

## EXP-PDP-ADV

Profibus DP interface  
expansion card



1S5F24, Manual EXP-PDP-ADV -IT/  
EN (rev 0.3 - 7-6-22)

## Sommario

|  |          |
|--|----------|
| <b>Reinforced insulation .....</b>     | <b>1</b> |
| <b>Introduction .....</b>              | <b>1</b> |
| <b>Mounting .....</b>                  | <b>1</b> |
| <b>Connections .....</b>               | <b>2</b> |
| <b>Leds.....</b>                       | <b>3</b> |
| <b>Optional card recognition .....</b> | <b>3</b> |
| <b>1.0 Profibus DP .....</b>           | <b>4</b> |
| 1.1 General Information.....           | 4        |
| 1.2 The Profibus DP system .....       | 4        |
| 1.3 Identification codes.....          | 4        |
| 1.4 EXP-PDP-ADV card control .....     | 5        |
| 1.5 Alarms.....                        | 6        |
| 1.6 Data frame composition .....       | 8        |
| 1.7 Process data channel control ..... | 13       |
| 1.8 Profidrive .....                   | 15       |
| 1.9 In general.....                    | 17       |

## Reinforced insulation

PELV (Protective Extra Low Voltage) EN 61800-5-1.

## Introduction

This manual describes the EXP-PDP-ADV option card aimed at connecting the ADV200 series Drives to Profibus-DP networks.

It is possible to use only one field bus expansion card per Drive.

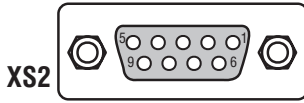
This manual is intended for design engineers and technicians responsible for the maintenance, commissioning and operation of Profibus-DP systems.

Basic knowledge of Profibus-DP is required. This is explained in detail in the document "PROFIBUS Specification Order No. 0.032"

## Mounting

Refer to ADV200 Quick Start up manual, chapter "**Installation of optional cards**": **the card must be inserted on slot 3.**

# Connections

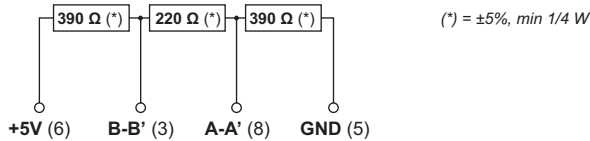


## Wire

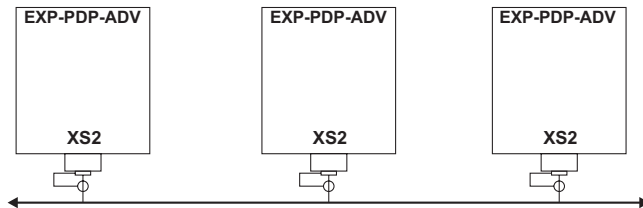
The Bus connection is provided via a shielded twisted cable (as stated by the Profibus-DP specification) which should be placed as far as possible from the power cables, with a minimum distance of 20 cm. The pinout of the Bus connectors are showed on the following table.

The cable shielding must be connected to ground at both ends of the cable. It is recommended that straight metal connectors be used and that the cable shielding is connected to the connector housing or to pin 1 (shield / protective ground). If the cable shielding from a number of drives is connected to ground at different points of the system, use equipotential connection cables to reduce the current flow between the drives and the Profibus DP master.

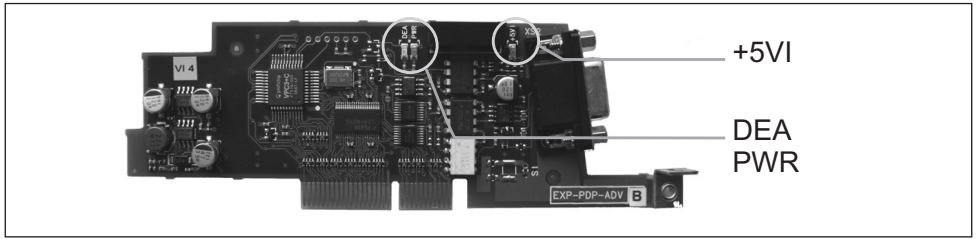
| Terminal  | Designation | Function                                       |
|---|-------------|--|
| <b>BUS terminal : allows to connect the card to the Profibus-DP network</b> |             |  |
| 1   | Shield      | Shield / grounding                             |
| 2   | -           | Not connected                                  |
| 3   | RX/TX-B     | P datum reception / transmission               |
| 4   | -           | Not connected                                  |
| 5   | 0V-GND      | Datum transmission potential (grounding at 5V) |
| 6   | +5V         | Resistance power supply - Terminating P (P5V)  |
| 7   | -           | Not connected                                  |
| 8   | RX/TX-A     | P datum reception / transmission               |
| 9   | -           | Not connected                                  |



The terminating resistances of the first and last network components must be active. Pins 5 (GND) and 6 (+5V) provide the connection of the terminating resistances. It is suggested to use resistance-supplied standard connectors. The following figure shows a connection between the single cards.



## Leds



|                     |   |
|---------------------|---|
| <b>DEA (yellow)</b> | Data Exchange Phase active  |
| <b>PWR (green)</b>  | The led is ON when the expansion card is powered and active             |
| <b>+5VI (green)</b> | The led is ON when the optoinsulated Profibus node is correctly powered |

## Optional card recognition

T+ T- EN LOC ILim n:0 AL

---

MESSAGE 0 1

Option detect slot 3  
Code: 0104H-260

T+ T- EN LOC ILim n:0 AL

---

01 MONITOR

02 DRIVE INFO

03 STARTUP WIZARD

04 DRIVE CONFIG

T+ T- EN LOC ILim n:0 AL

---

0 2.17 PAR : 5 3 4

Slot 3 card type  
**Profibus**  
Value 260

- 1 - At power-on, the drive recognizes the presence of optional card in the expansion slot 3, this message is shown on the display.
- 2- On 02 DRIVE INFO menu, select the PAR 534 Slot 3 card type to read the recognized card type.

| Value | Description | Card type   |
|-------|-------------|-------------|
| 0     | None        | -           |
| 260   | Profibus    | EXP-PDP-ADV |
| 255   | Unknown     | -           |

# 1.0 Profibus DP

## 1.1 General Information

The information held in this manual have to be integrated with the information supplied by the producer of the Mains master.

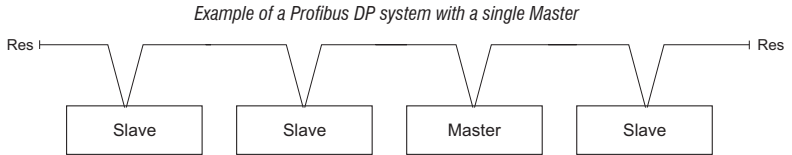
## 1.2 The Profibus DP system

Profibus DP is a field Bus designed for a fast data exchange relating to sensors/actuators the communication is established between a Master central unit (PLC or PC) and the Slave units, i.e. sensors, actuators, drives, etc.

The data exchange is cyclic; the Master unit reads the Slave input data and writes the Slave output data. The allowable Baud Rates for the EXP-PDP-ADV card, are defined by the standard Profibus DP Specification, section 3, and lie between 9.6 kbit/s and 12 Mbit/s.

The total cycle time depends on the number of connected Slaves, on the transmission speed and on the quantity of data to be exchanged. The minimum cycle time supported by the drive is 1 ms.

The physical support is the RS485 serial line; the maximum number of Slaves connected to the Bus is 125.



Profibus DP allows the use of a Multi-Master system. For further information reference should be made to sections 6 and 7 in the document "PROFIBUS Specification Order No. 0.032".

## 1.3 Identification codes

### 1.3.1 Card identification code

The PROFIBUS-DP protocol requires an identification number for every device to be connected to the Bus.

The identification number assigned to the EXP-PDP-ADV card by the Profibus Nutzerorganisation is the following:

0B5E hexadecimal corresponding to 2910 decimal.

### 1.3.2 Card configuration codes

The EXP-PDP-ADV card requires the following user parameter configuration data, available in the GSD file: **DPV1Enable**

Values:

0 = The drive functions as a DPV0 device

1 = Enables DPV1 mode and MSAC services.

The configuration data consist of 1 or 2 Bytes made up as follows:

| Configuration      |                    | Meaning                         |
|--------------------|--------------------|---------------------------------|
| Byte 1 (Dec - Hex) | Byte 2 (Dec - Hex) |                                 |
| 240 - F0           | Not exist          | 1 Word In + 1 Word Out PDC only |

| Configuration      |                    | Meaning                                      |
|--------------------|--------------------|--|
| Byte 1 (Dec - Hex) | Byte 2 (Dec - Hex) |  |
| 241 - F1           | Not exist          | 2 Word In + 2 Word Out PDC only              |
| 242 - F2           | Not exist          | 3 Word In + 3 Word Out PDC only              |
| 243 - F3           | Not exist          | 4 Word In + 4 Word Out PDC only              |
| 244 - F4           | Not exist          | 5 Word In + 5 Word Out PDC only              |
| 245 - F5           | Not exist          | 6 Word In + 6 Word Out PDC only              |
| 246 - F6           | Not exist          | 7 Word In + 7 Word Out PDC only              |
| 247 - F7           | Not exist          | 8 Word In + 8 Word Out PDC only              |
| 248 - F8           | Not exist          | 9 Word In + 9 Word Out PDC only              |
| 249 - F9           | Not exist          | 10 Word In + 10 Word Out PDC only            |
| 250 - FA           | Not exist          | 11 Word In + 11 Word Out PDC only            |
| 251 - FB           | Not exist          | 12 Word In + 12 Word Out PDC only            |
| 252 - FC           | Not exist          | 13 Word In + 13 Word Out PDC only            |
| 253 - FD           | Not exist          | 14 Word In + 14 Word Out PDC only            |
| 254 - FE           | Not exist          | 15 Word In + 15 Word Out PDC only            |
| 255 - FF           | Not exist          | 16 Word In + 16 Word Out PDC only            |
| 183 - B7           | 240 - F0           | Conf. Channel + 1 Word In + 1 Word Out PDC   |
| 183 - B7           | 241 - F1           | Conf. Channel + 2 Word In + 2 Word Out PDC   |
| 183 - B7           | 242 - F2           | Conf. Channel + 3 Word In + 3 Word Out PDC   |
| 183 - B7           | 243 - F3           | Conf. Channel + 4 Word In + 4 Word Out PDC   |
| 183 - B7           | 244 - F4           | Conf. Channel + 5 Word In + 5 Word Out PDC   |
| 183 - B7           | 245 - F5           | Conf. Channel + 6 Word In + 6 Word Out PDC   |
| 183 - B7           | 246 - F6           | Conf. Channel + 7 Word In + 7 Word Out PDC   |
| 183 - B7           | 247 - F7           | Conf. Channel + 8 Word In + 8 Word Out PDC   |
| 183 - B7           | 248 - F8           | Conf. Channel + 9 Word In + 9 Word Out PDC   |
| 183 - B7           | 249 - F9           | Conf. Channel + 10 Word In + 10 Word Out PDC |
| 183 - B7           | 250 - FA           | Conf. Channel + 11 Word In + 11 Word Out PDC |
| 183 - B7           | 251 - FB           | Conf. Channel + 12 Word In + 12 Word Out PDC |
| 183 - B7           | 252 - FC           | Conf. Channel + 13 Word In + 13 Word Out PDC |
| 183 - B7           | 253 - FD           | Conf. Channel + 14 Word In + 14 Word Out PDC |
| 183 - B7           | 254 - FE           | Conf. Channel + 15 Word In + 15 Word Out PDC |
| 183 - B7           | 255 - FF           | Conf. Channel + 16 Word In + 16 Word Out PDC |

The selection of the configuration bytes is performed during the network configuration phase via the network configuration tool supplied by the master.

### 1.3.3 Gsd file

The GSD file is available on [www.gefran.com](http://www.gefran.com) web site (Drive & Motion Control / Inverter / ADV200 / Downloads section: **Driver GSD File, EXP-PDP-ADV**, file name: GEF0B5E.GSD).

## 1.4 EXP-PDP-ADV card control

The user interface of the EXP-PDP-ADV card is performed via the drive parameters. The EXP-PDP-ADV card, in fact, is not supplied with its own interface. See the ADV200 manual to understand how the drive parameters can be controlled.

The parameters are controlled via hierarchical menus. All the writing parameters referring to the EXP-PDP-ADV cards are active only after the drive reset.

Here following is a list of drive parameters useful to control the EXP-PDP-ADV cards

### 1.4.1 Menu Fieldbus

To enable the EXP-PDP-ADV card set PAR 4000 **Fieldbus type** as "Profibus". The following parameters are available in the COMMUNICATION->FIELDBUS CONFIG menu:

| PAR  | Parameter description          | Type            | Default value | Attr      |
|------|--------------------------------|-----------------|---------------|-----------|
| 4004 | <b>Fieldbus baudrate</b>       | Enum            | None          | Write     |
| 4006 | <b>Fieldbus address</b>        | 2 byte unsigned | 0             | Write     |
| 4010 | <b>Fieldbus M-&gt;S enable</b> | Enum            | On            | Write     |
| 4012 | <b>Fieldbus alarm mode</b>     | 2 byte unsigned | 0             | Write     |
| 4014 | <b>Fieldbus state</b>          | Enum            | Stop          | Read only |

- **Fieldbus baudrate** = shows the network baud rate, automatically recognized when the card is connected;
- **Fieldbus address** = address of this slave node in the network, accepted values from 3 to 127
- **Fieldbus M->S enable** = if set to Off the data the PLC sends the drive (master to slave) are not updated anymore by the drive and the current values are maintained
- **Fieldbus alarm mode** = if set to On the drive generates Opt Bus Fault errors relating to the loss of communication (Bus Loss) even when the drive is not enabled.
- **Fieldbus state** = state of the communication on the Profibus network: Wait-PRM, WaitCfg, DataExchange, DPErrors.

## 1.5 Alarms

### 1.5.1 Alarms EXP-PDP-ADV card

There is an alarm for EXP-PDP-ADV card management:

**Opt bus fault** is automatically enabled if there is no communication on the bus at a PDC level. This alarm becomes active only when the drive is enabled.

Il parametro **Fieldbus alarm mode** se posto a ON, abilita la generazione dell'allarme **Opt bus fault** anche quando il drive è disabilitato.

If ON, the **Fieldbus alarm mode** parameter enables the generation of the **Opt bus fault** alarm also when the drive is disabled.

Table 1.5.1: Alarm codes

| Code       | Cfg | Description   | Action  |
|------------|-----|---|---|
| 0          |     | Bus Loss  | Check line for noise , terminations , problems with cabling |
| FF01       | *   | Fieldbus type does not match expansion card   | Verify if EXP-PDP-ADV card is properly installed            |
| FF03       | *   | Invalid address for node  | Check "Fieldbus address"                                    |
| FF14..FF23 | *   | Wrong object selected for mapping in channel M->S n                                     | Check "Fieldbus M-> Sn Dest"                                |
| FF24..FF33 | *   | More than one Src pointing to M2S Channel n   | Check for multiple destinations on "Fieldbus M->Sn Dest"    |
| FF34..FF43 | *   | M2S Channel n , data size is wrong (16 bits on 32 bits or 32 bits on 16 bits parameter) | Check "Fieldbus M->Sn sys"                                  |
| FF44..FF53 | *   | Invalid parameter in channel S2M n  | Check "Fieldbus S->Mn src"                                  |

| Code       | Cfg | Description   | Action  |
|------------|-----|---|---|
| FF54..FF63 | *   | S2M Channel n , data size is wrong (16 bits on 32 bits or 32 bits on 16 bits parameter) | Check "Fieldbus S->Mn sys"  |
| FF74..FF83 | *   | M2S Channel n : too many words in PDC   | "Fieldbus M-Sn dest" & "Fieldbus M->Sn sys" address more than 16 words in PDC |
| FF84..FF93 | *   | S2M Channel n : too many words in PDC   | "Fieldbus S->Mn src" & "Fieldbus S->Mn sys" address more than 16 words in PDC |
| FFB4..FFC3 | *   | Internal database error on channel n  | Please report back to manufacturer  |

### **Important !**

The drive generates the Opt Bus Fault alarm in case of configuration errors ("\*" in the Cfg column) or in case of loss of communication due to a Master timeout or errors on the line.

### **Note!**

The "Opt Bus Fault" error with code 0 (BusLoss) is only generated if the drive is enabled (or "Fieldbus alarm mode" is = 1). In these conditions the EXP-PDP-ADV card must be in Data Exchange.

The following codes can also be generated by the card and report the internal state of the Profibus ASIC VPC3+:

| Code       | Cfg | Description                          |
|------------|-----|--------------------------------------|
| 0x11       | *   | Address error                        |
| 0x12       | *   | Error configuring IO data len        |
| 0x13       |     | Error in length of output data       |
| 0x14       |     | Error in length of input data        |
| 0x15       |     | Error in length of diagnostic buffer |
| 0x16       |     | Error in length of parameter buffer  |
| 0x18       |     | Error in length of cfg buffer        |
| 0x19       |     | Too much memory allocated for VPC3   |
| 0x20       | *   | Error in values of parameter buffer  |
| 0x23       | *   | Error in values of cfg buffer        |
| 0x24       | *   | Error updating cfg                   |
| 0x30..0x36 |     | Error while sending diagnostic error |
| 0x91       | *   | Error initializing VPC3              |

### **1.5.2 Drive alarm management**

Alarms are managed using the standard Profibus diagnostics to which the drive alarm codes are added (see Table below) when active.

When the alarms are reset the codes relating to the alarms that have ceased are removed from the diagnostics.

If using the Profidrive profile the alarms are managed with objects 944, 947, 952, accessed by the master via the MSAC services (see Profidrive specifications 4.1 and section 8.1).

Table 1.5.2.1: Alarms included in the Profibus diagnostics

| <b>Selection</b> | <b>Code</b> |
|------------------|-------------|
| No alarm         | 0x0000      |
| Overvoltage      | 0x3210      |
| Undervoltage     | 0x3220      |
| Ground fault     | 0x2110      |
| Overcurrent      | 0x2310      |
| Desaturation     | 0x2130      |
| MultiUndervolt   | 0xFF06      |
| MultiOvercurr    | 0xFF07      |
| MultiDesat       | 0xFF08      |
| Heatsink OT      | 0x4210      |
| HeatsinkS OTUT   | 0x4310      |
| Intakeair OT     | 0x4130      |
| Motor OT         | 0xFF0C      |
| Drive overload   | 0x8311      |
| Motor overload   | 0x7121      |
| Bres overload    | 0x7112      |
| Phaseloss        | 0xFF10      |
| Opt Bus fault    | 0xFF11      |
| Opt 1 IO fault   | 0xFF12      |
| Opt Enc fault    | 0x3130      |
| External fault   | 0x9000      |
| Speed fbk loss   | 0x7310      |
| Overspeed        | 0x8400      |
| Plc1 fault       | 23          |
| Plc2 fault       | 24          |
| Plc3 fault       | 25          |
| Plc4 fault       | 26          |
| Plc5 fault       | 27          |
| Plc6 fault       | 28          |
| Plc7 fault       | 29          |
| Plc8 fault       | 30          |
| Emg stop alarm   | 31          |
| Watchdog         | 32          |
| Trap error       | 33          |
| System error     | 34          |
| User error       | 35          |
| Power down       | 36          |
| Speed ref loss   | 37          |
| Not Used1        | 38          |
| Opt 2 IO fault   | 39          |
| Not Used2        | 40          |
| Not Used3        | 41          |
| Not Used4        | 42          |
| Not Used5        | 43          |
| Not Used6        | 44          |
| Param error      | 45          |

## 1.6 Data frame composition

When the node is added to the network, the “DPV1 Enable” parameter in the GSD file can be used to select whether the drive must use the DPV1 mode or only the services offered by DPV0.

### 1.6.1 DPV1 mode

The ADV200 drive implements the Profibus standard according to DPV1 specifications. It supports the following communication relationships:



## MSCY

For Process Data Channel configuration refer to section 1.7.

### Note!

Big Endian is the default format of the data in the package.

## MSAC

Parameters are accessed according to Profdrive specifications, even if the Fieldbus type parameter is set to Profibus: requests to write and read must be sent to Slot 1, service 47. In addition to the Profdrive parameters (see section 1.8) it is also possible to access the drive parameters, visible from index 2000h (8192), which must therefore be added to the PAR of the parameter, and sub-index 1. Multiple requests are allowed, up to the maximum limit of 240 bytes.

For package format reference should be made to the Profdrive specifications, section 6.2.3.3 "Parameter requests & parameter responses"

### 1.6.2 DPV0 mode – Compatibility with Gefran drives

The card can be used in DPV0 mode while maintaining compatibility with the data exchange format used by other Gefran drives.

The frame can be made of two parts:

- the first, called "Configuration Channel", is the configuration channel for the non-cyclic data exchange; the user can decide to make it active via the Configuration bytes (see paragraph 1.3.2).
- the second part, with a variable length, is the process data channel for the cyclic exchange

A more detailed description is given in chapter 1.7 - Process Data Channel Control.

### Note!

Big Endian is the default format of data in the PDC.

To change to Little Endian mode (for compatibility with Gefran drives) set the "Profibus byte order" parameter to On.

The frame composition is the following:

| Configuration channel |       |   |      |              |   |   | Process data channel |        |          |        |
|-----------------------|-------|---|------|--------------|---|---|----------------------|--------|----------|--------|
| 0                     | 1     | 2 | 3    | 4            | 5 | 6 | 7                    | WORD 0 | WORD ... | WORD n |
| Control byte          | Index |   | Type | Data / error |   |   |                      |        |          |        |

As for the Data/Error and Index fields, the data format is set starting from the least significant Byte to the most significant one.

The format of the write or read datum depends on the type of parameter (refer to the drive manual). Format conversions are not implemented.

The field meaning is the following:

#### A ) Data format from the Master to the Slave:

- 1 ) Data / Error

The content of this field depends on the performed service: in case of writing it contains the parameter value, in case of reading it has no meaning. The format is Low-Byte High-Byte.

- 2 ) Not used
- 3 ) Index

Index of the parameter used during the operation with a Low-Byte High-Byte format.

4 ) Control byte

The meaning of this Byte is described in point 1.6.2.

#### **B ) Data format from the Slave to the Master:**

1 ) Data / Error

The content of this field depends on the performed service. In case of writing, it contains the operation result. In case of reading, it contains the parameter value if the reading had a positive result; otherwise it contains a detailed error code. See the specific tables for the error codes and the operation results; the format is Low-Byte High-Byte

2 ) Type

It contains the format of the read or written data; in case of reading with a void type (non-specified type), the drive returns the original data type.

3 ) Index

Index of the parameter used in the operation with a Low-Byte High-Byte format.

4 ) Control byte

The meaning of this Byte is described in point 1.6.2.

#### **Error codes for the parameter access**

| Code  | Description                                    |
|-------|--|
| 1     | Incorrect parameter number                     |
| 9     | Maximum value exceeded                         |
| 10    | Minimum value exceeded                         |
| 11    | Value not allowed for the parameter            |
| 12,13 | Read-only parameter                            |
| 16,31 | Parameter cannot be written with drive enabled |
| 20    | Parameter loading error                        |
| 21    | Error saving parameter                         |
| 23    | Parameter timeout                              |
| Other | Generic error, request technical assistance    |

#### **Parameter formats**

| FORMAT     | VALUE | MEANING                               |
|------------|-------|---------------------------------------|
| DB_T_VOID  | 0     | Return the value in the origin format |
| DB_T_INT   | 3     | 16 bit signed                         |
| DB_T_WORD  | 6     | 16 bit unsigned                       |
| DB_T_LONG  | 4     | 32 bit signed                         |
| DB_T_DWORD | 7     | 32 bit unsigned                       |
| DB_T_FLOAT | 8     | Float in IEEE 754 format              |

### 1.6.2.1 Setting of the control bytes

| 7      | 6         | 5        | 4 | 3 | 2       | 1 | 0 |
|--------|-----------|----------|---|---|---------|---|---|
| Status | Handshake | Reserved |   |   | Service |   |   |

#### Service

| Bit |   |   | Meaning                  |
|-----|---|---|--------------------------|
| 2   | 1 | 0 |                          |
| 0   | 0 | 0 | No request communication |
| 0   | 0 | 1 | Drive parameter reading  |
| 0   | 1 | 0 | Drive parameter writing  |

#### Status

| Bit |  | Meaning                            |
|-----|--|------------------------------------|
| 7   |  |                                    |
| 0   |  | Service carried out without errors |
| 1   |  | Error occurred                     |

The Status Bit is used exclusively by the Slave and, as a consequence, it acquires a value only during the transmission from the Slave to the Master; during the transmission from the Master to the Slave it must be always set at 0.

### 1.6.2.2 Handshake meaning

The Handshake bit prevents the same service request from being performed more than once. Its function is the same both in the direction from the Master to the Slave and from the Slave to the Master. The following explanation refers to the Master-Slave direction, but the same considerations can be applied also for the opposite direction.

Its default value is 0. With every transition of this bit, both from 0 to 1 (positive edge) and from 1 to 0 (negative edge), the Slave performs the service required by the Master via the previously set data frame. This Bit is therefore the trigger through which the Master states to the Slave that the data referring to the required service are ready.

The Slave responds to the Master in the same way, causing a Handshake Bit transition (both positive and negative). As a consequence, the Master can send a service to the Bus only if its Handshake Bit is equal to the one received by the Slave. During the initialisation and in case the Master does not receive any response from the Slave within a period of 500 msecs, the Master sends a non-required service (all the Bits are set at zero), thus allowing the Slave to perform a communication Reset. In this way the Slave Handshake Bit can be reset.

### 1.6.3 Access example to the drive parameter

These examples refer to the ADV drive firmware version 0.9.0 or later. It is assumed that the Handshake Bit is set at 0. See the specific table for the drive error codes (see paragraph 1.5.3).

#### 1.6.3.1 Writing of the drive parameter

The master must write the PAR 600 **Dig Ramp ref 1** parameter of the ADV200 drive. The information required is:

- 1) **Dig Ramp ref 1** parameter index: 600 decimal corresponding to 258 hexadecimal.
- 2) The parameter value is in 16-bit signed integer format

3) Value to be written: 1000 decimal (03E8h).

| 42h                              | 58h                   | 02h | 00h                  | E8h                                 | 03h | 00h | 00h |
|----------------------------------|-----------------------|-----|----------------------|-------------------------------------|-----|-----|-----|
| Control byte (see section 1.6.1) | Drive parameter index |     | Drive parameter type | Drive parameter value to be written |     |     |     |

Drive response:

| 42h                              | 58h                   | 02h | 00h                  | E8h        | 03h | XX | XXh |
|----------------------------------|-----------------------|-----|----------------------|------------|-----|----|-----|
| Control byte (see section 1.6.1) | Drive parameter index |     | Drive parameter type | No meaning |     |    |     |

### 1.6.3.2 Reading of the drive parameter

The PAR 628 **Ramp setpoint** parameter of the ADV200 drive must be read by the master. The information required is:

- 1) PAR 628 **Ramp setpoint** parameter index of the ADV200 drive: 628 decimal corresponding to 274 hexadecimal.
- 2) The parameter value is in 16-bit unsigned integer format.
- 3) If the current value is 1000 rpm, it is:

| 41h                              | 74h                   | 02h | 00h                  | XX         | XX | XX | XX |
|----------------------------------|-----------------------|-----|----------------------|------------|----|----|----|
| Control byte (see section 1.6.1) | Drive parameter index |     | Drive parameter type | No meaning |    |    |    |

Drive response:

| 41h                              | 74h                   | 02h | 00h                  | E8h                               | 03h | 00h | 00h |
|----------------------------------|-----------------------|-----|----------------------|-----------------------------------|-----|-----|-----|
| Control byte (see section 1.6.1) | Drive parameter index |     | Drive parameter type | Read value of the drive parameter |     |     |     |

## 1.7 Process data channel control

This function allows to allocate the drive parameters or application variables to the Process Data Channel data.

The EXP-PDP-ADV card uses a number of words for the Process Data Channel (abbr. PDC Process Data Channel ), which can always be set.

### Note!

The number and format of the parameters that are set determine the maximum size of the area of exchange, which must coincide with the configuration selected on the master when the node is added to the network (refer to section 1.3.2). If the configurations are not compatible the drive refuses the connection of the master and remains in WaitCfg state: data cannot be exchanged.

The Process Data Channel configuration for the EXP-PDP-ADV card is the following:

DATA 0                      DATA 1...                      DATA n

The Slave can both read and write the Process Data Channel data.

The Profibus DP data read by the Slave are defined as input data; the data written in Profibus DP by the Slave are defined as output data.

A datum can be made both of 2 and 4 bytes . The word "data" refers to any quantity of bytes included between 0 and 16, if the byte total number required is not higher than 32.

### ADV200 Example:

It is possible to have:

- from 0 to 16 data with 2 bytes
- 1 datum with 4 bytes + from 0 to 14 data with 2 bytes
- 2 data with 4 bytes + from 0 to 12 data with 2 bytes
- ...
- 8 data with 4 bytes

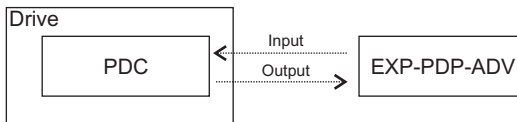
The data exchanged via the PDC can be of two types:

- drive parameters
- variables of an MDPLC application

the use of the MDPLC variables is described in par. 1.7.4.

The composition of the PDC input and output data is defined via suitable parameters as described in drive manual.

The master cyclically writes the data defined as PDC input and cyclically reads the data defined as PDC output.



### Note!

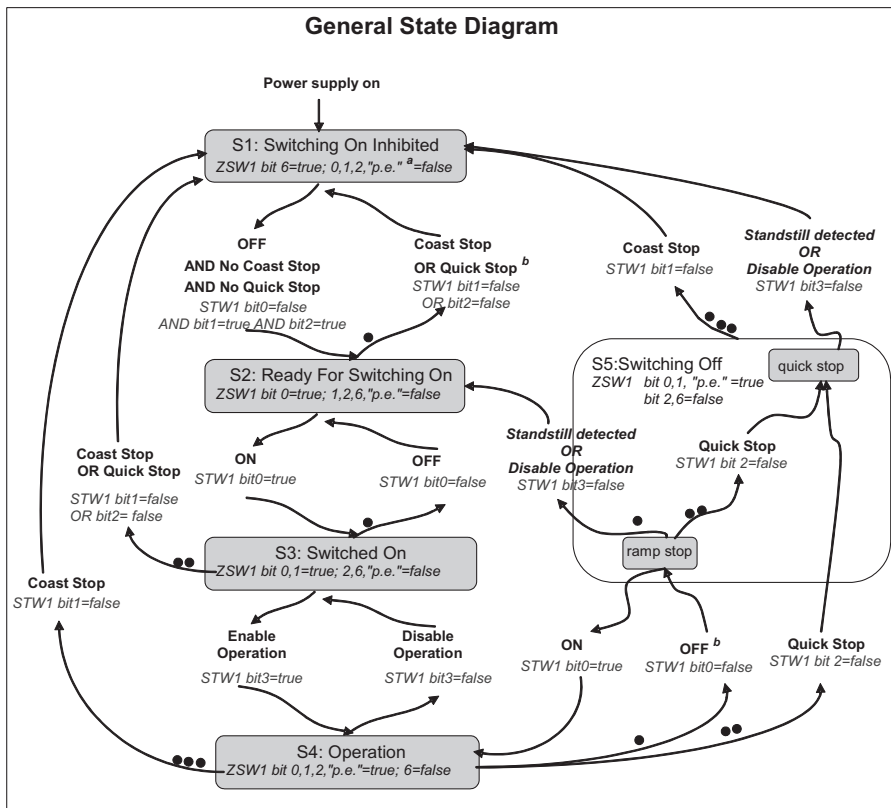
Reference should be made to the drive manual for parameter settings!

### 1.7.1 Configuration of the virtual digital I/Os

If the Profidrive profile is not used, commands can be sent to the drive using **Word decomp functions**, parameter PAR 4452. The meaning of the single bits is pro-

grammable. It can be set on a "Fieldbus M->Sn" channel as Count 16. The drive state is read in the PAR 443 **Word Comp** parameter, programmable on any "Fieldbus M->Mn" channel as Count 16. The meaning of each single bit can be selected by the user via parameters PAR 4400 **Word Bit 0 src** ... PAR 4430 **Word Bit 15 src**.

With the Profidrive profile the commands must be sent via control word STW1 according to the standard. The drive state is read by the status word ZSW1. In this case drive operation follows the machine states defined by the Profidrive standard, shown in the figure:



### 1.7.2 Use of the PDC in MDPLC applications

It is possible to configure both the PDC input and output data in order to allow the data direct access via the MDPLC application code.

PDC data can be mapped onto PLC variables for read data by setting the **Fieldbus S->Mn src** parameter to **Dig Fieldbus S->Mn**, the **Fieldbus S->Mn sys** parameter is automatically set to **MDPLC 16**.

For write data, **Fieldbus M->Sn sys** can be selected as MDPLC 16 or 32 and the destination can be left as **Not Used**. The datum is available on **Fieldbus M->Sn mon**.

The MDPLC application has the task of reading and writing on the relative **Dig** and **mon** parameters.

## 1.8 Profidrive

If the **Fieldbus type** parameter is set to Profidrive the drive operates in Profidrive Ver 4.1 mode, as P-Device (DPSlave) according to the Speed Control Mode for Application Class 1, with Master/Slave-type Cyclic Data Exchange (N.B.: clock synchronous operation DPV2 is not available). Alarms are managed via parameters.

### 1.8.1 Parameters

The drive makes the following parameters available, accessible using the DPV1-MSAC functions (see section 1.6.1), to the Process Data index DS47 (PAP):

#### In read mode:

918 : Node Address  
922 : Telegram selection ( value is always 1 )  
944 : Fault message number  
947 : Fault number  
952 : Fault situation number  
965 : Profile identification  
970 : Load parameter set  
971 : Transfer into non-volatile memory  
972 : Drive Reset

#### In write mode:

952: Fault situation number  
970: Load parameter set  
971: Transfer into non-volatile memory  
972: Drive Reset

### 1.8.2 Cyclic data exchange

The PDC channel is automatically configured according to Telegram 1 standard:

|                |                    |               |                                   |      |
|----------------|--------------------|---------------|-----------------------------------|------|
|                | Word 0             | Word 1        | Word 2                            | ...  |
| Word 15        |                    |               |                                   |      |
| In write mode: | STW1               | NSOLL_A       | User defined   ...   User defined |      |
|                |                    | In read mode: | ZSW1   NIST_A                     | User |
| defined        | ...   User defined |               |                                   |      |

Channel settings can be modified to exchange user parameters or other Telegram standards can be used, for example the following configuration can be used for Telegram Standard 2:

"Fieldbus M->S1 dest" = Profidrive control word , STW1  
"Fieldbus M->S1 sys" = Count 16  
"Fieldbus M->S2 dest" = Ramp ref1 src , NSOLL\_B  
"Fieldbus M->S2 sys" = Count 32  
"Fieldbus M->S3 dest" = Word decomp src , STW2 ( user defined )  
"Fieldbus M->S3 sys" = Count 16  
"Fieldbus S->M1 dest" = PFdrv status word1 , ZSW1  
"Fieldbus S->M1 sys" = Count 16  
"Fieldbus S->M2 dest" = Motor speed , NIST\_B  
"Fieldbus S->M2 sys" = Count 32  
"Fieldbus S->M3 dest" = PFdrv status word2 , ZSW2  
"Fieldbus S->M3 sys" = Count 16

### 1.8.3 Compatibility with Profidrive Ver 2.0

The drive can be used in Profidrive Ver 2.0 mode.

The default configuration works in the same way as PPO2.

To use the PKWs, one of the following configuration codes can be sent to the drive in place of those listed in section 1.3.2

Drive parameters can be accessed via the object with index 1 and sub-index equal to the relative PAR of the requested parameter.

| Config. Byte 1 | Config. Byte 2 | Config. Byte 3 | Meaning                            |
|----------------|----------------|----------------|------------------------------------|
| Hex            | Hex            | Hex            | -                                  |
| F3             | E0             | D0             | PKW & 1 Word In + 1 Word Out PDC   |
| F3             | E1             | D1             | PKW & 2 Word In + 2 Word Out PDC   |
| F3             | E2             | D2             | PKW & 3 Word In + 3 Word Out PDC   |
| F3             | E3             | D3             | PKW & 4 Word In + 4 Word Out PDC   |
| F3             | E4             | D4             | PKW & 5 Word In + 5 Word Out PDC   |
| F3             | E5             | D5             | PKW & 6 Word In + 6 Word Out PDC   |
| F3             | E6             | D6             | PKW & 7 Word In + 7 Word Out PDC   |
| F3             | E7             | D7             | PKW & 8 Word In + 8 Word Out PDC   |
| F3             | E8             | D8             | PKW & 9 Word In + 9 Word Out PDC   |
| F3             | E9             | D9             | PKW & 10 Word In + 10 Word Out PDC |
| F3             | EA             | DA             | PKW & 11 Word In + 11 Word Out PDC |
| F3             | EB             | DB             | PKW & 12 Word In + 12 Word Out PDC |
| F3             | EC             | DC             | PKW & 13 Word In + 13 Word Out PDC |
| F3             | ED             | DD             | PKW & 14 Word In + 14 Word Out PDC |
| F3             | EE             | DE             | PKW & 15 Word In + 15 Word Out PDC |
| F3             | EF             | DF             | PKW & 16 Word In + 16 Word Out PDC |



## 1.9 In general

### 1.9.1 Glossary

|                              |  |
|------------------------------|--|
| <b>Master</b>                | PLC or PC device controlling the Profibus DP; it has the right to access the Bus.                        |
| <b>Slave</b>                 | Drive or I/O modules which have no right to access the Bus   |
| <b>Process Channel</b>       | Channel for a fast, cyclical and high-priority data transfer of previously configured parameters.        |
| <b>Configuration Channel</b> | Channel for a non-cyclical and low-priority data transfer used, for example, for the drive configuration |
| <b>Profidrive</b>            | Standard communication profile for slave drives.   |

### 1.9.2 Abbreviations

|         |   |
|---------|---|
| • PDC   | Process Data Channel.                   |
| • DP    | Decentralized Peripherals.              |
| • CC    | Configuration Channel; see chapter 1.3. |
| • ZSW   | Status word                             |
| • STW   | Control word                            |
| • NSOLL | Speed setpoint                          |
| • NIST  | Speed Actual Value                      |

### 1.9.3 References

- 1 - "PROFIBUS Specification Normative Parts of PROFIBUS -FMS, -DP, -PA , Order No. 0.032 , Vol I & II
- 2- Profile Drive Technology - Profidrive - Ver 4.1
- 3 - ADV200 drive instruction manual

