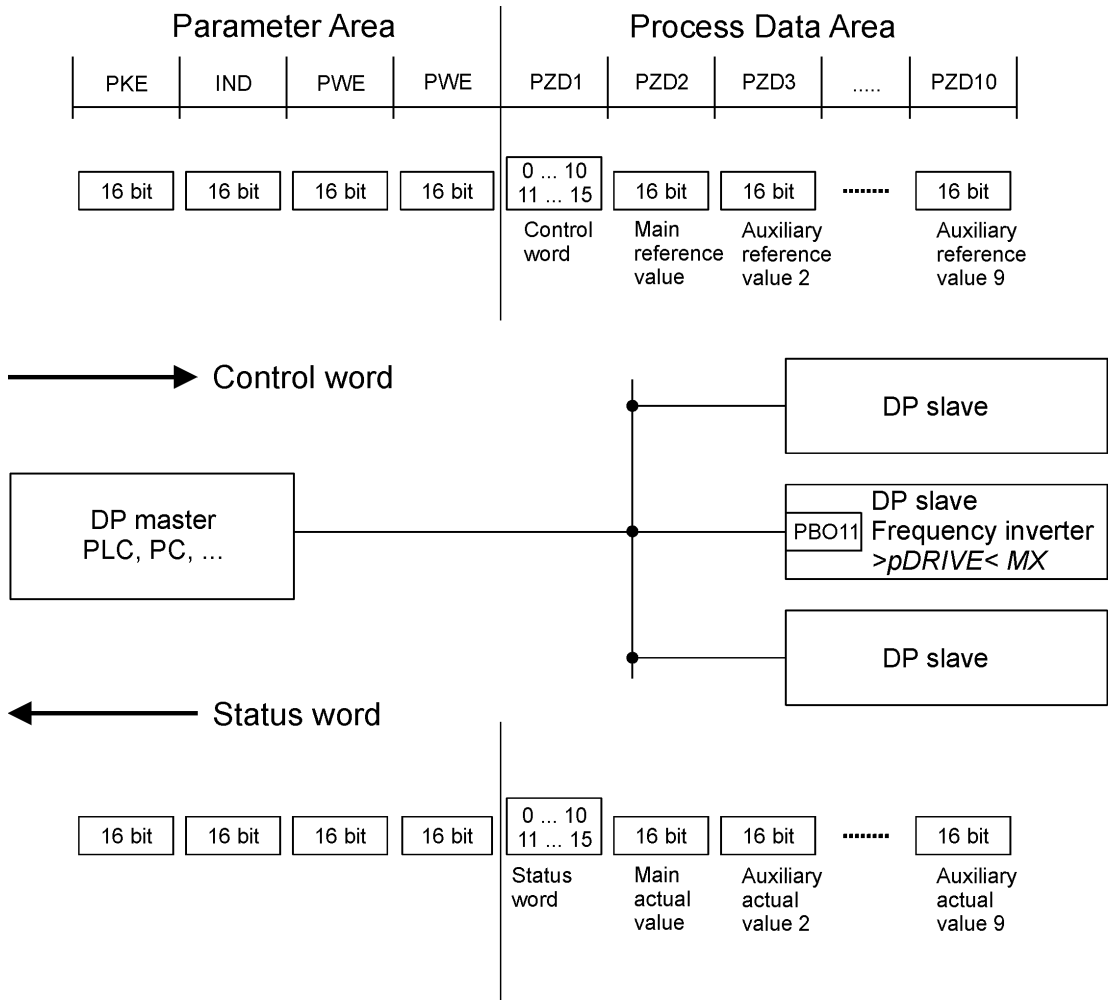
## Diagram of the data exchange according to Profidrive profile








In accordance with the PPO types (Parameter Process-data Object) defined in the Profibus Profile for variable speed drives the process data area (PZD) of the control word consists of the following user data:

| | |
|---|---|
| *Control word:* | 16 bit chain of commands, |
| | 11 bit corresponding to Profidrive profile, 5 bit freely usable |
| *Main ref. value:* | 16 bit display, -200...+200 %, resolution $2^{-14}$ |

The status word consists of the following user data:

| | |
|---|---|
| *Control word:* | 16 bit chain of commands, |
| | 11 bit corresponding to Profidrive profile, 5 bit freely usable |
| *Main actual value:* | 16 bit display, -200...+200 %, resolution $2^{-14}$ |

If parameter values should be read or adjusted in addition to the exchange of process data (data exchange), further 4 words are required → see PKW (Parameter Code Value).

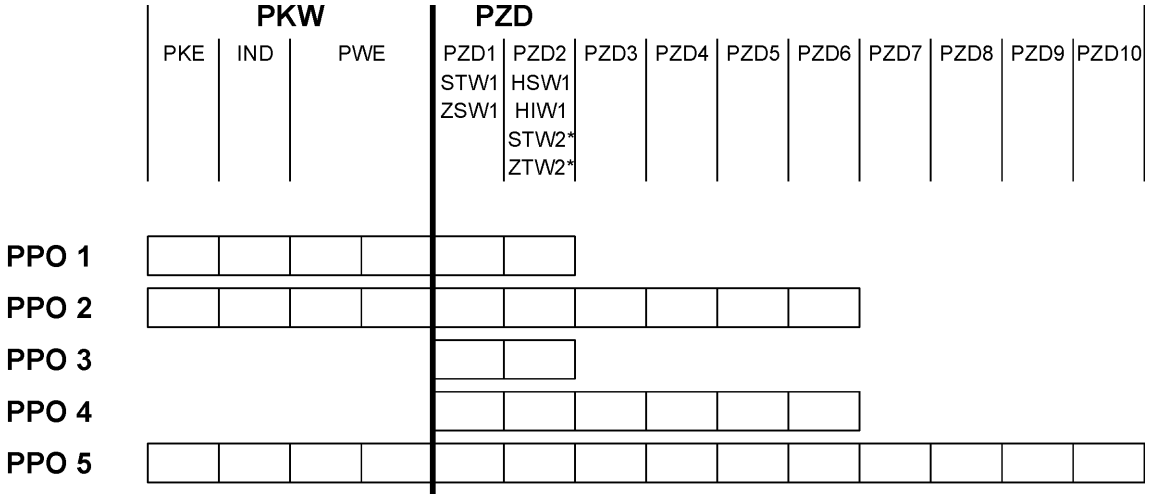
All data (PKW and PZD) are 16-bit chains of information which should be regarded as "words".

Transmission is carried out in two 8-bit bytes, whereby the high byte (8...15) is transmitted before the low byte (0...7).

The desired length of the telegram (PPO type) is defined during the configuration of the DP master and is transmitted to the inverter during the initialization of the bus by means of the configuration telegram.

## Structure of the telegram

The Parameter Process-data Object (PPO) is defined for the cyclical transmission of data between DP master and slave. Process data as well as parameters can be transmitted with this object. It describes the number and the meaning of the individual words of the available user data structures. PPO types 3 and 4 are purely process data objects, types 1 and 2 additionally enable cyclical parameter processing.



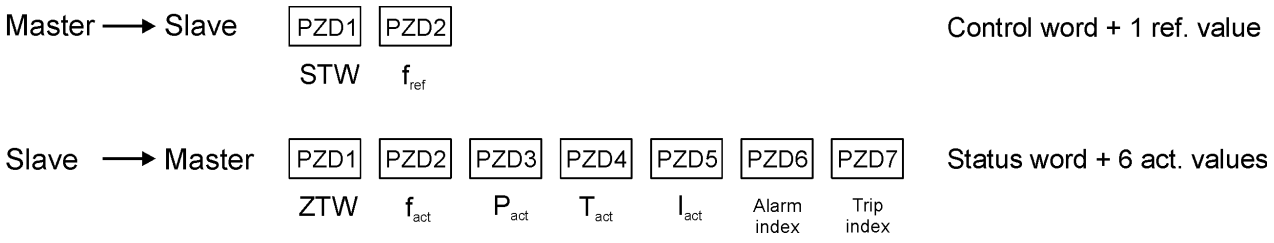

PKW: Parameter code value
PZD: Process data
PKE: Parameter code
IND: Index
PWE: Parameter value

STW: Control word
ZSW: Status word
HSW: Main reference value
HIW: Main actual value

* According to the communication-specific demands, the process data word PZD2 can be also used as second control word or second status word.

In addition to the telegram structure predefined by the Profidrive profile, the lengths of the telegrams can also be freely defined for both directions (master → slave / slave → master). As a result the telegram length can be optimized according to the existing requirements of the process. The configuration of the freely definable telegrams or the selection of the PPO type is performed with the applied bus configuration tool (e.g. SyCon / company Hilscher).

**Example of an optimized telegram**

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## Network configuration

Use the slave-specific Profibus DP device master file for the network configuration of a DP master connection. For the frequency inverters *>pDRIVE< MX pro* the configuration file **pDMX09F9.gsd** (8783448) has to be used. It is provided on the CD-ROM which is attached to each inverter as well as in the Internet under www.pdrive.com.

```
; ------------------------------------------------------------------
; (c) VA TECH ELIN EBG Elektronik GmbH & Co
; 8783448
; Geraetestammdatei für die Frequenzumrichter
; der Reihen: >pDRIVE< MX Eco
;             >pDRIVE< MX Pro
; Profibus DP Anschaltung mit Optionskarte PBO11
;
; Erstellt:
; 17.10.2005  TS/Jagodic
;
; Aenderungen:
;
; ------------------------------------------------------------------
;
;
#PROFIBUS_DP

GSD_Revision  = 1

; Device identification
Vendor_Name      = "VA TECH ELIN EBG Elektronik"
Model_Name       = ">pDRIVE< MX eco/pro"
Revision         = "Version 1.00"
Ident_Number     = 0x09F9
Protocol_Ident   = 0          ; DP protocol
Station_Type     = 0          ; DP Slave device
FMS_supp         = 0          ; FMS not supported
Hardware_Release = "8P01103"  ; Option PBO11
Software_Release = "PBS01"

; Supported baudrates
9.6_supp    = 1
19.2_supp   = 1
.
.
.
```

The device master file contains the whole information (according to Profibus DP standard) which are required for coupling the *>pDRIVE< MX pro* with a Profibus DP network. The file is designed in such a manner that it can be read by means of a text editor.

If the GSD-file is read in to the bus configuration tool, specific bus data like ident number, Watch Dog information, available baud rate and communication types a.s.o. are available in the device. The address ranges are defined by means of configuration and the configuration settings are transmitted during boot up of the network from the master to the individual slaves via the parameterization and configuration telegram. The slave checks the plausibility of both telegrams. If the parameterization telegram as well as the configuration telegram are valid the slave changes to "data exchange" mode and participates in the cyclical data exchange of the bus network.

In addition to the GSD-file also three graphic files are available which can be optionally used in the configuration tool.

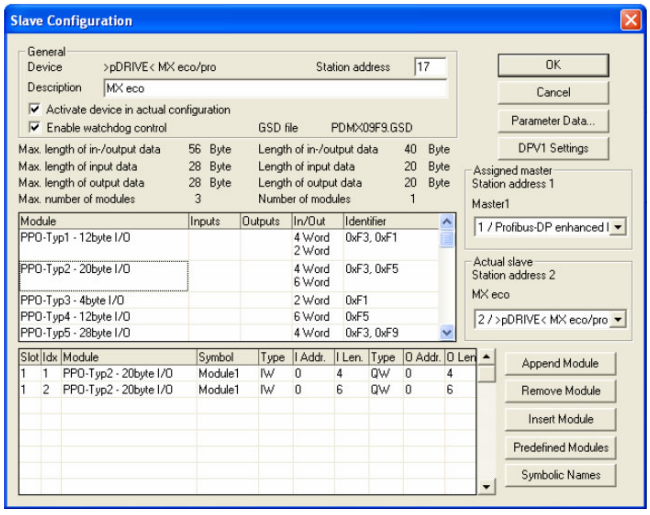
MX09F9S.dib


MX09F9R.dib

MX09F9D.dib

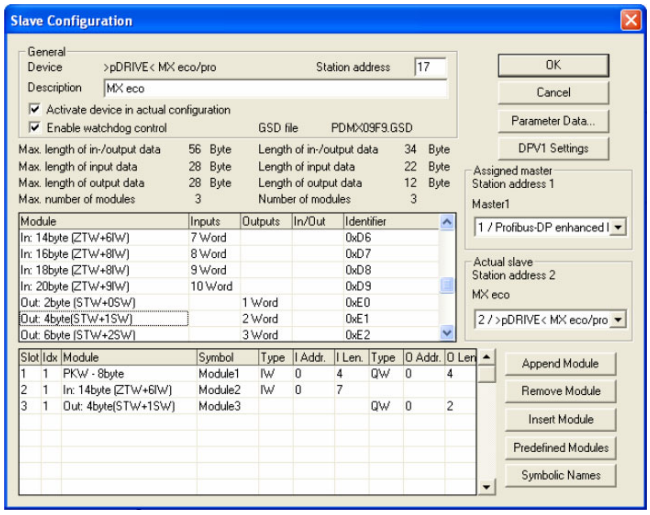
Modifying the GSD-file leads to faulty action and is therefore not allowed!

**Examples for slave configuration**




Communication type PPO2

(configuration tool SyCon)




Optimized telegram length

PZD master → slave 2 words

slave → master 6 words + PKW service

(configuration tool SyCon)

Using the parameters D6.34 to D6.42 it is possible to make a diagnosis of the configuration which is set by the bus master.

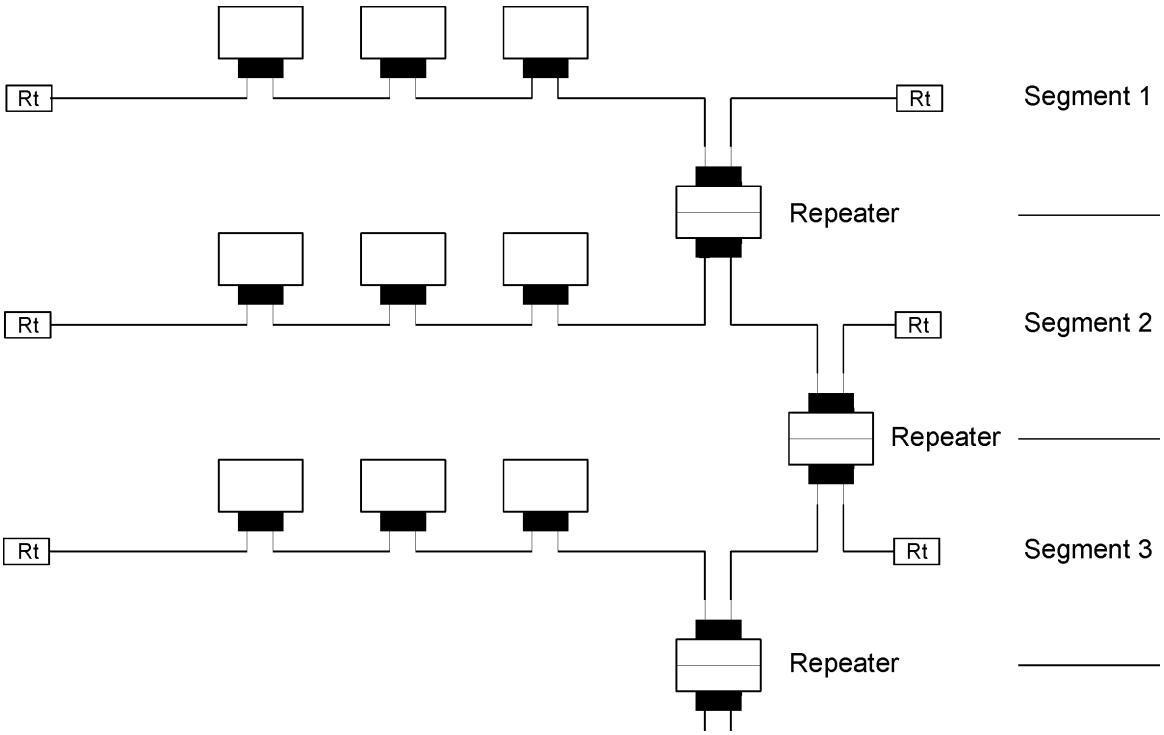
In case of problems with the network configuration please ensure that the valid GSD-file is used. Please contact the supplier of the Profibus DP master system for support.

## Structure of the network

The bus access method of the Profibus DP is based on the master/slave principle whereby a slave can be read from each master but it can only be written to the slave by one master.

A maximum of 126 subscribers can be operated on the bus, but only in separately segments. The maximum number of subscribers per segment is 32 including the repeater.

### Electric network



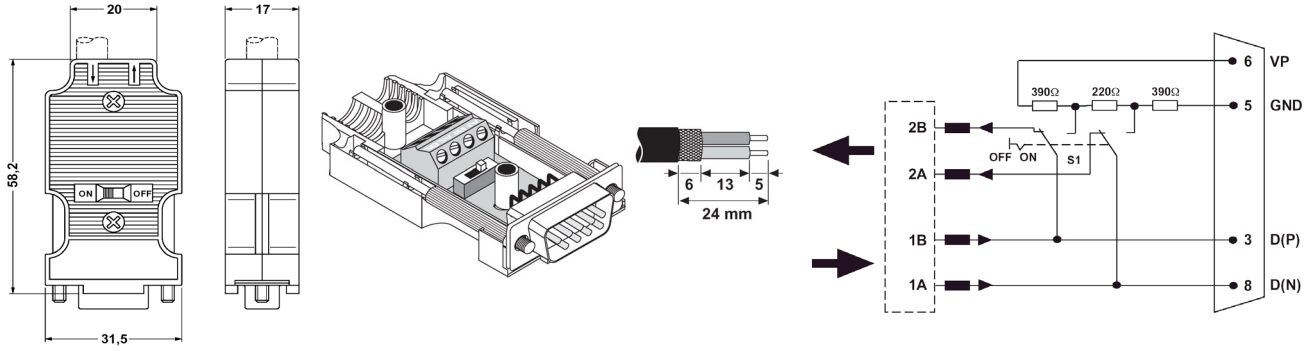

Rt ... Terminating resistor

| Technical data of on electrical network | |
|---|---|
| Max. number of subscribers | 126 in all segments |
| Max. number of subscribers per segment | 32 including the repeater |
| Maximum repeater cascading | 7 at 500 kbaud bus speed<br>4 at 1.5 Mbaud bus speed |
| Bus cable | Use a screened, twisted two-wire line as bus cable (wire type A, e.g. *LAPPKABEL* UNITRONIC® BUS-L2/FIP UL/CSA).<br>Characteristic impedance: 150 Ω ± 15Ω<br>Distributed capacitance: < 30 nF / km<br>Loop resistance: < 110 Ω / km<br>Wire cross-section: > 0.64 $mm^2$ |

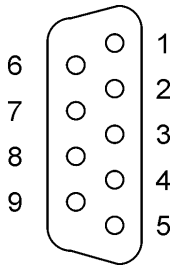
Each bus segment must be provided with a resistance combination at both ends. The terminal resistors are in the bus plug of the two outer bus subscribers, which also supply them with electricity.

The bus is connected using a 9-pin sub-D plug connector. The male multipoint connector is located on the bus cable, the multipoint socket connector (female) is located on the bus subscriber.

The bus plugs option *>pDRIVE< PROFIBUS PLUG* (order number 8 P01 306) are designed as T junctions, whereby the bus line sections are connected inside of the plug connector. The terminal resistors are located in the bus plug and can be switched on and off using DIP switches.




**Assignment of the Profibus interface at the option card PBO11**




9-pin Sub-D (female)

| Pole | Signal | Meaning |
|---|---|---|
| 1 | Screen | Screen |
| 2 | M24 | Ground of 24 V output voltage |
| 3 | RXD/TxD-P | Received/Transmitted data -P |
| 4 | CNTR-P | Control signals for the repeater |
| 5 | DGND | Reference potential for 5 V |
| 6 | VP | Supply voltage of the terminating resistor +5 V |
| 7 | P24 | Output voltage +24 V |
| 8 | RxD/TxD-N | Received/Transmitted data -N |
| 9 | CNTR-P | Control signals of the repeater for control of direction |

Depending on the baud rate and when using the described bus cable (type A), the following line lengths per segment are permitted:

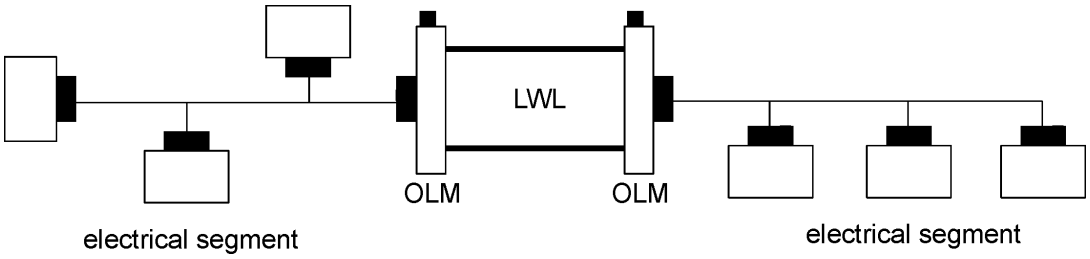
| Baud rate [kbit/s] | 9.6 | 19.2 | 93.75 | 187.5 | 500 | 1500 | 3000 | 6000 | 12000 |
|---|---|---|---|---|---|---|---|---|---|
| Length [m] | 1200 | 1200 | 1200 | 1000 | 400 | 200 | 100 | 100 | 100 |

## Optical (mixed) network

The optical network can be built up in a line, ring or star structure by means of OLM's (Optical Link Modules or active star connectors.

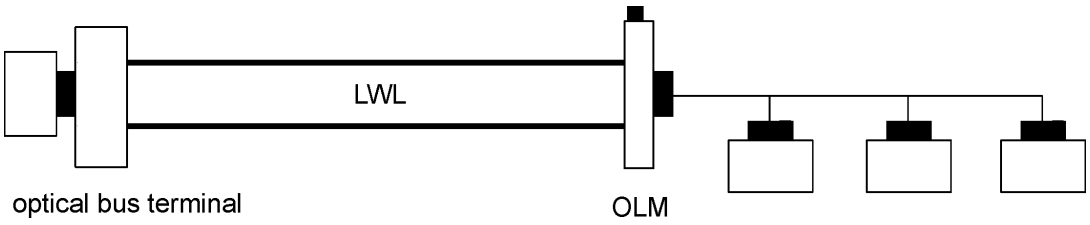
### Optical Link Module (OLM's)

- optical coupling modules for connecting electric segments with repeater function
- 9.6 kbaud to 12 Mbaud transmission rate



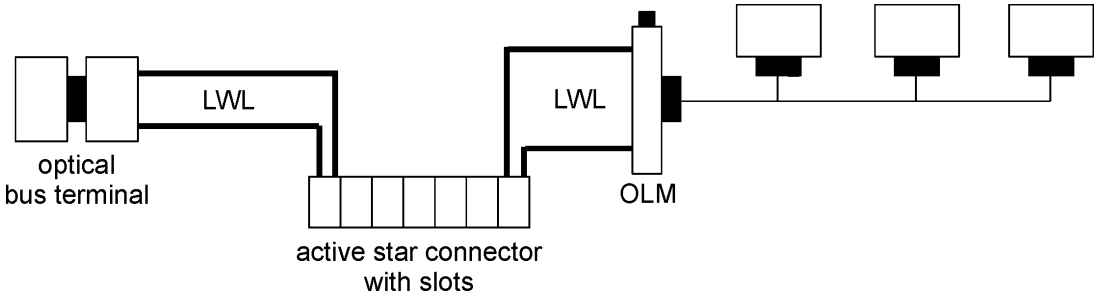

### Optical bus terminal

- for connecting individual subscribers with OLM's or star connectors
- supply from the bus subscriber




### Active star connectors

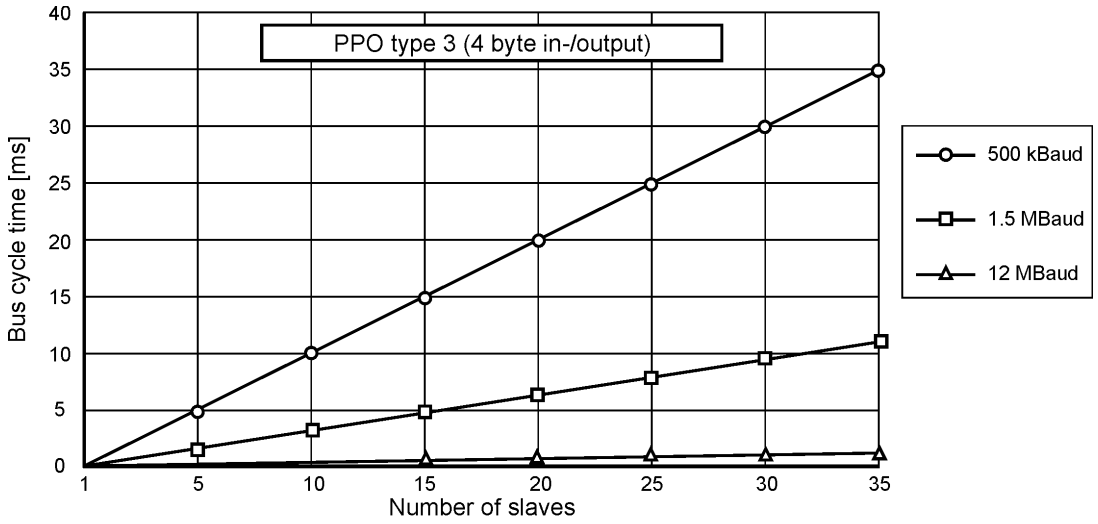
- to build up star structures
- max. 16 slots (subscribers)
- slots for optical waveguides made of plastics and glass

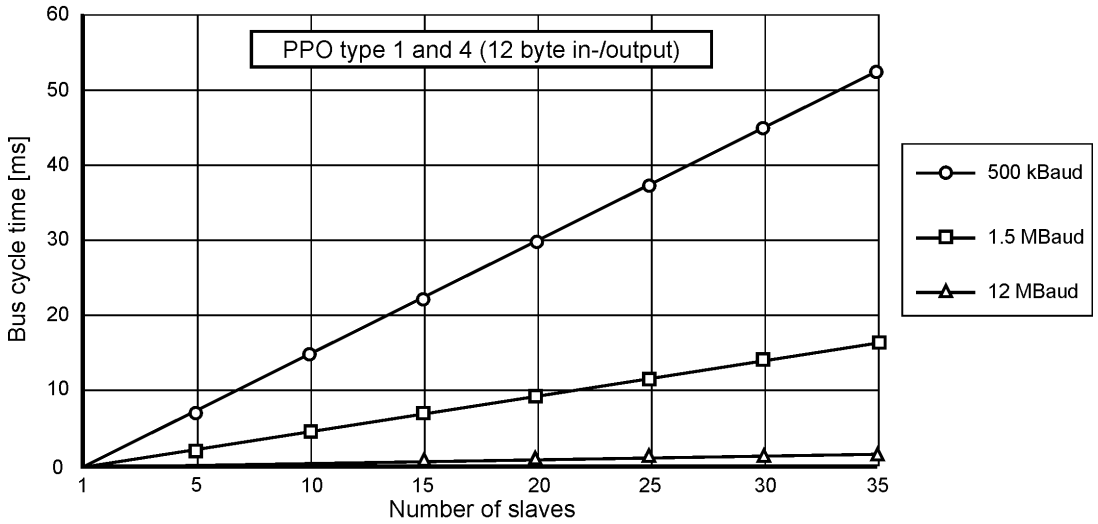


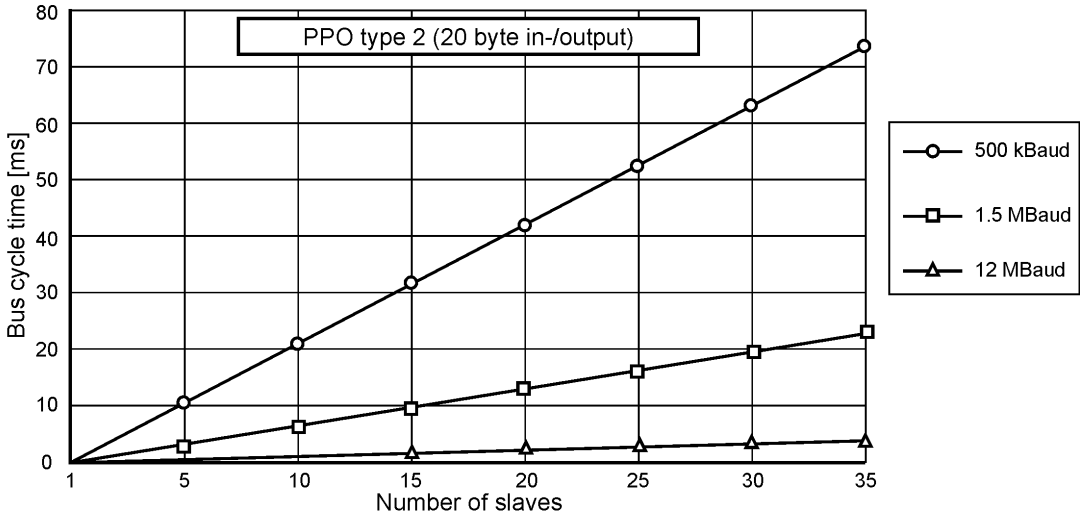

For technical details of the optical bus components, please refer to the relevant documentation of the manufacturer.

## Cycle times

The bus cycle times depending on the number of DP bus subscribers are given in the following diagrams for each PPO type.




**The following calculation principles apply to the calculation of the bus cycle time:**

tsdi = 37 bit; tsdr = 11 bit; for worst case 50% telegram repeats ! (pessimistic assumption)



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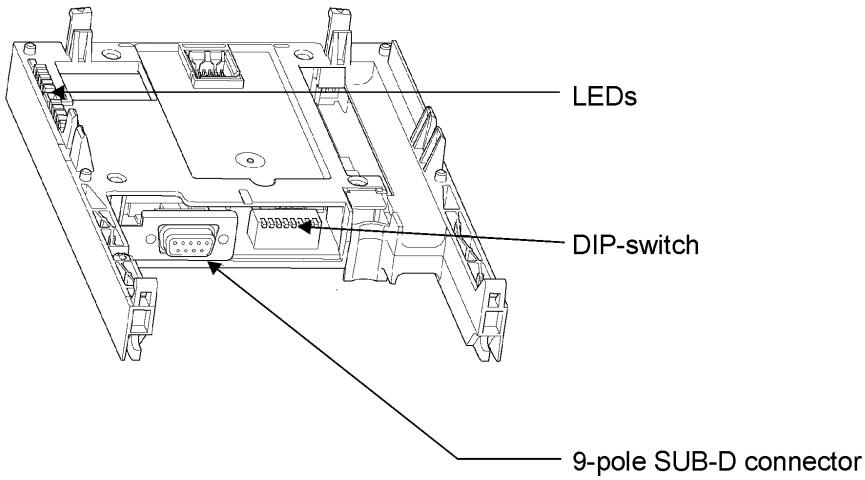
# Mechanical construction

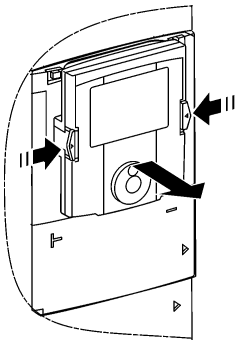



## Installing the option >*pDRIVE*< *PBO11*

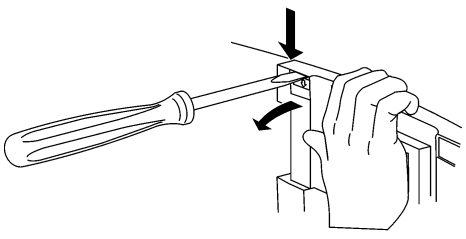
Installing of the option card into the >*pDRIVE*< *MX pro* frequency inverter is finished after a few steps.

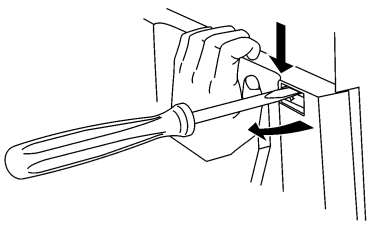
Only install the option card when there is no voltage on the inverter. Non-observance leads to destruction of the card.

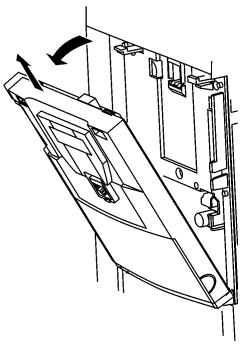
1. Remove the Matrix operating panel BE11 from the front side of the device.



2. Remove the front cover of the device by releasing both mechanical interlocks.







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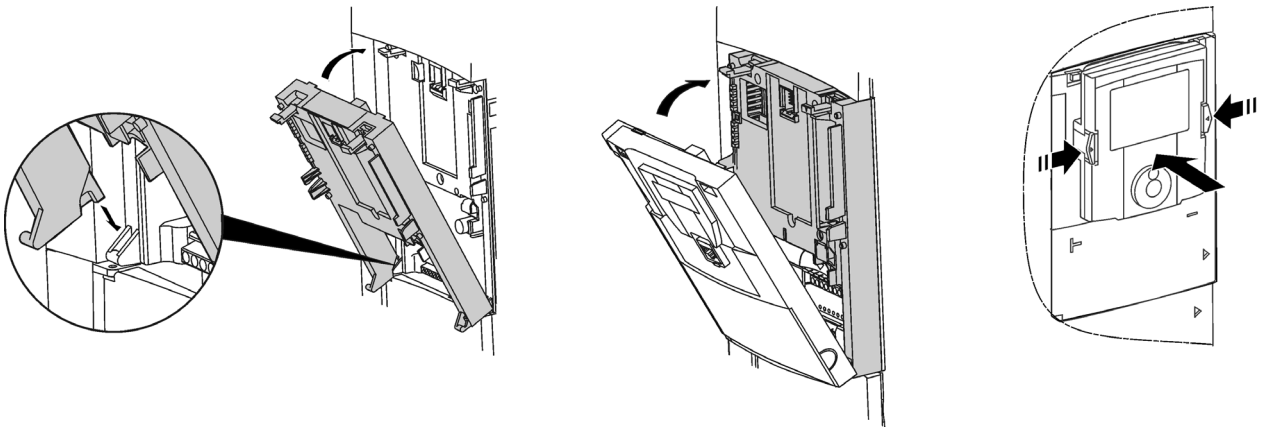
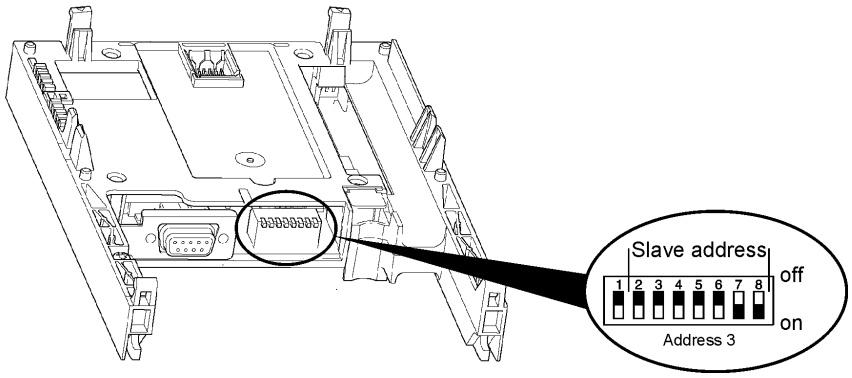
3. Mount the option card.



## Adjusting the bus address



| Address | Switch | Address | Switch | Address | Switch | Address | Switch |
|---|---|---|---|---|---|---|---|
| 0 | 0000 00100 | 32 | 0010 0000 | 64 | 0100 0000 | 96 | 0110 0000 |
| 1 | 0000 0001 | 33 | 0010 0001 | 65 | 0100 0001 | 97 | 0110 0001 |
| 2 | 0000 0010 | 34 | 0010 0010 | 66 | 0100 0010 | 98 | 0110 0010 |
| 3 | 0000 0011 | 35 | 0010 0011 | 67 | 0100 0011 | 99 | 0110 0011 |
| 4 | 0000 0100 | 36 | 0010 0100 | 68 | 0100 0100 | 100 | 0110 0100 |
| 5 | 0000 0101 | 37 | 0010 0101 | 69 | 0100 0101 | 101 | 0110 0101 |
| 6 | 0000 0110 | 38 | 0010 0110 | 70 | 0100 0110 | 102 | 0110 0110 |
| 7 | 0000 0111 | 39 | 0010 0111 | 71 | 0100 0111 | 103 | 0110 0111 |
| 8 | 0000 1000 | 40 | 0010 1000 | 72 | 0100 1000 | 104 | 0110 1000 |
| 9 | 0000 1001 | 41 | 0010 1001 | 73 | 0100 1001 | 105 | 0110 1001 |
| 10 | 0000 1010 | 42 | 0010 1010 | 74 | 0100 1010 | 106 | 0110 1010 |
| 11 | 0000 1011 | 43 | 0010 1011 | 75 | 0100 1011 | 107 | 0110 1011 |
| 12 | 0000 1100 | 44 | 0010 1100 | 76 | 0100 1100 | 108 | 0110 1100 |
| 13 | 0000 1101 | 45 | 0010 1101 | 77 | 0100 1101 | 109 | 0110 1101 |
| 14 | 0000 1110 | 46 | 0010 1110 | 78 | 0100 1110 | 110 | 0110 1110 |
| 15 | 0000 1111 | 47 | 0010 1111 | 79 | 0100 1111 | 111 | 0110 1111 |
| 16 | 0001 0000 | 48 | 0011 0000 | 80 | 0101 0000 | 112 | 0111 0000 |
| 17 | 0001 0001 | 49 | 0011 0001 | 81 | 0101 0001 | 113 | 0111 0001 |
| 18 | 0001 0010 | 50 | 0011 0010 | 82 | 0101 0010 | 114 | 0111 0010 |
| 19 | 0001 0011 | 51 | 0011 0011 | 83 | 0101 0011 | 115 | 0111 0011 |
| 20 | 0001 0100 | 52 | 0011 0100 | 84 | 0101 0100 | 116 | 0111 0100 |
| 21 | 0001 0101 | 53 | 0011 0101 | 85 | 0101 0101 | 117 | 0111 0101 |
| 22 | 0001 0110 | 54 | 0011 0110 | 86 | 0101 0110 | 118 | 0111 0110 |
| 23 | 0001 0111 | 55 | 0011 0111 | 87 | 0101 0111 | 119 | 0111 0111 |
| 24 | 0001 1000 | 56 | 0011 1000 | 88 | 0101 1000 | 120 | 0111 1000 |
| 25 | 0001 1001 | 57 | 0011 1001 | 89 | 0101 1001 | 121 | 0111 1001 |
| 26 | 0001 1010 | 58 | 0011 1010 | 90 | 0101 1010 | 122 | 0111 1010 |
| 27 | 0001 1011 | 59 | 0011 1011 | 91 | 0101 1011 | 123 | 0111 1011 |
| 28 | 0001 1100 | 60 | 0011 1100 | 92 | 0101 1100 | 124 | 0111 1100 |
| 29 | 0001 1101 | 61 | 0011 1101 | 93 | 0101 1101 | 125 | 0111 1101 |
| 30 | 0001 1110 | 62 | 0011 1110 | 94 | 0101 1110 | 126 | 0111 1110 |
| 31 | 0001 1111 | 63 | 0011 1111 | 95 | 0101 1111 | | |



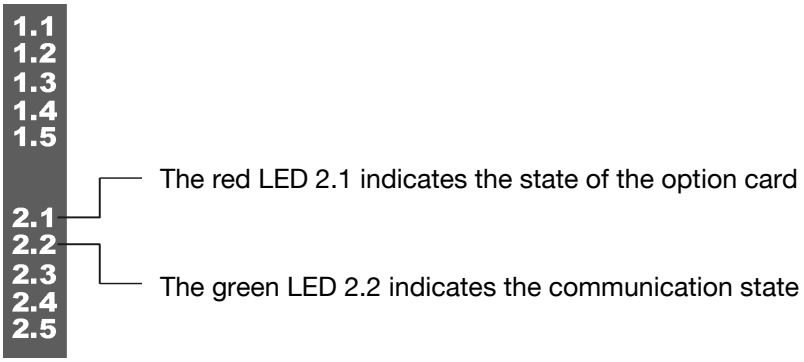
The bus addresses 0 and 1 are reserved for the Profibus master (class 1 and 2).
Avoid using bus address 126 due to incompatibility to various configuration tools.

The bus address which is adjusted by means of the DIP switches is active after booting the PBO11. Therefrom changes which are carried out during operation are without any effect !

The adjusted (effective) bus address can be read out by means of parameter D6.30.

## LED - Indicator lamps

The Profibus option *>pDRIVE< PBO11* includes two diagnostic LED's which are placed at the front of the device left to the operating panel.




| Meaning of the LED indication | | |
|---|---|---|
| LED 2.1 (red) |  | The bus option has received a valid parameter and configuration telegram from the master. |
| LED 2.2 (green) lights |  | Communication state "Data Exchange" is active, that means that cyclical data exchange with the DP master takes place. |
| LED 2.1 (red) flashes |   | The bus option expects a valid parameterization and configuration telegram from the master. |
| LED 2.2 (green) |  | |
| LED 2.1 (red) lights |  | Bus fault |
| LED 2.2 (green) |  | |

The green LED L2.2 lights as soon and as long as the slave is in the mode "data exchange". If Watch Dog was not activated by the master, the slave remains in this mode, even if no data transfer takes place; e.g. if the bus cable is removed !

# Process data area

# General

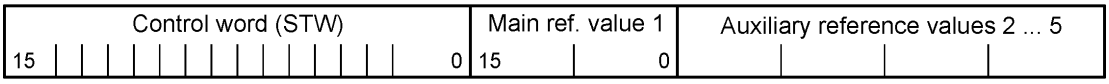
During the cyclical exchange of process data, binary or analog reference and actual values are exchanged between the bus subscribers, i.e. between DP master and DP slaves.

The achievable cycle time depends on the bus structure, the number of bus subscribers and the transmission rate. See chapter "Network configuration".

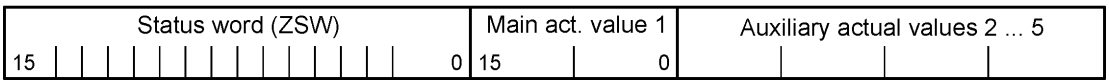
Every 5 ms the inverter internally reads in a control word or prepares a status word for the master.

The standardized information in the control and status word (bit 0...10) do not require any further internal inverter settings. The reference use, the assignment of actual values as well as the use of the free bits 11...15) of the first (STW1) and second control word (STW2) must be adjusted accordingly in matrix field "D6 Fieldbus".

Process data from master to slave (outputs)




Process data from slave to master (inputs)




# Control word

## Assignment

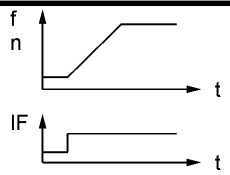
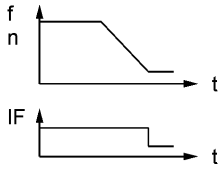
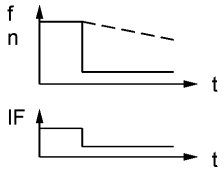
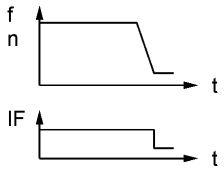
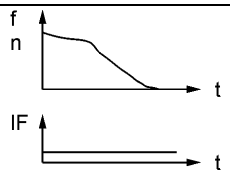
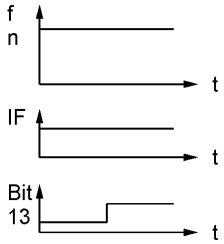
| | | |
|---|---|---|
| Bit 15 | | |
| Bit 14 | 5 freely configurable | |
| Bit 13 | control bits for internal or external | |
| Bit 12 | frequency inverter commands | |
| Bit 11 | | |
| Bit 10 | Control O.K. | No control |
| Bit 9 | – | – |
| Bit 8 | – | – |
| Bit 7 | Reset | – |
| Bit 6 | Release reference value | Lock reference value |
| Bit 5 | Release ramp integrator | Lock ramp integrator |
| Bit 4 | Release ramp output | Lock ramp output |
| Bit 3 | Release operation | Lock operation |
| Bit 2 | Operating condition | OFF 3 (Fast stop) |
| Bit 1 | Operating condition | OFF 2 (Impulse inhibit) |
| Bit 0 | On | OFF 1 |
| | High = 1 | Low = 0 |

## Description of control word bits

| Bit | Value | Meaning | Note |
|---|---|---|---|
| 0 | 1 | ON | – Is accepted when the drive state is "*1 .. Ready to switch on*" and changes to drive state "*3 Ready to run*" if the DC link is charged.<br>– At active line contactor control: Change to drive state "*2 .. Charge DC link*", after successful charging the drive state changes to "*3 .. Ready to run*". |
| | 0 | OFF 1 | – When the command has been accepted, the drive state changes to "*13 .. OFF 1 active*" and thus the drive is shut down along the deceleration ramp.<br>– When the output frequency reaches zero Hz: the drive state changes from "*0 .. Not ready to switch on*" to "*1 .. Ready to switch on*" if the basic state (bit 1 = 0, bit 2 = 1, bit 3 = 1 and bit 10 = 1) is present.<br>– If a renewed OFF 1 (On) command occurs during deceleration, the inverter tries to reach the given reference value along the acceleration ramp. Thereby the drive state changes to "*7 .. Run*".<br>– At active line contactor control, the line contactor is switched off if the drive state changes to "*1 .. Ready to switch on*". |
| 1 | 1 | Operating condition | "*OFF 2*" command canceled |
| | 0 | OFF 2<br>(Impulse inhibit) | – When the command has been accepted, the inverter will be locked and the drive state changes to "*19 .. Lock switching-on*".<br>– At active line contactor control the main contactor is switched off.<br>– If the basic state (bit 1 = 0, bit 2 = 1, bit 3 = 1 and bit 10 = 1) is given, the drive state changes to "*1 .. Ready to switch on*".<br>The OFF 2 command can also be triggered by means of the terminal function Impulse enable ! |
| 2 | 1 | Operating condition | "*OFF 3*" command canceled |
| | 0 | OFF 3 | – When the command has been accepted, the drive state changes to "*14 .. OFF 3 active*" and the drive is shut down as quickly as possible with maximum current and maximum DC link voltage.<br>– When the output frequency reaches zero Hz, the drive state changes to "*19 .. Lock switching-on*".<br>– Thereby, at active line contactor control the main contactor is switched off. If the OFF 3 command (bit 2 = 1) is canceled during deceleration, fast stop is executed all the same. |
| 3 | 1 | Operation released | When the command has been accepted, the inverter is released (Impulse enable) in drive state "*3 .. Ready to run*" and afterwards the drive state changes to "*4 .. Operation released*". |
| | 0 | Lock operation | – When the command has been accepted, the inverter will be locked and the drive state changes to "*3 .. Ready to run*".<br>– If the drive state is "*13 .. OFF 1 active*", the inverter will be locked and the drive state changes to "*0 .. Not ready to switch on*".<br>– Thereby, at active line contactor control the main contactor is switched off.<br>– If the basic state (bit 1 = 0, bit 2 = 1, bit 3 = 1 and bit 10 = 1) is given, the drive state changes to "*1 .. Ready to switch on*".<br>– If the drive state is "*14 .. OFF 3 active*", the procedure is executed all the same ! |

| Bit | Value | Meaning | Note |
|---|---|---|---|
| 4 | 1 | Release ramp output | Drive state "*5 .. Ramp output released*" |
| | 0 | Lock ramp output | When the command has been accepted, the output of the ramp function generator is set to zero. The drive stops with maximum current and maximum DC link voltage.<br>The drive state changes to "*4 .. Operation released*". |
| 5 | 1 | Release ramp integrator | Drive state "*6 .. Ramp output released*" |
| | 0 | Stop ramp integrator | When the command has been accepted, the output of the ramp function generator is set to zero. The drive stops with maximum current and maximum DC link voltage.<br>The drive state changes to "*4 .. Operation released*". |
| 6 | 1 | Release reference value | When the command has been accepted, the given reference value at the input of the ramp function generator is released. The drive state changes to "*7 .. Run*". |
| | 0 | Lock reference value | When the command has been accepted, the input of the ramp function generator is set to zero. As a result the drive decelerates along the set ramp.<br>The drive state changes to "*6 .. Ramp released*". |
| 7 | 1 | Reset | – The reset command is accepted at the positive edge when the drive state is "*20 .. Fault*".<br>– If there is no fault anymore, the drive state changes to "*19 .. Lock switching-on*".<br>– If a fault is still remaining the drive state is furthermore "*20 .. Fault*".<br>The reset command can also be triggered by means of the terminal function "Ext. reset" as well as by means of the Stop/Reset key on the keypad. |
| | 0 | no meaning | |
| 8 | 1 | Jog 1 start | Command not provided |
| | 0 | Jog 1 off | Command not provided |
| 9 | 1 | Jog 2 start | Command not provided |
| | 0 | Jog 2 off | Command not provided |
| 10 | 1 | Control O.K. | When the command has been accepted, the DP slave is controlled via the bus interface. The process data become valid.<br>This bit must be set in order to accept control commands and/or the free bits as well as analog signals ! |
| | 0 | No control | – When the command has been accepted, all data are processed depending in status bit 9 "*Control requested*". Control requested == 1 → Behaviour according to bus fault<br>– If the DP slave requests control furthermore, the frequency inverter switches over to fault state with the fault message BUS_COMM2 (depending on the setting of parameter D6.03 "Bus error behaviour").<br>In this case an alarm message is always set !<br>Control requested == 0 → Data to 0 ! → only I/O or panel operation |

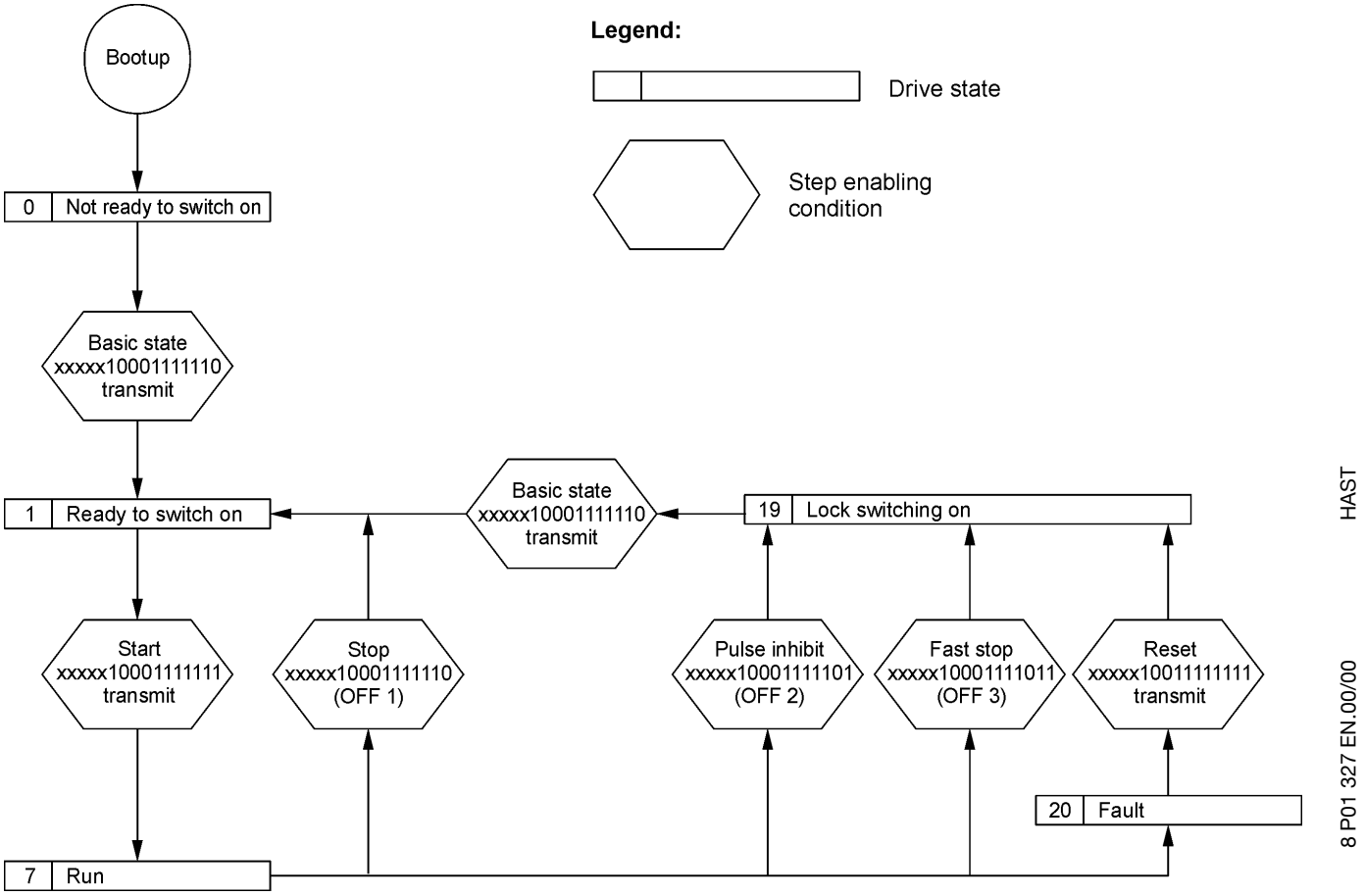
## Summary of the most important control commands

| Function | | Control word | |
|---|---|---|---|
| | | Binary | Hexadecimal |
| ON<br><br>Start with controlled acceleration |  | 0000010001111111 | 47F |
| OFF 1<br><br>Stop according to the set deceleration ramp |  | 0000010001111110<br><br>corresponds with the "basic state" | 47E |
| OFF 2<br><br>Impulse inhibit (free-wheeling) |  | 0000010001111101<br><br>results in drive state Lock switching-on ! | 47D |
| OFF 3<br><br>Emergency stop (deceleration at current or DC link voltage limit) |  | 0000010001111011<br><br>results in drive state Lock switching-on ! | 47B |
| Reset |  | xxxxx1xx1xxxxxxx | e.g. 480 |
| Use of a free bit (e.g. 13) during operation |  | 0000010001111111<br>+0010000000000000<br>0010010001111111 | 47F<br>+2000<br>247F |
| Canceling "Lock switching-on" | Basic state start command | "*15 Lock switching-on*"<br>0000010001111110<br>0000010001111111 | e.g.:<br>47E<br>47F |

## Simplified state machine

For standard control with the commands:

- Start / Stop along the inverter-internal acceleration / deceleration ramps
- Impulse inhibit
- Emergency stop
- Reset of a fault

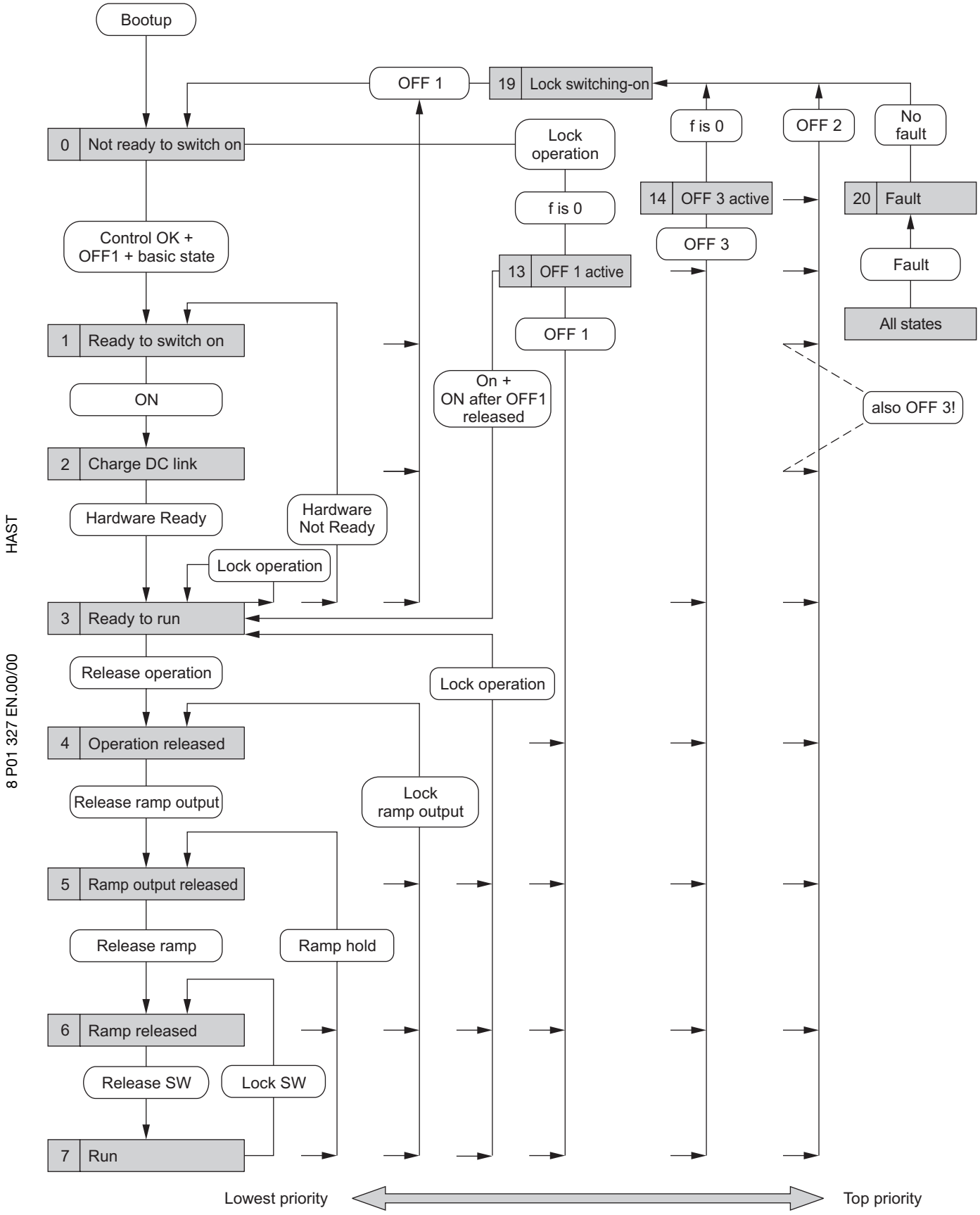



The commands Impulse inhibit (OFF 2), Fast stop (OFF 3) as well as a fault which has been reset always result in drive state "*Lock switching-on*" !

In order to reach drive state "Run" it is necessary to send the basic state (bit 0 = 0, bit 1, 2 = 1) before transmitting the start command (bit 0 = 1).

After connecting the mains (bootup of the drive) the basic state (bit 0 = 0, bit 1, 2 =1) must be provided in order to reach drive state "Ready to switch on".

## State machine Profidrive

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# Main reference value (Auxiliary reference values)

Depending on the used PPO type one to nine reference values are available in the Profibus user data protocol. The meaning of the individual reference values (each 16 bit) is defined by parameterization of the >*pDRIVE*< *MX pro* using the Matrix surface.

The reference values can be divided into two groups:

- inverter-internal reference values like e.g. f-reference, PID actual/reference value and suchlike (according to the reference use)
- forwarding to the analog outputs for external use, without influencing the inverter control (bit 10 STW must be 1 !).

The reference values are linear scaled values with 16 bit display.
That is: 0 % = 0 (0 hex), 100 % = 214 (4000 hex)

Therefrom a presentable data range of -200...+200 % with a resolution of $2^{-14}$ (0.0061 %) results.

| % | Binary | Hexadecimal | Decimal |
|---|---|---|---|
| 199.9939 | 01111111 11111111 | 7FFF | 32767 |
| 100.0000 | 01000000 00000000 | 4000 | 16384 |
| 0.0061 | 00000000 00000001 | 0001 | 1 |
| 0.0000 | 00000000 00000000 | 0000 | 0 |
| -0.0061 | 11111111 11111111 | FFFF | -1 |
| -100.0000 | 11000000 00000000 | C000 | -16384 |
| -200.0000 | 10000000 00000000 | 8000 | -32768 |

The reference values are scaled by means of parameterization in matrix field D6. All reference values are scaled in Hz or %.

## Using bits 11...15 of the control word

According to the Profibus profile bits 11...15 are not defined and therefore they can be freely used by the user. If more than five free control bits are required, process data word PZD2 can be defined as additional control word STW2 using parameter D6.100.

When the frequency inverter is parameterized appropriate, this digital information can be used

- for inverter-internal control signals (corresponding to the use of the digital inputs) or
- totally separated from the inverter functions in order to transmit information using the digital outputs of the frequency inverter (bit 10 STW1 must be 1 !).

| Use | Free control bits | Possible reference values |
|---|---|---|
| Inverter – "internal" | f-reference 2<br>2nd ramp<br>External fault<br>PID active<br>Mains ON(OFF)<br>...<br>(for the complete list see matrix filed D6) | f-reference 1<br>f-reference 2<br>f-correction<br>PID ref. value<br>PID actual value |
| Inverter – "external" | Relay and digital outputs of the basic card or the option card IO11 or IO12 | Analog output of the basic card or the option card >*pDRIVE*< IO12 |

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# Status word

## Assignment

| | | |
|---|---|---|
| Bit 15 | | |
| Bit 14 | 5 freely configurable | |
| Bit 13 | status bits for internal or external | |
| Bit 12 | frequency inverter messages | |
| Bit 11 | | |
| Bit 10 | f (n) ≥ f level | f (n) ≤ f level |
| Bit 9 | Control requested | No control rights requested |
| Bit 8 | f (n) = f (n) ref | f (n) ≠ f (n) ref |
| Bit 7 | Alarm | No alarm |
| Bit 6 | Lock switching-on | No Lock switching-on |
| Bit 5 | No OFF 3 | OFF 3 (Emergency stop) |
| Bit 4 | No OFF 2 | OFF 2 (Impulse inhibit) |
| Bit 3 | Fault | No fault |
| Bit 2 | Operation released | Operation locked |
| Bit 1 | Ready to run | Not ready to run |
| Bit 0 | Ready to switch on | Not ready to switch on |
| | High = 1 | Low = 0 |

| Listing of the most important drive states | Status word bits | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 .. Not ready to switch on | x | 1 | x | x | 0 | x | x | 0 | 0 | 0 | 0 |
| 1 .. Ready to switch on | x | 1 | x | x | 0 | x | x | 0 | 0 | 0 | 1 |
| 3 .. Ready to run | x | 1 | x | x | 0 | x | x | 0 | 0 | 1 | 1 |
| 7 .. Run | x | 1 | x | x | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| 19 .. Lock switching on | x | 1 | x | x | 1 | x | x | 0 | 0 | 0 | 0 |
| 20 .. Fault | x | 1 | x | x | 0 | x | x | 1 | 0 | 0 | 0 |

0 .. Bit state zero

1 .. Bit state one

x .. Bit state is undefined

## Description of status word bits

| Bit | Value | Meaning | Note |
|---|---|---|---|
| 0 | 1 | Ready to switch on | The drive state is "*1 .. Ready to switch on*".<br>The inverter is locked.<br>At active line contactor control the main contactor is switched off. |
| | 0 | Not ready to switch on | The drive state is "*0 .. Not ready to switch on*" or "*19 .. Lock switching-on*". |
| 1 | 1 | Ready to run | The drive state is "*3 .. Ready to run*".<br>That means that there is voltage on the power part and there are no faults. But the inverter is still locked.<br>At active line contactor control the Run message already occurs during charging → drive state "*2 .. Charge DC link*" |
| | 0 | Not ready to run | |
| 2 | 1 | Operation released | The drive state is "*4 .. Operation released*", "*5 .. Ramp output released*", "*6 .. Ramp released*", "*7 .. Run*", "*13 .. OFF 1 active*" or "*14 .. OFF 3 active*".<br>The inverter is operating with impulse enable and there is voltage on the output terminals. |
| | 0 | Operation locked | |
| 3 | 1 | Fault | The drive is not in operation due to a fault. The drive state is "*20 .. Fault*".<br>After successful trouble shooting and reset of the fault the drive state changes to "*19 .. Lock switching-on*". |
| | 0 | Failure-free | |
| 4 | 1 | no OFF 2 | |
| | 0 | OFF 2 (Impulse inhibit) | An OFF 2 (impulse inhibit) command is given. |
| 5 | 1 | no OFF 3 | |
| | 0 | OFF 3 (emergency stop) | An OFF 3 (emergency stop) command is given. |
| 6 | 1 | Lock switching-on | The inverter has drive state "*19 .. Lock switching-on*".<br>This state occurs in consequence of the commands OFF 2, OFF 3 and "Lock operation" as well as after successful resetting of a fault. This drive state is canceled by means of bit 0 STW = 0.<br>The drive state "Lock switching-on" is canceled by means of bit 1 of the control word (OFF1/ON). |
| | 0 | No lock switching-on | |
| 7 | 1 | Alarm | There is an alarm message, resetting is not required. |
| | 0 | No alarm | |
| 8 | 1 | f, (n) = f, (n) ref | Comparison of reference and actual value for frequency or speed.<br>A tolerance of 0.5 Hz is accepted. |
| | 0 | f, (n) ≠ f, (n) ref | |

| Bit | Value | Meaning | Note |
|---|---|---|---|
| 9 | 1 | Control requested | If the frequency inverter is parameterized for bus operation by means of parameter D6.01 (control via bus), the inverter asks the DP master for assumption of control after mains connection or connecting an external 24 V buffer voltage.<br>As long as the master does not assume control, an alarm message (ZTW bit 7) is given. |
| | 0 | No bus operation | If the inverter is disconnected from the bus communication because of switching to panel mode (key on the keypad), bit 9 is reset to zero.<br>– If the master does not send "Control OK" (STW bit10 = 0), an alarm message is set.<br>– If the drive is switched to remote mode = bus operation again, the automation system has to answer with "Control OK" within 2 seconds. Otherwise the drive is switched back to panel mode automatically. |
| 10 | 1 | $f \geq f$ level | Function not provided |
| | 0 | $f \leq f$ level | Function not provided |

# Main actual value (Auxiliary actual values)

Depending on the used PPO type one to nine actual values are available in the Profibus user data protocol.

The meaning of the individual actual values is defined by parameterization of the >*pDRIVE*< *MX pro* using the Matrix surface.

The actual values can be divided into two groups:

- inverter-internal actual values like e.g. actual value of speed, torque a.s.o. (according to the analog outputs of the frequency inverter)
- assumption of the analog inputs for external use by means of the DP master (without influencing the inverter control). Bit 10 STW must be 1 !

The actual values are linear scaled values with 16 bit display.
That is 0 % = 0 (0 hex), 100 % = 214 (4000 hex)

Therefrom a presentable data range of -200...+200 % with a resolution of $2^{-14}$ (0.0061 %) results.

| % | Binary | Hexadecimal | Decimal |
|---|---|---|---|
| 199.9939 | 01111111 11111111 | 7FFF | 32767 |
| 100.0000 | 01000000 00000000 | 4000 | 16384 |
| 0.0061 | 00000000 00000001 | 0001 | 1 |
| 0.0000 | 00000000 00000000 | 0000 | 0 |
| -0.0061 | 11111111 11111111 | FFFF | -1 |
| -100.0000 | 11000000 00000000 | C000 | -16384 |
| -200.0000 | 10000000 00000000 | 8000 | -32768 |

The actual values are scaled by means of parameterization in matrix field D6. The scaling of the individual actual values is fixed for each output value. See matrix field D6.

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## Using bits 11...15

According to the Profibus profile bits 11...15 of the status word ZTW1 are not defined and therefore they can be freely used by the user. When the frequency inverter is parameterized appropriate, this digital information can be derived from inverter-internal operating states (corresponding to the digital outputs) as well as totally separated from the inverter functions by means of the digital inputs of the frequency inverter.

If more than five free status word bits are required, process data word PZD2 can be defined as additional status word ZTW2 using parameter D6.137 Fieldbus actual values.

| Use | Free status word bits | Actual values |
|---|---|---|
| Inverter – "internal" | Ready | Output frequency |
| | Run | \|Output frequency\| |
| | Ready / run | Output current |
| | Fault | Torque |
| | ... | ... |
| | (for the complete list see matrix field D6) | (for the complete list see matrix field D6) |
| Inverter – "external" | DI1...DI6<br>DI7...DI10 or DI11...DI14 | Analog inputs of the basic card or the option card >*pDRIVE*< IO12 |

# Parameterization – PKW area

# General

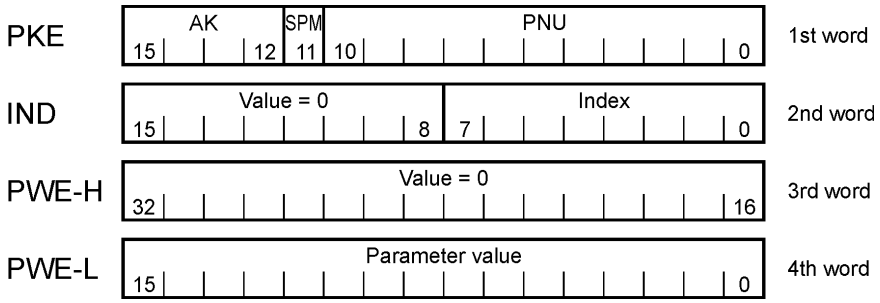
Using the PKW service (Parameter code value) each parameter of the inverter can be read and written by means of the bus. The PKW service is designed on the basis of the Profidrive profile and contains 4 words.

In the PKW mechanism, the master frames a request, the inverter processes the request and returns a corresponding response.

Processing parameterization happens inverter-internal in the background. Parameter requests are processed time-optimized there, i.e. a request is accepted and a response is provided to be picked up at the same time.

The inverter provides the response until the master frames a new request.

Request and response are of following data type:




## First word "PKE"

The parameter code is used to select parameters by means of their logical address. Addresses are valid in the range of 0...2047 (11 bits) and they are mentioned in the parameter list which is provided in the appendix. The address is used in the request telegram as well as in the response telegram.

## Second word "IND"

In the second word, the "index", the request and response code is transmitted.

In the request telegram there is a read and write command defined. If a request telegram is executed positive, the original request is transmitted as response code in the response telegram.

If the requests are not executable the value 004E hex is appears as response code in the index field.

| Request code | Index | | Pos. response | | Neg. response | |
|---|---|---|---|---|---|---|
| No request | 0000 hex | 0 dec | 0000 hex | 0 dec | 0000 hex | 0 dec |
| Request parameter value (read) | 0052 hex | 82 dec | 0052 hex | 82 dec | 004E hex | 78 dec |
| Write parameter value | 0057 hex | 87 dec | 0057 hex | 87 dec | 004E hex | 78 dec |

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## Third and fourth word "PWE - High", "PWE - Low"

If read or write requests are successfully processed, the value of the parameter which is defined by the logical address is transmitted in the two words PWE-High and PWE-Low. Thereby the value of the third word is always zero.

If a request is not executable, a corresponding fault code is transmitted in the 4th word (PWE-Low) instead of the parameter value.

| Fault code (PWE-Low) | Fault | Possible causes of fault |
|---|---|---|
| 0000 hex = dec | Faulty addressing | – Inadmissible logical address<br>– Access to a logical address which does not exist |
| 0001 hex = dec | Faulty parameterization | – Parameter is of type "actual value"<br>– Parameter cannot be changed during operation<br>– Parameter cannot be changed due to double assignment<br>– Parameterising station (F6.03) is not set to "Profibus" |

## Rules for processing of requests / responses

- The master must repeat a request until he receives a corresponding response from the inverter. During processing the request the inverter still sends the response of the previous request.
- The master has to identify the response to the sent request:
  - due to evaluation of the response code
  - due to evaluation of the parameter number
  - due to evaluation of the parameter value
- requests and responses must be transmitted completely in one telegram, combined requests are not possible.
- In case of responses which include actual values the inverter always returns the actual value when repeating the response telegrams.
- If no information should be exchanged by means of the PKW mechanism, the master has to define the request code "no request".
- For write requests, the value which is transmitted in the answer must be evaluated (the request is canceled if the value remains the same or if a fault occurs).
- After responses which contain a fault number (response code 4E) "no response" must be entered in the request list if the next regular request refers to the same logical address (deleting the last fault message).
- After changing a parameter a storage command must be sent in order to protect the data against voltage loss. The storage command takes place when writing value 1 to the logical address 0028 hex / 40 dec. After successful storage the value must be set to 0 again.

## Examples

**Reading the shaft power (parameter A2.07)**

*Request telegram*

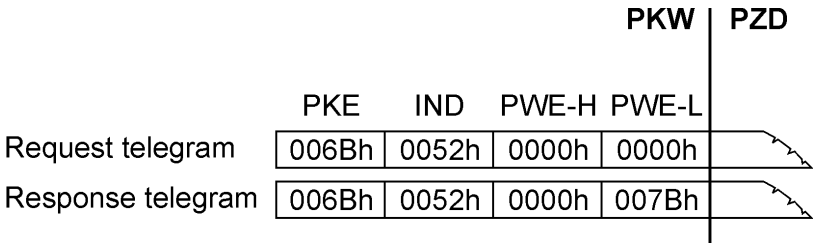
| | |
|---|---|
| 0 0 0 0 0 0 0 1 0 0 0 0 0 1 1 1 | A2.07: logical address 107 dec / 006B hex |
| 0 0 0 0 0 0 0 0 0 1 0 1 0 0 1 0 | Bit 8...15 always zero / request code "read" (82 dec / 52 hex) |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | No entry required |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | No entry required |

*Response telegram*

| | |
|---|---|
| 0 0 0 0 0 0 0 1 0 0 0 0 0 1 1 1 | A2.07: logical address 107 dec / 006B hex |
| 0 0 0 0 0 0 0 0 0 1 0 1 0 0 1 0 | Bit 8...15 always zero / positive response "read" (82 dec / 52 hex) |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Bit 0...15 always zero |
| 0 0 0 0 0 0 0 0 0 1 1 1 1 0 1 1 | Binary value of the actual shaft power = 123 dec |

Scaling: Real value = transmitted value / factor (see the factor in the parameter list given in the appendix)
P = 123 / 10 = 12.3 kW

*Summary of the telegram exchange*




**Adjusting the parameterizing station to Profibus (F6.03 = setting 4)**

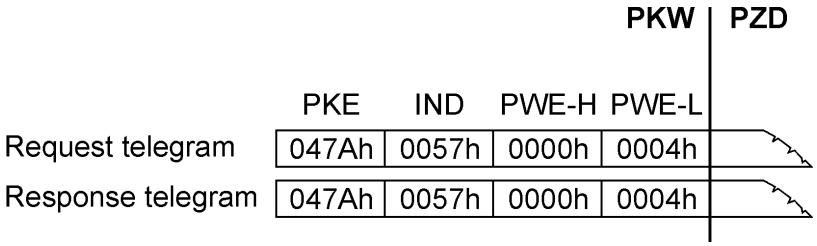
*Request telegram*

| | |
|---|---|
| 0 0 0 0 0 1 0 0 0 1 1 1 1 0 1 0 | F6.03: logical address 1146 dec / 047A hex |
| 0 0 0 0 0 0 0 0 0 1 0 1 0 1 1 1 | Bit 8...15 always zero / request code "write" (87dec / 57hex) |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | No entry required |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 | Binary value 4 |

*Response telegram*

| | |
|---|---|
| 0 0 0 0 0 1 0 0 0 1 1 1 1 0 1 0 | F6.03: logical address 1146 dec / 047A hex |
| 0 0 0 0 0 0 0 0 0 1 0 1 0 1 1 1 | Bit 8...15 always zero / positive response "write" (87dec / 57hex) |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Bit 0...15 always zero |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 | Binary value 4 |

*Summary of the telegram exchange*




It is necessary to set parameter F6.03 "Parametrising station" to setting "4 .. Profibus" in order to be qualified for adjusting other parameters.

**Assignment of the digital input DI1 to Motorpot + (D2.01 = setting 14)**

*Request telegram*

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | D2.01: logical address 767 dec / 02FF hex |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | Bit 8...15 always zero / request code "write" (87dec / 57hex) |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | No entry required |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | Binary value 14 |

*Response telegram (when the request has been accepted*

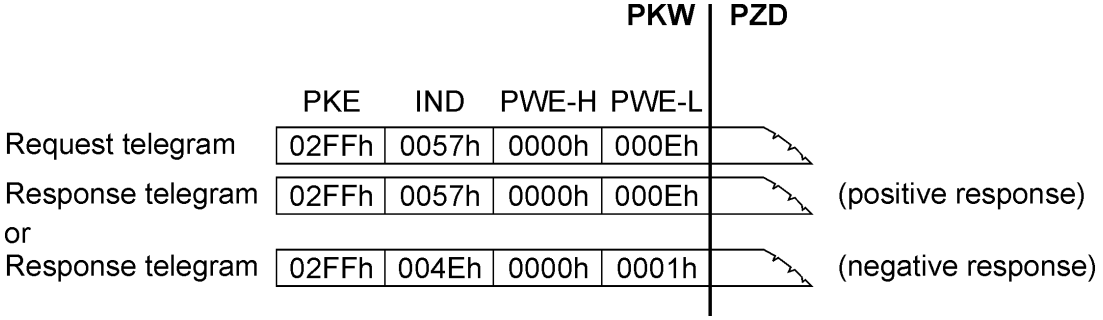
| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | D2.01: logical address 767 dec / 02FF hex |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | Bit 8...15 always zero / positive response "write" (87dec / 57hex) |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Bit 0...15 always zero |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | Binary value 14 |

*Response telegram (when the request is not executable)*

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | D2.01: logical address 767 dec / 02FF hex |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | Bit 8...15 always zero / fault code (78 dec / 004E hex) |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Bit 0...15 always zero |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | Fault code 01 (faulty parameterization) |

01 .. Parameter value cannot be written (Adjusting parameters is only permitted during impulse inhibit. You try to assign the digital function "Motorpot +" twice or the parameterization station is not set to "Profibus".)

*Summary of the telegram exchange*



**Adjustment of an analog value (D3.04 "AO1 max. value" = 150 %)**

*Request telegram*

| | |
|---|---|
| 0 0 0 0 0 0 1 1 0 0 0 1 0 0 0 1 | D3.04: logical address 785 dec / 0311 hex |
| 0 0 0 0 0 0 0 0 0 1 0 1 0 1 1 1 | Bit 8...15 always zero / request code "write" (87dec / 57hex) |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | No entry required |
| 0 0 1 1 1 0 1 0 1 0 0 1 1 0 0 0 | Binary value 15000 dec / 3A98 hex |

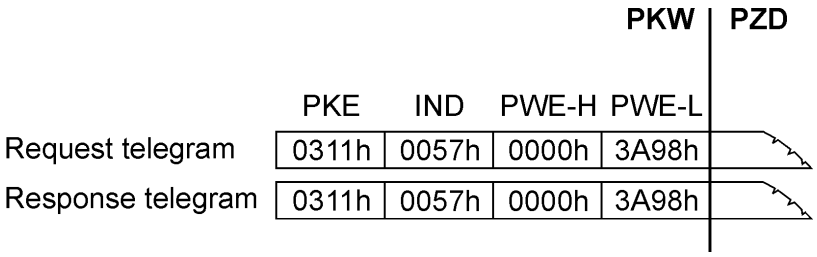
Scaling: value which should be transmitted = real value * factor
(see the factor in the parameter list given in the appendix)

150.00% * 100 =15000

*Response telegram*

| | |
|---|---|
| 0 0 0 0 0 0 1 1 0 0 0 1 0 0 0 1 | D3.04: logical address 785 dec / 0311 hex |
| 0 0 0 0 0 0 0 0 0 1 0 1 0 1 1 1 | Bit 8...15 always zero / positive response "write" (87dec / 57hex) |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Bit 0...15 always zero |
| 0 0 1 1 1 0 1 0 1 0 0 1 1 0 0 0 | Binary value 15000 dec / 3A98 hex |

*Summary of the telegram exchange*




**Reading the drive reference F1.01**

The drive reference is a parameter of the type text. It is read out in ASCII-coded form.

Corresponding to the expected length of text the start address and a certain number of ensuing parameters has to be read. See parameter list given in the appendix.

*Request telegram*

| | |
|---|---|
| 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 | F1.01: logical address 11 dec / 000B hex |
| 0 0 0 0 0 0 0 0 0 1 0 1 0 0 1 0 | Bit 8...15 always zero / request code "read" (82 dec / 52 hex) |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | No entry required |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | No entry required |

*Response telegram*

| | |
|---|---|
| 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 | F1.01: logical address 11 dec / 000B hex |
| 0 0 0 0 0 0 0 0 0 1 0 1 0 0 1 0 | Bit 8...15 always zero / positive response "read" (82 dec / 52 hex) |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Bit 0...15 always zero |
| 0 1 0 0 1 1 0 1 0 1 0 1 1 0 0 0 | bit 8...15: ASCII "M" bit 0...7: ASCII "X" |

*Request telegram*

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | Response for logical address 12 dec / 000C hex |
| | | | | | | | . | . | . | | | | | | | |
| 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | bit 8...15: ASCII "e" bit 0...7: ASCII "c" |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | Response for logical address 13 dec / 000D hex |
| | | | | | | | . | . | . | | | | | | | |
| 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | bit 8...15: ASCII "o" bit 0...7: ASCII "4" |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | Response for logical address 14 dec / 000E hex |
| | | | | | | | . | . | . | | | | | | | |
| 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | bit 8...15: ASCII "V" bit 0...7: ASCII "1" |

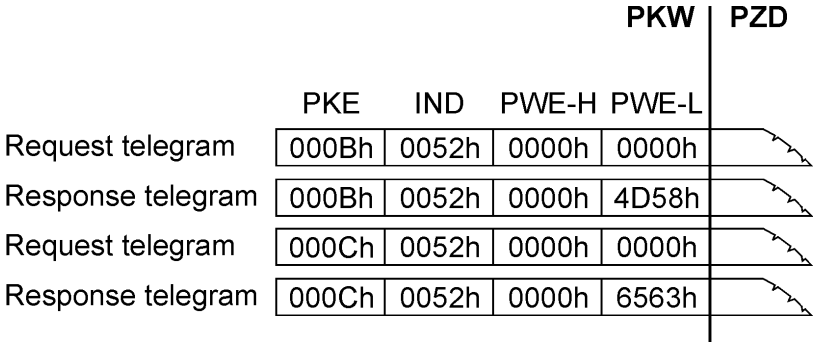
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | Response for logical address 15 dec / 000F hex |
| | | | | | | | . | . | . | | | | | | | |
| 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | bit 8...15: ASCII "." bit 0...7: ASCII "5" |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | Response for logical address 16 dec / 0010 hex |
| | | | | | | | | . | . | . | | | | | | |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | bit 8...15: ASCII "_" bit 0...7: ASCII "\n" |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | Response for logical address 17 dec / 0011 hex |
| | | | | | | | | . | . | . | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | bit 8...15: ASCII "\n" bit 0...7: ASCII "\n" |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Response for logical address 18 dec / 0012 hex |
| | | | | | | | | . | . | . | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | bit 8...15: ASCII "\n" bit 0...7: ASCII "\n" |

*Summary of the telegram exchange*




4D 58 65 63 6F 34 56 31 2E 35 20 00 00 00 00 00
(MXeco4V1.5_)

If you string the characters decoded with ASCII together, you get the drive reference

MXeco4V1.5_

(in case of this device only 10 characters are used)

# ASCII code table

ISO / IEC 10 367
Basic G0 Set
Latin Alphabet No. 1 supplementary set

| hex | Char | hex | Char | hex | Char | hex | Char | hex | Char | hex | Char |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | Space | 40 | @ | 60 | ` | A1 | ¡ | C1 | Á | E1 | á |
| 21 | ! | 41 | A | 61 | a | A2 | ¢ | C2 | Â | E2 | â |
| 22 | " | 42 | B | 62 | b | A3 | £ | C3 | Ã | E3 | ã |
| 23 | § | 43 | C | 63 | c | A4 | ¤ | C4 | Ä | E4 | ä |
| 24 | $ | 44 | D | 64 | d | A5 | ¥ | C5 | Å | E5 | å |
| 25 | % | 45 | E | 65 | e | A6 | ¦ | C6 | Æ | E6 | æ |
| 26 | & | 46 | F | 66 | f | A7 | § | C7 | Ç | E7 | ç |
| 27 | ´ | 47 | G | 67 | g | A8 | ¨ | C8 | È | E8 | è |
| 28 | ( | 48 | H | 68 | h | A9 | © | C9 | É | E9 | é |
| 29 | ) | 49 | I | 69 | i | AA | ª | CA | Ê | EA | ê |
| 2A | * | 4A | J | 6A | j | AB | « | CB | Ë | EB | ë |
| 2B | + | 4B | K | 6B | k | AC | ¬ | CC | Ì | EC | ì |
| 2C | , | 4C | L | 6C | l | AD |  | CD | Í | ED | í |
| 2D | - | 4D | M | 6D | m | AE | ® | CE | Î | EE | î |
| 2E | . | 4E | N | 6E | n | AF | ¯ | CF | Ï | EF | ï |
| 2F | / | 4F | O | 6F | o | B0 | ° | D0 | Đ | F0 | ð |
| 30 | 0 | 50 | P | 70 | p | B1 | ± | D1 | Ñ | F1 | ñ |
| 31 | 1 | 51 | Q | 71 | q | B2 | ² | D2 | Ò | F2 | ò |
| 32 | 2 | 52 | R | 72 | r | B3 | ³ | D3 | Ó | F3 | ó |
| 33 | 3 | 53 | S | 73 | s | B4 | ´ | D4 | Ô | F4 | ô |
| 34 | 4 | 54 | T | 74 | t | B5 | µ | D5 | Õ | F5 | õ |
| 35 | 5 | 55 | U | 75 | u | B6 | ¶ | D6 | Ö | F6 | ö |
| 36 | 6 | 56 | V | 76 | v | B7 | · | D7 | × | F7 | ÷ |
| 37 | 7 | 57 | W | 77 | w | B8 | ¸ | D8 | Ø | F8 | ø |
| 38 | 8 | 58 | X | 78 | x | B9 | ¹ | D9 | Ù | F9 | ù |
| 39 | 9 | 59 | Y | 79 | y | BA | º | DA | Ú | FA | ú |
| 3A | : | 5A | Z | 7A | z | BB | » | DB | Û | FB | û |
| 3B | ; | 5B | [ | 7B | { | BC | ¼ | DC | Ü | FC | ü |
| 3C | < | 5C | \ | 7C | \| | BD | ½ | DD | Ý | FD | ý |
| 3D | = | 5D | ] | 7D | } | BE | ¾ | DE | Þ | FE | þ |
| 3E | > | 5E | ^ | 7E | ~ | BF | ¿ | DF | ß | FF | ÿ |
| 3F | ? | 5F | _ | 7F | DEL | C0 | À | E0 | à | 0 | \n |

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# Inverter settings

## General fieldbus settings

Parameter group D6 Fieldbus is used for configuration of all fieldbus connections which are possible with the >*pDRIVE*< *MX pro*. The two fieldbus connections CANopen and Modus are available as standard. Further fieldbuses like e.g. Profibus DP can be realized by means of optional PCBs which can be built-in.

According to the used bus which is selected with parameter D6.01 only parameters for this bus are displayed in matrix field D6.

| D6.01 | Bus selection | | | | 0 .. No bus |
|---|---|---|---|---|---|

0 ...No bus
1 ...Modbus
2 ...CanOpen
3 ...Profibus

The desired fieldbus system is activated by means of parameter D6.01 "Bus selection". The activation influences the principle data exchange between the bus subscribers in respect of the transmitted process data (reference / actual values) and the parameterization service.

In order to use the bus control word of the respective bus profile for the control of the >*pDRIVE*< *MX pro,* Control source 1 or 2 (E4.01, E4.02) must be set to "Bus".

See also parameter group E4 of the >*pDRIVE*< *MX pro* Description of functions.

| D6.02 | Control requested | | | | 1 .. Active |
|---|---|---|---|---|---|

0 ...Not active
1 ...Active

In order to recognize a communication problem at the serial fieldbus interface, two different monitoring routines are available.

Watch dog timing

The watch dog timing checks the fieldbus interface for a cyclical signal of the active bus master or scanner and therefrom it is a check of the bus hardware (cable break, malfunction of the master component, ...). The monitoring time depends on the existing network configuration like the number of subscribers, set baud rate a.s.o.. It is automatically transmitted from the master to the slave by means of the parameterization telegram or it has to be set at the inverter.

Loss of control

In contrast to the watch dog timing the control monitoring checks the data content of the serial data traffic. If a malfunction occurs at the fieldbus master or its respective PLC, all outgoing data are set to zero (Fail Save Mode). Therefore, the slave receives a telegram (with data content zero) periodically whereby the triggering of the watch dog timing is prevented.

In order to recognize this state and to take suitable measures, a monitoring of control can be activated with parameter D6.02 (typical for Profibus DP).

If parameter D6.02 Control requested is set to "1 .. Active" the inverter monitors bit 10 of the control word. If this bit equals state "Low", loss of control is detected.

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| D6.03 | Bus error behaviour | | | | 1 .. Trip |
|---|---|---|---|---|---|

1 ...Trip
2 ...Last ref. val & alarm
3 ...Emerg. ref.val. & alarm

| D6.04 | Bus error delay time | | | | 0.5 s |
|---|---|---|---|---|---|

0...3200 s

Parameter D6.03 defines the behaviour of the inverter if a bus error occurs. Depending on the process demands one of the following reactions can be selected:

| Setting | Behaviour in case of a bus fault |
|---|---|
| 1 .. Trip | Fault shut-down with the message "Bus fault". |
| 2 .. Last ref. val & alarm | The alarm message "Bus fault" is set. The drive still remains in operation and uses the last valid reference value of this source instead of the missing bus reference value. If the bus connection is available again, the bus reference value is used and the alarm message is reset. |
| 3 .. Emerg. ref.val. & alarm | The alarm message "Bus fault" is set. The drive still remains in operation and uses the value according setting SW1-9 emergency value (see matrix field D6) instead of the missing bus reference value. If the bus connection is available again, the bus reference value is used and the alarm message is reset. |



## Profibus DP settings



| D6.30 | DP slave address | | | | |
|---|---|---|---|---|---|

For control reasons, parameter D6.30 "DP slave address" shows the adjusted slave address which is set using the DIP switches at the Profibus option PBO11.

After adjusting the address (using the DIP switches) the drive has to be disconnected from the mains (and a possibly existing 24 V buffer voltage) for a short time or activate the routine Software reset (F2.46) in order to reboot the drive and to assign the set slave address to the communication processor.

| D6.31 | DP baud rate | | | | |
|---|---|---|---|---|---|

0 ...12000 kbaud
1 ...6000 kbaud
2 ...3000 kbaud
3 ...1500 kbaud
4 ...500 kbaud
5 ...187,5 kbaud
6... 93,75 kbaud
7... 45,45 kbaud
8... 19,2 kbaud
9... 9,6 kbaud

If a running DP master is operating on the bus the PBO11 interface is automatically synchronized to the bus speed given from the DP master. Parameter D6.31 shows the active baud rate.

| D6.32 | Slave state | | | | |
|---|---|---|---|---|---|

0 ...Init
1 ...Real-time operation
2 ...Parametrisation phase
5 ...Fault
6 ...Busy
7 ...Config. phase

Displays the actual operating state of the Profibus connection.

| Function | Meaning |
|---|---|
| 0 .. Init | Boot phase after initialization of the communication processor state if no PBO11 option is installed |
| 1 .. Real-time operation | Data exchange between master/slave active |
| 2 .. Parametrisation phase | PBO11 is waiting for the parameterization telegram of the DP master |
| 5 .. Fault | CPU fault at PBO11 |
| 7 .. Config. phase | PBO11 is waiting for the configuration telegram of the DP master |

| D6.33 | On after off 1 | | | | 1 .. Active |
|---|---|---|---|---|---|

0 ...Inactive
1 ...Active

Parameter D6.33 "On after off 1" defines whether anew acceleration is possible during deceleration (initiated by an OFF 1 command, i.e. bit 0 is set to 0) by means of resetting this bit to "1".

In case of "0 .. Inactive" the inverter changes to "Lock switching-on", i.e. before restart the "basic state" must be provided.

## Diagnostics of the configuration settings

| D6.34 | Request master | 0110 | | | |
|---|---|---|---|---|---|

0 .. Ident number OK ☐ / ☑
1 .. Watch dog ☐ / ☑
2 .. Freeze mode ☐ / ☑
3 .. Sync mode ☐ / ☑

| D6.35 | DP master address | | | | |
|---|---|---|---|---|---|

Parameters D6.34 and D6.35 show the most important information of the parameter telegram sent from the master to the slave.



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| | | | | | |
|---|---|---|---|---|---|
| D6.36 | Config buffer 1 | | | | hex |
| D6.37 | Config buffer 2 | | | | hex |
| D6.38 | Config buffer 3 | | | | hex |

The configuration buffer contains the code bytes of the configuration telegram sent from the DP master to the DP slave which is defined in Profibus DP. It contains the amount of the input/output data ranges as well as information about the data length and their consistency. Each configuration buffer corresponds with one byte (8 bit) of the telegram and is displayed hexadecimal.

*Meaning of the individual bits:*

| Bit | Designation | Value (bin) | Meaning |
|---|---|---|---|
| 0...3 | Length of data (+1) | 0001 | 2 words |
| | | 0101 | 6 words |
| 4, 5 | Special code format | 00 | According EN 50170 vol. 2 |
| | Input data | 01 | Status word, actual values |
| | Output data | 10 | Control word, reference values |
| | Input/output data | 11 | Equal length of input/output data |
| 6 | Length | 0 | Byte |
| | | 1 | Word |
| 7 | Consistency | 0 | Byte or word |
| | | 1 | Total length |



According to the defined PPO types the configuration buffers contain the following values:

| | PPO1 | PPO2 | PPO3 | PPO4 | PPO5 |
|---|---|---|---|---|---|
| Configuration buffer 1 | F3 hex | F3 hex | F1 hex | F5 hex | F3 hex |
| Configuration buffer 2 | F1 hex | F5 hex | 00 hex | 00 hex | F9 hex |
| Configuration buffer 3 | 00 hex | 00 hex | 00 hex | 00 hex | 00 hex |

| D6.39 | DP diagnostic buffer 1 | | | | hex |
|---|---|---|---|---|---|

DP diagnostic buffer 1 includes the data contents of the diagnostic telegram (Station_status_1) of the DP slave which is defined in Profibus DP. The buffer corresponds with one byte (8 bit) of the telegram.

Octet 1 shows the bit oriented station status 1 in hexadecimal form.

The individual bits have following meaning:

| Bit | Function | Meaning |
|---|---|---|
| 0 | Diag. Station_Non_Existent | This bit is set by the DP master if the DP slave cannot be reached via the bus. When this bit is set the diagnostic bits contain the state of the last diagnostic report or the initial value.<br>The DP slave sets this bit fix to zero. |
| 1 | Diag. Station_Not_Ready | This bit is set by the DP slave if it is not ready for data exchange yet. |
| 2 | Diag. Cfg_Fault | This bit is set from the DP slave as soon as the last configuration data transmitted from the DP master do not correspond with those the DP slave determined. |
| 3 | Diag. Ext_Diag | Not provided by PBO11. |
| 4 | Diag. Not_Supported | This bit is set from the DP slave as soon as a function is requested which is not provided by the DP slave. |
| 5 | Diag. Invalid_Slave_Response | This bit is set from the DP master as soon as it receives an implausible response from the addressed slave. The DP slave sets this bit fix to zero. |
| 6 | Diag. Prmt_Fault | This bit is set from the DP slave if the last parameterization telegram was faulty. |
| 7 | Diag. Master_Lock | The DP slave has been parameterized from another master. This bit is set from the DP master (class 1) if the address in octet 4 is not 255 and not the same as its own address. The DP slave sets this bit fix to zero. |

| D6.40 | DP diagnostic buffer 2 | | | | hex |
|---|---|---|---|---|---|

The DP diagnostic buffer 2 includes the data contents of the diagnostic telegram (Station_status_2) of the DP slave which is defined in Profibus DP. The buffer corresponds with one byte (8 bit) of the telegram.

Octet 2 shows the bit oriented station status 2 in hexadecimal form.

The individual bits have following meaning:

| Bit | Function | Meaning |
|---|---|---|
| 0 | Diag. Prm_Req | If the DP slave sets this bit, it must be parameterized and configured again. |
| 1 | Diag. Stat_Diag | If the DP slave sets this bit, the DP master has to continue collecting diagnostic information until this bit is canceled.<br>For example, the DP slave sets this bit if it cannot provide valid user data. |
| 2 | Fixed to 1 | |
| 3 | Diag. WD_On | The bit is set from the DP slave as soon as its Watch Dog timing is activated. |
| 4 | Diag. Freeze_Mode | The bit is set from the DP slave as soon as it received the Freeze control command. |
| 5 | Diag. Sync_Mode | The bit is set from the DP slave as soon as it received the Sync control command. |
| 6 | Reserved | |
| 7 | Diag. Deactivated | This bit is set from the DP master as soon as the DP slave is marked as inactive in the respective parameter set and has been excluded from the cyclical processing. The DP slave sets this bit always to zero. |

| | | | | | |
|---|---|---|---|---|---|
| D6.41 | Group number | | | | |
| D6.42 | Global command | | | | |

The Global command includes the data content of the command "Global control" from the DP master to the DP slave which is defined in Profibus DP. Octet 1 shows the bit oriented command which should be carried out in hexadecimal form.

The individual bits have following meaning:

| Bit | Function | Meaning |
|---|---|---|
| 0 | Reserved | |
| 1 | Clear_Data | All outputs are canceled. |
| 2 | Unfreeze | The freezing of the inputs is canceled. |
| 3 | Freeze | The states of the inputs are read and frozen. This process is repeated when the Freeze command is given again. |
| 4 | Unsync | The command Unsync cancels the command Sync. |
| 5 | Sync | The output states transmitted with the Data_Exchange function are issued and frozen. Output data which are transmitted afterwards are not issued until the next Sync control command is given. |
| 6 | Reserved | |
| 7 | Reserved | |

## Configuration of the fieldbus reference values

Corresponding to the configured telegram length one to nine reference values are available in addition to the digital control word.

| D6.100 | No. of Bus-ref. values | | | | 5 .. 1 STW + 5 SW |
|---|---|---|---|---|---|
| 1 ...1 STW + 1 SW | 7... 1 STW + 7 SW | 13...2 STW + 4 SW | | | |
| 2 ...1 STW + 2 SW | 8... 1 STW + 8 SW | 14...2 STW + 5 SW | | | |
| 3 ...1 STW + 3 SW | 9... 1 STW + 9 SW | 15...2 STW + 6 SW | | | |
| 4 ...1 STW + 4 SW | 10 ..2 STW + 1 SW | 16...2 STW + 7 SW | | | |
| 5 ...1 STW + 5 SW | 11 ..2 STW + 2 SW | 17...2 STW + 8 SW | | | |
| 6 ...1 STW + 6 SW | 12 ..2 STW + 3 SW | | | | |

According to the set number of reference values D6.100 only relevant parameters are displayed in matrix field D6 in order to guarantee clear parameterization.

| PPO type | Number of bus reference values |
|---|---|
| PPO1 | 1 STW + 1 SW |
| PPO2 | 1 STW + 5 SW |
| PPO3 | 1 STW + 1 SW |
| PPO4 | 1 STW + 5 SW |
| PPO5 | 1 STW + 9 SW |



The references for the different functions of the >*pDRIVE*< *MX pro* can be provided in different ways (see chapters reference sources /reference value distributor in the Description of functions).

One way is the usage of fieldbus reference values. Thereby, the reference values are provided by means of automation devices (PLC) which transmit the required reference values serial to the activated fieldbus interface.



| D6.101 | Ref. value1 selection | | | | 0 .. Not used |
|---|---|---|---|---|---|
| 0 ...Not used | 8... T-ref. in % | | | | |
| 1 ...f-reference 1 [Hz] | 9... T-limitation in % | | | | |
| 2 ...f-reference 2 [Hz] | 14 .. Load measurement | | | | |
| 3 ...f-correction [Hz] | 15 .. Request [%] | | | | |
| 6 ...PID-reference val. [%] | | | | | |
| 7 ...PID-actual value [%] | | | | | |

The output of the reference source Bus SW1 can be set as source for different uses according to the reference value distributor. Parameter D6.101 "Ref. value1 selection" assigns the reference value to the desired use (see also chapter reference sources, reference value distributor in the Description of functions).

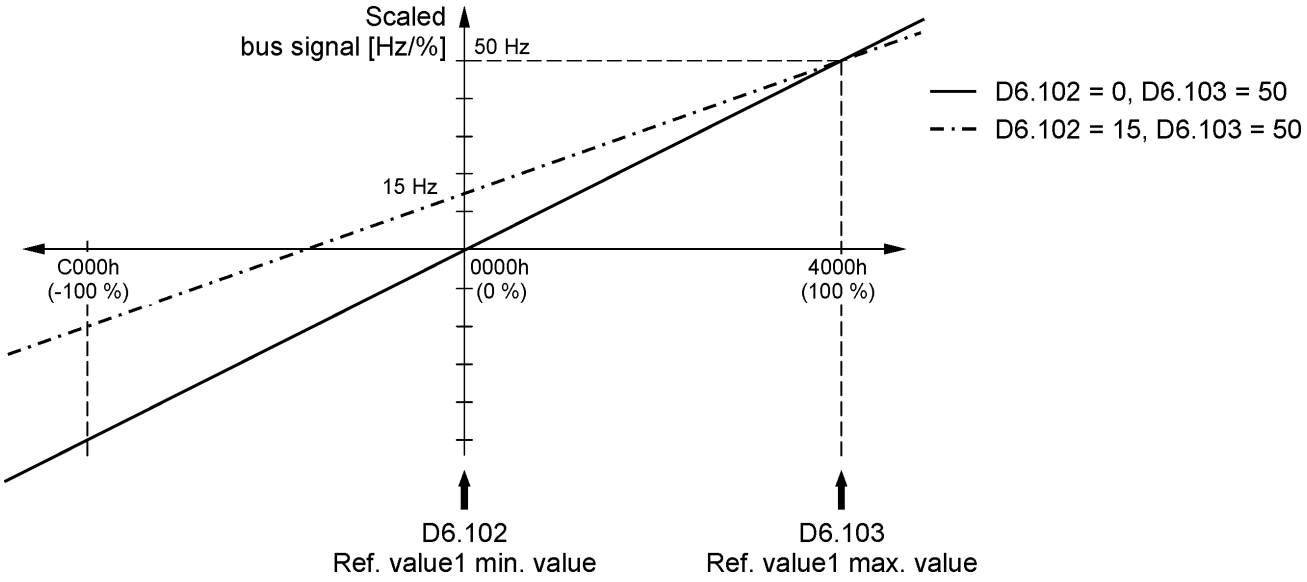
| | | | | | |
|---|---|---|---|---|---|
| D6.102 | Ref. value1 min. value | | | | 0 % or Hz |
| | -300...300 % or Hz | | | | |

| | | | | | |
|---|---|---|---|---|---|
| D6.103 | Ref. value1 max. value | | | | 50 % or Hz |
| | -300...300 % or Hz | | | | |

The two parameters D6.102 "Ref. value1 min. value" and D6.103 "Ref. value1 max. value" are used for linear scaling of the transmitted reference value. D6.102 assigns an output value to the reference point at 0 % (0 dec = 0000 hex), D6.103 assigns it to the reference point at 100 % (16384 dec = 4000 hex).

The unit of the reference value is scaled according to the reference use "D6.101 "Ref. value1 selection" for all frequency values in Hz, while the remaining signals are scaled in %.

*Bus SW-1 scaling*




| | | | | | |
|---|---|---|---|---|---|
| D6.104 | Ref. value1 emergency | | | | 0 hex |
| | 0...65535 hex | | | | |

In case of setting D6.03 Bus error behaviour to "3 .. Emerg. ref.val. & alarm" the set emergency reference value is used during a bus fault. The unit of the emergency reference value corresponds to that of the min/max scaling.

It is not possible to assign reference paths twice. If you try to assign a second reference source to a use which is already allocated in the reference value distributor, the parameterization will prevent this and the alarm message " Multiple usage of inputs not possible !" will be shown in the display.

| | | | | | |
|---|---|---|---|---|---|
| D6.105 | Ref. value2 selection | | | | 0 .. Not used |
| D6.106 | Ref. value2 min. value | | | | 0 |
| D6.107 | Ref. value2 max. value | | | | 50 |
| D6.108 | Ref. value2 emergency | | | | 0 hex |

| | | | | | |
|---|---|---|---|---|---|
| D6.109 | Ref. value3 selection | | | | 0 .. Not used |
| D6.110 | Ref. value3 min. value | | | | 0 |
| D6.111 | Ref. value3 max. value | | | | 50 |
| D6.112 | Ref. value3 emergency | | | | 0 hex |

| | | | | | |
|---|---|---|---|---|---|
| D6.113 | Ref. value4 selection | | | | 0 .. Not used |
| D6.114 | Ref. value4 min. value | | | | 0 |
| D6.115 | Ref. value4 max. value | | | | 50 |
| D6.116 | Ref. value4 emergency | | | | 0 hex |

| | | | | | |
|---|---|---|---|---|---|
| D6.117 | Ref. value5 selection | | | | 0 .. Not used |
| D6.118 | Ref. value5 min. value | | | | 0 |
| D6.119 | Ref. value5 max. value | | | | 50 |
| D6.120 | Ref. value5 emergency | | | | 0 hex |

| | | | | | |
|---|---|---|---|---|---|
| D6.121 | Ref. value6 selection | | | | 0 .. Not used |
| D6.122 | Ref. value6 min. value | | | | 0 |
| D6.123 | Ref. value6 max. value | | | | 50 |
| D6.124 | Ref. value6 emergency | | | | 0 hex |

| | | | | | |
|---|---|---|---|---|---|
| D6.125 | Ref. value7 selection | | | | 0 .. Not used |
| D6.126 | Ref. value7 min. value | | | | 0 |
| D6.127 | Ref. value7 max. value | | | | 50 |
| D6.128 | Ref. value7 emergency | | | | 0 hex |

| | | | | | |
|---|---|---|---|---|---|
| D6.129 | Ref. value8 selection | | | | 0 .. Not used |
| D6.130 | Ref. value8 min. value | | | | 0 |
| D6.131 | Ref. value8 max. value | | | | 50 |
| D6.132 | Ref. value8 emergency | | | | 0 hex |

| | | | | | |
|---|---|---|---|---|---|
| D6.133 | Ref. value9 selection | | | | 0 .. Not used |
| D6.134 | Ref. value9 min. value | | | | 0 |
| D6.135 | Ref. value9 max. value | | | | 50 |
| D6.136 | Ref. value9 emergency | | | | 0 hex |

The settings of the bus reference values 2...9 are logical identical with those of bus reference value 1 (see parameters D6.101...D6.104).

## Configuration of the fieldbus actual values

Corresponding to the configured telegram length one to nine actual values are available in addition to the digital status word.

| D6.137 | Number actual values | | | | 5 .. 1 ZTW + 5 IW |
|---|---|---|---|---|---|
| 1 ...1 ZTW + 1 IW | 7... 1 ZTW + 7 IW | 13.. 2 ZTW + 4 IW | | | |
| 2 ...1 ZTW + 2 IW | 8... 1 ZTW + 8 IW | 14.. 2 ZTW + 5 IW | | | |
| 3 ...1 ZTW + 3 IW | 9... 1 ZTW + 9 IW | 15.. 2 ZTW + 6 IW | | | |
| 4 ...1 ZTW + 4 IW | 10 .. 2 ZTW + 1 IW | 16.. 2 ZTW + 7 IW | | | |
| 5 ...1 ZTW + 5 IW | 11 .. 2 ZTW + 2 IW | 17.. 2 ZTW + 8 IW | | | |
| 6 ...1 ZTW + 6 IW | 12 .. 2 ZTW + 3 IW | | | | |

According to the set number of actual values D6.137 only relevant parameters are displayed in matrix field D6 in order to guarantee clear parameterization.

| PPO type | Number of bus actual values |
|---|---|
| PPO1 | 1 ZTW + 1 IW |
| PPO2 | 1 ZTW + 5 IW |
| PPO3 | 1 ZTW + 1 IW |
| PPO4 | 1 ZTW + 5 IW |
| PPO5 | 1 ZTW + 9 IW |

The >*pDRIVE*< *MX pro* provides analog outputs and serial fieldbus actual values to forward analog information of the actual values. The size to be issued as well as their scaling can be freely configured.

Following process sizes can be transmitted as actual values:

| Process size | Value | Unit | Scaling |
|---|---|---|---|
| 1 .. Output frequency | 100.0 | Hz | 100.0 |
| 2 .. \|Output frequency\| | 100.0 | Hz | 100.0 |
| 3 .. Motor current | 100.0 | % | Nominal current >*pDRIVE*< *MX pro* |
| 4 .. Torque | 100.0 | % | Nominal motor torque |
| 5 .. \|Torque\| | 100.0 | % | Nominal motor torque |
| 8 .. Power | 100.0 | % | Nominal inverter power |
| 9 .. \|Power\| | 100.0 | % | Nominal inverter power |
| 10 .. Motor voltage | 100.0 | % | Nominal voltage motor |
| 11 .. Speed | 100.0 | % | Nominal speed at $f_{MAX}$ (C2.02) |
| 12 .. \|Speed\| | 100.0 | % | Nominal speed at $f_{MAX}$ (C2.02) |
| 15 .. Int. f-ref. before ramp | 100.0 | Hz | 100.0 |
| 16 .. Int. f-ref. after ramp | 100.0 | Hz | 100.0 |
| 17 .. PID-reference val. [%] | 100.0 | % | 100.0 |
| 18 .. PID-actual value [%] | 100.0 | % | 100.0 |
| 19 .. PID-deviation [%] | 100.0 | % | 100.0 |
| 20 .. PID-output | 100.0 | % | 100.0 |
| 23 .. Int. ref. switch-over | 100.0 | Hz | 100.0 |
| 24 .. Calculator | 100.0 | % | 100.0 |
| 25 .. Curve generator | 100.0 | % | 100.0 |
| 26 .. Counter (average) | 100.0 | % | 100.0 |
| 27 .. Total counter | 100.0 | % | 100.0 |
| 30 .. T reference value | 100.0 | % | Nominal motor torque |
| 33 .. DC voltage | 100.0 | % | 1000 V DC |
| 34 .. Tmax motor | 100.0 | % | Nominal motor torque |
| 35 .. Tmax generator | 100.0 | % | Nominal motor torque |
| 36 .. Thermal load M1 | 100.0 | % | 100.0 |
| 37 .. Thermal load M2 | 100.0 | % | 100.0 |
| 38 .. Thermal load BR | 100.0 | % | 100.0 |
| 39 .. Thermal load VSD | 100.0 | % | 100.0 |
| 41 .. AI 1 | 100.0 | % | 10 V = 4000 hex |
| 42 .. AI 2 | 100.0 | % | 10 V or 20 mA = 4000 hex |
| 43 .. AI 3 | 100.0 | % | 20 mA = 4000 hex |
| 44 .. AI 4 | 100.0 | % | 10V or 20 mA = 4000 hex |
| 45 .. Frequency input | 100.0 | % | D1.33 = 4000 hex |
| 47 .. Bus SW 1 | 100.0 | % | 100.0 |
| 48 .. Bus SW 2 | 100.0 | % | 100.0 |
| 49 .. Bus SW 3 | 100.0 | % | 100.0 |
| 50 .. Bus SW 4 | 100.0 | % | 100.0 |
| 51 .. Bus SW 5 | 100.0 | % | 100.0 |
| 52 .. Bus SW 6 | 100.0 | % | 100.0 |
| 53 .. Bus SW 7 | 100.0 | % | 100.0 |
| 54 .. Bus SW 8 | 100.0 | % | 100.0 |
| 55 .. Bus SW 9 | 100.0 | % | 100.0 |
| 58 .. Act. Error Code | – | Integer | See table alarm index given in the appendix |
| 59 .. Act. alarm Code | – | Integer | See table alarm index given in the appendix |
| 62 .. Position value LOW | – | hex | |
| 63 .. Position value HIGH | – | hex | |

| D6.138 | Act. value1 selection | | | | 1 .. Output frequency |
|---|---|---|---|---|---|

| | | |
|---|---|---|
| 0 ...Not used | 23 .. Int. ref. switch-over | 45...Frequency input |
| 1 ...Output frequency | 24 .. Calculator | 47...Bus SW 1 |
| 2 ...\|Output frequency\| | 25 .. Curve generator | 48...Bus SW 2 |
| 3 ...Motor current | 26 .. Counter (average) | 49...Bus SW 3 |
| 4 ...Torque | 27 .. Total counter | 50...Bus SW 4 |
| 5 ...\|Torque\| | 30 .. T reference value | 51...Bus SW 5 |
| 8 ...Power | 33 .. DC voltage | 52...Bus SW 6 |
| 9 ...\|Power\| | 34 .. Tmax motor | 53...Bus SW 7 |
| 10...Motor voltage | 35 .. Tmax generator | 54...Bus SW 8 |
| 11...Speed | 36 .. Thermal load M1 | 55...Bus SW 9 |
| 12...\|Speed\| | 37 .. Thermal load M2 | 58...Act. Error Code |
| 15...Int. f-ref. before ramp | 38 .. Thermal load BR | 59...Act. alarm Code |
| 16...Int. f-ref. after ramp | 39 .. Thermal load VSD | 62...Position value LOW |
| 17...PID-reference val. [%] | 41 .. AI 1 | 63...Position value HIGH |
| 18...PID-actual value [%] | 42 .. AI 2 | |
| 19...PID-deviation [%] | 43 .. AI 3 | |
| 20...PID-output | 44 .. AI 4 | |

Selection of the size which should be transmitted at bus actual value 1.

| D6.139 | Act. value1 min. value | | | | 0 % or Hz |
|---|---|---|---|---|---|
| | -300...300 % or Hz | | | | |

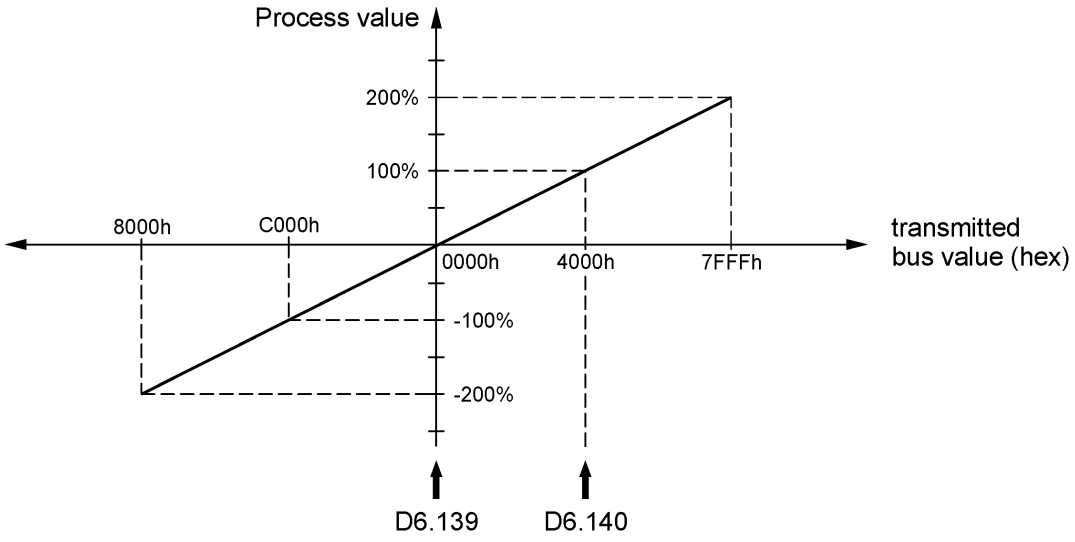
| D6.140 | Act. value1 max. value | | | | 50 % or Hz |
|---|---|---|---|---|---|
| | -300...300 % or Hz | | | | |

The two parameters D6.139 "Act. value1 min. value" and D6.140 "Act. value1 max. value" are used for linear scaling of the transmitted bus actual value. D6.139 assigns the minimum value to the actual value point 0 % (0 dec = 0000 hex), D6.140 assigns the maximum value of a process size to the actual value point 100 % (16384 dec = 4000 hex).

The scaling of the process size and their unit can be seen from the table above.

Settings example for bus actual value 1

| Process size | Scaling | D6.139 "Act. value1 min. value" | D6.140 "Act. value1 max. value" | Scaling of the output signal |
|---|---|---|---|---|
| 8 .. Power | 100 % = Nom. motor power (e.g. 90 kW) | 0 % | 100 % | 4000 hex (16384 dec) at 100 % $P_{N\ Motor}$<br>(max. presentable range = 200 %) |



| | | | | | |
|---|---|---|---|---|---|
| D6.141 | Act. value1 filter-time | | | | 0.1 s |

0...30 s

During the measurement of dynamically changing values, such as current or torque, it may be a good idea to filter the actual value which should be transmitted already in the inverter. The measurement value can be stabilized before transmission by setting an appropriate filter time at the output filter.

At setting 0.0 seconds the filter is deactivated.

| | | | | | |
|---|---|---|---|---|---|
| D6.142 | Act. value2 selection | | | | 3 .. Motor current |
| D6.143 | Act. value2 min. value | | | | 0 |
| D6.144 | Act. value2 max. value | | | | 100 |
| D6.145 | Act. value2 filter-time | | | | 0.1 s |

| | | | | | |
|---|---|---|---|---|---|
| D6.146 | Act. value3 selection | | | | 4 .. Torque |
| D6.147 | Act. value3 min. value | | | | 0 |
| D6.148 | Act. value3 max. value | | | | 100 |
| D6.149 | Act. value3 filter-time | | | | 0.1 s |

| | | | | | |
|---|---|---|---|---|---|
| D6.150 | Act. value4 selection | | | | 8 .. Power |
| D6.151 | Act. value4 min. value | | | | 0 |
| D6.152 | Act. value4 max. value | | | | 100 |
| D6.153 | Act. value4 filter-time | | | | 0.1 s |

| | | | | | |
|---|---|---|---|---|---|
| D6.154 | Act. value5 selection | | | | 0 .. Not used |
| D6.155 | Act. value5 min. value | | | | 0 |
| D6.156 | Act. value5 max. value | | | | 100 |
| D6.157 | Act. value5 filter-time | | | | 0.0 s |

| | | | | | |
|---|---|---|---|---|---|
| D6.158 | Act. value6 selection | | | | 0 .. Not used |
| D6.159 | Act. value6 min. value | | | | 0 |
| D6.160 | Act. value6 max. value | | | | 100 |
| D6.161 | Act. value6 filter-time | | | | 0.1 s |

| | | | | | |
|---|---|---|---|---|---|
| D6.162 | Act. value7 selection | | | | 0 .. Not used |
| D6.163 | Act. value7 min. value | | | | 0 |
| D6.164 | Act. value7 max. value | | | | 100 |
| D6.165 | Act. value7 filter-time | | | | 0.1 s |

| | | | | | |
|---|---|---|---|---|---|
| D6.166 | Act. value8 selection | | | | 0 .. Not used |
| D6.167 | Act. value8 min. value | | | | 0 |
| D6.168 | Act. value8 max. value | | | | 100 |
| D6.169 | Act. value8 filter-time | | | | 0.1 s |

| | | | | | |
|---|---|---|---|---|---|
| D6.170 | Act. value9 selection | | | | 0 .. Not used |
| D6.171 | Act. value9 min. value | | | | 0 |
| D6.172 | Act. value9 max. value | | | | 100 |
| D6.173 | Act. value9 filter-time | | | | 0.1 s |

The settings of the bus reference values 2...9 are logical identical with those of bus reference value 1 (see parameters D6.138...D6.141).

## Configuration of bits 11...15 of the control word STW1

| | | | | | |
|---|---|---|---|---|---|
| D6.174 | Bit 11 STW1 selection | | | | 0 .. Not used |

| | | |
|---|---|---|
| 0 ...Not used | 40 .. Feed in pressure OK | 76.. 2nd parameter set |
| 9 ...Jog REV | 41 .. Level OK | 77.. 15P selection B |
| 11...f-ref reverse | 42 .. Level < | 78.. 15P selection C |
| 14...Motor pot. + | 45 .. T-limitation active | 81.. n-contr. active (M/S) |
| 15...Motor pot. - | 46 .. Ext. T-limitation active | 82.. n-controller ext. I |
| 16...Pre-set A | 47 .. 2nd I-limit active | 83.. n-controller static on |
| 17...Pre-set B | 56 .. Mains cut-off | 86.. S-ramp OFF |
| 18...Pre-set C | 57 .. ON-lock | 87.. Save reference value |
| 19...Pre-set D | 58 .. Locking | 88.. Feedback brake |
| 22...f-reference 2 [Hz] | 59 .. Feedb. motor cont. | 89.. Enable BU |
| 23...Control source 2 | 60 .. Motor heating | 90.. Reset position |
| 24...2nd ramp | 61 .. Operation with IR | 93.. Position switch FW |
| 25...Reference value B | 64 .. Pulse counter input | 94.. Position switch REV |
| 26...Panel operation | 65 .. Pulse counter reset | 95.. Position switch OFF |
| 29...Ext. fault 1 | 66 .. n-monitoring | 98.. Slowdown FWD |
| 30...Ext. fault 2 | 67 .. Parameter locked | 99.. Position switch FWD |
| 32...Emergency oper. | 68 .. Curve gen. start | 100 Slowdown REV |
| 35...PID-active | 69 .. Curve gen. reset | 101 Position switch REV |
| 36...PID-lock | 70 .. Curve gen. hold | 102 Pos/Slowdown OFF |
| 37...PID-wind up | 75 .. 2nd motor | |

Parameter D6.174 assigns a digital input function to bit 11 of the control word. A description of this function can be found in the *>pDRIVE< MX pro* Description of functions (matrix field D2).

| | | | | | |
|---|---|---|---|---|---|
| D6.175 | Bit 12 STW1 selection | | | | 0 .. Not used |
| D6.176 | Bit 13 STW1 selection | | | | 0 .. Not used |
| D6.177 | Bit 14 STW1 selection | | | | 0 .. Not used |
| D6.178 | Bit 15 STW1 selection | | | | 0 .. Not used |

Setting possibilities see D6.174.

| D6.179 | Bit at term.-mode act. | 0110 | | | |
|---|---|---|---|---|---|
| | 0 ...STW1 Bit 11 | ☐ / ☑ | | | |
| | 1 ...STW1 Bit 12 | ☐ / ☑ | | | |
| | 2 ...STW1 Bit 13 | ☐ / ☑ | | | |
| | 3 ...STW1 Bit 14 | ☐ / ☑ | | | |
| | 4 ...STW1 Bit 15 | ☐ / ☑ | | | |

When the control source selection (see Matrix field E4) is used to switch between terminal and fieldbus operation it might be necessary to have individual bits (11...15) of the bus control word active despite the fact that the control source has been switched to the terminals.

This exception from switch-over can be configured by the appropriate selection with parameter D6.179 "Bit at term.-mode act.".

**Example: External fault**

In case of a process fault the inverter is shut-down systematically using bit 11 of the control word. This behaviour should be also guaranteed in case of controlling the drive via local operation (by means of terminal commands). Digital input DI4 can be used to switch between terminal strip operation and bus operation.

D6.174 "Bit 11 STW1 selection" = "29 .. Ext. fault 1"

If a switch-over from bus operation to terminal strip operation takes place, the commands of the control word become ineffective ! The parameterized function "Ext. fault 1" is not effective any longer.

For this reason, for control word bits that shall be effective both in the bus operation as well as the terminal operation bit 11 must be marked in parameter D6.179 "Bit at term.-mode act.".

Adjust parameter D2.15 "DI at bus mode active" on the other hand, if a digital input should be effective in terminal operation as well as in bus operation,

If a control signal is configured both on a free bit at the bus as well as on the terminals which are active during bus operation, the bus command will be preferred.

## Configuration of bits 0...15 of the control word STW2

| | | | | | |
|---|---|---|---|---|---|
| D6.180 | Bit 0 STW2 selection | | | | 0 .. Not used |

| | | |
|---|---|---|
| 0 ...Not used | 40 .. Feed in pressure OK | 76.. 2nd parameter set |
| 9 ...Jog REV | 41 .. Level OK | 77.. 15P selection B |
| 11 ...f-ref reverse | 42 .. Level < | 78.. 15P selection C |
| 14 ...Motor pot. + | 45 .. T-limitation active | 81.. n-contr. active (M/S) |
| 15 ...Motor pot. - | 46 .. Ext. T-limitation active | 82.. n-controller ext. I |
| 16 ...Pre-set A | 47 .. 2nd I-limit active | 83.. n-controller static on |
| 17 ...Pre-set B | 56 .. Mains cut-off | 86.. S-ramp OFF |
| 18 ...Pre-set C | 57 .. ON-lock | 87.. Save reference value |
| 19 ...Pre-set D | 58 .. Locking | 88.. Feedback brake |
| 22 ...f-reference 2 [Hz] | 59 .. Feedb. motor cont. | 89.. Enable BU |
| 23 ...Control source 2 | 60 .. Motor heating | 90.. Reset position |
| 24 ...2nd ramp | 61 .. Operation with IR | 93.. Position switch FW |
| 25 ...Reference value B | 64 .. Pulse counter input | 94.. Position switch REV |
| 26 ...Panel operation | 65 .. Pulse counter reset | 95.. Position switch OFF |
| 29 ...Ext. fault 1 | 66 .. n-monitoring | 98.. Slowdown FWD |
| 30 ...Ext. fault 2 | 67 .. Parameter locked | 99.. Position switch FWD |
| 32 ...Emergency oper. | 68 .. Curve gen. start | 100 Slowdown REV |
| 35 ...PID-active | 69 .. Curve gen. reset | 101 Position switch REV |
| 36 ...PID-lock | 70 .. Curve gen. hold | 102 Pos/Slowdown OFF |
| 37 ...PID-wind up | 75 .. 2nd motor | |

Parameter D6.180 assigns a digital input function to bit 0 of the control word STW2. A description of this function can be found in the >*pDRIVE*< *MX pro* Description of functions (matrix field D2).

| | | | | | |
|---|---|---|---|---|---|
| D6.181 | Bit 1 STW2 selection | | | | 0 .. Not used |
| D6.182 | Bit 2 STW2 selection | | | | 0 .. Not used |
| D6.183 | Bit 3 STW2 selection | | | | 0 .. Not used |
| D6.184 | Bit 4 STW2 selection | | | | 0 .. Not used |
| D6.185 | Bit 5 STW2 selection | | | | 0 .. Not used |
| D6.186 | Bit 6 STW2 selection | | | | 0 .. Not used |
| D6.187 | Bit 7 STW2 selection | | | | 0 .. Not used |
| D6.188 | Bit 8 STW2 selection | | | | 0 .. Not used |
| D6.189 | Bit 9 STW2 selection | | | | 0 .. Not used |
| D6.190 | Bit 10 STW2 selection | | | | 0 .. Not used |
| D6.191 | Bit 11 STW2 selection | | | | 0 .. Not used |
| D6.192 | Bit 12 STW2 selection | | | | 0 .. Not used |
| D6.193 | Bit 13 STW2 selection | | | | 0 .. Not used |
| D6.194 | Bit 14 STW2 selection | | | | 0 .. Not used |
| D6.195 | Bit 15 STW2 selection | | | | 0 .. Not used |

Setting possibilities see D6.180.

| D6.196 | Bit at term.-mode act. | 0110 | | | |
|---|---|---|---|---|---|

| | | | |
|---|---|---|---|
| 0 ...STW 2 Bit 00 | ☐ / ☑ | 8 .. STW 2 Bit 08 | |
| 1 ...STW 2 Bit 01 | ☐ / ☑ | 9 .. STW 2 Bit 09 | |
| 2 ...STW 2 Bit 02 | ☐ / ☑ | 10 .. STW 2 Bit 10 | |
| 3 ...STW 2 Bit 03 | ☐ / ☑ | 11 .. STW 2 Bit 11 | |
| 4 ...STW 2 Bit 04 | ☐ / ☑ | 12 .. STW 2 Bit 12 | |
| 5 ...STW 2 Bit 05 | ☐ / ☑ | 13 .. STW 2 Bit 13 | |
| 6 ...STW 2 Bit 06 | ☐ / ☑ | 14 .. STW 2 Bit 14 | |
| 7 ...STW 2 Bit 07 | ☐ / ☑ | 15 .. STW 2 Bit 15 | |

When the control source selection (see Matrix field E4) is used to switch between terminal and fieldbus operation it might be necessary to have individual bits (0...15) of the bus control word STW2 active despite the fact that the control source has been switched to the terminals.

This exception from switch-over can be configured by the appropriate selection with parameter D6.196 "Bit at term.-mode act.".

## Configuration of bits 11...15 of the status word ZTW1

| D6.197 | Bit 11 ZTW1 selection | | | 0 .. Not used |
|---|---|---|---|---|

| | | |
|---|---|---|
| 0 ...Not used | 22 .. Ext. T-limitation active | 55...Bus STW bit 12 |
| 1 ...Ready | 23 .. T-control active | 56...Bus STW bit 13 |
| 2 ...Operation | 24 .. Motor heating active | 57...Bus STW bit 14 |
| 3 ...Ready / run | 25 .. Motorfluxing active | 58...Bus STW bit 15 |
| 4 ...Trip | 27 .. DC link charged | 61...Digital input DI1 |
| 5 ...Sum alarm | 28 .. Line Contactor ON | 62...Digital input DI2 |
| 6 ...Motor turns | 29 .. Motor contactor ON | 63...Digital input DI3 |
| 7 ...f = f ref | 36 .. Alarm cat. 1 | 64...Digital input DI4 |
| 8 ...Generator operation | 37 .. Alarm cat. 2 | 65...Digital input DI5 |
| 9 ...T-controller at n-limit | 38 .. Alarm cat. 3 | 66...Digital input DI6 |
| 11...Shut down | 41 .. Output T1 | 67...Digital input DI7 |
| 12...Panel mode active | 42 .. Output T2 | 68...Digital input DI8 |
| 13...Motor 1 active | 43 .. Output T3 | 69...Digital input DI9 |
| 14...Motor 2 active | 44 .. Output T4 | 70...Digital input DI10 |
| 15...Param.-set 1 active | 45 .. Output T5 | 71...Digital input DI11 |
| 16...Param.-set 2 active | 46 .. Output T6 | 72...Digital input DI12 |
| 19...Safe standstill active | 49 .. Brake release | 73...Digital input DI13 |
| 20...Limitation active | 50 .. Hoist emerg. (n≠0) | 74...Digital input DI14 |
| 21...BU active | 54 .. Bus STW bit 11 | |

Parameter D6.197 assigns the respective digital state information to bit 11 of the status word. A description of the individual digital output functions can be found in the *>pDRIVE< MX pro* Description of functions (matrix field D4).

| D6.198 | Bit 12 ZTW1 selection | | | 0 .. Not used |
|---|---|---|---|---|
| D6.199 | Bit 13 ZTW1 selection | | | 0 .. Not used |
| D6.200 | Bit 14 ZTW1 selection | | | 0 .. Not used |
| D6.201 | Bit 15 ZTW1 selection | | | 0 .. Not used |

Setting possibilities see D6.179.

## Configuration of bits 0...15 of the status word ZTW2

| | | | | | |
|---|---|---|---|---|---|
| D6.202 | Bit 0 ZTW2 selection | | | | 0 .. Not used |

| | | |
|---|---|---|
| 0 ...Not used | 22 .. Ext. T-limitation active | 55.. Bus STW bit 12 |
| 1 ...Ready | 23 .. T-control active | 56.. Bus STW bit 13 |
| 2 ...Operation | 24 .. Motor heating active | 57.. Bus STW bit 14 |
| 3 ...Ready / run | 25 .. Motorfluxing active | 58.. Bus STW bit 15 |
| 4 ...Trip | 27 .. DC link charged | 61.. Digital input DI1 |
| 5 ...Sum alarm | 28 .. Line Contactor ON | 62.. Digital input DI2 |
| 6 ...Motor turns | 29 .. Motor contactor ON | 63.. Digital input DI3 |
| 7 ...f = f ref | 36 .. Alarm cat. 1 | 64.. Digital input DI4 |
| 8 ...Generator operation | 37 .. Alarm cat. 2 | 65.. Digital input DI5 |
| 9 ...T-controller at n-limit | 38 .. Alarm cat. 3 | 66.. Digital input DI6 |
| 11...Shut down | 41 .. Output T1 | 67.. Digital input DI7 |
| 12...Panel mode active | 42 .. Output T2 | 68.. Digital input DI8 |
| 13...Motor 1 active | 43 .. Output T3 | 69.. Digital input DI9 |
| 14...Motor 2 active | 44 .. Output T4 | 70.. Digital input DI10 |
| 15...Param.-set 1 active | 45 .. Output T5 | 71.. Digital input DI11 |
| 16...Param.-set 2 active | 46 .. Output T6 | 72.. Digital input DI12 |
| 19...Safe standstill active | 49 .. Brake release | 73.. Digital input DI13 |
| 20...Limitation active | 50 .. Hoist emerg. (n≠0) | 74.. Digital input DI14 |
| 21...BU active | 54 .. Bus STW bit 11 | |

Parameter D6.202 assigns the respective digital state information to bit 0 of the status word ZTW2. A description of the individual digital output functions can be found in the *>pDRIVE< MX pro* Description of functions (matrix field D4).

| | | | | | |
|---|---|---|---|---|---|
| D6.203 | Bit 1 ZTW2 selection | | | | 0 .. Not used |
| D6.204 | Bit 2 ZTW2 selection | | | | 0 .. Not used |
| D6.205 | Bit 3 ZTW2 selection | | | | 0 .. Not used |
| D6.206 | Bit 4 ZTW2 selection | | | | 0 .. Not used |
| D6.207 | Bit 5 ZTW2 selection | | | | 0 .. Not used |
| D6.208 | Bit 6 ZTW2 selection | | | | 0 .. Not used |
| D6.209 | Bit 7 ZTW2 selection | | | | 0 .. Not used |
| D6.210 | Bit 8 ZTW2 selection | | | | 0 .. Not used |
| D6.211 | Bit 9 ZTW2 selection | | | | 0 .. Not used |
| D6.212 | Bit 10 ZTW2 selection | | | | 0 .. Not used |
| D6.213 | Bit 11 ZTW2 selection | | | | 0 .. Not used |
| D6.214 | Bit 12 ZTW2 selection | | | | 0 .. Not used |
| D6.215 | Bit 13 ZTW2 selection | | | | 0 .. Not used |
| D6.216 | Bit 14 ZTW2 selection | | | | 0 .. Not used |
| D6.217 | Bit 15 ZTW2 selection | | | | 0 .. Not used |

Setting possibilities see D6.202.



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# Bus - Diagnostics

# Diagnostics of the control / status word

## Diagnostics STW (Bus → Inverter)

| | | | | | |
|---|---|---|---|---|---|
| D6.218 | Bus STW hex | | | | hex |

| | | | | | |
|---|---|---|---|---|---|
| D6.219 | Bus STW bin | 0110 | | | |

| | | | |
|---|---|---|---|
| 0 .. STW1 Bit 0 | ☐ / ☑ | 8 .. STW1 Bit 8 | ☐ / ☑ |
| 1 .. STW1 Bit 1 | ☐ / ☑ | 9 .. STW1 Bit 9 | ☐ / ☑ |
| 2 .. STW1 Bit 2 | ☐ / ☑ | 10 .. STW1 Bit 10 | ☐ / ☑ |
| 3 .. STW1 Bit 3 | ☐ / ☑ | 11 .. STW1 Bit 11 | ☐ / ☑ |
| 4 .. STW1 Bit 4 | ☐ / ☑ | 12 .. STW1 Bit 12 | ☐ / ☑ |
| 5 .. STW1 Bit 5 | ☐ / ☑ | 13 .. STW1 Bit 13 | ☐ / ☑ |
| 6 .. STW1 Bit 6 | ☐ / ☑ | 14 .. STW1 Bit 14 | ☐ / ☑ |
| 7 .. STW1 Bit 7 | ☐ / ☑ | 15 .. STW1 Bit 15 | ☐ / ☑ |

Presentation of the control word STW1 received at the >*pDRIVE*< *MX pro*.

| | | | | | |
|---|---|---|---|---|---|
| D6.220 | Bus STW2 hex | | | | hex |

| | | | | | |
|---|---|---|---|---|---|
| D6.221 | Bus STW2 bin | 0110 | | | |

| | | | |
|---|---|---|---|
| 0 ...STW 2 Bit 0 | ☐ / ☑ | 8 .. STW 2 Bit 8 | ☐ / ☑ |
| 1 ...STW 2 Bit 1 | ☐ / ☑ | 9 .. STW 2 Bit 9 | ☐ / ☑ |
| 2 ...STW 2 Bit 2 | ☐ / ☑ | 10 .. STW 2 Bit 10 | ☐ / ☑ |
| 3 ...STW 2 Bit 3 | ☐ / ☑ | 11 .. STW 2 Bit 11 | ☐ / ☑ |
| 4 ...STW 2 Bit 4 | ☐ / ☑ | 12 .. STW 2 Bit 12 | ☐ / ☑ |
| 5 ...STW 2 Bit 5 | ☐ / ☑ | 13 .. STW 2 Bit 13 | ☐ / ☑ |
| 6 ...STW 2 Bit 6 | ☐ / ☑ | 14 .. STW 2 Bit 14 | ☐ / ☑ |
| 7 ...STW 2 Bit 7 | ☐ / ☑ | 15 .. STW 2 Bit 15 | ☐ / ☑ |

Presentation of the control word STW2 received at the >*pDRIVE*< *MX pro*.

## Diagnostics ZTW (Inverter → Bus)

| | | | | | |
|---|---|---|---|---|---|
| D6.222 | Bus ZTW hex | | | | hex |

| | | | | | |
|---|---|---|---|---|---|
| D6.223 | Bus ZTW bin | 0110 | | | |

| | | | |
|---|---|---|---|
| 0 .. ZTW1 Bit 0 | ☐ / ☑ | 8 .. ZTW1 Bit 8 | ☐ / ☑ |
| 1 .. ZTW1 Bit 1 | ☐ / ☑ | 9 .. ZTW1 Bit 9 | ☐ / ☑ |
| 2 .. ZTW1 Bit 2 | ☐ / ☑ | 10 .. ZTW1 Bit 10 | ☐ / ☑ |
| 3 .. ZTW1 Bit 3 | ☐ / ☑ | 11 .. ZTW1 Bit 11 | ☐ / ☑ |
| 4 .. ZTW1 Bit 4 | ☐ / ☑ | 12 .. ZTW1 Bit 12 | ☐ / ☑ |
| 5 .. ZTW1 Bit 5 | ☐ / ☑ | 13 .. ZTW1 Bit 13 | ☐ / ☑ |
| 6 .. ZTW1 Bit 6 | ☐ / ☑ | 14 .. ZTW1 Bit 14 | ☐ / ☑ |
| 7 .. ZTW1 Bit 7 | ☐ / ☑ | 15 .. ZTW1 Bit 15 | ☐ / ☑ |

Presentation of the status word ZTW1 sent at the >*pDRIVE*< *MX pro*.

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| D6.224 | Bus ZTW2 hex | | | | hex |
|---|---|---|---|---|---|

| D6.225 | Bus ZTW2 bin | 0110 | | | |
|---|---|---|---|---|---|

| | | | |
|---|---|---|---|
| 0 ...ZTW 2 Bit 0 | ☐ / ☑ | 8 .. ZTW 2 Bit 8 | ☐ / ☑ |
| 1 ...ZTW 2 Bit 1 | ☐ / ☑ | 9 .. ZTW 2 Bit 9 | ☐ / ☑ |
| 2 ...ZTW 2 Bit 2 | ☐ / ☑ | 10 .. ZTW 2 Bit 10 | ☐ / ☑ |
| 3 ...ZTW 2 Bit 3 | ☐ / ☑ | 11 .. ZTW 2 Bit 11 | ☐ / ☑ |
| 4 ...ZTW 2 Bit 4 | ☐ / ☑ | 12 .. ZTW 2 Bit 12 | ☐ / ☑ |
| 5 ...ZTW 2 Bit 5 | ☐ / ☑ | 13 .. ZTW 2 Bit 13 | ☐ / ☑ |
| 6 ...ZTW 2 Bit 6 | ☐ / ☑ | 14 .. ZTW 2 Bit 14 | ☐ / ☑ |
| 7 ...ZTW 2 Bit 7 | ☐ / ☑ | 15 .. ZTW 2 Bit 15 | ☐ / ☑ |

Presentation of the status word ZTW2 sent at the >*pDRIVE*< *MX pro*.

## Diagnostics of the operating state

| D6.226 | Internal control word | | | | hex |
|---|---|---|---|---|---|

| D6.227 | Internal condition | 0110 | | | |
|---|---|---|---|---|---|

| | | | |
|---|---|---|---|
| 0 ...Ready to switch on | ☐ / ☑ | 6 .. Lock switching on | ☐ / ☑ |
| 1 ...Ready to run | ☐ / ☑ | 7 .. Alarm | ☐ / ☑ |
| 2 ...Operation released | ☐ / ☑ | 8 .. f = f ref. | ☐ / ☑ |
| 3 ...Fault | ☐ / ☑ | 9 .. Control | ☐ / ☑ |
| 4 ...No Off 2 | ☐ / ☑ | 10 .. f > level | ☐ / ☑ |
| 5 ...No Off 3 | ☐ / ☑ | | |

Presentation of the internal affecting drive state.

# Diagnostics of the "Bus raw data"

| | | | | | |
|---|---|---|---|---|---|
| D6.228 | PRx 01 | | | | hex |
| D6.229 | PRx 02 | | | | hex |
| D6.230 | PRx 03 | | | | hex |
| D6.231 | PRx 04 | | | | hex |
| D6.232 | PRx 05 | | | | hex |
| D6.233 | PRx 06 | | | | hex |
| D6.234 | PRx 07 | | | | hex |
| D6.235 | PRx 08 | | | | hex |
| D6.236 | PRx 09 | | | | hex |
| D6.237 | PRx 10 | | | | hex |

Presentation of the incoming data words 1...10 at the bus.

| | | | | | |
|---|---|---|---|---|---|
| D6.242 | PTx 01 | | | | hex |
| D6.243 | PTx 02 | | | | hex |
| D6.244 | PTx 03 | | | | hex |
| D6.245 | PTx 04 | | | | hex |
| D6.246 | PTx 05 | | | | hex |
| D6.247 | PTx 06 | | | | hex |
| D6.248 | PTx 07 | | | | hex |
| D6.249 | PTx 08 | | | | hex |
| D6.250 | PTx 09 | | | | hex |
| D6.251 | PTx 10 | | | | hex |

Presentation of the outgoing data words 1...10 at the bus.

# Application examples

# General

In addition to the typical "Bus operation" (all inverters are controlled via fieldbus) also a "Mixed operation" (i.e. simultaneous use of bus control and conventional control via terminals) is available due to the simple configuration of the reference and actual values and the free areas of the control and status word.

Following all three basic control types are described in form of block diagrams.

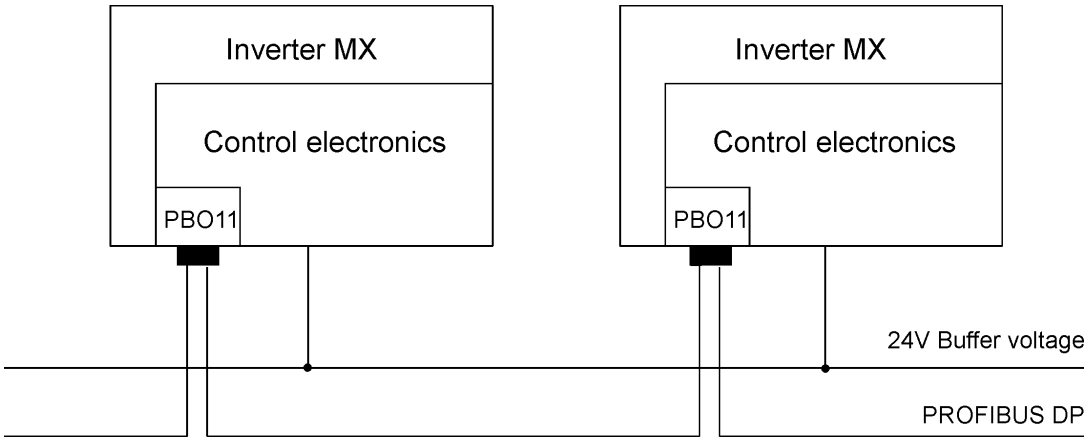
A mixed operation of these variants is certainly possible.

## Controlling the MX by means of the fieldbus interface → "Pure bus operation"

The whole control and diagnostics of the inverter is carried out by means of the bus coupling.

The possibility to implement conventional control elements is not used.

In order to address an inverter via fieldbus also during mains cut-off (line contactor control, disconnecting switch, ...) the >*pDRIVE*< *MX pro* has to be supplied with an external 24 V buffer voltage.

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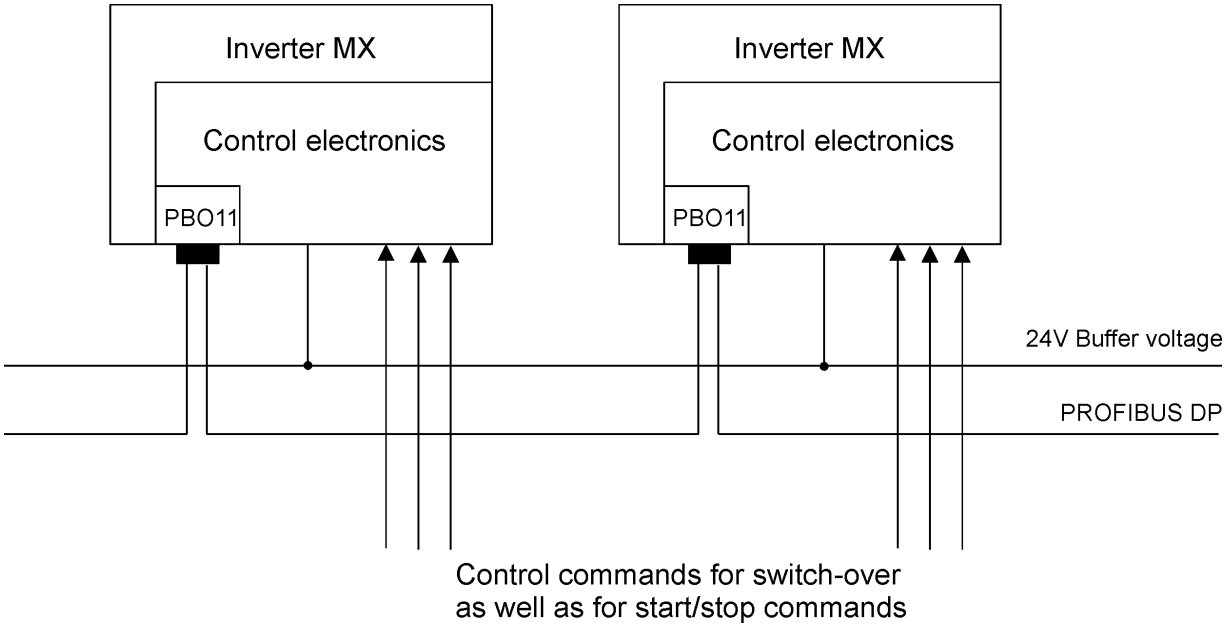
## Controlling the MX alternatively by means of the fieldbus interface or the terminals → "Control source switch-over"

The inverter is controlled depending on a digital signal (at the terminals or the bus) via the bus control word or digital commands at the inverter terminals. Further information about the selection of the control source are given in matrix field E4 and the presetting of macro 4 in matrix field B2.

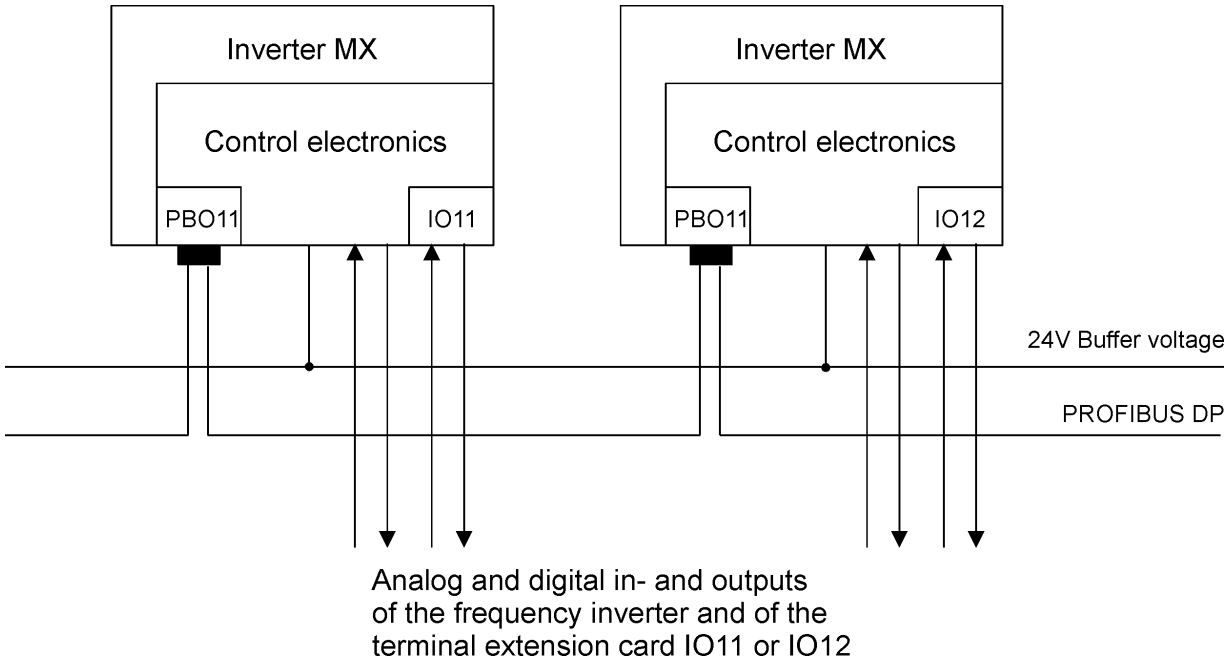



In order to address an inverter via fieldbus also during mains cut-off (line contactor control, disconnecting switch, ...) the *>pDRIVE< MX pro* has to be supplied with an external 24 V buffer voltage.

## Controlling the MX by means of the fieldbus interface and the terminals of the device → "Mixed operation"

The whole control and diagnostics of the inverter is carried out by means of the bus coupling. However, also additionally external information for inverter operation (additional reference values, control signals) or system information which do not directly affect the drive are implemented in the automation concept using the standard terminals or the terminal extension IO11 or IO12.

An external supply of the inverter electronics with 24 V buffer voltage is necessary if the system information have to be exchanged furthermore via the DP master even if the inverter is cut from the mains.




**Example 1:** *Use of the MX internal PID process controller*

Reference value: provided serial from the fieldbus

Actual value: A sensor provides a 0...10 V analog signal directly for the control terminals of the inverter.

**Example 2:** *A screw conveyor is connected and disconnected by means of a filling level indicator.*

The filling level indicator provides two floating-ground signals which can be directly integrated in the telegram to the DP master by means of the digital inputs DI1 and DI2 of the inverter and thus they are available for the control program of the system.

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# Appendix

# Parameter list of the >pDRIVE< MX pro

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **A2** | **Motor values** | | | | | | | | |
| **Motor values** | | | | | | | | | |
| A2.01 | Speed | 101 | 65 | | | 1 | | | rpm |
| A2.02 | Direction of rotation | 102 | 66 | | | | | | |
| A2.03 | Torque | 103 | 67 | | | see table | | | Nm |
| A2.04 | Operating quadrant | 104 | 68 | | | | | | |
| A2.05 | Motor current in A | 105 | 69 | | | see table | | | A |
| A2.06 | Motor current in % | 106 | 6A | | | 1 | | | % |
| A2.07 | Shaft power in kW | 107 | 6B | | | see table | | | kW |
| A2.08 | Shaft power in HP | 108 | 6C | | | see table | | | Hp |
| A2.09 | Apparent power | 109 | 6D | | | see table | | | kVA |
| A2.10 | Motor voltage | 110 | 6E | | | 1 | | | V |
| A2.11 | Thermal load M1 | 111 | 6F | | | 1 | | | % |
| A2.12 | Thermal load M2 | 112 | 70 | | | 1 | | | % |
| A2.13 | Process speed | 113 | 71 | | | 10 | | | rpm |
| A2.14 | Multiplier - n | 451 | 1C3 | | | 1 | -1000 | 1000 | |
| A2.15 | Divisor - n | 452 | 1C4 | | | 1 | 1 | 1000 | |
| A2.16 | Offset - n | 453 | 1C5 | | | 100 | -100 | 100 | rpm |
| A2.17 | Symbol for A2.13 | 454 | 1C6 | txt | | | | | |
| | Ensuing parameter | 458 | 1CA | txt | | | | | |
| A2.18 | Unit for A2.13 | 456 | 1C8 | txt | | | | | |
| | Ensuing parameter | 457 | 1C9 | txt | | | | | |
| A2.19 | Process torque | 459 | 1CB | | | 1 | | | % |
| A2.20 | Multiplier - T | 460 | 1CC | | | 1 | 1 | 10000 | |
| A2.21 | Divisor - T | 461 | 1CD | | | 1 | 1 | 1000 | |
| A2.22 | Offset - T | 462 | 1CE | | | 100 | -100 | 100 | % |
| A2.23 | Symbol for A2.19 | 463 | 1CF | txt | | | | | |
| | Ensuing parameter | 464 | 1D0 | txt | | | | | |
| A2.24 | Unit for A2.19 | 465 | 1D1 | txt | | | | | |
| | Ensuing parameter | 466 | 1D2 | txt | | | | | |
| A2.25 | Active motor | 114 | 72 | | | | | | |
| A2.26 | Position value Low | 115 | 73 | | | 1 | | | hex |
| A2.27 | Position value High | 116 | 74 | | | 1 | | | hex |
| **A3** | **Inverter values** | | | | | | | | |
| **Inverter values** | | | | | | | | | |
| A3.01 | Output frequency | 117 | 75 | | | 100 | | | Hz |
| A3.02 | Inverter load | 118 | 76 | | | 1 | | | % |
| A3.03 | Mains voltage | 119 | 77 | | | 1 | | | V |
| A3.04 | DC voltage | 120 | 78 | | | 1 | | | V |
| A3.05 | Thermal load VSD | 121 | 79 | | | 1 | | | % |
| A3.06 | Active pulse frequency | 122 | 7A | | | 10 | | | kHz |
| A3.07 | Thermal load BR | 124 | 7C | | | 1 | | | % |
| **A4** | **Reference values** | | | | | | | | |
| **Monitoring of analog inputs** | | | | | | | | | |
| A4.01 | AI1 ref. value [%] | 125 | 7D | | | 10 | | | % |
| A4.02 | AI1 ref. value scaled | 126 | 7E | | | 100 | | | % / Hz |
| A4.03 | AI2 ref. value [%] | 127 | 7F | | | 10 | | | % |
| A4.04 | AI2 ref. value scaled | 128 | 80 | | | 100 | | | % / Hz |
| A4.05 | AI3 ref. value [%] | 129 | 81 | | | 10 | | | % |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| A4.06 | AI3 ref. value scaled | 130 | 82 | | | 100 | | | % / Hz |
| A4.07 | AI4 ref. value [%] | 131 | 83 | | | 10 | | | % |
| A4.08 | AI4 ref. value scaled | 132 | 84 | | | 100 | | | % / Hz |
| A4.09 | FP ref. value in kHz | 133 | 85 | | | 100 | | | kHz |
| A4.10 | FP ref. value scaled | 134 | 86 | | | 100 | | | % / Hz |
| **Monitoring of digital reference sources** | | | | | | | | | |
| A4.11 | Motor pot. ref. value | 135 | 87 | | | 100 | | | % / Hz |
| A4.12 | MX-wheel ref. value | 136 | 88 | | | 100 | | | Hz |
| A4.13 | Pre-set reference | 137 | 89 | | | 100 | | | % / Hz |
| **Monitoring of internal reference sources** | | | | | | | | | |
| A4.14 | Ref. value switch-over | 138 | 8A | | | 100 | | | % / Hz |
| A4.15 | Calculator | 139 | 8B | | | 100 | | | % / Hz |
| A4.16 | Act. value selection | 140 | 8C | | | 100 | | | % / Hz |
| A4.17 | Curve generator | 141 | 8D | | | 100 | | | % / Hz |
| **Monitoring of digital inputs** | | | | | | | | | |
| A4.18 | DI state basic device | 142 | 8E | 0110 | | | | | |
| A4.19 | DI state IO11 | 143 | 8F | 0110 | | | | | |
| A4.20 | DI state IO12 | 144 | 90 | 0110 | | | | | |
| **Monitoring of bus reference sources** | | | | | | | | | |
| A4.21 | Bus reference 1 scaled | 145 | 91 | | | 100 | | | % / Hz |
| A4.22 | Bus reference 2 scaled | 146 | 92 | | | 100 | | | % / Hz |
| A4.23 | Bus reference 3 scaled | 147 | 93 | | | 100 | | | % / Hz |
| A4.24 | Bus reference 4 scaled | 148 | 94 | | | 100 | | | % / Hz |
| A4.25 | Bus reference 5 scaled | 149 | 95 | | | 100 | | | % / Hz |
| A4.26 | Bus reference 6 scaled | 150 | 96 | | | 100 | | | % / Hz |
| A4.27 | Bus reference 7 scaled | 151 | 97 | | | 100 | | | % / Hz |
| A4.28 | Bus reference 8 scaled | 152 | 98 | | | 100 | | | % / Hz |
| A4.29 | Bus reference 9 scaled | 153 | 99 | | | 100 | | | % / Hz |
| **A5** | **Counter** | | | | | | | | |
| **Operating hours** | | | | | | | | | |
| A5.01 | Operating hours motor1 | 154 | 9A | | | 1 | | | h |
| A5.02 | Interval motor 1 | 468 | 1D4 | | | 1 | 0 | 10000 | h |
| A5.03 | Interval counter M1 | 155 | 9B | | | 1 | | | h |
| A5.04 | Operating hours motor2 | 156 | 9C | | | 1 | | | h |
| A5.05 | Interval motor 2 | 469 | 1D5 | | | 1 | 0 | 10000 | h |
| A5.06 | Interval counter M2 | 157 | 9D | | | 1 | | | h |
| A5.07 | Power on hours | 158 | 9E | | | 1 | | | h |
| A5.08 | Interval power on | 470 | 1D6 | | | 1 | 0 | 10000 | h |
| A5.09 | Interval count. PowerOn | 159 | 9F | | | 1 | | | h |
| A5.10 | Operating hours fan | 160 | A0 | | | 1 | | | h |
| A5.11 | Interval fan | 471 | 1D7 | | | 1 | 0 | 10000 | h |
| A5.12 | Interval counter fan | 161 | A1 | | | 1 | | | h |
| A5.13 | Clear intervall counter | 162 | A2 | | | | | | |
| **Energy meter** | | | | | | | | | |
| A5.14 | MWh meter mot. | 163 | A3 | | | 1 | | | MWh |
| A5.15 | kWh meter mot. | 164 | A4 | | | 10 | | | kWh |
| A5.16 | MWh meter gen. | 165 | A5 | | | 1 | | | MWh |
| A5.17 | kWh meter gen. | 166 | A6 | | | 10 | | | kWh |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **A6** | **Display configuration** | | | | | | | | |
| **Configuration of the display** | | | | | | | | | |
| A6.01 | Selection upper field | 472 | 1D8 | | | | | | |
| A6.02 | Selection middle field | 473 | 1D9 | | | | | | |
| A6.03 | Selection lower field | 474 | 1DA | | | | | | |
| A6.04 | View all parameters | 475 | 1DB | | | | | | |
| A6.05 | Limitations | 398 | 18E | | | | | | |
| **B1** | **Language selection** | | | | | | | | |
| **Language selection** | | | | | | | | | |
| B1.01 | Select language | 477 | 1DD | | | | | | |
| **B2** | **Macro configuration** | | | | | | | | |
| **Parameter management** | | | | | | | | | |
| B2.01 | Active parameter set | 167 | A7 | | | | | | |
| B2.02 | Macro selection | 478 | 1DE | | | | | | |
| B2.03 | Parameter mode | 479 | 1DF | | | | | | |
| B2.04 | Create backup | 1801 | 709 | | | | | | |
| B2.05 | Restore backup | 1802 | 70A | | | | | | |
| B2.06 | Copy parameter set | 1803 | 70B | | | | | | |
| B2.07 | Name parameter set 1 | 481 | 1E1 | txt | | | | | |
| | Ensuing parameter | 482 | 1E2 | txt | | | | | |
| | Ensuing parameter | 483 | 1E3 | txt | | | | | |
| | Ensuing parameter | 484 | 1E4 | txt | | | | | |
| | Ensuing parameter | 485 | 1E5 | txt | | | | | |
| | Ensuing parameter | 486 | 1E6 | txt | | | | | |
| | Ensuing parameter | 487 | 1E7 | txt | | | | | |
| B2.08 | Name parameter set 2 | 488 | 1E8 | txt | | | | | |
| | Ensuing parameter | 489 | 1E9 | txt | | | | | |
| | Ensuing parameter | 490 | 1EA | txt | | | | | |
| | Ensuing parameter | 491 | 1EB | txt | | | | | |
| | Ensuing parameter | 492 | 1EC | txt | | | | | |
| | Ensuing parameter | 493 | 1ED | txt | | | | | |
| | Ensuing parameter | 494 | 1EE | txt | | | | | |
| **B3** | **Inverter data** | | | | | | | | |
| **Line voltage** | | | | | | | | | |
| B3.01 | Mains voltage | 495 | 1EF | | | | | | |
| **Motor control** | | | | | | | | | |
| B3.02 | Control mode | 496 | 1F0 | | | | | | |
| B3.03 | Starting voltage | 497 | 1F1 | | | 1 | 0 | 1000 | V |
| B3.04 | V/f - V1 | 498 | 1F2 | | | 1 | 0 | 1000 | V |
| B3.05 | V/f - f1 | 499 | 1F3 | | | 10 | 0 | 300 | Hz |
| B3.06 | V/f - V2 | 500 | 1F4 | | | 1 | 0 | 1000 | V |
| B3.07 | V/f - f2 | 501 | 1F5 | | | 10 | 0 | 300 | Hz |
| B3.08 | V/f - V3 | 502 | 1F6 | | | 1 | 0 | 1000 | V |
| B3.09 | V/f - f3 | 503 | 1F7 | | | 10 | 0 | 300 | Hz |
| B3.10 | V/f - V4 | 504 | 1F8 | | | 1 | 0 | 1000 | V |
| B3.11 | V/f - f4 | 505 | 1F9 | | | 10 | 0 | 300 | Hz |
| B3.12 | V/f - V5 | 506 | 1FA | | | 1 | 0 | 1000 | V |
| B3.13 | V/f - f5 | 507 | 1FB | | | 10 | 0 | 300 | Hz |
| B3.16 | Inverter power | 1151 | 47F | | | | | | |
| B3.17 | Starting torque | 508 | 1FC | | | 1 | 25 | 200 | % |
| B3.18 | Slip compensation | 509 | 1FD | | | 1 | 0 | 150 | % |
| B3.19 | Vmax field weakening | 510 | 1FE | | | 1 | 100 | 200 | % |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **General settings** | | | | | | | | | |
| B3.24 | Stop mode | 513 | 201 | | | | | | |
| B3.25 | decel. persistant freq. | 515 | 203 | | | 10 | 0 | 50 | Hz |
| B3.26 | decel. persistant time | 516 | 204 | | | 1 | 0 | 3600 | s |
| B3.27 | Motor fluxing | 514 | 202 | | | | | | |
| B3.30 | Skip frequency | 517 | 205 | | | 10 | 2 | 16 | kHz |
| B3.32 | Vmot optimization | 519 | 207 | | | | | | |
| B3.35 | Catch on the fly | 520 | 208 | | | | | | |
| B3.36 | Allowed catch direction | 521 | 209 | | | | | | |
| B3.37 | Sensibility | 522 | 20A | | | 10 | 0.4 | 12 | |
| B3.40 | Output filter | 523 | 20B | | | | | | |
| B3.41 | Fan control | 524 | 20C | | | | | | |
| B3.42 | Auto tune at power on | 525 | 20D | | | | | | |
| B3.43 | Automatic SC test | 526 | 20E | | | | | | |
| B3.44 | Operation with IR | 527 | 20F | | | | | | |
| **B4** | **Motor data** | | | | | | | | |
| **Motor selection** | | | | | | | | | |
| B4.01 | Motor type | 528 | 210 | | | | | | |
| B4.02 | Motor selection | 529 | 211 | | | | | | |
| B4.03 | Start tuning | 1804 | 70C | | | | | | |
| **Motor data M1** | | | | | | | | | |
| B4.05 | Nominal power M1 | 531 | 213 | | | see table | 0.2 | 3500 | kW |
| B4.06 | Nominal current M1 | 532 | 214 | | | see table | 0 | 4000 | A |
| B4.07 | Nominal voltage M1 | 533 | 215 | | | 1 | 0 | 1000 | V |
| B4.08 | Nominal frequency M1 | 534 | 216 | | | 10 | 0 | 300 | Hz |
| B4.09 | Nominal speed M1 | 535 | 217 | | | 1 | 0 | 65000 | rpm |
| B4.10 | Nominal slip M1 | 168 | A8 | | | 100 | | | Hz |
| B4.11 | No. of pole pairs M1 | 169 | A9 | | | 1 | | | |
| B4.12 | Stator resistor M1 | 536 | 218 | | | see table | 0 | 65000 | mOhm |
| B4.13 | Rotortime constant M1 | 537 | 219 | | | 1 | 0 | 10000 | ms |
| B4.14 | Fluxing current M1 | 538 | 21A | | | 10 | 0 | 4000 | A |
| B4.15 | Stray reactance M1 | 539 | 21B | | | 100 | 0 | 655.35 | mH |
| **Motor data M2** | | | | | | | | | |
| B4.17 | Nominal power M2 | 541 | 21D | | | see table | 0.2 | 3500 | kW |
| B4.18 | Nominal current M2 | 542 | 21E | | | see table | 0 | 4000 | A |
| B4.19 | Nominal voltage M2 | 543 | 21F | | | 1 | 0 | 1000 | V |
| B4.20 | Nominal frequency M2 | 544 | 220 | | | 10 | 0 | 300 | Hz |
| B4.21 | Nominal speed M2 | 545 | 221 | | | 1 | 0 | 65000 | rpm |
| B4.22 | Nominal slip M2 | 170 | AA | | | 100 | | | Hz |
| B4.23 | No. of pole pairs M2 | 171 | AB | | | 1 | | | |
| B4.24 | Stator resistor M2 | 546 | 222 | | | see table | 0 | 65000 | mOhm |
| B4.25 | Rotortime constant M2 | 547 | 223 | | | 1 | 0 | 10000 | ms |
| B4.26 | Fluxing current M2 | 548 | 224 | | | 10 | 0 | 4000 | A |
| B4.27 | Stray reactance M2 | 549 | 225 | | | 100 | 0 | 655.35 | mH |
| **Motor data M0** | | | | | | | | | |
| B4.29 | Nominal power M0 | 172 | AC | | | see table | | | kW |
| B4.30 | Nominal current M0 | 173 | AD | | | see table | | | A |
| B4.31 | Nominal voltage M0 | 174 | AE | | | 1 | | | V |
| B4.32 | Nominal frequency M0 | 175 | AF | | | 10 | | | Hz |
| B4.33 | Nominal speed M0 | 176 | B0 | | | 1 | | | rpm |
| B4.34 | Nominal slip M0 | 177 | B1 | | | 100 | | | Hz |
| B4.35 | No. of pole pairs M0 | 178 | B2 | | | 1 | | | |
| B4.36 | Stator resistor M0 | 179 | B3 | | | see table | | | mOhm |

| Parameter name | | Log. address dec | Log. address hex | Type | Adjustability | Factor | Setting range min | Setting range max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| B4.37 | Rotortime constant M0 | 180 | B4 | | | 1 | | | ms |
| B4.38 | Fluxing current M0 | 181 | B5 | | | 10 | | | A |
| B4.39 | Stray reactance M0 | 182 | B6 | | | 100 | | | mH |
| B4.40 | Load default motor | 397 | 18D | | | | | | |
| **Motor data SM1** | | | | | | | | | |
| B4.44 | Nominal power SM1 | 551 | 227 | | | see table | 0.2 | 3500 | kW |
| B4.45 | Nominal current SM1 | 552 | 228 | | | see table | 0 | 4000 | A |
| B4.46 | Nominal voltage SM1 | 1152 | 480 | | | 1 | 0 | 1000 | V |
| B4.47 | Nominal speed SM1 | 553 | 229 | | | 1 | 0 | 65000 | rpm |
| B4.48 | No. of pole pairs SM1 | 554 | 22A | | | 1 | 1 | 100 | |
| B4.49 | Nominal frequency SM1 | 556 | 22C | | | 10 | | | Hz |
| B4.50 | EMC constant SM1 | 555 | 22B | | | 10 | 0 | 6553.5 | V |
| B4.51 | d-axis inductivity SM1 | 558 | 22E | | | 100 | 0 | 655.35 | mH |
| B4.52 | q-axis inductivity SM1 | 1153 | 481 | | | 100 | 0 | 655.35 | mH |
| B4.53 | Stator resistor SM1 | 557 | 22D | | | see table | 0 | 65000 | mOhm |
| **Motor data SM2** | | | | | | | | | |
| B4.55 | Nominal power SM2 | 560 | 230 | | | see table | 0.2 | 3500 | kW |
| B4.56 | Nominal current SM2 | 561 | 231 | | | see table | 0 | 4000 | A |
| B4.57 | Nominal voltage SM2 | 1154 | 482 | | | 1 | 0 | 1000 | V |
| B4.58 | Nominal speed SM2 | 562 | 232 | | | 1 | 0 | 65000 | rpm |
| B4.59 | No. of pole pairs SM2 | 563 | 233 | | | 1 | 1 | 100 | |
| B4.60 | Nominal frequency SM2 | 565 | 235 | | | 10 | | | Hz |
| B4.61 | EMC constant SM2 | 564 | 234 | | | 10 | 0 | 6553.5 | V |
| B4.62 | d-axis inductivity SM2 | 567 | 237 | | | 100 | 0 | 655.35 | mH |
| B4.63 | q-axis inductivity SM2 | 1155 | 483 | | | 100 | 0 | 655.35 | mH |
| B4.64 | Stator resistor SM2 | 566 | 236 | | | see table | 0 | 65000 | mOhm |
| **Motor data SM0** | | | | | | | | | |
| B4.66 | Nominal power SM0 | 569 | 239 | | | see table | | | kW |
| B4.67 | Nominal current SM0 | 183 | B7 | | | see table | | | A |
| B4.68 | Nominal voltage SM0 | 406 | 196 | | | 1 | | | V |
| B4.69 | Nominal speed SM0 | 184 | B8 | | | 1 | | | rpm |
| B4.70 | No. of pole pairs SM0 | 185 | B9 | | | 1 | | | |
| B4.71 | Nominal frequency SM0 | 187 | BB | | | 10 | | | Hz |
| B4.72 | EMC constant SM0 | 186 | BA | | | 10 | | | V |
| B4.73 | d-axis inductivity SM0 | 189 | BD | | | 100 | | | mH |
| B4.74 | q-axis inductivity SM0 | 407 | 197 | | | 100 | | | mH |
| B4.75 | Stator resistor SM0 | 188 | BC | | | see table | | | mOhm |

## B5 Brake function

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Brake mode** | | | | | | | | | |
| B5.01 | Braking mode | 570 | 23A | | | | | | |
| **Braking unit** | | | | | | | | | |
| B5.02 | BU-braking level | 580 | 244 | | | 1 | 700 | 785 | V |
| B5.05 | BR overload activation | 582 | 246 | | | | | | |
| B5.06 | BR overload response | 583 | 247 | | | | | | |
| B5.07 | Time Δt | 584 | 248 | | | 10 | 0 | 200 | s |
| B5.08 | BR continuous power | 585 | 249 | | | 100 | 0 | 650 | kW |
| B5.09 | BR Ohm value | 586 | 24A | | | 10 | 0.5 | 1000 | Ohm |
| B5.10 | BR-thermal load | 190 | BE | | | 10 | | | % |
| **DC-brake** | | | | | | | | | |
| B5.15 | DC-brake I-start | 571 | 23B | | | 1 | 0 | 100 | % |
| B5.16 | DC-brake t-start | 572 | 23C | | | 10 | 0 | 100 | s |
| B5.17 | DC-brake I-cont. | 573 | 23D | | | 1 | 0 | 100 | % |
| B5.18 | DC-brake t-cont. | 574 | 23E | | | 10 | 0 | 100 | s |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **DC-Holdingbrake** | | | | | | | | | |
| B5.20 | DC-holdingbrake | 575 | 23F | | | | | | |
| B5.21 | DC-holdingbrake I-start | 576 | 240 | | | 1 | 0 | 100 | % |
| B5.22 | DC-holdingbrake t-start | 577 | 241 | | | 10 | 0 | 100 | s |
| B5.23 | DC-holdingbrake I-cont. | 578 | 242 | | | 1 | 0 | 100 | % |
| B5.24 | DC-holdingbrake t-cont. | 579 | 243 | | | 10 | 0 | 100 | s |
| **C1** | **Int. reference** | | | | | | | | |
| **Preset reference values** | | | | | | | | | |
| C1.01 | Pre-set ref. selection | 588 | 24C | | | | | | |
| C1.02 | Pre-set reference 1 | 589 | 24D | | | 100 | -300 | 300 | % / Hz |
| C1.03 | Pre-set reference 2 | 590 | 24E | | | 100 | -300 | 300 | % / Hz |
| C1.04 | Pre-set reference 3 | 591 | 24F | | | 100 | -300 | 300 | % / Hz |
| C1.05 | Pre-set reference 4 | 592 | 250 | | | 100 | -300 | 300 | % / Hz |
| C1.06 | Pre-set reference 5 | 593 | 251 | | | 100 | -300 | 300 | % / Hz |
| C1.07 | Pre-set reference 6 | 594 | 252 | | | 100 | -300 | 300 | % / Hz |
| C1.08 | Pre-set reference 7 | 595 | 253 | | | 100 | -300 | 300 | % / Hz |
| C1.09 | Pre-set reference 8 | 596 | 254 | | | 100 | -300 | 300 | % / Hz |
| C1.10 | Pre-set reference 9 | 597 | 255 | | | 100 | -300 | 300 | % / Hz |
| C1.11 | Pre-set reference 10 | 598 | 256 | | | 100 | -300 | 300 | % / Hz |
| C1.12 | Pre-set reference 11 | 599 | 257 | | | 100 | -300 | 300 | % / Hz |
| C1.13 | Pre-set reference 12 | 600 | 258 | | | 100 | -300 | 300 | % / Hz |
| C1.14 | Pre-set reference 13 | 601 | 259 | | | 100 | -300 | 300 | % / Hz |
| C1.15 | Pre-set reference 14 | 602 | 25A | | | 100 | -300 | 300 | % / Hz |
| C1.16 | Pre-set reference 15 | 603 | 25B | | | 100 | -300 | 300 | % / Hz |
| C1.17 | Pre-set reference 16 | 604 | 25C | | | 100 | -300 | 300 | % / Hz |
| **Motor potentiometer** | | | | | | | | | |
| C1.18 | Motor pot. selection | 605 | 25D | | | | | | |
| C1.19 | Motor pot. control | 606 | 25E | | | | | | |
| C1.20 | Motor pot. min. value | 607 | 25F | | | 100 | -300 | 300 | % / Hz |
| C1.21 | Motor pot. max. value | 608 | 260 | | | 100 | -300 | 300 | % / Hz |
| C1.22 | Motor pot. accel. time | 609 | 261 | | | 10 | 0 | 6500 | s |
| C1.23 | Motor pot. decel. time | 610 | 262 | | | 10 | 0 | 6500 | s |
| C1.24 | Motor pot. ref. storage | 611 | 263 | | | | | | |
| C1.25 | Motor pot. tracking | 612 | 264 | | | | | | |
| **Panel reference sources** | | | | | | | | | |
| C1.29 | MX-wheel selection | 613 | 265 | | | | | | |
| C1.30 | MX-wheel f min. value | 614 | 266 | | | 10 | 0 | 300 | Hz |
| C1.31 | MX-wheel f max. value | 615 | 267 | | | 10 | 0 | 300 | Hz |
| C1.32 | MX-wheel T-min. value | 616 | 268 | | | 10 | -300 | 300 | % |
| C1.33 | MX-wheel T max. value | 617 | 269 | | | 10 | -300 | 300 | % |
| C1.34 | MX-wheel single step | 618 | 26A | | | 100 | 0 | 50 | |
| C1.35 | Store MX-wheel ref. | 619 | 26B | | | | | | |
| **Calculator** | | | | | | | | | |
| C1.38 | Calculator selection | 620 | 26C | | | | | | |
| C1.39 | Calculator input A | 621 | 26D | | | | | | |
| C1.40 | Calculator input B | 622 | 26E | | | | | | |
| C1.41 | Calculator function | 623 | 26F | | | | | | |
| C1.42 | Reference value | 624 | 270 | | | 100 | -300 | 300 | |
| C1.43 | Multiplier | 625 | 271 | | | 1 | 1 | 30000 | |
| C1.44 | Divisor | 626 | 272 | | | 1 | 1 | 1000 | |
| C1.45 | Calculator min. value | 627 | 273 | | | 100 | -300 | 300 | % / Hz |
| C1.46 | Calculator max. value | 628 | 274 | | | 100 | -300 | 300 | % / Hz |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **Actual value selection** | | | | | | | | | |
| C1.49 | Actual value usage | 629 | 275 | | | | | | |
| C1.50 | Actual value selection | 630 | 276 | | | | | | |
| C1.51 | Actual value filter time | 631 | 277 | | | 100 | 0 | 20 | s |
| C1.52 | Value at 0Hz [%] | 632 | 278 | | | 100 | -300 | 300 | % / Hz |
| C1.53 | Value at 100Hz [%] | 633 | 279 | | | 100 | -300 | 300 | % / Hz |
| **Reference value switch** | | | | | | | | | |
| C1.54 | Ref. val. switch usage | 634 | 27A | | | | | | |
| C1.55 | Ref. val. switch selec. | 635 | 27B | | | | | | |
| C1.56 | Ref. val. switch input A | 636 | 27C | | | | | | |
| C1.57 | Ref. val. switch input B | 637 | 27D | | | | | | |
| **Jog mode** | | | | | | | | | |
| C1.58 | Jog frquency | 638 | 27E | | | 10 | 0 | 20 | Hz |
| C1.59 | Jog ramp | 1156 | 484 | | | 10 | 0 | 300 | s |
| **Curve generator** | | | | | | | | | |
| C1.61 | Curve generator selec. | 639 | 27F | | | | | | |
| C1.62 | Curve gen. start mode | 640 | 280 | | | | | | |
| C1.63 | Ref. value 0 | 641 | 281 | | | 100 | -300 | 300 | % / Hz |
| C1.64 | Time - Δt1 | 642 | 282 | | | 100 | 0 | 650 | s |
| C1.65 | Ref. value 1 | 643 | 283 | | | 100 | -300 | 300 | % / Hz |
| C1.66 | Time - Δt2 | 644 | 284 | | | 100 | 0 | 650 | s |
| C1.67 | Ref. value 2 | 645 | 285 | | | 100 | -300 | 300 | % / Hz |
| C1.68 | Time - Δt3 | 646 | 286 | | | 100 | 0 | 650 | s |
| C1.69 | Ref. value 3 | 647 | 287 | | | 100 | -300 | 300 | % / Hz |
| C1.70 | Time - Δt4 | 648 | 288 | | | 100 | 0 | 650 | s |
| C1.71 | Ref. value 4 | 649 | 289 | | | 100 | -300 | 300 | % / Hz |
| C1.72 | Time - Δt5 | 650 | 28A | | | 100 | 0 | 650 | s |
| C1.73 | Ref. value 5 | 651 | 28B | | | 100 | -300 | 300 | % / Hz |
| C1.74 | Time - Δt6 | 652 | 28C | | | 100 | 0 | 650 | s |
| C1.75 | Ref. value 6 | 653 | 28D | | | 100 | -300 | 300 | % / Hz |
| C1.76 | Time - Δt7 | 654 | 28E | | | 100 | 0 | 650 | s |
| **XY Graph** | | | | | | | | | |
| C1.90 | XY graph selection | 1157 | 485 | | | | | | |
| C1.91 | XY graph input selection | 1158 | 486 | | | | | | % / Hz |
| C1.92 | No. of value pairs | 1159 | 487 | | | 1 | 2 | 6 | |
| C1.93 | XY Graph min | 1160 | 488 | | | 100 | -300 | 300 | % / Hz |
| C1.94 | XY Graph max | 1161 | 489 | | | 100 | -300 | 300 | % / Hz |
| C1.95 | XY Graph - IN 1 | 1162 | 48A | | | 100 | -300 | 300 | % / Hz |
| C1.96 | XY Graph - OUT 1 | 1163 | 48B | | | 100 | -300 | 300 | % / Hz |
| C1.97 | XY Graph - IN 2 | 1164 | 48C | | | 100 | -300 | 300 | % / Hz |
| C1.98 | XY Graph - OUT 2 | 1165 | 48D | | | 100 | -300 | 300 | % / Hz |
| C1.99 | XY Graph - IN 3 | 1166 | 48E | | | 100 | -300 | 300 | % / Hz |
| C1.100 | XY Graph - OUT 3 | 1167 | 48F | | | 100 | -300 | 300 | % / Hz |
| C1.101 | XY Graph - IN 4 | 1168 | 490 | | | 100 | -300 | 300 | % / Hz |
| C1.102 | XY Graph - OUT 4 | 1169 | 491 | | | 100 | -300 | 300 | % / Hz |
| C1.103 | XY Graph - IN 5 | 1170 | 492 | | | 100 | -300 | 300 | % / Hz |
| C1.104 | XY Graph - OUT 5 | 1171 | 493 | | | 100 | -300 | 300 | % / Hz |
| C1.105 | XY Graph - IN 6 | 1172 | 494 | | | 100 | -300 | 300 | % / Hz |
| C1.106 | XY Graph - OUT 6 | 1173 | 495 | | | 100 | -300 | 300 | % / Hz |

## C2 Ramp / frequency

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Frequency range** | | | | | | | | | |
| C2.01 | Minimum frequency | 655 | 28F | | | 10 | 0 | 300 | Hz |
| C2.02 | Maximum frequency | 656 | 290 | | | 10 | 10 | 300 | Hz |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **Direction of rotation** | | | | | | | | | |
| C2.03 | Direction enable | 657 | 291 | | | | | | |
| C2.04 | Phase rotation | 658 | 292 | | | | | | |
| **Acceleration/deceleration ramps** | | | | | | | | | |
| C2.05 | Acceleration ramp 1 | 659 | 293 | | | 10 | 0 | 6000 | s |
| C2.06 | Deceleration ramp 1 | 660 | 294 | | | 10 | 0 | 6000 | s |
| C2.07 | Acceleration ramp 2 | 661 | 295 | | | 10 | 0 | 6000 | s |
| C2.08 | Deceleration ramp 2 | 662 | 296 | | | 10 | 0 | 6000 | s |
| C2.09 | Switch 1st/2nd accel. | 663 | 297 | | | 10 | 0 | 300 | Hz |
| C2.10 | Switch 2nd/1st decel. | 664 | 298 | | | 10 | 0 | 300 | Hz |
| C2.11 | Start ramp | 665 | 299 | | | 10 | 0 | 6000 | s |
| C2.12 | S-ramp mode | 666 | 29A | | | | | | |
| C2.13 | S-ramp | 667 | 29B | | | 1 | 1 | 100 | % |
| C2.14 | Limitation | 1174 | 496 | | | | | | |

## C3 Crane application

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Crane control** | | | | | | | | | |
| C3.45 | Brake control | 1175 | 497 | | | | | | |
| C3.46 | Engage frequency | 1180 | 49C | | | 10 | 0 | 10 | Hz |
| C3.47 | Brake release time | 1178 | 49A | | | 100 | 0 | 5 | s |
| C3.48 | Release frequency | 1182 | 49E | | | 10 | 0 | 10 | Hz |
| C3.49 | Stop delay time | 1186 | 4A2 | | | 100 | 0 | 5 | s |
| C3.50 | Brake engage time | 1179 | 49B | | | 100 | 0 | 5 | s |
| C3.51 | DC-brake current | 1187 | 4A3 | | | 1 | 0 | 120 | % |
| C3.52 | Skipfrequency 0Hz | 1181 | 49D | | | 10 | 0 | 10 | Hz |
| C3.53 | Start delay | 1185 | 4A1 | | | 100 | 0 | 5 | s |
| C3.56 | Hoist options | 1189 | 4A5 | 0110 | | | | | |
| C3.57 | Starting torque ↑ | 1176 | 498 | | | 1 | 0 | 140 | % |
| C3.58 | Starting torque ↓ | 1177 | 499 | | | 1 | 0 | 140 | % |
| C3.59 | Ramp time | 1184 | 4A0 | | | 100 | 0 | 5 | s |
| C3.60 | Feedback Timeout | 1190 | 4A6 | | | 10 | 0 | 5 | s |
| **External load measurement** | | | | | | | | | |
| C3.65 | Loadadapting brakecont. | 1191 | 4A7 | | | | | | |
| C3.66 | Loadpoint 1 | 1192 | 4A8 | | | 1 | -300 | 300 | % |
| C3.67 | Starting torque 1 | 1193 | 4A9 | | | 1 | -140 | 140 | % |
| C3.68 | Loadpoint 2 | 1194 | 4AA | | | 1 | -300 | 300 | % |
| C3.69 | Starting Torque 2 | 1195 | 4AB | | | 1 | -140 | 140 | % |

## C4 PID configuration

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Monitoring of PID values** | | | | | | | | | |
| C4.01 | PID reference value | 196 | C4 | | | 10 | | | % |
| C4.02 | PID actual value | 197 | C5 | | | 10 | | | % |
| C4.03 | PID deviation | 198 | C6 | | | 1 | | | % |
| C4.04 | PID output | 199 | C7 | | | 100 | | | % / Hz |
| **Basic setting** | | | | | | | | | |
| C4.07 | Control mode | 694 | 2B6 | | | | | | |
| C4.08 | Control sense | 695 | 2B7 | | | | | | |
| C4.09 | Proportional gain | 696 | 2B8 | | | 1000 | 0 | 30 | |
| C4.10 | Integration time | 697 | 2B9 | | | 100 | 0 | 600 | s |
| C4.11 | Derive time | 698 | 2BA | | | 100 | 0 | 600 | s |
| C4.12 | Max. D-part | 699 | 2BB | | | 100 | 0 | 300 | |
| C4.13 | Output level min. | 700 | 2BC | | | 100 | -300 | 300 | |
| C4.14 | Output level max. | 701 | 2BD | | | 100 | -300 | 300 | |
| C4.15 | Limitation | 1196 | 4AC | | | | | | |
| C4.17 | Frequency tracking | 702 | 2BE | | | | | | |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| C4.18 | Ref. value acceleration | 703 | 2BF | | | 10 | 0 | 6000 | s |
| C4.19 | Ref. value deceleration | 704 | 2C0 | | | 10 | 0 | 6000 | s |
| **Compensation of pressure drop** | | | | | | | | | |
| C4.22 | Pressure drop | 705 | 2C1 | | | 10 | 0 | 300 | % |
| C4.23 | Start compensation | 706 | 2C2 | | | 10 | 0 | 300 | Hz |
| C4.24 | Compensation dynamic | 707 | 2C3 | | | 10 | 0 | 300 | s |
| **Advanced functions** | | | | | | | | | |
| C4.32 | PID-lock | 711 | 2C7 | | | | | | |
| C4.33 | Wind-up behaviour | 712 | 2C8 | | | | | | |
| C4.34 | PID multiplier | 713 | 2C9 | | | 1 | -1000 | 1000 | |
| C4.35 | PID divisor | 714 | 2CA | | | 1 | 1 | 1000 | |
| C4.36 | PID offset | 715 | 2CB | | | 100 | -100 | 100 | |
| C4.37 | Process unit | 716 | 2CC | txt | | | | | |
| | Ensuing parameter | 717 | 2CD | txt | | | | | |
| **C5** | **n/T-controller** | | | | | | | | |
| **Speed controller** | | | | | | | | | |
| C5.01 | Speed prop. gain | 1197 | 4AD | | | 1 | 0 | 1000 | % |
| C5.02 | Speed time integral | 1198 | 4AE | | | 1 | 1 | 1000 | % |
| C5.03 | Ref. Filterfactor | 1199 | 4AF | | | 1 | 0 | 100 | % |
| **T-controller** | | | | | | | | | |
| C5.07 | Torque controller | 1200 | 4B0 | | | | | | |
| C5.08 | T-offset value | 1213 | 4BD | | | 100 | -300 | 300 | % |
| C5.09 | positiv T-ramp | 1206 | 4B6 | | | 10 | 0 | 300 | s |
| C5.10 | neg. T-Ramp | 1207 | 4B7 | | | 10 | 0 | 300 | s |
| C5.11 | T-ref min | 1208 | 4B8 | | | 10 | -300 | 300 | % |
| C5.12 | T ref max | 1209 | 4B9 | | | 10 | -300 | 300 | % |
| C5.13 | Limitation | 1210 | 4BA | | | | | | |
| **Speed limitation** | | | | | | | | | |
| C5.16 | + Δn limit | 1211 | 4BB | | | 100 | 0 | 300 | Hz |
| C5.17 | - Δn limit | 1212 | 4BC | | | 100 | 0 | 300 | Hz |
| C5.18 | Response at n-limitation | 1201 | 4B1 | | | | | | |
| C5.19 | Time Δt | 1202 | 4B2 | | | 10 | 0 | 100 | s |
| **Stop behaviour** | | | | | | | | | |
| C5.22 | T-controller stop mode | 1203 | 4B3 | | | | | | |
| C5.23 | Standby time | 1204 | 4B4 | | | 1 | 0 | 3600 | s |
| **C6** | **Special functions** | | | | | | | | |
| **Motor heating** | | | | | | | | | |
| C6.05 | Motor heating | 722 | 2D2 | | | | | | |
| C6.06 | Heating current | 723 | 2D3 | | | 1 | 0 | 50 | % |
| **Line contactor control** | | | | | | | | | |
| C6.07 | Contactor control | 724 | 2D4 | | | | | | |
| **Motor contactor control** | | | | | | | | | |
| C6.08 | Motor contactor control | 725 | 2D5 | | | | | | |
| **Standby Mode** | | | | | | | | | |
| C6.11 | Standby mode | 726 | 2D6 | | | | | | |
| C6.12 | Off delay time | 727 | 2D7 | | | 10 | 1 | 3000 | s |
| C6.13 | On delay time | 728 | 2D8 | | | 10 | 1 | 100 | s |
| C6.14 | Max. level | 729 | 2D9 | | | 10 | 0 | 300 | % |
| C6.15 | Min. level | 730 | 2DA | | | 10 | 0 | 300 | % |
| **Impulse Counter** | | | | | | | | | |
| C6.18 | Pulse counter | 731 | 2DB | | | | | | |
| C6.19 | Total counter | 200 | C8 | | | 10 | | | |

| Parameter name | | Log. address dec | Log. address hex | Type | Adjust-ability | Factor | Setting range min | Setting range max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| C6.20 | Counter (average) | 201 | C9 | | | 10 | | | |
| C6.21 | Scaling | 732 | 2DC | | | 1000 | 0 | 65 | |
| C6.22 | Time base pulse counter | 733 | 2DD | | | 1 | 0 | 3600 | s |
| C6.23 | Pulse type | 734 | 2DE | | | | | | |
| C6.24 | Symbol pulse counter | 735 | 2DF | txt | | | | | |
| | Ensuing parameter | 736 | 2E0 | txt | | | | | |
| C6.25 | Pulse counter unit | 737 | 2E1 | txt | | | | | |
| | Ensuing parameter | 738 | 2E2 | txt | | | | | |
| **Correction reference value** | | | | | | | | | |
| C6.26 | f-correction | 740 | 2E4 | | | | | | |
| **Load balance** | | | | | | | | | |
| C6.29 | Load sharing | 1214 | 4BE | | | | | | |
| C6.30 | Correction frequency | 1215 | 4BF | | | 10 | 0 | 300 | Hz |
| C6.31 | Load sharing f-start | 1216 | 4C0 | | | 10 | 0 | 300 | Hz |
| C6.32 | Load sharing T-start | 1218 | 4C2 | | | 1 | 0 | 300 | % |
| C6.33 | Dynamic | 1219 | 4C3 | | | 10 | 0 | 20 | s |
| **SlowDown Functionality** | | | | | | | | | |
| C6.37 | SlowDown | 1220 | 4C4 | | | | | | |
| C6.38 | SlowDown function | 1221 | 4C5 | | | | | | |
| C6.39 | Deceleration time | 1222 | 4C6 | | | 10 | 0 | 3200 | s |
| C6.40 | Persistence time | 1223 | 4C7 | | | 10 | 0 | 3600 | s |
| C6.41 | Start distancemeasuring | 1813 | 715 | | | | | | |
| **Reference take over** | | | | | | | | | |
| C6.44 | Reference take over | 1224 | 4C8 | | | | | | |
| C6.45 | Delaytime | 1225 | 4C9 | | | 100 | 0 | 10 | s |
| C6.46 | Edge | 1226 | 4CA | | | | | | |

| D1 | Analog inputs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Analog input AI1** | | | | | | | | | |
| D1.01 | AI1 selection | 741 | 2E5 | | | | | | |
| D1.02 | AI1 level | 742 | 2E6 | | | | | | |
| D1.03 | AI1 min. value | 743 | 2E7 | | | 100 | -300 | 300 | % / Hz |
| D1.04 | AI1 max. value | 744 | 2E8 | | | 100 | -300 | 300 | % / Hz |
| D1.05 | AI1 filter-time | 745 | 2E9 | | | 100 | 0 | 30 | s |
| **Analog input AI2** | | | | | | | | | |
| D1.08 | AI2 selection | 746 | 2EA | | | | | | |
| D1.09 | AI2 level | 747 | 2EB | | | | | | |
| D1.10 | AI2 min. value | 748 | 2EC | | | 100 | -300 | 300 | % / Hz |
| D1.11 | AI2 max. value | 749 | 2ED | | | 100 | -300 | 300 | % / Hz |
| D1.12 | AI2 filter-time | 750 | 2EE | | | 100 | 0 | 30 | s |
| **Analog input AI3** | | | | | | | | | |
| D1.15 | AI3 selection | 751 | 2EF | | | | | | |
| D1.16 | AI3 level | 752 | 2F0 | | | | | | |
| D1.17 | AI3 min. value | 753 | 2F1 | | | 100 | -300 | 300 | % / Hz |
| D1.18 | AI3 max. value | 754 | 2F2 | | | 100 | -300 | 300 | % / Hz |
| D1.19 | AI3 filter-time | 755 | 2F3 | | | 100 | 0 | 30 | s |
| **Analog input AI4** | | | | | | | | | |
| D1.22 | AI4 selection | 756 | 2F4 | | | | | | |
| D1.23 | AI4 level | 757 | 2F5 | | | | | | |
| D1.24 | AI4 min. value | 758 | 2F6 | | | 100 | -300 | 300 | % / Hz |
| D1.25 | AI4 max. value | 759 | 2F7 | | | 100 | -300 | 300 | % / Hz |
| D1.26 | AI4 filter-time | 760 | 2F8 | | | 100 | 0 | 30 | s |
| **Frequency input FP** | | | | | | | | | |
| D1.29 | FP selection | 761 | 2F9 | | | | | | |
| D1.30 | FP min. | 762 | 2FA | | | 100 | 0 | 30 | kHz |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| D1.31 | FP max. | 763 | 2FB | | | 100 | 0 | 30 | kHz |
| D1.32 | FP min. value | 764 | 2FC | | | 100 | -300 | 300 | % / Hz |
| D1.33 | FP max. value | 765 | 2FD | | | 100 | -300 | 300 | % / Hz |
| D1.34 | FP filter-time | 766 | 2FE | | | 100 | 0 | 30 | s |
| **D2** | **Digital inputs** | | | | | | | | |
| **Digital Inputs** | | | | | | | | | |
| D2.01 | DI1 selection | 767 | 2FF | | | | | | |
| D2.02 | DI2 selection | 768 | 300 | | | | | | |
| D2.03 | DI3 selection | 769 | 301 | | | | | | |
| D2.04 | DI4 selection | 770 | 302 | | | | | | |
| D2.05 | DI5 selection | 771 | 303 | | | | | | |
| D2.06 | DI6 selection | 772 | 304 | | | | | | |
| D2.07 | DI7 selection | 773 | 305 | | | | | | |
| D2.08 | DI8 selection | 774 | 306 | | | | | | |
| D2.09 | DI9 selection | 775 | 307 | | | | | | |
| D2.10 | DI10 selection | 776 | 308 | | | | | | |
| D2.11 | DI11 selection | 777 | 309 | | | | | | |
| D2.12 | DI12 selection | 778 | 30A | | | | | | |
| D2.13 | DI13 selection | 779 | 30B | | | | | | |
| D2.14 | DI14 selection | 780 | 30C | | | | | | |
| D2.15 | DI at bus mode active | 781 | 30D | 0110 | | | | | |
| **D3** | **Analog outputs** | | | | | | | | |
| **Analog output AO1** | | | | | | | | | |
| D3.01 | AO1 selection | 782 | 30E | | | | | | |
| D3.02 | AO1 level | 783 | 30F | | | | | | |
| D3.03 | AO1 min. value | 784 | 310 | | | 100 | -300 | 300 | % / Hz |
| D3.04 | AO1 max. value | 785 | 311 | | | 100 | -300 | 300 | % / Hz |
| D3.05 | AO1 filter-time | 786 | 312 | | | 100 | 0 | 30 | s |
| D3.06 | AO1 value | 64 | 40 | | | 100 | | | V / mA |
| **Analog output AO2** | | | | | | | | | |
| D3.08 | AO2 selection | 787 | 313 | | | | | | |
| D3.09 | AO2 level | 788 | 314 | | | | | | |
| D3.10 | AO2 min. value | 789 | 315 | | | 100 | -300 | 300 | % / Hz |
| D3.11 | AO2 max. value | 790 | 316 | | | 100 | -300 | 300 | % / Hz |
| D3.12 | AO2 filter-time | 791 | 317 | | | 100 | 0 | 30 | s |
| D3.13 | AO2 value | 65 | 41 | | | 100 | | | V / mA |
| **Analog output AO3** | | | | | | | | | |
| D3.15 | AO3 selection | 792 | 318 | | | | | | |
| D3.16 | AO3 level | 793 | 319 | | | | | | |
| D3.17 | AO3 min. value | 794 | 31A | | | 100 | -300 | 300 | % / Hz |
| D3.18 | AO3 max. value | 795 | 31B | | | 100 | -300 | 300 | % / Hz |
| D3.19 | AO3 filter-time | 796 | 31C | | | 100 | 0 | 30 | s |
| D3.20 | AO3 value | 66 | 42 | | | 100 | | | V / mA |
| **D4** | **Digital outputs** | | | | | | | | |
| **Digital outputs** | | | | | | | | | |
| D4.01 | R1 selection | 797 | 31D | | | | | | |
| D4.02 | R2 selection | 798 | 31E | | | | | | |
| D4.03 | R3 selection | 799 | 31F | | | | | | |
| D4.04 | DO1 selection | 800 | 320 | | | | | | |
| D4.05 | DO2 selection | 801 | 321 | | | | | | |
| D4.06 | R4 selection | 802 | 322 | | | | | | |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| D4.07 | DO3 selection | 803 | 323 | | | | | | |
| D4.08 | DO4 selection | 804 | 324 | | | | | | |
| D4.11 | DO invertation | 805 | 325 | 0110 | | | | | |
| **D5** | **Encoder configuration** | | | | | | | | |
| **Encoder** | | | | | | | | | |
| D5.01 | SFB use for | 1227 | 4CB | | | | | | |
| D5.02 | Encoder pulses | 1228 | 4CC | | | 1 | 100 | 5000 | |
| D5.03 | SFB signals | 1229 | 4CD | | | | | | |
| D5.04 | Encoder rotation | 1230 | 4CE | | | | | | |
| **Encoder failure** | | | | | | | | | |
| D5.06 | Encoder slip detection | 1231 | 4CF | | | | | | |
| D5.07 | f-detection level | 1232 | 4D0 | | | 10 | 0 | 100 | Hz |
| D5.08 | Delay time | 1233 | 4D1 | | | 10 | 0.1 | 10 | s |
| **Encoder** | | | | | | | | | |
| D5.09 | Encoder pulses calc. | 408 | 198 | | | 1 | | | |
| **D6** | **Fieldbus** | | | | | | | | |
| **Fieldbus configuration** | | | | | | | | | |
| D6.01 | Bus selection | 1301 | 515 | | | | | | |
| D6.02 | Control requested | 1302 | 516 | | | | | | |
| D6.03 | Bus error behaviour | 1303 | 517 | | | | | | |
| D6.04 | Bus error delay time | 1304 | 518 | | | 10 | 0 | 3200 | s |
| D6.10 | Modbus address | 1305 | 519 | | | 1 | 0 | 247 | |
| D6.11 | Modbus baud rate | 1306 | 51A | | | | | | |
| D6.12 | Modbus format | 1307 | 51B | | | | | | |
| D6.13 | Modbus frame count | 202 | CA | | | 1 | | | |
| D6.14 | Modbus CRC errors | 203 | CB | | | 1 | | | |
| D6.15 | Modbus time-out | 1308 | 51C | | | 10 | 0 | 300 | s |
| D6.20 | CANopen address | 1319 | 527 | | | 1 | 0 | 127 | |
| D6.21 | CANopen baud rate | 1320 | 528 | | | | | | |
| D6.22 | CANopen status | 206 | CE | | | | | | |
| D6.23 | CANopen error register | 207 | CF | 0110 | | | | | |
| D6.24 | CANopen Rx errorcount | 204 | CC | | | 1 | | | |
| D6.25 | CANopen Tx errorcount | 205 | CD | | | 1 | | | |
| D6.30 | DP slave address | 1321 | 529 | | | 1 | | | |
| D6.31 | DP baud rate | 208 | D0 | | | | | | |
| D6.32 | Slave state | 209 | D1 | | | | | | |
| D6.33 | On after off 1 | 1322 | 52A | | | | | | |
| D6.34 | Request master | 210 | D2 | 0110 | | | | | |
| D6.35 | DP master address | 211 | D3 | | | 1 | | | |
| D6.36 | Config buffer 1 | 212 | D4 | | | 1 | 0 | FA | hex |
| D6.37 | Config buffer 2 | 213 | D5 | | | 1 | 0 | FA | hex |
| D6.38 | Config buffer 3 | 214 | D6 | | | 1 | 0 | FA | hex |
| D6.39 | DP diagnostic buffer 1 | 215 | D7 | | | 1 | | | hex |
| D6.40 | DP diagnostic buffer 2 | 216 | D8 | | | 1 | | | hex |
| D6.41 | Group number | 217 | D9 | | | 1 | | | |
| D6.42 | Global command | 218 | DA | | | 1 | | | |
| **Fieldbus references** | | | | | | | | | |
| D6.100 | No. of Bus-ref. values | 1323 | 52B | | | | | | |
| D6.101 | Ref. value1 selection | 1324 | 52C | | | | | | |
| D6.102 | Ref. value1 min. value | 1325 | 52D | | | 100 | -300 | 300 | % / Hz |
| D6.103 | Ref. value1 max. value | 1326 | 52E | | | 100 | -300 | 300 | % / Hz |
| D6.104 | Ref. value1 emergency | 1327 | 52F | | | 1 | 0 | FFFF | hex |

| Parameter name | Log. address dec | Log. address hex | Type | Adjust-ability | Factor | Setting range min | Setting range max | Unit |
|---|---|---|---|---|---|---|---|---|
| D6.105 Ref. value2 selection | 1328 | 530 | | | | | | |
| D6.106 Ref. value2 min. value | 1329 | 531 | | | 100 | -300 | 300 | % / Hz |
| D6.107 Ref. value2 max. value | 1330 | 532 | | | 100 | -300 | 300 | % / Hz |
| D6.108 Ref. value2 emergency | 1331 | 533 | | | 1 | 0 | FFFF | hex |
| D6.109 Ref. value3 selection | 1332 | 534 | | | | | | |
| D6.110 Ref. value3 min. value | 1333 | 535 | | | 100 | -300 | 300 | % / Hz |
| D6.111 Ref. value3 max. value | 1334 | 536 | | | 100 | -300 | 300 | % / Hz |
| D6.112 Ref. value3 emergency | 1335 | 537 | | | 1 | 0 | FFFF | hex |
| D6.113 Ref. value4 selection | 1336 | 538 | | | | | | |
| D6.114 Ref. value4 min. value | 1337 | 539 | | | 100 | -300 | 300 | % / Hz |
| D6.115 Ref. value4 max. value | 1338 | 53A | | | 100 | -300 | 300 | % / Hz |
| D6.116 Ref. value4 emergency | 1339 | 53B | | | 1 | 0 | FFFF | hex |
| D6.117 Ref. value5 selection | 1340 | 53C | | | | | | |
| D6.118 Ref. value5 min. value | 1341 | 53D | | | 100 | -300 | 300 | % / Hz |
| D6.119 Ref. value5 max. value | 1342 | 53E | | | 100 | -300 | 300 | % / Hz |
| D6.120 Ref. value5 emergency | 1343 | 53F | | | 1 | 0 | FFFF | hex |
| D6.121 Ref. value6 selection | 1344 | 540 | | | | | | |
| D6.122 Ref. value6 min. value | 1345 | 541 | | | 100 | -300 | 300 | % / Hz |
| D6.123 Ref. value6 max. value | 1346 | 542 | | | 100 | -300 | 300 | % / Hz |
| D6.124 Ref. value6 emergency | 1347 | 543 | | | 1 | 0 | FFFF | hex |
| D6.125 Ref. value7 selection | 1348 | 544 | | | | | | |
| D6.126 Ref. value7 min. value | 1349 | 545 | | | 100 | -300 | 300 | % / Hz |
| D6.127 Ref. value7 max. value | 1350 | 546 | | | 100 | -300 | 300 | % / Hz |
| D6.128 Ref. value7 emergency | 1351 | 547 | | | 1 | 0 | FFFF | hex |
| D6.129 Ref. value8 selection | 1352 | 548 | | | | | | |
| D6.130 Ref. value8 min. value | 1353 | 549 | | | 100 | -300 | 300 | % / Hz |
| D6.131 Ref. value8 max. value | 1354 | 54A | | | 100 | -300 | 300 | % / Hz |
| D6.132 Ref. value8 emergency | 1355 | 54B | | | 1 | 0 | FFFF | hex |
| D6.133 Ref. value9 selection | 1356 | 54C | | | | | | |
| D6.134 Ref. value9 min. value | 1357 | 54D | | | 100 | -300 | 300 | % / Hz |
| D6.135 Ref. value9 max. value | 1358 | 54E | | | 100 | -300 | 300 | % / Hz |
| D6.136 Ref. value9 emergency | 1359 | 54F | | | 1 | 0 | FFFF | hex |
| **Fieldbus actual values** | | | | | | | | |
| D6.137 Number actual values | 1360 | 550 | | | | | | |
| D6.138 Act. value1 selection | 1361 | 551 | | | | | | |
| D6.139 Act. value1 min. value | 1362 | 552 | | | 100 | -300 | 300 | % / Hz |
| D6.140 Act. value1 max. value | 1363 | 553 | | | 100 | -300 | 300 | % / Hz |
| D6.141 Act. value1 filter-time | 1364 | 554 | | | 100 | 0 | 30 | s |
| D6.142 Act. value2 selection | 1365 | 555 | | | | | | |
| D6.143 Act. value2 min. value | 1366 | 556 | | | 100 | -300 | 300 | % / Hz |
| D6.144 Act. value2 max. value | 1367 | 557 | | | 100 | -300 | 300 | % / Hz |
| D6.145 Act. value2 filter-time | 1368 | 558 | | | 100 | 0 | 30 | s |
| D6.146 Act. value3 selection | 1369 | 559 | | | | | | |
| D6.147 Act. value3 min. value | 1370 | 55A | | | 100 | -300 | 300 | % / Hz |
| D6.148 Act. value3 max. value | 1371 | 55B | | | 100 | -300 | 300 | % / Hz |
| D6.149 Act. value3 filter-time | 1372 | 55C | | | 100 | 0 | 30 | s |
| D6.150 Act. value4 selection | 1373 | 55D | | | | | | |
| D6.151 Act. value4 min. value | 1374 | 55E | | | 100 | -300 | 300 | % / Hz |
| D6.152 Act. value4 max. value | 1375 | 55F | | | 100 | -300 | 300 | % / Hz |
| D6.153 Act. value4 filter-time | 1376 | 560 | | | 100 | 0 | 30 | s |
| D6.154 Act. value5 selection | 1377 | 561 | | | | | | |
| D6.155 Act. value5 min. value | 1378 | 562 | | | 100 | -300 | 300 | % / Hz |
| D6.156 Act. value5 max. value | 1379 | 563 | | | 100 | -300 | 300 | % / Hz |
| D6.157 Act. value5 filter-time | 1380 | 564 | | | 100 | 0 | 30 | s |
| D6.158 Act. value6 selection | 1381 | 565 | | | | | | |
| D6.159 Act. value6 min. value | 1382 | 566 | | | 100 | -300 | 300 | % / Hz |

| Parameter name | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|
| D6.160 Act. value6 max. value | 1383 | 567 | | | 100 | -300 | 300 | % / Hz |
| D6.161 Act. value6 filter-time | 1384 | 568 | | | 100 | 0 | 30 | s |
| D6.162 Act. value7 selection | 1385 | 569 | | | | | | |
| D6.163 Act. value7 min. value | 1386 | 56A | | | 100 | -300 | 300 | % / Hz |
| D6.164 Act. value7 max. value | 1387 | 56B | | | 100 | -300 | 300 | % / Hz |
| D6.165 Act. value7 filter-time | 1388 | 56C | | | 100 | 0 | 30 | s |
| D6.166 Act. value8 selection | 1389 | 56D | | | | | | |
| D6.167 Act. value8 min. value | 1390 | 56E | | | 100 | -300 | 300 | % / Hz |
| D6.168 Act. value8 max. value | 1391 | 56F | | | 100 | -300 | 300 | % / Hz |
| D6.169 Act. value8 filter-time | 1392 | 570 | | | 100 | 0 | 30 | s |
| D6.170 Act. value9 selection | 1393 | 571 | | | | | | |
| D6.171 Act. value9 min. value | 1394 | 572 | | | 100 | -300 | 300 | % / Hz |
| D6.172 Act. value9 max. value | 1395 | 573 | | | 100 | -300 | 300 | % / Hz |
| D6.173 Act. value9 filter-time | 1396 | 574 | | | 100 | 0 | 30 | s |
| **Assignment free bits STW** | | | | | | | | |
| D6.174 Bit 11 STW1 selection | 1397 | 575 | | | | | | |
| D6.175 Bit 12 STW1 selection | 1398 | 576 | | | | | | |
| D6.176 Bit 13 STW1 selection | 1399 | 577 | | | | | | |
| D6.177 Bit 14 STW1 selection | 1400 | 578 | | | | | | |
| D6.178 Bit 15 STW1 selection | 1401 | 579 | | | | | | |
| D6.179 Bit at term.-mode act. | 1402 | 57A | 0110 | | | | | |
| **Assignment bit 0 - 15 PZD2 STW** | | | | | | | | |
| D6.180 Bit 0 STW2 selection | 1403 | 57B | | | | | | |
| D6.181 Bit 1 STW2 selection | 1404 | 57C | | | | | | |
| D6.182 Bit 2 STW2 selection | 1405 | 57D | | | | | | |
| D6.183 Bit 3 STW2 selection | 1406 | 57E | | | | | | |
| D6.184 Bit 4 STW2 selection | 1407 | 57F | | | | | | |
| D6.185 Bit 5 STW2 selection | 1408 | 580 | | | | | | |
| D6.186 Bit 6 STW2 selection | 1409 | 581 | | | | | | |
| D6.187 Bit 7 STW2 selection | 1410 | 582 | | | | | | |
| D6.188 Bit 8 STW2 selection | 1411 | 583 | | | | | | |
| D6.189 Bit 9 STW2 selection | 1412 | 584 | | | | | | |
| D6.190 Bit 10 STW2 selection | 1413 | 585 | | | | | | |
| D6.191 Bit 11 STW2 selection | 1414 | 586 | | | | | | |
| D6.192 Bit 12 STW2 selection | 1415 | 587 | | | | | | |
| D6.193 Bit 13 STW2 selection | 1416 | 588 | | | | | | |
| D6.194 Bit 14 STW2 selection | 1417 | 589 | | | | | | |
| D6.195 Bit 15 STW2 selection | 1418 | 58A | | | | | | |
| D6.196 Bit at term.-mode act. | 1419 | 58B | 0110 | | | | | |
| **Assignment free bits ZTW** | | | | | | | | |
| D6.197 Bit 11 ZTW1 selection | 1420 | 58C | | | | | | |
| D6.198 Bit 12 ZTW1 selection | 1421 | 58D | | | | | | |
| D6.199 Bit 13 ZTW1 selection | 1422 | 58E | | | | | | |
| D6.200 Bit 14 ZTW1 selection | 1423 | 58F | | | | | | |
| D6.201 Bit 15 ZTW1 selection | 1424 | 590 | | | | | | |
| **Assignment bit 0 - 15 PZD2 ZTW** | | | | | | | | |
| D6.202 Bit 0 ZTW2 selection | 1425 | 591 | | | | | | |
| D6.203 Bit 1 ZTW2 selection | 1426 | 592 | | | | | | |
| D6.204 Bit 2 ZTW2 selection | 1427 | 593 | | | | | | |
| D6.205 Bit 3 ZTW2 selection | 1428 | 594 | | | | | | |
| D6.206 Bit 4 ZTW2 selection | 1429 | 595 | | | | | | |
| D6.207 Bit 5 ZTW2 selection | 1430 | 596 | | | | | | |
| D6.208 Bit 6 ZTW2 selection | 1431 | 597 | | | | | | |
| D6.209 Bit 7 ZTW2 selection | 1432 | 598 | | | | | | |
| D6.210 Bit 8 ZTW2 selection | 1433 | 599 | | | | | | |
| D6.211 Bit 9 ZTW2 selection | 1434 | 59A | | | | | | |

| Parameter name | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|
| D6.212 Bit 10 ZTW2 selection | 1435 | 59B | | | | | | |
| D6.213 Bit 11 ZTW2 selection | 1436 | 59C | | | | | | |
| D6.214 Bit 12 ZTW2 selection | 1437 | 59D | | | | | | |
| D6.215 Bit 13 ZTW2 selection | 1438 | 59E | | | | | | |
| D6.216 Bit 14 ZTW2 selection | 1439 | 59F | | | | | | |
| D6.217 Bit 15 ZTW2 selection | 1440 | 5A0 | | | | | | |
| **Diagnosis STW (BUS -> VSD)** | | | | | | | | |
| D6.218 Bus STW hex | 219 | DB | | | 1 | | | hex |
| D6.219 Bus STW bin | 220 | DC | 0110 | | | | | |
| D6.220 Bus STW2 hex | 221 | DD | | | 1 | | | hex |
| D6.221 Bus STW2 bin | 222 | DE | 0110 | | | | | |
| **Diagnosis ZTW (VSD -> BUS)** | | | | | | | | |
| D6.222 Bus ZTW hex | 223 | DF | | | 1 | | | hex |
| D6.223 Bus ZTW bin | 224 | E0 | 0110 | | | | | |
| D6.224 Bus ZTW2 hex | 225 | E1 | | | 1 | | | hex |
| D6.225 Bus ZTW2 bin | 226 | E2 | 0110 | | | | | |
| **Diagnosis of the operating state** | | | | | | | | |
| D6.226 Internal control word | 227 | E3 | | | 1 | | | hex |
| D6.227 Internal condition | 228 | E4 | 0110 | | | | | |
| **Diagnosis BUS -> VSD** | | | | | | | | |
| D6.228 PRx 01 | 230 | E6 | | | 1 | | | hex |
| D6.229 PRx 02 | 231 | E7 | | | 1 | | | hex |
| D6.230 PRx 03 | 232 | E8 | | | 1 | | | hex |
| D6.231 PRx 04 | 233 | E9 | | | 1 | | | hex |
| D6.232 PRx 05 | 234 | EA | | | 1 | | | hex |
| D6.233 PRx 06 | 235 | EB | | | 1 | | | hex |
| D6.234 PRx 07 | 236 | EC | | | 1 | | | hex |
| D6.235 PRx 08 | 237 | ED | | | 1 | | | hex |
| D6.236 PRx 09 | 238 | EE | | | 1 | | | hex |
| D6.237 PRx 10 | 239 | EF | | | 1 | | | hex |
| **Diagnosis VSD -> BUS** | | | | | | | | |
| D6.242 PTx 01 | 250 | FA | | | 1 | | | hex |
| D6.243 PTx 02 | 251 | FB | | | 1 | | | hex |
| D6.244 PTx 03 | 252 | FC | | | 1 | | | hex |
| D6.245 PTx 04 | 253 | FD | | | 1 | | | hex |
| D6.246 PTx 05 | 254 | FE | | | 1 | | | hex |
| D6.247 PTx 06 | 255 | FF | | | 1 | | | hex |
| D6.248 PTx 07 | 256 | 100 | | | 1 | | | hex |
| D6.249 PTx 08 | 257 | 101 | | | 1 | | | hex |
| D6.250 PTx 09 | 258 | 102 | | | 1 | | | hex |
| D6.251 PTx 10 | 259 | 103 | | | 1 | | | hex |

| E1 Process protection | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Limitations** | | | | | | | | |
| E1.01 I max 1 | 806 | 326 | | | 1 | 10 | 165 | % |
| E1.02 I max 2 | 807 | 327 | | | 1 | 10 | 165 | % |
| E1.03 Inverter temp. model | 1234 | 4D2 | | | | | | |
| E1.05 T max. motor | 808 | 328 | | | 1 | 10 | 300 | % |
| E1.06 T max generator | 809 | 329 | | | 1 | 10 | 300 | % |
| E1.07 T lim activation | 810 | 32A | | | | | | |
| E1.08 T limit source | 811 | 32B | | | | | | |
| E1.13 P max. motor | 814 | 32E | | | 1 | 10 | 300 | % |
| E1.14 P max. generator | 815 | 32F | | | 1 | 10 | 300 | % |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **Behaviour at limitations** | | | | | | | | | |
| E1.17 | Reaction at limitation | 816 | 330 | | | | | | |
| E1.18 | Time Δt | 817 | 331 | | | 100 | 0 | 300 | s |
| E1.19 | Ref. after acc. extension | 818 | 332 | | | | | | |
| E1.21 | Reaction at deceleration | 819 | 333 | | | | | | |
| E1.22 | Time Δt | 820 | 334 | | | 100 | 0 | 300 | s |
| E1.23 | Ref. after dec. extension | 821 | 335 | | | | | | |
| **Skip frequencies** | | | | | | | | | |
| E1.25 | Skip frequency 1 | 822 | 336 | | | 10 | -300 | 300 | Hz |
| E1.26 | Hysteresis 1 | 823 | 337 | | | 100 | 0 | 10 | Hz |
| E1.27 | Skip frequency 2 | 824 | 338 | | | 10 | -300 | 300 | Hz |
| E1.28 | Hysteresis 2 | 825 | 339 | | | 100 | 0 | 10 | Hz |
| E1.29 | Skip frequency 3 | 826 | 33A | | | 10 | -300 | 300 | Hz |
| E1.30 | Hysteresis 3 | 827 | 33B | | | 100 | 0 | 10 | Hz |
| E1.31 | Skip frequency 4 | 828 | 33C | | | 10 | -300 | 300 | Hz |
| E1.32 | Hysteresis 4 | 829 | 33D | | | 100 | 0 | 10 | Hz |
| **Speed monitoring** | | | | | | | | | |
| E1.38 | n-monitoring | 830 | 33E | | | | | | |
| E1.39 | Pulse / rotation | 831 | 33F | | | 1 | 0 | 100 | |
| E1.40 | Filter-time | 832 | 340 | | | 10 | 0 | 300 | s |
| E1.41 | Detected speed | 270 | 10E | | | 10 | | | rpm |
| E1.42 | Ratio factor | 833 | 341 | | | 100 | 0 | 10 | |
| E1.43 | Calculated slip | 271 | 10F | | | 10 | | | rpm |
| E1.44 | Tolerance | 834 | 342 | | | 10 | 0 | 500 | rpm |
| E1.45 | n-monitoring response | 835 | 343 | | | | | | |
| E1.46 | Time Δt | 836 | 344 | | | 10 | 0 | 300 | s |
| **Feed-in monitoring** | | | | | | | | | |
| E1.49 | Feed in monitoring | 837 | 345 | | | | | | |
| E1.50 | Feed in mon. reaction | 838 | 346 | | | | | | |
| E1.51 | Time Δt | 839 | 347 | | | 10 | 0 | 300 | s |
| **Rotation angle monitoring** | | | | | | | | | |
| E1.54 | Rot. angle monitoring | 1235 | 4D3 | | | | | | |
| E1.55 | Revolutions | 1236 | 4D4 | | | 100 | 0 | 500 | rpm |
| E1.56 | Response | 1237 | 4D5 | | | | | | |
| E1.57 | Time Δt | 1238 | 4D6 | | | 10 | 0 | 300 | s |
| E1.58 | Δ- rotational angle | 409 | 199 | | | 100 | | | rpm |

## E2 Motor protection

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Thermistor control** | | | | | | | | | |
| E2.01 | TH1 motor allocation | 840 | 348 | | | | | | |
| E2.02 | TH1 activation | 841 | 349 | | | | | | |
| E2.03 | TH1 response | 842 | 34A | | | | | | |
| E2.04 | TH1 Time Δt | 843 | 34B | | | 1 | 0 | 300 | s |
| E2.05 | TH1 verification | 844 | 34C | | | | | | |
| E2.06 | TH2 motor allocation | 845 | 34D | | | | | | |
| E2.07 | TH2 activation | 846 | 34E | | | | | | |
| E2.08 | TH2 response | 847 | 34F | | | | | | |
| E2.09 | TH2 Time Δt | 848 | 350 | | | 1 | 0 | 300 | s |
| E2.10 | TH2 verification | 849 | 351 | | | | | | |
| E2.11 | TH3 motor allocation | 850 | 352 | | | | | | |
| E2.12 | TH3 activation | 851 | 353 | | | | | | |
| E2.13 | TH3 response | 852 | 354 | | | | | | |
| E2.14 | TH3 Time Δt | 853 | 355 | | | 1 | 0 | 300 | s |
| E2.15 | TH3 verification | 854 | 356 | | | | | | |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **Thermal mathematical motor model** | | | | | | | | | |
| E2.18 | M1 - overl. monitoring | 855 | 357 | | | | | | |
| E2.19 | M1 - response | 856 | 358 | | | | | | |
| E2.20 | M1 - Imax at 0Hz | 857 | 359 | | | 1 | 0 | 300 | % |
| E2.21 | M1 - Imax at f nom. | 858 | 35A | | | 1 | 0 | 150 | % |
| E2.22 | M1 - therm. f-limitation | 859 | 35B | | | 10 | 0 | 300 | Hz |
| E2.23 | M1 - motor-time | 860 | 35C | | | 1 | 0 | 500 | min |
| E2.24 | M1 - cooling temp. | 861 | 35D | | | 1 | -10 | 80 | °C |
| E2.25 | M1 - alarm level | 862 | 35E | | | 1 | 0 | 300 | % |
| E2.26 | M1 - trigger level | 863 | 35F | | | 1 | 0 | 300 | % |
| E2.27 | M1 - thermal load | 272 | 110 | | | 1 | | | % |
| E2.30 | M2 - overl. monitoring | 864 | 360 | | | | | | |
| E2.31 | M2 - response | 865 | 361 | | | | | | |
| E2.32 | M2 - Imax at 0Hz | 866 | 362 | | | 1 | 0 | 300 | % |
| E2.33 | M2 - Imax at f nom. | 867 | 363 | | | 1 | 0 | 150 | % |
| E2.34 | M2 - therm. f-limitation | 868 | 364 | | | 10 | 0 | 300 | Hz |
| E2.35 | M2 - motor-time | 869 | 365 | | | 1 | 0 | 500 | min |
| E2.36 | M2 - cooling temp. | 870 | 366 | | | 1 | -10 | 80 | °C |
| E2.37 | M2 - alarm level | 871 | 367 | | | 1 | 0 | 300 | % |
| E2.38 | M2 - trigger level | 872 | 368 | | | 1 | 0 | 300 | % |
| E2.39 | M2 - thermal load | 273 | 111 | | | 1 | | | % |
| **Stall protection** | | | | | | | | | |
| E2.42 | Stall protection | 873 | 369 | | | | | | |
| E2.43 | Stalling time | 874 | 36A | | | 10 | 0 | 200 | s |
| E2.44 | Stalling frequency | 875 | 36B | | | 10 | 0 | 20 | Hz |
| E2.45 | Stalling current | 876 | 36C | | | 1 | 0 | 150 | % |
| **Overspeed protection** | | | | | | | | | |
| E2.48 | Overspeed monitoring | 877 | 36D | | | | | | |
| E2.49 | Overspeed response | 878 | 36E | | | | | | |
| E2.50 | Overspeed level | 879 | 36F | | | 1 | 0 | 20000 | rpm |
| E2.51 | Time Δt | 880 | 370 | | | 10 | 0 | 300 | s |
| **Loss of motor phase** | | | | | | | | | |
| E2.54 | Motor phase monitor | 881 | 371 | | | | | | |
| **Underload protection** | | | | | | | | | |
| E2.61 | Underload monitor | 882 | 372 | | | | | | |
| E2.62 | Underload response | 883 | 373 | | | | | | |
| E2.63 | Underload level n² | 884 | 374 | | | 1 | 0 | 100 | % |
| E2.64 | Underload level ½ fn | 885 | 375 | | | 1 | 0 | 100 | % |
| E2.65 | Underload level fn | 886 | 376 | | | 1 | 0 | 100 | % |
| E2.66 | Underload start time | 887 | 377 | | | 10 | 0 | 300 | s |
| E2.67 | Time Δt | 888 | 378 | | | 10 | 0 | 300 | s |
| E2.68 | Filter-time | 889 | 379 | | | 10 | 0 | 300 | s |

## E3 Fault configuration

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Behaviour in case of faults** | | | | | | | | | |
| E3.01 | Reaction at a trip | 890 | 37A | | | | | | |
| E3.03 | Auto reset | 891 | 37B | | | | | | |
| E3.04 | Auto reset selection | 892 | 37C | 0110 | | | | | |
| E3.06 | Auto reset trials | 893 | 37D | | | 1 | 1 | 20 | |
| E3.07 | Period | 275 | 113 | | | 1 | 60 | 600 | s |
| **Emergency operation** | | | | | | | | | |
| E3.09 | Enable emergency op. | 894 | 37E | | | | | | |
| E3.10 | Emergency op. active | 276 | 114 | | | | | | |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **Loss of reference value** | | | | | | | | | |
| E3.13 | AI2 - 4mA monitor | 895 | 37F | | | | | | |
| E3.14 | AI2 - 4mA response | 896 | 380 | | | | | | |
| E3.15 | AI2 - emergency val. | 897 | 381 | | | 10 | 4 | 20 | mA |
| E3.16 | AI3 - 4mA monitor | 898 | 382 | | | | | | |
| E3.17 | AI3 - 4mA response | 899 | 383 | | | | | | |
| E3.18 | AI3- emergency val. | 900 | 384 | | | 10 | 4 | 20 | mA |
| E3.19 | AI4 - 4mA monitor | 901 | 385 | | | | | | |
| E3.20 | AI4 - 4mA response | 902 | 386 | | | | | | |
| E3.21 | AI4 - emergency val. | 903 | 387 | | | 10 | 4 | 20 | mA |
| E3.22 | FP - f monitoring | 904 | 388 | | | | | | |
| E3.23 | FP - monitoring resp. | 905 | 389 | | | | | | |
| E3.24 | FP - emergency val. | 906 | 38A | | | 100 | 0 | 30 | kHz |
| **Loss of line phase** | | | | | | | | | |
| E3.27 | Mains phase monitoring | 907 | 38B | | | | | | |
| **Behaviour at undervoltage** | | | | | | | | | |
| E3.29 | V< response | 908 | 38C | | | | | | |
| E3.30 | Allowed V< time | 909 | 38D | | | 10 | 0 | 300 | s |
| E3.31 | Max. V< time | 910 | 38E | | | 10 | 0 | 3000 | s |
| **External fault** | | | | | | | | | |
| E3.34 | Ext. fault 1 monitor | 911 | 38F | | | | | | |
| E3.35 | Ext. fault 1 response | 912 | 390 | | | | | | |
| E3.36 | Start delay time | 913 | 391 | | | 10 | 0 | 600 | s |
| E3.37 | Time Δt | 914 | 392 | | | 10 | 0 | 300 | s |
| E3.38 | Ext. fault 1 name | 915 | 393 | txt | | | | | |
| | Ensuing parameter | 916 | 394 | txt | | | | | |
| | Ensuing parameter | 917 | 395 | txt | | | | | |
| | Ensuing parameter | 918 | 396 | txt | | | | | |
| | Ensuing parameter | 919 | 397 | txt | | | | | |
| | Ensuing parameter | 920 | 398 | txt | | | | | |
| | Ensuing parameter | 921 | 399 | txt | | | | | |
| | Ensuing parameter | 922 | 39A | txt | | | | | |
| E3.41 | Ext. fault 2 monitor | 923 | 39B | | | | | | |
| E3.42 | Ext. fault 2 response | 924 | 39C | | | | | | |
| E3.43 | Start delay time | 925 | 39D | | | 10 | 0 | 600 | s |
| E3.44 | Time Δt | 926 | 39E | | | 10 | 0 | 300 | s |
| E3.45 | Ext. fault 2 name | 927 | 39F | txt | | | | | |
| | Ensuing parameter | 928 | 3A0 | txt | | | | | |
| | Ensuing parameter | 929 | 3A1 | txt | | | | | |
| | Ensuing parameter | 930 | 3A2 | txt | | | | | |
| | Ensuing parameter | 931 | 3A3 | txt | | | | | |
| | Ensuing parameter | 932 | 3A4 | txt | | | | | |
| | Ensuing parameter | 933 | 3A5 | txt | | | | | |
| | Ensuing parameter | 934 | 3A6 | txt | | | | | |
| **ON lock** | | | | | | | | | |
| E3.48 | ON lock activation | 935 | 3A7 | | | | | | |
| E3.49 | ON lock response | 936 | 3A8 | | | | | | |
| E3.50 | Time Δt | 937 | 3A9 | | | 10 | 0 | 300 | s |
| **Alarm categories** | | | | | | | | | |
| E3.51 | Alarm category 1 | 938 | 3AA | 0110 | | | | | |
| E3.54 | Alarm category 2 | 940 | 3AC | 0110 | | | | | |
| E3.57 | Alarm category 3 | 942 | 3AE | 0110 | | | | | |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **E4** | **Control configuration** | | | | | | | | |
| **Control logic** | | | | | | | | | |
| E4.01 | Control source 1 | 944 | 3B0 | | | | | | |
| E4.02 | Control source 2 | 945 | 3B1 | | | | | | |
| E4.03 | 3-wire-control | 946 | 3B2 | | | | | | |
| **E5** | **Keypad** | | | | | | | | |
| **Panel operation** | | | | | | | | | |
| E5.01 | Local mode | 947 | 3B3 | | | | | | |
| E5.02 | Local reset | 948 | 3B4 | | | | | | |
| E5.03 | Keypad stop button | 949 | 3B5 | | | | | | |
| **Parametertransfer with keypad** | | | | | | | | | |
| E5.04 | Copy: MX -> Keypad | 1805 | 70D | | | | | | |
| E5.05 | Copy: Keypad -> MX | 1806 | 70E | | | | | | |
| **E6** | **Function blocks** | | | | | | | | |
| **Comparator C1 - C4** | | | | | | | | | |
| E6.01 | Comparator C1 | 950 | 3B6 | | | | | | |
| E6.02 | C1 signal A selection | 951 | 3B7 | | | | | | |
| E6.03 | C1 signal A filter-time | 952 | 3B8 | | | 100 | 0 | 300 | s |
| E6.04 | C1 signal B selection | 953 | 3B9 | | | | | | |
| E6.05 | C1 signal B ref. value | 954 | 3BA | | | 100 | -300 | 300 | |
| E6.06 | C1 signal B filter-time | 955 | 3BB | | | 100 | 0 | 300 | s |
| E6.07 | C1 function | 956 | 3BC | | | | | | |
| E6.08 | C1 hysteresis/band | 957 | 3BD | | | 100 | 0 | 650 | |
| E6.09 | C1 output | 277 | 115 | | | | | | |
| E6.10 | Comparator C2 | 958 | 3BE | | | | | | |
| E6.11 | C2 signal A selection | 959 | 3BF | | | | | | |
| E6.12 | C2 signal A filter-time | 960 | 3C0 | | | 100 | 0 | 300 | s |
| E6.13 | C2 signal B selection | 961 | 3C1 | | | | | | |
| E6.14 | C2 signal B ref. value | 962 | 3C2 | | | 100 | -300 | 300 | |
| E6.15 | C2 signal B filter-time | 963 | 3C3 | | | 100 | 0 | 300 | s |
| E6.16 | C2 function | 964 | 3C4 | | | | | | |
| E6.17 | C2 hysteresis/band | 965 | 3C5 | | | 100 | 0 | 650 | |
| E6.18 | C2 output | 278 | 116 | | | | | | |
| E6.19 | Comparator C3 | 966 | 3C6 | | | | | | |
| E6.20 | C3 signal A selection | 967 | 3C7 | | | | | | |
| E6.21 | C3 signal A filter-time | 968 | 3C8 | | | 100 | 0 | 300 | s |
| E6.22 | C3 signal B selection | 969 | 3C9 | | | | | | |
| E6.23 | C3 signal B ref. value | 970 | 3CA | | | 100 | -300 | 300 | |
| E6.24 | C3 signal B filter-time | 971 | 3CB | | | 100 | 0 | 300 | s |
| E6.25 | C3 function | 972 | 3CC | | | | | | |
| E6.26 | C3 hysteresis/band | 973 | 3CD | | | 100 | 0 | 650 | |
| E6.27 | C3 output | 279 | 117 | | | | | | |
| E6.28 | Comparator C4 | 974 | 3CE | | | | | | |
| E6.29 | C4 signal A selection | 975 | 3CF | | | | | | |
| E6.30 | C4 signal A filter-time | 976 | 3D0 | | | 100 | 0 | 300 | s |
| E6.31 | C4 signal B selection | 977 | 3D1 | | | | | | |
| E6.32 | C4 signal B ref. value | 978 | 3D2 | | | 100 | -300 | 300 | |
| E6.33 | C4 signal B filter-time | 979 | 3D3 | | | 100 | 0 | 300 | s |
| E6.34 | C4 function | 980 | 3D4 | | | | | | |
| E6.35 | C4 hysteresis/band | 981 | 3D5 | | | 100 | 0 | 650 | |
| E6.36 | C4 output | 280 | 118 | | | | | | |

| Parameter name | | Log. address dec | Log. address hex | Type | Adjust-ability | Factor | Setting range min | Setting range max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **Logic module L1 - L6** | | | | | | | | | |
| E6.46 | Logic 1 | 982 | 3D6 | | | | | | |
| E6.47 | LM1 signal A selection | 983 | 3D7 | | | | | | |
| E6.48 | LM1 signal B selection | 984 | 3D8 | | | | | | |
| E6.49 | LM1 signal C selection | 985 | 3D9 | | | | | | |
| E6.50 | LM1 function | 986 | 3DA | | | | | | |
| E6.51 | LM1 output reverse | 987 | 3DB | | | | | | |
| E6.52 | LM1 output | 281 | 119 | | | | | | |
| E6.53 | Logic 2 | 988 | 3DC | | | | | | |
| E6.54 | LM2 signal A selection | 989 | 3DD | | | | | | |
| E6.55 | LM2 signal B selection | 990 | 3DE | | | | | | |
| E6.56 | LM2 signal C selection | 991 | 3DF | | | | | | |
| E6.57 | LM2 function | 992 | 3E0 | | | | | | |
| E6.58 | LM2 output reverse | 993 | 3E1 | | | | | | |
| E6.59 | LM2 output | 282 | 11A | | | | | | |
| E6.60 | Logic 3 | 994 | 3E2 | | | | | | |
| E6.61 | LM3 signal A selection | 995 | 3E3 | | | | | | |
| E6.62 | LM3 signal B selection | 996 | 3E4 | | | | | | |
| E6.63 | LM3 signal C selection | 997 | 3E5 | | | | | | |
| E6.64 | LM3 function | 998 | 3E6 | | | | | | |
| E6.65 | LM3 output reverse | 999 | 3E7 | | | | | | |
| E6.66 | LM3 output | 283 | 11B | | | | | | |
| E6.67 | Logic 4 | 1000 | 3E8 | | | | | | |
| E6.68 | LM4 signal A selection | 1001 | 3E9 | | | | | | |
| E6.69 | LM4 signal B selection | 1002 | 3EA | | | | | | |
| E6.70 | LM4 signal C selection | 1003 | 3EB | | | | | | |
| E6.71 | LM4 function | 1004 | 3EC | | | | | | |
| E6.72 | LM4 output reverse | 1005 | 3ED | | | | | | |
| E6.73 | LM4 output | 284 | 11C | | | | | | |
| E6.74 | Logic 5 | 1006 | 3EE | | | | | | |
| E6.75 | LM5 signal A selection | 1007 | 3EF | | | | | | |
| E6.76 | LM5 signal B selection | 1008 | 3F0 | | | | | | |
| E6.77 | LM5 signal C selection | 1009 | 3F1 | | | | | | |
| E6.78 | LM5 function | 1010 | 3F2 | | | | | | |
| E6.79 | LM5 output reverse | 1011 | 3F3 | | | | | | |
| E6.80 | LM5 output | 285 | 11D | | | | | | |
| E6.81 | Logic 6 | 1012 | 3F4 | | | | | | |
| E6.82 | LM6 signal A selection | 1013 | 3F5 | | | | | | |
| E6.83 | LM6 signal B selection | 1014 | 3F6 | | | | | | |
| E6.84 | LM6 signal C selection | 1015 | 3F7 | | | | | | |
| E6.85 | LM6 function | 1016 | 3F8 | | | | | | |
| E6.86 | LM6 output reverse | 1017 | 3F9 | | | | | | |
| E6.87 | LM6 output | 286 | 11E | | | | | | |
| **Flip Flop** | | | | | | | | | |
| E6.94 | SR module 1 | 1018 | 3FA | | | | | | |
| E6.95 | SR1 signal S selection | 1019 | 3FB | | | | | | |
| E6.96 | SR1 signal R selection | 1020 | 3FC | | | | | | |
| E6.97 | SR1 function | 1021 | 3FD | | | | | | |
| E6.98 | SR1 output | 287 | 11F | | | | | | |
| E6.99 | SR module 2 | 1022 | 3FE | | | | | | |
| E6.100 | SR2 signal S selection | 1023 | 3FF | | | | | | |
| E6.101 | SR2 signal R selection | 1024 | 400 | | | | | | |
| E6.102 | SR2 function | 1025 | 401 | | | | | | |
| E6.103 | SR2 output | 288 | 120 | | | | | | |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **Time device** | | | | | | | | | |
| E6.109 | Time module 1 | 1026 | 402 | | | | | | |
| E6.110 | T1 signal A selection | 1027 | 403 | | | | | | |
| E6.111 | T1 function | 1028 | 404 | | | | | | |
| E6.112 | T1 Time Δt | 1029 | 405 | | | 10 | 0 | 6500 | s |
| E6.113 | T1 output | 289 | 121 | | | | | | |
| E6.114 | T1 selection | 1030 | 406 | | | | | | |
| E6.115 | Time module 2 | 1031 | 407 | | | | | | |
| E6.116 | T2 signal A selection | 1032 | 408 | | | | | | |
| E6.117 | T2 function | 1033 | 409 | | | | | | |
| E6.118 | T2 Time Δt | 1034 | 40A | | | 10 | 0 | 6500 | s |
| E6.119 | T2 output | 290 | 122 | | | | | | |
| E6.120 | T2 selection | 1035 | 40B | | | | | | |
| E6.121 | Time module 3 | 1036 | 40C | | | | | | |
| E6.122 | T3 signal A selection | 1037 | 40D | | | | | | |
| E6.123 | T3 function | 1038 | 40E | | | | | | |
| E6.124 | T3 Time Δt | 1039 | 40F | | | 10 | 0 | 6500 | s |
| E6.125 | T3 output | 291 | 123 | | | | | | |
| E6.126 | T3 selection | 1040 | 410 | | | | | | |
| E6.127 | Time module 4 | 1041 | 411 | | | | | | |
| E6.128 | T4 signal A selection | 1042 | 412 | | | | | | |
| E6.129 | T4 function | 1043 | 413 | | | | | | |
| E6.130 | T4 Time Δt | 1044 | 414 | | | 10 | 0 | 6500 | s |
| E6.131 | T4 output | 292 | 124 | | | | | | |
| E6.132 | T4 selection | 1045 | 415 | | | | | | |
| E6.133 | Time module 5 | 1046 | 416 | | | | | | |
| E6.134 | T5 signal A selection | 1047 | 417 | | | | | | |
| E6.135 | T5 function | 1048 | 418 | | | | | | |
| E6.136 | T5 Time Δt | 1049 | 419 | | | 10 | 0 | 6500 | s |
| E6.137 | T5 output | 293 | 125 | | | | | | |
| E6.138 | T5 selection | 1050 | 41A | | | | | | |
| E6.139 | Time module 6 | 1051 | 41B | | | | | | |
| E6.140 | T6 signal A selection | 1052 | 41C | | | | | | |
| E6.141 | T6 function | 1053 | 41D | | | | | | |
| E6.142 | T6 Time Δt | 1054 | 41E | | | 10 | 0 | 6500 | s |
| E6.143 | T6 output | 294 | 126 | | | | | | |
| E6.144 | T6 selection | 1055 | 41F | | | | | | |

| F1 | Info | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Identification of the device** | | | | | | | | | |
| F1.01 | Drive reference | 11 | B | txt | | | | | |
| | Ensuing parameter | 12 | C | txt | | | | | |
| | Ensuing parameter | 13 | D | txt | | | | | |
| | Ensuing parameter | 14 | E | txt | | | | | |
| | Ensuing parameter | 15 | F | txt | | | | | |
| | Ensuing parameter | 16 | 10 | txt | | | | | |
| | Ensuing parameter | 17 | 11 | txt | | | | | |
| | Ensuing parameter | 18 | 12 | txt | | | | | |
| F1.02 | Nominal power | 295 | 127 | | | | | | |
| F1.03 | Nominal current | 296 | 128 | | | 10 | | | A |
| F1.04 | Nominal voltage | 297 | 129 | | | | | | |
| F1.05 | Drive serial number | 19 | 13 | | | 1 | | | |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| F1.06 | Facility description | 23 | 17 | txt | | | | | |
| | Ensuing parameter | 24 | 18 | txt | | | | | |
| | Ensuing parameter | 25 | 19 | txt | | | | | |
| | Ensuing parameter | 26 | 1A | txt | | | | | |
| | Ensuing parameter | 27 | 1B | txt | | | | | |
| | Ensuing parameter | 28 | 1C | txt | | | | | |
| | Ensuing parameter | 29 | 1D | txt | | | | | |
| | Ensuing parameter | 30 | 1E | txt | | | | | |
| F1.07 | APP software | 31 | 1F | txt | | | | | |
| | Ensuing parameter | 32 | 20 | txt | | | | | |
| | Ensuing parameter | 33 | 21 | txt | | | | | |
| | Ensuing parameter | 34 | 22 | txt | | | | | |
| | Ensuing parameter | 35 | 23 | txt | | | | | |
| | Ensuing parameter | 36 | 24 | txt | | | | | |
| | Ensuing parameter | 37 | 25 | txt | | | | | |
| | Ensuing parameter | 38 | 26 | txt | | | | | |
| F1.08 | Service notice | 1993 | 7C9 | txt | | | | | |
| | Ensuing parameter | 1994 | 7CA | txt | | | | | |
| | Ensuing parameter | 1995 | 7CB | txt | | | | | |
| | Ensuing parameter | 1996 | 7CC | txt | | | | | |
| | Ensuing parameter | 1997 | 7CD | txt | | | | | |
| | Ensuing parameter | 1998 | 7CE | txt | | | | | |
| | Ensuing parameter | 1999 | 7CF | txt | | | | | |
| | Ensuing parameter | 2000 | 7D0 | txt | | | | | |
| | Ensuing parameter | 2001 | 7D1 | txt | | | | | |
| | Ensuing parameter | 2002 | 7D2 | txt | | | | | |
| | Ensuing parameter | 2003 | 7D3 | txt | | | | | |
| | Ensuing parameter | 2004 | 7D4 | txt | | | | | |
| **F2** | **Test routines** | | | | | | | | |
| **Force operation** | | | | | | | | | |
| F2.01 | Force operation | 1807 | 70F | | | | | | |
| F2.02 | Force DI1 | 1056 | 420 | | | | | | |
| F2.03 | Force DI2 | 1057 | 421 | | | | | | |
| F2.04 | Force DI3 | 1058 | 422 | | | | | | |
| F2.05 | Force DI4 | 1059 | 423 | | | | | | |
| F2.06 | Force DI5 | 1060 | 424 | | | | | | |
| F2.07 | Force DI6 | 1061 | 425 | | | | | | |
| F2.08 | Force DI7 | 1062 | 426 | | | | | | |
| F2.09 | Force DI8 | 1063 | 427 | | | | | | |
| F2.10 | Force DI9 | 1064 | 428 | | | | | | |
| F2.11 | Force DI10 | 1065 | 429 | | | | | | |
| F2.12 | Force DI11 | 1066 | 42A | | | | | | |
| F2.13 | Force DI12 | 1067 | 42B | | | | | | |
| F2.14 | Force DI13 | 1068 | 42C | | | | | | |
| F2.15 | Force DI14 | 1069 | 42D | | | | | | |
| F2.16 | Force R1 | 1070 | 42E | | | | | | |
| F2.17 | Force R2 | 1071 | 42F | | | | | | |
| F2.18 | Force R3 | 1072 | 430 | | | | | | |
| F2.19 | Force DO1 | 1073 | 431 | | | | | | |
| F2.20 | Force DO2 | 1074 | 432 | | | | | | |
| F2.21 | Force R4 | 1075 | 433 | | | | | | |
| F2.22 | Force DO3 | 1076 | 434 | | | | | | |
| F2.23 | Force DO4 | 1077 | 435 | | | | | | |
| F2.24 | Force AI1 | 1078 | 436 | | | | | | |
| F2.25 | Force value AI1 | 1079 | 437 | | | 100 | -10 | 10 | V |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| F2.26 | Force AI2 | 1080 | 438 | | | | | | |
| F2.27 | Force value AI2 | 1081 | 439 | | | 100 | 0 | 20 | V / mA |
| F2.28 | Force AI3 | 1082 | 43A | | | | | | |
| F2.29 | Force value AI3 | 1083 | 43B | | | 100 | 0 | 20 | mA |
| F2.30 | Force AI4 | 1084 | 43C | | | | | | |
| F2.31 | Force value AI4 | 1085 | 43D | | | 100 | 0 | 20 | V / mA |
| F2.32 | Force FP | 1086 | 43E | | | | | | |
| F2.33 | Force value FP | 1087 | 43F | | | 100 | 0 | 30 | kHz |
| F2.34 | Force AO1 | 1088 | 440 | | | | | | |
| F2.35 | Force value AO1 | 1089 | 441 | | | 100 | 0 | 20 | V / mA |
| F2.36 | Force AO2 | 1090 | 442 | | | | | | |
| F2.37 | Force value AO2 | 1091 | 443 | | | 100 | -20 | 20 | V / mA |
| F2.38 | Force AO3 | 1092 | 444 | | | | | | |
| F2.39 | Force value AO3 | 1093 | 445 | | | 100 | -20 | 20 | V / mA |
| **Test routines** | | | | | | | | | |
| F2.40 | Start IGBT test | 1808 | 710 | | | | | | |
| F2.41 | Test charging circuit | 1809 | 711 | | | | | | |
| F2.42 | Test encoder | 1814 | 716 | | | | | | |
| F2.43 | Status SFB | 1816 | 718 | | | | | | |
| F2.45 | Simulation mode | 1094 | 446 | | | | | | |
| F2.46 | Software reset | 1095 | 447 | | | | | | |
| F2.47 | Test Brake | 1815 | 717 | | | | | | |
| F2.48 | Testing torque | 1812 | 714 | | | 1 | 0 | 300 | % |

## F3 Fault memory

| **Fault memory** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| F3.01 | Number of faults | 298 | 12A | | | 1 | | | |
| F3.02 | Review | 1096 | 448 | | | | | | |
| F3.03 | Fault number | 299 | 12B | | | 1 | | | |
| F3.04 | Fault cause | 300 | 12C | | | | | | |
| F3.05 | Operating hours | 301 | 12D | | | 1 | | | h |
| F3.06 | Min / sec | 302 | 12E | | | 100 | | | m:s |
| F3.07 | Reference value [Hz] | 303 | 12F | | | 10 | | | Hz |
| F3.08 | Actual value [Hz] | 304 | 130 | | | 10 | | | Hz |
| F3.09 | Output current | 305 | 131 | | | see table | | | A |
| F3.10 | DC voltage | 306 | 132 | | | 1 | | | V |
| F3.11 | Thermal load VSD | 307 | 133 | | | 1 | | | % |
| F3.12 | Control mode | 308 | 134 | | | | | | |
| F3.13 | Operating status | 309 | 135 | | | | | | |
| F3.14 | Alarm message | 310 | 136 | | | | | | |
| F3.15 | Drive state | 312 | 138 | | | | | | |
| F3.16 | Control word bus | 311 | 137 | 0110 | | | | | |
| F3.17 | Bus statusword | 313 | 139 | 0110 | | | | | |

## F4 Diagnosis

| **Data-Logger** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| F4.01 | Data logger channel 1 | 1097 | 449 | | | | | | |
| F4.02 | Data logger channel 2 | 1098 | 44A | | | | | | |
| F4.03 | Data logger channel 3 | 1099 | 44B | | | | | | |
| F4.04 | Time base | 1100 | 44C | | | 1 | 0 | 1500 | min |
| F4.05 | Rating channel 1 | 1101 | 44D | | | | | | |
| F4.06 | Rating channel 2 | 1102 | 44E | | | | | | |
| F4.07 | Rating channel 3 | 1103 | 44F | | | | | | |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| **State digital inputs** | | | | | | | | | |
| F4.10 | DI state basic device | 314 | 13A | 0110 | | | | | |
| F4.11 | DI state IO11 | 315 | 13B | 0110 | | | | | |
| F4.12 | DI state IO12 | 316 | 13C | 0110 | | | | | |
| **State digital outputs** | | | | | | | | | |
| F4.13 | DO state basic device | 317 | 13D | 0110 | | | | | |
| F4.14 | DO state IO11 | 318 | 13E | 0110 | | | | | |
| F4.15 | DO state IO12 | 319 | 13F | 0110 | | | | | |
| **Analog checkpoints** | | | | | | | | | |
| F4.16 | f-reference 1 [Hz] | 320 | 140 | | | 10 | | | Hz |
| F4.17 | f-reference 2 [Hz] | 321 | 141 | | | 10 | | | Hz |
| F4.18 | f-reference after sel. | 322 | 142 | | | 10 | | | Hz |
| F4.19 | f-ref. after FW/REV | 323 | 143 | | | 10 | | | Hz |
| F4.20 | f-correction | 324 | 144 | | | 10 | | | Hz |
| F4.21 | f-ref. before ramp | 325 | 145 | | | 10 | | | Hz |
| F4.22 | f-ref. after ramp | 326 | 146 | | | 10 | | | Hz |
| F4.23 | f-ref. after PID act. | 327 | 147 | | | 10 | | | Hz |
| F4.24 | f-ref. after loc/rem | 328 | 148 | | | 10 | | | Hz |
| F4.25 | f-ref. after f-corr. | 329 | 149 | | | 10 | | | Hz |
| F4.26 | PID reference value | 330 | 14A | | | 10 | | | % |
| F4.27 | PID actual value | 331 | 14B | | | 10 | | | % |
| F4.28 | PID deviation | 332 | 14C | | | 1 | | | % |
| F4.29 | PID output | 333 | 14D | | | 100 | | | |
| F4.30 | T reference | 334 | 14E | | | 1 | | | % |
| F4.31 | T-ref after PID active | 335 | 14F | | | 1 | | | % |
| F4.32 | T before ramp | 336 | 150 | | | 1 | | | % |
| F4.33 | T after ramp | 337 | 151 | | | 1 | | | % |
| F4.35 | Ext. T-limit | 339 | 153 | | | 1 | | | % |
| F4.36 | T max motor | 340 | 154 | | | 1 | | | % |
| F4.37 | T max generator | 341 | 155 | | | 1 | | | % |
| F4.38 | I limit | 342 | 156 | | | 10 | | | A |
| F4.39 | Load measure signal | 343 | 157 | | | 1 | | | % |
| **Power part** | | | | | | | | | |
| F4.44 | DC voltage | 344 | 158 | | | 1 | | | V |
| F4.45 | IGBT overload time | 123 | 7B | | | 1 | 0 | 65535 | s |
| F4.46 | Thermal load VSD | 345 | 159 | | | 1 | | | % |
| F4.47 | Thermal load M1 | 346 | 15A | | | 1 | | | % |
| F4.48 | Thermal load M2 | 347 | 15B | | | 1 | | | % |
| F4.49 | Thermal load BR | 348 | 15C | | | 1 | | | % |
| F4.50 | Fan status | 349 | 15D | | | | | | |
| **State option cards** | | | | | | | | | |
| F4.56 | Option 1 type | 350 | 15E | | | | | | |
| F4.57 | Option 2 type | 351 | 15F | | | | | | |
| F4.58 | SFB type | 352 | 160 | | | | | | |
| F4.59 | Status SFB | 353 | 161 | | | | | | |
| F4.60 | Status APP | 354 | 162 | | | | | | |
| F4.61 | Status MC | 355 | 163 | | | | | | |
| F4.62 | Status LCD-keypad | 356 | 164 | | | | | | |
| **Reference value linkage** | | | | | | | | | |
| F4.65 | Source f-reference 1 | 399 | 18F | | | | | | |
| F4.66 | Source f-reference 2 | 400 | 190 | | | | | | |
| F4.67 | Source f-correction | 401 | 191 | | | | | | |
| F4.68 | Source PID-reference | 402 | 192 | | | | | | |

| Parameter name | | Log. address dec | hex | Type | Adjust-ability | Factor | Setting range min | max | Unit |
|---|---|---|---|---|---|---|---|---|---|
| F4.69 | Source PID-actual | 403 | 193 | | | | | | |
| F4.70 | Source T-reference | 404 | 194 | | | | | | |
| F4.71 | Source T-limit | 405 | 195 | | | | | | |
| **F6** | **Code** | | | | | | | | |
| **Security settings** | | | | | | | | | |
| F6.01 | Code | 1144 | 478 | | | 1 | 0 | 9999 | |
| F6.02 | Code value | 1145 | 479 | | | 1 | 0 | 9999 | |
| F6.03 | Parametrising station | 1146 | 47A | | | | | | |
| F6.04 | Impulse inhibit | 1147 | 47B | | | | | | |
| F6.05 | Service code | 1148 | 47C | | | 1 | 0 | 59999 | |
| **System parameters** | | | | | | | | | |
| | Store parameter values | 40 | 28 | | | | | | |

**Factors depending on the device**

| >*pDRIVE*< devices | Unit A | kW | kVA | Hp | Nm | mΩ |
|---|---|---|---|---|---|---|
| MX eco 4V0,75...4V7,5 | 100 | 100 | 100 | 100 | 100 | 1 |
| MX eco 4V11...4V75 | 10 | 10 | 10 | 10 | 10 | 1 |
| MX eco 4V90...4V630 | 1 | 1 | 1 | 1 | 1 | 1000 |

# Inverter messages

**Alarm/Info messages**

| Matrix operating panel | Alarm index (dec.) | Description |
|---|---|---|
| Force active | 01 | The force mode is active (see F2.01 Force operation). |
| Emergency op. active | 02 | The inverter is switched over to the status "Emergency operation" via a digital input command. See parameter E3.10. |
| Ext. fault 1<br>(or free editable text E3.38) | 03 | An external fault is signalized via a digital input command (see E3.34 to E3.38).<br>It is processed as an alarm message corresponding to the setting of E3.35 Ext. fault 1 response. |
| Ext. fault 2<br>(or free editable text E3.45) | 04 | An external fault is signalized via a digital input command (see E3.41 to E3.45).<br>It is processed as an alarm message corresponding to the setting of E3.42 Ext. fault 2 response. |
| Undervoltage | 05 | There is an undervoltage situation. This leads to an alarm message corresponding to the setting of E3.29 V< response. |
| Reference fault AI2 | 06 | At analog input AI2 the reference value fell below 2 mA. This leads to an alarm message corresponding to the setting of E3.13 AI2 - 4mA monitor and E3.14 AI2 - 4mA response. If the reference value exceeds 2.5 mA again, the alarm message will be reset. |
| Reference fault AI3 | 07 | At analog input AI3 the reference value fell below 2 mA. This leads to an alarm message corresponding to the setting of E3.16 AI3 - 4mA monitor and E3.17 AI3 - 4mA response. If the reference value exceeds 2.5 mA again, the alarm message will be reset. |
| Reference fault AI4 | 08 | At analog input AI4 the reference value fell below 2 mA. This leads to an alarm message corresponding to the setting of E3.19 AI4 - 4mA monitor and E3.20 AI4 - 4mA response. If the reference value exceeds 2.5 mA again, the alarm message will be reset. |
| Bus fault | 09 | According to the setting of D6.03 Bus error behaviour a bus fault caused by exceeded runtime or a loss of control leads to an alarm message. |
| BR overload | 10 | The thermal mathematical model has detected an overload of the braking resistor. |
| Reference fault FP | 11 | At the frequency input FP the reference value fell short by 50 % of the setting $f_{min}$. This leads to an alarm message corresponding to the setting of E3.22 FP - f monitoring and E3.23 FP - monitoring resp.. |
| Feed in < | 12 | According to the setting of E1.49 Feed in monitoring and E1.50 Feed in mon. reaction the trigger of the feed-in monitoring leads to an alarm message. |
| ON-lock from DI | 13 | The digital input function ON-lock (E3.48) signalizes a problem which leads to an alarm message corresponding to the setting of E3.49 ON lock response. |
| Speed check fault | 14 | The function n-monitoring (E1.38) leads to an alarm message corresponding to the setting of E1.45 n-monitoring response. |
| ϑ M1 > | 15 | The thermal mathematical motor model has reached the set alarm level for motor M1.<br>See parameter E2.19 M1 - response. |

| Matrix operating panel | Alarm index (dec.) | Description |
|---|---|---|
| ϑ M2 > | 16 | The thermal mathematical motor model has reached the set alarm level for motor M2.<br>See parameter E2.31 M2 - response. |
| Overspeed | 17 | The overspeed protection (E2.48) has triggered and signalizes an alarm corresponding to the setting of the parameter E2.49 Overspeed response. |
| TH - ϑ M1 > | 18 | At least one of the thermistors (PTC) or thermal switches assigned to motor M1 (see motor assignment E2.01, E2.06, E2.11) has detected an overtemperature.<br>An alarm message is as a result activated corresponding to the reaction setting for the respective thermistor. |
| TH - ϑ M2 > | 19 | At least one of the thermistors (PTC) or thermal switches assigned to motor M1 (see motor assignment E2.01, E2.06, E2.11) has detected an overtemperature.<br>An alarm message is as a result activated corresponding to the reaction setting for the respective thermistor. |
| TH - ϑ Ext > | 20 | At least one of the thermistors (PTC) or thermal switches, which is planned for the general use (see assignment E2.01, E2.06, E2.11) has detected an overtemperature.<br>An alarm message is as a result activated corresponding to the reaction setting for the respective thermistor. |
| Underload | 21 | The underload function (E2.61) recognises a motor underload and activates an alarm message corresponding to the setting of E2.62 Underload response. |
| Limitation active | 22 | A limitation function is active. |
| Ramp adaption | 23 | The set acceleration or deceleration ramp cannot be maintained and is automatically extended. |
| Service M1 | 24 | The operating hours counter (A5.01) for motor M1 has exceeded the set time interval (A5.02). |
| Service M2 | 25 | The operating hours counter (A5.04) for motor M2 has exceeded the set time interval (A5.05). |
| Service Power On | 26 | The operating hours counter (A5.07) for the power part of the device (device is supplied with mains voltage) has exceeded the set time interval (A5.08). |
| Service fan | 27 | The operating hours counter (A5.10) for the power part fan has exceeded the set time interval (A5.11). |
| Simulation active | 28 | The Simulation mode (F2.45) is activated. |
| Download active | 29 | The PC program Matrix 3 executes a parameter download. After transmission it is necessary to confirm the parameterization on the LED keypad with shortcut "Digit + ↑" (or shortcut "Digit + ↓" to deny parameterization) in order to return to the regular operating state.<br>Alternatively confirmation is possibly by means of the service code F6.05 = 33.<br>(When using the matrix operating panel BE11 the function keys F1/F3 are provided for confirmation.) |
| E6 incomplete | 30 | *Parameterization alarm*<br>One or several function modules in parameter group E6 are parameterized incompletely or faulty. |
| XY-Graph set faulty | 31 | *Parameterization alarm*<br>The reference source XY graph is parameterized incompletely or faulty. |

| Matrix operating panel | Alarm index (dec.) | Description |
|---|---|---|
| wrong control mode | 32 | *Parameterization alarm*<br>The selected function cannot be combined with the actual control mode. |
| $\Delta\varphi >$ | 33 | The monitoring of the rotation angle has detected a too high deviation. |
| Hoist emerg. (n≠0) | 34 | A speed was measured at the motor in spite of closed brake → malfunction of the brake |
| Hoist emergency (def) | 35 | The state of the brake and the confirmation are contradictory. |
| Para. Set 1 | 36 | Faulty Eprom-zone for parameter set 1 |
| Para. Set 2 | 37 | Faulty Eprom-zone for parameter set 2 |
| IGBT ϑ > | 38 | IGBT overtemperature, determined by the thermal mathematical inverter model |
| SFB-selection faulty | 39 | *Parameterization alarm*<br>If B3.02 Control mode is set to "4 .. VC feedback", the use of the encoder D5.01 has to be set to "2 .. VC feedback". |
| V/f 7 point set faulty | 40 | *Parameterization alarm*<br>Incomplete or faulty parameterization of the V/f characteristic. |
| Stopfrequency << | 41 | *Parameterization alarm*<br>Parameter C3.48 Release frequency is set greater than or equal with the start frequency. (The start frequency must be set at least 0.1 Hz greater than the stop frequency.) |
| T-controller at n-limit | 42 | Torque control operation has been interrupted because of active speed limitation. |
| Hoist emergency (SFB) | 43 | *Parameterization alarm*<br>Using the hoist options "Emergency operation at brake fault" and "Emergency operation at n ≠ 0" is only possible when B3.02 Control mode is set to "4 .. VC feedback". |
| Brake monitoring fault | 44 | *Parameterization alarm*<br>The hoist option "Monitor brake feedback always" requires a digital input which is parameterized to the function "Feedback brake". |

Trip messages

| Matrix operating panel | Trip index (dec.) | Description |
|---|---|---|
| Undervoltage | 01 | There is an undervoltage situation.<br>See parameter E3.29 V< response. |
| V>> at deceleration | 02 | The DC link voltage has exceeded the hardware protection level of 825 V due to a deceleration.<br>Extend deceleration ramps or activate motor brake B5.01 Braking mode. |
| Line overvoltage | 03 | The DC link voltage has exceeded the protection level of 756 V. As the fault evaluation only occurs with impulse inhibit, a line overvoltage situation takes place ! |
| MC not ready | 04 | The charging process of the DC link could not be completed. |
| DC missing | 05 | The frequency inverter is operated at the intelligent rectifier >*pDRIVE*< *LX*. The DC link voltage, made available by this rectifier, has shut down. |
| Precharging fault | 06 | Fault of the soft charge device (half controlled thyristor bridge).<br>Only for devices larger than >*pDRIVE*< *MX pro* 4V18. |
| Precharging fault | 07 | The given start command could not be carried out because the DC link is not charged yet. |
| Line fault 1p | 08 | Loss of one mains phase |
| Line fault 2-3p | 09 | Loss of two or three mains phases |
| Overcurrent | 10 | Overcurrent at the output |
| Motor earth fault | 11 | Earth fault at the output<br>Registration by means of the software (only with devices up to and including >*pDRIVE*< *MX pro* 4V75) |
| Insulation fault | 12 | The differential current determined from the three motor phases is larger than 25 % of the nominal current of the inverter. |
| Overcurrent | 13 | Overcurrent at the output<br>Registration by means of the software (only with devices up to and including >*pDRIVE*< *MX pro* 4V75) |
| IGBT ϑ >> | 14 | IGBT overtemperature, determined by the thermal mathematical inverter model |
| Motor phase fault 3p | 15 | Loss of the three motor phases |
| Motor phase U lost | 16 | Loss of motor phase U |
| Motor phase V lost | 17 | Loss of motor phase V |
| Motor phase W lost | 18 | Loss of motor phase W |
| Inverter overtemp. | 19 | Inverter overtemperature (overload, cooling problem) |
| Unknown MC | 20 | Unknown power part |
| PTC short circuit | 21 | Short-circuit at a thermistor sensor (PTC). |
| PTC open circuit | 22 | A thermistor sensor (PTC) is open |
| ASIC Init fault | 23 | Asic on the motor control cannot be initialised. |
| SFB fault | 24 | Fault at the encoder |
| IGBT fault | 25 | The desaturation protection of an IGBT has triggered.<br>The registration of this fault occurs only with devices larger than >*pDRIVE*< *MX pro* 4V75. |
| IGBT schort circuit | 27 | Electronically determined short circuit at one of the IGBTs. |

| Matrix operating panel | Trip index (dec.) | Description |
|---|---|---|
| Motor short circuit | 28 | The automatically running test routine B3.43 Automatic SC test has detected a short circuit at the output. |
| Current measure fault | 30 | Fault of the current transformer, its voltage supply or the evaluation electronics.<br>The registration of this fault occurs only with devices larger than >*pDRIVE*< *MX pro* 4V75. |
| Braking unit fault | 31 | Fault at the braking unit |
| MC E² zones invalid | 32 | Motor control EEProm defect |
| CPU fault | 33 | Internal electronic fault |
| ISL fault | 34 | Communication fault on the internal serial link |
| MTHA fault | 35 | Asic for time measurement defect (undervoltage time determination) |
| Overspeed | 36 | The motor has exceeded the maximum allowed Overspeed level (E2.50). |
| Safe Standstill | 37 | There is a fault in the area of the internal monitoring for function "Safe Standstill" (PWR). |
| IO12 comm. fault | 38 | Communication fault at option card >*pDRIVE*< *IO12* |
| Opt. comm. fault | 39 | Communication fault at an option card |
| Wrong option board | 40 | Defect or unknown option card used |
| Bus fault | 41 | A bus fault occurred due to exceeded run time or loss of control. |
| Param. config. fault | 42 | Parameter settings invalid |
| Reference fault AI2 | 43 | At analog input AI2 the reference value fell below 2 mA. |
| Reference fault AI3 | 44 | At analog input AI3 the reference value fell below 2 mA. |
| Reference fault AI4 | 45 | At the analog input AI4 the reference value fell below 2 mA. |
| Reference fault FP | 46 | At the frequency input FP the reference value fell short by 50 % of the setting $f_{min}$. |
| TH ϑ M1 >> | 47 | At least one of the thermistors (PTC) or thermal switches assigned to motor M1 (see motor assignment E2.01, E2.06, E2.11) has detected an overtemperature. |
| TH ϑ M2 >> | 48 | At least one of the thermistors (PTC) or thermal switches assigned to motor M2 (see motor assignment E2.01, E2.06, E2.11) has detected an overtemperature. |
| TH ϑ Ext >> | 49 | At least one of the thermistors (PTC) or thermal switches, which is planned for the general use (see assignment E2.01, E2.06, E2.11), has detected an overtemperature. |
| ϑ M1 >> | 50 | The thermal mathematical motor model has reached the set trigger level for motor M1. |
| ϑ M2 >> | 51 | The thermal mathematical motor model has reached the set trigger level for motor M2. |
| Stall protection | 52 | The stall protection has triggered due to a rotor blockade or a highly overloaded starting. See parameters E2.42 to E2.45. |
| Underload | 53 | The underload function (E2.61) has recognized a motor underload. |
| Speed check fault | 54 | The function n-monitoring (E1.38) has recognized an overspeed. |
| Feed in << | 55 | The function Feed in monitoring(E1.49) has triggered. |
| AT-fault 1 | 56 | Fault at the execution of the autotuning routine |
| Config. fault | 57 | EEProm application software incompatible or changed power part |

| Matrix operating panel | Trip index (dec.) | Description |
|---|---|---|
| Ext. fault 1 | 58 | An external fault is signalized via a digital input function (see E3.34 to E3.38). |
| Ext. fault 2 | 59 | An external fault is signalized via a digital input function (see E3.41 to E3.45). |
| Contactor fault | 60 | Line contactor control defect (response monitoring) |
| Motor contactor error | 61 | Feedback for motor contactor control faulty |
| Motor contactor error | 62 | Feedback for motor contactor control faulty |
| ON-lock | 63 | The digital input function ON-lock (E3.48) caused a protective shut-down. |
| Internal SW error | 64 | Internal software bug |
| Power rating fault | 65 | Unclear power part assignment |
| Incompatible MC | 66 | Motor control is not compatible to the application software |
| Flash fault APP | 67 | Flash Eprom on the application software defect |
| Indus zone fault | 68 | Value for calibration on the application software defect |
| Eprom fault APP | 69 | EEProm on the application software defect |
| BR - fault | 70 | Shut-down by the thermal mathematical model due to inadmissible high temperature of the braking resistor. |
| Limitation active | 71 | A limitation function of the motor control (current or torque) is active. |
| Ramp adaption | 72 | The set acceleration or deceleration ramp cannot be maintained and is automatically extended. |
| 24V fault | 73 | Problem with the external 24 V buffer voltage |
| Encoder fault | 74 | An inadmissible high slip, coupling break or loss of the signal has been detected at the encoder. |
| Encoder test failed | 75 | The test of the encoder could not be carried out. |
| T-controller at n-limit | 76 | An inadmissible long speed limitation occurred during torque control operation. |
| No motor available | 77 | No motor for prefluxing available. |
| Brake fault | 78 | The state of the brake and the confirmation are contradictory. |
| $\Delta\varphi$ >> | 79 | The monitoring of the rotation angle has detected a too high deviation. |

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