DE51-NET-DP

Operational Manual

TABLE OF CONTENTS

1 Product description

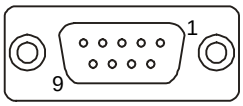
DE51-NET-DP gateway is a communication module controlling Moeller DF/V51 inverters from Profibus DP network. The module is powered through RJ45 connector and it is connected to the inverter by means of RS422. The Profibus network can be operated up to 12 Mbit/s. The operator panel (OPE) can be connected to the gateway via another RJ45 port. The gateway merges the communication from OPE and Profibus so that the inverter can be controlled/parametrized from both sources. Five status leds describe the operating status.

1.1 Specifications

Power supply Voltage range Current range	Via the serial port 4.75-5.25 VDC, 5 VDC nominal 260 mA
Indicators	5 green/red/orange LEDs
Addressing	Via 2 rotary switches
Profibus-DP Baud rate Controller Interface Connector	EN 50170 9.6 Kbaud up 12 Mbaud SPC3 RS485 1 DB9 connector
Serial port for inverter Type RS-422 Connector	 RJ45 (used also for gateway power supply)
Serial port for OPE Type RS-422 Connector	(also used as a firmware download port) RJ45
Temperature Operating Storage	 0 to 50 C° -10 to 70 C°
Humidity	20 to 85%, non condensing
Vibration	To be defined
Dimensions WxDxH	Refer to the table in the next page
Weight	Refer to the table in the next page

1.2 Physical interface

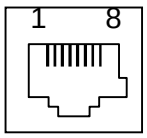
1.2.1 Profibus connector



Standard D-SUB 9 contact female

Pin	Name	Description
Housing	Shield	Connected to PE
1	Not conn.	
2	Not conn.	
3	B-line	Positive Rx/Tx
4	RTS	Request to Send
5	GND BUS	Isolated GND
6	+5V OUT	Isolated +5V
7	Not conn.	
8	A-line	Negative Rx/Tx
9	Not conn.	

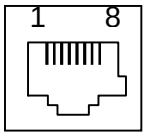
1.2.2 RS422 Inverter connector



Standard RJ45

Pin	Name	Description
1	+5V IN	Voltage supply for gateway
2	A+	Positive TX (RS422)
3	A-	Negative TX (RS422)
4	GND	Ground
5	B+	Positive RX (RS422)
6	B-	Negative RX (RS422)
7	GND	Ground
8	Not conn.	

1.2.3 RS422 OPE connector



Standard RJ45

Pin	Name	Description
1	+5V IN	Voltage supply for OPE
2	A+	Positive TX (RS422)
3	A-	Negative TX (RS422)
4	GND	Ground
5	B+	Positive RX (RS422)
6	B-	Negative RX (RS422)
7	GND	Ground
8	Not conn.	

1.3 Module configuration

Two rotary switches configure the module profibus DP address.

The address is set for two different purposes:

- Profibus node addressing (allowable addresses are 1-99);
- Activating the gateway configuration mode in order to upgrade the gateway firmware (00 address).

2 Operating modes

The inverter can be driven in two modes:

- a direct Profibus DP drive using a predefined memory map (Basic Mode)
- a ProfiDrive standard compatible driving (ProfiDrive Mode)

The driving mode is selected by using the appropriate GSD files. There is one gsd file (moeb09de.gsd) for the configuration of basic mode and another gsd file (moea09de.gsd) for the configuration of ProfiDrive mode.

If using the basic mode there is a single possible configuration available (Basic block). It consists of 4 words long input/output. All values in input and output block are predefined, the gateway user should just set values in output area and read values in input area.

If using the ProfiDrive mode configuration the standard ProfiDrive procedures can be used. The standard control procedures are converted to the native access of the DF/V51 inverter. In addition to the standard driving procedure the ProfiDrive mode enables the access to all inverter parameters in three possible ways: PZD, PKW, DPV1. When accessing inverter parameters by parameter index one should check the DF/V51 variables dictionary in this manual.

After selecting the desired operating mode by appropriate gsd file check the appropriate reference chapter:

1. Basic mode
2. ProfiDrive mode

For all reference information regarding installation and safety issues, please refer to the Installation Manuals of the DF/V51 inverter.

3 Basic mode

By using Basic Mode the essential control/measurement variables and parameters are accessed directly from the formated IO space, so there is no need to use other means of parameter accessing (like PKW, PZD, DPV1, which are used in DPV1 mode). This mode is similar to Basic Mode used for DF5/DV5 series of frequency inverters (there are some differences though).

Features

Control and monitoring of the drive from Profibus DP
Selection of the source for the speed reference and the control
Start/Stop control
Moving Direction control
Fault reset
Output speed control
Acceleration/Deceleration control
Actual Speed indication
Output Current indication
Status indication

3.1 Configuration

The Basic Mode is configurated by selecting the only available module from gsd file by a gsd configuration tool. In the future there might be also the byte-order swapped module.

3.2 Description of Operation

The basic block contains the most commonly used parameters in the drive control. Using this block should be sufficient for the control in most cases. The basic block consists of 4 words (8 bytes) of input data area and 4 words (8 bytes) of output data area.

In the Basic Mode the Profibus DP master sends the following data to the gateway:

- Configuration of the source of the control: whether the drive should be controlled (FWD/REV/STOP) by the Profibus master or by the source set by A002 parameter.
- The speed reference source for the drive (Profibus or the source set by A001 parameter).
- The Fwd, Rev and Stop signals to the drive (when controlled from Profibus DP).
- The Fault Reset signal to the drive.
- The Speed Reference value (in Hz/100) for the drive (when controlled from Profibus DP).
- The acceleration/deceleration time of the drive (in s/10).

- The ‘save parameters to the inverter flash’ command
- The procedure to do in case of profibus disconnection

In basic mode of operation the DE51-NET-DP sends the following data to the Profibus master:

- The state of the drive, running forward, running reverse, stopped, faulted.
- Fault information (if the drive is faulted).
- The source of the control (FWD/REV/STOP) by the Profibus master or by the source set by parameter A002.
- The actual speed reference source for the drive (Profibus or the source set by parameter A001).
- The actual speed of the drive (in Hz/100).
- The output current of the drive (in A/10).

3.3 Output Area

These are the variables being transmitted from the Profibus DP master to the gateway:

Word	Bit 15	Bit 14	Bit 13-8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	EEp Wri	Conn Sta	-	Reset	Net Ref	-	Net Ctrl	-	-	Run Rev	Run Fwd
1	Speed Reference										
2	Acceleration Time										
3	Deceleration Time										

Parameter	Description
Eep Wri	When bit 15 is set to 1, the gateway will start EEprom writing process. Bit 15 in W0 INPUT data reflects bit 15 in W0 OUT data. For repeating the EEprom writing command, bit 15 must be set to 0 and then set to 1 again (a single time execution command).
Conn Sta	Bit 14 sets the gateway’s behaviour in case of Profibus line error (cable disconnection or else): if set to 0, the gateway will decelerate the inverter to a complete stop; if set to 1, no action will be taken, the current inverter state is frozen until the Profibus communication is restored. Command bit 14 (W0 OUT data) is reflected in status bit 14 (W0 INPUT data).
Reset	If the drive is faulted, a 0 → 1 transition will reset the fault.
Net Ref	The speed reference is taken from the Profibus network if set to 1. The speed reference is taken from the inverter if set to 0. (See the Inv Ref bit)
Net Ctrl	The run commands are taken from the Profibus network if set to 1. The run commands are taken from the terminal block of the drive if set to 0.
Run Rev	Issues a reverse run command to the drive if set to 1.
Run Fwd	Issues a forward run command to the drive if set to 1.
Speed Reference	Sets the speed of the drive. Please observe that the speed is given in a resolution of 1/100Hz. (For instance 1388hex equals 50 Hz). Value range:

	0.00 - 360.00 Hz
Acceleration Time	Defines the acceleration time of the drive. Please observe that the acceleration time is given in a resolution of 1/10 s. (For instance 64hex equals 10 s). Value range: 0.1 – 3000.0 s
Deceleration Time	Defines the deceleration time of the drive. Please observe that the deceleration time is given in a resolution of 1/10 s. (For instance 64hex equals 10 s). Value range: 0.1 – 3000.0 s

3.4 Input Area

These are the variables being transmitted from the gateway to the Profibus DP master.

Word	Bit 15	Bit 14	Bit 13-8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	EEp Wri	Conn Sta		Faulted	Net Ref		Net Ctrl			Run Rev	Run Fwd
1	Speed Actual										
2	Output current										
3	Inverter status										

Parameter	Description
EEp Wri	Status bit 15 reflects the command bit 15 in W0 OUT data.
Conn Sta	Status bit 14 reflects the command bit 14 in W0 OUT data.
Faulted	If set, the drive is faulted.
Net Ref	If set to 1, the drive is currently using the speed reference being transmitted over the Profibus network. If it is set to 0, the reference is determined by the bit Inv Ref.
Net Ctrl	If set to 1, the drive is currently accepting the run commands transferred over Profibus.
Run Rev	If set to 1, the drive is currently running in reverse motion.
Run Fwd	If set to 1, the drive is currently running in forward motion.
Speed Actual	The current speed of the drive. Please observe that the speed is given in a resolution of 1/100 Hz. (For instance 7D0hex equals 20 Hz).
Output Current	The current being supplied to the motor by the drive. Please observe that the current is given in a resolution of 1/100 A. (For instance 32hex equals 0.5 A).
Inverter Status	Represents the current operating state of the drive. 0 – stop, 1 – run, 2 – jogging, 3 - free run, 4 – DC breaking, 10 – inverter is faulted.

4 ProfiDrive mode

The gateway will accept all the configurations specified by Profidrive V2 (PPO1-PPO5) and the standard telegram 1 specified by Profidrive V3.

4.1 Cyclic communication (process data)

Cyclic communication data are exchanged with the Profibus DP master at every communication cycle. The exchanged data format and length are specified at the initialization by Profibus DP master using the Profibus DP configuration mechanism.

The supported configurations are:

Type	Configuration bytes	Process data layout
Profidrive V2, PPO1	0xf3 0xf1	PKW + 2 words PZD
Profidrive V2, PPO2	0xf3 0xf5	PKW + 6 words PZD
Profidrive V2, PPO3	0xf1	2 words PZD
Profidrive V2, PPO4	0xf5	6 words PZD
Profidrive V2, PPO5	0xf3 0xf9	PKW + 10 words PZD
Profidrive V3, Standard telegram 1	0xe1 0xd1	2 words PZD
Profidrive V3, Standard telegram 1	0xc3 0xc1 0xc1 0xfd 0x00 0x01	2 words PZD

The cyclic data consists of two parts, a parameter area (PKW) and a process data area (PZD). The layout of the process data:

PKW – 4 words			PZD 2-10 words									
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**

PPO1

PKE	IND	PWE	PZD 1	PZD 2

PPO2

PKE	IND	PWE	PZD 1	PZD 2	PZD 3	PZD 4	PZD 5	PZD 6

PPO3

PZD 1	PZD 2

PPO4

PZD 1	PZD 2	PZD 3	PZD 4	PZD 5	PZD 6

PPO5

PKE	IND	PWE	PZD 1	PZD 2	PZD 3	PZD 4	PZD 5	PZD 6	PZD 7	PZD 8	PZD 9	PZD 10

Standard telegram 1 (Profidrive V3)

PZD 1	PZD 2

The PKW part of the process data is used for asynchronous parameter access over proccess data.

The first two PZD words have always the same meaning (depending on the transfer direction it is control word + main reference or status word + main actual value) described later. The PZD words after the first two words (shaded on the layout diagram) can be programmed to hold a value of any available parameter of the word type. The standard parameters for configuring the source/destination of these PZD words are 915 and 916.

4.1.1 PKW-part

The parameter part (PKW) is fixed to 4 words and can be used for reading and/or updating the parameters in the inverter one by one. Requests and responses use the predefined handshake procedure.

The PKW is further divided into three parts; PKE- Parameter ID (2 bytes), IND – Sub-index (2 bytes) and PWE- Parameter value (4 bytes). Second IND byte (4-th byte from the beginning) is not used and should be set to 0.

PKE consists of three parts:
AKA – command/response identificator (4 bits)
SPM – toggle bit, not used (1 bit)
PNU – parameter number (12 bits)

B16	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B0
AKA				SPM	PNU										

PNU parameters 0-900 are Moeller specific parameters while parameters 900-999 are profidrive specific parameters.

AKA field meanings (master -> slave):

Value	Function	Ack+	Ack-	Comment
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	3	7	not used
5	Change description element	3	7	not used
6	Request parameter value (array)	4	7	
7	Change parameter value (array word)	4	7/8	
8	Change parameter value (array long word)*	5	7/8	not used
9	Request number of array elements	6	7	

Note: description elements are accessibile by DPV1 interface.

AKA field meanings (slave -> master):

Value	Function
0	No response
1	Transfer parameter value (word)
2	Transfer parameter value (long word)
3	Transfer description element*
4	Transfer parameter value (array word)
5	Transfer parameter value (array long word)*
6	Request number of array elements
7	Request rejected, followed by fault code (in PWE part). Error values: 0 = Non-admissible parameter number 1 = Parameter value cannot be changed 2 = Upper or lower limit exceeded 3 = Erroneous sub-index 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 22 = Parameter address impermissible 24 = Number of values not consistent 101 = communication error to the inverter
8	No parameter change rights by PKW interface

4.1.2 PZD-part

The first two words in the PZD part have the following meaning:

Word Nr.	Master->Slave	Slave->Master
1	STW – Control word	ZSW – Status word
2	HSW – Main reference	HIW – Main actual value

4.1.2.1 Control word (STW)

Control word is used to control the inverter according to ProfiDrive V3 specification. The used bits are the following:

Bit	Significance
0	ON / OFF 1
1	no OFF2 (Operating condition) / OFF 2
2	no OFF3 (Operating condition) / OFF 3
3	Enable operation / Inhibit operation
4	Enable ramp-function generator output (operating condition)/ inhibit ramp-function generator output
5	Enable ramp-function generator/ stop ramp-function generator
6	Enable setpoint / inhibit setpoint
7	Acknowledge (positive edge)
8	Jogging 1 ON / Jogging 1 OFF
9	Jogging 2 ON / Jogging 2 OFF
10	Control by PLC / no control by PLC
11-15	Not used

4.1.2.2 Status word (ZSW)

Status word reports the inverter status. The used bits are the following:

Bit	Significance
0	Ready to switch on / not ready to switch on
1	Ready / not ready
2	Operation enabled / operation inhibited
3	Fault/no fault
4	No OFF 2 / OFF 2
5	No OFF 3 / OFF 3
6	switch on inhibit / no switch on inhibit
7	Warning / no warning
8	Actual value within tolerance range
9	Control requested / on site operation
10	f or n reached / f or n fallen below setpoint
11-14	not used
15	Communication error to the inverter

4.1.2.3 Main reference / main actual value (HSW/HIW)

These values are normalized to +-4096. The normalization value is the inverter's parameter Maximum frequency (A04). Positive values mean forward movement, negative values mean backward movement and value 0 means stop.

4.1.2.4 State machine

By manipulating bits in the control word the master can change the state of the slave. The slave state is indicated in the status word. The gateway supports the state machine handling defined by Profidrive V3 standard. Here just a few notes describing the basic functions.

In order to enable control over Profibus the master has to set the bit 10 in control word (control by PLC). If this bit is not set the gateway will not process the state machine and the status word will be 0.

The gateway will accept the setpoint only in the operating state. By setting appropriate bits the intermediate states can be skipped. For example, the control word 047Fh will put the gateway from the idle state directly to the operating state (indicated by status word 0637h).

In case of inverter trip the state machine will go to the fault state (indicated by bit 3 – Fault in the status word). In order to quit the fault state the master has to generate a raising edge on the control word bit 7 – reset acknowledge.

4.1.2.5 User defined PZD slots

For configurations which contain more than 2 PZD words (PPO2, PPO4, PPO5) the standard parameters 915 and 916 are used to define which values are transferred in these slots. Parameter 915 defines output and 916 input direction. Both parameters 915 and 916 are of array type and the subindex is used to reference the PZD slot (subindex 0 references PZD slot 2). Parameters of type word and byte can be selected (there is an implicit conversion byte-word). Not used PZD slots are marked with 0 in the parameters 915 and 916. Example: The setup of the parameter 916 = (7, 9, 0, 0) specifies that values of the parameters 7 (acceleration) and 9 (deceleration) should be read in PZD2 and PZD3 places. The values are transferred in the original inverter format without any normalization.

4.1.2.6 Permanent PZD configuration

PZD configuration (the values of the array parameters 915 and 916) can be stored to non-volatile memory and automatically restored at the gateway power up. For this purpose the internal gateway parameter 704 is provided. By writing to this parameter the permanent storage of the PZD configuration is controlled. The possible values to be written to this parameter (eg. by PKW or DPV1 parameter access) are:

1 - clear non-volatile PZD setting
2 - store the current PZD setting to non-volatile memory
3 - restore the PZD settings from non-volatile memory

The PZD setting saving is executed on the transition of the value of the parameter 704. To generate this transition firstly store 0 to this parameter and then the desired value.
Ones that there are stored PZD settings in seeprom, the function 3 (restore) is automatically executed at the gateway power up. In order to stop this auto-initialization the value 1 has to be written to parameter 704.

4.2 Acyclic communication

The gateway supports DPV1 parameter model. By issuing appropriate read/write request and using standard parameter format all parameters values and descriptions can be read/written.

4.2.1 DPV1 telegram frame

For DPV1 parameter access the DPV1 read/write request are sent to the SAP 51. The data parts are sent after the DPV1 Read/Write headers. Here are the telegram layouts:

1. Transmission of the parameter request in a DPV1 Write request

DPV1 Write Header	Function_Num = 0x5F (Write)	Slot_Number (…)
	Index = 47	Data Length (Data)
DPV1 Data (Length)	Parameter request …	

2. Short acknowledge of the parameter request with DPV1 Write response (no data)

DPV1 Write Header	Function_Num = 0x5F (Write)	Slot_Number (mirrored)
	Index = 47	Data Length (mirrored)

3. Request of the parameter response in a DPV1 Read request (no data)

DPV1 Read Header	Function_Num = 0x5E (Read)	Slot_Number (…)
	Index = 47	Data Length (MAX)

4. Transmission of the parameter response in the DPV1 Read response

DPV1 Read Header	Function_Num = 0x5E (Read)	Slot_Number (mirrored)
	Index = 47	Data Length (Data)
DPV1 Data (Length)	Parameter request …	

As the first step the master has to put the request by using the DPV1 Write request. This request will be acknowledged by short acknowledge. Thereafter the master should be placing the DPV1 Read requests until there is an approriate answer available. The usual procedure ilustration:

Master	Gateway	meaning
1->		Write request with parameter r/w request
	<-2	Short acknowledge
3->		Read request
	<- nack	Data not available yet (state conflict)
…	…	… repetition
3->		Read request
	<-4	Read response with parameter r/w response

If there is an error, the reply to DPV1 Read or Write request is an error reponse:

DPV1 Error	Function_Num = 0xDF (Read) = 0xDE (Read)	Error_Decode = 128 (DPV1)

	Error_Code_1	Error_Code_2 = 0

The gateway can response with following Error_Code_1:

Error_Code_1	meaning
0xA9	Feature not supported
0xB0	Index not 47
0xB1	Length too long
0xB5	State conflict
0xC2	Resource busy (accessing inverter data)

The state conflict is reported when read/write procedure is not correct (for example, reading the response before placing a request or writing before the reading request is succesfully finished). When response data is not available at the moment because it should be read from the inverter the resource busy response is returned, in that case a master should repeat the reading request.

4.2.2 Parameter requests and parameter responses

A parameter requests consists of three segments:

- Request header
- Parameter address (only in request, many addresses in multiparameter requests)
- Parameter value (in modify request and read response)

DPV1 parameter request

Request Header	Request reference	Request ID
	Axis	No. of Parameters = n
Parameter 1 Address	Attribute	No. of Elements
	Parameter number	
	Subindex	
…	…	
Parameter N Address	….	
Parameter 1 Value(s) (only in ‘modify’ request)	Format	No. of Values = m
	Values (m) …	
…	…	
Parameter N values	…	

DPV1 parameter response

Response Header	Request reference (mirrored)	Request ID
	Axis	No. of Parameters = n
Parameter 1 Value(s)	Format	No. of Values = m
	Values or error values (m) …	
…	…	
Parameter N values	…	

Meaning of the fields:

Request Header:

• Request Reference:
Unique identification of the request/response pair for the master. The master changes the request reference with each new request (for example, modulo 255). The slave mirrors the request reference in the response.

• Request ID:
Two IDs are defined:
- Request parameter (0x01)
- Change parameter (0x02)

• Response ID:
Mirroring of the request ID with supplement information whether the request was executed positively or negatively.
- Request parameter positive (0x01)
- Request parameter negative (0x81) (it was not possible to execute the request, entirely or partially)
- Change parameter positive (0x02)
- Change parameter negative (0x82) (it was not possible to execute the request, entirely or partially)
If the response is negative, error numbers are entered per partial response instead of values.

• Axis:
Axis addressing for multi-axis drives. Not used by gateway.

• No. of Parameters:
In the case of multi-parameter requests, specifying the number of the following Parameter Address and/or Parameter Value areas. For single requests the No. of parameters = 1.
Value range 1 .. 37 (limitation because of DPV1 telegram length)

Parameter Address:
• Attribute:
Type of object which is being accessed. Value range:
- Value (0x10)
- Description (0x20)

• Number of Elements:
Number of array elements that are accessed or length of string which is accessed.
Value range: 0, 1..234
Limitation because of DPV1 telegram length.
Special Case Number of Elements = 0:
If values are accessed: recommended for non-indexed parameters in achieving a compatible conversion of the parameter request into a PKW request according to the PROFIdrive Profile, Version 2 (differentiation “request/change parameter value” and “request/change parameter value (array)”).

• Parameter Number:
Addresses the parameter that is being accessed. Value range: 1..65535.

• Subindex:
Addresses the first array element of the parameter or the beginning of a string access or the text array, or the description element that is being accessed. Value range: 0.. 65535.

Parameter Value:
• Format:
Format and number specify the location in the telegram to which subsequent values are assigned.
Value range:
- Data type (refer to data type codes)
- Zero (0x40) (without values as positive partial response to a change request)
- Error (0x44) (as negative partial response)

• Number of Values:
Number of the following values

• Values:
The values of the parameter or error values.
If the values consist of an odd number of bytes, a zero byte is appended in order to secure the word structure of the telegrams.
In the case of a positive partial response with values, the parameter value contains the following:
- Format = Data type (refer to data type codes)
- Number of values
- the values
In the case of a positive partial response without values, the parameter value contains the following:
- Format = Zero (0x40)
- Number of values = 0
- (no values)
In the case of a negative partial response, the parameter value contains the following:
- Format = Error (0x44)
- No. of values = 1
- Value = error value = error number

The following error description may appear in the Value field following the format of type Error (0x44).

Value	Meaning
0x00	Unavailable parameter
0x01	Parameter is read only
0x02	Low or high limit exceeded
0x03	Access to unavailable subindex
0x04	Access with subindex to non-array parameter
0x05	Incorect data type
0x07	Description element can’t be changed
0x09	No description available
0x0b	No rights to change parameter
0x16	Parameter address not valid
0x18	Number of values in data doesn’t match the number in the param address
0x65	Inverter doesn’t repond to gateway requests

4.2.3 Parameter value

The parameter value contains a single value or an array of several values of the same type which can be individually accessed with sub-indices from 0 to n-1. All data are virtually in the parameter directory (accessed by parameter number) and can be of the following type:

Data type	Code (decimal)
Integer16	3
Unsigned8	5
Unsigned16	6
Unsigned32	7
FloatingPoint	8
VisibleString	9
OctetString	10
V2 BitSequence	35

In addition, the following general data types may be used as a format inside parameter requests and responses.

Data type	Code
Byte	0x41
Word	0x42
DoubleWord	0x43

In case that data format contains many bytes, the byte order is MSB first (big endian).

4.2.4 Parameter description

The parameter description contains relevant information about the respective parameter. It is defined structure which can be accessed partially (using subindexes 1-12) or completely (using subindex 0) in one reading. The structure is as follows:

Subindex	Meaning	Data type
1	Identifier (ID)	V2
2	Number of array elements or length of string	Unsigned 16
3	Standardization factor	Floating Point
4	Variable attribute	OctetString 2
5	Reserved	OctetString 4
6	Name	VisibleString 16
7	Low limit	OctetString 4
8	High limit	OctetString 4
9	Reserved	OctetString 2
10	ID extension	V2
11	PZD reference parameter	Unsigned 16
12	PZD normalization	V2
0	Complete description	OctetString 46

The bits of Identifier ID have the following meaning:

Bit	Meaning
15	Reserved
14	Array
13	Parameter value can be reset only
12	Parameter was changed with respect to the factory setting
11	Reserved
10	Additional text array available
9	Parameter not writeable
8	Standardization factor and variable attribute not relevant
0 – 7	Data type of the parameter value (refer to data type codes)

The meaning of other fields can be found in the Profidrive V3 standard.

4.3 List of parameters

Parameters can be devided into three categories:

1. Profidrive standard parameters (from the range 900-999)
2. Gateway internal parameters (from the range 600-899)
3. Inverter internal parameters (from the range 0-599)

4.3.1 Profidrive standard parameters

These parameters are defined by profibus standard.

Index	Data type	Description
915 [8]	Unsigned16 (Array)	PZD configuring, setpoint telegram Parameter is an array of 8 subindexes for defining output PZD slot content
916 [8]	Unsigned16 (Array)	PZD configuring, actual value telegram Parameter is an array of 8 subindexes for defining input PZD slot content
918	Unsigned8	Gateway DP address
922	Unsigned16	Telegram selection Value is 0 (telegram defined by 915,916 parameters)
927	Unsigned 8	Operation priority for asynchronous access This parameter controls rights for changing parameters. It should be set to 1 in order to enable modifying any parameter by master. If it is set to the value different than 1 the PKW or DPV1 interfaces can't be used to change parameters (getting NoRights error). The default power up value is 1 (enabled access).
928	Unsigned 8	Control priority This parameter controls which of the devices controls speed and movement of the drive (synchronous access). The possible values are: 0 - no change of the current rights setup (the default power up value) 1 - DP master controls speed and command (OPE selected in the inverter) 2 - speed and command are controlled by A001/A002 setting In order to take control the master may have to write 1 to the parameter 928
964 [5]	Unsigned16 (Array)	Device identification Array parameter with the following subindices meanings: Manufacturer code, device type, version, year, day+month
965	Unsigned16	Profile version and subversion (first and second byte)
967	Unsigned16	Control word
968	Unsigned16	Status word
971	Unsigned16	Saving parameters to the flash A change from 0 to 1 in this parameter value causes saving inverter parameter to flash (so actually two writings to 971 are needed for the request to save all parameters to flash).

		NOTE: Currently this parameter is not supported

4.3.2 Gateway internal parameters

Index	Data type	R/W access	Description
700	Integer16	Read-only	Main reference value (HSW) The value is normalized –4096/+4096.
701	Integer16	Read-only	Main actual value (HIW) The value is normalized –4096/+4096
702	Unsigned8	Read-only	State machine state The state machine state is reported as an integer number (SAx, SBx values names are referenced in the profidrive standard): SA1=0, SA2, SA3, SA4, SA5, SA6, SA7, SA8, SA9, SA10, SA11, SB1, SB2, SB3, SB4, SB5, SB6=16
703	Unsigned8	Read-write	Action if Profibus DP bus disconnected The parameter controls the gateways reaction to the DP bus disconnection. Possible values are: 0 - keep last output values (default power up value) 1 - FRS (free run stop) 2 - Stop 3 – Quick stop (DC breaking) 4 – local control (A001/A002 parameters select the source) If the value 4 is set, after the reconnection the master has to set parameter 928 to 1 again to get the control.
704	Unsigned8	Read-write	Saving PZD setting to the gateway seeprom: 0 - clear non-volatile PZD setting 1 - store the current PZD setting to non-volatile memory 2 - restore the PZD settings from non-volatile memory

4.3.3 Gateway control parameters

Gateway control parameters participate in gateway control messages which are exchanged with the gateway cyclically. That means, writing to this parameter is not writing to any parameter, it is just direction how to fill some fields in the control message. Since some parts of the control messages are controlled by the gateway state machine the appropriate control parameters are marked as read only, in order not to interfere with the gateway control.

Index	Data type	R/W access	Description
600	Unsigned8	Read-only	Network control Bit 0 – network reference (1) / local reference (0) Bit 1 – network control (1) / local control (0)
601	Unsigned8	Read-write	External trip 0 – idle

			1 – generate external trip to the inverter
602	Unsigned8	Read-only	OPND Profibus communication indication (0 – Off / 1 – On)
603	Unsigned8	Read-write	Inverter reset Changing value 0 -> 1 resets the inverter
604	Unsigned8	Read-only	Run state: 0 - stop 1 – run forward 2 – run backward
605	Unsigned8	Read-write	JOG 0 – idle 1 – jog command active
606	Unsigned8	Read-write	DC breaking 0 – off 1 - on
607	Unsigned8	Read-write	Select second motor data 0 – first motor data 1 – second motor data
608	Unsigned8	Read-write	Free run select 0 – controlled acceleration / deceleration 1 – free run
609	Unsigned8	Read-write	Two stage acceleration and deceleration 0 – off 1 – on
610	Unsigned8	Read-write	Software parameter lock 0 – off 1 – on
611	Unsigned16	Read-only	Actual output frequency (unit 0.01 Hz)
612	Unsigned16	Read-only	Inverter control word
613	Unsigned16	Read-only	Inverter status word
614	Unsigned16	Read-only	Actual output frequency (unit 0.01 Hz)
615	Unsigned16	Read-only	Actual output current (unit 0.1 A)
616	Unsigned8	Read-write	Trip monitor data request 0-1 transition causes reading trip info data (data read are latched to parameters 200 – 205)

4.3.4 Gateway application identification parameters

These parameters are used to identificate the application type and the application version loaded to the inverter. All parameters are read only.

Index	Data type	Description
800	Unsigned16	Gateway application type
801	Unsigned16	Gateway application version High byte - version Low byte - subversion

4.3.5 Inverter specific internal parameters

The inverter specific parameters are accessed by dictionary index. All available parameters with dictionary indices are described in the following table.

The internal inverter parameter values are represented according to their original values, without any normalization. For example, parameter 1 (Jump frequency 1) is represented as number 0-4000 what should be interpreted as 0.0 – 400.0 Hz.

When writing to any inverter parameter the value is checked on min/max limits. If it is outside the range the error is reported. Please check the inverter documentation for the rights for changing the parameters (parameters can be read_only, write_in_stop_only, read_write).

Depending on the parameter length the data type Unsigned8 or Unsigned16 are used.

No	Addr (HEX)	size	function name	code	range	unit	initial data
1	1204	2	Jump frequency1	A063	Jump frequency:0.0-400.0 Jump frequency Width:0.0-10.0	0.1[Hz] 0.1[Hz]	0
2	1206	2	Jump frequency Width 1	A064			50
3	1208	2	Jump frequency2	A065			0
4	120A	2	Jump frequency Width 2	A066			50
5	120C	2	Jump frequency3	A067			0
6	120E	2	Jump frequency Width 3	A068			50
7	1210	2	1st acceleration time	F002	0.01-99.99/100.0-999.9/1000.-3000.	0.01/0.1/1.[s]	64536
8	1212	2	2nd acceleration time	F202	0.01-99.99/100.0-999.9/1000.-3000.	0.01/0.1/1.[s]	64536

9	1214	2	1st deceleration time	F003	0.01-99.99/100.0-999.9/1000.-3000.	0.01/0.1/1.[s]	64536
10	1216	2	2nd deceleration time	F203	0.01-99.99/100.0-999.9/1000.-3000.	0.01/0.1/1.[s]	64536
11	1218	2	O start	A011	0.0-400.0	0.1[Hz]	0
12	121A	2	O end	A012	0.0-400.0	0.1[Hz]	0
13	121C	2	Base frequency	A003	30. - Maximum. frequency(Hz)	1.[Hz]	60
14	121E	2	Base frequency, 2nd motor	A203	30. - 2nd Maximum. frequency (Hz)	1.[Hz]	60
15	1220	2	Maximum frequency	A004	30.-400.	1.[Hz]	60
16	1222	2	Maximum frequency, 2nd motor	A204	30.-400.	1.[Hz]	60
17	1224	2	Multi-speed 0	A020	0.0, starting frequency-maximum. frequency(Hz)	0.1[Hz]	0
18	1226	2	Multi-speed 0, 2nd motor	A220	0.0, starting frequency-2nd maximum frequency(Hz)	0.1[Hz]	0
19	1228	2	Multi-speed1	A021	0.0, starting frequency-maximum frequency(Hz)	0.1[Hz]	0
20	122A	2	Multi-speed2	A022			0
21	122C	2	Multi-speed3	A023			0
22	122E	2	Multi-speed4	A024			0
23	1230	2	Multi-speed5	A025			0
24	1232	2	Multi-speed6	A026			0
25	1234	2	Multi-speed7	A027			0
26	1236	2	Multi-speed8	A028			0
27	1238	2	Multi-speed9	A029			0
28	123A	2	Multi-speed10	A030			0
29	123C	2	Multi-speed11	A031			0
30	123E	2	Multi-speed12	A032			0
31	1240	2	Multi-speed13	A033			0
32	1242	2	Multi-speed14	A034			0
33	1244	2	Multi-speed15	A035			0
34	1246	2	Jogging frequency	A038	0.00, starting frequency-9.99(Hz)	0.01[Hz]	100
35	1248	2	Manual torque boost point	A043	0.0-50.0	0.1%	30
36	124A	2	Manual torque boost point,2nd motor	A243	0.0-50.0	0.1%	0
37	124C	2	Auto boost Voltage	A046	0.-255.	1.%	100

			compensate gain				
38	124E	2	Auto boost Voltage compensate gain, 2nd motor	A246	0.-255.	1.%	100
39	1250	2	Auto boost Slip compensate gain	A047	0.-255.	1.%	100
40	1252	2	Auto boost Slip compensate gain,2nd motor	A247	0.-255.	1.%	100
41	1258	2	DC braking frequency settibg	A052	starting frequency - 60.0(Hz)	0.1[Hz]	50
42	125A	2	DC braking time for deceleration	A055	0.0-60.0	0.1[s]	0
43	125C	2	1st frequency upper limit setting	A061	0.0, 1st frequency lower limit-maximum frequency(Hz)	0.1[Hz]	0
44	125E	2	2nd frequency upper limit setting	A261	0.0, 2nd frequency lower limit - 2nd setting maximum frequency(Hz)	0.1[Hz]	0
45	1260	2	1st frequency upper limit setting	A062	0.0, start frequency- 1st frequency upper limit (Hz)	0.1[Hz]	0
46	1262	2	2nd frequency upper limit setting	A262	0.0, start frequency-2nd frequency upper limit (Hz)	0.1[Hz]	0
47	1264	2	PID-I gain	A073	0.0-150.0	0.1[s]	10
48	1266	2	PID-D gain	A074	0.00-99.99/100.0	0.01[s]	0
49	1268	2	PID scale	A075	0.01-99.99	0.01	100
50	126A	2	Motor voltage selection	A082	200V class:200/215/220/230/240?? 400V class:380/400/415/440/460/480	?	200
51	126C	2	Acceleration time2	A092	0.01-99.99/100.0-999.9/1000.-3000.	0.01/0.1/1.[s]	64036
52	126E	2	Acceleration time2(2nd motor)	A292	0.01-99.99/100.0-999.9/1000.-3000.	0.01/0.1/1.[s]	64036
53	1270	2	Deceleration time2	A093	0.01-99.99/100.0-999.9/1000.-3000.	0.01/0.1/1.[s]	64036
54	1274	2	Deceleration time2(2nd	A293	0.01-99.99/100.0-999.9/1000.-3000.	0.01/0.1/1.[s]	64036

			motor)				
55	1276	2	Acc1 to Acc2 frequency transition point	A095	0.0-400.0	0.1[Hz]	0
56	1278	2	Acc1 to Acc2 frequency transition point(2nd motor)	A295	0.0-400.0	0.1[Hz]	0
57	127A	2	Dcc1 to Dcc2 frequency transition point	A096	0.0-400.0	0.1[Hz]	0
58	127C	2	Dcc1 to Dcc2 frequency transition point(2nd motor)	A296	0.0-400.0	0.1[Hz]	0
59	127E	2	OI start	A101	0.0-400.0	0.1[Hz]	0
60	1280	2	OI end	A102	0.0-400.0	0.1[Hz]	0
61	1282	2	Retry wait time	b003	0.3-100.0	0.1[s]	10
62	1284	2	Electronic thermal level	b012	0.2*rated inverter current-1.20*rated inverter current(A)	0.01[A]	10000
63	1286	2	Electronic thermal level(2nd motor)	b212	0.2*rated inverter current-1.20*rated inverter current(A)	0.01[A]	10000
64	1288	2	Overload restriction setting	b022	0.2* rated current(A)-1.5* rated current(A)	0.01[A]	15000
65	128A	2	Deceleration rate at Overload restriction	b023	0.1-30.0	0.1[s]	10
66	1294	2	Start frequency adjustment	b082	0.5-9.9	0.1[Hz]	50
67	1296	2	Frequency scaling conversion factor	b086	0.1-99.9	0.1	10
68	1298	2	Dynamic braking usage	b090	0.0-100.0	0.1	0
69	129A	2	BRD ON level	b096	200V class 330-380/ 400V class 660-760(V)	1	380
70	129C	2	Overload advance notice level	C041	0.00-2.00*rated current(A)	0.01[A]	10000
71	129E	2	Frequency arrival setting for acceleration.	C042	0.0-400.0	0.1[Hz]	0
72	12A0	2	Arrival	C043	0.0-400.0	0.1[Hz]	0

			frequency setting for deceleration.				
73	12A2	2	PID deviation level setting	C044	0.0-100.0	0.1%	30
74	12A4	2	O input scan calibration	C081	0.0-200.0	0.1	1000
75	12A6	2	OI input scan calibration	C082	0.0-200.0	0.1	1000
76	12A8	2	AM offset adjustment	C086	0.0-10.0	0.1	0
77	12AA	2	1st stabilizing factor	H006	0.-255.	1.%	100
78	12AC	2	2nd stabilizing factor	H206	0.-255.	1.%	100
79	12AE	1	Keypad Run Key routing (Operation direction selection)	F004	00(forward)/01(reverse)	?	0
80	12AF	1	Frequency source setting	A001	00(VR)/01(terminal)/02(operator)/03(Modbus)/10(Output of cal.function)	?	1
81	12B0	1	Run command source setting	A002	01(terminal)/02(operator)/03(Modbus)	?	1
82	12B1	1	O start rate	A013	0.-100.	1.%	0
83	12B2	1	O end rate	A014	0.-100.	1.%	100
84	12B3	1	O start selection	A015	00(external start frequency)/01(0Hz)	?	1
85	12B4	1	O, OI sampling	A016	1.-8.	1.	2
86	12B5	1	Jog stop mode	A039	00(free-run stop) / 01(Controlled deceleration) / 02(DC braking to stop)	?	0
87	12B8	1	Manual torque boost	A042	0.0-20.0	0.1%	50
88	12B9	1	Manual torque boost, 2nd motor	A242	0.0-20.0	0.1%	0
89	12BA	1	V/f characteristic curve selection	A044	00(VC)/01(VP1.7power)/02(I-SLV)	?	2
90	12BB	1	V/f characteristic curve selection 2nd motor	A244	00(VC)/01(VP1.7power)/02(I-SLV)	?	2
91	12BC	1	Output voltage	A045	20.-100.	1.%	100

			gain				
92	12BD	1	DC braking enable	A051	00(disable)/01(enable)	?	0
93	12BE	1	DC braking wait time	A053	0.0-5.0	0.1[s]	0
94	12BF	1	DC braking during decelerationg	A054	0.-100.	1.%	0
95	12C0	1	DC braking enable input signal edge/level selection	A056	00(edge action)/01(level action)	?	1
96	12C2	1	PID enable	A071	00(disable)/01(enable)	?	0
97	12C3	1	PID-P gain	A072	0.2-5.0	0.1	10
98	12C4	1	PID feedback selection	A076	00(OI)/01(O)/02(Network)/10(Output of cal.function)	?	0
99	12C5	1	AVR selection	A081	00(ON always)/01(OFF always)/02(OFF on decelerating)	?	0
100	12C6	1	Select mothod to switch to Acc2/Dcc2 profile	A094	00(change with 2CH terminal)/01(change with setting)	?	0
101	12C7	1	Select mothod to switch to Acc2/Dcc2 profile(2nd motor)	A294	00(change with 2CH terminal)/01(change with setting)	?	0
102	12C8	1	Acceleration curve selection	A097	00(Linear)/01(S-curve)	?	0
103	12C9	1	Deceleration curve selection	A098	00(Linear)/01(S-curve)	?	0
104	12CA	1	OI start rate	A103	0.-100.	1.%	0
105	12CB	1	OI end rate	A104	0.-100.	1.%	100
106	12CC	1	OI start selection	A105	00(external start frequency)/01(0Hz)	?	1
107	12CD	1	Automatic Restart Selection	b001	00(alarm output trip,NO restart)/01(Restart at 0Hz)/02(start after frequency matching)/03(trip after frequency matching,then deceleration stop)	?	0
108	12CE	1	Allowable under-voltage power failure	b002	0.3-25.0	0.1[s]	10

			time				
109	12CF	1	Instantaneous power failure/ under-voltage trip during stop	b004	00(invalid/01(valid)	?	0
110	12D0	1	Instantaneous power failure/ under-voltage retry time selection	b005	00(16 times)/01(Retry until starting)	?	0
111	12D1	1	1st electronic thermal characteristic selection	b013	00(reduced characteristic 1)/ 01(constant torque characteristic)/02(reduced characteristic 2)	?	1
112	12D2	1	2nd electronic thermal characteristic selection	b213	00(reduced characteristic 1)/ 01(constant torque characteristic)/02(reduced characteristic 2)	?	1
113	12D3	1	Overload restriction operation mode	b021	00(disable)/01(enabled on acceleration / constant speed)/02(enabled on constant speed)	?	1
114	12D4	1	Software lock mode selection	b031	00(impossible to change the data setting except b031when SFT terminal is ON)/01(impossible to change the data except b031 and frequency setting parameters when SFT terminalis ON)/02(impossible to change the data setting except b031)/03(impossible to change the data setting except b031and frequency setting parameters)	?	1
115	12D6	1	AM adjustment	b080	0-255	1	100
116	12D8	1	Carrier Frequency setting	b083	2.0-14.0	0.1[kHz]	50
117	12D9	1	Initialization mode	b084	00(Trip history clear)/01(Parameter initialization)/02(Trip history clear + Parameter initialization)	?	0
118	12DA	1	Country code for initialization	b085	00(JPN)/01(EU)/02(USA)	?	1
119	12DB	1	STOP key	b087	00(enable)/01(disable)	?	0

			enable				
120	12DC	1	Restart mode after FRS	b088	00(Restart from 0Hz)/01(Restart from f-matching)	?	0
121	12DD	1	Stop mode selection	b091	00(deceleration and stop)/01(Free-run to stop)	?	0
122	12DE	1	Cooling fan control	b092	00(Fan is always ON)/01(ON during run, After power ON,then for 5 minutes on stop is implied.)/02(during inverter internal temperature higher than ON level)	?	0
123	12DF	1	BRD selection	b095	00(disable)/01(enable<disable during stop>)/02(enable<enable during stop too>)	?	0
124	1,20E +01	1	OV LADSTOP selection	b130	00(OFF)/01(ON)	?	0
125	1,20E +02	1	Intelligent terminal 1 function setting	C001	00(FW:Forward)/ 01(RV:Reverse)/02(CF1:Multi-speed1)/ 03(CF2:Multi-speed2)/ 04(CF3:Multi-speed3)/ 05(CF4:Multi-speed4)/06(JG:Jogging)/ 07(DB:External DC braking)/08(SET:2nd control)/09(2CH:two-stage adjustable speed)/ 11(FRS:Free-run)/ 12(EXT:External trip)/ 13(USP:Unattended start protection)/ 15(SFT:software lock)/ 16(AT:Analog input voltage/current select)/18(RS:Reset inverter)/19(PTC:PTC Thermistor Thermal Protection)(only C006 is available to set PTC)/20(STA:3wire run)/21(STP:3wire stop)/ 22(F/R:3wire forward/reverse)/23(PID:PID enable/disable)/24(PIDC:PID integral reset)/27(UP:Remote control UP function)/28(DWN:Remote control DOWN	?	0

					function)/29(UDC:Remote data clear)/ 31(OPE:Operating by operator select)/50(ADD)/51(F-TM)/255(No:No assign)		
126	1,20E+03	1	Intelligent terminal 2 function setting	C002			1
127	1,20E+04	1	Intelligent terminal 3 function setting	C003			2
128	1,20E+05	1	Intelligent terminal 4 function setting	C004			3
129	1,20E+06	1	Intelligent terminal 5 function setting	C005			18
130	1,20E+07	1	Intelligent terminal 6 function setting	C006			9
131	1,20E+08	1	Reverse PID	A077	00(OFF) / 01(ON)	?	0
132	1,20E+09	1	Intelligent output 11 setting	C021	00(RUN:run signal)/01(FA1:Frequency arrival type1 signal)/02(FA2:over setting frequency)/03(OL:Overload advance notice signal)/04(OD:Output deviation for PID control)/05(AL:Alarm signal)/06(Dc:External analog input disconnection detection)/07(FBV)/08(NDc)/09(LOG)	?	1
133	1,20E+10	1	Intelligent output 12 setting	C022			0
134	12EA	1	Alarm relay output	C026			5
135	12EC	1	AM selection	C028	00(Output frequency)/01(Output current)	?	0
136	12ED	1	Plus/Minus select	A146	00:plus?01:minus	?	0
137	12EE	1	Alarm relay active state	C036	00(NO)/01(NC)	?	1
138	12F0	1	Communicating transmission speed	C071	04(4800bps)/05(9600bps)/06(19200bps)	?	6

139	12F1	1	Communication code	C072	1.-32.	1.	1
140	12F3	1	Communication parity	C074	00(no parity name)/01(even parity)/02(odd parity)	?	0
141	12F4	1	Communication stop bit	C075	1(1bit)/2(2bit)	?	1
142	12F5	1	Comm. Error select	C076	00(trip)/01(trip after deceleration stop)/02(invalid) /03(FRS)/04(deceleration stop)	?	2
143	12F6	1	Debug mode enable	C091	00(No display)/01(Display)	?	0
144	12F7	1	UP/DWN selection	C101	00(No frequency data store)/01(Keep frequency data)	?	0
145	12F8	1	Reset selection	C102	00(Trip cancel during ON)/01(Trip cancel during OFF)/02(Valid only during trip<Cancel during ON>)	?	0
146	12FC	1	1st allowable motor capacity	H003	JPN,USA:0.2/0.4/0.75/1.5/2.2/ 3.7/5.5/7.5/11.0 EU:0.2/0.4/0.55/0.75/1.1/1.5/2. 2/3.0/4.0/5.5/7.5/11.0	?	8
147	12FD	1	2nd allowable motor capacity	H203		?	8
148	1304	2	Communication waiting time	C078	0.-1000.	1.[ms]	0
149	1306	2	Thermistor adj.	C085	0.0-200.0	0.1	1000
150	130B	1	1st motor pole setting	H004	2/4/6/8	?	4
151	130C	1	2nd motor pole setting	H204		?	4
152	1337	2	PID feedback High-LIM	C052	0.0-100.0	0.1	1000
153	1339	2	PID feedback Low-LIM	C053	0.0-100.0	0.1	0
154	133B	2	PID Output limiter	A078	0.0-100.0%	0.1[%]	0
155	133D	2	Setpoint frequency	A145	0.0-400.0Hz	0.1Hz	0
156	133F	2	ON delay time (OUTPUT11)	C144	0.0-100.0	0.1[s]	0
157	1341	2	OFF delay time (OUTPUT11)	C145	0.0-100.0	0.1[s]	0
158	1343	2	ON delay time (OUTPUT12)	C146	0.0-100.0	0.1[s]	0

159	1345	2	OFF delay time (OUTPUT12)	C147	0.0-100.0	0.1[s]	0
160	1347	2	ON delay time (RY)	C148	0.0-100.0	0.1[s]	0
161	1349	2	OFF delay time (RY)	C149	0.0-100.0	0.1[s]	0
162	1354	1	1st motor voltage select	H007	00(200V)/ 01(400V)	?	0
163	1355	1	2nd motor voltage select	H207	00(200V)/ 01(400V)	?	0
164	135B	2	Comm. Error time	C077	0.00-99.99	0.01[s]	0
165	1361	1	Over current prevention	b140	00(OFF)/01(ON)	?	0
166	1362	1	“AT” terminal selection	A005	00(O/OI)/01(Invalid(O+OI))/02(O/VR)/03(OI/VR)	?	0
167	1363	1	Carrier Mode	b150	00(OFF)/01(reduceing)	?	0
168	1364	1	Intelligent terminal 1 active state	C011	00(NO)/01(NC)	?	0
169	1365	1	Intelligent terminal2 active state	C012			0
170	1366	1	Intelligent terminal 3 active state	C013			0
171	1367	1	Intelligent terminal 4 active state	C014			0
172	1368	1	Intelligent terminal 5 active state	C015			0
173	1369	1	Intelligent terminal 6 active state	C016			0
174	136A	1	Terminal 11 active state	C031	00(NO)/01(NC)	?	0
175	136B	1	Terminal 12 active state	C032			0
176	136C	1	Cal.frequency1	A141	00(operator)/01(VR) 02(O input)/03(OI input)/04(Network)	?	2
177	136D	1	Cal.frequency2	A142		?	3
178	136E	1	Cal.select	A143	00(A141+A142)/01(A141-A142)/02(A141*A142)	?	0

179	136F	1	Logic output1	C141	00(RUN)/01(FA1)/02(FA2)/03(OL)/04(OD) 05(AL)/06(Dc)/07(FBV)/08(NDc)	?	0
180	1370	1	Logic output2	C142		?	1
181	1371	1	AND/OR/XOR select	C143	00(AND)/01(OR)/02(XOR)	?	0

4.3.6 Trip monitor parameters

Trip monitor parameters are automatically latched by gateway ~120 ms after that inverter reports the TRIP state. The trip monitor data latching can be also initiated manually by issuing 0-1 transition in writing parameter 616. All trip monitor data parameters are read only.

Index	Data type	Description
200	Unsigned8	Trip factor
201	Unsigned16	Trip frequency
202	Unsigned16	Trip current
203	Unsigned16	Trip DC bus voltage
204	Unsigned32	Run time
205	Unsigned32	On time

5 Diagnostic and special features

5.1 Led operations

LED1  Power supply

LED2  Inverter status

LED3  Inverter condition

LED4  PROFIBUS status

LED5  Gateway status

In the operational mode the meanings of LEDs are:

LED Functions	Color	Behaviour in prototype
LED1 Power Supply	Red	Inverter main supply is ON
	Green	Gateway power supply is ON
	Orange	Both power supplies are ON
	Blank	Both power supplies are OFF
LED2 Inverter Status	Green	Inverter in Run state
	Blank	Inverter in Stop state
	Red	The inverter can't run (unquitted trip)
LED3 Inverter Mode	Blank	Normal mode
	Red blinking	Trip detected, the inverter is waiting for the trip reset
	Red	The inverter is faulted also after the trip reset
LED4 Profibus Status	Red	Profibus cable disconnected or gateway not in data-exchange.
	Blank	Regular profibus connection
LED5 Gateway Status	Blank	High speed protocol communication error
	Green	Communication is regular

The configuration mode condition (rotary switches in 00 position) is indicated:

LED1 (Green/Red,Orange)	Orange
LED2 (Green/Red)	Red
LED3 (Green/Red)	Blank
LED4 (Red)	Red
LED5 (Green)	Blank

5.2 Troubleshooting

The main working conditions and most common errors are signaled by the two leds (refer to 3.3 “Led operation” paragraph). The table below shows some error conditions to be handled

Error condition	Possible cause
The drive does not start.	In the basic block mode verify that: - the NetCtrl bit is set. - the NetRef bit is set and that a speed reference is given. In the ProfiDrive mode verify that: - parameter 928 is set to 1.
The motor is running at a different speed from reference one	In the basic block mode verify that: - the NetRef bit is set In the ProfiDrive mode check that: - parameter 928 is set to 1.
The drive does not respond to new value setting	Verify that value does not exceed min/max limit.