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DE6-NET-DP
PROFIBUS-DP option card

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PROFIBUS-DP option card

The DE6-NET-DP option card gives an instant connection between DF6/DV6 inverters and PROFIBUS-DP. The option board will perform as an integrated part of the inverter and gives the user access to all relevant parameters, as well as control/status signals needed to control the inverter.

The DE6-NET-DP option card communicates according to the PROFIBUS Protocol Standard DIN 19245 part 1 and 3. This means that it can communicate with all masters that comply with this standard, but it does not necessarily mean that all services available in the PROFIBUS standard are supported. The "PROFIBUS Profile for Variable Speed Drives, Version 2", also known as PROFIDRIVE, is a subset of PROFIBUS which only supports the services relevant to speed control applications.

In a control system the option board will act as a slave that can be read and written to, from a PROFIBUS-DP master. It will not initiate communication to other nodes, it will only respond to incoming telegrams.

Legend of symbols and abbreviations

Abbreviations and symbols with the following meanings are described in this manual:

HIW	Main actual value
HSW	Main setpoint
NC	Normally closed
NO	Normally open
PKE	Parameter ID
PKW	Parameter ID/value
PNU	Parameter number
PPO	Parameter process data object
PWE	Parameter value
PZD	Process data, cyclically transferred
PZDO	Process data object
STW	Control word
ZSW	Status word

▶ indicates instructions to be followed

→ Makes you aware of interesting tips and additional information

⚠ **Caution!**
warns about the possibility of major material damage and minor injury.

⚠ **Warning!**
warns about the possibility of major material damage and severe injury or death.

In order to improve the readability, the title of the chapter is indicated on the top of the left-hand page and the current section is indicated on the top of the right-hand page. Pages where chapters commence and blank pages at the end of the chapter are an exception.

1 About this product

System overview

The generic type code for interface modules shows the device's position among the Moeller range of products:

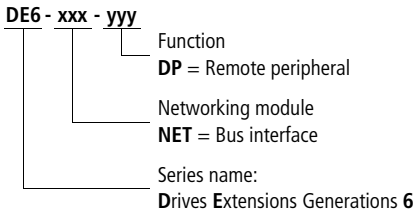

Figure 1: Type code for PROFIBUS-DP interface modules

Features of the PROFIBUS-DP interface module

The DE6-NET-DP interface module has the following features:

Communication profile	PROFIBUS-DP (DIN 19245 part 1 and 3)			
Profile	PROFIDRIVE Profile for Variable Speed Drives, Version 2			
Hardware interface	RS 485			
Status in PROFIBUS-DP line	Slave			
Baud rate	9.6 to 93.75	kBaud for	1200	m data cable
	187.5	kBaud for	1000	m data cable
	500	kBaud for	400	m data cable
	1500	kBaud for	200	m data cable
	12000	kBaud for	100	m data cable
Baud rate detection	Automatic			
Process data	2, 6 or 10 words			
Process data exchange	Cyclic			
Parameter data exchange	PKW(Parameter ID/value)-mechanism			
Max. number of stations	Depends on master type			
Power requirements	Internal			
Diagnosis LEDs	3			
Simple assembly	Yes			

2 Assembly

Scope of delivery

After receiving the equipment, check immediately whether the delivered items match the delivery documents. Moeller cannot be held responsible for guarantee claims made at a later date.

The following components are supplied with the interface module:

- DE6-NET-DP interface module
- 2 fixing screws
- Assembly instructions AWA8240-1942

Making claims:

- If there is any visible transport damage, please contact the supplier immediately.
- If there are any visible faults or if some of the items are missing, please contact your local Moeller agent immediately.

Attaching device to DF6/DV6-series frequency inverters

Proceed as follows to attach the interface module in the frequency inverter:

Warning!
Only open in de-energized state!

▶ Remove the lower terminal shroud.

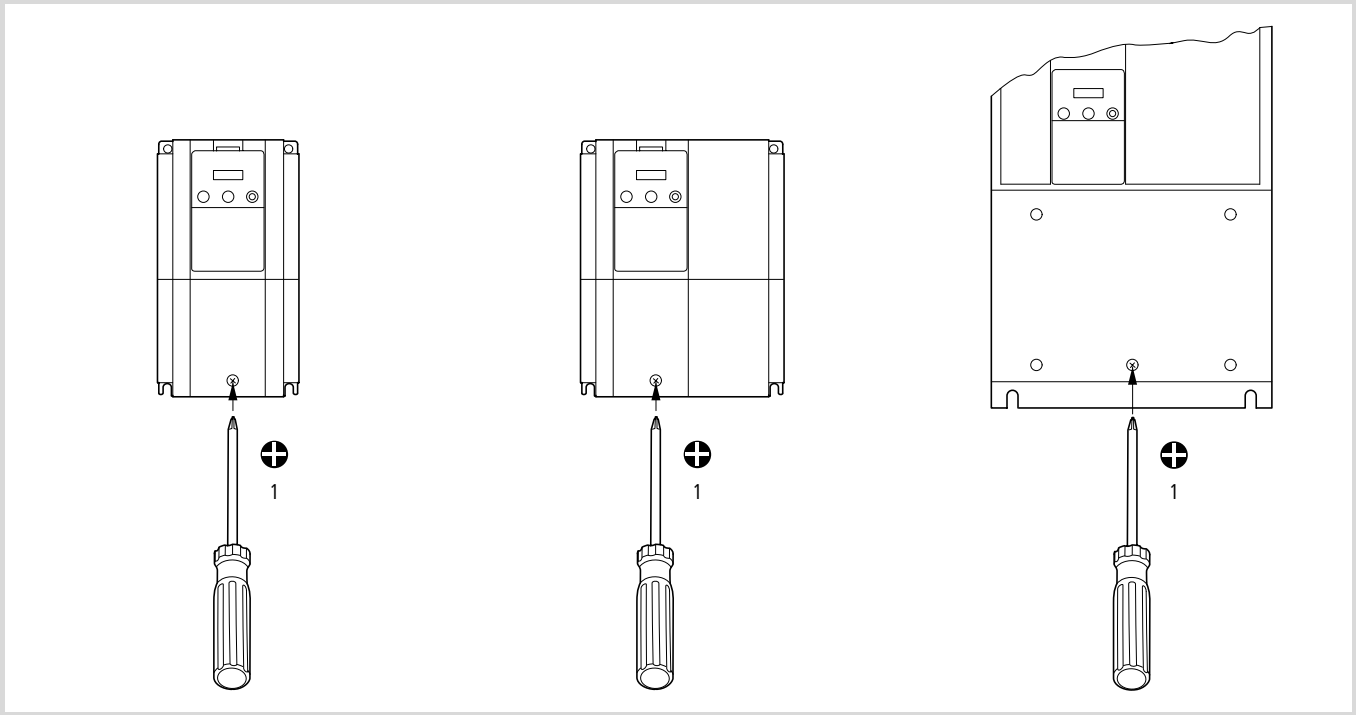

Figure 2: Terminal shroud removal

► Remove the keypad and the upper enclosure cover.

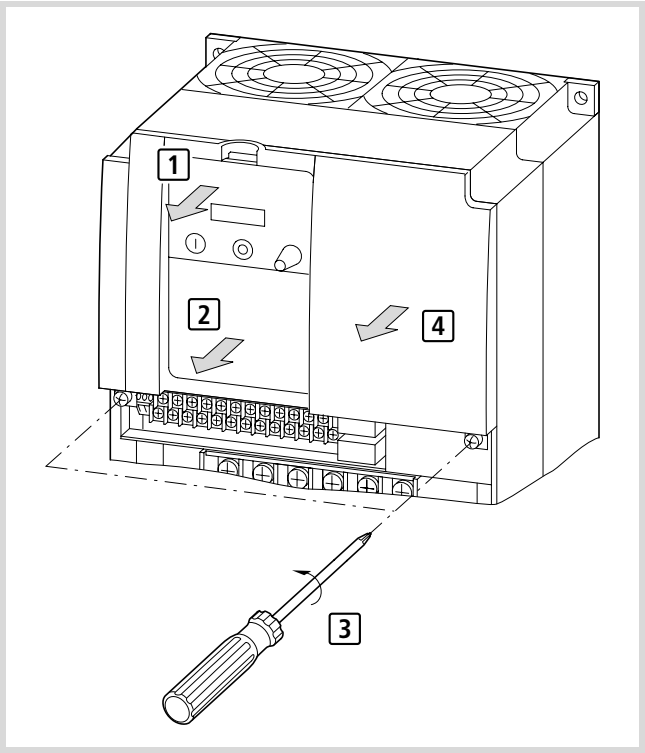

Figure 3: Remove keypad and enclosure cover

► Plug in the interface module at slot 2 (lower). Tighten the screw.
Insertion at slot 1 (top) is not permitted.

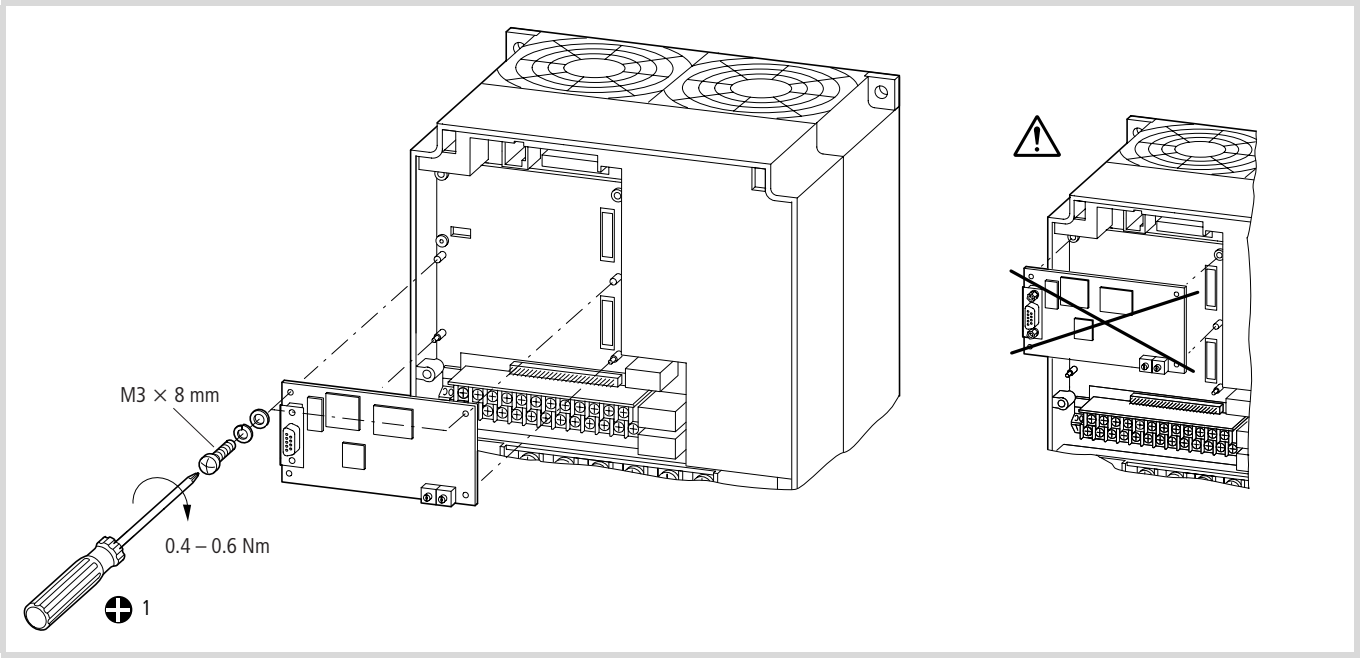

Figure 4: Interface module attachment

Caution!
Address coding only permitted with power supply switched off!

► Set the bus address (→ Page 11).

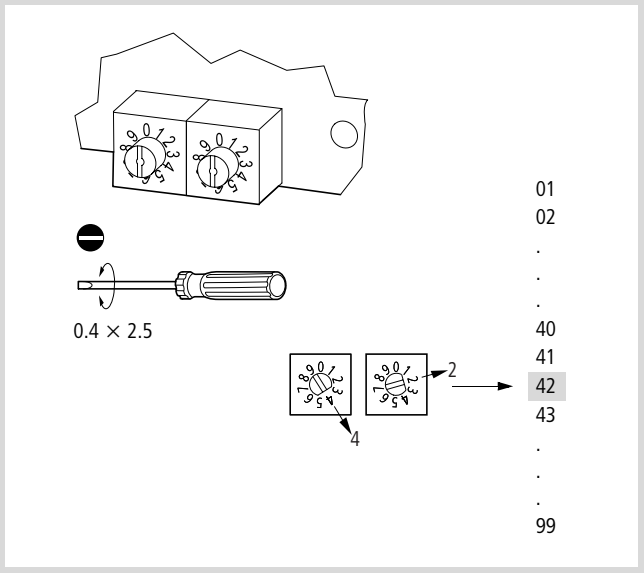

Figure 5: Bus address setting

► Knock out the marked areas on the top enclosure cover.

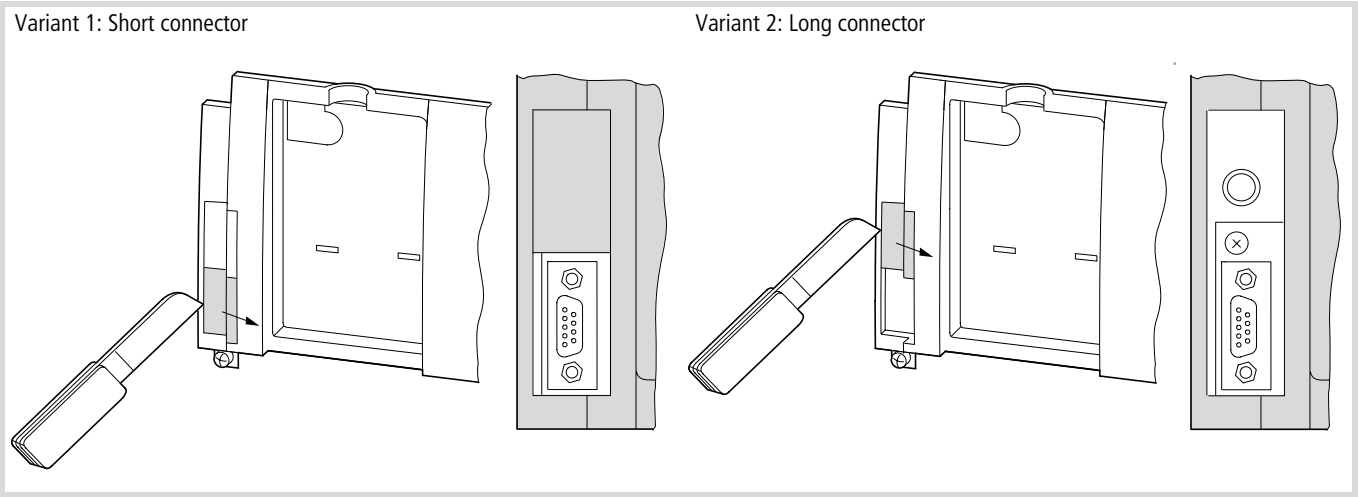

Figure 6: Location of PROFIBUS-connector

► Attach the enclosure cover and the terminal shroud.

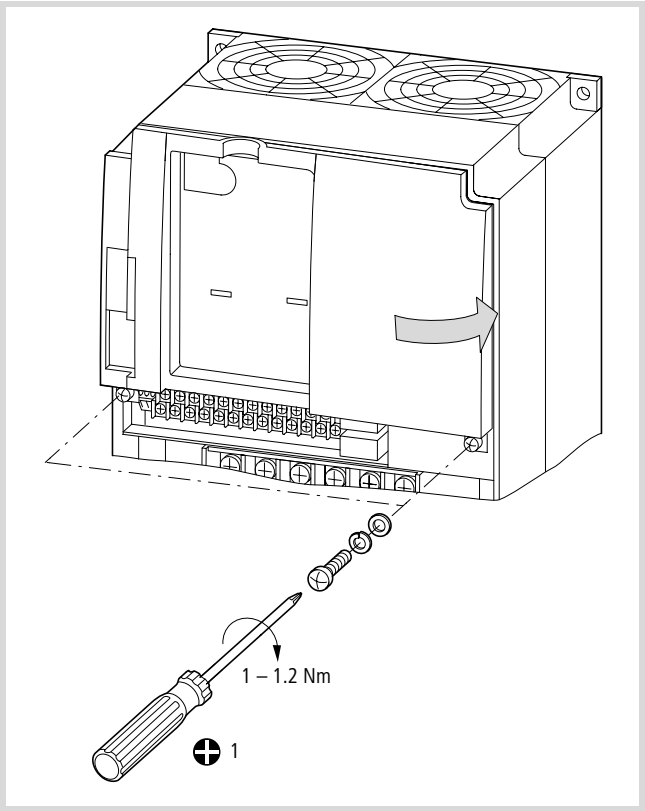

Figure 7: Attaching rhe enclosure cover

3 DE6-NET-DP Overview

This chapter contains all necessary information to start-up and configure the DF6/DV6 inverter with PROFIBUS-DP.

Physical interface

Isolation: The bus is galvanically separated from the other electronics with an on board DC/DC converter. Bus signals (A-line and B-line) are isolated via opto couplers.

PROFIBUS-DP communication ASIC: VPC3 chip from ProfiChip.

Bus connection: The DE6-NET-DP connects to the PROFIBUS network with a 9-pin female SUB-D connector. For the pin layout, refer to Table 1.

Table 1: Pin Layout

Pin	Name	Function
Housing	Shield	Connected to PE
1	Not Connected	–
2	Not Connected	–
3	B-Line	Positive RxD/TxD according to RS 485 specification
4	RTS	Request To Send[1)]
5	GND BUS	Isolated GND from RS 485 side[1)]
6	+5 V BUS	Isolated +5 V from RS 485 side[1)]
7	Not Connected	–
8	A-Line	Negative RxD/TxD according to RS 485 specification
9	Not Connected	–

1) +5 V BUS and GND BUS are used for bus termination. Some devices, like optical transceivers (RS 485 to fibre optics) might require an external power supply from these pins. RTS is used in some equipment to determine the direction of transmission. In standard applications only A-Line, B-Line and Shield are used.

Configuration

baud rate

The baud rate on a PROFIBUS-DP network is set during configuration of the master and only one baud rate is possible in a PROFIBUS-DP installation. The DE6-NET-DP has an auto baud rate detection function and the user does not have to configure the baud rate on the module. Refer to the following mentioned list for the baud rates supported.

baud rates supported by DE6-NET-DP:

- 9.6 kBit/s
- 19.2 kBit/s
- 45.45 kBit/s
- 93.75 kBit/s
- 187.5 kBit/s
- 500 kBit/s
- 1.5 MBit/s
- 3 MBit/s
- 6 MBit/s
- 12 MBit/s

Node address

Before power-on the DE6-NET-DP the node address has to be set. This is done with the two rotary switches on the DE6-NET-DP option board; this enables address settings from 0 to 99 in decimal format. The right rotary switch at the top of the option board (→ Figure 8) represents a times ten factor. The rotary switch at the left (→ Figure 8) represents one to nine. For example, if address 27 shall be set: Set the right rotary switch to two and the left rotary switch to seven.

Address = (Right Switch Setting × 10) + (Left Switch Setting × 1)

→ The node address cannot be changed during operation; the module needs to be re-powered in order for the change to take effect.

Indication LEDs

There are three LEDs mounted on the module (→ Figure 8).

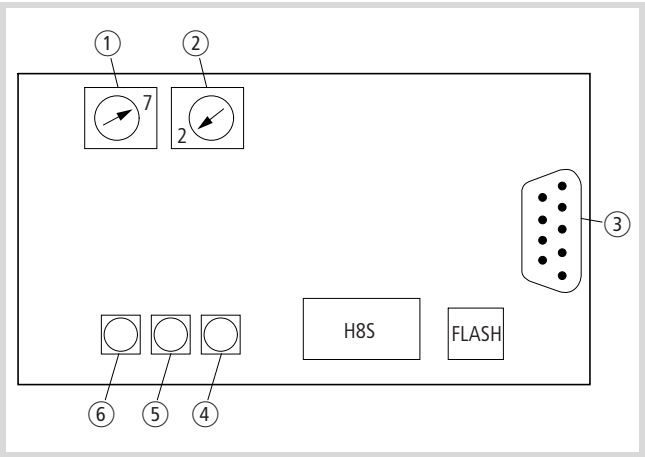

Figure 8: Top-view of the field bus communication module. Node address set to 27.

① Left rotary switch
② Right rotary switch
③ 9-pin SUB-D connector for PROFIBUS-DP
④ Field bus ON/OFF
⑤ Field bus diagnostics
⑥ Serial channel status

LED	Colour	Function
Field bus ON/OFF	Green	Field bus is on-line
	Red	Field bus is off-line
Field bus diagnosis	Flash Red 1 Hz	Configuration error
	Flash Red 2 Hz	User configuration data error
	Flash Red 4 Hz	VPC3+ initialisation failed
Serial channel status	Green	Serial channel status OK
	Flash Red 1 Hz	Serial communication error
	Red	No serial communication

PPO type selection

DE6-NET-DP supports PPO type 1-5. (→ Section "PPO description", Page 15).

The PPO type is configured from the master. The DE6-NET-DP senses the configuration and configures itself accordingly. The amount of input/output data transferred on the PROFIBUS network depends on the selected PPO type. Amount of data transferred in the data-exchange telegram is ranging from 4 Bytes input/output (PPO type 3) to 28 Bytes input/output (PPO type 5).

Controlling frequency and start/stop commands from PROFIBUS-DP

The DF6/DV6 inverters can be configured to take reference set-points and commands from several different locations. Refer to the Table below for information of how to configure the inverter so that the field bus controls frequency and the commands.

Control	Frequency Setting Selection – PNU A001	Operation Setting Selection – PNU A002
DE6-NET-DP		
controls frequency and commands	2	1
controls frequency only[1)]	2	Not equal to 1
controls commands only	Not equal to 2	1
has no control	Not equal to 2	Not equal to 1

1) Please note that when frequency reference is controlled from the field bus and commands from another location (such as "Terminal") the direction of the motor must be controlled from the command source (Reverse/Forward command). In this case changing the sign of reference value cannot control the direction of the motor.

However, since the DE6-NET-DP module uses the "Terminal" to give commands and "Operator" to give references to the inverter certain steps must be taken in order to be able to control the inverter manually (not from field bus). Study the Table below to see how the Control Word Bits shall be set to accomplish control from field bus and from the user.

Controlling the inverter with PNU A001 = 2 (Operator), PNU A002 = 1 (Terminal)	Control Word Bit settings		
	10	12	13
DE6-NET-DP			
controls frequency and commands	1	0	0
controls frequency only[1)]	1	1	0
controls commands only	1	0	1
has no control	1	1	1
	0	–	–

1) Please note that when frequency reference is controlled from the field bus and commands from another location (such as "Terminal") the direction of the motor must be controlled from the command source (Reverse/Forward command). In this case changing the sign of reference value cannot control the direction of the motor.

From the "Terminal" input when a DE6-NET-DP is present in the option slot. In order to do this, Bit 10 in the Control Word shall be set to zero. That is, by setting PNU A001 = 2, PNU A002 = 1, and Control Word Bit 10 = 0 it is possible to control the inverter with the terminal while giving frequency reference from the field bus.

Configuration of PZD word 3-10

With some of the PPO types (PPO type 2, 4, 5) it is possible to read and write parameters cyclically. Parameter write values are placed in the PZDs 3-10 transferred from the master to the inverter. Parameter read values are placed in the PZDs 3-10 transferred from the inverter to the master. However, the meaning of the data transferred in PZD 3-10 must be defined in some way so that it can be determined what parameters that shall be written, and also so that the data transferred from the inverter can be connected with the correct parameter.

PNU 915 and PNU 916 are used to determine what parameters that shall be written (PNU 915) and read (PNU 916) cyclically (PNU as specified in Chapter , for examples of how to assign these refer to Section "Example 2: Writing a 2 Byte array parameter", Page 25 and Section "Example 3: Writing a 2 Byte array parameter #2", Page 26).

Table 2: Assignment of PZD write word 3-10 (PLC => Inverter) with PNU 915

Subindex	PNU for parameter transferred in
1	PZD 3
2	PZD 4
3	PZD 5
4	PZD 6
5	PZD 7
6	PZD 8
7	PZD 9
8	PZD 10

Table 3: Assignment of PZD read word 3-10 (Inverter => PLC) with PNU 916

Subindex	PNU for parameter transferred in
1	PZD 3
2	PZD 4
3	PZD 5
4	PZD 6
5	PZD 7
6	PZD 8
7	PZD 9
8	PZD 10

→
- PZD words 3-6 are enabled if PPO type 2 or 4 is selected. PZD words 3-10 are enabled with PPO type 5.
- PNUs are within the range 1 to 418. → Chapter for an index of the inverter PNUs. If a PNU is set to "0", the actual PZD word will be ignored.
- Only parameters that are of size **2 Bytes or less** can be assigned as PZD objects.

Action at communication error

In case of occurring transmission errors (communication cut-off with the master), the following actions can be selected.

PNU P001/ P002	Action at error detection		Remarks
0	Inverter will trip.	Option trip E6x or E7x.	Fault can be reset either from field bus or from keypad.
1	Continue operation according to the last received command.	–	–

4 Operating the inverter via PROFIDRIVE profile

This chapter describes how to access the inverters parameters how to control the inverter via Control/Status Word.

PPO description

The structure of the user data is designated as parameter process data objects (PPO) in the PROFIDRIVE profile. The profile defines five PPO types, where DE6-NET-DP supports all these PPO types.

There are PPOs with a parameter area (PKW) and a process data area (PZD). There is also PPOs that consist exclusively of process data (PZD).

- PPO type 1 consists of the PKW area and 2 words PZD.
- PPO type 2 consists of the PKW area and 6 words PZD.
- PPO type 3 consists of 2 words PZD.
- PPO type 4 consists of 6 words PZD.
- PPO type 5 consists of the PKW area and 10 words PZD.

The user can configure what shall be transferred in PZD 3-10 (shaded grey below), for more instructions of how to do this configuration → Section "Configuration of PZD word 3-10" (Page 13), "Example 2: Writing a 2 Byte array parameter" (Page 25), "Example 3: Writing a 2 Byte array parameter #2" (Page 26) and Chapter (Page 29).

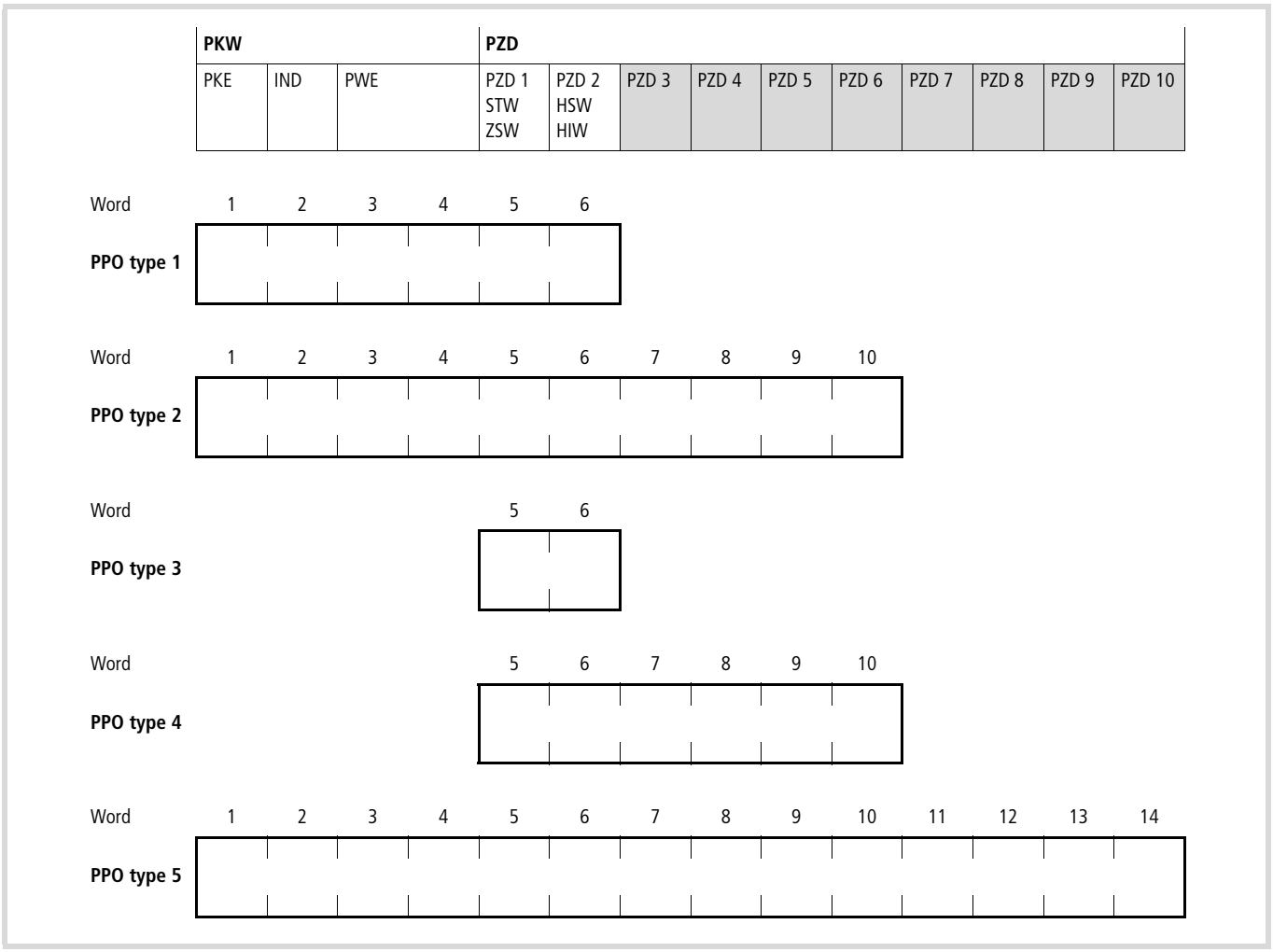

Figure 9: PPO types 1-5

PKW – Parameter ID/value
PZD – Process data, cyclically transferred
PKE – Parameter ID (1st and 2nd octet)
IND – Subindex (3rd octet), 4th octet is reserved
PWE – Parameter value (5th to 8th octet, 32 bits)
STW – Control word
ZSW – Status word
HSW – Main reference
HIW – Main actual value

Parameter data

The parameter part (PKW) is fixed to 4 words and can be used for reading and/or writing the parameters in the inverter one by one. Requests and responses is a handshake procedure and cannot be batched, meaning that if the master sends out a read/write request, it has to wait for the response, before it sends a new request.

Caution!
Parameters will be lost when turning power off unless PNU 971 has been written with "0 => 1".

The PKW is further divided into three parts; PKE-Parameter ID (2 Bytes), IND-Subindex (2 Bytes) and PWE-Parameter value (4 Bytes).

PKW			PZD									
PKE	**IND**	**PWE**	PZD 1 STW ZSW	PZD 2 HSW HIW	PZD 3	PZD 4	PZD 5	PZD 6	PZD 7	PZD 8	PZD 9	PZD 10

Figure 10: PKW-part

PKW – Parameter ID/value

PKE – Parameter ID

IND – Subindex (3rd Byte, 4th Byte is reserved)

PWE – Parameter value (4 Bytes)

PKE handling

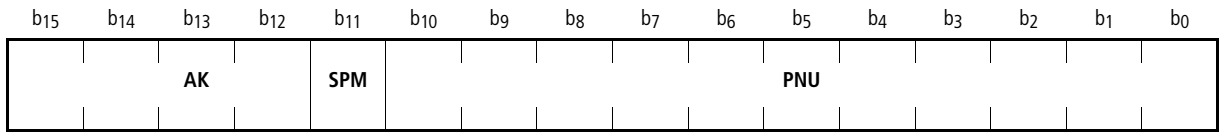

Figure 11: PKE word

AK – Request/response IDs

SPM – Toggle Bit for Spontaneous Messages, not used by DE6-NET-DP

PNU – Parameter number. Range 1 to 418 for DF6/DV6 specific parameters → Section "Appendix" (Page 29) and 900 to 999 for PROFIDRIVE specific parameters → Section "PROFIDRIVE specific parameters" (Page 27).

Request/Response handling

The AK portion of the PKE word defines the request/response that may be issued.

Since parameter length of the inverter may vary, parameter values are always transferred so that the least significant Byte is placed in octet 8.

If the Request/Response contains array elements, the HIGH-Byte (Byte 3) of the IND word will carry the array Subindex, LOW-Byte (Byte 4) is reserved for future use.

Master => Slave

AK Request ID	Function	Acknowledge (+)	Acknowledge (–)
0	No request	0	-
1	Request parameter value	1	7
2	Change parameter value (word)	1	7/8
3	Change parameter value (long word)	2	7/8
4	Request description element[1)]	3	7
5	Change description element[1)]	3	7
6	Request parameter value (array)	4	7
7	Change parameter value (array word)	4	7/8
8	Change parameter value (array long word)[1)]	5	7/8
9	Request number of array elements	6	7

1) Not supported by the DE6-NET-DP option board.

Slave => Master

AK Response ID	Function	
0	No response	
1	Transfer parameter value (word)	
2	Transfer parameter value (long word)	
3	Transfer description element[1)]	
4	Transfer parameter value (array word)	
5	Transfer parameter value (array long word)[1)]	
6	Request number of array elements	
7	Request rejected, followed by fault code (in PWE part)	
	0 =	Non-admissible PNU
	1 =	Parameter value cannot be changed
	2 =	Upper or lower limit exceeded
	3 =	Erroneous Subindex
	4 =	No array
	5 =	Incorrect data type
	7 =	Descriptive element cannot be changed
	9 =	Descriptive data not available
	11 =	No parameter change rights
	17 =	Task cannot be executed due to operating status
	102 =	Task cannot be executed due to communication error
	106 =	Illegal Task, Task ID not allowed
	18 =	Other
8	No parameter change rights by PKW interface	
9	Parameter data signal (word)[1)]	
10	Parameter data signal (double word)[1)]	

1) Not supported by the DE6-NET-DP option board.

If the inverter rejects a request from the master, the AK word in the PPO-read will indicate this by assuming value 7 or 8. The describing fault number will be found in the PWE part.

Process data

PKW			PZD									
PKE	IND	PWE	**PZD 1 STW ZSW**	**PZD 2 HSW HIW**	**PZD 3**	**PZD 4**	**PZD 5**	**PZD 6**	**PZD 7**	**PZD 8**	**PZD 9**	**PZD 10**

Figure 12: PZD-part

In this section the process data part (PZD) of a PPO is discussed.

The PZD part consists of a fixed part (PZD 1-2, all PPOs) and a parameterable part (PZD 3-10, shaded grey above, PPO type 2, 4 and 5).

In the fixed part, Control Word and Speed Reference are transferred to the inverter while Status Word and Actual Output Frequency are transferred from the inverter.

In the parameterable part, PZD word 3-10, the user can configure what parameters that should be transferred to/from the inverter every bus-cycle (→ Section "Configuration of PZD word 3-10", Page 13 and Chapter , Page 29).

Control/Status Word (STW/ZSW)

This section describes how to operate the inverter with the Control/Status Word. With the Control Word the PROFIDRIVE state-machine (→ Figure 13) is controlled, the Status Word is reflecting the state of the inverter.

PROFIDRIVE Control Word (STW)

The Control Word is used to send control commands to the inverter (PLC => Inverter).

Table 4: PROFIDRIVE Control Word

Bit	Value	Meaning	Remark
0	1	ON1	Inverter can be started if all other start conditions are fulfilled.
	0	OFF1	Normal stop; uses deceleration time specified in "1st deceleration time" (PNU F003).
1	1	ON2	Inverter can be started if all other start conditions are fulfilled.
	0	OFF2	Inverter coast to stop. Returns to "Switch-on inhibit" state.
2	1	ON3	Inverter can be started if all other start conditions are fulfilled.
	0	OFF3	Quick stop that uses deceleration time specified in "2nd deceleration time" (PNU F203).
3	1	Operation enabled	Inverter can be started if all other start conditions are fulfilled.
	0	Operation disabled	Inverter coast to stop (Enter "Inhibit operation" state).
4	1	Condition for operation	Inverter can be started if all other start conditions are fulfilled.
	0	Ramp generator disabled	Output frequency is set to zero. Inverter remains in the running state.
5	1	Ramp generator enabled	Inverter can be started if all other start conditions are fulfilled.
	0	Stop ramp generator	Actual output frequency is frozen. A change to frequency set-point has no effect.
6	1	Enable set-point	Inverter can be started if all other start conditions are fulfilled, using "1st acceleration time" (PNU F002).
	0	Inhibit set-point	Normal stop that uses deceleration time specified in "1st deceleration time" (PNU F003).
7	1	Acknowledge	Fault is acknowledged on positive edge, i.e. Bit 7 = 0 then 1 ("Enter Switch-on inhibited" state).
	0	No function	
8	1	Inching 1 ON	Inverter accelerates to inching set-point 1. PROFIDRIVE must be in "Enable operation" state. Parameter "Jogging frequency" specifies the jogging set-point (PNU A038).
	0	Inching 1 OFF	Inverter brakes as fast as possible and goes into the "Enable operation" state.
9		Not used	

Bit	Value	Meaning	Remark
10	1	Data valid	The Control Word and frequency set-point (from PROFIBUS) are activated (→ Section "Controlling frequency and start/stop commands from PROFIBUS-DP", Page 12).
	0	Data invalid	The Control Word and frequency set-point (from PROFIBUS) are not valid (→ Section "Controlling frequency and start/stop commands from PROFIBUS-DP", Page 12). The field bus module will not send any commands or references to the inverter.
11	1	REV	Inverter will operate in reverse motion. Please note that a negative reference and reverse selected will result in inverter running forward.
	0	FWD	Inverter will operate in forward motion.
12	1	Commands invalid	The field bus module will not write any commands to the inverter. This makes it possible to operate motor via the terminal input (if PNU A002 is set to "Terminal").
	0	Commands valid	The field bus module can write commands to the inverter (if PNU A002 is set to "Terminal").
13	1	Reference invalid	The field bus module will not write any reference to the inverter.
	0	Reference valid	The field bus module can write reference to the inverter (if PNU A001 is set to "Operator").
14 to 15		Not used	

PROFIDRIVE Status Word (ZSW)

The Status Word indicates the status of the inverter (Inverter => PLC).

Table 5: PROFIDRIVE Status Word

Bit	Value	Meaning	Remark
0	1	Ready to switch-on	Control Word Bit 0 = 0 and Bits 1, 2, 10 are set to 1 ("Ready to switch-on" state).
	0	Not ready to switch-on	Control Word Bit 0, 1 or 2 (OFF1, OFF2, OFF3) is set to "0", or the inverter is tripped.
1	1	Ready for operation	Control Word Bit 0, 1 and 2 are set to "1". Inverter is not faulted ("Ready" state).
	0	Not ready for operation	Control Word Bit 0, 1 or 2 (OFF1, OFF2, OFF3) is set to "0", or the inverter is faulted.
2	1	Operation enabled	Control Word Bit 0, 1, 2 and 3 are set to "1". Inverter is not faulted ("Enable operation" state).
	0	Operation inhibited	Control Word Bit 0, 1, 2 or 3 (OFF1, OFF2, OFF3, Operation disabled) is set to "0", or the inverter is faulted.
3	1	Fault	Inverter is faulted.
	0	No fault	Inverter is not faulted.
4	1	ON2	Control Word Bit 1 = 1.
	0	OFF2	OFF2 command active. Control Word Bit 1 = 0 ("OFF2 active" state).
5	1	ON3	Control Word Bit 2 = 1.
	0	OFF3	OFF3 command active. Control Word Bit 2 = 0 ("OFF3 active" state).
6	1	Start enable	Control Word Bit 1 or 2 (OFF2, OFF3) is set to "0" or fault has been acknowledged ("Switch-on inhibit" state).
	0	No switch-on inhibit	Control Word Bit 0 = 0 and Bit 10 = 1 ("Not ready to switch-on" state).
7		Not used	
8	1	Frequency equal set-point	Actual output frequency does equal frequency set-point.
	0	Frequency not equal set-point	Actual output frequency does not equal frequency set-point (i.e. motor accelerating/decelerating).
9	1	Bus control	Run command or frequency setting is valid via PROFIBUS.
	0	Local control	Run command and frequency setting are invalid via PROFIBUS.
10	1	Frequency within range	Actual output frequency is above or equal to the limit specified by "Arrival frequency at acceleration/deceleration 1" (PNU C042/C043).
	0	Frequency out of range	Actual output frequency is below the limit specified by "Arrival frequency at acceleration/ deceleration 1" (PNU C042/C043).
11		Not used	
12	–		Mirror of Bit 12 in the Control Word.
13	–		Mirror of Bit 13 in the Control Word.
14 to 15		Not used	

PROFIDRIVE state diagram

Commands issued in the PROFIDRIVE Control Word (STW) are used to change the device state, shown in the Status Word (ZSW), as follows:

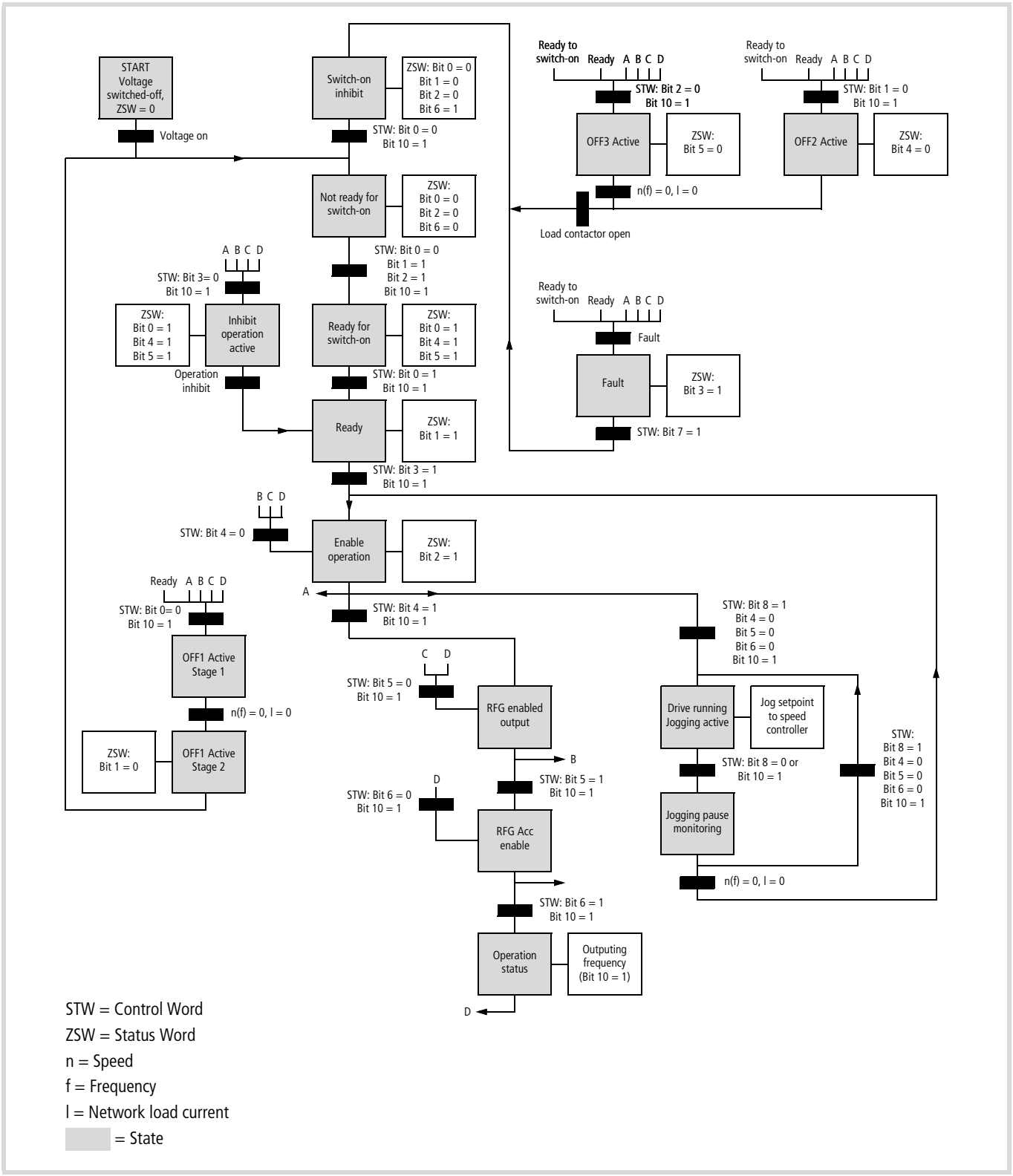

Figure 13: PROFIDRIVE state diagram

Start the inverter

To start the inverter the PROFIBUS state machine must be shifted in a correct way. This may be done in two steps. First the Control Word should be set to 0406 ("Ready for switch-on" state) and then to 047F ("Operation" state) → Figure 13.

Frequency set-point/Actual frequency

The data format is "Standardized value", where 0_{hex} = 0 % and 4000_{hex} is 100 % of Maximum frequency specified in PNU A004.

- Range:

–200 %	...	–100 %	...	0	...	100 %	...	200 %
8000_{hex}	...	$C000_{hex}$	...	0	...	4000_{hex}	...	$7FFF_{hex}$
32768_{dec}	...	49152_{dec}	...	0	...	16384_{dec}	...	32767_{dec}

- Resolution: 2^{-14} = 0.0061 %
- Length: 2 Bytes
- Data type: N2

→ 2's complement notation. MSB is 1st Bit after sign Bit in 1st Byte.
Sign Bit = 0 = positive number
Sign Bit = 1 = negative number

PZD word 3-10

In PZD word 3-10 the user can determine which inverter parameters that should be transferred to/from the inverter every bus-cycle. → Section "Configuration of PZD word 3-10", Page 13 for configuration of PZD word 3-10.

Examples

Example 1: Writing a 4 Byte parameter

In this first example, PPO type 1 is used to set PNU F002 (1st Acceleration time 1) to 4.00 s. Also, a Start command and a frequency set-point (50 %) is given.

→ When reading/writing parameters via the PROFIDRIVE profile the cross-reference list must be used, → Chapter , Page 29. For example, PNU F002 (1st Acceleration time 1) have PNU 23 (17_{hex}) on PROFIBUS.

	PKW				PZD	
Word	1	2	3	4	5	6
	PKE	IND	PWE	PWE	STW ZSW	HSW HIW
Request: PLC => Inverter	3017_{hex}	0000_{hex}	0000_{hex}	0190_{hex}	0406_{hex} $047F_{hex}$ 1)	2000_{hex}
Response: Inverter => PLC	2017_{hex}	0000_{hex}	0000_{hex}	0190_{hex}	0331_{hex} 0337_{hex}	2000_{hex}

Figure 14: Example 1

1) To start the inverter the PROFIBUS state machine must be shifted in a correct way. This may be done in two steps. First the Control Word should be set to 0406 ("Ready to switch-on" state) and then to 047F ("Operation" state). → Figure 13.

In the request message the first 2 Bytes are used for parameter identification. The first digit (3) denotes the function "Change parameter value (long word)" (→ Section "Parameter data", Page 17). The second digit along with the 2 Byte (0 and 17) indicates PNU 23. Bytes 7 and 8 (0190 = 400_{dec}) is the parameter value (400 meaning 4.00 s). The last 4 Bytes are the Control Word and Frequency set-point. Control Word value 0406 => 047F[1)] starts the motor, while 2000 (→ Section "Frequency set-point/ Actual frequency", Page 23) signifies 50 % of the maximum frequency specified in PNU A004.

In the response message, the first digit (2) indicates the function "Transfer parameter value (long word)". Value (0190 in Bytes 7 and 8) and PNU (x017) are mirrored from the request. The last 4 Bytes are Status Word and Actual frequency (%).

Example 2: Writing a 2 Byte array parameter

In this second example, we are configuring PZD 3 to contain the value of PNU A038, "Jogging frequency" in the responses from the inverter to the master (PLC). PPO type 2 is used. On PROFIBUS PNU A038 corresponds to PNU 61 ($3D_{hex}$). This is configured with PNU 916 (394_{hex}), "Assignment of PZD read word" (→ Section "Configuration of PZD word 3-10", Page 13 and Section "PROFIDRIVE specific parameters", Page 27).

	PKW				PZD					
Word	1	2	3	4	5	6	7	8	9	10
	PKE	IND	PWE	PWE	STW ZSW	HSW HIW	PZD 3	PZD 4	PZD 5	PZD 6
Request: PLC => Inverter	7394_{hex}	0100_{hex}	0000_{hex}	$003D_{hex}$	0406_{hex} $047F_{hex}$	2000_{hex}	0000_{hex}	0000_{hex}	0000_{hex}	0000_{hex}
Response: Inverter => PLC	4394_{hex}	0100_{hex}	0000_{hex}	$003D_{hex}$	0331_{hex} 0337_{hex}	2000_{hex}	$01F4_{hex}$	0000_{hex}	0000_{hex}	0000_{hex}

Figure 15: Example 2

In the request message the first 2 Bytes are used for parameter identification. The first digit (7) denotes the function "Change parameter value (array word)" (→ Section "Parameter data", Page 17). The second digit along with the 2 Byte (3 and 93) indicates PNU 916. Byte 3 (01) denotes Subindex in the array parameter, in this case "01" means the first index in the array. Bytes 7 and 8 ($003D = 61_{dec}$) contains the PNU that shall be mapped. This means that in the PZD 3 field the read value of PNU A038 (PROFIBUS PNU 61_{dec}) shall be transferred from the inverter to the master every bus-cycle.

In the response message, the first digit (4) indicates the function "Transfer parameter value (array word)". Subindex (0100), value (003D in Bytes 7 and 8) and PNU (x394) are mirrored from the request. In the PZD 3 field (word 7) the value ($01F4 = 500_{dec}$, 5.00 Hz) of "Jogging frequency" is transferred.

Example 3: Writing a 2 Byte array parameter #2

In this third example, we are configuring PZD 3 to contain the value of PNU A004, "1st Maximum frequency" in the request from the master to the inverter. PPO type 2 is used. On PROFIBUS PNU A004 corresponds to PNU 62 ($3E_{hex}$). This is configured with PNU 915 (393_{hex}), "Assignment of PZD write word" (→ Section "Configuration of PZD word 3-10", Page 13 and Section "PROFIDRIVE specific parameters", Page 27).

	PKW				PZD					
Word	1	2	3	4	5	6	7	8	9	10
	PKE	IND	PWE	PWE	STW ZSW	HSW HIW	PZD 3	PZD 4	PZD 5	PZD 6
Request: PLC => Inverter	7393_{hex}	0100_{hex}	0000_{hex}	$003E_{hex}$	$047F_{hex}$	2000_{hex}	$004B_{hex}$	0000_{hex}	0000_{hex}	0000_{hex}
Response: Inverter => PLC	4393_{hex}	0100_{hex}	0000_{hex}	$003E_{hex}$	0337_{hex}	2000_{hex}	$01F4_{hex}$	0000_{hex}	0000_{hex}	0000_{hex}

Figure 16: Example 3

In the request message the first 2 Bytes are used for parameter identification. The first digit (7) denotes the function "Change parameter value (array word)" (→ Section "Parameter data", Page 17). The second digit along with the 2 Byte (3 and 93) indicates PNU 915. Byte 3 (01) denotes Subindex in the array parameter, in this case "01" means the first index in the array. Bytes 7 and 8 (003E = 62_{dec}) contains the PNU that shall be mapped. In the PZD 3 field (word 7) the value (004B = 75, 75 Hz) of "1st Maximum frequency" is transferred. That is, PNU A004 will be written with the value 75.

In the response message, the first digit (4) indicates the function "Transfer parameter value (array word)". Subindex (0100), value (003E in Bytes 7 and 8) and PNU (x393) are mirrored from the request. As can be seen in word 7 (PZD 3) $01F4_{hex}$ is transferred from the inverter to the master, that is the mapping from the example above (→ Section "Example 2: Writing a 2 Byte array parameter", Page 25) is still present.

PROFIDRIVE specific parameters

Table 6 shows which PROFIDRIVE specific parameters that are supported by DE6-NET-DP.

Table 6: PROFIDRIVE parameters

PNU	Description	Range	
915			
Assignment of PZD write word 3-10	→ Section "Configuration of PZD word 3-10", Page 13 and Section "Example 3: Writing a 2 Byte array parameter #2", Page 26 for how to assign PZD words. Use the parameter cross-reference list in Chapter , Page 29.[1)]	Parameter range: 1 to 418 Subindex range: 1 to 8	R/W
916			
Assignment of PZD read word 3-10	→ Section "Configuration of PZD word 3-10", Page 13 and Section "Example 2: Writing a 2 Byte array parameter", Page 25 for how to assign PZD words. Use the parameter cross-reference list in Chapter , Page 29.[1)]	Parameter range: 1 to 418 Subindex range: 1 to 8	R/W
918			
PROFIBUS-DP slave address	Returns address switch setting.	1 to 99	R
927			
Parameter edit rights	1 – PKW interface enabled. Parameters can be read/written. 0 – PKW interface disabled, only PNU 927 can be read/written.	0, 1	R/W
928			
Control rights (process data)	1 – Option board will send Control Word, reference and will update PZD 3-10. 0 – PZD not enabled.	0, 1	R/W
947			
Indexed Fault memory	Fault Codes as described in Table 8, Page 28 below. Subindex 1 = Not acknowledged fault. Subindex 9 = Latest acknowledged fault. Subindex 17 = 2nd latest acknowledged fault. Subindex 25 = 3rd latest acknowledged fault. Subindex 33 = 4th latest acknowledged fault. Subindex 41 = 5th latest acknowledged fault. Subindex 49 = 6th latest acknowledged fault.	–	R
963			
PROFIBUS-DP baud rate	Shows the baud rate of the PROFIBUS-DP network, → Table 7, Page 28 below.	0 to 9	R
964			
Device identification	Bit 15 represents the type of inverter, 0 to DVx, 1 to DFx. Rest of the word represents the model number. DV6 – 0x012C DF6 – 0x812C	$012C_{hex}$, $812C_{hex}$	R
965			
Profile version	Returns the PROFIDRIVE profile version used in the DE6-NET-DP implementation.	2	R
967			
Control Word	Shows the latest received Control Word in "hex" format. → Section "Control/Status Word (STW/ZSW)", Page 19 for detailed information about the Control Word.	Bit 0 to 15	R

PNU	Description	Range	
968			
Status Word	Shows the latest Status Word in "hex" format. → Section "Control/Status Word (STW/ZSW)", Page 19 for detailed information about the Status Word.	Bit 0 to 15	R
971			
Transfer into non-volatile memory[2)]	Please note that it will take approximately 10 s for this process to finish (inverter must be stopped). 0 – No function. 0 => 1 – Will save inverter parameters to non-volatile memory and the Profile specific parameters to FLASH.	0, 1	W

1) Parameters will be lost when turning power off unless PNU 971 has been written with "0 =>1".

2) The parameter needs to do a 0 => 1 transition. Thus, to save the parameters in the inverter, first write zero and then one.

Table 7: Baud rate coding

PNU 963	Baud rate
0	12 MBit/s
1	6 MBit/s
2	3 MBit/s
3	1.5 MBit/s
4	500 kBit/s
5	187.5 kBit/s
6	93.75 kBit/s
7	45.45 kBit/s
8	19.2 kBit/s
9	9.6 kBit/s

The malfunction codes are coded as follows.

Table 8: Fault codes

Fault code PNU 947	Fault description
0	No fault
1	Overcurrent inverter
2	Overcurrent deceleration
3	Overcurrent acceleration
4	Overcurrent
5	Overload protection
6	Braking resistor overload protection
7	Over-voltage protection
8	EEPROM error
9	Undervoltage
10	Current detector error
11	CPU error
12	External trip
13	USP error
14	Ground fault protection
15	Incoming overvoltage protection
16	Temporary power loss protection
21	Abnormal temperature
23	Gate allay error
24	Open-phase error
30	IGBT error
35	Thermistor error
36	Abnormal brake
60 to 69	Option 1 error 0 to 9
70 to 79	Option 2 error 0 to 9

Appendix

Parameter cross-reference list

To be able to read/write parameters via PROFIBUS it is necessary to use a cross-reference list to convert from PROFIBUS parameters to DF6/DV6 parameters.

Example, if parameter "1st Acceleration time 1" shall be read then PNU 23 shall be used (if the keypad is used PNU F002 is used).

The DF6 inverter supports a slightly different parameter map; the "DF6" field reflects this. "–" means that the DF6 inverter does not support the parameter, a figure means that the parameter is supported, but with this maximum value instead.

DF6/DV6 PNU	PROFIBUS PNU	Size [Bytes]	Range	Multi-plier	Contents	DF6	Read/ Write
A020	1	4	0 to 400.00 Hz	*100	1st setting multispeed frequency 0	✓	R/W
A220	2	4	0 to 400.00 Hz	*100	2nd setting multispeed frequency 0	✓	R/W
A320	3	4	0 to 400.00 Hz	*100	3rd setting multispeed frequency 0	–	R/W
A021	4	4	0 to 400.00 Hz	*100	Multispeed frequency 1	✓	R/W
A022	5	4	0 to 400.00 Hz	*100	Multispeed frequency 2	✓	R/W
A023	6	4	0 to 400.00 Hz	*100	Multispeed frequency 3	✓	R/W
A024	7	4	0 to 400.00 Hz	*100	Multispeed frequency 4	✓	R/W
A025	8	4	0 to 400.00 Hz	*100	Multispeed frequency 5	✓	R/W
A026	9	4	0 to 400.00 Hz	*100	Multispeed frequency 6	✓	R/W
A027	10	4	0 to 400.00 Hz	*100	Multispeed frequency 7	✓	R/W
A028	11	4	0 to 400.00 Hz	*100	Multispeed frequency 8	✓	R/W
A029	12	4	0 to 400.00 Hz	*100	Multispeed frequency 9	✓	R/W
A030	13	4	0 to 400.00 Hz	*100	Multispeed frequency 10	✓	R/W
A031	14	4	0 to 400.00 Hz	*100	Multispeed frequency 11	✓	R/W
A032	15	4	0 to 400.00 Hz	*100	Multispeed frequency 12	✓	R/W
A033	16	4	0 to 400.00 Hz	*100	Multispeed frequency 13	✓	R/W
A034	17	4	0 to 400.00 Hz	*100	Multispeed frequency 14	✓	R/W
A035	18	4	0 to 400.00 Hz	*100	Multispeed frequency 15	✓	R/W
A061	19	4	0 to 400.00 Hz	*100	1st Upper limiter frequency	✓	R/WOS
A261	20	4	0 to 400.00 Hz	*100	2nd Upper limiter frequency	✓	R/WOS
A062	21	4	0 to 400.00 Hz	*100	1st Lower limiter frequency	✓	R/WOS
A262	22	4	0 to 400.00 Hz	*100	2nd Lower limiter frequency	✓	R/WOS
F002	23	4	0.01 to 3600.00 s	*100	1st Acceleration time 1	✓	R/W
F202	24	4	0.01 to 3600.00 s	*100	2nd Acceleration time 1	✓	R/W
F302	25	4	0.01 to 3600.00 s	*100	3rd Acceleration time 1	–	R/W
F003	26	4	0.01 to 3600.00 s	*100	1st Deceleration time 1	✓	R/W
F203	27	4	0.01 to 3600.00 s	*100	2nd Deceleration time 1	✓	R/W
F303	28	4	0.01 to 3600.00 s	*100	3rd Deceleration time 1	–	R/W
A092	30	4	0.01 to 3600.00 s	*100	1st Acceleration time 2	✓	R/W
A292	31	4	0.01 to 3600.00 s	*100	2nd Acceleration time 2	✓	R/W
A392	32	4	0.01 to 3600.00 s	*100	3rd Acceleration time 2	–	R/W
A093	33	4	0.01 to 3600.00 s	*100	1st Deceleration time 2	✓	R/W
A293	34	4	0.01 to 3600.00 s	*100	2nd Deceleration time 2	✓	R/W
A393	35	4	0.01 to 3600.00 s	*100	3rd Deceleration time 2	–	R/WOS

DF6/DV6 PNU	PROFIBUS PNU	Size [Bytes]	Range	Multi-plier	Contents	DF6	Read/ Write
A011	36	4	0 to 400.00 Hz	*100	Start frequency of analog input O	✓	R/WOS
A012	37	4	0 to 400.00 Hz	*100	End frequency of analog input O	✓	R/WOS
A111	38	4	–400.00 to 400.00 Hz	*100	Start frequency of analog input O2	✓	R/WOS
A112	39	4	–400.00 to 400.00 Hz	*100	End frequency of analog input O2	✓	R/WOS
A101	40	4	0 to 400.00 Hz	*100	Start frequency of analog input OI	✓	R/WOS
A102	41	4	0 to 400.00 Hz	*100	End frequency of analog input OI	✓	R/WOS
A063	43	4	0 to 400.00 Hz	*100	Jumping frequency 1	✓	R/WOS
A065	44	4	0 to 400.00 Hz	*100	Jumping frequency 2	✓	R/WOS
A067	45	4	0 to 400.00 Hz	*100	Jumping frequency 3	✓	R/WOS
A069	46	4	0 to 400.00 Hz	*100	Frequency of stopping acceleration	✓	R/WOS
A095	47	4	0 to 400.00 Hz	*100	1st Frequency of 2-stage acceleration	✓	R/WOS
A295	48	4	0 to 400.00 Hz	*100	2nd Frequency of 2-stage acceleration	✓	R/WOS
A096	49	4	0 to 400.00 Hz	*100	1st Frequency of 2-stage deceleration	✓	R/WOS
A296	50	4	0 to 400.00 Hz	*100	2nd Frequency of 2-stage deceleration	✓	R/WOS
b007	51	4	0 to 400.00 Hz	*100	Frequency of frequency matching	✓	R/WOS
b053	52	4	0.01 to 3600.00 s	*100	Deceleration time of non-stop operation at instantaneous power failure	–	R/WOS
C042	53	4	0 to 400.00 Hz	*100	Arrival frequency at acceleration 1	✓	R/WOS
C043	54	4	0 to 400.00 Hz	*100	Arrival frequency at deceleration 1	✓	R/WOS
C045	55	4	0 to 400.00 Hz	*100	Arrival frequency at acceleration 2	–	R/WOS
C046	56	4	0 to 400.00 Hz	*100	Arrival frequency at deceleration 2	–	R/WOS
A003	58	2	30 to 400 Hz	*1	1st Base frequency	✓	R/WOS
A203	59	2	30 to 400 Hz	*1	2nd Base frequency	✓	R/WOS
A303	60	2	30 to 400 Hz	*1	3rd Base frequency	–	R/WOS
A038	61	2	0 to 9.99 Hz	*100	Jogging frequency	✓	R/W
A004	62	2	30 to 400 Hz	*1	1st Maximum frequency	✓	R/WOS
A204	63	2	30 to 400 Hz	*1	2nd Maximum frequency	✓	R/WOS
A304	64	2	30 to 400 Hz	*1	3rd Maximum frequency	–	R/WOS
H020	66	4	0 to 65.535 Ω	*1000	1st Primary resistor R1 of motor	–	R/WOS
H220	67	4	0 to 65.535 Ω	*1000	2nd Primary resistor R1 of motor	–	R/WOS
H021	68	4	0 to 65.535 Ω	*1000	1st Secondary resistor R2 of motor	–	R/WOS
H221	69	4	0 to 65.535 Ω	*1000	2nd Secondary resistor R2 of motor	–	R/WOS
H022	70	4	0 to 655.35 mH	*100	1st Inductance L of motor	–	R/WOS
H222	71	4	0 to 655.35 mH	*100	2nd Inductance L of motor	–	R/WOS
H023	72	4	0 to 655.35 A	*100	1st No load current Io of motor	–	R/WOS
H223	73	4	0 to 655.35 A	*100	2nd No load current Io of motor	–	R/WOS
H024	74	4	0.001 to 9999.000 kgm^2	*100	1st Inertia J of motor	–	R/WOS
H224	75	4	0.001 to 9999.000 kgm^2	*100	2nd Inertia J of motor	–	R/WOS
H030	76	4	0 to 65.535 Ω	*1000	1st Primary resistor R1 of motor (Auto)	–	R/WOS
H230	77	4	0 to 65.535 Ω	*1000	2nd Primary resistor R1 of motor (Auto)	–	R/WOS
H031	78	4	0 to 65.535 Ω	*1000	1st Secondary resistor R2 of motor (Auto)	–	R/WOS
H231	79	4	0 to 65.535 Ω	*1000	2nd Secondary resistor R2 of motor (Auto)	–	R/WOS

DF6/DV6 PNU	PROFIBUS PNU	Size [Bytes]	Range	Multi-plier	Contents	DF6	Read/ Write
H032	80	4	0 to 655.35 mH	*100	1st Inductance L of motor (Auto)	–	R/WOS
H232	81	4	0 to 655.35 mH	*100	2nd Inductance L of motor (Auto)	–	R/WOS
H033	82	4	0 to 655.35 A	*100	1st No load current Io of motor (Auto)	–	R/WOS
H233	83	4	0 to 655.35 A	*100	2nd No load current Io of motor (Auto)	–	R/WOS
H034	84	4	0.001 to 9999.000 kgm^2	*100	1st Inertia J of motor (Auto)	–	R/WOS
H234	85	4	0.001 to 9999.000 kgm^2	*100	2nd Inertia J of motor (Auto)	–	R/WOS
A043	86	2	0 to 50.0 %	*10	1st Break point of manual torque boost	✓	R/W
A243	87	2	0 to 50.0 %	*10	2nd Break point of manual torque boost	✓	R/W
A343	88	2	0 to 50.0 %	*10	3rd Break point of manual torque boost	–	R/W
A052	89	2	0 to 60.00 Hz	*100	Frequency of DC braking start	✓	R/WOS
A055	90	2	0 to 60.0 s	*10	Time of DC braking working	✓	R/WOS
A058	91	2	0 to 60.0 s	*10	Time of DC braking working for beginning of inverter running	✓	R/WOS
A064	92	2	0 to 10.00 Hz	*100	Width of jumping frequency 1	✓	R/WOS
A066	93	2	0 to 10.00 Hz	*100	Width of jumping frequency 2	✓	R/WOS
A068	94	2	0 to 10.00 Hz	*100	Width of jumping frequency 3	✓	R/WOS
A070	95	2	0 to 60.0 s	*10	Time of stopping to accelerate	✓	R/WOS
A073	96	2	0 to 3600.0 s	*10	Integrate (I) gain of PID control	✓	R/W
A074	97	2	0 to 100.00	*100	Differential (D) gain of PID control	✓	R/W
A075	98	2	0.01 to 99.99 %	*100	Scale of PID control	✓	R/WOS
A086	99	2	0 to 100.0	*10	Response time of energy saving function	✓	R/W
b003	101	2	0.3 to 100.0 s	*10	Waiting time of retry	✓	R/WOS
b012	102	2	20.0 to 120.0	*10	Level of 1st electronic thermal protection	✓	R/WOS
b212	103	2	20.0 to 120.0	*10	Level of 2nd electronic thermal protection	✓	R/WOS
b312	104	2	20.0 to 120.0	*10	Level of 3rd electronic thermal protection	–	R/WOS
b015	105	2	0 to 400 Hz	*1	Free electronic thermal frequency 1	✓	R/WOS
b016	106	2	0 to 1000.0 A	*10	Free electronic thermal current 1	✓	R/WOS
b017	107	2	0 to 400 Hz	*1	Free electronic thermal frequency 2	✓	R/WOS
b018	108	2	0 to 1000.0 A	*10	Free electronic thermal current 2	✓	R/WOS
b019	109	2	0 to 400 Hz	*1	Free electronic thermal frequency 3	✓	R/WOS
b020	110	2	0 to 1000.0 A	*10	Free electronic thermal current 3	✓	R/WOS
b100	111	2	0 to 400 Hz	*1	Free V/F control frequency 1	✓	R/WOS
b101	112	2	0 to 800.0 V	*10	Free V/F control voltage 1	✓	R/WOS
b102	113	2	0 to 400 Hz	*1	Free V/F control frequency 2	✓	R/WOS
b103	114	2	0 to 800.0 V	*10	Free V/F control voltage 2	✓	R/WOS
b104	115	2	0 to 400 Hz	*1	Free V/F control frequency 3	✓	R/WOS
b105	116	2	0 to 800.0 V	*10	Free V/F control voltage 3	✓	R/WOS
b106	117	2	0 to 400 Hz	*1	Free V/F control frequency 4	✓	R/WOS
b107	118	2	0 to 800.0 V	*10	Free V/F control voltage 4	✓	R/WOS
b108	119	2	0 to 400 Hz	*1	Free V/F control frequency 5	✓	R/WOS
b109	120	2	0 to 800.0 V	*10	Free V/F control voltage 5	✓	R/WOS
b110	121	2	0 to 400 Hz	*1	Free V/F control frequency 6	✓	R/WOS

DF6/DV6 PNU	PROFIBUS PNU	Size [Bytes]	Range	Multi-plier	Contents	DF6	Read/ Write
b111	122	2	0 to 800.0 V	*10	Free V/F control voltage 6	✓	R/WOS
b112	123	2	0 to 400 Hz	*1	Free V/F control frequency 7	✓	R/WOS
b113	124	2	0 to 800.0 V	*10	Free V/F control voltage 7	✓	R/WOS
b022	125	2	50.0 to 200.0	*10	Level of overload restriction 1	150.0	R/WOS
b023	126	2	0.10 to 30.00	*100	Constant value of overload restriction 1	✓	R/WOS
b025	127	2	50.0 to 200.0	*10	Level of overload restriction 2	150.0	R/WOS
b026	128	2	0.10 to 30.00	*100	Constant value of overload restriction 2	✓	R/WOS
b034	129	2	0 to 65535 (*10 hr)	*1/10	Display time of warning	✓	R/WOS
b051	130	2	0 to 1000.0 V	*10	Starting voltage of nonstop operation for instantaneous power failure	–	R/WOS
b052	131	2	0 to 1000.0 V	*10	Starting voltage of OV-LAD stop at Nonstop operation for instantaneous power failure	–	R/WOS
b054	132	2	0 to 10.00 Hz	*100	Frequency width of starting deceleration at Nonstop operation for instantaneous power failure	–	R/WOS
b082	133	2	0.10 to 9.99 Hz	*100	Minimum frequency	✓	R/WOS
b086	134	2	0.1 to 99.9	*10	Coefficient of converting frequency	✓	R/W
b090	135	2	0 to 100.0 %	*10	Usage rate of BRD	✓	R/WOS
b096	136	2	330 to 380/660 to 760	*1	On level of BRD	✓	R/WOS
b099	137	2	0 to 9999 Ω	*1	Level of thermister error	✓	R/WOS
b121	138	2	0 to 5.00 s	*100	Waiting time for establishing external braking condition	–	R/WOS
b122	139	2	0 to 5.00 s	*100	Waiting time for acceleration at external braking	–	R/WOS
b123	140	2	0 to 5.00 s	*100	Waiting time for stop at external braking	–	R/WOS
b124	141	2	0 to 5.00 s	*100	Waiting time for confirmation signal at external braking	–	R/WOS
b125	142	2	0 to 400.00 Hz	*100	Release frequency of external braking	–	R/WOS
b126	143	2	0 to 200.0 (%)	*10	Release current of external braking	–	R/WOS
H005	145	2	0.001 to 65.535	*1000	1st Speed response gain	–	R/W
H205	146	2	0.001 to 65.535	*1000	2nd Speed response gain	–	R/W
H006	147	2	0 to 255	*1	1st Stability gain	✓	R/W
H206	148	2	0 to 255	*1	2nd Stability gain	✓	R/W
H306	149	2	0 to 255	*1	3rd Stability gain	–	R/W
H050	150	2	0 to 1000.0 (%)	*10	1st Proportional gain of speed control (PI control)	–	R/W
H250	151	2	0 to 1000.0 (%)	*10	2nd Proportional gain of speed control (PI control)	–	R/W
H051	152	2	0 to 1000.0 (%)	*10	1st Integral gain of speed control (PI control)	–	R/W
H251	153	2	0 to 1000.0 (%)	*10	2nd Integral gain of speed control (PI control)	–	R/W
H052	154	2	0.01 to 10.00	*100	1st Proportional gain of speed control (P control)	–	R/W
H252	155	2	0.01 to 10.00	*100	2nd Proportional gain of speed control (P control)	–	R/W
H060	156	2	0 to 100.0	*10	1st Limiter of 0 Hz control	–	R/W

DF6/DV6 PNU	PROFIBUS PNU	Size [Bytes]	Range	Multi-plier	Contents	DF6	Read/ Write
H260	157	2	0 to 100.0	*10	2nd Limiter of 0 Hz control	–	R/W
H070	158	2	0 to 1000.0 (%)	*10	PI proportional gain Change	–	R/W
H071	159	2	0 to 1000.0 (%)	*10	PI Integral gain Change	–	R/W
H072	160	2	0.01 to 10.00	*100	P proportional gain Change	–	R/W
C029	162	1	00 to 07	Code	Selection of AMI function	✓	R/WOS
C087	163	1	0 to 255	*1	Adjustment of AMI output	✓	R/W
C088	164	1	0 to 20.0 mA	*10	Adjustment of offset of AMI output	✓	R/W
C091	166	1	00 to 01	Code	Selection of debug mode method	✓	R/W
C041	168	2	0 to 200.0 (%)	*10	Level 1 of overload restriction warning	✓	R/WOS
C111	169	2	0 to 200.0 (%)	*10	Level 2 of overload restriction warning	–	R/WOS
C044	170	2	0 to 100.0 %	*10	Level over acceptable deviation of PID control	✓	R/WOS
C063	171	2	0 to 100.00 Hz	*100	Level f detecting zero speed	–	R/WOS
C061	173	2	0 to 100 %	*1	Warning level of electronic thermal protection	✓	R/WOS
C078	174	2	0 to 1000 ms	*1	Waiting time of communication start	✓	R/WOS
P011	176	2	128 to 65000 pls	*1	Pulse number of the encoder	–	R/WOS
P014	177	2	0 to 4095	*1	Stop position at orientation mode	–	R/WOS
P015	178	2	0 to 120.00 Hz	*100	Speed at orientation mode	–	R/WOS
P017	179	2	0 to 10000 pls	*1	Defining area of completion of orientation mode	–	R/WOS
P018	180	2	0 to 9.99 s	*100	Delay time of completion orientation mode	–	R/WOS
P020	181	2	0 to 9999	*1	The numerator of electric gear	–	R/WOS
P021	182	2	0 to 9999	*1	The denominator of electric gear	–	R/WOS
P022	183	2	0 to 655.35	*100	Feed forward gain of position control	–	R/WOS
P023	184	2	0 to 100.00	*100	Loop gain of position control	–	R/WOS
P026	185	2	0 to 150.0	*10	Level of detecting over speed	–	R/WOS
P027	186	2	0 to 120.00 Hz	*100	Value of detecting over deviation	–	R/WOS
F004	188	1	00 to 01	Code	Selection of running direction for DIG-OPE	✓	R/WOS
A001	189	1	00 to 05	Code	Selection of frequency command destination	✓	R/WOS
A002	190	1	01 to 05	Code	Selection of running command destination	✓	R/WOS
A005	191	1	00 to 01	Code	Selection of AT function	✓	R/WOS
A006	192	1	00 to 02	Code	Selection of O2 terminal function	✓	R/WOS
A013	193	1	0 to 100 %	*1	Starting rate of O terminal	✓	R/WOS
A014	194	1	0 to 100 %	*1	End rate of O terminal	✓	R/WOS
A015	195	1	00 to 01	Code	Selection of starting function of O terminal	✓	R/WOS
A016	196	1	1 to 30 times	*1	Sampling number of fetching data from?	✓	R/WOS
A113	197	1	–100 to 100 %	*1	Starting rate of O2 terminal	✓	R/WOS
A114	198	1	–100 to 100 %	*1	End rate of O2 terminal	✓	R/WOS
A103	199	1	0 to 100 %	*1	Starting rate of OI terminal	✓	R/WOS
A104	200	1	0 to 100 %	*1	End rate of OI terminal	✓	R/WOS
A105	201	1	00 to 01	Code	Selection of starting function of OI terminal	✓	R/WOS
A019	203	1	00 to 01	Code	Selection of multispeed method	✓	R/WOS
A039	204	1	00 to 05	Code	Selection of jogging method	✓	R/WOS

DF6/DV6 PNU	PROFIBUS PNU	Size [Bytes]	Range	Multi-plier	Contents	DF6	Read/ Write
A041	205	1	00 to 01	Code	Selection of 1st torque boost Method	✓	R/WOS
A241	206	1	00 to 01	Code	Selection of 2nd torque boost Method	✓	R/WOS
A042	207	1	0 to 20.0 %	*10	Value of 1st manual torque boost	✓	R/W
A242	208	1	0 to 20.0 %	*10	Value of 2nd manual torque boost	✓	R/W
A342	209	1	0 to 20.0 %	*10	Value of 3rd manual torque boost	–	R/W
A044	210	1	00 to 05	Code	Selection of 1st control method	2	R/WOS
A244	211	1	00 to 04	Code	Selection of 2nd control method	2	R/WOS
A344	212	1	00 to 01	Code	Selection of 3rd control method	–	R/WOS
A045	213	1	20 to 100 %	*1	Gain of output voltage	✓	R/W
A051	214	1	00 to 01	Code	Selection of DC braking method	✓	R/WOS
A053	215	1	0 to 5.0 s	*10	Delay time of DC braking start	✓	R/WOS
A054	216	1	0 to 100	*1	Power of DC braking (end of running)	✓	R/WOS
A056	217	1	00 to 01	Code	Selection of edge/level action of DC braking trigger	✓	R/WOS
A057	218	1	0 to 100	*1	Power of DC braking (start of running)	✓	R/WOS
A059	219	1	0.5 to 15.0 kHz	*10	Carrier frequency of DC braking	12.0	R/WOS
A071	220	1	00 to 01	Code	Selection of PID control presence	✓	R/WOS
A072	221	1	0.2 to 5.0	*10	Proportional (P) gain of PID control	✓	R/W
A076	222	1	00 to 01	Code	Selection of feedback destination for PID control	✓	R/WOS
A081	223	1	00 to 02	Code	Selection of AVR function	✓	R/WOS
A082	224	1	0 to 10	Code	Selection of motor voltage	✓	R/WOS
A085	225	1	00 to 02	Code	Selection of operation mode	1	R/WOS
A094	226	1	00 to 01	Code	Selection of 1st 2-stage accel/decel method	✓	R/WOS
A294	227	1	00 to 01	Code	Selection of 2nd 2-stage accel/decel method	✓	R/WOS
A097	228	1	00 to 03	Code	Selection of acceleration pattern	✓	R/WOS
A098	229	1	00 to 03	Code	Selection of deceleration pattern	✓	R/WOS
A131	230	1	01 to 10	Code	Curve constant of acceleration	✓	R/WOS
A132	231	1	01 to 10	Code	Curve constant of deceleration	✓	R/WOS
b001	233	1	00 to 03	Code	Selection of retry method	✓	R/WOS
b002	234	1	0.3 to 1.0 s	*10	Acceptable time for instantaneous power failure	✓	R/WOS
b004	235	1	00 to 02	Code	Selection of method (action) at instantaneous power and under voltage	✓	R/WOS
b005	236	1	00 to 01	Code	Retry number of instantaneous power and undervoltage	✓	R/WOS
b006	237	1	00 to 01	Code	Selection of fail phase function	✓	R/WOS
b013	238	1	00 to 02	Code	Selection of characteristic of 1st electronic thermal protection	✓	R/WOS
b213	239	1	00 to 02	Code	Selection of characteristic of 2nd electronic thermal protection	✓	R/WOS
b313	240	1	00 to 02	Code	Selection of characteristic of 3rd electronic thermal protection	–	R/WOS
b021	242	1	00 to 03	Code	Selection of method of overload restriction 1	✓	R/WOS

DF6/DV6 PNU	PROFIBUS PNU	Size [Bytes]	Range	Multi-plier	Contents	DF6	Read/ Write
b024	243	1	00 to 03	Code	Selection of method of overload restriction 2	✓	R/WOS
b031	244	1	00 to 03, 10	Code	Selection of method of software lock	✓	R/WOS
b037	245	1	00 to 02	Code	Selection of display	✓	R/WOS
b040	247	1	00 to 04	Code	Selection of method of torque limiter	–	R/WOS
b041	248	1	0 to 200 %	*1	Level of torque limiter in forward and drive (1st quadrant)	–	R/WOS
b042	249	1	0 to 200 %	*1	Level of torque limiter in reverse and regenerative (2nd quadrant)	–	R/WOS
b043	250	1	0 to 200 %	*1	Level of torque limiter in reverse and drive (3rd quadrant)	–	R/WOS
b044	251	1	0 to 200 %	*1	Level of torque limiter in forward and regenerative (4th quadrant)	–	R/WOS
b045	252	1	00 to 01	Code	Selection of LAD stop by torque	–	R/WOS
b035	253	1	00 to 02	Code	Selection of running direction limitation	✓	R/WOS
b046	254	1	00 to 01	Code	Selection of preventive of reverse running	–	R/WOS
b036	255	1	00 to 06	*1	Selection of method of reducing voltage start	✓	R/WOS
b050	257	1	00 to 01	Code	Selection of non-stop operation at instantaneous power failure	–	R/WOS
b080	258	1	0 to 255	*1	Adjustment of AM (analog monitor)	✓	R/W
b081	259	1	0 to 255	*1	Adjustment of FM (digital monitor)	✓	R/W
b083	260	1	0.5 to 15.0 kHz	*10	Carrier frequency (PWM frequency)	12.0	R/WOS
b084	261	1	00 to 02	Code	Selection of initialization	✓	R/WOS
b085	262	1	00 to 02	Code	Selection of initialized data	✓	R/WOS
b087	263	1	00 to 01	Code	Selection of STOP key function	✓	R/WOS
b088	264	1	00 to 01	Code	Selection free run function	✓	R/WOS
b091	265	1	00 to 01	Code	Selection of action at stop	✓	R/WOS
b092	267	1	00 to 01	Code	Selection of action of cooling fan	✓	R/WOS
b095	268	1	00 to 02	Code	Selection of BRD function	✓	R/WOS
b098	269	1	00 to 02	Code	Selection of thermister function	✓	R/WOS
b120	270	1	00 to 01	Code	Selection of external braking function	–	R/WOS
C001	272	1	01 to 48, 255	Code	Selection of function in intelligent input 1	39	R/WOS
C002	273	1	01 to 48, 255	Code	Selection of function in intelligent input 2	39	R/WOS
C003	274	1	01 to 48, 255	Code	Selection of function in intelligent input 3	39	R/WOS
C004	275	1	01 to 48, 255	Code	Selection of function in intelligent input 4	39	R/WOS
C005	276	1	01 to 48, 255	Code	Selection of function in intelligent input 5	39	R/WOS
C006	277	1	01 to 48, 255	Code	Selection of function in intelligent input 6	–	R/WOS
C007	278	1	01 to 48, 255	Code	Selection of function in intelligent input 7	–	R/WOS
C008	279	1	01 to 48, 255	Code	Selection of function in intelligent input 8	–	R/WOS
C011	280	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent input 1	✓	R/WOS
C012	281	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent input 2	✓	R/WOS
C013	282	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent input 3	✓	R/WOS

DF6/DV6 PNU	PROFIBUS PNU	Size [Bytes]	Range	Multi-plier	Contents	DF6	Read/ Write
C014	283	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent input 4	✓	R/WOS
C015	284	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent input 5	✓	R/WOS
C016	285	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent input 6	–	R/WOS
C017	286	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent input 7	–	R/WOS
C018	287	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent input 8	–	R/WOS
C019	288	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in FW input	✓	R/WOS
C101	289	1	00 to 01	Code	Selection of UP/DOWN function	✓	R/WOS
C102	290	1	00 to 02	Code	Selection of RESET function	✓	R/WOS
C103	291	1	00 to 01	Code	Selection of frequency matching function at RESET	✓	R/WOS
C021	292	1	00 to 26	Code	Selection of function in intelligent output 11	13	R/WOS
C022	293	1	00 to 26	Code	Selection of function in intelligent output 12	13	R/WOS
C023	294	1	00 to 26	Code	Selection of function in intelligent output 13	–	R/WOS
C024	295	1	00 to 26	Code	Selection of function in intelligent output 14	–	R/WOS
C025	296	1	00 to 26	Code	Selection of function in intelligent output 15	–	R/WOS
C026	297	1	00 to 26	Code	Selection of function in alarm relay output	13	R/WOS
C027	298	1	00 to 07	Code	Selection of FM function	✓	R/WOS
C028	299	1	00 to 07	Code	Selection of AM function	✓	R/WOS
C086	300	1	0 to 10.0 V	*10	Adjustment of offset of AM	✓	R/W
C031	301	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent output 11	✓	R/WOS
C032	302	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent output 12	✓	R/WOS
C033	303	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent output 13	–	R/WOS
C034	304	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent output 14	–	R/WOS
C035	305	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in intelligent output 15	–	R/WOS
C036	306	1	00 to 01	Code	Selection of a (NO) or b (NC) contact in alarm relay output	✓	R/WOS
C040	307	1	00 to 01	Code	Selection of output mode of overload warning signal	✓	R/WOS
C055	308	1	0 to 200 %	*1	Level of over torque in forward and drive (1st quadrant)	–	R/WOS
C056	309	1	0 to 200 %	*1	Level of over torque in reverse and regenerative (2nd quadrant)	–	R/WOS
C057	310	1	0 to 200 %	*1	Level of over torque in reverse and drive (3rd quadrant)	–	R/WOS
C058	311	1	0 to 200 %	*1	Level of over torque in forward and regenerative (4th quadrant)	–	R/WOS

DF6/DV6 PNU	PROFIBUS PNU	Size [Bytes]	Range	Multi-plier	Contents	DF6	Read/ Write
C062	313	1	00 to 02	Code	Selection of alarm code	–	R/WOS
C070	314	1	02 to 05	Code	Selection of data command	✓	R/WOS
C071	315	1	02 to 06	Code	Selection of communication speed for RS 485	✓	R/WOS
C072	316	1	1 to 32	*1	Selection of inverter address for RS 485	✓	R/WOS
C073	317	1	7 to 8 Bits	*1	Selection of bit length of data for RS 485	✓	R/WOS
C074	318	1	00 to 02	Code	Selection of parity (odd or even) for RS 485	✓	R/WOS
C075	319	1	1 to 2 Bits	*1	Selection of stop bit for RS 485	✓	R/WOS
H001	321	1	00 to 02	Code	Selection of auto-tuning presence	–	R/WOS
H002	322	1	00 to 02	Code	Selection of motor constant for 1st motor	–	R/WOS
H202	323	1	00 to 02	Code	Selection of motor constant for 2nd motor	–	R/WOS
H003	324	1	00 to 21	Code	Selection of motor capacity for 1st motor	✓	R/WOS
H203	325	1	00 to 21	Code	Selection of motor capacity for 2nd motor	✓	R/WOS
H004	326	1	00 to 03	Code	Selection of motor poles for 1st motor	✓	R/WOS
H204	327	1	00 to 03	Code	Selection of motor poles for 2nd motor	✓	R/WOS
P012	328	1	00 to 01	Code	Selection of control mode	–	R/WOS
P013	329	1	00 to 03	Code	Selection of method of pulse lines input	–	R/WOS
P016	330	1	00 to 01	Code	Set of orientation direction	–	R/WOS
P019	331	1	00 to 01	Code	Selection of location of electric gear	–	R/WOS
P001	332	1	00 to 01	Code	Selection of action at option 1 error	✓	R/WOS
P002	333	1	00 to 01	Code	Selection of action at option 2 error	✓	R/WOS
P010	334	1	00 to 01	Code	Selection of feedback option	–	R/WOS
P025	336	1	00 to 01	Code	Selection of available compensation of secondary resistor	–	R/WOS
P031	337	1	00 to 02	Code	Acc/Dec input mode selection	✓	R/WOS
P032	338	1	00 to 02	Code	Stop position setting input mode selection	–	R/WOS
d016	340	4	0 to 4294836225 s	*1	Set of accumulated time during running	✓	RO
d017	341	4	0 to 4294836225 s	*1	Set of accumulated time during power ON	✓	RO
C085	343	2	0 to 1000.0	*10	Adjusting value of thermister	✓	R/W
C081	344	2	0 to 65535	*1	Adjustment of ? terminal	✓	R/W
C083	345	2	0 to 65535	*1	Adjustment of ? terminal	✓	R/W
C082	346	2	0 to 65535	*1	Adjustment of ? terminal	✓	R/W
C121	348	2	0 to 65535	*1	Adjustment of zero of ? terminal	✓	R/W
C123	349	2	0 to 65535	*1	Adjustment of zero of ? terminal	✓	R/W
C122	350	2	0 to 65535	*1	Adjustment of zero of ? terminal	✓	R/W
d080	352	2	0 to 65535	*1	Accumulated number of trip (error)	✓	RO
→ d081	354	1	00 to 05	*1	Pointer of history of last trip (error)	✓	RO
	355	4	00 to FF_{hex}	*1	Factor and status of trip 1	✓	RO
	356	4	0 to 400.00 Hz	*100	Frequency of trip 1	✓	RO
	357	2	0 to 1000.0 A	*10	Output current of trip 1	✓	RO
	358	2	0 to 1000.0 V	*10	PN voltage (DC voltage) of trip 1	✓	RO
	359	4	0 to 4294836225 s	*1	Accumulated time during running of trip 1	✓	RO
	360	4	0 to 4294836225 s	*1	Accumulated time during power ON of trip 1	✓	RO

DF6/DV6 PNU	PROFIBUS PNU	Size [Bytes]	Range	Multi-plier	Contents	DF6	Read/ Write
→ d082	361	4	00 to FF_{hex}	*1	Factor and status of trip 2	✓	RO
	362	4	0 to 400.00 Hz	*100	Frequency of trip 2	✓	RO
	363	2	0 to 1000.0 A	*10	Output current of trip 2	✓	RO
	364	2	0 to 1000.0 V	*10	PN voltage (DC voltage) of trip 2	✓	RO
	365	4	0 to 4294836225 s	*1	Accumulated time during running of trip 2	✓	RO
	366	4	0 to 4294836225 s	*1	Accumulated time during power ON of trip 2	✓	RO
→ d083	367	4	00 to FF_{hex}	*1	Factor and status of trip 3	✓	RO
	368	4	0 to 400.00 Hz	*100	Frequency of trip 3	✓	RO
	369	2	0 to 1000.0 A	*10	Output current of trip 3	✓	RO
	370	2	0 to 1000.0 V	*10	PN voltage (DC voltage) of trip 3	✓	RO
	371	4	0 to 4294836225 s	*1	Accumulated time during running of trip 3	✓	RO
	372	4	0 to 4294836225 s	*1	Accumulated time during power ON of trip 3	✓	RO
→ d084	373	4	00 to FF_{hex}	*1	Factor and status of trip 4	✓	RO
	374	4	0 to 400.00 Hz	*100	Frequency of trip 4	✓	RO
	375	2	0 to 1000.0 A	*10	Output current of trip 4	✓	RO
	376	2	0 to 1000.0 V	*10	PN voltage (DC voltage) of trip 4	✓	RO
	377	4	0 to 4294836225 s	*1	Accumulated time during running of trip 4	✓	RO
	378	4	0 to 4294836225 s	*1	Accumulated time during power ON of trip 4	✓	RO
→ d085	379	4	00 to FF_{hex}	*1	Factor and status of trip 5	✓	RO
	380	4	0 to 400.00 Hz	*100	Frequency of trip 5	✓	RO
	381	2	0 to 1000.0 A	*10	Output current of trip 5	✓	RO
	382	2	0 to 1000.0 V	*10	PN voltage (DC voltage) of trip 5	✓	RO
	383	4	0 to 4294836225 s	*1	Accumulated time during running of trip 5	✓	RO
	384	4	0 to 4294836225 s	*1	Accumulated time during power ON of trip 5	✓	RO
→ d086	385	4	00 to FF_{hex}	*1	Factor and status of trip 6	✓	RO
	386	4	0 to 400.00 Hz	*100	Frequency of trip 6	✓	RO
	387	2	0 to 1000.0 A	*10	Output current of trip 6	✓	RO
	388	2	0 to 1000.0 V	*10	PN voltage (DC voltage) of trip 6	✓	RO
	389	4	0 to 4294836225 s	*1	Accumulated time during running of trip 6	✓	RO
	390	4	0 to 4294836225 s	*1	Accumulated time during power ON of trip 6	✓	RO
d001	397	4	0 to 400.000 Hz	*1000	Output frequency	✓	RO
d004	398	4	0 to 400.000 Hz	*1000	Feedback data of PID control	✓	RO
d007	399	4	0 to 39960.000	*1000	Value of conversion of frequency	✓	RO
d016	401	4	0 to 4294836225 s	*1	Accumulated time during running	✓	RO
d017	402	4	0 to 4294836225 s	*1	Accumulated time during power ON	✓	RO
–	403	4	0 to 400.000 Hz	*1000	Setting frequency from terminal	✓	RO
–	404	4	0 to 400.000 Hz	*1000	Setting frequency from attached potentiometer	✓	RO
–	405	4	0 to 400.000 Hz	*1000	Setting frequency from digital operator	✓	RO
d002	407	2	0 to 1000.0 A	*10	Output current	✓	RO
d005	408	2	0 to $FFFF_{hex}$	Bit	Status of input terminal	✓	RO
d012	409	2	–300 to +300 %	*1	Output torque	–	RO

DF6/DV6 PNU	PROFIBUS PNU	Size [Bytes]	Range	Multi-plier	Contents	DF6	Read/ Write
d014	410	2	0 to 1000.0 kW	*10	Input electric power	✓	RO
d006	416	2	0 to $FFFF_{hex}$	Bit	Status of output terminal	✓	RO
d013	417	2	0 to 1000.0 V	*10	Output voltage	✓	RO
d003	418	1	00 to 02	Code	Direction of present running	✓	RO

R/W: Parameter is read/writable.

R/WOS: Parameter is readable, but can only be written when the inverter is stopped.

RO: Parameter is read-only. Cannot be written.

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