Fieldbus Tde Macno

User's manual
PROFIBUS Attachment

Cod. MB00401E00 V_1.7

INDEX

Following the standards regarding the communication profile for drives (PROFIDrive), the profibus message is divided into two independent parts: parametrization data and process data. This makes it possible to work at different speeds on two types of data. The card and the Profibus are connected by means of a DB9 female connector pinned in accordance with the Profibus standard:

Pin n.	Name	Description
1	SHIELD	Protection shield
2		
3	A	Positive Rx/Tx data
4	DE	Control signal for repeater
5	GNDISO	0V power
6	+5VISO	Outgoing power +5V
7		
8	B	Negative Rx/Tx data
9		

The C64 connection makes it possible to enable either the old management which is compatible with the OPD line (C64=2), or the new management (C64=1) allowing for greater flexibility.

1 OLD MANAGEMENT (C64=2)

With this system, the process part has to be set up using the “setup data” variable choosing between five different possibilities; the first two only require a 2-word exchange, the others 6 words. The drive parametrization component is always included and it also allows for the process part configuration.

1.1 APPLICATION CONFIGURATION

1.1.1 Node Configuration

The Profibus node number is the same as that of the serial slave which is set on the drive.
To change the node number:

- Set the parameter P92: drive number.
- Save the data on FLASH (C63=1).
- Switch the drive off and then on again.

Please refer to the drive user manual for parameter matching and how to save the parameters on FLASH.

Name	Description	Range	Default
P92	Profibus node address	1÷255	1

The converter, seen as the slave Profibus node, is able to automatically search for the transmission speed of the Profibus master among the values shown in the table; each speed also includes an indication of the maximum length of each segment in the Profibus network:

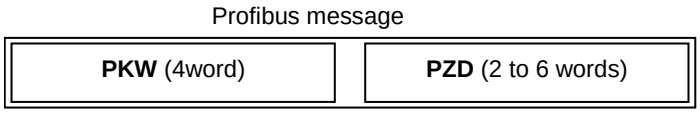
9,6KBd	19,2kBd	45,45kBd	93,75kBd	187,5kBd	500kBd	1,5MBd	3 MBd	6 MBd	12MBd
1200 m	1200 m	1200 m	1200 m	1000 m	400 m	200 m	200 m	200 m	100 m

1.2 MANAGED SERVICES

A cyclical exchange of data has been implemented based on a specific Profibus message according to the indications regarding the standard communication profile for PROFIDrive.

1.2.1 Profibus Message Description

The profibus message is sent cyclically from the master to the drive.
The request to the drive consists of two parts:

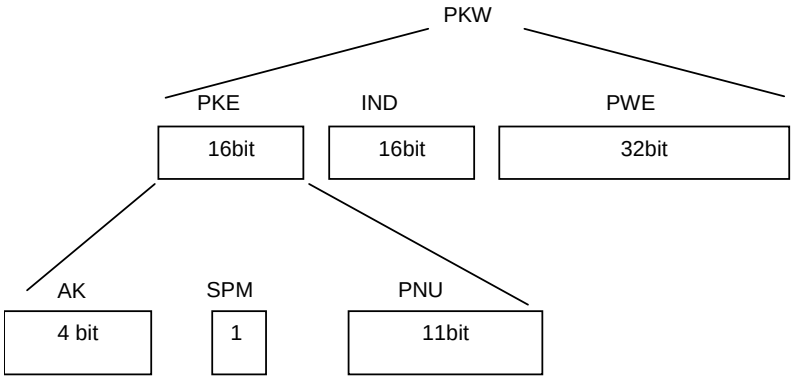


1) PKW : parametrization data
2) PZD : process data

The response from the drive to the master is composed in the same way.
The PZD part can be chosen dynamically between various configurations (see paragraph below).

1.2.2 Parametrization Data: PKW

The PKW message part has a fixed length (4 words), and makes it possible to change the drive parameters. If the application does not require any parameter change, it is sufficient to set the field AK = 0 (No Task). The other fields are automatically disregarded.
The PKW message is composed as follows:



The following description includes all the functions and parameter types allowed by the OPEN DRIVE series.

AK

The AK field contains the operation to be performed.
Valid values for the request from the master to the drive:

AK	Description
0	No task
2	Word reading
3	Double word reading
5	Word writing
6	Double word writing

Valid values for the request from the drive to the master:

AK	Description
0	No task
2	Word reading
3	Double word reading
5	Word writing
6	Double word writing
14	Operation not allowed

If the drive responds with a code **14** (operation not allowed), the PWE field also includes an error code:

PWE	Description
4	Non-existent parameter
5	Type of operation not allowed

PNU

The PNU field contains the type of parameter involved. For parameter descriptions, please refer to the control core bundle. The following table shows the values of the AK and PNU fields of the profibus message for reading and writing operations:

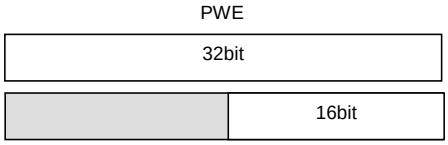
Description	bit no.	Read (AK)	Write (AK)	PNU
Parametres P	16 o 32	2	5	1
Connections C	16	2	5	2
Internal d	16 o 32	2	-	3
Alarms A	16	2	-	4
Inputs I	16	2	5	5
Outputs O	16	2	-	6
data setup	16	2	5	10

IND

The value of the IND field is the order number of the size selected in the case of Parameters P, Connections C and internal sizes d. For alarms A the field IND is disregarded, if the selected PNU = 4, the response will be a 16-bit response where the bit by bit logic status matches the status of the corresponding alarm. For logic inputs I and logic outputs O, the bit by bit correspondence applies and the IND field can only have the values 0 and 1 to select the more or less significant 16-bit words. For a description of all the internal sizes, please refer to the control core bundle.

PWE

The PWE field contains the values of the size selected. For a description of all the internal sizes and their allowed range value, please refer to the control core bundle. The fields within the 32 bits are aligned as follows:

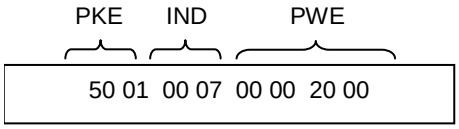


Examples:

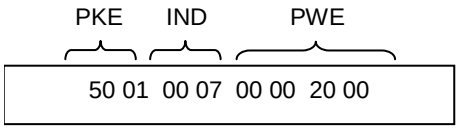
Example no.1: P7 writing = 50%

field	decimal value	hexadecimal value	Description
AK	= 5	= 05H	(word writing)
PNU	= 1	= 01H	(parameter P)
IND	= 7	= 00 07H	
PWE	= 16383x50/100 = 8192	= 00 00 2000 H	

Request MS -> SL:



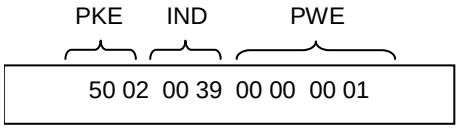
Response SL -> MS:



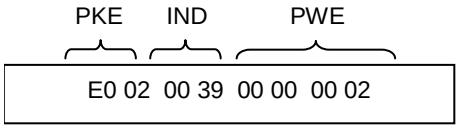
Example no.2: C57 writing =1

Field	dec. value	hexadec. Value	Description
AK	= 5	= 05H	(word writing)
PNU	= 2	= 02H	(connection C)
IND	= 57	= 00 39H	
PWE	= 1	= 00 00 00 01H	

Request MS -> SL:



Response SL -> MS:

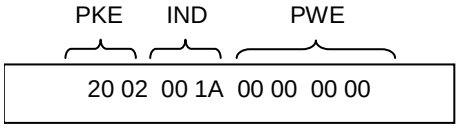


The drive responds with a 0EH code (operation not allowed) because the connection C57 is key-protected (PWE = 02). The key P60=95 has to be set.
Connection C57 remains not set.

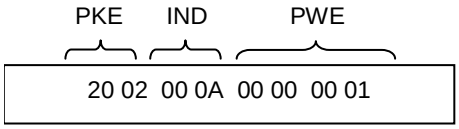
Example no.3: C26 reading

Field	dec. value	hexadec. value	Description
AK	= 2	= 02H	(word reading)
PNU	= 2	= 02H	(connection C)
IND	= 26	= 1AH	

Request MS -> SL:



Response SL -> MS:

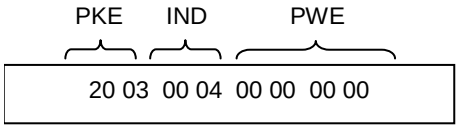


Hence the connection C26 = 1

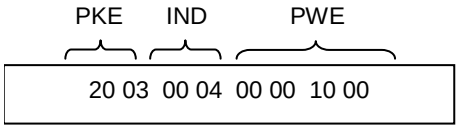
Example no.4: d4 reading (rotation speed)

Field	dec. value	hexadec. value	Description
AK	= 2	= 02H	(word reading)
PNU	= 3	= 03H	(d internal size)
IND	= 4	= 04H	

Request MS -> SL:



Response SL -> MS:



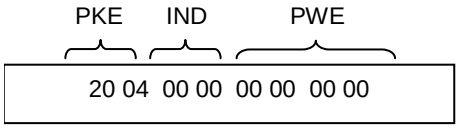
Therefore the value read is 1000H = 4096. The user manual shows that d4 is a full-scale 16383 percentage, hence

V6 = 4096 * 100 /16383 = 25.0%

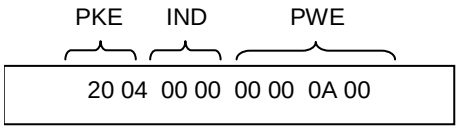
Example no.5: alarm status reading

Field	dec. value	hexadec. value	Description
AK	**= 2**	**= 02H**	**(word reading)**
PNU	**= 4**	**= 04H**	**(alarms A)**

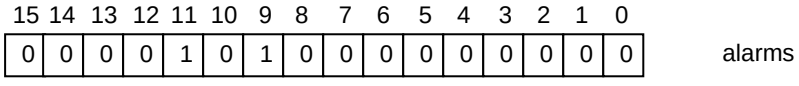
Request MS -> SL:



Response SL -> MS:



Therefore the value read is 0A00H: there are two active alarms, more specifically A9 and A11



1.2.3 Process Data: PZD

The PZD message part contains the data which have to be exchanged cyclically between master and slave: I/O, diagnostics, set point, measured speed, etc. these references are taken into consideration only if the connection “Abilitazione riferimenti da Fieldbus” [“Enable references from Fieldbus”] is on; in any case the converter responds with the current value of the sizes in question.

The control and status words are listed in the following table:

Master → Slave

Control Word	word data1	word data2	word data3	word data4	word data5

Slave → Master

Status Word	word data1	word data2	word data3	word data4	word data5

Control Word:

bit	Description
0	Input L.I.1
1	Input L.I.2
2	Input L.I.3
3	Input L.I.4
4	Input L.I.5
5	Input L.I.6
6	Input L.I.7
7	Input L.I.8
8	*** N.U.
9	*** N.U.
10	*** N.U.
11	*** N.U.
12	*** N.U.
13	*** N.U.
14	*** N.U.
15	*** N.U.

Status Word:

bit	description
0	Output L.O.1
1	Output L.O.2
2	Output L.O.3
3	Output L.O.4
4	*** N.U.
5	*** N.U.
6	*** N.U.
7	*** N.U.
8	Drive ready
9	Drive running
10	*** N.U.
11	*** N.U.
12	*** N.U.
13	*** N.U.
14	*** N.U.
15	*** N.U.

Note1: The RUNinput (di default L.I.4) is in series with that on the terminal board and of the serial (logic AND); the other inputs are read in parallel with those on the terminal board and of the serial (logic OR).

Note2: the meaning of the 8 logic inputs and of the 4 logic outputs is the same as the corresponding inputs/outputs available on the terminal board. Please refer to the control core bundle for an explanation of the meaning of the various inputs/outputs and their configuration.

For the DATA part it is possible to choose one of the following configurations:

0)	Speed (16bit)			
1)	Torque (16bit)			
2)	Speed (16bit)	Torque (16bit)	N.U.	Application inputs (32bit)
3)	Speed (16bit)	Position (32bit)		Application inputs (32bit)
4)	Speed (16bit)	Torque (16bit)	Max. torque (16bit)	Application inputs (32bit)

The full-scales of the previous sizes are:

Data	Standardisation	Meaning
Speed	16384	= 100% maximum working speed
Torque	4095	= 100% nominal motor torque
Position	65536	= 1 mechanical turn
Torque limit	4095	= 100% nominal motor torque

In cases 0, 1 the DATA field is 2-byte long, in cases 2, 3, 4 it is 10-byte long.
The data from the master are references, while the data sent by the drive are the current values of the corresponding adjusted sizes.

The configuration is chosen dynamically and it can be changed only with the motor in “Stop” position.
To modify the chosen configuration, use the parameter part which contains the “**setup data**” (PNU = 10), setting to the required value (0÷4) the 0-byte index (AK = 5, IND = 0).

It is also possible to configure the same “setup data” variable using OPDExplorer and then save it in the permanent memory always using the command C63.

Name	Description
PDP_SETUP_DATA	Profibus DP setup data

Application inputs

In the configurations from 2) to 4) with word data4 and word data5 it is possible to write the logic status of the inputs. With the same reading words, the standard 32 logic output status of the converter is available.

1.2.4 Profibus DP Device Description: GSD File

Each Profibus DP device is associated to a file with the extension GSD which specifies all its characteristics, such as allowed transmission speed, maximum message length, meaning of diagnostics messages ...
The GSD is used by the Profibus master to understand the slave characteristics.

The GSD file OPEN DRIVE is available: OpenDr.gsd

2 NEW MANAGEMENT (C64=2)

With this new management, the drive parametrization part may be present or not; for the rest it manages exactly the same services as the old version, plus possible access to the sizes in the Dictionary of CAN objects.
The process part can be configured completely up to 10 words incoming or outgoing. The mapping reference is the Dictionary of CAN objects in the drive: to select an internal size it is sufficient to indicate its index and subindex.

2.1 APPLICATION CONFIGURATION

2.1.1 Node Configuration

Through OPDExplorer it is possible to set the following parameters:

Name	Description
NODE_SLAVE_ADDR	number of the Profibus node
DATA_CONSISTANCE	Consistency of the data exchanged
EN_ACYCLIC_DATA	enable PKW parametrization or not
EN_BIG_ENDIAN	With this representation the first byte transmitted is the most significant

And check the status of the profibus slave node

FLDB_ERROR_CODE	Fieldbus error code
FLDB_STATE	Fieldbus node status: WAIT_PRM = waiting for programming WAIT_CFG = waiting for configuration DATA_EX = data exchange in progress ERROR = node error

After completing the configuration:

- Save the data in FLASH (C63=1)
- Switch the drive off and then on again.

The converter, seen as the slave Profibus node, is able to automatically search for the transmission speed of the Profibus master among the values shown in the table; each speed also includes an indication of the maximum length of each segment in the Profibus network:

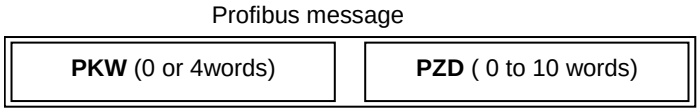
9,6KBd	19,2kBd	45,45kBd	93,75kBd	187,5kBd	500kBd	1,5MBd	3 MBd	6 MBd	12MBd
1200 m	1200 m	1200 m	1200 m	1000 m	400 m	200 m	200 m	200 m	100 m

2.2 MANAGED SERVICES

A cyclical exchange of data has been implemented based on a specific Profibus message according to the indications regarding the standard communication profile for PROFIDrive.

2.2.1 Profibus Message Description

The profibus message is sent cyclically from the master to the drive.
The request to the drive consists of two parts:

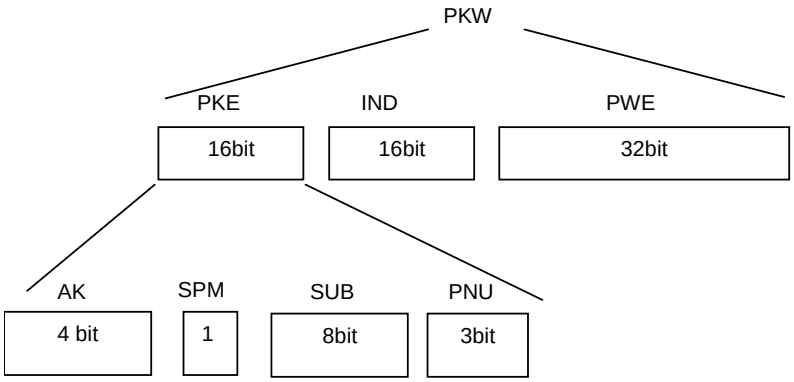


3) PKW: parametrization data
4) PZD: process data

The response from the drive to the master is composed in the same way.
The PKW part may be enabled or not.
The PZD part may be completely programmed in terms of word number and meaning.

2.2.2 Parametrization Data: PKW

The PKW message part has a fixed length (4 words), and makes it possible to change the drive parameters. If the application does not require any parameter change, it is sufficient to set the field AK = 0 (No Task). The other fields are automatically disregarded.
The PKW message is composed as follows:



The following description includes all the functions and parameter types allowed by the OPEN DRIVE series.

AK

The AK field contains the operation to be performed.
Valid values for the request from the master to the drive:

AK	Description
0	No task
2	Word reading
3	Double word reading
5	Word writing
6	Double word writing

Valid values for the response from the drive to the master:

AK	Description
0	No task
2	Word reading
3	Double word reading
5	Word writing
6	Double word writing
14	Operation not allowed

If the drive responds with a code **14** (operation not allowed), the PWE field specifies an error code:

PWE	Description
4	Non-existent parameter
5	Type of operation not allowed

PNU

The PNU field contains the type of parameter involved. For parameter descriptions, please refer to the control core bundle. The following table shows the values of the AK and PNU fields of the profibus message for reading and writing operations:

Description	bit no.	Read (AK)	Write (AK)	PNU
Parameters P	16 o 32	2	5	1
Connections C	16	2	5	2
Internal d	16 o 32	2	-	3
Alarm A	16	2	-	4
Inputs I	16	2	5	5
Outputs O	16	2	-	6
Dictionary CAN	16	2	5	7

IND

The value of the IND field is the serial number of the size selected in the case of Parameters P, of Connections C and internal sizes d.
For alarms A the field IND is disregarded, if the selected PNU = 4, the response will be a 16-bit response where the bit by bit logic status corresponds to the status of the corresponding alarm.
For logic inputs I and logic outputs O, the bit by bit correspondence applies and the IND field can only have the values 0 and 1 to select the more or less significant 16-bit words.
For a description of all the internal sizes, please refer to the control core bundle.

SUB

If PNU is set = 7, in order to access required object in the Dictionary CAN it is necessary to set the index in the IND field and the subindex in the SUB field.

PWE

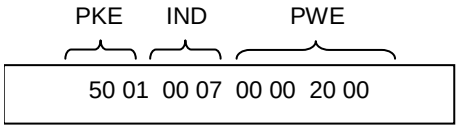
The PWE field contains the selected size value.
It is possible to send the most significant (Big-Endian) or the least significant (Little-Endian) byte first, using the configuration parameter “EN_BIG_ENDIAN” of OPDExplorer.

Examples:

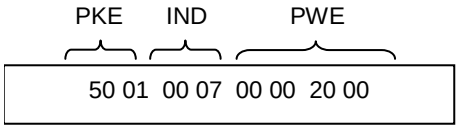
Example no.1: P7 writing = 50%

Field	decimal value	hexadecimal value	Description
AK	= 5	= 05H	(word writing)
PNU	= 1	= 01H	(parameter P)
IND	= 7	= 00 07H	
PWE	= 16383x50/100 = 8192	= 00 00 2000 H	

Request MS -> SL:



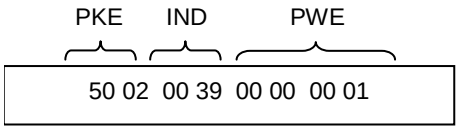
Response SL -> MS:



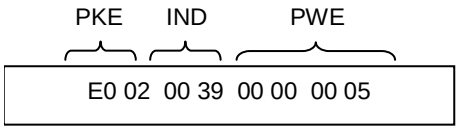
Example no.2: C57 writing = 1 (enable radiator thermal probe management)

Field	dec. value	hexadec. Value	Description
AK	= 5	= 05H	(word writing)
PNU	= 2	= 02H	(connection C)
IND	= 57	= 00 39H	
PWE	= 1	= 00 00 00 01H	

Request MS -> SL:



Response SL -> MS:

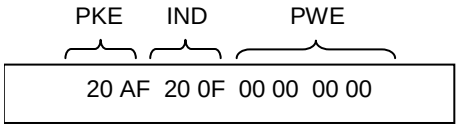


The drive responds with a 0EH code (operation not allowed) because the connection C57 is key-protected (PWE = 02). The key P60=95 has to be set.
La connection C57 remains not set.

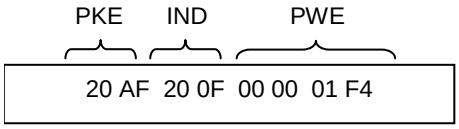
Example no.3: reading of the rotation speed d21 from the CAN Dictionary (Index 0x200F, Sub=21)

Field	dec. value	hexadec. value	Description
AK	= 2	= 02H	(word reading)
PNU	= 7	= 07H	(CAN Dictionary)
IND	= 8207	= 200FH	object Index
SUB	= 21	= 15H	object Subindex

Request MS -> SL:



Response SL -> MS:

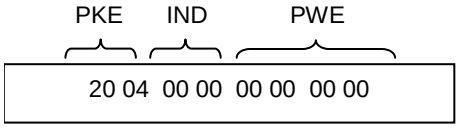


Therefore the read value is 1F4H = 500. The user manual shows that d21is a direct value, so the speed is 500rpm.

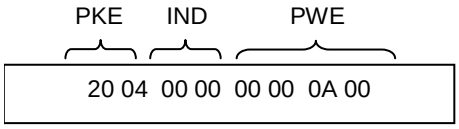
Example no.4 : alarm status readings

Field	dec. value	hexadec. value	Description
AK	= 2	= 02H	(word reading)
PNU	= 4	= 04H	(alarms A)

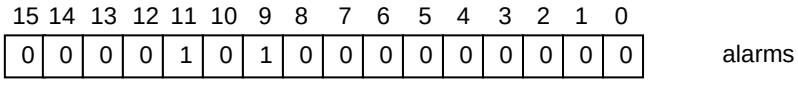
Request MS -> SL:



Response SL -> MS:



Therefore the read value is 0A00H: there are 2 active alarms, more specifically alarms A9 and A11



2.2.3 Process Data: PZD

The PZD message part contains the data which have to be exchanged cyclically between master and slave: I/O, diagnostics, set point, measured speed, etc. these references are taken into consideration only if the connection “Abilitazione riferimenti da Fieldbus” [“Enable references from Fieldbus”] is on. Through the configuration page of the OPDExplorer or by accessing the item 0x2027 in the CAN Dictionary through PKW, it is possible to select which and how many words to exchange, bearing in mind that the items that can be mapped are listed in the CAN Dictionary.

Name	Description
RX0_INDEX	Receive Object0 Index
RX0_SUB_INDEX	Receive Object0 Sub-Index
RX1_INDEX	Receive Object1 Index
RX1_SUB_INDEX	Receive Object1 Sub-Index

…….
…….

RX9_INDEX	Receive Object9 Index
RX9_SUB_INDEX	Receive Object9 Sub-Index

TX0_INDEX	Transmit Object0 Index
TX0_SUB_INDEX	Transmit Object0 Sub-Index
TX1_INDEX	Transmit Object1 Index
TX1_SUB_INDEX	Transmit Object1 Sub-Index

…….
…….

TX9_INDEX	Transmit Object9 Index
TX9_SUB_INDEX	Transmit Object9 Sub-Index

For the process area configuration:

- Programme the objects being received and transmitted by indicating the index and sub-index of the objects in the Dictionary CAN (the sub-index is the array index).
- Save the data in FLASH (C63=1).
- Switch the drive off and then on again.

After it has been turned on again, verify the mapping outcome by checking in the OPDExplorer the following internal sizes:

Name	Display	Description
MAP_ERROR_CODE	Ok	successful configuration
	OBJ_NOTFOUND	the object listed in the following MAP_ERROR_OBJwas not found in the dictionary
	OBJ_NOTMAPPABLE	the object listed in the following MAP_ERROR_OBJ is not mappable
	OBJ_INVDATASIZE	the object listed in the following MAP_ERROR_OBJhas sizes exceeding long
	OBJ_NOTWRITABLE	the object listed in the following MAP_ERROR_OBJ is not writable
	OBJ_NOTREADABLE	the object listed in the following MAP_ERROR_OBJ is not readable
	MAXRX_DATA	Too many words to read (more than 10)
	MAXTX_DATA	Too many words to write (more than 10)
MAP_ERROR_OBJ	Mapping Error Object	

The following table shows the CAN Dictionary with the relevant sizes.
At application level it is possible to extend the Dictionary objects.

2.2.4 Dictionary of Canopen Objects

The variables shown in bold are mappable in the process area.

Index (hex)	Object	Type	Name	Description	Access
200D	ARRAY	INTEGER16	Tab_par [200]	Current parameter values	reading/writing
200E	ARRAY	INTEGER16	Tab_con [100]	Current connection values	reading/writing
200F	**ARRAY**	**INTEGER16**	**Tab_int [128]**	**Current internal size values**	**reading**
2010	**ARRAY**	**INTEGER16**	**Tab_inp_dig [32]**	**Current values of standard input logic functions**	**reading**
2011	**ARRAY**	**INTEGER16**	**Tab_out_dig [32]**	**Current values of standard output logic functions**	**reading**
2012	**ARRAY**	**INTEGER16**	**Tab_osc [100]**	**Current monitorable size values**	**reading**
2013	**VAR**	**UNSIGNED16**	**ingressi**	**Logic 8 input status to terminal board**	**reading**
2014	**VAR**	**UNSIGNED16**	**ingressi_hw**	**Logic 3 input status from power**	**reading**
2015	**VAR**	**UNSIGNED16**	**uscite_hw**	**Logic 4 digital output status**	**reading**
2016	**VAR**	**UNSIGNED32**	**Out_dig_appl**	**Application output function reading via fieldbus**	**reading**
2017	**VAR**	**UNSIGNED16**	**Stato**	**Converter variable status**	**reading**
2018	**VAR**	**UNSIGNED16**	**allarmi**	**Converter alarm status**	**reading**
2019	**VAR**	**UNSIGNED16**	**abilitazione_allarmi**	**Converter alarm enabling word**	**reading**
201A	**VAR**	**INTEGER16**	**f_fieldbus**	**Speed reference as % of n_{MAX} in 16384**	**reading/writing**
201B	**VAR**	**INTEGER16**	**Limit_fieldbus**	**Torque limit as % of Tnom in 4095**	**reading/writing**
201C	**VAR**	**INTEGER16**	**trif_fieldbus**	**Torque limit as % of Tnom in 4095**	**reading/writing**
201D	**VAR**	**INTEGER16**	**Theta_fieldbus**	**Speed reference as impulses**	**reading/writing**
201E	**ARRAY**	**INTEGER16**	**Tab_dati_applicazione [100]**	**Available data area for application**	**reading/writing**
201F	**VAR**	**UNSIGNED32**	**Inp_dig_field**	**Input logic function writing via fieldbus**	**writing**
2020	**VAR**	**UNSIGNED32**	**Inp_dig**	**Input logic function reading via fieldbus**	**reading/writing**
2021	**VAR**	**UNSIGNED32**	**Out_dig**	**Standard logic output reading via fieldbus**	**reading**
2022	**VAR**	**UNSIGNED16**	**Word_vuota**	**Unused word**	**reading/writing**
2023	**VAR**	**UNSIGNED32**	**double_vuota**	**Unused double word**	**reading/writing**
2025	**ARRAY**	**INTEGER16**	**Tab_codice_allarmi [16]**	**Subcode table of active alarms**	**reading**
2026	**VAR**	**INTEGER32**	**Quota_att**	**Current position**	**reading**
2027	ARRAY	UNSIGNED16	tabProcessData	Process variable mapping	reading/writing

The content of some objects is shown more specifically below:

- Index 0x200F “Tab_int” on the internal sizes (word)

Name	Description	UM	Scale
FW_REV	D00 – Software version		256
ACTV_POW	D01 – Active power generated	kW	16
PRC_TOT_APP_SPD_REF	D02 – Speed reference before the ramps	% MOT_SPD_MAX	163.84
PRC_END_SPD_REF	D03 – Speed reference after the ramps	% MOT_SPD_MAX	163.84
PRC_MOT_SPD	D04 – Measured speed	% MOT_SPD_MAX	163.84
PRC_T_REF	D05 – Torque request	% MOT_T_NOM	40.96
PRC_IQ_REF	D07 – Torque current request	% DRV_I_NOM	40.96
PRC_ID_REF	D08 – Reactive current request	% DRV_I_NOM	40.96
V_REF	D09 – Maximum voltage reference	% MOT_E_NOM	40.96
PRC_APP_T_REF	D10 – Torque request from application	% MOT_T_NOM	40.96
MOT_I	D11 – Current module	A rms	16
REF_FRQ_IN	D12 – Input frequency	KHz	16
EL_FRQ	D13 – Electric size frequencies	Hz	16
PRC_APP_FRQ_SPD_REF	D14 – Speed reference in frequency from application	% MOT_SPD_MAX	163.84
PRC_IQ	D15 – Measured torque current	% DRV_I_NOM	40.96
PRC_ID	D16 – Measured reactive current	% DRV_I_NOM	40.96
MOT_V	D17 – Generated statoric voltage	V rms	16
PRC_MOT_V	D18 – Generated statoric voltage	% MOT_E_NOM	40.96
MOD_INDEX	D19 – Modulation index		40.96
PRC_VQ_REF	D20 – Statoric voltage reference axis Q	% DRV_E_NOM	40.96
MOT_SPD	D21 – Motor rotation speed	rpm	1
PRC_VD_REF	D22 – Statoric voltage reference axis D	% DRV_E_NOM	40.96
MOT_POS	D23 – Current position on the turn	±16384	1
DC_BUS	D24 – DC Bus voltage	V	16
DRV_TEMP	D25 – Radiator temperature	°C	16
MOT_TEMP	D26 – Motor temperature	°C	16
PRC_DRV_I_THERM	D28 – Motor thermal current	% soglia All	40.96
PRC_DRV_I_MAX	D29 – Current limit	% DRV_I_NOM	40.96
PRC_DRV_T_MAX	D30 – Maximum positive torque	% MOT_T_NOM	40.96
PRC_DRV_I_T_MAX	D31 – Maximum torque from positive limit	% MOT_T_NOM	40.96

PRC_APP_T_MAX	D32 – Maximum torque from application	% MOT_T_NOM	40.96
PRC_APP_SPD_REF	D33 – Speed reference from application	% MOT_SPD_MAX	163.84
PRC_MOT_T	D35 – Torque produced	% MOT_T_NOM	40.96
MOT_TURN_POS	D36 – Absolute mechanical position on current turn	±16384	1
MOT_N_TURN	D37 – Number of turns completed		1
OFFSET_SINCOS_ENC	D38 –Analogue/digital compensation term of the Sin/Cos	impulses	1
SENSOR_FRQ_IN	D39 – Sensor input frequency	kHz	16
REG_CARD_TEMP	D40 – Adjustment card temperature	°C	16
MOT_PRB_RES	D41 – Measured motor thermal resistance	Ohm	1
AI1	D42 – Analogue input AI1	%	163.84
AI2	D43 – Analogue input AI2	%	163.84
AI3	D44 – Analogue input AI3	%	163.84
SPD_ISR	D45 – Speed routine duration	us	64
I_ISR	D46 – Current routine duration	us	64
I_LOOP_BAND	D47 – Current ring passing band	Hz	1
PRC_APP_T_MIN	D48 – Minimum torque from the application	% MOT_T_NOM	40.96
WORK_HOURS	D49 – Working hours	hours	1
ENC_HALL_SECTOR	D50 – Encoder-read sensor and Hall probes		1
SENS2_SPD	D51 – Rotation speed of sensor two	rpm	1
SENS2_TURN_POS	D52 – Absolute mechanical position on the current turn of sensor two	±16384	1
SENS2_N_TURN	D53 – Number of turns completed by sensor two		1
SENS2_FRQ_IN	D54 – Input frequency of sensor two	KHz	16
SENS1_ZERO_TOP	D55 – Sensor1 Top Zero	impulses	1
SENS2_ZERO_TOP	D56 – Sensor2 Top Zero	impulses	1
SYNC_DELAY	D57 – Synchronisation of the SYNC	us	1
PWM_SYNC_OFFSET	D58 - PWM offset for SYNC control	pulses	1
SERIAL_NUMBER	D59 - Drive Serial Number		1
FLD_CARD	D60 –Fieldbus card present		1
APPL_REV	D61 – Revision of the application		40.96
HW_SENSOR2	D63 – Decoding card Sensor 2		1
HW_SENSOR1	D63 – Decoding card Sensor 1		1

At application level it is possible to define another 64 internal sizes from D64 to D127.

- Index 0x2012 “Tab_osc” on monitor sizes

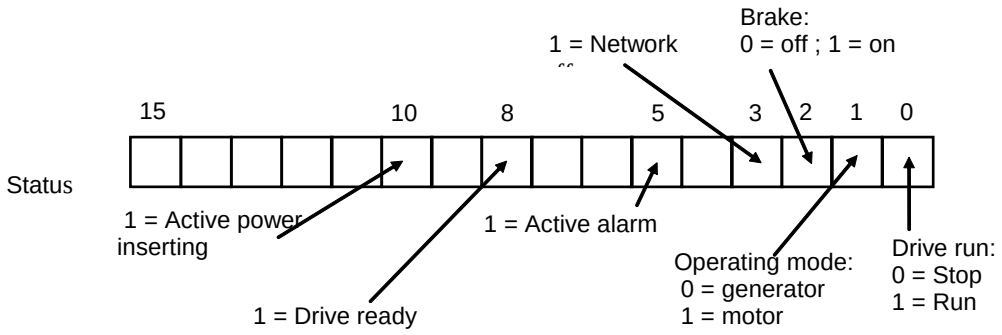
Name	Description	UM	Scale
ACT_POS	O00 – Current position read by the sensor		327.67
ELECTRIC_POS	O01 – Current electric power		327.67
PRC_TOT_APP_SPD_REF	O02 – Speed reference before the ramps	% MOT_SPD_MAX	163.84
PRC_END_SPD_REF	O03 – Speed reference after the ramps	% MOT_SPD_MAX	163.84
PRC_MOT_SPD	O04 – Measured speed	% MOT_SPD_MAX	163.84
PRC_T_REF	O05 – Torque request	% MOT_T_NOM	40.96
PRC_IQ_REF	O07 – Torque current request	% DRV_I_NOM	40.96
PRC_ID_REF	O08 – Reactive current request	% DRV_I_NOM	40.96
PRC_V_REF	O09 – Maximum voltage reference	% MOT_E_NOM	40.96
ALARMS	O10 – Active alarms		1
PRC_MOT_I	O11 – Current module	% DRV_I_NOM	40.96
ZERO_TOP	O12 – Zero top	pulses	1
PRC_IU	O13 – Phase current U	% DRV_I_MAX	40.96
INPUTS	O14 – Physical input		1
PRC_IQ	O15 – Measured torque current	% DRV_I_NOM	40.96
PRC_ID	O16 – Measured reactive current	% DRV_I_NOM	40.96
TU	O17 – Duty cycle phase U		327.67
PRC_MOT_V	O18 – Generated statoric voltage	% MOT_E_NOM	40.96
MOD_INDEX	O19 – Modulation index		40.96
PRC_VQ_REF	O20 – Statoric voltage reference axis Q	% DRV_E_NOM	40.96
PRC_POWER	O21 – Supplied power	%MOT_POW_NOM	40.96
PRC_VD_REF	O22 – Statoric voltage reference axis D	% DRV_E_NOM	40.96
PRC_T_OUT	O23 – Supplied torque	% MOT_T_NOM	40.96
PRC_DC_BUS	O24 – DC Bus voltage	%900V	40.96
PRC_DRV_TEMP	O25 – Radiator temperature	%37.6°	40.96
PRC_MOT_TEMP	O26 – Motor temperature	% 80°	40.96
PRC_DRV_I_THERM	O28 – Motor thermal current	% soglia All	40.96
PRC_DRV_I_MAX	O29 – Current limit	% DRV_I_NOM	40.96
PRC_DRV_T_MAX	O30 – Maximum torque	% MOT_T_NOM	40.96

PRC_DRV_T_MIN	O31 – Minimum torque	% MOT_T_NOM	40.96
OUTPUTS	O32 – physical outputs		1
PRC_IV	O34 – Phase current V	% DRV_I_MAX	40.96
PRC_IW	O35 – Phase current W	% DRV_I_MAX	40.96
ALFA_FI	O36 – Electric angle		327.67

Name	Description	UM	Scale
AI1	O37 – AI1		163.84
AI2	O38 – AI2		163.84
AI3	O39 – AI3		163.84
SYS_SPD_PERC_REF	O41 – Speed reference from application	% MOT_SPD_MAX	163.84
SYS_T_PERC_REF	O42 – Torque reference from application	% MOT_T_NOM	40.96
SYS_T_MAX	O43 – Maximum torque limit from application	% MOT_T_NOM	40.96
SYS_SPD_REF_PULS	O44 – Speed reference as impulses from the application		1
SYS_POS_REF_PULS	O45 – Position reference as impulses from the application		1
RES_AMPLITUDE	O46 – Resolver retroaction amplitude		1
RES_SIN	O47 – Resolver sine/absolute sin cos		1
RES_COS	O48 – Revolver cosine /absolute sin cos		40.96
PRC_MOT_SPD	O49 – Unfiltered measured speed	% MOT_SPD_MAX	163.84
PULSES_RD	O50 – Delta impulses read at frequency input		1
MEM_POS_LSW	O51 – Overlapping space ring memory (lsw)	electric impulses	1
MEM_POS_MSW	O52 – Overlapping space ring memory (msw)		1
INCR_SIN	O53 – Sine in the incremental sin cos		1
INCR_COS	O54 – Cosine in the incremental sin cos		1
INIT_RESET	O55 – Initial reset cycle		1
PTM_TH_PRB	O56 – Motor thermal Pellet		40.96
PTR_TH_PRB	O57 – Radiator thermal Pellet		40.96
SENS_PULSES_RD	O58 – Delta impulses read by the sensor		1
PRC_SENS2_SPD	O59 – Unfiltered measured speed according to sensor	% MOT_SPD_MAX	163.84
ACT_SENS2_POS	O60 – Current position read by the second sensor		327.67
SENS2_SIN	O61 – Sensor two sine		1
SENS2_COS	O62 – Sensor two cosine		1
SYNC_DELAY	O63 – Delay in receiving SYNC		1
SYS_T_MIN	O64 – Minimum torque limit from the application	% MOT_T_NOM	40.96
BRAKE_EN	O65 – Energy dissipated while braking		1

At application level, it is possible to define another 32 monitor sizes from O68 to O99.

- Index 0x2017 a converter status variable is available with the following meaning:



- Index 0x2018 shows the status of the various converter alarms bit per bit, that is to say A8 is associated with bit 8.

- Index 0x2019 is the alarm enabling mask, also here the meaning is bit by bit.

- Index 0x201A “f_fieldbus” = speed reference as a percentage of the maximum set speed. The representation basis is 16384: therefore 16384 equals 100%

- Index 0x201D “theta_fieldbus” = speed reference as impulses per PWM period, considering that there are 65536 impulses on the turn.

- Index 0x201C trif_fieldbus = torque reference as percentage of the nominal motor torque. The representation basis is 4095: therefore 4095 equals 100%

- Index 0x201A limit_fieldbus = torque limit as percentage of the nominal motor torque (which will be an alternative to the other existing limits, the most restrictive applies). The representation basis is 4095: therefore 4095 equals 100%

Configuration example

At drive level, in order to receive in the process part in the first 2 words the logic input function command and in the third word the speed reference and to have as output in the first 2 words the logic output function status and the current speed, it is necessary to set:

RX0_INDEX	201F	input logic function writing
RX0_SUB_INDEX	0	
RX1_INDEX	201A	speed reference writing
RX1_SUB_INDEX	0	

TX0_INDEX	2021	output logic function reading
TX0_SUB_INDEX	0	
TX1_INDEX	2012	current speed reading
TX1_SUB_INDEX	4	

2.2.5 Profibus DP Device Description: GSD File

Each Profibus DP device is associated to a file with the extension GSD which specifies all its characteristics, such as allowed transmission speed, maximum message length, meaning of diagnostics messages ...
The GSD is used by the Profibus master to understand the slave characteristics.
With the new management the parametrization part (PKW) can be enabled or not and the process part (PZD) can be completely configured; therefore our gsd file includes a series of possible configurations from which the active one shall have to be selected.

The GSD file OPEN DRIVE: opd.gsd is available.
The GSD file OPDE: opde.gsd is available

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