

Hitachi Inverter

SJ200/L200/X200 Series

SJ2-PB (Profibus Interface Option)

INSTRUCTION MANUAL

SJ2-PB

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1 Introduction

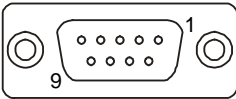
SJ2-PB gateway is a communication module controlling Hitachi SJ200, L200 and X200 inverters from Profibus DP network. The module is powered through RJ45 connector and it is connected to the inverter by means of RS422. The Profibus network can be operated up to 12 Mbit/s. The operator panel (OPE) can 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	Via the serial port 4.75-5.25 VDC, 5 VDC nominal
Current range	260 mA
Indicators	5 green/red/orange LEDs
Addressing	Via 2 rotary switches
Profibus-DP	EN 50170
Baud rate	9.6 Kbaud up 12 Mbaud
Controller	SPC3
Interface	RS485
Connector	1 DB9 connector
Serial port for inverter	
Type RS-422	
Connector	RJ45 (used also for gateway power supply)
Serial port for OPE	(also used as a firmware download port)
Type RS-422	
Connector	RJ45
Temperature	
Operating	0 to 50 C°
Storage	-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

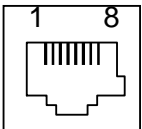
1.2.1 Profibus connector



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.	

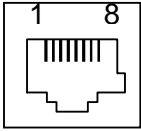
1.2.2 RS422 Inverter connector



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.	

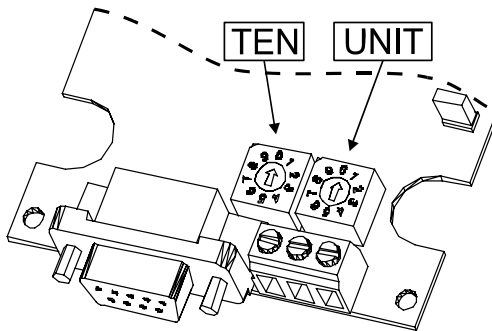
1.2.3 RS422 OPE connector



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

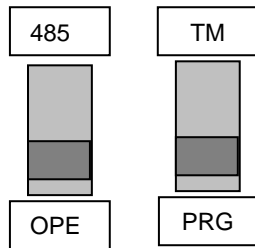


Two rotary switches configure the module profibus DP address.

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).

1.4 Inverter dip-switch setup



Set internal dip-switch as showed above to get correct communication between inverter and remote controller.

2 Operating modes

The inverter can be driven in two modes:

- a direct Profibus DP drive using a predefined memory map or single channel modules (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 (XXXX.gsd) for the configuration of basic mode and another gsd file (XXXX.gsd) for the configuration of ProfiDrive mode.

If using the Basic Mode it is possible to configure any combination of modules specified in the gsd file. There is a Basic block module which 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. There are also various input/output modules which access inverter parameters referencing them by parameter index or by parameter address.

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 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 inverter 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 inverter.

3 Basic mode

3.1 The gsd file format

The Basic mode is configured using appropriate gsd file for basic mode. Inverter types SJ200 and L200 share the same format but setting of the bit7 of the first parameter byte selects if module is to be used with SJ200 or L200 type. The inverter type X200 uses different (shorter) module parameters and in that way gateway can also detect that it is gsd file to be used with X200 type. Before accepting the profibus configuration the gateway reads the type from the inverter. If the type selected in the profibus configuration is not the type that the gateway dynamically detects at the startup the profibus configuration will be refused.

3.1.1 Gsd file format for types SJ200 and L200

The modules available in the gsd file are specified using the following format of the profibus parameters:

Byte 1 – 8 bit flags

Byte 2 and 3 – parameter index or address

Byte 4-5 or 4-7 – optional min-max values of the output parameter

Byte (flags) format

Bit	Value 0	Value 1
7	SJ200	L200
6	Input	Output
5	Not generic	Generic
4	Not swapped	Swapped
3	Index based	Address based
2	Data length (number of bytes minus 1, 0 means 1 byte etc..)	
1		
0		

Bit 7 specifies the inverter type.

Bit 6 distinguish the input and output parameters

Bit 5 specifies whether the output parameter has the parametrized min-max value (not significant for the input parameters)

Bit 4 specifies whether the words in the module use HI-LO or LO-HI order (0 means HI-LO)

Bit 3 specifies whether the bytes 2 and 3 of the module parameters are parameter index or parameter address

Bits 2-1 are data length minus 1 (eg. parameter of type word has here the value 1)

Bytes 2 and 3:

These bytes are the parameter index or parameter address in format (Hi-Lo). Whether here is index or address is specified by the bit 3 in the first parameter byte of the module. The value 0xffff specifies a special basic-block module.

Bytes 4 and 5 (for generic output parameter of size 1 byte)

Byte 4 = Min output value

Byte 5 – Max output value

Bytes 4, 5, 6, 7 (for generic output parameter of size 2 bytes)

Bytes 4,5 – Min Value (Hi-Lo)

Bytes 6,7 – Max Value (Hi-Lo)

Inverter parameters can be accessed both in index mode and in address mode. The gateway internal parameters (index > 600) or the standard profidrive parameters (index > 900) can be accessed only in the index mode.

Some examples:

Module	Profibus cfg.	Profibus parameters
L200 Get acceleration (non inverted, index based)	0x50	0x81 0x00 0x07
L200 Get acceleration (inverted, address based)	0x50	0x99 0x12 0x10
L200 Basic block (non inverted)	0xF3	0xC7 0xFF 0xFF
L200 Set deceleration (non inverted, index based, generic, min 0x0001, max 0x7530)	0x60	0xE1, 0x00, 0x09, 0x00, 0x01, 0x75, 0x30

3.1.2 Gsd file format for type X200

The modules available in the gsd file are specified using the following format of the profibus parameters:

Byte 1 – 4 bit flags, low nibble of higher index/address byte

Byte 2 – low byte of parameter index/address

Byte 3-4 or 5-6 – optional min-max values of the output parameter

Byte (flags) format

Bit	Value 0	Value 1
7	Input	Output
6	Not generic	Generic
5	Not swapped	Swapped
4	Index based	Address based
3	Low nibble of the higher byte of the parameter index/address (hex: xXxx)	
2		
1		
0		

Bit 7 distinguish the input and output parameters

Bit 6 specifies whether the output parameter has the parametrized min-max value (not significant for the input parameters)

Bit 5 specifies whether the words in the module use HI-LO or LO-HI order (0 means HI-LO)

Bit 4 specifies whether the bytes 2 and 3 of the module parameters are parameter index or parameter address

Bytes 2:

This byte is the lower byte of the parameter index or address. Whether here is index or address is specified by the bit 4 in the first parameter byte of the module.

Bytes 3 and 4 (for generic output parameter of size 1 byte)

Byte 4 – Min output value

Byte 5 – Max output value

Bytes 3, 4, 5, 6 (for generic output parameter of size 2 bytes)

Bytes 3,4 – Min Value (Hi-Lo)

Bytes 5,6 – Max Value (Hi-Lo)

So there are 12 bits for specifying index/address. This 12 bits are converted to 16 bit word. If index is specified the highest 4 bits of the word are set to 0000b. If address is used the highest 4 bits of the word are set to 0001b. The value 0x0fff specifies a special basic-block module. That means that the calculated indices can be specified in the range [0x0001-0x0FFE], the addresses can be in the range [0x1000-0x1FFE].

Inverter parameters can be accessed both in index mode and in address mode. The gateway internal parameters (index > 600) or the standard profidrive parameters (index > 900) can be accessed only in the index mode.

Some examples:

Module	Profibus cfg.	Profibus parameters
X200 Get acceleration (index 0x0007) (non swapped, index based)	0x50	0x00 0x07
X200 Get acceleration (address 0x1210) (swapped, address based)	0x50	0x32 0x10
X200 Basic block (non swapped)	0xF3	0x8F 0xFF
X200 Set deceleration (index 0x0009) (non swapped, index based, generic, min 0x0001, max 0x7530)	0x60	0xC0, 0x09, 0x00, 0x01, 0x75, 0x30

3.2 Basic block module

By using Basic block module the essential control/measurement variables and parameters are accessed directly from the formatted IO space.

3.3 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

3.3.1 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 SJ2-PB 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).

3.3.2 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	Inv 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)
Inv Ref	If it is set to 0 the terminal block will be used as speed reference. If it is set to 1 the potentiometer on top of the inverter is used as speed reference.
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

3.3.3 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	Trip Cause	Faulted	Net Ref	Inv Ref	Net Ctrl	Trip cond 1	Trip cond 2	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.
Trip Cause	It determines the reason of the current fault: 0x00 – Overcurrent at const.speed/other conditions, 0x01- Overcurrent at deceleration, 0x02 - Overcurrent at acceleration, 0x03 – Overvoltage, 0x04 – Undervoltage, 0x05 – Overload, 0x06 Eeprom error, 0x08/0x0E – CPU error, 0x0A Thermal error, 0x0D ground error, 0x0F – Oversupply voltage, 0x20 – Braking overl., 0x21 – Unattended Start Protection error, 0x22 – PTC error, 0x25 External trip, 0x28 – Gate array error.
Trip Cond 1 & 2	It determines the circumstances of the faulted drive.
Inv Ref	The drive is currently using the speed reference of the terminal block if set to 0. The drive is currently using the reference of the potentiometer if set to 1.
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	PZD 2	PZD 3	PZD 4	PZD 5	PZD 6	PZD 7	PZD 8	PZD 9	PZD 10
			STW	HSW								
			ZSW	HIW								

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
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PPO5

PKE	IND	PWE	PZD 1	PZD 2	PZD 3	PZD 4	PZD 5	PZD 6	PZD 7	PZD 8	PZD 9	PZD 10
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Standard telegram 1 (Profidrive V3)

PZD 1	PZD 2
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The PKW part of the process data is used for asynchronous parameter access over process 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 identifier (4 bits)

SPM – toggle bit, not used (1 bit)

PNU – parameter number (12 bits)

B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
AKA				SPM	PNU										

PNU parameters 0-900 are Hitachi 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 accessible 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	Invert forward and backward (non-standard extension)
12	0 – control from profibus, 1 – local control (non-standard extension)
13	0 – speed reference from profibus, 1 – local reference (non-standard extension)
14-15	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 appropriate answer available. The usual procedure illustration:

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 response:

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 successfully 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	Incorrect 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 respond 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.

5 List of parameters

Parameters can be divided 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)

5.1 Profidrive standard parameters

These parameters are defined by profibus standard. They are used in ProfiDrive mode.

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
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5.2 Gateway internal parameters

These parameters are used in the ProfiDrive mode

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

5.3 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 (so can't be written by PKW, PZD or DPV1 parameter writing procedure). Anyway, if these parameters are used from Basic mode modules (meaning that ProfiDrive state machine is not running), they can be written.

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	Setpoint 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 300 – 305)
620	Unsigned8	Read-write	Hold last speed (in Basic mode defines the action in the case that profibus is disconnect (0-stop, 1-hold last speed)
621	Unsigned8	Read-write	Write eeprom (in Basic mode) In the case that 1 is written here the inverter parameters are

			saved into inverter eeprom.
622	Unsigned8	Read-only	SJ100/L100 compatible status 0 - stop 1 - run 2 - jogging 3 - free run stop 4 - DC breaking 10 - trip
623	Unsigned8	Read-write	SJ100/L100 compatible run command (2 - forward, 4 – backward, 8 – stop)
624	Unsigned8	Read-only	Detected inverter model: 0x10 – SJ200 0x20 – L200 0x40 – X200

5.4 Gateway application identification parameters

These parameters are used to identify 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

5.5 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 0-40000 what should be interpreted as 0.0 – 400.00 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	address(HEX)	size	function name	code	R/W	DV51 Data range (DF51 Data range : Refer to ES0963X)
1	1204	2	Jump frequency1	A063	R/W	Jump frequency:0.00-400.00 Hz = 0 - 40000 Jump frequency Width:0.00-10.00 Hz = 0 - 1000
2	1206	2	Jump frequency Width 1	A064	R/W	
3	1208	2	Jump frequency2	A065	R/W	
4	120A	2	Jump frequency Width 2	A066	R/W	
5	120C	2	Jump frequency3	A067	R/W	
6	120E	2	Jump frequency Width 3	A068	R/W	
7	1210	2	1st acceleration time	F002	R/W	0.01-99.99[s] = FFFF - D8F1(-1 to -9999) 100.0 - 3000.0[s] = 3E8 - 7530(1000 to 30000)
8	1212	2	2nd acceleration time	F202	R/W	0.01-99.99[s] = FFFF - D8F1(-1 to -9999) 100.0 - 3000.0[s] = 3E8 - 7530(1000 to 30000)

9	1214	2	1st deceleration time	F003	R/W	0.01-99.99[s] = FFFF - D8F1(-1 to -9999) 100.0 - 3000.0[s] = 3E8 - 7530(1000 to 30000)
10	1216	2	2nd deceleration time	F203	R/W	0.01-99.99[s] = FFFF - D8F1(-1 to -9999) 100.0 - 3000.0[s] = 3E8 - 7530(1000 to 30000)
11	1218	2	O start	A011	R/W	0.00-400.00Hz = 0 - 40000
12	121A	2	O end	A012	R/W	0.00-400.00Hz = 0 - 40000
13	121C	2	Base frequency	A003	R/W	30. - Maximum. frequency(Hz) = 30 - A004
14	121E	2	Base frequency, 2nd motor	A203	R/W	30. - 2nd Maximum. frequency (Hz) = 30 - A204
15	1220	2	Maximum frequency	A004	R/W	30.-400.
16	1222	2	Maximum frequency, 2nd motor	A204	R/W	30.-400.
17	1224	2	Multi-speed 0	A020	R/W	0.00, starting frequency-maximum. frequency(Hz) = 0 - A004
18	1226	2	Multi-speed 0, 2nd motor	A220	R/W	0.00, starting frequency-2nd maximum frequency(Hz) = 0 - A204
19	1228	2	Multi-speed1	A021	R/W	0.00, starting frequency-(2nd)maximum frequency(Hz) = 0,b082 - A004,A204
20	122A	2	Multi-speed2	A022	R/W	
21	122C	2	Multi-speed3	A023	R/W	
22	122E	2	Multi-speed4	A024	R/W	
23	1230	2	Multi-speed5	A025	R/W	
24	1232	2	Multi-speed6	A026	R/W	
25	1234	2	Multi-speed7	A027	R/W	
26	1236	2	Multi-speed8	A028	R/W	
27	1238	2	Multi-speed9	A029	R/W	
28	123A	2	Multi-speed10	A030	R/W	
29	123C	2	Multi-speed11	A031	R/W	
30	123E	2	Multi-speed12	A032	R/W	
31	1240	2	Multi-speed13	A033	R/W	
32	1242	2	Multi-speed14	A034	R/W	
33	1244	2	Multi-speed15	A035	R/W	
34	1246	2	Jogging frequency	A038	R/W	0.00, starting frequency-9.99(Hz) = 0,b082 - 999
35	1248	2	Manual torque boost point	A043	R/W	0.0-50.0% = 0 - 500
36	124A	2	Manual torque boost point,2nd motor	A243	R/W	0.0-50.0% = 0 - 500
37	124C	2	Auto boost Voltage compensate gain	A046	R/W	0.-255.% = 0 - 255
38	124E	2	Auto boost Voltage compensate	A246	R/W	0.-255.% = 0 - 255

			gain, 2nd motor			
39	1250	2	Auto boost Slip compensate gain	A047	R/W	0.-255.% = 0 - 255
40	1252	2	Auto boost Slip compensate gain,2nd motor	A247	R/W	0.-255.% = 0 - 255
41	1258	2	DC braking frequency settibg	A052	R/W	starting frequency - 60.00(Hz) = b082 - 6000
42	125A	2	DC braking time for deceleration	A055	R/W	0.0-60.0[s] = 0 - 600
43	125C	2	1st frequency upper limit setting	A061	R/W	0.00, 1st frequency lower limit-maximum frequency(Hz) = 0,A062 - A004
44	125E	2	2nd frequency upper limit setting	A261	R/W	0.00, 2nd frequency lower limit - 2nd setting maximum frequency(Hz) = 0,A262-A204
45	1260	2	1st frequency lower limit setting	A062	R/W	0.00, start frequency- 1st frequency upper limit (Hz) = 0,b082 - A061
46	1262	2	2nd frequency lower limit setting	A262	R/W	0.00, start frequency-2nd frequency upper limit (Hz) = 0,b082 - A261
47	1264	2	PID-I gain	A073	R/W	0.0-150.0[s] = 0 - 1500
48	1266	2	PID-D gain	A074	R/W	0.00-99.99/100.0[s] = 0 - 10000
49	1268	2	PID scale	A075	R/W	0.01-99.99 = 1 - 9999
50	126A	2	Motor voltage selection	A082	R/W	200V class:200/215/220/230/240 400V class:380/400/415/440/460/480
51	126C	2	Acceleration time2	A092	R/W	0.01-99.99[s] = FFFF - D8F1(-1 to -9999) 100.0 - 3000.0[s] = 3E8 - 7530(1000 to 30000)
52	126E	2	Acceleration time2(2nd motor)	A292	R/W	0.01-99.99[s] = FFFF - D8F1(-1 to -9999) 100.0 - 3000.0[s] = 3E8 - 7530(1000 to 30000)
53	1270	2	Deceleration time2	A093	R/W	0.01-99.99[s] = FFFF - D8F1(-1 to -9999) 100.0 - 3000.0[s] = 3E8 - 7530(1000 to 30000)
54	1274	2	Deceleration time2(2nd motor)	A293	R/W	0.01-99.99[s] = FFFF - D8F1(-1 to -9999) 100.0 - 3000.0[s] = 3E8 - 7530(1000 to 30000)
55	1276	2	Acc1 to Acc2 frequency transition point	A095	R/W	0.0-400.0[Hz] = 0 - 4000
56	1278	2	Acc1 to Acc2 frequency transition point(2nd motor)	A295	R/W	0.0-400.0[Hz] = 0 - 4000
57	127A	2	Dcc1 to Dcc2 frequency	A096	R/W	0.0-400.0[Hz] = 0 - 4000

			transition point			
58	127C	2	Dcc1 to Dcc2 frequency transition point(2nd motor)	A296	R/W	0.0-400.0[Hz] = 0 - 4000
59	127E	2	OI start	A101	R/W	0.00-400.00[Hz] = 0 - 40000
60	1280	2	OI end	A102	R/W	0.00-400.00[Hz] = 0 - 40000
61	1282	2	Retry wait time	b003	R/W	0.3-100.0[s] = 3 - 1000
62	1284	2	Electronic thermal level	b012	R/W	20.00%-120.00% (rated inverter current) = 2000 - 12000
63	1286	2	Electronic thermal level(2nd motor)	b212	R/W	20.00%-120.00% (rated inverter current) = 2000 - 12000
64	1288	2	Overload restriction setting	b022	R/W	DV51:10.00%-150.00% (rated inverter current) = 1000 - 15000 DF51 :20.00%-150.00% (rated inverter current) = 2000 - 15000
65	128A	2	Deceleration rate at Overload restriction	b023	R/W	0.1-30.0[s] = 1 - 300
66	128C	1	Frequency source setting,2nd motor	A201	R/W	00(VR)/01(terminal)/02(operator)/03(Modbus)/10(Output of cal. function)
67	128D	1	Run command source setting,2nd motor	A202	R/W	01(terminal)/02(operator)/03(Modbus)
68	128E	1	Intelligent terminal 1 function setting,2nd motor	C201	R/W	00(FW:Forward)/01(RV:Reverse)/02(CF1:Multi_Speed1)/03(CF2:Multi_Speed2)/04(CF3:Multi_Speed3)/05(CF4:Multi_Speed4)
69	128F	1	Intelligent terminal 2 function setting,2nd motor	C202	R/W	/06(JG:Jogging)/07(DB:External DCbraking)/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 function)/29(UDC:Remote data clear)/31(OPE:Operating by operator select)/50(ADD)/51(F-TM)/52(RDY: Quick starting)/53(SP-SET: Special Set Terminal)/ [only X200] 64 (EMR: Safe stop)/255(No:No assign)
70	1290	1	Intelligent terminal 3 function setting,2nd motor	C203	R/W	
71	1291	1	Intelligent terminal 4 function setting,2nd motor	C204	R/W	
72	1292	1	Intelligent terminal 5 function setting,2nd motor	C205	R/W	
73	1293	1	Intelligent terminal 6 function setting,2nd motor	C206	R/W	
74	1294	2	Start frequency adjustment	b082	R/W	0.50-9.90[Hz] = 50 - 990
75	1296	2	Frequency scaling conversion factor	b086	R/W	0.1-99.9 = 1 - 999
76	1298	2	Dynamic braking usage	b090	R/W	0.0-100.0 = 0 - 1000

77	129A	2	BRD ON level	b096	R/W	DV51: 200V class 330-395[V]=330-395/ 400V class 660-790(V)=660-790
78	129C	2	Overload advance notice level	C041	R/W	0.00%-200.00% (rated inverter current) = 0 - 20000
79	129E	2	Frequency arrival setting for acceleration.	C042	R/W	0.0-400.0[Hz] = 0 - 4000
80	12A0	2	Arrival frequency setting for deceleration.	C043	R/W	0.0-400.0[Hz] = 0 - 4000
81	12A2	2	PID deviation level setting	C044	R/W	0.0-100.0[%] = 0 - 1000
82	12A4	2	O input scan calibration	C081	R/W	0.0-200.0 = 0 - 2000
83	12A6	2	OI input scan calibration	C082	R/W	0.0-200.0 = 0 - 2000
84	12A8	2	AM offset adjustment	C086	R/W	0.0-10.0 = 0 - 1000
85	12AA	2	1st stabilizing factor	H006	R/W	0.-255.[%] = 0 - 255
86	12AC	2	2nd stabilizing factor	H206	R/W	0.-255.[%] = 0 - 255
87	12AE	1	Keypad Run Key routing (Operation direction selection)	F004	R/W	00(forward)/01(reverse)
88	12AF	1	Frequency source setting	A001	R/W	EU,USA: 00(VR)/01(terminal)/02(operator)/03(Modbus)/10(Output of cal.function) JPN : 00(VR)/01(terminal)/02(operator)/03(Modbus)
89	12B0	1	Run command source setting	A002	R/W	01(terminal)/02(operator)/03(Modbus)
90	12B1	1	O start rate	A013	R/W	0.-100.[%] = 0 - 100
91	12B2	1	O end rate	A014	R/W	0.-100.[%] = 0 - 100
92	12B3	1	O start selection	A015	R/W	00(external start frequency)/01(0Hz)
93	12B4	1	O, OI sampling	A016	R/W	1.-17.
94	12B5	1	Jog stop mode	A039	R/W	00(free-run stop) / 01(Controlled deceleration) / 02(DC braking to stop)
95	12B6	1	Torque boost method selection	A041	R/W	00 (manual torque boost) / 01 (manual + automatic boost)
96	12B7	1	Torque boost method selection, 2nd motor	A241	R/W	00 (manual torque boost) / 01 (manual + automatic boost)
97	12B8	1	Manual torque boost	A042	R/W	0.0-20.0[%] = 0 - 200
98	12B9	1	Manual torque boost, 2nd motor	A242	R/W	0.0-20.0[%] = 0 - 200
99	12BA	1	V/f characteristic curve selection	A044	R/W	DV51: 00(VC)/01(VP1.7power)/(I-SLV) DF51 : 00(VC)/01(VP1.7power)
100	12BB	1	V/f characteristic curve selection 2nd motor	A244	R/W	DV51: 00(VC)/01(VP1.7power)/(I-SLV)

						DF51 : 00(VC)/01(VP1.7power)
101	12BC	1	Output voltage gain	A045	R/W	20.-100.[%] = 20 - 100
102	12BD	1	DC braking enable	A051	R/W	00(disable)/01(enable)
103	12BE	1	DC braking wait time	A053	R/W	0.0-5.0[s] = 0 - 50
104	12BF	1	DC braking during decelerationg	A054	R/W	0.-100.[%] = 0 - 100
105	12C0	1	DC braking enable input signal edge/level selection	A056	R/W	00(edge action)/01(level action)
106	12C2	1	PID enable	A071	R/W	00(disable)/01(enable)
107	12C3	1	PID-P gain	A072	R/W	0.2-5.0 = 2 - 50
108	12C4	1	PID feedback selection	A076	R/W	EU,USA:00(OI)/01(O)/02(Network)/10(Output of cal.function) JPN:00(OI)/01(O)
109	12C5	1	AVR selection	A081	R/W	00(ON always)/01(OFF always)/02(OFF on decelerating)
110	12C6	1	Select mothod to switch to Acc2/Dcc2 profile	A094	R/W	00(change with 2CH terminal)/01(change with setting)
111	12C7	1	Select mothod to switch to Acc2/Dcc2 profile(2nd motor)	A294	R/W	00(change with 2CH terminal)/01(change with setting)
112	12C8	1	Acceleration curve selection	A097	R/W	00(Linear)/01(S-curve)
113	12C9	1	Deceleration curve selection	A098	R/W	00(Linear)/01(S-curve)
114	12CA	1	OI start rate	A103	R/W	0.-100.[%] = 0 - 100
115	12CB	1	OI end rate	A104	R/W	0.-100.[%] = 0 - 100
116	12CC	1	OI start selection	A105	R/W	00(external start frequency)/01(0Hz)
117	12CD	1	Automatic Restart Selection	b001	R/W	00(alarm output trip,NO restart)/01(Restart at 0Hz)/02(start after frequency matching)/03(trip after frequency matching,then deceleration stop)
118	12CE	1	Allowable under-voltage power failure time	b002	R/W	0.3-25.0[s] = 3 - 250
119	12CF	1	Instantaneous power failure/ under-voltage trip during stop	b004	R/W	00(invalid)/01(valid)
120	12D0	1	Instantaneous power failure/ under-voltage retry time selection	b005	R/W	00(16 times)/01(Retry until starting)
121	12D1	1	1st electronic thermal characteristic selection	b013	R/W	00(reduced characteristic 1)/01(constant torque characteristic)/02(reduced characteristic 2)
122	12D2	1	2nd electronic thermal characteristic selection	b213	R/W	00(reduced characteristic 1)/01(constant torque characteristic)/02(reduced characteristic 2)
123	12D3	1	Overload restriction operation mode	b021	R/W	00(disable)/01(enabled on acceleration / constant speed)/

						02(enabled on constant speed)
124	12D4	1	Software lock mode selection	b031	R/W	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 terminal is ON)/02(impossible to change the data setting except b031)/03(impossible to change the data setting except b031and frequency setting parameters)/10(High-level access including b031)
125	12D6	1	AM adjustment	b080	R/W	0-255
126	12D8	1	Carrier Frequency setting	b083	R/W	2.0-14.0[kHz] = 20 - 140
127	12D9	1	Initialization mode	b084	R/W	00(Trip history clear)/01(Parameter initialization)/02(Trip history clear + Parameter initialization)
128	12DA	1	Country code for initialization	b085	R/W	00(JPN)/01(EU)/02(USA)
129	12DB	1	STOP key enable	b087	R/W	00(enable)/01(disable)
130	12DC	1	Restart mode after FRS	b088	R/W	00(Restart from 0Hz)/01(Restart from f-matching)
131	12DD	1	Stop mode selection	b091	R/W	00(deceleration and stop)/01(Free-run to stop)
132	12DE	1	Cooling fan control	b092	R/W	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)
133	12DF	1	BRD selection	b095	R/W	00(disable)/01(enable<disable during stop>)/02(enable<enable during stop too>)
134	12E0	1	Over-voltage LADSTOP enable	b130	R/W	00(Disable)/01(Enable)
135	12E1	1	Intelligent terminal 1 function setting	C001	R/W	00(FW:Forward)/01(RV:Reverse)/02(CF1:Multi-speed1)/03(CF2:Multi-speed2)/
136	12E2	1	Intelligent terminal 2 function setting	C002	R/W	04(CF3:Multi-speed3)/05(CF4:Multi-speed4)/06(JG:Jogging)/
137	12E3	1	Intelligent terminal 3 function setting	C003	R/W	07(DB:External DC braking)/08(SET:2nd control)/09(2CH:two-stage adjustable speed)/
138	12E4	1	Intelligent terminal 4 function setting	C004	R/W	11(FRS:Free-run)/

139	12E5	1	Intelligent terminal 5 function setting	C005	R/W	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 function)/29(UDC:Remote data clear)/31(OPE:Operating by operator select)/50(ADD)/51(F- TM)/255(No:No assign)
140	12E6	1	Intelligent terminal 6 function setting	C006	R/W	00(OFF) / 01(ON)
141	12E7	1	Reverse PID	A077	R/W	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)/10(OPDc: Option comm. disconnect)/[X200 only] 43 (LOC: Low load detect.)
142	12E8	1	Intelligent output 11 setting	C021	R/W	00(Output frequency)/01(Output current)
143	12E9	1	Intelligent output 12 setting	C022	R/W	00:plus 01:minus
144	12EA	1	Alarm relay output	C026	R/W	00(NO)/01(NC)
145	12EC	1	AM selection	C028	R/W	04(4800bps)/05(9600bps)/06(192 00bps)
146	12ED	1	Plus/Minus select	A146	R/W	1.-32.
147	12EE	1	Alarm relay active state	C036	R/W	00(no parity name)/01(even parity)/02(odd parity)
148	12F0	1	Communicating transmission speed	C071	R/W	1(1bit)/2(2bit)
149	12F1	1	Communication code	C072	R/W	00(trip)/01(trip after deceleration stop)/02(invalid) /03(FRS)/04(deceleration stop)
150	12F3	1	Communication parity	C074	R/W	00(No display)/01(Display)
151	12F4	1	Communication stop bit	C075	R/W	
152	12F5	1	Comm. Error select	C076	R/W	
153	12F6	1	Debug mode enable	C091	R/W	

154	12F7	1	UP/DWN selection	C101	R/W	00(No frequency data store)/01(Keep frequency data)
155	12F8	1	Reset selection	C102	R/W	00(Trip cancel during ON)/01(Trip cancel during OFF)/02(Valid only during trip<Cancel during ON>)
156	12FC	1	1st allowable motor capacity	H003	R/W	00-1D(HEX)
157	12FD	1	2nd allowable motor capacity	H203	R/W	
158	1304	2	Communication waiting time	C078	R/W	0.-1000.[ms] = 0 - 1000
159	1306	2	Thermistor adj.	C085	R/W	0.0-200.0 = 0 - 2000
160	130B	1	1st motor pole setting	H004	R/W	2/4/6/8
161	130C	1	2nd motor pole setting	H204	R/W	
162	1323	1	Output voltage gain,2nd motor	A245	R/W	20.-100.[%] = 20 - 100
163	1324	2	Pot start	A151	R/W	0.00-400.00[Hz] = 0 - 40000
164	1326	2	Pot end	A152	R/W	0.00-400.00[Hz] = 0 - 40000
165	1328	1	Pot start rate	A153	R/W	0.-100.[%] = 0 - 100
166	1329	1	Pot end rate	A154	R/W	0.-100.[%] = 0 - 100
167	132A	1	Pot start selection	A155	R/W	00(external start frequency)/01(0Hz)
168	132B	1	Overload restriction operation mode,2nd motor	b221	R/W	00(disable)/01(enabled on acceleration / constant speed)/02(enabled on constant speed)
169	132C	2	Overload restriction setting,2nd motor	b222	R/W	DV51:10.00%-150.00% (rated inverter current) = 1000 - 15000 DF51 :20.00%-150.00% (rated inverter current) = 2000 - 15000
170	132E	2	Deceleration rate at Overload restriction,2nd motor	b223	R/W	0.1-30.0 = 1 - 300
171	1330	1	Overload restriction source selection	b028	R/W	00(b022/b222 setting level)/01(O-L analog input)
172	1331	1	Overload restriction source selection, 2nd motor	b228	R/W	00(b022/b222 setting level)/01(O-L analog input)
173	1332	2	Overload advance notice level,2nd motor	C241	R/W	0.00%-200.00% (rated inverter current) = 0 - 20000
174	1335	2	Over-voltage LADSTOP level	b131	R/W	200V:330-395V = 330 - 395 400V:660-790V = 660 - 790
175	1337	2	PID feedback High-LIM	C052	R/W	0.0-100.0 = 0 - 1000

176	1339	2	PID feedback Low-LIM	C053	R/W	0.0-100.0 = 0 - 1000
177	133B	2	PID Output limiter	A078	R/W	0.0-100.0% = 0 - 1000
178	133D	2	Setpoint frequency	A145	R/W	0.00-400.00Hz = 0 - 40000
179	133F	2	ON delay time (OUTPUT11)	C144	R/W	0.0-100.0[s] = 0 - 1000
180	1341	2	OFF delay time (OUTPUT11)	C145	R/W	0.0-100.0[s] = 0 - 1000
181	1343	2	ON delay time (OUTPUT12)	C146	R/W	0.0-100.0[s] = 0 - 1000
182	1345	2	OFF delay time (OUTPUT12)	C147	R/W	0.0-100.0[s] = 0 - 1000
183	1347	2	ON delay time (RY)	C148	R/W	0.0-100.0[s] = 0 - 1000
184	1349	2	OFF delay time (RY)	C149	R/W	0.0-100.0[s] = 0 - 1000
185	134E	1	Inverter action When communication error.	P045	R/W	00(trip) / 01(trip after deceleration stop) / 02(ignore) / 03(free run) / 04(deceleration stop)
186	134F	1	Polled I/O OUTPUT Instance number	P046	R/W	20, 21, 100
187	1350	1	Polled I/O INPUT Instance number	P047	R/W	70, 71, 101
188	1351	2	Timer setting of communication timeout Whilst running	P044	R/W	0.00 to 99.99(s) = 0 - 9999
189	1353	1	Motor poles setting for revolution per minute	P049	R/W	0 to 38(Only even number is possible to set.)
190	1354	1	1st motor voltage select	H007	R/W	00(200V)/ 01(400V)
191	1355	1	2nd motor voltage select	H207	R/W	00(200V)/ 01(400V)
192	1357	2	Reactive current setting	b032	R/W	0-65535 (ex. 100%=32768 , range=50%-200%)
193	135A	1	Inverter action When Idle mode detected.	P048	R/W	00(trip) / 01(trip after deceleration stop) / 02(ignore) / 03(free run) / 04(deceleration stop)
194	135B	2	Comm. Error time	C077	R/W	0.00-99.99[s] = 0 - 9999
195	1361	1	Over current prevention	b140	R/W	00(OFF)/01(ON)
196	1362	1	"AT" terminal selection	A005	R/W	00(O/OI)/01(Invalid(O+OI))/02(O/VR)/03(OI/VR)

197	1363	1	Carrier Mode	b150	R/W	00(OFF)/01(reduceing)
198	1364	1	Intelligent terminal 1 active state	C011	R/W	00(NO)/01(NC)
199	1365	1	Intelligent terminal2 active state	C012	R/W	
200	1366	1	Intelligent terminal 3 active state	C013	R/W	
201	1367	1	Intelligent terminal 4 active state	C014	R/W	
202	1368	1	Intelligent terminal 5 active state	C015	R/W	
203	1369	1	Intelligent terminal 6 active state	C016	R/W	
204	136A	1	Terminal 11 active state	C031	R/W	00(NO)/01(NC)
205	136B	1	Terminal 12 active state	C032	R/W	
206	136C	1	Cal.frequency1	A141	R/W	00(operator)/01(VR)
207	136D	1	Cal.frequency2	A142	R/W	02(O input)/03(OI input)/04(Network)
208	136E	1	Cal.select	A143	R/W	00(A141+A142)/01(A141-A142)/02(A141*A142)
209	136F	1	Logic output1	C141	R/W	00(RUN)/01(FA1)/02(FA2)/03(OL)
210	1370	1	Logic output2	C142	R/W	04(OD) 05(AL)/06(Dc)/07(FBV)/08(NDc)
211	1371	1	AND/OR/XOR select	C143	R/W	00(AND)/01(OR)/02(XOR)
212	1374	1	A Cause of trip	dbg	R	DV51: 0 – 60 DF51: 0 – 30
213	1375	2	A trip counter	d020	R	0 – 65535 time = 0 – 65535
214	1377	1	The last trip pointer	dbg	R	0 – 2
215	1378	1	A Cause of trip 1	d081	R	DV51: 0 – 60,255 DF51: 0 – 30,255
216	137A	2	Output frequency at trip 1	dbg	R	0.00 – 400.00Hz = 0 – 40000
217	137C	2	output current at trip 1	dbg	R	0.00% – (rated inverter current)
218	137E	2	P–N voltage at trip 1 (DC bus voltage at trip 1)	dbg	R	0.0 – 6553.5V = 0 – 65535
219	1380	4	Accumulated run time at trip 1	dbg	R	0 – 4294836225s = 0 – 4294836225
220	1384	4	Accumulated power ON time at trip 1	dbg	R	0 – 4294836225s = 0 – 4294836225
221	1388	1	A Cause of trip 2	d082	R	DV51: 0 – 60,255 DF51: 0 – 30,255
222	138A	2	Output frequency at trip 2	dbg	R	0.00 – 400.00Hz = 0 – 40000
223	138C	2	output current at trip 2	dbg	R	0.00% – (rated inverter current)
224	138E	2	P–N voltage at trip 2 (DC bus voltage at trip 2)	dbg	R	0.0 – 6553.5V = 0 – 65535
225	1390	4	Accumulated run time at trip 2	dbg	R	0 – 4294836225s = 0 – 4294836225
226	1394	4	Accumulated power ON time at trip 2	dbg	R	0 – 4294836225s = 0 – 4294836225
227	1398	1	A Cause of trip 3	d083	R	DV51: 0 – 60,255 DF51: 0 – 30,255
228	139A	2	Output frequency at trip 3	dbg	R	0.00 – 400.00Hz = 0 – 40000

229	139C	2	output current at trip 3	dbg	R	0.00% - (rated inverter current)
230	139E	2	P-N voltage at trip 3	dbg	R	0.0 - 6553.5V = 0 - 65535
231	13A0	4	Accumulated run time at trip 3	dbg	R	0 - 4294836225s = 0 - 4294836225
232	13A4	4	Accumulated power ON time at trip 3	dbg	R	0 - 4294836225s = 0 - 4294836225
233	13A8	1	Inverter [kW] setting	C196	R	200Vclass 0h:0.2kW 1h:0.37kW 2h:0.4kW 3h:0.55kW 4h:0.75kW 5h:1.1kW 6h:1.5kW 7h:2.2kW 8h:3.0kW 9h:3.7kW Ah:4.0kW Bh:5.5kW Ch:7.5kW 400Vclass 10h:0.2kW 11h:0.37kW 12h:0.4kW 13h:0.55kW 14h:0.75kW 15h:1.1kW 16h:1.5kW 17h:2.2kW 18h:3.0kW 19h:3.7kW 1A:4.0kW 1Bh:5.5kW 1Ch:7.5kW
234	13A9	1	Inverter Voltage class	C197	R	0:200V class 1:400V class
235	13B2	2	MCU version(core)	d106	R	1- 65535
236	13DA	1	Area Code	dbg	R	0:JPN 1:EC 2:USA
237	13DB	2	PTC trip level	dbg	R	0~65535
238	11A8	4	Scaled output frequency monitor	d007	R	0.00 - 9999.00 = 0 - 999900
239	11AC	2	Output frequency monitor	d001	R	0.0 - 400.0[Hz] = 0 - 4000
240	11AE	2	Output current monitor	d002	R	0 - 2000(Filered display of output current to monitor(100ms internal filter time constant),range is 0 to 200% of inverter rated current)
241	11b0	4	Process variable (PV),PID feedback monitor	d004	R	0.00 - 9999.00 = 0 - 999900
242	11b4	2	Intelligent input terminal status	d005	R	bit0:1 bit1:2 bit2:3 bit3:4 bit4:5 bit5:6 bit6,7:RSB SJ200 1 - 6:Intelligent input terminal No. L200, X200 1 - 5:Intelligent input terminal No.
243	11b6	2	Intelligent Output terminal status	d006	R	bit0:RUN,bit1:FA1,bit2:FA2 bit3:OL bit4:OD bit5:AL bit6:DC bit7:FBV bit8:NDC bit9:LOG
244	11C2	2	MCU version(I/O)	d107	R	1- 65535
245	11C4	2	Selected frequency setting.(F001) read only	F001	R	0.00,Starting frequency - 400.0[Hz] = 0,b082 - 4000
246	11C6	1	Rotation direction monitor	d003	R	0:Stop, 1:Forward, 2:Reverse
247	11C7	1	Inverter Status	-	R	00:Initial status,01:(Reserve),02:Stop,03:Run,

						04:Free-run,05:Jogging,06:DC Braking, 07:Retry,08:Trip,09:Under Voltage
248	11C8	2	STW	—	R/W	bit0:RDY,bit1:RSB,bit2:NetRef bit3:NetCtrl bit4:EXT bit5:OPNDc bit6:RSB bit7:RST bit8:RUN bit9:F/R bit10:JOG bit11:DB bit12:SET bit13:FRS bit14:2CH bit15:SFT
249	11CA	2	ZSW	—	R	bit0:Ready,bit1:RSB,bit2:NetRef bit3:NetCtrl bit4:Fault bit5:RUN/STOP bit6:FA1 bit7:FA2 bit8:RSB bit9:F/R bit10:JOG bit11:DB bit12:SET bit13:FRS bit14:2CH bit15:SFT
250	11CC	1	drive reset	—	R/W	0:initial status 1:power-on reset(initiation) 2:power-on reset(preparation)
251	1272	1	Inverter type	-	R	Depends on the inverter model and version.
252	13DA	1	Area code	-	R	0:JPN, 1:EC, 2:USA
253	13DB	2	PTC trip level	-	R	0-65535
260	12D5	1	Instantaneous power failure non stop selection	b050	R/W	0-Off 1-On
261	12EF	1	Communication interface selection	C070	R/W	02-OPEs 03-Modbus
262	1359	1	X200 on board monitor setting	b089	R/W	01 (frequency monitor) 02 (current monitor) 03 (direction monitor) 04 (PID feedback monitor) 05 (Intelligent input terminal monitor) 06 (Intelligent output terminal monitor) 07 (frequency conversion monitor)
263	13E4	1	Operation mode selection	A085	R/W	00 (Normal operation) 01 (Energy-saver operation)
264	13E5	2	Energy saving mode tuning	A086	R/W	0.0-100.0[%], resolution:0.1[%]

265	13E7	1	Restart frequency selection	b011	R/W	00 (frequency when stop) 01 (Max frequency) 02 (Set frequency)
266	13E8	2	Frequency search deceleration time	b029	R/W	0.0 – 3000.0 [s]
267	13EA	2	Frequency search restart current level	b030	R/W	(0.2-2-0)* rated current resolution 0.1 [A]
268	13EC	2	DC bus voltage trigger level during power loss	b051	R/W	0.0-1000.0V, resolution 0.1 [V]
269	13EE	2	Over-voltage LADSTOP level	b052	R/W	0.0-1000.0V, resolution 0.1 [V]
270	13F0	2	Deceleration time setting during power loss	b053	R/W	0.0 – 3000.0 [s]
271	13F2	2	Initial output frequency decrease during power loss	b054	R/W	0.0-10.0 [Hz], resolution 0.1Hz
272	13F4	1	Low current detection selection	C038	R/W	00 (enabled on acceleration, deceleration, constant speed) 01 (enabled on constant speed)
273	13F6	2	Low current detection current level	C039	R/W	(0.0-2.0) * rated inverter current resolution 0.1 [A]
274	13FA	1	PN AVR selection	b133	R/W	00 (Disable) 01 (Enable)
275	13FC	2	PN AVR start voltage	b134	R/W	300-390 : 200V class 660-780 : 400V class
276	11F1	2	Intelligent Output terminal status (for X200)	d006	R	bit0:RUN,bit1:FA1,bit2:FA2,bit3:OL,bit4:OD,bit5:AL,bit6/bit7:not used bit0:DC,bit1:FBV,bit2:NDC,bit3:LOG,bit5:LoC,bit4/6/7:not used
277	13B2	2	MCU Version (for X200)	d106	R	1-65535

Most of the indices can be used with all three inverter types (SJ200, L200, X200). Anyway, some indices do not exist on all types. The following table lists the indices which are not present on all types:

Index	SJ200	L200	X200
37-40	Yes	No	No
73	Yes	No	No
77	Yes	No	No
78	Yes	Yes	No

133	Yes	Yes	No
140	Yes	No	No
145	Yes	Yes	No
150	Yes	Yes	No
181-182	Yes	Yes	No
185-188	Yes	Yes	No
190	Yes	No	No
191	Yes	No	No
192	No	Yes	No
193	Yes	Yes	No
203	Yes	No	No
205	Yes	Yes	No
212-250	Yes	Yes	No
253	Yes	Yes	No
260-277	No	No	Yes






5.6 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
300	Unsigned8	Trip factor
301	Unsigned16	Trip frequency
302	Unsigned16	Trip current
303	Unsigned16	Trip DC bus voltage
304	Unsigned32	Run time
305	Unsigned32	On time

6 Diagnostic and special features

6.1 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

6.2 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: <ul style="list-style-type: none"> - the NetCtrl bit is set. - the NetRef bit is set and that a speed reference is given. In the ProfiDrive mode verify that: <ul style="list-style-type: none"> - parameter 928 is set to 1.
The motor is running at a different speed from reference one	In the basic block mode verify that: <ul style="list-style-type: none"> - the NetRef bit is set In the ProfiDrive mode check that: <ul style="list-style-type: none"> - parameter 928 is set to 1.
The drive does not respond to new value setting	Verify that value does not exceed min/max limit.