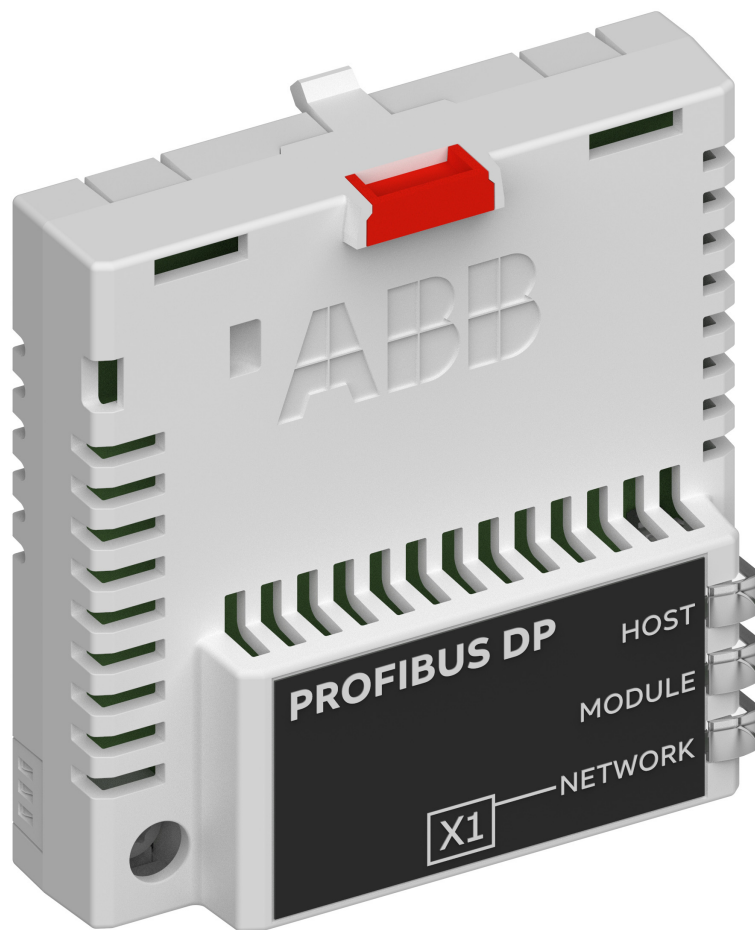


—  
OPTIONS FOR ABB DRIVES

# FPBA-01 PROFIBUS DP adapter module

User's manual



---

# List of related documents

See section [Related documents](#) on page 19.

You can find manuals and other product documents in PDF format on the Internet. See section Document library on the Internet on the inside of the back cover. For manuals not available in the Document library, contact your local ABB representative.

The code below opens an online listing of the manuals applicable to the product:



[FPBA-01 manual](#)



[Fieldbus connectivity webpage](#)

# FPBA-01 PROFIBUS DP adapter module

## User's manual

Table of contents



1. Safety instructions



4. Mechanical installation



5. Electrical installation



6. Start-up





# Table of contents

---

## **1. Safety instructions**

|  |    |
|--|----|
| Contents of this chapter .....               | 11 |
| Use of warnings .....                        | 11 |
| Safety in installation and maintenance ..... | 12 |

## **2. Introduction to the manual**

|                                       |    |
|---------------------------------------|----|
| Contents of this chapter .....        | 13 |
| Applicability .....                   | 13 |
| Compatibility .....                   | 13 |
| Target audience .....                 | 14 |
| Purpose of the manual .....           | 14 |
| Cybersecurity disclaimer .....        | 14 |
| Before you start .....                | 14 |
| Terms and abbreviations .....         | 15 |
| General terms and abbreviations ..... | 15 |
| PROFIBUS terms .....                  | 16 |
| PROFIBUS abbreviations .....          | 17 |
| Related documents .....               | 19 |

## **3. Overview of the PROFIBUS network and the FPBA-01 module**

|   |    |
|---|----|
| Contents of this chapter .....              | 21 |
| PROFIBUS network .....                      | 21 |
| Example topology of the PROFIBUS link ..... | 23 |
| FPBA-01 PROFIBUS DP adapter module .....    | 24 |
| Layout of the adapter module .....          | 25 |

## **4. Mechanical installation**

|  |    |
|--|----|
| Contents of this chapter .....             | 27 |
| Necessary tools and instructions .....     | 27 |
| Unpacking and examining the delivery ..... | 27 |
| Before you start .....                     | 28 |

---

Installing option modules .....28

## 5. Electrical installation

Contents of this chapter .....31  
Necessary tools and instructions .....31  
General cabling instructions .....31  
Connecting the module to the PROFIBUS network .....32  
Switching on the bus termination ..... 34

## 6. Start-up

Contents of this chapter .....35  
Drive configuration ..... 36  
    PROFIBUS connection configuration ..... 36  
        Data transfer rates supported .....37  
    Emulation modes .....37  
        RPBA-01, NPBA-02 and NPBA-12 modes .....37  
        VIK-NAMUR mode..... 38  
        FPBA-01 configuration parameters – group A (group 1)  
        39  
        FPBA-01 configuration parameters – group B (group 2)  
        47  
        FPBA-01 configuration parameters – group C (group 3)  
        49  
        Virtual address allocation with ACSM1 .....51  
    Control locations .....52  
Starting up ACS355 drives .....53  
    Parameter setting examples – ACS355 ..... 54  
        Speed control using the PROFIdrive communication  
        profile with PPO Type 2..... 54  
        Speed and torque control using the ABB Drives commu-  
        nication profile with PPO Type 4 .....57  
Starting up ACSM1 drives .....61  
    Parameter setting examples – ACSM1 .....62  
        Speed control using the PROFIdrive communication  
        profile with PPO Type 2.....62  
        Position control using the PROFIdrive communication

---

|   |     |
|---|-----|
| profile with PPO Type 4 . . . . .   | 65  |
| Speed and torque control using the ABB Drives communication profile with PPO Type 4 . . . . . | 70  |
| Starting up ACS380 drives . . . . .   | 73  |
| Setting up the drive for fieldbus control manually . . . . .                                  | 74  |
| Starting up ACS850 and ACQ810 drives . . . . .  | 76  |
| Parameter setting examples – ACS850 and ACQ810 . . . . .                                      | 78  |
| Speed control using the PROFIdrive communication profile with PPO Type 2 . . . . .            | 78  |
| Starting up ACS880 and ACS880-M04 drives . . . . .  | 81  |
| Parameter setting examples – ACS880 and ACS880-M04 . . . . .                                  | 82  |
| Speed control using the PROFIdrive communication profile with PPO Type 2 . . . . .            | 82  |
| Configuring the master station . . . . .  | 85  |
| Downloading the GSD file . . . . .  | 85  |
| Configuring an ABB AC500 PLC . . . . .  | 86  |
| Configuring a Siemens SIMATIC S7 PLC . . . . .  | 91  |
| Configuring a Siemens S7 PLC with TIA Portal V13 . . . . .                                    | 97  |
| Cyclic data handling . . . . .  | 101 |

## **7. Communication profiles**

|  |     |
|--|-----|
| Contents of this chapter . . . . .                       | 103 |
| Communication profiles . . . . .                         | 103 |
| PROFIdrive communication profile . . . . .               | 105 |
| Control word and Status word . . . . .                   | 105 |
| Control word contents . . . . .                          | 105 |
| Status word contents . . . . .                           | 109 |
| State machine for all operating modes . . . . .          | 111 |
| State machine for positioning mode . . . . .             | 112 |
| References . . . . .                                     | 113 |
| References in speed control mode . . . . .               | 113 |
| References in positioning mode (ACSM1 only) . . . . .    | 113 |
| Actual values . . . . .                                  | 114 |
| Actual values in speed control mode . . . . .            | 114 |
| Actual values in positioning mode (ACSM1 only) . . . . . | 114 |

---

|   |     |
|---|-----|
| ABB Drives communication profile .....      | 115 |
| Control word and Status word .....          | 115 |
| Control word contents .....                 | 115 |
| Status word contents .....                  | 118 |
| State machine .....                         | 120 |
| References .....                            | 121 |
| Scaling .....                               | 121 |
| Actual values .....                         | 122 |
| Scaling .....                               | 122 |
| PROFIdrive v4.2 communication profile ..... | 123 |
| Supported drives .....                      | 123 |
| Control word and Status word .....          | 123 |
| Control word contents .....                 | 123 |
| Status word contents .....                  | 125 |
| State machine .....                         | 127 |
| References .....                            | 129 |
| References in speed control mode .....      | 129 |
| Actual values .....                         | 129 |
| Actual values in speed control mode .....   | 130 |

## **8. Communication protocol**

|   |     |
|---|-----|
| Contents of this chapter .....                                | 131 |
| PROFIBUS DP .....   | 131 |
| Service access points (SAPs) .....                            | 132 |
| Communication start-up .....                                  | 132 |
| PROFIBUS SD2 telegram for Default SAP (0) and SAP 58-62. .... | 133 |
| Default SAP (SAP 0) (Data_Exch) .....                         | 134 |
| SAP 58 (Global_Control) .....                                 | 135 |
| SAP 60 (Slave_Diag) .....                                     | 136 |
| SAP 61 (Set_Prm) .....  | 140 |
| SAP 62 (Chk_Cfg) .....  | 146 |
| Other SAPs for DP-V1 communication .....                      | 148 |
| Cyclical message types .....                                  | 149 |
| PPO types .....   | 149 |
| Standard telegram (ST) types (DP-V1) .....                    | 150 |

---



|   |     |
|---|-----|
| Parameter handling in cyclic communication (DP) .....                         | 151 |
| Parameter data transfer examples (DP-V0) .....                                | 156 |
| Example 1: Reading a drive parameter (or data set)                            | 156 |
| Example 2: Writing a drive parameter (or data set).                           | 158 |
| Example 3: Reading a PROFIdrive parameter (word)                              | 160 |
| Example 4: Writing a PROFIdrive parameter (word)                              | 161 |
| Example 5: Reading a PROFIdrive parameter (array)                             | 162 |
| Example 6: Configuring the process data written to the<br>drive .....         | 163 |
| Example 7: Configuring the process data read from the<br>drive .....          | 164 |
| DP-V1 read/write request sequence .....                                       | 165 |
| PROFIBUS SD2 telegram for SAP 51 .....  | 167 |
| Parameter data transfer examples (DP-V1) .....                                | 176 |
| Example 1a: Reading a drive parameter (array element)                         | 177 |
| Example 1b: Reading 3 drive parameters (multi-param-<br>eter) .....           | 179 |
| Example 2a: Writing a drive parameter (one array ele-<br>ment) .....          | 182 |
| Example 2b: Writing 2 drive parameters (multi-paramete-<br>r).....            | 184 |
| Example 3: Reading a PROFIdrive parameter .....                               | 186 |
| Example 4: Configuring the process data written to the<br>drive .....         | 187 |
| Example 5: Determining the source of process data<br>read from the drive..... | 190 |

## **9. Diagnostics**

|                                |     |
|--------------------------------|-----|
| Contents of this chapter ..... | 193 |
| LED indications .....          | 193 |

## **10. Technical data**

|                                |     |
|--------------------------------|-----|
| Contents of this chapter ..... | 195 |
| FPBA-01 .....                  | 195 |
| PROFIBUS link .....            | 197 |

---

|  |     |
|--|-----|
| License information for 3rd party components ..... | 198 |
|--|-----|

## **11. Appendix A – PROFIdrive parameters**

|                                |     |
|--------------------------------|-----|
| Contents of this chapter ..... | 201 |
| PROFIdrive parameters .....    | 201 |

## **12. Appendix B – I&M records**

|  |     |
|--|-----|
| Contents of this chapter .....                                   | 213 |
| I&M records .....  | 213 |
| Call-REQ-PDU telegram for read/write access to I&M records ..... | 214 |
| Response structure for I&M0 (Read-only) .....                    | 215 |
| Response structure for I&M1 (Read/Write) .....                   | 216 |
| Response structure for I&M2 (Read/Write) .....                   | 216 |

## **Further information**

---

# 1

## Safety instructions

---

### Contents of this chapter

The chapter describes the warning symbols used in this manual and refers to the safety instructions which you must obey when you install or connect an option module. If you ignore the safety instructions, injury, death or damage can occur. Read this chapter before you start the installation.

### Use of warnings

Warnings tell you about conditions which can cause injury or death, or damage to the equipment. They also tell you how to prevent the danger. Notes draw attention to a particular condition or fact, or give information on a subject.

The manual uses these warning symbols:



**Electricity warning** tells you about hazards from electricity which can cause injury or death, or damage to the equipment.

---



**General warning** tells you about conditions, other than those caused by electricity, which can cause injury or death, or damage to the equipment.

---

## Safety in installation and maintenance

These instructions are for all who install or connect an optional module to a drive, converter or inverter and need to open its front cover or door to do the work.

---



**WARNING!** Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.

---



# Introduction to the manual

---

## Contents of this chapter

This chapter introduces this manual.

## Applicability

This manual applies to the FPBA-01 PROFIBUS DP adapter module, SW version 3.10 or later.

## Compatibility

The FPBA-01 PROFIBUS DP adapter module is compatible with the following drives: ACSM1, ACS355, ACS380, ACS480, ACS580, ACH580, ACQ580, ACS850, ACQ810, ACS880, ACS880-M04, etc.

The FPBA-01 PROFIBUS DP adapter module is compatible with all master stations that support the PROFIBUS DP-V0 and DP-V1 protocols.

**Note:** The adapter module is compatible with more drives that may not be listed here. For details of compatibility, check the drive's firmware manual.

---

## **Target audience**

The reader is expected to have a basic knowledge of the fieldbus interface, electrical fundamentals, electrical wiring practices and how to operate the drive.

## **Purpose of the manual**

The manual provides information on installing, commissioning and using an FPBA-01 PROFIBUS DP adapter module.

## **Cybersecurity disclaimer**

This product is designed to be connected to and to communicate information and data via a network interface. It is Customer's sole responsibility to provide and continuously ensure a secure connection between the product and Customer network or any other network (as the case may be). Customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

## **Before you start**

It is assumed that the drive is installed and ready to operate before you start the installation of the adapter module.

In addition to conventional installation tools, have the drive manuals available during the installation as they contain important information not included in this manual. The drive manuals are referred to at various points of this manual.

---

## Terms and abbreviations

### ■ General terms and abbreviations

| <b>Term / Abbreviation</b>         | <b>Explanation</b>  |
|------------------------------------|---|
| Communication module               | Communication module is a name for a device (eg, a fieldbus adapter) through which the drive is connected to an external communication network (eg, a fieldbus). The communication with the module is activated with a drive parameter. |
| Command word                       | See Control word.   |
| Control word                       | 16-bit word from master to slave with bit-coded control signals (sometimes called the Command word).  |
| FPBA-01 PROFIBUS DP adapter module | One of the optional fieldbus adapter modules available for ABB drives. FPBA-01 is a device through which an ABB drive is connected to a PROFIBUS network.   |
| Parameter                          | Operating instruction for the drive. Parameters can be read and programmed with the drive control panel, drive PC tools or through the adapter module.  |
| PLC                                | Programmable logic controller   |
| Profile                            | Adaptation of the protocol for certain application field, for example, drives. In this manual, drive-internal profiles (eg, DCU or FBA) are called native profiles.   |
| Status word                        | 16-bit word from slave to master with bit-coded status messages   |

## ■ PROFIBUS terms

| Term                  | Explanation   |
|-----------------------|---|
| Acyclic communication | Communication in which messages are sent only once on request   |
| Array                 | Parameter consisting of data fields of equal data type  |
| Broadcast             | Non-acknowledged message from master to all bus participants (compare Multicast)  |
| Cyclic communication  | Communication in which parameter/process data objects are sent cyclically at predefined intervals   |
| Drivecast             | Broadcast and Multicast, a special message frame for drives   |
| Fault                 | Event that leads to tripping of the device  |
| GSD file              | ASCII-format device description file in a specified form. Each different slave type on the PROFIBUS network needs to have its own GSD file. |
| Index                 | Access reference for objects in PROFIBUS  |
| Master                | Control system with bus initiative. In the PROFIBUS terminology, master stations are also called active stations.                           |
| Multicast             | Non-acknowledged message from master to one group of bus participants (compare Broadcast)   |
| Name                  | Symbolic name of a parameter  |
| Parameter             | Value that can be accessed as an object, eg, variable, constant, signal   |
| Parameter number      | Parameter address   |
| Parameter/Process     | Special object that contains parameter and process  |
| Data object           | Special object that contains parameter and process data   |



| <b>Term</b>    | <b>Explanation</b>  |
|----------------|---|
| Process data   | Data that contains Control word and reference value or Status word and actual value. May also contain other (user-definable) control information. |
| Request label  | Coded information specifying the required service for the parameter part sent from master to slave  |
| Response label | Coded information specifying the required service for the parameter part sent from slave to master  |
| Slave          | Passive bus participant. In the PROFIBUS terminology, slave stations (or slaves) are also called passive stations. Also referred to as node.      |
| Warning        | Signal caused by an existing alarm which does not lead to tripping of the device  |

## ■ PROFIBUS abbreviations

The text in *italics* is the original German term.

| <b>Abbreviation</b> | <b>Explanation</b>  |
|---------------------|---|
| ACT                 | Actual value<br><i>Istwert</i>  |
| AK                  | Request label/Response label<br><i>Auftragskennung/Antwortkennung</i>   |
| DP                  | Decentralised Periphery<br><i>Dezentrale Peripherie</i>   |
| DP-V0               | PROFIBUS DP extension to the EN 50170 standard, providing the basic functionality of DP, including cyclic data exchange |
| DP-V1               | PROFIBUS DP extension to the EN 50170 standard, including, eg, acyclic data exchange                                    |
| FMS                 | Fieldbus Message Specification  |
| ISW                 | See ACT.  |

## 18 Introduction to the manual

| <b>Abbreviation</b> | <b>Explanation</b>   |
|---------------------|--|
| PA                  | Process Automation<br>Prozessautomatisierung                           |
| PD                  | Process data<br><i>Prozessdaten</i>                                    |
| PKE                 | Parameter identification<br><i>Parameter-Kennung</i>                   |
| PKW                 | Parameter identification value<br><i>Parameter-Kennung-Wert</i>        |
| PNU                 | Parameter number<br>Parameternummer                                    |
| PPO                 | Parameter/Process data object<br><i>Parameter-/Prozessdaten-Objekt</i> |
| PWE                 | Parameter value<br>Parameter-Wert                                      |
| PZD                 | See PD.  |
| PZDO                | Process data object<br><i>Prozessdatenobjekt</i>                       |
| SAP                 | Service access point   |
| SOW                 | Reference<br><i>Sollwert</i>   |
| SPM                 | Request signal<br><i>Spontanmeldung</i>                                |
| STW                 | Control word<br><i>Steuerwort</i>                                      |
| ZSW                 | Status word<br><i>Zustandswort</i>                                     |

## Related documents

You can find manuals on the Internet. See below for the relevant link. For more documentation, go to [www.abb.com/drives/documents](http://www.abb.com/drives/documents).

| <b>Drive user's manuals</b>                             | <b>Code (English)</b>           |
|---|---------------------------------|
| ACS355 drives (0.37...22 kW, 0.5...30 hp) user's manual | <a href="#">3AUA0000066143</a>  |
| <b>Drive hardware manuals and guides</b>                |                                 |
| ACSM1 manuals   | <a href="#">00578051</a>        |
| ACH580-01 manuals                                       | <a href="#">9AKK10103A0587</a>  |
| ACH580-04 manuals                                       | <a href="#">9AKK106930A9059</a> |
| ACH580-07 manuals                                       | <a href="#">9AKK106930A5241</a> |
| ACQ580-01 manuals                                       | <a href="#">9AKK106713A2709</a> |
| ACQ580-04 manuals                                       | <a href="#">9AKK106930A9053</a> |
| ACQ580-07 manuals                                       | <a href="#">9AKK106930A3150</a> |
| ACS580-01 manuals                                       | <a href="#">9AKK105713A8085</a> |
| ACS580-04 manual  | <a href="#">9AKK106930A9060</a> |
| ACS580-07 (250 to 500 kW) manuals                       | <a href="#">9AKK106713A0278</a> |
| ACS580-07 (75 to 250 kW) manuals                        | <a href="#">9AKK106930A5239</a> |
| ACS850-04 manuals                                       | <a href="#">00592009</a>        |
| ACQ810 manuals  | <a href="#">00598718</a>        |
| ACS880-01 manuals                                       | <a href="#">9AKK105408A7004</a> |
| ACS880-04 manuals                                       | <a href="#">9AKK105713A4819</a> |
| ACS880-07 manuals (45 to 710 kW)                        | <a href="#">9AKK105408A8149</a> |
| ACS880-07 (560 to 2800 kW)                              | <a href="#">9AKK105713A6663</a> |
| ACS880-17 (132 to 355 kW)                               | <a href="#">9AKK106930A3466</a> |
| ACS880-17 (160 to 3200 kW)                              | <a href="#">9AKK106354A1499</a> |
| ACS880-37 (132 to 355 kW)                               | <a href="#">9AKK106930A3467</a> |
| ACS880-37 (160 to 3200 kW)                              | <a href="#">9AKK106354A1500</a> |
| Cybersecurity for ABB drives Technical guide            | <a href="#">3AXD10000492137</a> |
| <b>Option manuals and guides</b>                        |                                 |
| FPBA-01 PROFIBUS DP adapter module user's manual        | <a href="#">3AFE68573271</a>    |

For manuals not available in ABB Library, contact your local ABB representative.



3

# Overview of the PROFIBUS network and the FPBA-01 module

---

## Contents of this chapter

This chapter contains a short description of the PROFIBUS network and the FPBA-01 PROFIBUS DP adapter module.

## PROFIBUS network

PROFIBUS is an open serial communication standard that enables data exchange between all kinds of automation components. There are three main variations of PROFIBUS:

- PROFIBUS FMS (Fieldbus Message Specification)
- PROFIBUS DP (Decentralised Periphery)
- PROFIBUS PA (Process Automation).

The physical transmission medium of the bus is a twisted pair cable (according to the RS-485 standard). The maximum length of the bus cable is 100 to 1200 meters, depending on the selected transmission rate (see chapter [Technical data](#)). Up to 32 nodes can be connected to the same PROFIBUS network segment without the use of repeaters. With repeaters, it is possible to connect 126 nodes (including repeaters and a master station) to the network.

---

## 22 Overview of the PROFIBUS network and the FPBA-01 module

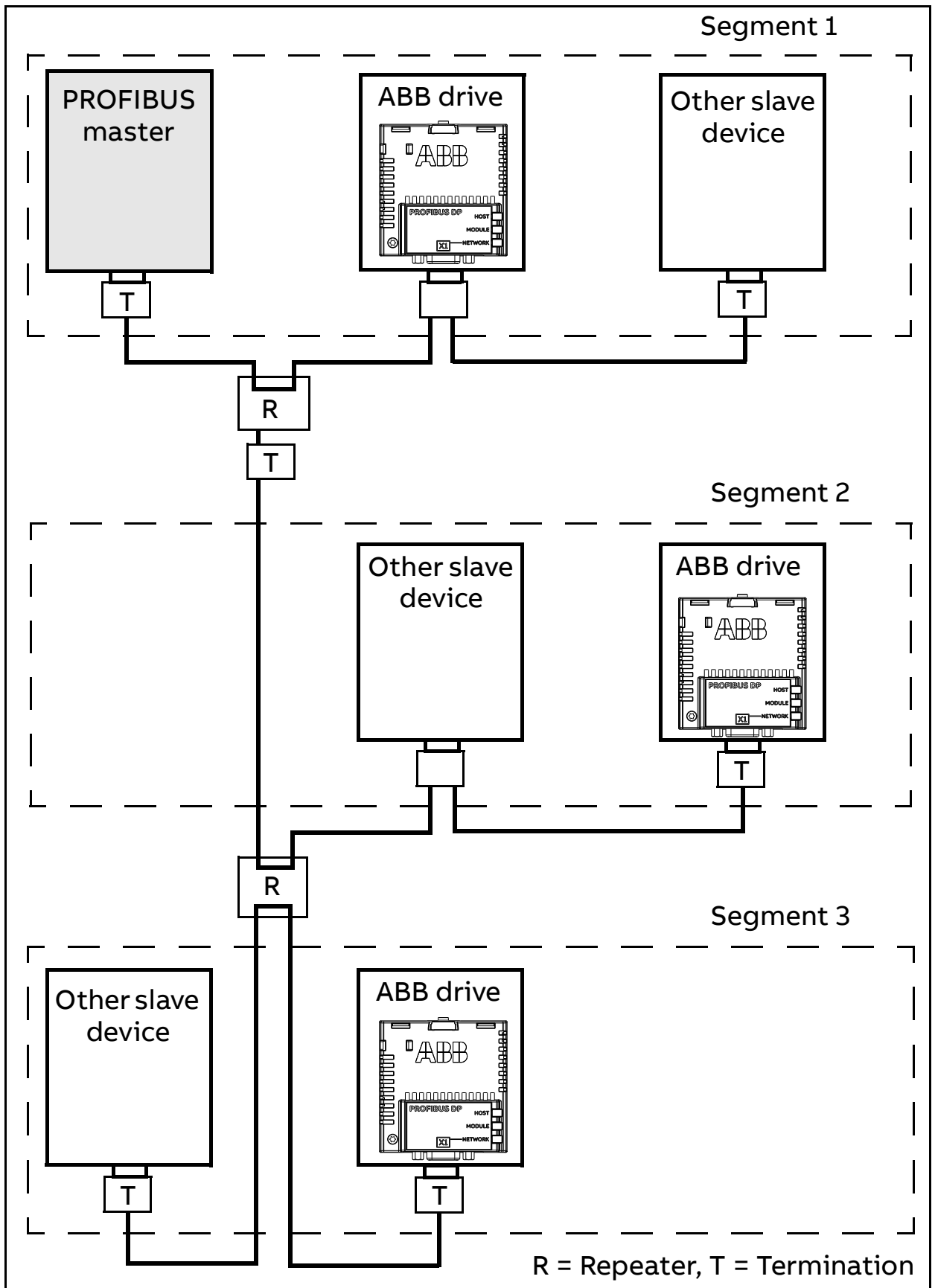
In PROFIBUS communication, the master station – usually a programmable logic controller (PLC) – polls the nodes which respond and take the actions requested by the master. It is also possible to send a command to several nodes at the same broadcast; in this case the nodes do not send a response message to the master.

The PROFIBUS protocol family is specified in the IEC 61158 standard. The communication with a drive is defined in *PROFdrive-PROFILE – The PROFIBUS Profile for Adjustable Speed Drives*. For further information on PROFIBUS, refer to the above-mentioned standard.

---

## ■ Example topology of the PROFIBUS link

The figure below shows an example of an allowable topology of the PROFIBUS link.



## FPBA-01 PROFIBUS DP adapter module

The FPBA-01 PROFIBUS DP adapter module is an optional device for ABB drives which enables the connection of the drive to a PROFIBUS network. The drive is considered a slave on the PROFIBUS network.

Through the adapter module you can:

- give control commands to the drive (for example, Start, Stop, Run enable)
- feed a motor speed or torque reference to the drive
- give a process actual value or a process reference to the PID controller of the drive
- read status information and actual values from the drive
- change drive parameter values
- reset a drive fault.

**Note:** PROFIdrive v4.2 cannot access the drive parameters.

The PROFIBUS commands and services supported by the adapter module are described in chapter [Communication protocol](#) on page 131. Refer to the user documentation of the drive as to which commands are supported by the drive.

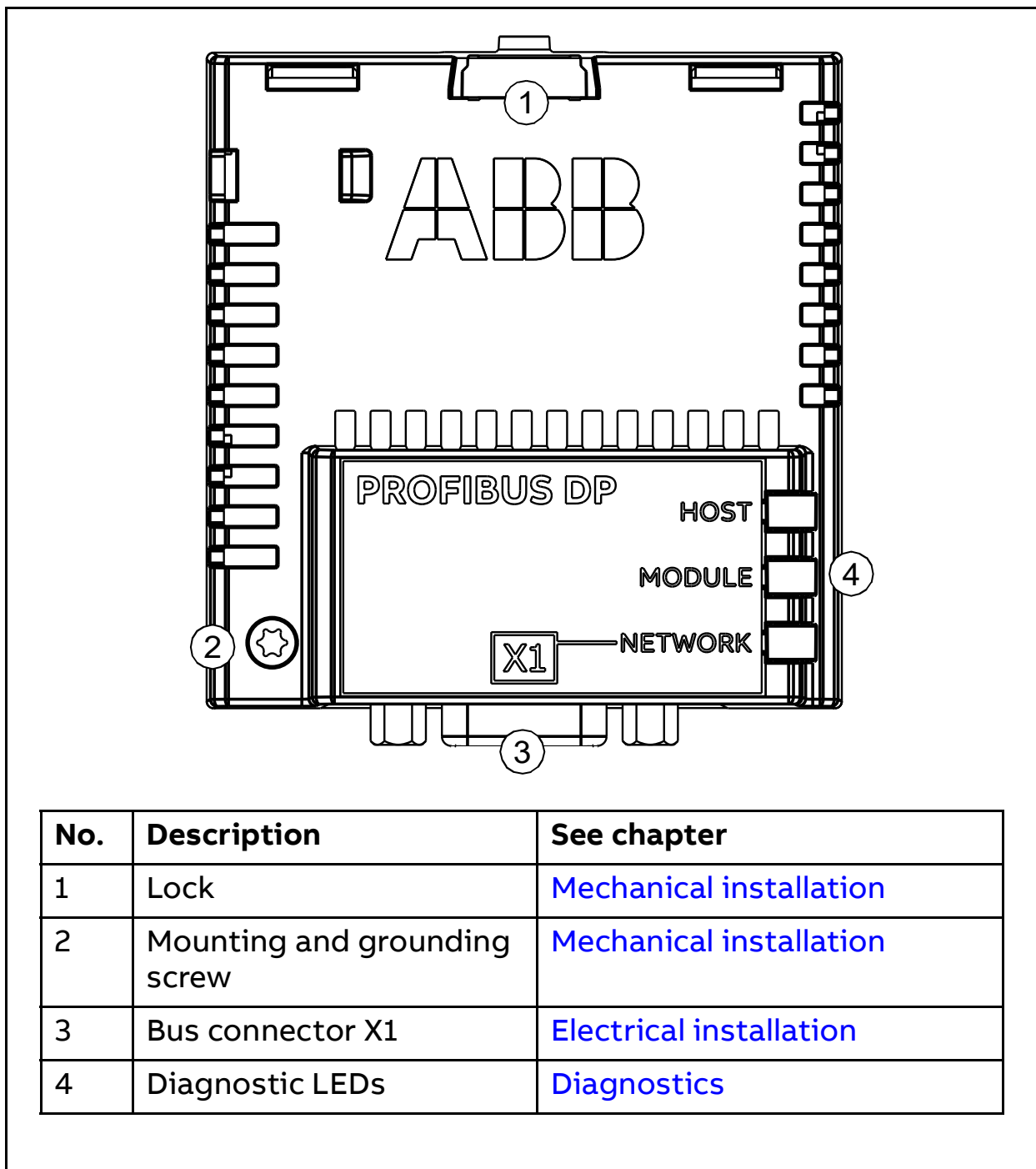
The adapter module is mounted into an option slot on the motor control unit of the drive. See the drive manuals for module placement options.

---



## ■ Layout of the adapter module

This figure shows the layout of FPBA-01.



## 26 Overview of the PROFIBUS network and the FPBA-01 module



# Mechanical installation

---

## Contents of this chapter

This chapter contains a delivery checklist and instructions on installing the module.

## Necessary tools and instructions

You will need a Torx TX10 screwdriver to secure the FPBA-01 adapter module to the drive. See also the applicable drive hardware manual.

## Unpacking and examining the delivery

1. Open the option package.
  2. Make sure that the package contains:
    - PROFIBUS DP adapter module, type FPBA-01
    - this manual.
  3. Make sure that there are no signs of damage.
-

## Before you start

The adapter module has a specific position in the drive. Plastic pins, a lock and one screw to hold the adapter module in place. The screw also makes an electrical connection between the module and drive frame for cable shield grounding.

When the adapter module is installed, it makes the signal and power connection to the drive through a 20-pin connector.

## Installing option modules



**WARNING!** Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur.

---

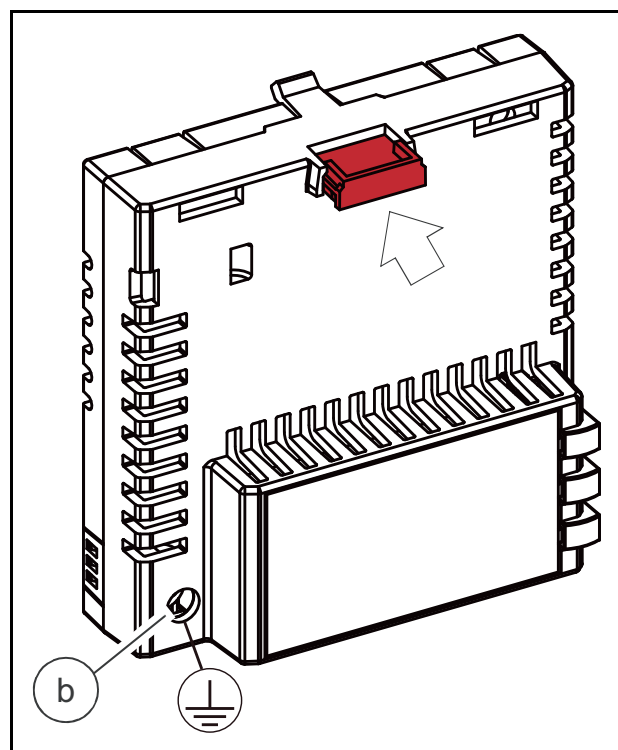
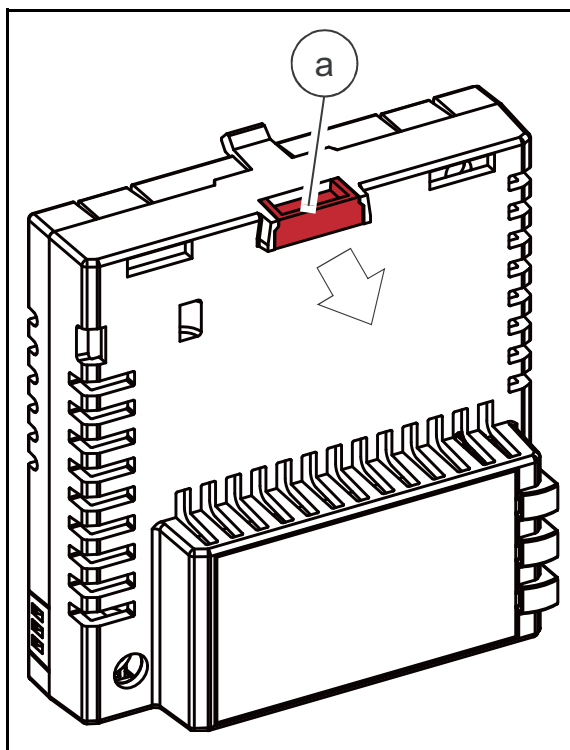
1. Stop the drive.
2. De-energize the drive system: Do the steps given in the safety instructions of the drive. Refer to the drive hardware manual.
3. Get access to the drive control unit.
4. Pull out the lock on the module (a).
5. Install the module to a free option module slot on the control unit.
6. Push in the lock on the module (a).
7. Torque the grounding screw (b) to 0.8 N·m (7 lbf·in)

**Note:** The screw tightens the connections and grounds the module. It is necessary for fulfilling the EMC requirements and for correct operation of the module.

---



**WARNING!** Do not use excessive force, or leave the screw too loose. Over-tightening can damage the screw or module. A loose screw decreases the EMC performance, and can even cause an operation failure.



If you need to remove the adapter module after it has been installed into the drive, use a suitable tool (e.g. small pliers) to carefully pull out the lock.



5

# Electrical installation

---

## Contents of this chapter

This chapter contains:

- general cabling instructions
- instructions on connecting the module to the PROFIBUS DP network
- instructions on switching on the bus termination.

## Necessary tools and instructions

See the applicable drive hardware manual.

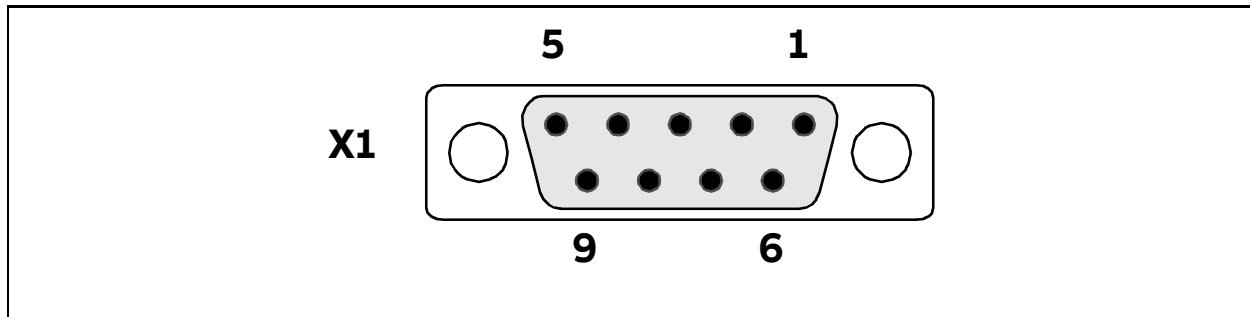
## General cabling instructions

- Arrange the bus cables as far away from the motor cables as possible.
  - Avoid parallel runs.
  - Use grommets at cable entries.
-

## Connecting the module to the PROFIBUS network

Connect the bus cable to connector X1 on the adapter module.

The connector pin allocation described below follows the PROFIBUS standard.



| X1      |                     | Description   |
|---------|---------------------|---|
| 1       | SHLD                | Alternate cable shield connection. Connected to connector housing.                                      |
| 2       |                     | Not used  |
| 3       | B                   | Data positive (Conductor 1 in twisted pair)   |
| 4       | RTS <sup>1)</sup>   | Request to send   |
| 5       | GND_B               | Isolated ground   |
| 6       | +5V_B <sup>2)</sup> | Isolated 5 V DC voltage supply (30 mA max.)   |
| 7       |                     | Not used  |
| 8       | A                   | Data negative (Conductor 2 in twisted pair)   |
| 9       |                     | Not used  |
| Housing | SHLD                | PROFIBUS cable shield. Internally connected to GND_B via an RC filter and directly to CH_GND (chassis). |

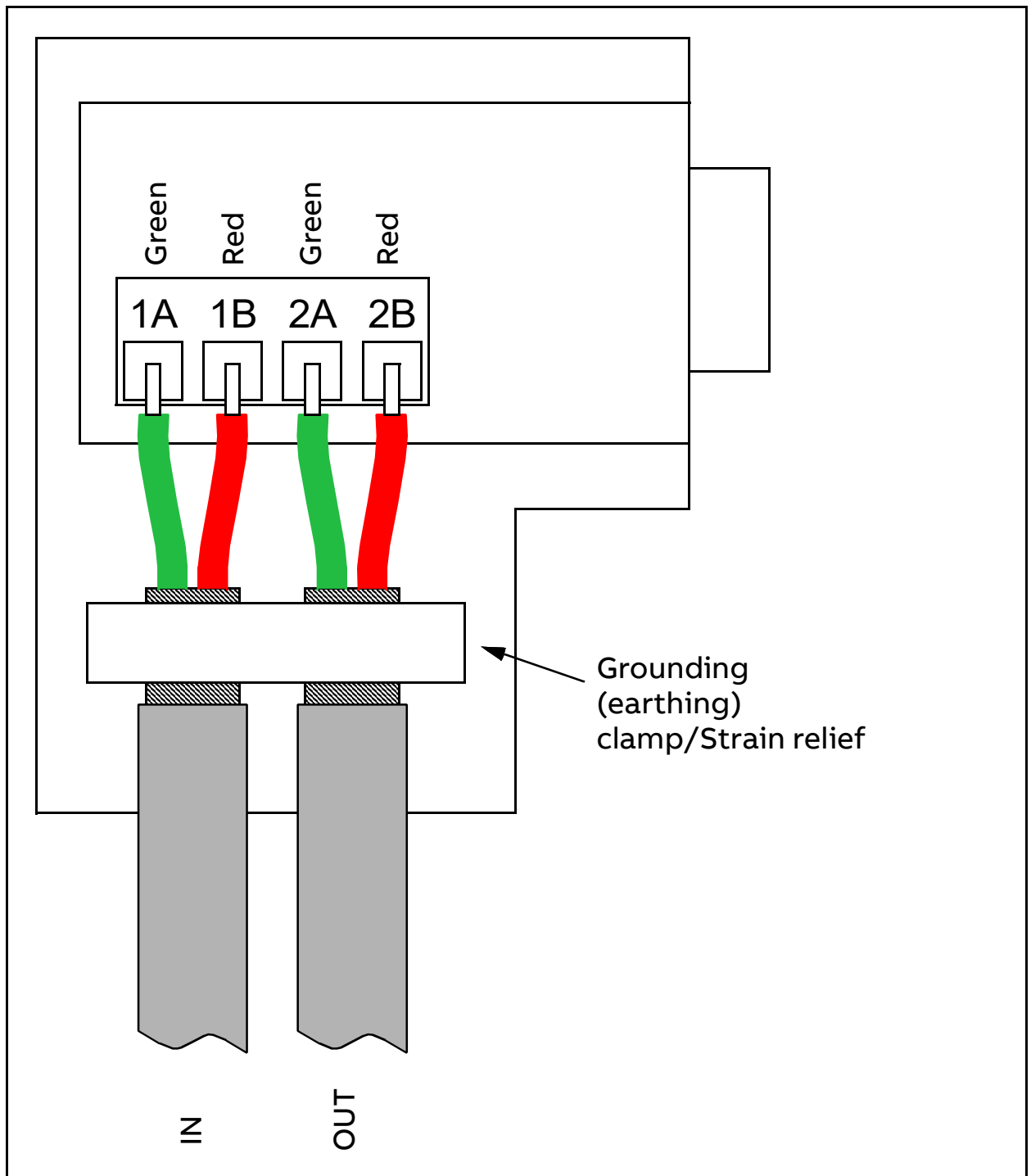
<sup>1)</sup> RTS is used in some equipment to determine the direction of transmission. In typical applications, only the line A, line B and shield are used.

<sup>2)</sup> +5V\_B and GND\_B are used for bus termination.



ABB recommends to use a PROFIBUS-approved D-SUB 9 connector. These connectors have a built-in termination network and inductors for station capacitance compensation.

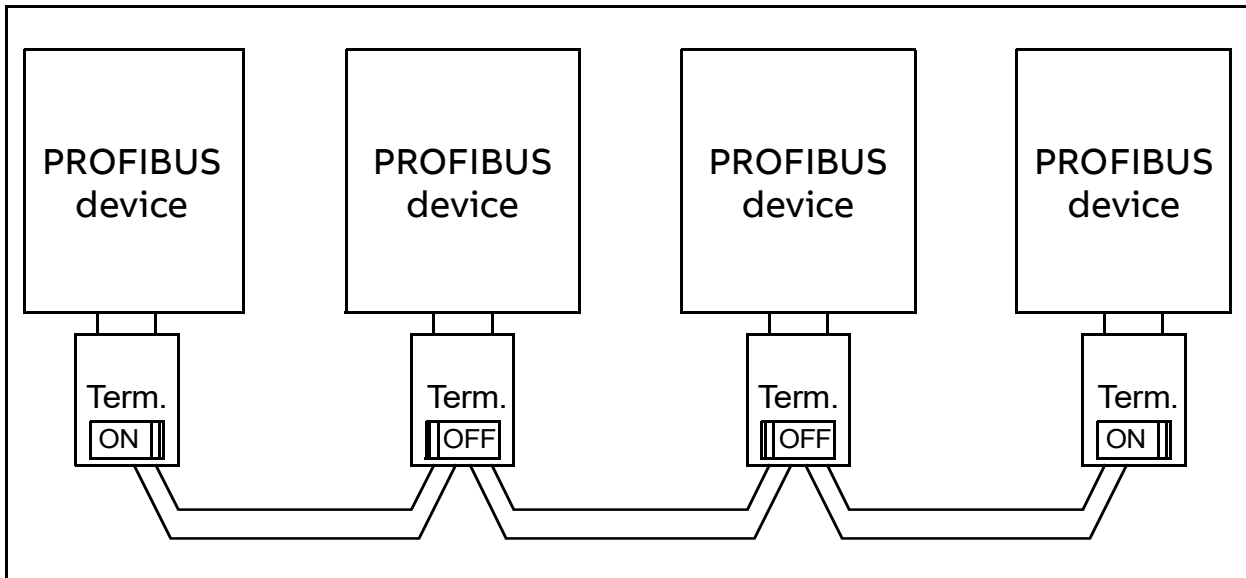
Connect the cable to the D-SUB connector as follows:



## Switching on the bus termination

Bus termination is required to prevent signal reflections from the bus cable ends. The adapter module is not equipped with internal bus termination. Therefore, the D-SUB connectors at the first and last modules of the bus must have built-on termination switched on as shown in the diagram below.

The adapter module is able to supply power for an active-type termination circuitry (30 mA max.).



**Note:** Further information on PROFIBUS wiring is available from the publication *PROFIBUS RS 485-IS User and Installation Guideline* ([www.profibus.com](http://www.profibus.com), order no. 2.262).



# Start-up

---

## Contents of this chapter

This chapter contains:

- information on configuring the drive for operation with the adapter module
  - drive-specific instructions on starting up the drive with the adapter module
  - examples of configuring the master station for communication with the adapter module.
-

## Drive configuration

The following information applies to all drive types compatible with the adapter module, unless otherwise stated.

### ■ PROFIBUS connection configuration

After the adapter module is mechanically and electrically installed according to the instructions in chapters [Mechanical installation](#) and [Electrical installation](#), prepare the drive for communication with the module.

The detailed procedure of activating the module for PROFIBUS DP communication with the drive depends on the drive type. Normally, a parameter must be adjusted to activate the communication. See the drive-specific start-up procedures starting on page [53](#).

Once communication between the drive and the adapter module has been established, several configuration parameters are copied to the drive. These parameters are shown in the tables below and must be checked first and adjusted where necessary.

#### **Note:**

- Not all drives display descriptive names of the configuration parameters.
  - The new settings take effect only when the adapter module is powered up the next time or when the fieldbus adapter refresh parameter is activated.
  - Make sure the proper operation of the adapter module with the drive by also setting the extended Parameter Data (see [SAP 61 \(Set\\_Prm\)](#) on page [140](#)).
-

## Data transfer rates supported

The FPBA-01 module supports the following PROFIBUS communication speeds: 9.6 kbit/s, 19.2 kbit/s, 45.45 kbit/s, 93.75 kbit/s, 187.5 kbit/s, 500 kbit/s, 1.5 Mbit/s, 3 Mbit/s, 6 Mbit/s, 12 Mbit/s.

The module automatically detects the communication speed and telegram type used.

## ■ Emulation modes

FPBA-01 supports emulation modes for RPBA-01, NPBA-02, NPBA-12 and VIK-NAMUR.

Emulation modes change the FPBA-01 identification information so that FPBA-01 accepts connection from PLC configuration made for RPBA-01, NPBA-02, NPBA-12 or VIK-NAMUR.

Emulation mode can be used in these conditions:

- when replacing an older drive
- where the PLC program cannot be changed
- when using ACS880 as a VIK-NAMUR drive.

## RPBA-01, NPBA-02 and NPBA-12 modes

Cyclic process data is handled based on profile selection. Control word, status word, references and actuals can be used normally according to the configured profile.

PROFIdrive parameter handling in cyclic data (PKW DP-V0) is emulated. The parameter addresses can be modified to convert the request to drive parameter index similarly as in the emulated modules.

**Note:** Emulation mode only emulates parameter addresses. The emulated parameters need to be made on the drive side with application programming tools.

---

## **VIK-NAMUR mode**

The VIK-NAMUR mode can be used in combination with ACS880 NAMUR application. With this mode, FPBA-01 acts in the transparent mode and the drive application provides cyclic data content for Standard telegram 20.

Use this mode with the generic VIK-NAMUR GSD file (*pd013aa0.gsd*).

**Note:** In NPBA-x2 and VIK-NAMUR emulation mode the cut-off timeout is constantly 30ms.

## FPBA-01 configuration parameters – group A (group 1)

**Note:** The actual parameter group number depends on the drive type. Group A (group 1) corresponds to:

- parameter group 51 in ACSM1, ACS355, ACS380, ACS580, ACS850 and ACQ810
- parameter group 51 in ACS880 and ACS880-M04 if the adapter is installed as fieldbus adapter A or group 54 if the adapter is installed as fieldbus adapter B.

| No. | Name/Value   | Description   | Default                |
|-----|--------------|---|------------------------|
| 01  | FBA type     | Read-only. Shows the fieldbus adapter type as detected by the drive. The value cannot be adjusted by the user.<br>If the value is <b>0</b> = None, the communication between the drive and the module has not been established. | <b>1</b> = Profibus_DP |
| 02  | Node address | Each device on the PROFIBUS network must have a unique node number. This parameter defines a node number for the drive the module is connected to. Recommended node numbers are 3 to 125 inclusive.                             | 3                      |
|     | 0...126      | Node number   |                        |
| 03  | Baud rate    | Read-only. Indicates the detected communication speed in kbit/s.<br><br>1) Default value is 0 if there is no connection.  | 1500 <sup>1)</sup>     |
|     | 12000        | 12 Mbit/s   |                        |
|     | 6000         | 6 Mbit/s  |                        |
|     | 3000         | 3 Mbit/s  |                        |
|     | 1500         | 1.5 Mbit/s  |                        |
|     | 500          | 500 kbit/s  |                        |

## 40 Start-up

| No. | Name/Value | Description  | Default         |
|-----|------------|--|-----------------|
|     | 187        | 187.5 kbit/s   |                 |
|     | 93         | 93.75 kbit/s   |                 |
|     | 45         | 45.45 kbit/s   |                 |
|     | 19         | 19.2 kbit/s  |                 |
|     | 9          | 9.6 kbit/s   |                 |
| 04  | MSG type   | <p>Read-only. Indicates the telegram type selected for PROFIBUS communication. The adapter module automatically detects the telegram type used. For more information on the supported PPO message types, see section <a href="#">PPO types</a> on page <a href="#">149</a>.</p> <p>If standard telegrams (ST) are used, parameter <a href="#">05 Profile</a> is automatically set.</p> | <b>1 = PPO1</b> |
|     | 1 = PPO1   | PPO1 selected  |                 |
|     | 2 = PPO2   | PPO2 selected  |                 |
|     | 3 = PPO3   | PPO3 selected  |                 |
|     | 4 = PPO4   | PPO4 selected  |                 |
|     | 5 = PPO5   | PPO5 selected  |                 |
|     | 6 = PPO6   | PPO6 selected  |                 |
|     | 7 = ST1    | ST1 selected   |                 |
|     | 8 = ST2    | ST2 selected. Only supported with ACSM1.   |                 |
|     | 9 = PPO7   | PPO7 selected  |                 |
|     | 10 = PPO8  | PPO8 selected  |                 |
|     | 20 = ST20  | Standard telegram 20. Visible only in VIK-NAMUR emulation mode.  |                 |



| No. Name/Value      | Description   | Default               |
|---------------------|---|-----------------------|
| 05 Profile          | Selects the communication profile used.<br>For more information on the communication profiles, see chapter <a href="#">Communication profiles</a> . | <b>1 = ABB drives</b> |
| 0 = PROFIdrive      | PROFIdrive profile selected. See also <a href="#">Virtual address allocation with ACSM1</a> on page 51.   |                       |
| 1 = ABB DRIVES      | ABB Drives profile selected   |                       |
| 2 = Trans16         | Transparent 16 profile selected   |                       |
| 3 = Trans32         | Transparent 32 profile selected.<br>Not supported with ACS355.  |                       |
| 4 = PROFIdrive P    | PROFIdrive positioning mode selected. Only supported with ACSM1. See also <a href="#">Virtual address allocation with ACSM1</a> on page 51.         |                       |
| 5 = PROFIdrive v4.2 | PROFIdrive v4.2 profile selected.   |                       |

| No. Name/Value | Description  | Default |
|----------------|--|---------|
| 06 T16 scale   | <p>Defines the reference multiplier/actual value divisor for the adapter module.</p> <p><b>Note:</b> The parameter is effective only when</p> <ul style="list-style-type: none"> <li>• Transparent 16 profile is selected</li> <li>• drive is using the native communication profile (for example, DCU or FBA)</li> <li>• a 16-bit transparent Reference 1/Actual value 1 is used.</li> </ul> <p>For ACS880, ACS380, ACS580 and ACS480, bus reference is multiplied by (T16 scale + 1).<br/>For example, value 0 will be <math>1 = 1</math> (the value 1 from PLC will be 1.00 in the drive), the value 99 will be <math>1 = 100.00</math>.</p> <p>With an ACS355 drive, the speed reference from the PLC is multiplied by the value of this parameter plus one. For example, if the parameter has a value of 99 and a reference of 1000 is given by the master, the reference will be multiplied by <math>99 + 1 = 100</math> and forwarded to the drive as 100000. According to the DCU profile, this value is interpreted as a reference of 100 rpm in the drive.</p> <p>With ACSM1, ACS850 and ACQ810, setting this parameter to 65535 provides the approximation of <math>1 \approx 1</math> rpm.</p> | 99      |
| 0...65535      | Reference multiplier/actual value divisor  |         |

| No. | Name/Value       | Description  | Default             |
|-----|------------------|--|---------------------|
| 07  | Emul mode        | <p>Enables the emulation mode for the drive. When the mode is enabled, it is possible to replace a drive using modules RPBA-01, NPBA-02 or NPBA-12 in the PROFIBUS network with a drive using the FPBA-01 module, without modifying the PLC hardware configuration.</p> <p>The VIK-NAMUR mode enables the use of ACS880 with the FPBA-01 module as a VIK-NAMUR device.</p> <p>See also <a href="#">Emulation modes</a> on page 37.</p> | <b>0</b> = Disabled |
|     | 0 = Disabled     | Emulation mode is disabled.  |                     |
|     | 1 = RPBA-01      | RPBA-01 emulation mode is enabled.   |                     |
|     | 2 = NPBA-02      | NPBA-02 emulation mode is enabled.   |                     |
|     | 3 = NPBA-12      | NPBA-12 emulation mode is enabled.   |                     |
|     | 4 = VIK-NAMUR    | VIK-NAMUR emulation mode is enabled.   |                     |
| 08  | Map selection    | Selects the resolution of parameter used for PZD mapping through PROFIdrive parameters 915 and 916.  | <b>0</b> = 32 bit   |
|     | 0 = 32 bit       | 32 bit scaling   |                     |
|     | 1 = 16 bit       | 16 bit scaling   |                     |
| 09  | Module info      | Indicates the status of mapping configuration.   |                     |
|     | 0 = OK           |  |                     |
|     | 1 = MAP_ERR_LAST | 32 bit parameter is mapped in the last PZD place   |                     |
|     | 2 = CFG_ERR_PPO  | Wrong PPO/ST type (data size) code sent by PLC   |                     |

## 44 Start-up

| No.             | Name/Value               | Description  | Default         |
|-----------------|--------------------------|--|-----------------|
|                 | 3 =<br>MAP_ERR_WRONG_IDX | Wrong mapping index (e.g. index of PZD 10) is used when PPO type 2 is in use   |                 |
|                 | 4 = MAP_ERR_IN           | Parameter number or virtual index number is not supported for input mapping  |                 |
|                 | 5 =<br>MAP_ERR_OUT       | Parameter number or virtual index number is not supported for output mapping   |                 |
|                 | 6 =<br>MAP_ERR_SEND      | Internal mapping error   |                 |
| 10<br>...<br>26 | Reserved                 | These parameters are not used by the adapter module.   | N/A             |
| 27              | FBA par refresh          | Validates any changed adapter module configuration parameter settings. After refreshing, the value reverts automatically to <b>0 = Done</b> .<br><b>Note:</b> This parameter cannot be changed while the drive is running. | <b>0 = Done</b> |
|                 | <b>0 = Done</b>          | Refreshing done  |                 |
|                 | <b>1 = Refresh</b>       | Refreshing   |                 |

| No. | Name/Value              | Description   | Default                                      |
|-----|-------------------------|---|--|
| 28  | FBA par table ver       | <p><b>Read-only.</b> Displays the parameter table revision of the fieldbus adapter module mapping file stored in the memory of the drive.</p> <p>In format <b>xyz</b>, where<br/> <b>x</b> = major revision number<br/> <b>y</b> = minor revision number<br/> <b>z</b> = correction number</p> <p>OR</p> <p>in format <b>axyz</b>, where<br/> <b>a</b> = major revision number<br/> <b>xy</b> = minor revision number<br/> <b>z</b> = correction number or letter.</p> <p>OR</p> <p>in format <b>axyz</b>, where<br/> <b>ax</b> = major table revision number<br/> <b>yz</b> = minor table revision number.</p> | N/A  |
|     |                         | Parameter table revision  |  |
| 29  | FBA drive type code     | <p><b>Read-only.</b> Displays the drive type code of the fieldbus adapter module mapping file stored in the memory of the drive.</p>  | N/A  |
|     |                         | Drive type code of the fieldbus adapter module mapping file   |  |
| 30  | FBA mapping file ver    | <p><b>Read-only.</b> Displays the fieldbus adapter module mapping file revision stored in the memory of the drive in decimal format.</p>  | N/A  |
|     |                         | Mapping file revision   |  |
| 31  | D2FBA comm status       | <p><b>Read-only.</b> Displays the status of the fieldbus adapter module communication.</p> <p><b>Note:</b> The value names may vary by drive.</p>   | <b>0</b> = Idle<br>OR<br><b>4</b> = Off-line |
|     | 0 = Idle/Not configured | Adapter is not configured.  |  |

| No. | Name/Value                           | Description   | Default |
|-----|--------------------------------------|---|---------|
|     | 1 = Exec.init/<br>Initializing       | Adapter is initializing.  |         |
|     | 2 = Time out                         | A timeout has occurred in the communication between the adapter and the drive.  |         |
|     | 3 = Conf.err/<br>Configuration error | Adapter configuration error: The major or minor revision code of the common program revision in the fieldbus adapter module is not the revision required by the module or mapping file upload has failed more than three times.   |         |
|     | 4 = Off-line                         | Adapter is off-line.  |         |
|     | 5 = On-line                          | Adapter is on-line.   |         |
|     | 6 = Reset                            | Adapter is performing a hardware reset.   |         |
| 32  | FBA A comm SW ver                    | Read-only. Displays firmware patch and build number of the adapter module in format <b>xyyy</b> , where:<br><b>xx</b> = patch number<br><b>yy</b> = build number.<br>Example: C80D ≥ 200.13<br>or 0 ≥ 0.0   | 0 hex   |
|     | 0..0xFFFF                            | Firmware patch and build number of the adapter module.  |         |
| 33  | FBA appl SW ver                      | Read-only. Displays the firmware version of the adapter module in format <b>xyyy</b> , where:<br><b>xx</b> = major revision number<br><b>xy</b> = minor revision number.<br>Example: 0310h = 3.10<br>Version number is in the form:<br><major>.<minor>.<patch>.<build><br>Example: 3.10.200.3 or 3.10.0.0 | 0 hex   |
|     | 0..0xFFFF                            | Firmware version of the adapter module.   |         |

## FPBA-01 configuration parameters – group B (group 2)

**Note:** The actual parameter group number depends on the drive type. Group B (group 2) corresponds to:

- parameter group 55 in ACS355
- parameter group 53 in ACSM1, ACS380, ACS580, ACS850, ACQ580, and ACQ810
- parameter group 53 in ACS880 and ACS880-M04 if the adapter is installed as fieldbus adapter A or group 56 if the adapter is installed as fieldbus adapter B.

| No. <sup>1)</sup> | Name/Value                            | Description   | Default               |          |        |                                       |                |                             |                       |
|-------------------|---------------------------------------|---|-----------------------|----------|--------|---------------------------------------|----------------|-----------------------------|-----------------------|
| 01                | FBA data out 1<br>(master to drive)   | Selects the resolution of control word (16 bit or 32 bit) received by the drive.  | 1 or 11 <sup>2)</sup> |          |        |                                       |                |                             |                       |
|                   | 1 = CW 16bit                          | Control word (16 bits)  |                       |          |        |                                       |                |                             |                       |
|                   | 11 = CW 32bit                         | Control word (32 bits)  |                       |          |        |                                       |                |                             |                       |
| 02                | FBA data out 2                        | Selects data word 1 received by the drive over the PROFIBUS network. The content is defined by a decimal number in the range of 0 to 9999 as follows: <table border="1" data-bbox="635 1256 1260 1536"> <tr> <td>0</td> <td>Not used</td> </tr> <tr> <td>1...99</td> <td>Virtual address area of drive control</td> </tr> <tr> <td>101...999<br/>9</td> <td>Parameter area of the drive</td> </tr> </table> <p>See also <a href="#">Virtual address allocation with ACSM1</a> on page 51.</p> | 0                     | Not used | 1...99 | Virtual address area of drive control | 101...999<br>9 | Parameter area of the drive | 0 or 24 <sup>4)</sup> |
| 0                 | Not used                              |   |                       |          |        |                                       |                |                             |                       |
| 1...99            | Virtual address area of drive control |   |                       |          |        |                                       |                |                             |                       |
| 101...999<br>9    | Parameter area of the drive           |   |                       |          |        |                                       |                |                             |                       |
|                   | 0 = None                              | Not used  |                       |          |        |                                       |                |                             |                       |
|                   | 1 = CW 16bit                          | Control word (16 bits) <sup>3)</sup>  |                       |          |        |                                       |                |                             |                       |
|                   | 2 = Ref1 16bit                        | Reference REF1 (16 bits) <sup>3)</sup>  |                       |          |        |                                       |                |                             |                       |
|                   | 3 = Ref2 16bit                        | Reference REF2 (16 bits) <sup>3)</sup>  |                       |          |        |                                       |                |                             |                       |
|                   | 11 = CW 32bit                         | Control word (32 bits)  |                       |          |        |                                       |                |                             |                       |
|                   | 12 = Ref1 32bit                       | Reference REF1 (32 bits)  |                       |          |        |                                       |                |                             |                       |

## 48 Start-up

| No. <sup>1)</sup> | Name/Value                              | Description  | Default |
|-------------------|---|--|---------|
|                   | 13 = Ref2 32bit                         | Reference REF2 (32 bits)   |         |
|                   | 21 = CW2 16bit                          | Control word 2 (16 bits)   |         |
|                   | 101...9999                              | Parameter index with format <b>xyyy</b> , where <ul style="list-style-type: none"> <li>• <b>xx</b> is the parameter group number (1...99)</li> <li>• <b>yy</b> is the parameter number index within that group (01...99).</li> </ul> |         |
|                   | Other                                   | Path to parameter area selection.  |         |
| 03<br>...<br>12   | FBA data out 3<br>...<br>FBA data out12 | See parameter <a href="#">01 FBA data out 1</a> .  | 0       |

<sup>1)</sup> The number of parameters in this group may vary by drive type and drive firmware.

<sup>2)</sup> 11 (CW 32bit) is the default setting if the Transparent 32 profile is used.

<sup>3)</sup> With an ACS355 drive, Control word and REF 1 are always fixed to virtual addresses 1 and 2 respectively. If REF2 is used, its virtual address is always 3.

<sup>4)</sup> 2 (Ref1 16bit) is a fixed setting with an ACS355 drive.



## FPBA-01 configuration parameters – group C (group 3)

**Note:** The actual parameter group number depends on the drive type. Group C (group 3) corresponds to:

- parameter group 54 in ACS355
- parameter group 52 in ACSM1, ACS380, ACS580, ACS850, ACQ580, and ACQ810
- parameter group 52 in ACS880 and ACS880-M04 if the adapter is installed as fieldbus adapter A or group 55 if the adapter is installed as fieldbus adapter B.

| No. <sup>1)</sup> | Name/Value                            | Description   | Default               |          |        |                                       |            |                             |                      |
|-------------------|---------------------------------------|---|-----------------------|----------|--------|---------------------------------------|------------|-----------------------------|----------------------|
| 01                | FBA data in 1<br>(drive to master)    | Selects the resolution of status word (16 bit or 32 bit) sent by the drive.   | 4 or 14 <sup>2)</sup> |          |        |                                       |            |                             |                      |
|                   | 4 = SW 16bit                          | Status word (16 bits)   |                       |          |        |                                       |            |                             |                      |
|                   | 14 = SW 32bit                         | Status word (32 bits)   |                       |          |        |                                       |            |                             |                      |
| 02                | FBA data in 2<br>(drive to master)    | Selects data word 1 sent by the drive over the PROFIBUS network. The content is defined by a decimal number in the range of 0 to 9999 as follows:<br><br><table border="1" data-bbox="671 1272 1288 1550"> <tr> <td>0</td> <td>Not used</td> </tr> <tr> <td>1...99</td> <td>Virtual address area of drive control</td> </tr> <tr> <td>101...9999</td> <td>Parameter area of the drive</td> </tr> </table><br>See also <a href="#">Virtual address allocation with ACSM1</a> on page 51. | 0                     | Not used | 1...99 | Virtual address area of drive control | 101...9999 | Parameter area of the drive | 0 or 5 <sup>3)</sup> |
| 0                 | Not used                              |   |                       |          |        |                                       |            |                             |                      |
| 1...99            | Virtual address area of drive control |   |                       |          |        |                                       |            |                             |                      |
| 101...9999        | Parameter area of the drive           |   |                       |          |        |                                       |            |                             |                      |
|                   | 0 = None                              | Not used  |                       |          |        |                                       |            |                             |                      |
|                   | 4 = SW 16bit                          | Status word (16 bits)   |                       |          |        |                                       |            |                             |                      |
|                   | 5 = Act1 16bit                        | Actual value ACT1 (16 bits)   |                       |          |        |                                       |            |                             |                      |
|                   | 6 = Act2 16bit                        | Actual value ACT2 (16 bits)   |                       |          |        |                                       |            |                             |                      |
|                   | 14 = SW 32bit                         | Status word (32 bits)   |                       |          |        |                                       |            |                             |                      |
|                   | 15 = Act1 32bit                       | Actual value ACT1 (32 bits)   |                       |          |        |                                       |            |                             |                      |

## 50 Start-up

| No. <sup>1)</sup> | Name/Value                        | Description  | Default |
|-------------------|-----------------------------------|--|---------|
|                   | 16 = Act2 32bit                   | Actual value ACT2 (32 bits)  |         |
|                   | 24 = SW2 16bit                    | Status word 2 (16 bits)  |         |
|                   | 101...9999                        | Parameter index with format <b>xyyy</b> , where <ul style="list-style-type: none"> <li>• <b>xx</b> is the parameter group number (1...99)</li> <li>• <b>yy</b> is the parameter number index within that group (01...99).</li> </ul> |         |
|                   | Other                             | Path to parameter area selection.  |         |
| 03...<br>12       | FBA data in 3...<br>FBA data in12 | See parameter <a href="#">01 FBA data in 1.</a>  | 0       |

<sup>1)</sup> The number of parameters in this group may vary by drive type and drive firmware.

<sup>2)</sup> 14 (SW 32bit) is the default setting if the Transparent 32 profile is used.

<sup>3)</sup> 5 (Act1 16bit) is a fixed setting with an ACS355 drive.

## Virtual address allocation with ACSM1

When the PROFIdrive profile or PROFIdrive positioning mode is used with an ACSM1 drive, the virtual addresses shown below are recommended. (FBA REFx mode is selected with drive parameter **50.04/50.05**.)

The information in the table is applicable only if PPO messaging is used (see parameter **04 MSG type**). If standard telegrams (STx) are used, virtual addresses for standard telegrams (ST1 and ST2) are updated automatically.

| Abbreviation | Description             | Data length | Recommended virtual address with ACSM1 FBA REFx modes |               |
|--------------|-------------------------|-------------|---|---------------|
|              |                         |             | Speed mode  | Position mode |
| STW1         | Control word 1          | 16-bit      | 1   | 1             |
| NSOLL_A      | Speed set point A       | 16-bit      | 2 or 3  |               |
| NSOLL_B      | Speed set point B       | 32-bit      | 12 or 13  |               |
| STW2         | Control word 2          | 16-bit      | 21  | 21            |
| XSOLL_A      | Position set point A    | 32-bit      |   | 12 or 13      |
| VELOCITY_A   | Velocity                | 32-bit      |   | 13            |
| ZSW2         | Status word 2           | 16-bit      | 24  | 24            |
| NIST_A       | Speed actual value A    | 16-bit      | 5 or 6  |               |
| NIST_B       | Speed actual value B    | 32-bit      | 15 or 16  |               |
| ZSW1         | Status word 1           | 16-bit      | 4   | 4             |
| XIST_A       | Position actual value A | 32-bit      |   | 15 or 16      |

## ■ Control locations

ABB drives can receive control information from multiple sources including digital inputs, analog inputs, the drive control panel and a communication module (for e.g., the adapter module). ABB drives allow the user to separately determine the source for each type of control information (Start, Stop, Direction, Reference, Fault reset, etc.).

To give complete control of the fieldbus master station over the drive, select communication module as the source for this information. The drive-specific parameter setting examples below contain the drive control parameters needed in the examples. For a complete parameter list, see the drives documentation.

## Starting up ACS355 drives

1. Power up the drive.
  2. Enable the communication between the adapter module and the drive by setting parameter **9802 COMM PROT SEL** to EXT FBA.
  3. Set the FPBA-01 configuration parameters in group 51. At the minimum, set the required node address in parameter **5102** and the communication profile in **5105**.
  4. With parameter **3018 COMM FAULT FUNC**, select how the drive reacts to a fieldbus communication break.
  5. With parameter **3019 COMM FAULT TIME**, define the time between communication break detection and the selected action.
  6. Define the process data transferred to and from the drive in the FPBA-01 configuration parameter groups 54 and 55.  
**Note:** The adapter module sets the Status word and actual value automatically in parameters **5401** and **5402**, and Control word and reference in parameters **5501** and **5502**.
  7. Validate the settings made in parameter groups 51, 54 and 55 by setting parameter **5127 FBA PAR REFRESH** to REFRESH.
  8. Set the relevant drive control parameters to control the drive according to the application. Examples of appropriate values are shown in the tables below.
-

## ■ Parameter setting examples – ACS355

### Speed control using the PROFIdrive communication profile with PPO Type 2

This example shows how to configure a basic speed control application that uses the PROFIdrive profile. In addition, some application-specific data is added to the communication.

The start/stop commands and reference are according to the PROFIdrive profile. For more information, see the PROFIdrive state machine on page [111](#).

The reference value  $\pm 16384$  (4000h) corresponds to parameter **1105 REF1 MAX** in the forward and reverse directions.

| Direction | PZD1         | PZD2               | PZD3                           | PZD4                           | PZD5 | PZD6 |
|-----------|--------------|--------------------|--------------------------------|--------------------------------|------|------|
| Out       | Control word | Speed reference    | Constant speed 1 <sup>1)</sup> | Constant speed 2 <sup>1)</sup> | N/A  | N/A  |
| In        | Status word  | Speed actual value | Power <sup>1)</sup>            | DC bus voltage <sup>1)</sup>   | N/A  | N/A  |

<sup>1)</sup> Example

The table below gives the recommended drive parameter settings

| Drive parameter              | Setting for ACS355 drives | Description  |
|------------------------------|---------------------------|--|
| 9802 COMM PROT SEL           | 4 = EXT FBA               | Enables communication between the drive and the fieldbus adapter module. |
| 5101 FBA TYPE                | PROFIBUS-DP <sup>1)</sup> | Displays the type of the fieldbus adapter module.                        |
| 5102 FB PAR 2 (NODE ADDRESS) | 3 <sup>2)</sup>           | Defines the PROFIBUS node address of the fieldbus adapter module.        |

| <b>Drive parameter</b>           | <b>Setting for ACS355 drives</b> | <b>Description</b>   |
|----------------------------------|----------------------------------|--|
| 5103 FB PAR 3<br>(BAUD RATE)     | 12000 <sup>1)</sup>              | Displays the current baud rate on the PROFIBUS network in kbit/s.  |
| 5104 FB PAR 4<br>(TELEGRAM TYPE) | 2 (= PPO2) <sup>1)</sup>         | Displays the telegram type selected by the PLC configuration tool.   |
| 5105 FB PAR 5<br>(PROFILE)       | 0 (= PROFIdrive)                 | Selects the Control word according to the PROFIdrive profile (speed control mode).                           |
| 3018 COMM FAULT<br>FUNC          | 3 = LAST SPEED                   | Enables fieldbus communication fault monitoring.   |
| 3019 COMM FAULT TIME             | 3.0 s                            | Defines the fieldbus communication break supervision time.   |
| 5401 FBA DATA IN 1               | 4 (= SW 16bit) <sup>1)</sup>     | Status word  |
| 5402 FBA DATA IN 2               | 5 (= Act1 16bit) <sup>1)</sup>   | Actual value 1 (speed)   |
| 5403 FBA DATA IN 3               | 106 <sup>2)</sup>                | Power  |
| 5404 FBA DATA IN 4               | 107 <sup>2)</sup>                | DC bus voltage   |
| 5501 FBA DATA OUT 1              | 1 (= CW 16bit) <sup>1)</sup>     | Control word   |
| 5502 FBA DATA OUT 2              | 2 (= Ref1 16bit) <sup>1)</sup>   | Reference 1 (speed)  |
| 5503 FBA DATA OUT 3              | 1202 <sup>2)</sup>               | Constant speed 1   |
| 5504 FBA DATA OUT 4              | 1203 <sup>2)</sup>               | Constant speed 2   |
| 5127 FBA PAR REFRESH             | 1 = REFRESH                      | Validates the FPBA-01 configuration parameter settings.  |
| 1001 EXT1 COMMANDS               | 10 = COMM                        | Selects the fieldbus interface as the source of the start and stop commands for external control location 1. |

| Drive parameter      | Setting for ACS355 drives | Description  |
|----------------------|---------------------------|--|
| 1103 REF1 SELECT     | 8 = COMM                  | Selects the fieldbus reference 1 as the source for speed reference 1.                          |
| 1601 RUN ENABLE      | 7 = COMM                  | Selects the fieldbus interface as the source for the inverted Run enable signal (Run disable). |
| 1604 FAULT RESET SEL | 8 = COMM                  | Selects the fieldbus interface as the source for the fault reset signal.                       |

1) Read-only or automatically detected/set

2) Example

The start sequence for the parameter example above is given below.

| Control word        | Start sequence         |
|---------------------|------------------------|
| 47Eh (1150 decimal) | READY TO SWITCH ON     |
| 47Fh (1151 decimal) | OPERATING (Speed mode) |



## Speed and torque control using the ABB Drives communication profile with PPO Type 4

This example shows how to configure a speed and torque control application that uses the ABB Drives profile. From the PLC programming point, the ABB Drives profile is similar to the PROFIdrive profile shown in the first example.

The start/stop commands and reference are according to the ABB Drives profile. For more information, see section [ABB Drives communication profile](#) on page 115.

When Reference 1 (REF1) is used, a reference value of  $\pm 20000$  (decimal) corresponds to the reference set by parameter 1105 REF1 MAX in the forward and reverse directions.

When Reference 2 (REF2) is used, a reference value of  $\pm 10000$  (decimal) corresponds to the reference set by parameter 1108 REF2 MAX in the forward and reverse directions.

The minimum and maximum 16-bit integer values that can be given through the fieldbus are -32768 and 32767 respectively.

| Direction | PZD1         | PZD2               | PZD3             | PZD4 | PZD5 | PZD6 |
|-----------|--------------|--------------------|------------------|------|------|------|
| Out       | Control word | Speed reference    | Torque reference | N/A  | N/A  | N/A  |
| In        | Status word  | Speed actual value | Torque actual    | N/A  | N/A  | N/A  |

The table below gives the recommended drive parameter settings.

| Drive parameter    | Setting for ACS355 drives | Description  |
|--------------------|---------------------------|--|
| 9802 COMM PROT SEL | 4 = EXT FBA               | Enables communication between the drive and the fieldbus adapter module. |
| 5101 FBA TYPE      | PROFIBUS-DP <sup>1)</sup> | Displays the type of the fieldbus adapter module.                        |

| <b>Drive parameter</b>           | <b>Setting for ACS355 drives</b> | <b>Description</b>   |
|----------------------------------|----------------------------------|--|
| 5102 FB PAR 2<br>(NODE ADDRESS)  | 4 <sup>2)</sup>                  | Defines the PROFIBUS node address of the fieldbus adapter module.  |
| 5103 FB PAR 3<br>(BAUD RATE)     | 1500 <sup>1)</sup>               | Displays the current baud rate on the PROFIBUS network in kbit/s.  |
| 5104 FB PAR 4<br>(TELEGRAM TYPE) | 4 (= PPO4) <sup>1)</sup>         | Displays the telegram type selected by the PLC configuration tool. |
| 5105 FB PAR 5<br>(PROFILE)       | 1 (= ABB DRIVES)                 | Selects the Control word according to the ABB Drives profile.      |
| 3018 COMM FAULT FUNC             | 3 = LAST SPEED                   | Enables fieldbus communication fault monitoring.                   |
| 3019 COMM FAULT TIME             | 3.0 s                            | Defines the fieldbus communication break supervision time.         |
| 5401 FBA DATA IN 1               | 4 (= SW 16bit) <sup>1)</sup>     | Status word  |
| 5402 FBA DATA IN 2               | 5 (= Act1 16bit) <sup>1)</sup>   | Actual value 1 (speed)   |
| 5403 FBA DATA IN 3               | 6 (= Act2 16bit) <sup>2)</sup>   | Actual value 2 (torque)  |
| 5501 FBA DATA OUT 1              | 1 (= CW 16bit) <sup>1)</sup>     | Control word   |
| 5502 FBA DATA OUT 2              | 2 (= Ref1 16bit) <sup>1)</sup>   | Reference 1 (speed)  |
| 5503 FBA DATA OUT 3              | 3 (= Ref2 16bit) <sup>2)</sup>   | Reference 2 (torque)   |
| 5127 FBA PAR REFRESH             | 1 = REFRESH                      | Validates the FPBA-01 configuration parameter settings.            |

| <b>Drive parameter</b> | <b>Setting for ACS355 drives</b> | <b>Description</b>   |
|------------------------|----------------------------------|--|
| 9904 MOTOR CTRL MODE   | 2 = VECTOR: TORQ                 | Selects the vector control mode as the motor control mode.   |
| 1001 EXT1 COMMANDS     | 10 = COMM                        | Selects the fieldbus interface as the source of the start and stop commands for external control location 1. |
| 1002 EXT2 COMMANDS     | 10 = COMM                        | Selects the fieldbus interface as the source of the start and stop commands for external control location 2. |
| 1102 EXT1/EXT2 SEL     | 8 = COMM                         | Enables external control location 1/2 selection through the fieldbus.  |
| 1103 REF1 SELECT       | 8 = COMM                         | Selects the fieldbus reference 1 as the source for speed reference 1.  |
| 1106 REF2 SELECT       | 8 = COMM                         | Selects the fieldbus reference 2 as the source for speed reference 1.  |
| 1601 RUN ENABLE        | 7 = COMM                         | Selects the fieldbus interface as the source for the inverted Run enable signal (Run disable).               |
| 1604 FAULT RESET SEL   | 8 = COMM                         | Selects the fieldbus interface as the source for the fault reset signal.                                     |

<sup>1)</sup> Read-only or automatically detected/set

<sup>2)</sup> Example

## 60 Start-up

The start sequence for the parameter example above is given below.

| <b>Control word</b> | <b>Start sequence</b>   |
|---------------------|-------------------------|
| 47Eh (1150 decimal) | READY TO SWITCH ON      |
| 47Fh (1151 decimal) | OPERATING (Speed mode)  |
| C7Fh (3199 decimal) | OPERATING (Torque mode) |

## Starting up ACSM1 drives

1. Power up the drive.
  2. Enable the communication between the adapter module and the drive by setting parameter **50.01 FBA ENABLE** to **Enable**.
  3. With parameter **50.02 COMM LOSS FUNC**, select how the drive reacts to a fieldbus communication break.  
Note that this function monitors both communication between the fieldbus master and the adapter module and communication between the adapter module and the drive.
  4. With parameter **50.03 COMM LOSS T OUT**, define the time between communication break detection and the selected action.
  5. Select application-specific values for parameters **50.04...50.11**. Examples of appropriate values are shown in the tables below.
  6. Set the FPBA-01 configuration parameters in group 51. At the minimum, set the required node address in parameter **51.02** and the communication profile in **51.05**.
  7. Define the process data transferred to and from the drive in the FPBA-01 configuration parameter groups 52 and 53.  
**Note:** The adapter module sets the Status word and Control word automatically in parameters **52.01** and **53.01**.
  8. Validate the settings made in parameter groups 51, 52 and 53 by setting parameter **51.27 FBA PAR REFRESH** to **REFRESH**.
  9. Set the relevant drive control parameters to control the drive according to the application. Examples of appropriate values are shown in the tables below.
-

## ■ Parameter setting examples – ACSM1

### Speed control using the PROFIdrive communication profile with PPO Type 2

This example shows how to configure a basic speed control application that uses the PROFIdrive profile. In addition, some application-specific data is added to the communication.

The start/stop commands and reference are according to the PROFIdrive profile, speed control mode. For more information, see the PROFIdrive state machine on page [111](#).

The reference value  $\pm 16384$  (4000h) corresponds to parameter **25.02 SPEED SCALING** in the forward and reverse directions.

| Direction | PZD1         | PZD2               | PZD3                         | PZD4 | PZD5   | PZD6 |
|-----------|--------------|--------------------|------------------------------|------|--|------|
| Out       | Control word | Speed reference    | Constant speed <sup>1)</sup> |      | Speed reference for Jogging function 1 <sup>1)</sup> |      |
| In        | Status word  | Speed actual value | Power <sup>1)</sup>          |      | DC bus voltage <sup>1)</sup>                         |      |

<sup>1)</sup> Example

The table below gives the recommended drive parameter settings.

| Drive parameter       | Setting for ACSM1 drives | Description  |
|-----------------------|--------------------------|--|
| 50.01 FBA ENABLE      | Enable                   | Enables communication between the drive and the fieldbus adapter module. |
| 50.02 COMM LOSS FUNC  | Last speed               | Enables fieldbus communication fault monitoring.                         |
| 50.03 COMM LOSS T OUT | 3.0 s                    | Defines the fieldbus communication break supervision time.               |

| <b>Drive parameter</b>            | <b>Setting for ACSM1 drives</b> | <b>Description</b>   |
|-----------------------------------|---------------------------------|--|
| 50.04 FBA REF1<br>MODESEL         | Speed                           | Selects the fieldbus reference 1 scaling.  |
| 51.01 FBA TYPE                    | PROFIBUS-DP <sup>1)</sup>       | Displays the type of the fieldbus adapter module.                                  |
| 51.02 FBA PAR2<br>(NODE ADDRESS)  | 3 <sup>2)</sup>                 | Defines the PROFIBUS node address of the fieldbus adapter module.                  |
| 51.03 FBA PAR3<br>(BAUD RATE)     | 12000 <sup>1)</sup>             | Displays the current baud rate on the PROFIBUS network in kbit/s.                  |
| 51.04 FBA PAR4<br>(TELEGRAM TYPE) | 2 (= PPO2) <sup>1)</sup>        | Displays the telegram type selected by the PLC configuration tool.                 |
| 51.05 FBA PAR5<br>(PROFILE)       | 0 (= PROFIdrive)                | Selects the Control word according to the PROFIdrive profile (speed control mode). |
| 52.01 FBA DATA IN1                | 4 (= SW 16bit) <sup>1)</sup>    | Status word  |
| 52.02 FBA DATA IN2                | 5 (= Act1 16bit)                | Actual value 1 (speed)   |
| 52.03 FBA DATA IN3                | 122 <sup>2)</sup>               | Power  |
| 52.05 FBA DATA IN5                | 107 <sup>2)</sup>               | DC bus voltage   |
| 53.01 FBA DATA OUT1               | 1 (= CW 16bit) <sup>1)</sup>    | Control word   |
| 53.02 FBA DATA OUT2               | 2 (= Ref1 16bit)                | Reference 1 (speed)  |
| 53.03 FBA DATA OUT3               | 2508 <sup>2)</sup>              | Constant speed   |
| 53.05 FBA DATA OUT5               | 2410 <sup>2)</sup>              | Speed reference for Jogging function 1   |
| 51.27 FBA PAR REFRESH             | REFRESH                         | Validates the FPBA-01 configuration parameter settings.                            |

## 64 Start-up

| Drive parameter       | Setting for ACSM1 drives | Description  |
|-----------------------|--------------------------|--|
| 10.01 EXT1 START FUNC | FBA                      | Selects the fieldbus interface as the source of the start and stop commands for external control location 1. |
| 10.08 FAULT RESET SEL | P.FBA MAIN CW.8          | Selects the fieldbus interface as the source for fault reset.  |
| 24.01 SPEED REF1 SEL  | FBA REF1                 | Selects the fieldbus reference 1 as the source for speed reference 1.  |
| 34.03 EXT1 CTRL MODE1 | Speed                    | Selects speed control as the control mode 1 for external control location 1.                                 |

1) Read-only or automatically detected/set

2) Example

The start sequence for the parameter example above is given below.

| Control word        | Start sequence         |
|---------------------|------------------------|
| 47Eh (1150 decimal) | READY TO SWITCH ON     |
| 47Fh (1151 decimal) | OPERATING (Speed mode) |



## Position control using the PROFIdrive communication profile with PPO Type 4

This example shows how to configure a basic positioning application. The start/stop commands and reference are according to the PROFIdrive profile, positioning mode. For more information, see the PROFIdrive state machine on page [112](#).

**Note:** By default, fieldbus is not the only control source. For details of actual signal **02.12 FBA MAIN CW**, see in ACSM1 motion control program firmware manual.

The position set point and velocity reference are defined as 32-bit integer values; both are scaled as defined by drive parameter settings.

| Direction | PZD1                | PZD2                  | PZD3 | PZD4                  | PZD5 | PZD6 |
|-----------|---------------------|-----------------------|------|-----------------------|------|------|
| Out       | Control word (STW1) | Position set point    |      | Velocity reference    |      | N/A  |
| In        | Status word (ZSW1)  | Position actual value |      | Velocity actual value |      | N/A  |

The table below gives the recommended drive parameter settings.

| Drive parameter        | Setting for ACSM1 drives | Description  |
|------------------------|--------------------------|--|
| 50.01 FBA ENABLE       | Enable                   | Enables communication between the drive and the fieldbus adapter module. |
| 50.02 COMM LOSS FUNC   | Fault                    | Enables fieldbus communication fault monitoring.                         |
| 50.03 COMM LOSS T OUT  | 3.0 s                    | Defines the fieldbus communication break supervision time.               |
| 50.04 FBA REF1 MODESEL | Position                 | Selects the fieldbus reference 1 scaling.                                |
| 50.05 FBA REF2 MODESEL | Velocity                 | Selects the fieldbus reference 2 scaling.                                |

| <b>Drive parameter</b>            | <b>Setting for ACSM1 drives</b> | <b>Description</b>   |
|-----------------------------------|---------------------------------|--|
| 51.01 FBA TYPE                    | PROFIBUS-DP <sup>1)</sup>       | Displays the type of the fieldbus adapter module.  |
| 51.02 FBA PAR2<br>(NODE ADDRESS)  | 3 <sup>2)</sup>                 | Defines the PROFIBUS node address of the fieldbus adapter module.  |
| 51.03 FBA PAR3<br>(BAUD RATE)     | 12000 <sup>1)</sup>             | Displays the current baud rate on the PROFIBUS network in kbit/s.  |
| 51.04 FBA PAR4<br>(TELEGRAM TYPE) | 4 (= PPO4) <sup>1)</sup>        | Displays the telegram type selected by the PLC configuration tool.   |
| 51.05 FBA PAR5<br>(PROFILE)       | 4 (= PROFIdrive P)              | Selects the Control word according to the PROFIdrive positioning mode.                                       |
| 52.01 FBA DATA IN1                | 4 (= SW 16bit) <sup>1)</sup>    | Status word  |
| 52.02 FBA DATA IN2                | 15 (= Act1 32bit)               | Actual value 1   |
| 52.04 FBA DATA IN4                | 16 (= Act2 32bit)               | Actual value 2   |
| 53.01 FBA DATA OUT1               | 1 (= CW 16bit) <sup>1)</sup>    | Control word   |
| 53.02 FBA DATA OUT2               | 12 (= Ref1 32bit)               | Reference 1  |
| 53.04 FBA DATA OUT4               | 13 (= Ref2 32bit)               | Reference 2  |
| 51.27 FBA PAR<br>REFRESH          | REFRESH                         | Validates the FPBA-01 configuration parameter settings.  |
| 10.01 EXT1 START<br>FUNC          | FBA                             | Selects the fieldbus interface as the source of the start and stop commands for external control location 1. |
| 22.01 SPEED FB SEL                | Enc1 speed <sup>2)</sup>        | Selects the actual speed measured by encoder 1 as the speed feedback.  |

| <b>Drive parameter</b> | <b>Setting for ACSM1 drives</b> | <b>Description</b>   |
|------------------------|---------------------------------|--|
| 34.02 EXT1 MODE 1/2SEL | P.FBA MAIN CW.26                | Selects the source for external 1 control mode 1/2 selection. Selection is done by START_HOMING bit (bit 26 in the fieldbus Control word).<br>Mode 1: Position, Mode 2: Homing |
| 34.03 EXT1 CTRL MODE1  | Position                        | Selects position control as the control mode 1 for external control location 1.  |
| 34.04 EXT1 CTRL MODE2  | Homing                          | Selects homing control as the control mode 2 for external control location 1.  |
| 62.01 HOMING METHOD    | CAN Methodxx                    | Selects the homing mode. Select the appropriate CAN Method.  |
| 62.03 HOMING START     | C.False                         | Selects the fieldbus as the homing start source.   |
| 65.01 POS REFSOURCE    | Fieldbus                        | Position reference and speed are read from the fieldbus.   |
| 65.03 POS START 1      | C.False                         | Selects the fieldbus as the position start1 source.  |
| 65.04 POS REF 1 SEL    | FBA REF 1                       | Selects the FBA reference 1 as the position reference source.  |
| 65.11 POS START 2      | C.False                         | Selects the fieldbus as the position start2 source.  |
| 65.22 PROF VEL REF SEL | FBA REF2                        | Selects the FBA reference 2 as the velocity reference source.  |

| Drive parameter   | Setting for ACSM1 drives | Description   |
|-------------------|--------------------------|---|
| 66.05 POS ENABLE  | C.False                  | Selects the fieldbus as the source for enabling the position reference generator. |
| 70.03 POS REF ENA | C.False                  | Selects the fieldbus as the source for the position reference enable command.     |

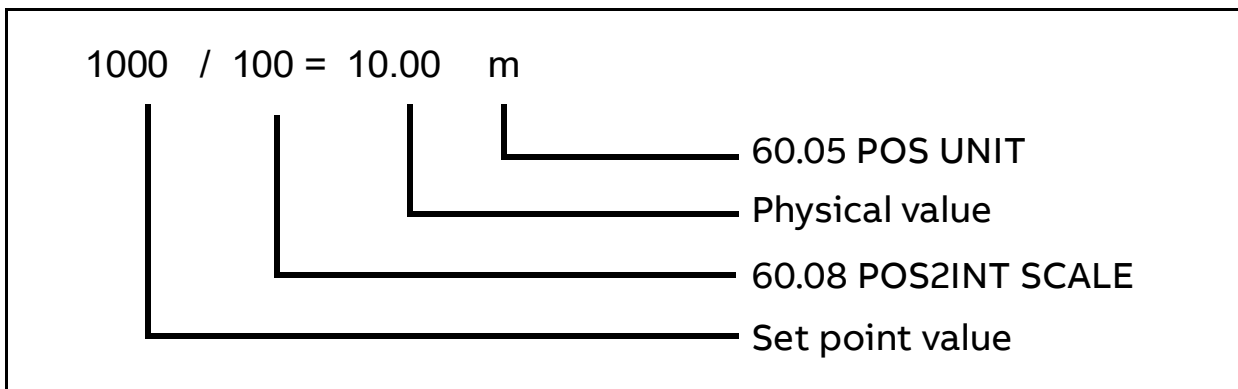
- 1) Read-only or automatically detected/set
- 2) Example

The position set point is scaled as follows:

| Drive parameter                   | Setting           |
|-----------------------------------|-------------------|
| 60.05 POS UNIT<br>(Position unit) | m <sup>1)</sup>   |
| 60.08 POS2INT SCALE               | 100 <sup>1)</sup> |

- 1) Example

The position set point and actual values are scaled with the above example values as follows:

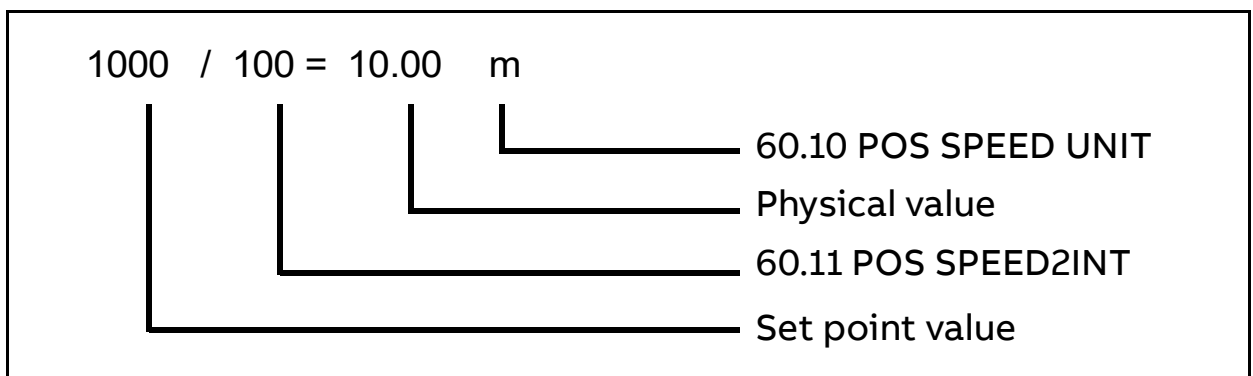


Example for velocity set point scale:

| Drive parameter      | Value             | Description  |
|----------------------|-------------------|--|
| 60.10 POS SPEED UNIT | u/s <sup>1)</sup> | Unit/s (in this case m/s)  |
| 60.11 POS SPEED2INT  | 100 <sup>1)</sup> | Scales position speed values to integer values.<br>Selections:<br>1/10/100/1000/10000/100000 |

<sup>1)</sup> Example

The velocity set point and actual values are scaled with the above example values as follows:



Pay attention to the following parameter groups:

| Parameter group | Description             |
|-----------------|-------------------------|
| 90              | Encoder selection       |
| 91/92/93        | Settings of the encoder |

The start sequence for the above parameter example is given below:

| Control word        | Start sequence   |
|---------------------|--|
| 406h (1030 decimal) | READY TO SWITCH ON   |
| 40Fh (1039 decimal) | OPERATING  |
| 43Fh (1087 decimal) | OPERATING (Reject traversing task with no intermediate stop) |
| 47Fh (1151 decimal) | OPERATING (Activate traversing task)                         |
| C0Fh (3087 decimal) | OPERATING (Start Homing procedure)                           |

## Speed and torque control using the ABB Drives communication profile with PPO Type 4

This example shows how to configure a speed and torque control application that uses the ABB Drives profile. From the PLC programming point, the ABB Drives profile is similar to the PROFIdrive profile shown in the first example.

The start/stop commands and reference are according to the ABB Drives profile. For more information, see section [ABB Drives communication profile](#) on page 115.

When Reference 1 (REF1) is used, a reference value of  $\pm 20000$  (4E20h) corresponds to the reference set by parameter **25.02 SPEED SCALING** in the forward and reverse directions.

When Reference 2 (REF2) is used, a reference value of  $\pm 10000$  (2710h) corresponds to the reference set by parameter **32.04 TORQUE REF 1 MAX** in the forward and reverse directions.

| Direction | PZD1         | PZD2               | PZD3             | PZD4 | PZD5 | PZD6 |
|-----------|--------------|--------------------|------------------|------|------|------|
| Out       | Control word | Speed reference    | Torque reference | N/A  | N/A  | N/A  |
| In        | Status word  | Speed actual value | Torque actual    | N/A  | N/A  | N/A  |

The table below gives the recommended drive parameter settings.

| Drive parameter        | Setting for ACSM1 drives | Description  |
|------------------------|--------------------------|--|
| 50.01 FBA ENABLE       | Enable                   | Enables communication between the drive and the fieldbus adapter module. |
| 50.02 COMM LOSS FUNC   | Fault                    | Enables fieldbus communication fault monitoring.                         |
| 50.03 COMM LOSS TOUT   | 3.0 s                    | Defines the fieldbus communication break supervision time.               |
| 50.04 FBA REF1 MODESEL | Speed                    | Selects the fieldbus reference 1 scaling.                                |

| <b>Drive parameter</b>            | <b>Setting for ACSM1 drives</b> | <b>Description</b>   |
|-----------------------------------|---------------------------------|--|
| 50.05 FBA REF2<br>MODESEL         | Torque                          | Selects the fieldbus reference 2 scaling.  |
| 51.01 FBA TYPE                    | PROFIBUS-DP <sup>1)</sup>       | Displays the type of the fieldbus adapter module.  |
| 51.02 FBA PAR2<br>(NODE ADDRESS)  | 3 <sup>2)</sup>                 | Defines the PROFIBUS node address of the fieldbus adapter module.  |
| 51.03 FBA PAR3<br>(BAUD RATE)     | 12000 <sup>1)</sup>             | Displays the current baud rate on the PROFIBUS network in kbit/s.  |
| 51.04 FBA PAR4<br>(TELEGRAM TYPE) | 4 (= PPO4) <sup>1)</sup>        | Displays the telegram type selected by the PLC configuration tool.   |
| 51.05 FBA PAR5<br>(PROFILE)       | 1 (= ABB DRIVES)                | Selects the Control word according to the ABB Drives profile.  |
| 52.01 FBA DATA IN1                | 4 (= SW 16bit) <sup>1)</sup>    | Status word (PZD 1)  |
| 52.02 FBA DATA IN2                | 5 (= Act1 16bit) <sup>2)</sup>  | Actual value 1   |
| 52.03 FBA DATA IN3                | 6 (= Act2 16bit) <sup>2)</sup>  | Actual value 2   |
| 53.01 FBA DATA OUT1               | 1 (= CW 16bit) <sup>1)</sup>    | Control word   |
| 53.02 FBA DATA OUT2               | 2 (= Ref1 16bit) <sup>2)</sup>  | Reference 1  |
| 53.03 FBA DATA OUT3               | 3 (= Ref2 16bit) <sup>2)</sup>  | Reference 2  |
| 51.27 FBA PAR<br>REFRESH          | REFRESH                         | Validates the FPBA-01 configuration parameter settings.  |
| 10.01 EXT1 START<br>FUNC          | FBA                             | Selects the fieldbus interface as the source of the start and stop commands for external control location 1. |

## 72 Start-up

| Drive parameter        | Setting for ACSM1 drives | Description  |
|------------------------|--------------------------|--|
| 10.04 EXT2 START FUNC  | FBA                      | Selects the fieldbus interface as the source of the start and stop commands for external control location 2.     |
| 24.01 SPEED REF1 SEL   | FBA REF1                 | Selects the fieldbus reference 1 as the source for speed reference 1.  |
| 32.02 TORQ REF ADD SEL | FBA REF2                 | Selects the fieldbus reference 2 as the source for torque reference 1.   |
| 34.01 EXT1/EXT2 SEL    | P.FBA MAIN CW.15         | Enables external control location 1/2 selection through the fieldbus only (bit 15 in the fieldbus Control word). |
| 34.03 EXT1 CTRL MODE1  | Speed                    | Selects speed control as the control mode 1 for external control location 1.                                     |
| 34.05 EXT2 CTRL MODE1  | Torque                   | Selects torque control as the control mode 1 for external control location 2.                                    |

<sup>1)</sup> Read-only or automatically detected/set

<sup>2)</sup> Example

The start sequence for the parameter example above is given below.

| Control word        | Start sequence          |
|---------------------|-------------------------|
| 47Eh (1150 decimal) | READY TO SWITCH ON      |
| 47Fh (1151 decimal) | OPERATING (Speed mode)  |
| C7Fh (3199 decimal) | OPERATING (Torque mode) |



## Starting up ACS380 drives

The ACS380 software automatically sets the relevant parameters when the fieldbus adapter module is connected to the drive. Automatic configuration is only minimum configuration, and you can change these parameters later, e.g., Node address.

| <b>Parameter</b>              | <b>General setting</b> |
|-------------------------------|------------------------|
| 20.01 Ext1 commands           | Fieldbus A             |
| 20.03 Ext1 in1                | Not selected           |
| 20.04 Ext1 in2                | Not selected           |
| 22.11 Ext1 speed ref1         | FB A ref1              |
| 22.22 Constant speed sel1     | Not selected           |
| 22.23 Constant speed sel2     | Not selected           |
| 23.11 Ramp sel selection      | Acc/Dec time 1         |
| 28.11 Ext1 frequency ref1     | FB A ref1              |
| 28.22 Constant frequency sel1 | Not selected           |
| 28.23 Constant frequency sel2 | Not selected           |
| 28.71 Freq ramp set sel       | Acc/Dec time 1         |
| 31.11 Fault reset selection   | DI1                    |
| 50.01 FB A enable             | Enable                 |
| 50.02 FB A comm loss func     | Fault                  |
| 51.02 Node address            | 3                      |
| 51.05 Profile                 | ABB Drives             |
| 52.01 FBA A data in1          | SW 16 bit              |
| 52.02 FBA A data in 2         | Act1 16 bit            |
| 53.01 FBA A data out1         | CW 16 bit              |
| 53.02 FBA A data out2         | Ref1 16 bit            |

The start sequence for the parameter example above is given below.

| Control word        | Start sequence         |
|---------------------|------------------------|
| 47Eh (1150 decimal) | READY TO SWITCH ON     |
| 47Fh (1151 decimal) | OPERATING (Speed mode) |

## ■ Setting up the drive for fieldbus control manually

The fieldbus adapter module is typically pre-installed. The device automatically recognizes the module. If the adapter is not pre-installed, you can install it mechanically and electrically.

1. Install the fieldbus adapter module mechanically and electrically according to the instructions given in the user's manual of the module.
  2. Power up the drive.
  3. Enable the communication between the drive and the fieldbus adapter module with parameter **50.01 FBA A enable**.
  4. With parameter **50.02 FBA A comm loss func**, select how the drive should react to a fieldbus communication break.
- Note:** This function monitors both the communication between the fieldbus master and the adapter module and the communication between the adapter module and the drive.
5. With parameter **50.03 FBA A comm loss t out**, define the time between communication break detection and the selected action.
  6. Select application-specific values for rest of the parameters in group **50 Fieldbus adapter (FBA)**, starting from parameter **50.04**. Examples of appropriate values are shown in the tables below.
  7. Set the fieldbus adapter module configuration parameters in group **51 FBA A settings**. As a minimum, set the required node address and the communication profile.
  8. Define the process data transferred to and from the drive in parameter groups **52 FBA A data in** and **53 FBA A data out**.
-

**Note:** Depending on the communication protocol and profile being used, the Control word and Status word may already be configured to be sent/received by the communication system.

9. Save the valid parameter values to permanent memory by setting parameter **96.07 Parameter save manually** to Save.

10. Validate the settings made in parameter groups 51, 52 and 53 by setting parameter **51.27 FBA A par refresh** to Configure.

11. Configure control locations EXT1 and EXT2 to allow control and reference signals to come from the fieldbus.parameter changes, or after changing the fieldbus module.

---

## Starting up ACS850 and ACQ810 drives

1. Power up the drive.
  2. Enable the communication between the adapter module and the drive by setting parameter **50.01 FBA enable** to Enable.
  3. With parameter **50.02 Comm loss func**, select how the drive reacts to a fieldbus communication break.  
Note that this function monitors both communication between the fieldbus master and the adapter module and communication between the adapter module and the drive.
  4. With parameter **50.03 Comm loss t out**, define the time between communication break detection and the selected action.
  5. ACQ810 only: With parameter **50.21 Comm loss enable**, select in which control locations communication loss detection is active.
  6. Select application-specific values for parameters **50.04...50.11**. Examples of appropriate values are shown in the tables below.
  7. Set the FPBA-01 configuration parameters in group 51. At the minimum, set the required node address in parameter **51.02** and the communication profile in **51.05**.
  8. Define the process data transferred to and from the drive in the FPBA-01 configuration parameter groups 52 and 53.  
**Note:** The adapter module sets the Status word and Control word automatically in parameters **52.01** and **53.01**.
-

9. Validate the settings made in parameter groups 51, 52 and 53 by setting parameter **51.27 FBA par refresh** to Refresh.
  10. Set the relevant drive control parameters to control the drive according to the application. Examples of appropriate values are shown in the tables below.
-

## ■ Parameter setting examples – ACS850 and ACQ810

### Speed control using the PROFIdrive communication profile with PPO Type 2

This example shows how to configure a basic speed control application that uses the PROFIdrive profile. In addition, some application-specific data is added to the communication.

The start/stop commands and reference are according to the PROFIdrive profile, speed control mode. For more information, see the PROFIdrive state machine on page [111](#).

The reference value  $\pm 16384$  (4000h) corresponds to parameter **19.01 Speed scaling** in the forward and reverse directions.

| Direction | PZD1         | PZD2               | PZD3                           | PZD4 | PZD5                           | PZD6 |
|-----------|--------------|--------------------|--------------------------------|------|--------------------------------|------|
| Out       | Control word | Speed reference    | Constant speed 1 <sup>1)</sup> |      | Constant speed 2 <sup>1)</sup> |      |
| In        | Status word  | Speed actual value | Power <sup>1)</sup>            |      | DC bus voltage <sup>1)</sup>   |      |

<sup>1)</sup> Example

The table below gives the recommended drive parameter settings.

| Drive parameter       | Setting for ACS850/ACQ810 drives | Description  |
|-----------------------|----------------------------------|--|
| 50.01 Fba enable      | Enable                           | Enables communication between the drive and the fieldbus adapter module. |
| 50.02 Comm loss func  | Fault                            | Enables fieldbus communication fault monitoring.                         |
| 50.03 Comm loss t out | 3.0 s                            | Defines the fieldbus communication break supervision time.               |
| 50.04 Fb ref1 modesel | Speed                            | Selects the fieldbus reference 1 scaling.                                |

| <b>Drive parameter</b>                  | <b>Setting for ACS850/ACQ810 drives</b> | <b>Description</b>   |
|---|---|--|
| (ACQ810 only)<br>50.21 Comm loss enable | bit 0 = 1                               | Enables communication loss detection for EXT 1.                                    |
| 51.01 FBA type                          | Profibus-DP <sup>1)</sup>               | Displays the type of the fieldbus adapter module.                                  |
| 51.02 FBA par2<br>(NODE ADDRESS)        | 3 <sup>2)</sup>                         | Defines the PROFIBUS node address of the fieldbus adapter module.                  |
| 51.03 FBA par3<br>(BAUD RATE)           | 12000 <sup>1)</sup>                     | Displays the current baud rate on the PROFIBUS network in kbit/s.                  |
| 51.04 FBA par4<br>(TELEGRAM TYPE)       | 2 (= PPO2) <sup>1)</sup>                | Displays the telegram type selected by the PLC configuration tool.                 |
| 51.05 FBA par5<br>(PROFILE)             | 0 (= PROFIdrive)                        | Selects the Control word according to the PROFIdrive profile (speed control mode). |
| 52.01 FBA data in1                      | 4 (= SW 16bit) <sup>1)</sup>            | Status word  |
| 52.02 FBA data in2                      | 5 (= Act1 16bit)                        | Actual value 1 (speed)   |
| 52.03 FBA data in3                      | 122 <sup>2)</sup>                       | Power (32-bit)   |
| 52.05 FBA data in5                      | 107 <sup>2)</sup>                       | DC bus voltage (32-bit)  |
| 53.01 FBA data out1                     | 1 (= CW 16bit) <sup>1)</sup>            | Control word   |
| 53.02 FBA data out2                     | 2 (= Ref1 16bit)                        | Reference 1 (speed)  |
| 53.03 FBA data out3                     | 2606 <sup>2)</sup>                      | Constant speed 1 (32-bit)  |
| 53.05 FBA data out5                     | 2607 <sup>2)</sup>                      | Constant speed 2 (32-bit)  |
| 51.27 FBA par refresh                   | Refresh                                 | Validates the FPBA-01 configuration parameter settings.                            |

| Drive parameter   | Setting for ACS850/ACQ810 drives | Description  |
|---|----------------------------------|--|
| 10.01 Ext1 start func   | FB                               | Selects the fieldbus interface as the source of the start and stop commands for external control location 1. |
| 10.08 FAULT RESET SEL   | P.FBA MAIN CW.8                  | Selects fieldbus interface as the source for fault reset.  |
| 21.01 Speed ref1 sel (ACS850)<br>21.01 Speed ref sel (ACQ810) | FBA ref1<br>FBA ref1             | Selects the fieldbus reference 1 as the source for speed reference 1.  |

<sup>1)</sup> Read-only or automatically detected/set

<sup>2)</sup> Example

The start sequence for the parameter example above is given below.

| Control word        | Start sequence         |
|---------------------|------------------------|
| 47Eh (1150 decimal) | READY TO SWITCH ON     |
| 47Fh (1151 decimal) | OPERATING (Speed mode) |



## Starting up ACS880 and ACS880-M04 drives

1. Power up the drive.
  2. Enable communication between the adapter module and the drive by setting parameter **50.01 FBA A Enable**, option slot 1, 2 or 3 depending on the slot the adapter module is attached to.
  3. With parameter **50.02 FBA A comm loss func**, select how the drive reacts to a fieldbus communication break.  
**Note:** This function monitors communication both between the fieldbus master and the adapter module and between the adapter module and the drive.
  4. With parameter **50.03 FBA A comm loss t out**, define the time between communication break detection and the selected action.
  5. Select application-specific values for the rest of the parameters in group 50, starting from parameter **50.04 FBA A ref1 type**. Examples of appropriate values are shown in the tables below.
  6. Set the FPBA-01 configuration parameters in group 51. At the minimum, set the required node address in parameter **51.02 Node address** and the communication profile in **51.05 Profile**.
  7. Define the process data transferred to and from the drive in FPBA-01 configuration parameter groups 52 and 53.
-

**Note:** The adapter module sets the Status word and Control word automatically in parameters **52.01 FBA A data in1** and **53.01 FBA A data out1**.

8. Save the valid parameter values to permanent memory by setting parameter **96.07 Parameter save manually** to Save.
9. Validate the settings made in parameter groups 51, 52 and 53 by setting parameter **51.27 FBA A par refresh** to Refresh.
10. Set the relevant drive control parameters to control the drive according to the application. Examples of appropriate values are shown in the tables below.

## ■ Parameter setting examples – ACS880 and ACS880-M04

### Speed control using the PROFIdrive communication profile with PPO Type 2

This example shows how to configure a basic speed control application that uses the PROFIdrive profile.

The start/stop commands and reference are according to the PROFIdrive profile, speed control mode. For more information, see the PROFIdrive state machine on page [111](#).

The reference value  $\pm 16384$  (4000h) corresponds to parameter **46.01 Speed scaling** in the forward and reverse directions.

| Direction | PZD1         | PZD2               | PZD3             | PZD4 | PZD5             | PZD6 |
|-----------|--------------|--------------------|------------------|------|------------------|------|
| Out       | Control word | Speed reference    | Constant speed 1 |      | Constant speed 2 |      |
| In        | Status word  | Speed actual value | Motor current    |      | DC voltage       |      |

The table below gives the recommended drive parameter settings.

| Drive parameter           | Setting for ACS880 drives  | Description   |
|---------------------------|----------------------------|---|
| 50.01 FBA A enable        | 1 = Option slot 1          | Enables communication between the drive and the fieldbus adapter A module (if adapter is in slot 1).                      |
| 50.04 FBA A ref1 type     | 4 = Speed                  | Selects the fieldbus A reference 1 type and scaling.  |
| 50.07 FBA A actual 1 type | 4 = Speed                  | Selects the actual value type and scaling according to the currently active Ref1 mode defined in parameter <b>50.04</b> . |
| 51.01 FBA A type          | 1 = FPBA <sup>1)</sup>     | Displays the type of the fieldbus adapter module.   |
| 51.02 FBA A Par2          | 3 <sup>2)</sup>            | Defines the PROFIBUS node address of the fieldbus adapter module.   |
| 51.03 Baud rate           | 12000 <sup>1)</sup>        | Displays the current baud rate on the PROFIBUS network in kbit/s.   |
| 51.04 MSG type            | 1 = PPO1 <sup>1)</sup>     | Displays the telegram type selected by the PLC configuration tool.  |
| 51.05 Profile             | 0 = PROFIdrive             | Selects the Control word according to the PROFIdrive profile (speed control mode).  |
| 51.07 Emul mode           | 0 = Disabled               | Disables the emulation mode.  |
| 52.01 FBA A data in1      | 4 = SW 16bit <sup>1)</sup> | Status word   |
| 52.02 FBA A data in2      | 5 = Act1 16bit             | Actual value 1  |
| 52.03 FBA A data in3      | 1.7 [32] <sup>2)</sup>     | Motor current   |

## 84 Start-up

| Drive parameter               | Setting for ACS880 drives  | Description  |
|-------------------------------|----------------------------|--|
| 52.05 FBA A data in5          | 1.11 [32] <sup>2)</sup>    | DC voltage   |
| 53.01 FBA A data out1         | 1 = CW 16bit <sup>1)</sup> | Control word   |
| 53.02 FBA A data out2         | 2 = Ref1 16bit             | Reference 1 (speed)  |
| 53.03 FBA A data out3         | 22.26 [32] <sup>2)</sup>   | Constant speed 1   |
| 53.05 FBA A data out5         | 22.27 [32] <sup>2)</sup>   | Constant speed 2   |
| 51.27 FBA A par refresh       | 1 = Refresh                | Validates the FPBA-01 configuration parameter settings.  |
| 19.12 Ext1 control mode       | 2 = Speed                  | Selects speed control as the control mode 1 for external control location 1.                                   |
| 20.01 Ext1 commands           | 12 = Fieldbus A            | Selects the fieldbus A interface as the source of the start and stop commands for external control location 1. |
| 20.02 Ext1 start trigger type | 1 = Level                  | Selects the start trigger type to be level.  |
| 22.11 Speed ref1 source       | FB A ref1                  | Selects the fieldbus A reference 1 as the source for speed reference 1.  |

<sup>1)</sup> Read-only or automatically detected/set

<sup>2)</sup> Example

The start sequence for the parameter example above is given below.

| Control word        | Start sequence         |
|---------------------|------------------------|
| 47Eh (1150 decimal) | READY TO SWITCH ON     |
| 47Fh (1151 decimal) | OPERATING (Speed mode) |

## Configuring the master station

After the adapter module is initialized by the drive, prepare the master station for communication with the module. See examples of an ABB AC500 PLC and Siemens SIMATIC S7 PLC given below. If you are using another master system, refer to its documentation for more information.

The examples can be applied to all drive types compatible with the module.

### ■ Downloading the GSD file

Configuration of the master station requires a type definition (GSD) file. Download the FPBA-01 GSD file from the Document library (<http://new.abb.com/drives/connectivity/fieldbus-connectivity/profibus/profibus-dp-fpba>).

| Communication type | File name    |
|--------------------|--------------|
| DP-V0              | ABB_0959.GSD |
| DP-V1              | ABB10959.GSD |

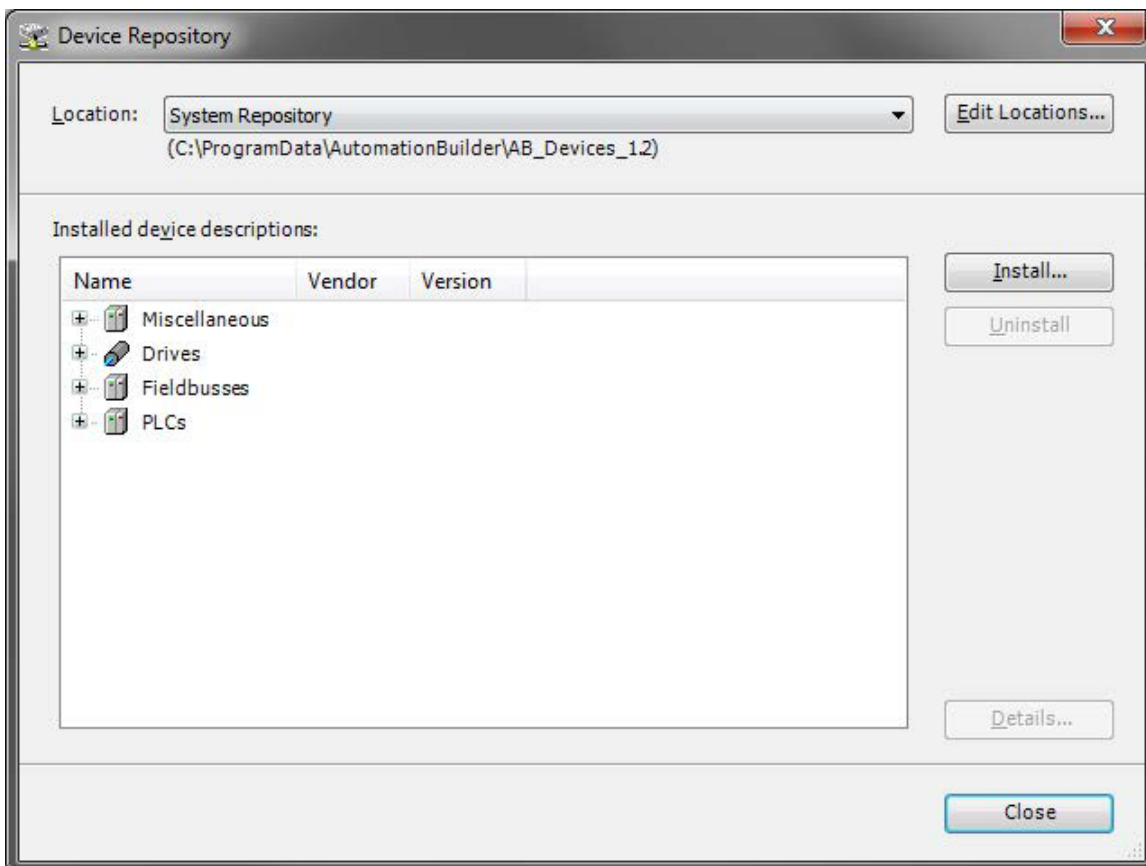
The GSD file describes the vendor-specific and PROFIdrive-specific features of the adapter module. Vendor-specific features can be used, for example, in the ABB Drives communication profile. The PROFIdrive profile supports a set of services described in the PROFIdrive specification.

## ■ Configuring an ABB AC500 PLC

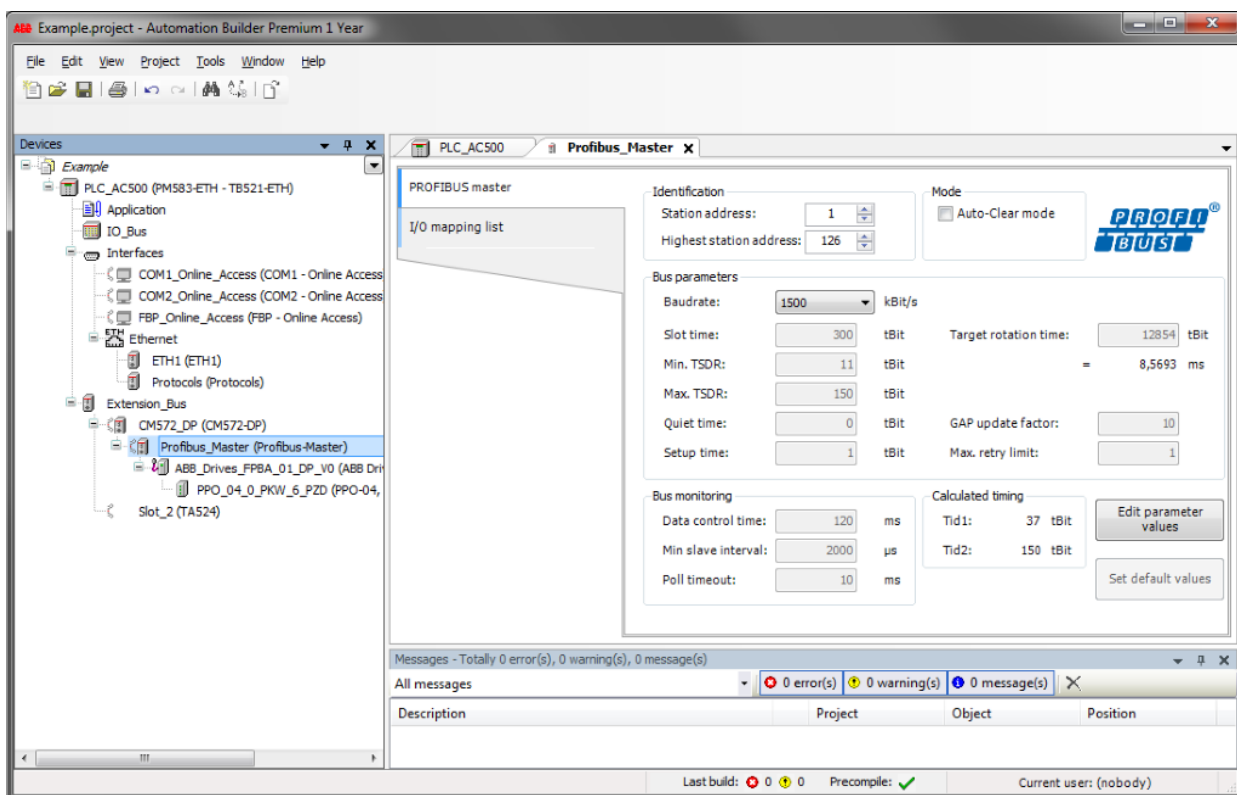
This example shows how to configure the communication between an ABB AC500 PLC and the adapter module using the Automation Builder software, version 1.2 and later.

Before you start, make sure that you have downloaded the FPBA-01 GSD file from the Document library.

1. Start the Automation Builder software.
2. On the **Tools** menu, select **Device Repository**.
3. Click **Install...** and browse for the GSD file.



4. Open or create the PLC project that is used to control the drive.
5. Add the PROFIBUS master (CM572-DP or CM592-DP) device to the PLC.
6. Add the FPBA-01 module to the PROFIBUS network.
7. Add the DP module, for example, PPO Type 4 to the FPBA-01 module to define cyclical communication between the adapter module and the PLC.
8. Define the CM572-DP master properties, such as the Baud rate, Node address (Station address) and the Highest station address.



9. Define the FPBA-01 properties:
  - On the **DP-Parameters** tab,
    - select the Node address (Station address) and the DP Mode

- configure the Fail-safe functionality.

The screenshot shows the configuration interface for a PROFIBUS DPV1 drive. The 'General' tab is active, and the 'User parameters' section is expanded. The 'Fail Safe mode' is set to 'Stop'. The 'Failsafe Timeout(0 = No timeout)' is set to 30. The 'PZD1 Failsafe value' is set to 1150, and all other PZD failsafe values (PZD2 to PZD12) are set to 0.

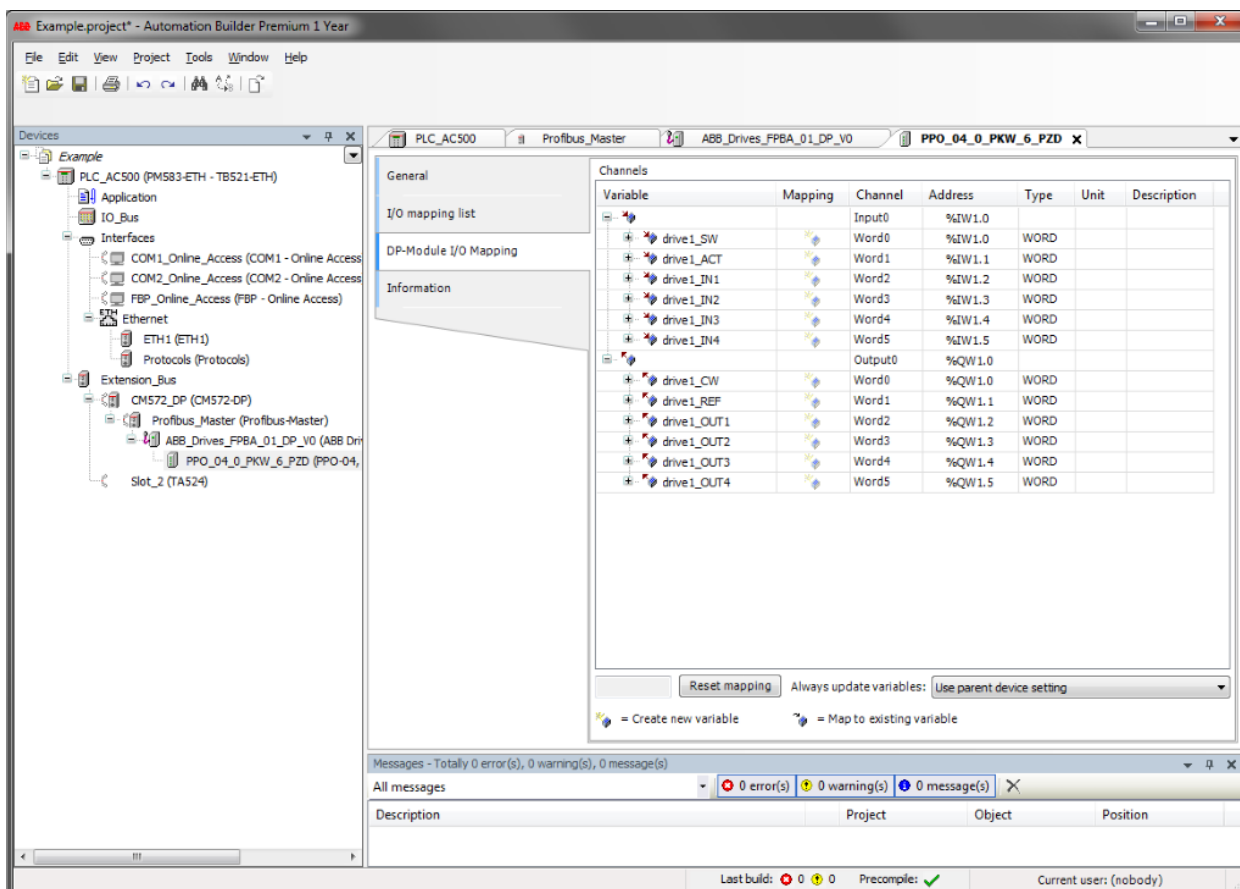
| Parameter                        | Value     | Allowed values          |
|----------------------------------|-----------|-------------------------|
| DP Mode                          | DPV1      | Bit(7) 0 0-1            |
| Process Alarm                    | Disabled  | Bit(6) 0 0-0            |
| Diagnostic Alarm                 | Disabled  | Bit(5) 0 0-0            |
| Update Alarm                     | Disabled  | Bit(2) 0 0-0            |
| Alarm Mode                       | Type mode | BitArea(0-2) 0 0-0      |
| Prm Structure                    | Enabled   | Bit(3) 1 1-1            |
| Length of User Data              | 30        | Unsigned8 30 30-30      |
| Structure Type                   | 129       | Unsigned8 129 129-129   |
| Slot                             | 0         | Unsigned8 0 0-0         |
| Reserved                         | 0         | Unsigned8 0 0-0         |
| Fail Safe mode                   | Stop      | BitArea(0-1) 0 0-2      |
| Control-zero mode                | Use data  | BitArea(2-3) 0 0-1      |
| Failsafe Timeout(0 = No timeout) | 30        | Unsigned16 30 0-65535   |
| PZD1 Failsafe value              | 1150      | Unsigned16 1150 0-65535 |
| PZD2 Failsafe value              | 0         | Unsigned16 0 0-65535    |
| PZD3 Failsafe value              | 0         | Unsigned16 0 0-65535    |
| PZD4 Failsafe value              | 0         | Unsigned16 0 0-65535    |
| PZD5 Failsafe value              | 0         | Unsigned16 0 0-65535    |
| PZD6 Failsafe value              | 0         | Unsigned16 0 0-65535    |
| PZD7 Failsafe value              | 0         | Unsigned16 0 0-65535    |
| PZD8 Failsafe value              | 0         | Unsigned16 0 0-65535    |
| PZD9 Failsafe value              | 0         | Unsigned16 0 0-65535    |
| PZD10 Failsafe value             | 0         | Unsigned16 0 0-65535    |
| PZD11 Failsafe value             | 0         | Unsigned16 0 0-65535    |
| PZD12 Failsafe value             | 0         | Unsigned16 0 0-65535    |

**Note:** If Fail-Safe Timeout = 0, then the drive's communication fault function is disabled.



## 10. Define the DP module properties:

On the **DP-module I/O Mapping** tab, type names for the variables that refer to the drive's signals in the PLC program.

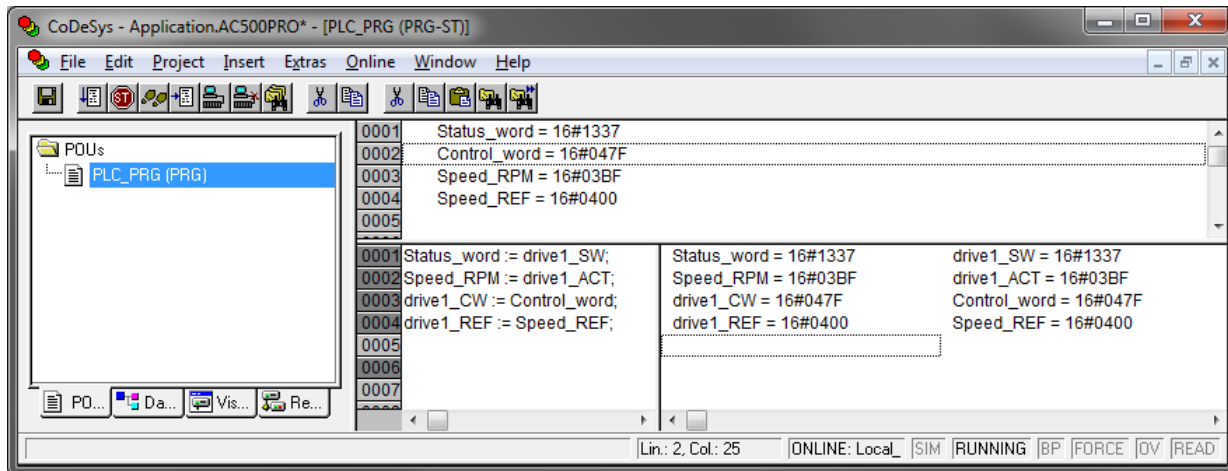


## 11. Open the PLC program and create a program that controls the drive.

## 12. Compile the project and download it to the PLC.

## 90 Start-up

**Note:** Make sure that the variable names defined for the drive signals are used in the PLC program. Otherwise the communication will not work.

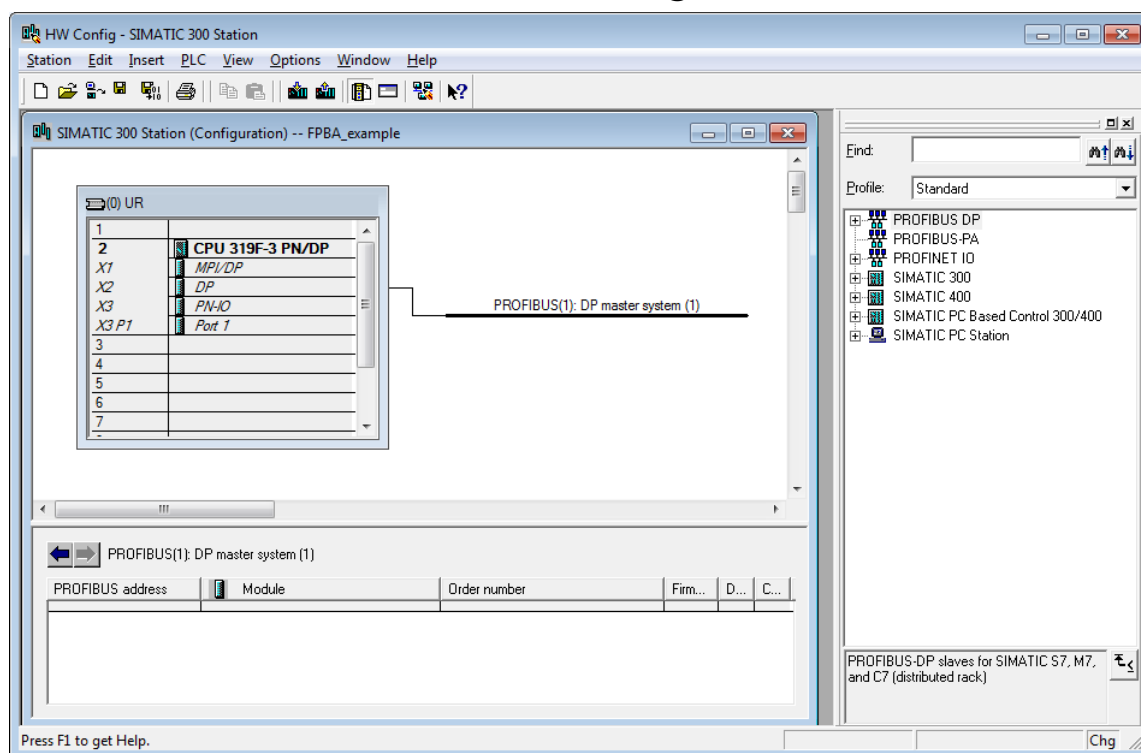


## ■ Configuring a Siemens SIMATIC S7 PLC

This example shows how to configure the communication between a Siemens SIMATIC S7 PLC and the adapter module using SIMATIC Manager Step 7.

Before you start, make sure that you have downloaded the FPBA-01 GSD files from the Document library.

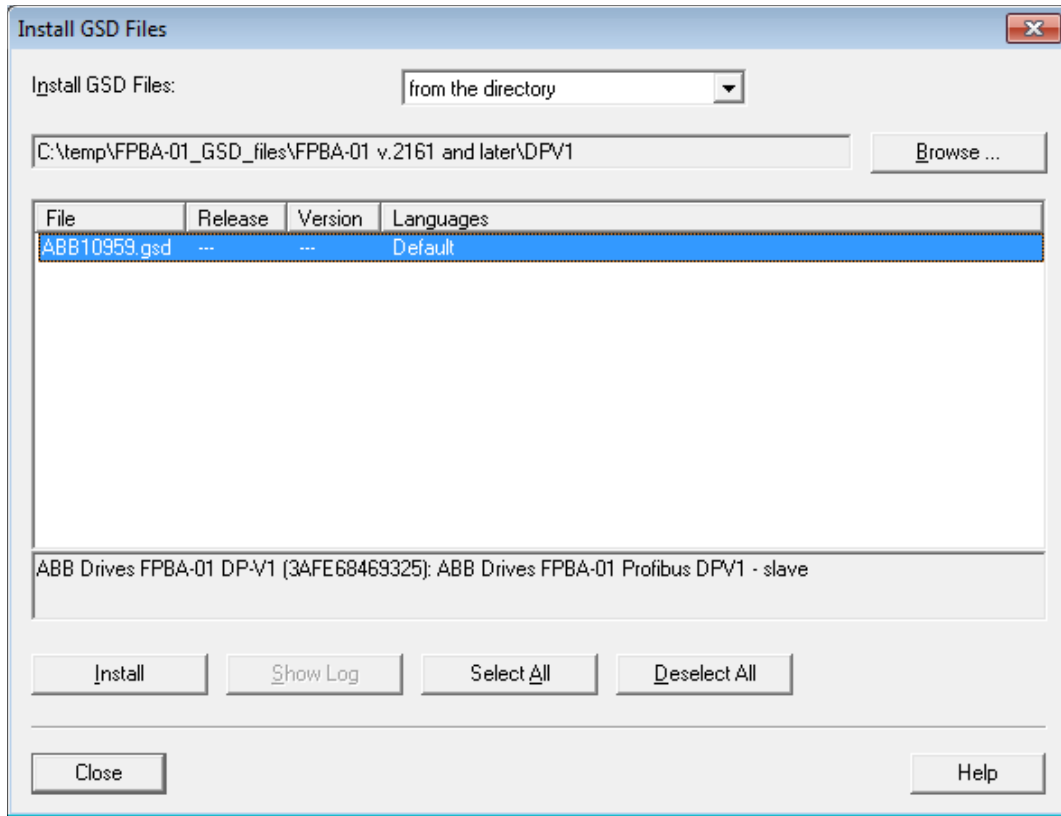
1. Start the SIMATIC Manager and open or create a SIMATIC program.
2. Open the hardware configuration of the project.
3. Add PROFIBUS master system.
  - Right- click **X2** and choose **Add Master System**.
  - Click **New**.
  - Check that the network settings are valid and click **OK**.



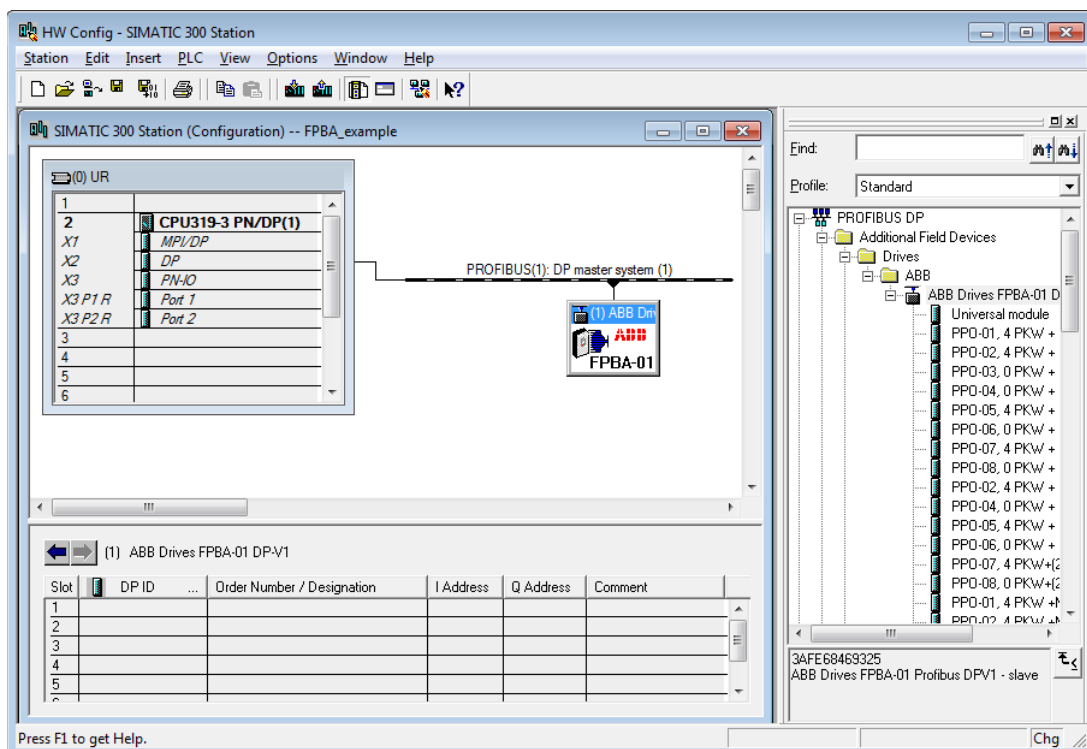
4. Install the FPBA GSD file:
  - On the Options menu, select **Install GSD files**.
  - Browse for the GSD file downloaded from the Document library and click **Install**.

## 92 Start-up

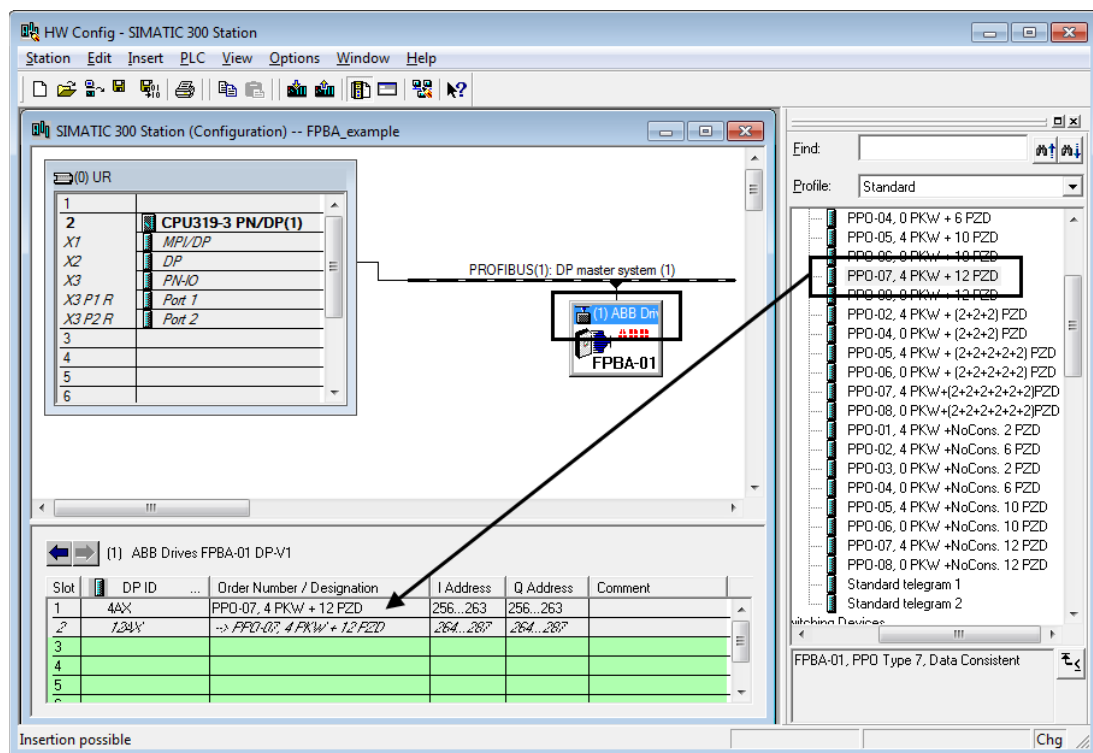
- Choose the GSD file based on the software version of the module (see underside of the module) and what DP extension version will be used.



5. Click and drag the FPBA-01 object from the device catalog to the PROFIBUS(1): DP master system(1).

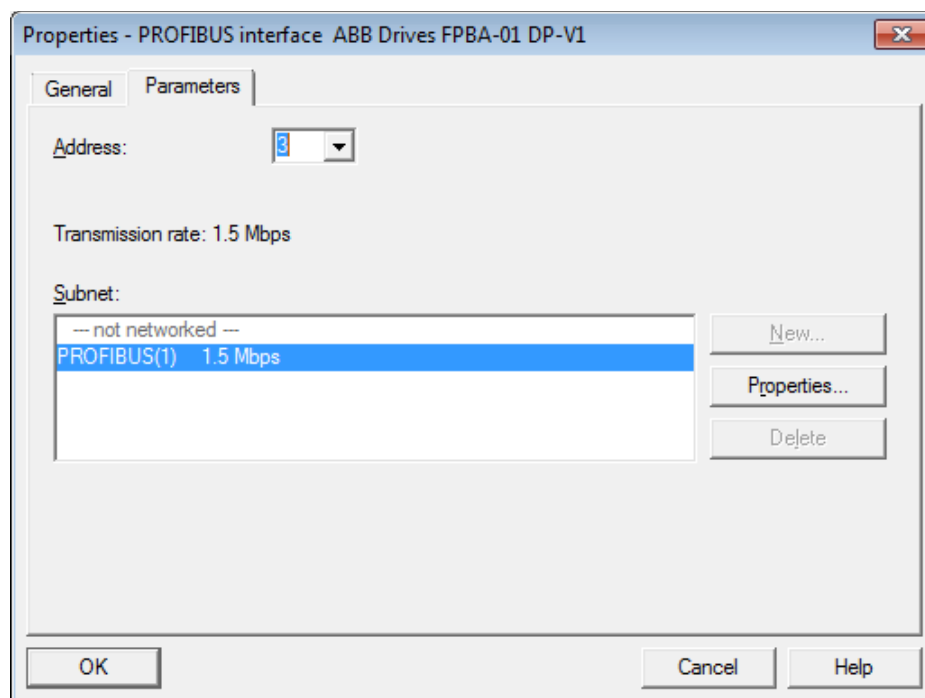


- Click and drag the PPO Type 7 object to slot 1. Then double-click **FPBA**.

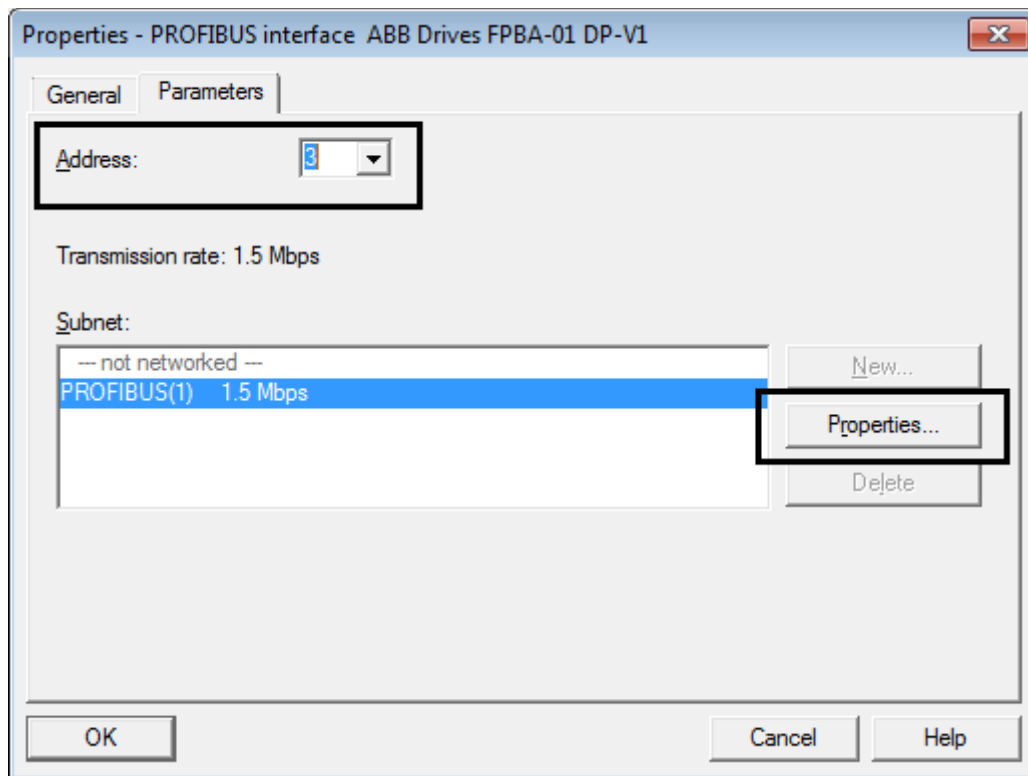


The Properties window appears.

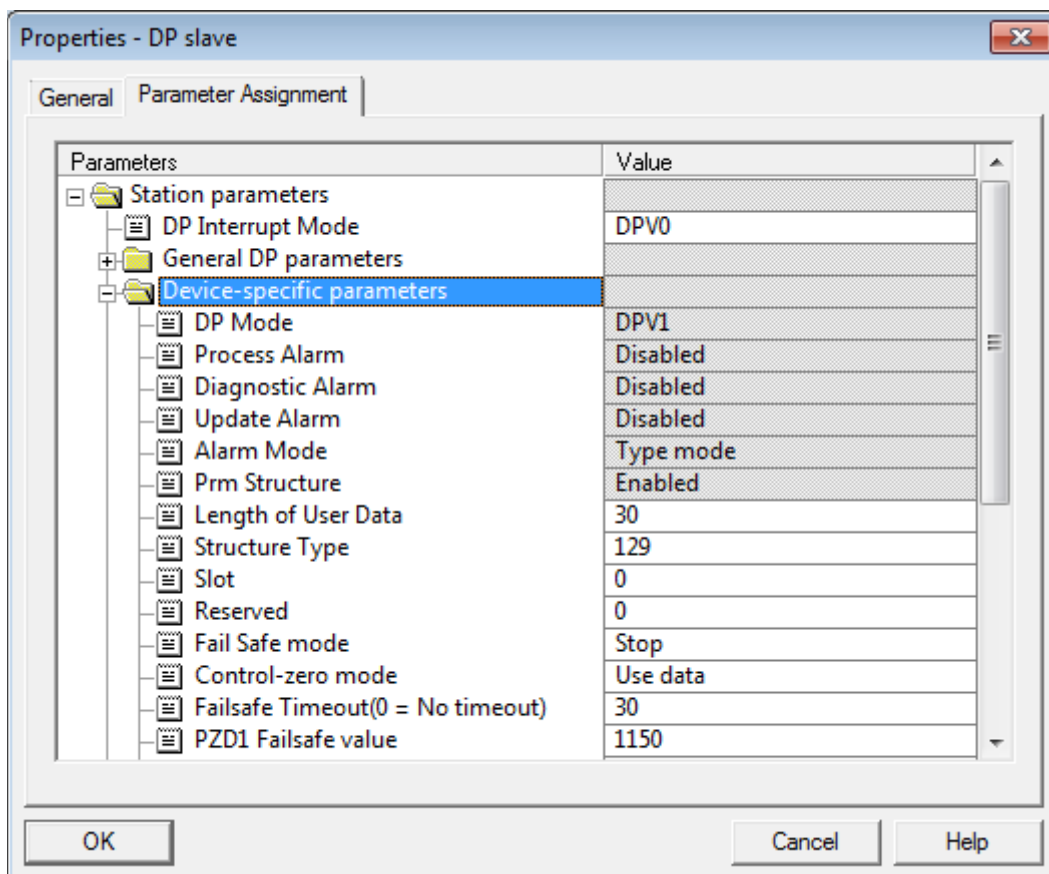
- On the General tab, click **PROFIBUS...** and set Node number.



8. Click **Properties** → **Network Settings** and set baud rate.



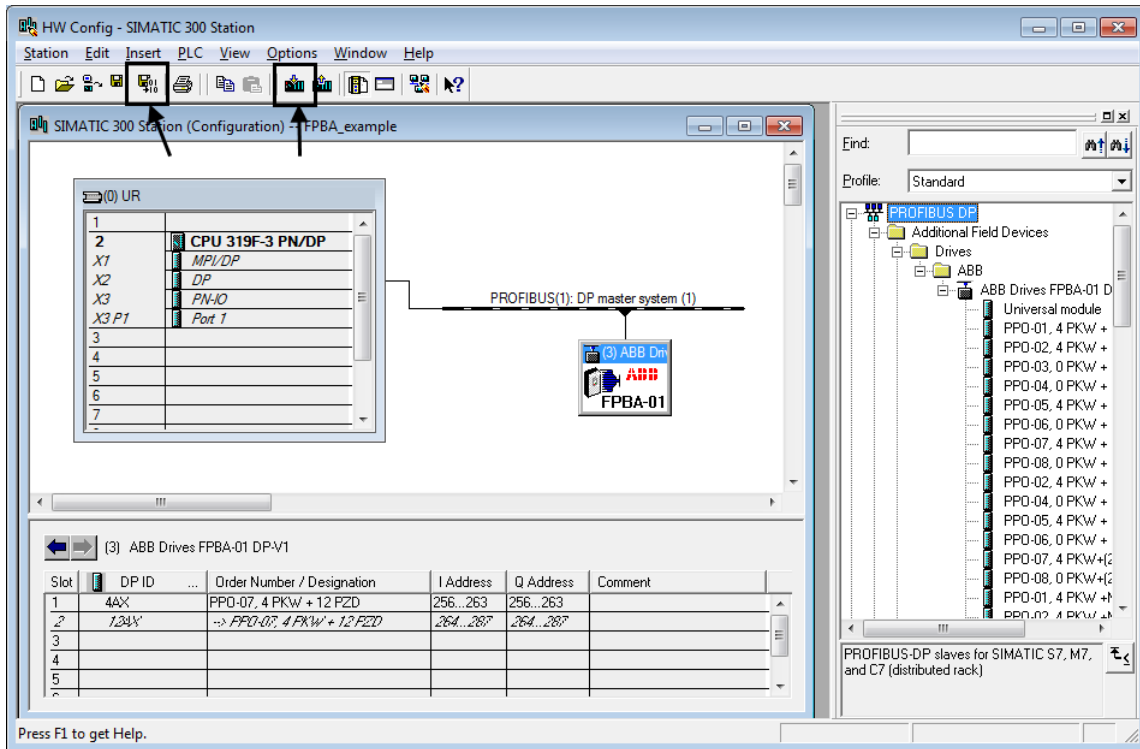
9. Open the Parameter Assignment tab.
  - Under the **Device-specific parameters** folder configure the Fail Safe mode and Control-zero mode.
  - Enter a Failsafe Timeout value.
  - Configure Failsafe values for the PLC output process data (PZDs).



**Note:** If Fail-Safe Timeout = 0, then the drive's communication fault function is disabled.

## 96 Start-up

### 10. Save and compile the hardware configuration.

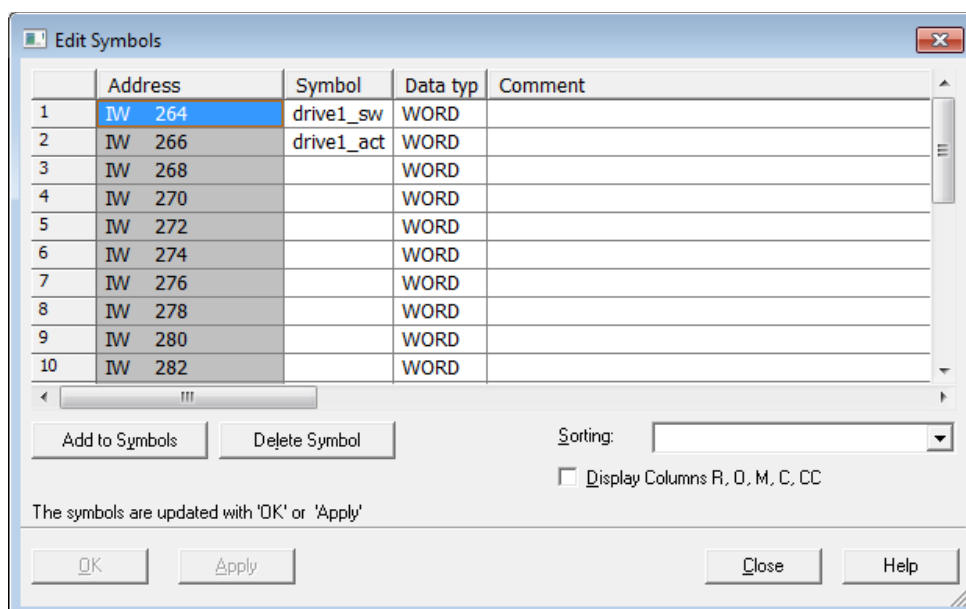


### 11. Download the compiled hardware configuration to the PLC.



The PLC is now ready for communication with the adapter module.

12. If needed, give proper symbol names to the cyclic data:
  - Right-click I/O object (PP0 Type 7) and select **Edit Symbols...**
  - Add names for the symbols.



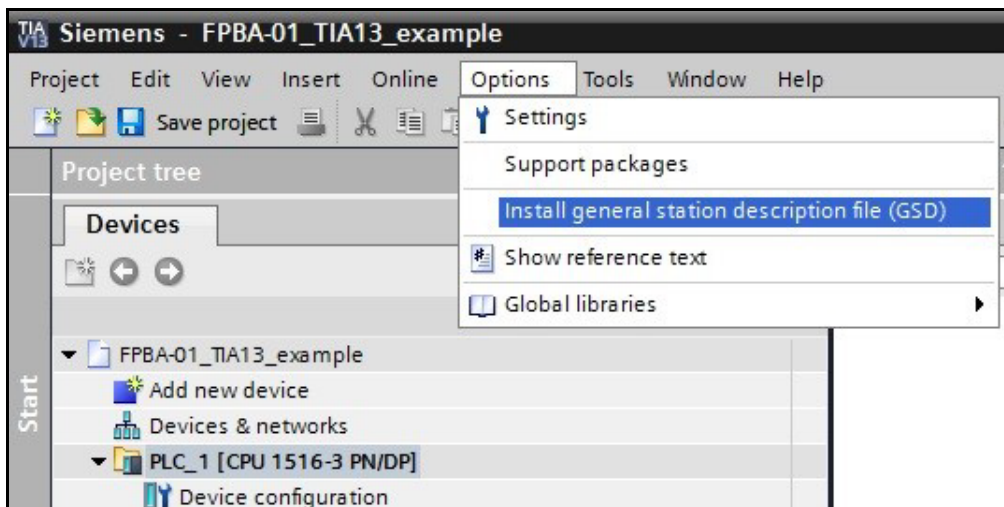
## ■ Configuring a Siemens S7 PLC with TIA Portal V13

This example shows how to configure the communication between a Siemens SIMATIC S7 PLC and the adapter module using TIA Portal V13.

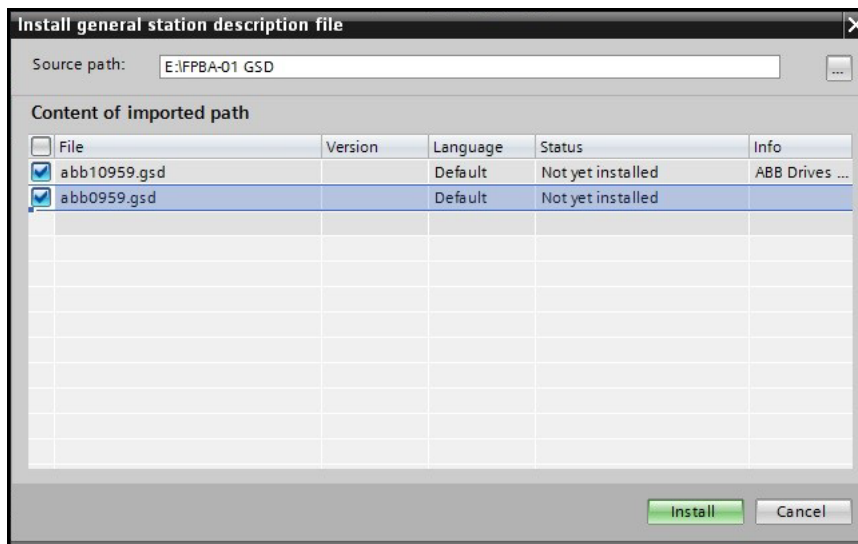
Before you start, make sure that you have downloaded the FPBA-01 GSD files from the Document library.

## 98 Start-up

1. Start the TIA portal.
2. Go to **Options** → **Install general station description file (GSD)**.



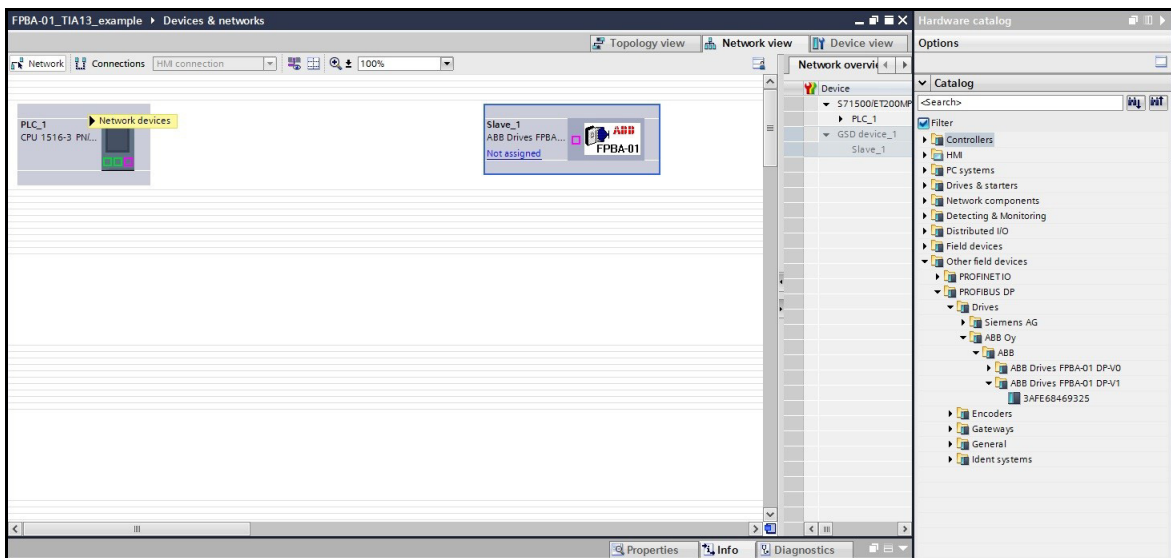
3. Browse the folder containing FPBA-01 GSD files and select the files (both DP-V0 and DP-V1).



4. Click **Install**.

Wait for two minutes, till the TIA portal updates the Device catalog.

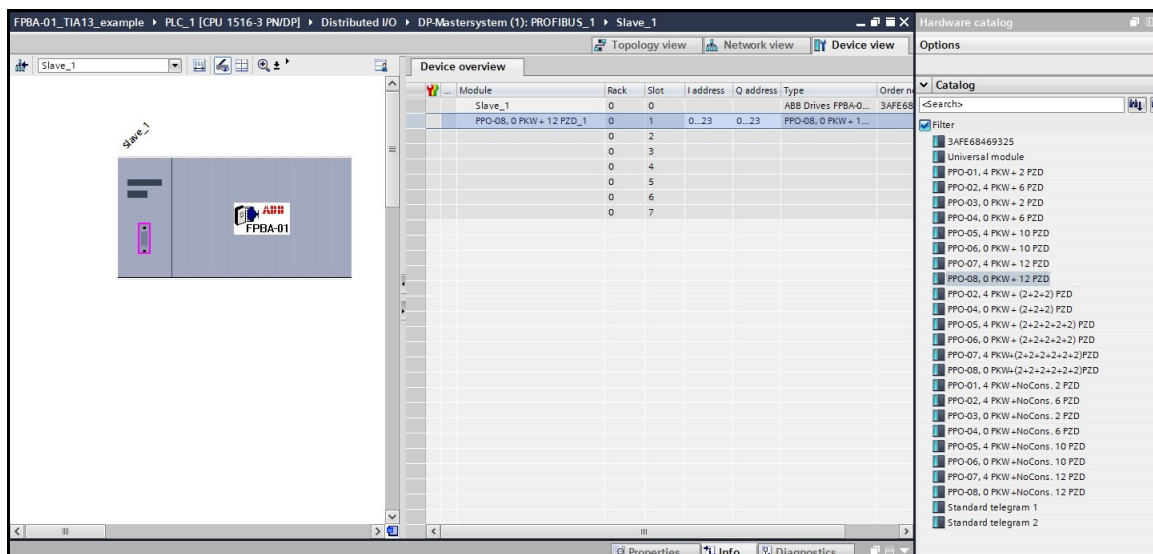
- In TIA portal, go to Network view. Drag and drop FPBA-01 from the Device catalog to the Network view.



- Click on **Not assigned** text and select the master to create link between the master and FPBA-01.

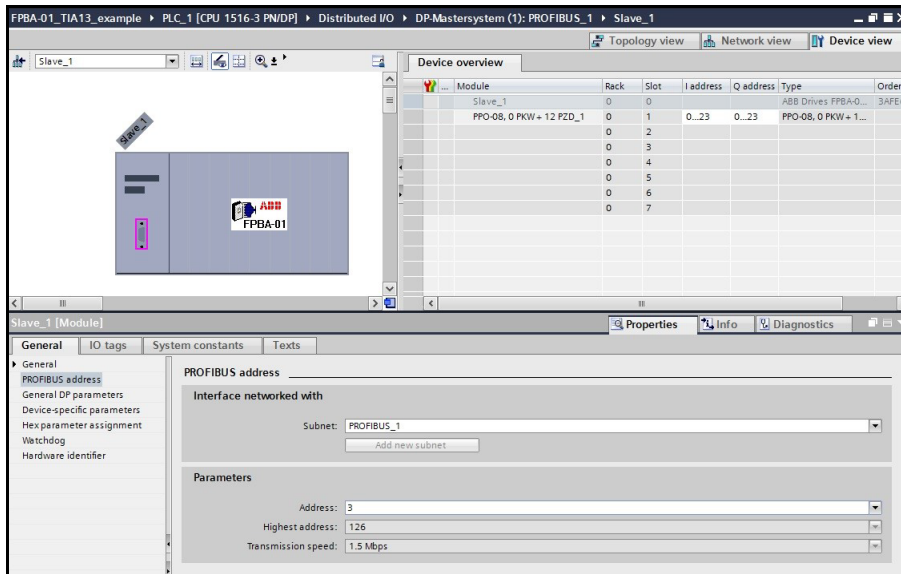


- Go to Device view and select **Slave\_1 (FPBA-01)**. Drag and drop the telegram from Catalog to Device.

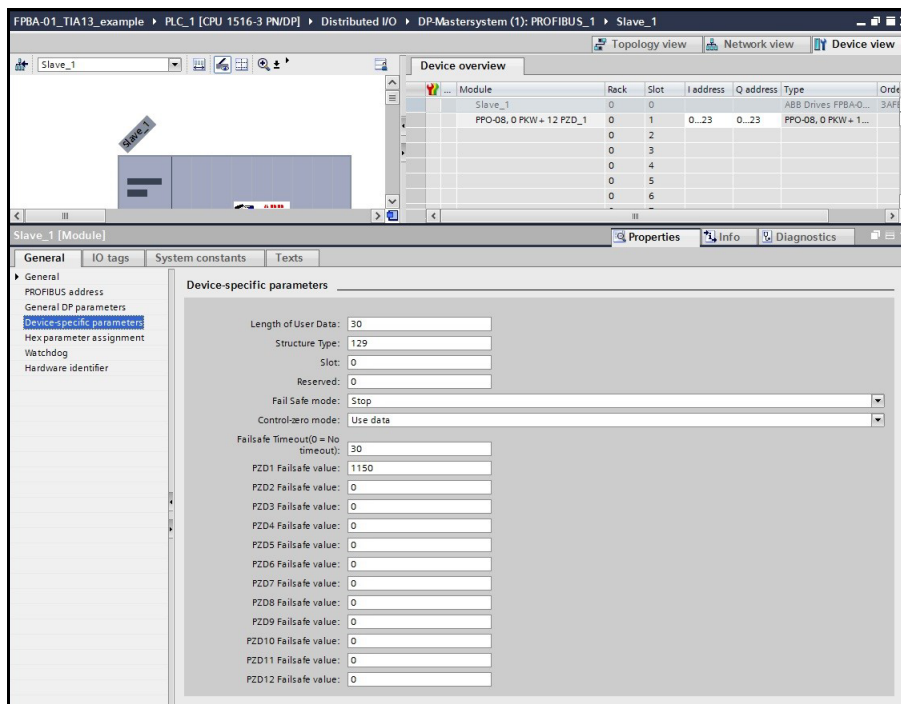


## 100 Start-up

### 8. In the General tab, set FPBA-01 node address.



### 9. In the Device-specific parameters, set fail-safe mode, time out and fail-safe values.



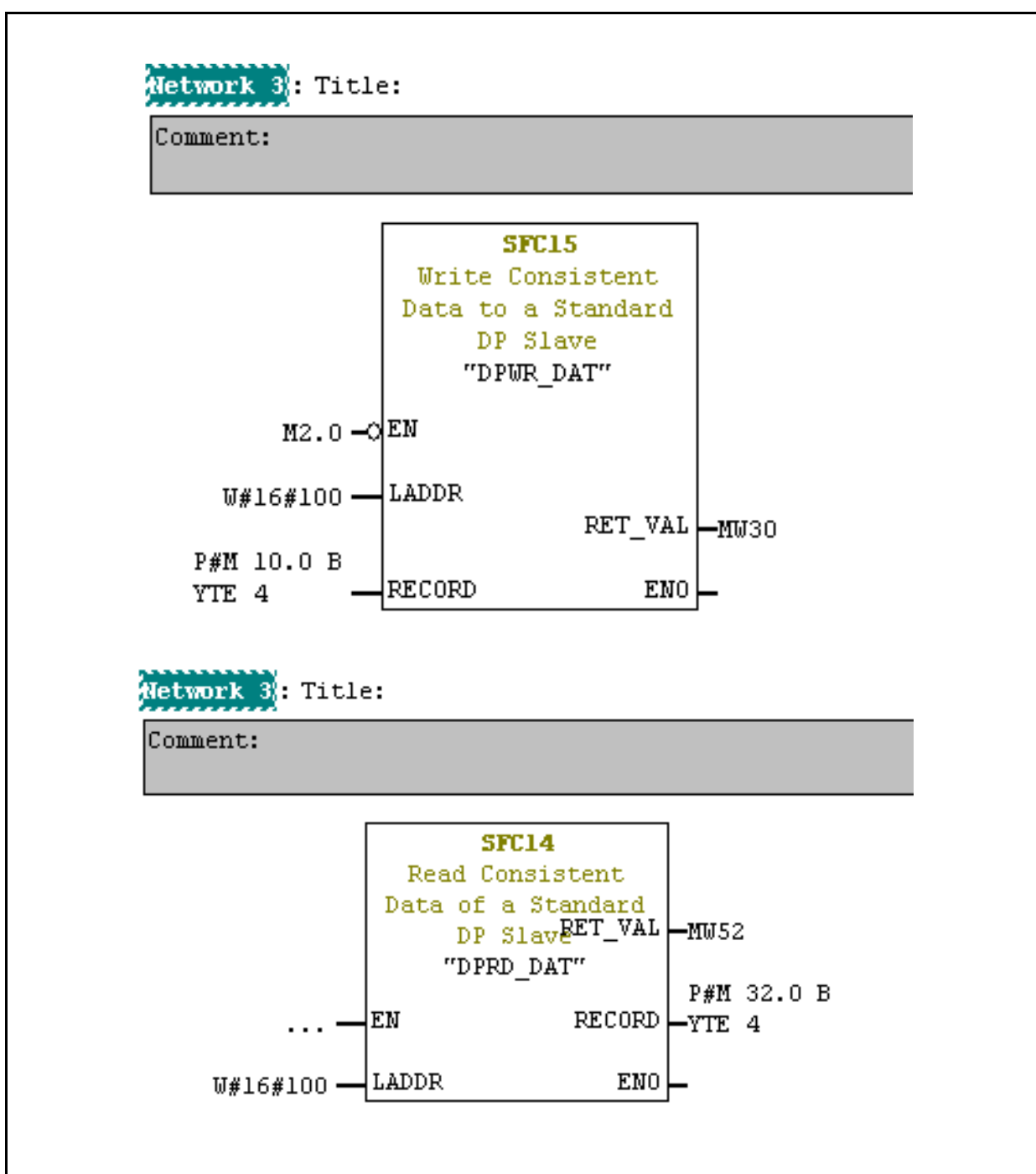
### 10. Compile and download the project.

After the PLC starts, node 3 (FPBA-01) goes online with PPO-08.

## ■ Cyclic data handling

With FPBA-01, both data-consistent and non-consistent communication can be used, data-consistent meaning that the whole cyclic data frame is transmitted during a single program cycle. Some PLCs handle this internally, but others must be programmed to transmit data-consistent telegrams. For more information, see chapter [Communication protocol](#) on page 131.

For example, Siemens SIMATIC S7 requires the use of special functions SFC15 and SFC14.







# Communication profiles

---

## Contents of this chapter

This chapter describes the communication profiles used in the communication between the PROFIBUS network, the adapter module and the drive.

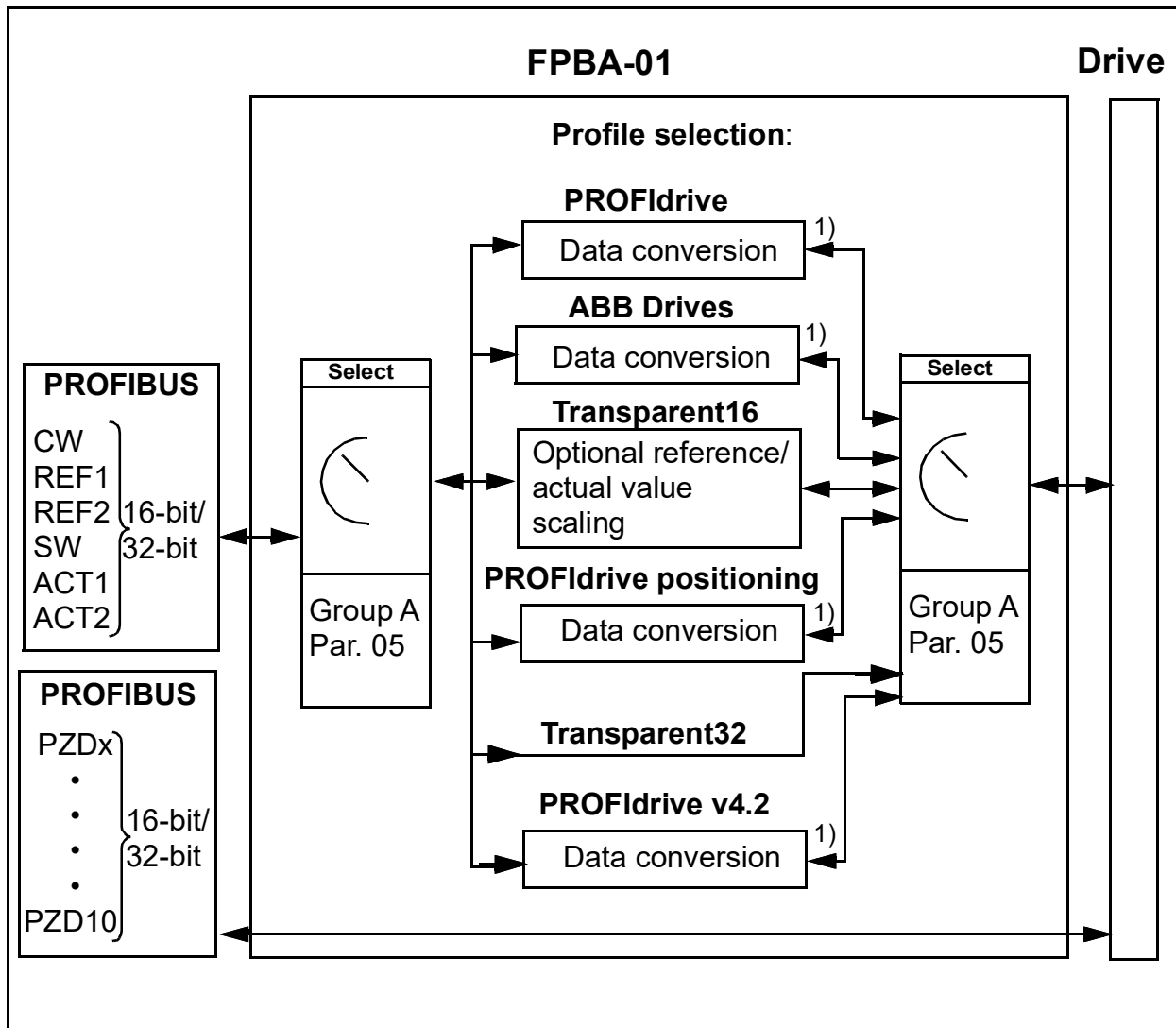
## Communication profiles

Communication profiles are ways of conveying control commands (Control word, Status word, references and actual values) between the master station and the drive.

With the FPBA-01 module, the PROFIBUS network can use either the PROFIdrive v4.2, legacy PROFIdrive (referred to as PROFIdrive from here on) or the ABB Drives profile. All are converted to the native profile (for example, DCU or FBA) by the adapter module. In addition, two Transparent modes – for 16-bit and 32-bit words respectively – are available. With the Transparent modes, no data conversion takes place.

---

The figure below illustrates the profile selection:



<sup>1)</sup> Native profile (e.g., DCU or FBA)

**Note:** The diagram is applicable only when PPO messaging is used. If standard telegrams (ST) are used, the communication profile is selected automatically.

The sections that follow describe the Control word, the Status word, references and actual values for the PROFIdrive v4.2, PROFIdrive and ABB Drives communication profiles. Refer to the drive manuals for details on the native profiles.



## PROFIdrive communication profile

### ■ Control word and Status word


The Control word (PROFIdrive parameter **967**) is the principal means for controlling the drive from a fieldbus system. It is sent by the fieldbus master station to the drive through the adapter module. The drive switches between its states according to the bit-coded instructions in the Control word and returns status information to the master in the Status word (PROFIdrive parameter **968**).

The contents of the Control word and the Status word are detailed below. See the drives documentation for information on drive-specific bits. The drive states for all operating modes are presented on page [111](#). The drive states for the positioning mode are presented on page [112](#).

### Control word contents

The table below shows the contents of the Control word for the PROFIdrive communication profile (PROFIdrive parameter **967**). The upper case boldface text refers to the states shown in the state machine on page [111](#).

| Bit | Name | Value | STATE/Description  |                  |
|-----|------|-------|--|------------------|
|     |      |       | Speed control mode   | Positioning mode |
| 0   | ON   | 1     | Proceed to <b>READY TO OPERATE</b> .   |                  |
|     | OFF1 | 0     | Emergency OFF, stop by the selected deceleration ramp. Proceed to <b>OFF1 ACTIVE</b> ; proceed further to <b>READY TO SWITCH ON</b> unless other interlocks (OFF2, OFF3) are active. |                  |
| 1   | OFF2 | 1     | Continue operation (OFF2 inactive).  |                  |
|     |      | 0     | Emergency OFF, coast to stop. Proceed to <b>OFF2 ACTIVE</b> ; proceed further to <b>SWITCH-ON INHIBIT</b> .  |                  |

| Bit | Name                        | Value | STATE/Description   |  |
|-----|-----------------------------|-------|---|--|
|     |                             |       | Speed control mode  | Positioning mode                                 |
| 2   | OFF3                        | 1     | Continue operation (OFF3 inactive).   |  |
|     |                             | 0     | Emergency stop, stop according to fastest possible deceleration mode. Proceed to <b>OFF3 ACTIVE</b> ; proceed further to <b>SWITCH-ON INHIBIT</b> .<br> <b>WARNING!</b> Make sure that the motor and driven machine can be stopped using this stop mode. |  |
| 3   | OPERATION_ENABLE            | 1     | Proceed to <b>ENABLE OPERATION</b> .  |  |
|     |                             | 0     | Inhibit operation. Proceed to <b>OPERATION INHIBIT</b> .  |  |
| 4   | ENABLE_RAMP_GENERATOR<br>or | 1     | Normal operation. Proceed to <b>RAMP FUNCTION GENERATOR: ENABLE OUTPUT</b> .  | Normal operation. Do not reject traversing task. |
|     | TRAVERSING_TASK             | 0     | Stop according to selected stop type.   | Reject traversing task.                          |
| 5   |                             | 1     | Normal operation. Proceed to <b>RAMP FUNCTION GENERATOR: ENABLE ACCELERATOR</b> .   | Normal operation. No intermediate stop.          |
|     |                             | 0     | Halt ramping (Ramp Function Generator output held).   | Intermediate stop                                |

| Bit | Name       | Value | STATE/Description   |  |
|-----|------------|-------|---|--|
|     |            |       | Speed control mode  | Positioning mode   |
| 6   |            | 1     | Normal operation. Proceed to <b>OPERATING</b> .<br><b>Note:</b> This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters.                              | Activate traversing task (0 → 1). This is a toggle bit; each rising edge of signal enables a traversing task or a new set point. |
|     |            | 0     | Force Ramp Function Generator input to zero.  |  |
| 7   | RESET      | 0 → 1 | Fault reset if an active fault exists. Proceed to <b>SWITCH-ON INHIBIT</b> .<br><b>Note:</b> This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters. |  |
|     |            | 0     | (Continue normal operation)   |  |
| 8   | JOGGING_1  |       | Jogging 1 (Not supported by all drive types)  |  |
| 9   | JOGGING_2  |       | Jogging 2 (Not supported by all drive types)  |  |
| 10  | REMOTE_CMD | 1     | Fieldbus control enabled  |  |
|     |            | 0     | Control word <> 0 or reference <> 0:<br>Retain last Control word and reference.<br>Control word = 0 and reference = 0:<br>Fieldbus control enabled.   |  |
| 11  |            | 1     | Vendor-specific bit as defined by PROFIdrive parameter <b>933</b> .   | Start homing procedure.  |
|     |            | 0     |   | Stop homing procedure.   |
| 12  |            |       | Vendor-specific bit as defined by PROFIdrive parameter <b>934</b>   |  |

## 108 Communication profiles

| Bit | Name | Value | STATE/Description   |                  |
|-----|------|-------|---|------------------|
|     |      |       | Speed control mode  | Positioning mode |
| 13  |      |       | Vendor-specific bit as defined by PROFIdrive parameter <b>935</b> |                  |
| 14  |      |       | Vendor-specific bit as defined by PROFIdrive parameter <b>936</b> |                  |
| 15  |      |       | Vendor-specific bit as defined by PROFIdrive parameter <b>937</b> |                  |

## Status word contents

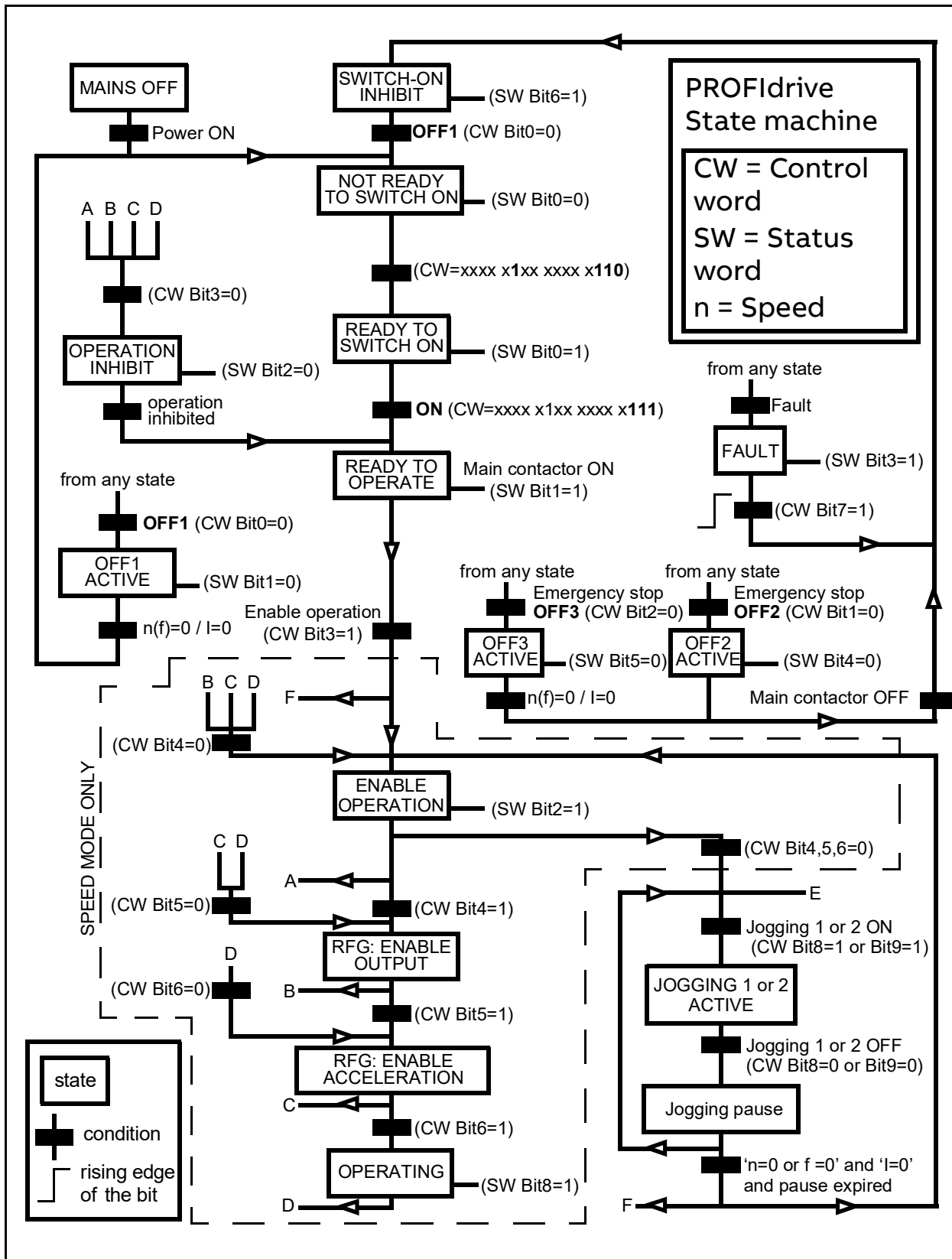
The table below shows the contents of the Status word for the PROFIdrive communication profile (PROFIdrive parameter **968**). The upper case boldface text refers to the states shown in the state machine on page [111](#).

| Bit | Name         | Value | STATE/Description   |                  |
|-----|--------------|-------|---|------------------|
|     |              |       | Speed control mode  | Positioning mode |
| 0   | RDY_ON       | 1     | READY TO SWITCH ON  |                  |
|     |              | 0     | NOT READY TO SWITCH ON  |                  |
| 1   | RDY_RUN      | 1     | READY TO OPERATE  |                  |
|     |              | 0     | OFF1 ACTIVE   |                  |
| 2   | RDY_REF      | 1     | ENABLE OPERATION  |                  |
|     |              | 0     | DISABLE OPERATION   |                  |
| 3   | TRIPPED      | 1     | FAULT   |                  |
|     |              | 0     | No fault  |                  |
| 4   | OFF_2_STA    | 1     | OFF2 inactive   |                  |
|     |              | 0     | OFF2 ACTIVE   |                  |
| 5   | OFF_3_STA    | 1     | OFF3 inactive   |                  |
|     |              | 0     | OFF3 ACTIVE   |                  |
| 6   | SWC_ON_INHIB | 1     | SWITCH-ON INHIBIT ACTIVE  |                  |
|     |              | 0     | SWITCH-ON INHIBIT NOT ACTIVE  |                  |
| 7   | ALARM        | 1     | Warning/Alarm   |                  |
|     |              | 0     | No Warning/Alarm  |                  |
| 8   | AT_SETPOINT  | 1     | <b>OPERATING.</b> Actual value equals reference value (= is within tolerance limits). |                  |
|     |              | 0     | Actual value differs from reference value (= is outside tolerance limits).            |                  |
| 9   | REMOTE       | 1     | Drive control location: REMOTE  |                  |
|     |              | 0     | Drive control location: LOCAL   |                  |

| Bit | Name | Value | STATE/Description  |   |
|-----|------|-------|--|---|
|     |      |       | Speed control mode   | Positioning mode                                    |
| 10  |      | 1     | Actual frequency or speed value equals or is greater than supervision limit. | Target position reached                             |
|     |      | 0     | Actual frequency or speed value is within supervision limit.                 | Not at target position                              |
| 11  |      | 1     | Vendor-specific bit as defined by PROFIdrive parameter <b>939</b>            | Homing procedure was executed and is valid.         |
|     |      | 0     |  | No valid home position available                    |
| 12  |      | 1     | Vendor-specific bit as defined by PROFIdrive parameter <b>940</b>            | Traversing task acknowledgement (0 → 1)             |
|     |      | 0     |  |   |
| 13  |      | 1     | Vendor-specific bit as defined by PROFIdrive parameter <b>941</b>            | Drive stopped.                                      |
|     |      | 0     |  | Drive moving. Traversing task is executed (n <> 0). |
| 14  |      |       | Vendor-specific bit as defined by PROFIdrive parameter <b>942</b>            |   |
| 15  |      |       | Vendor-specific bit as defined by PROFIdrive parameter <b>943</b>            |   |

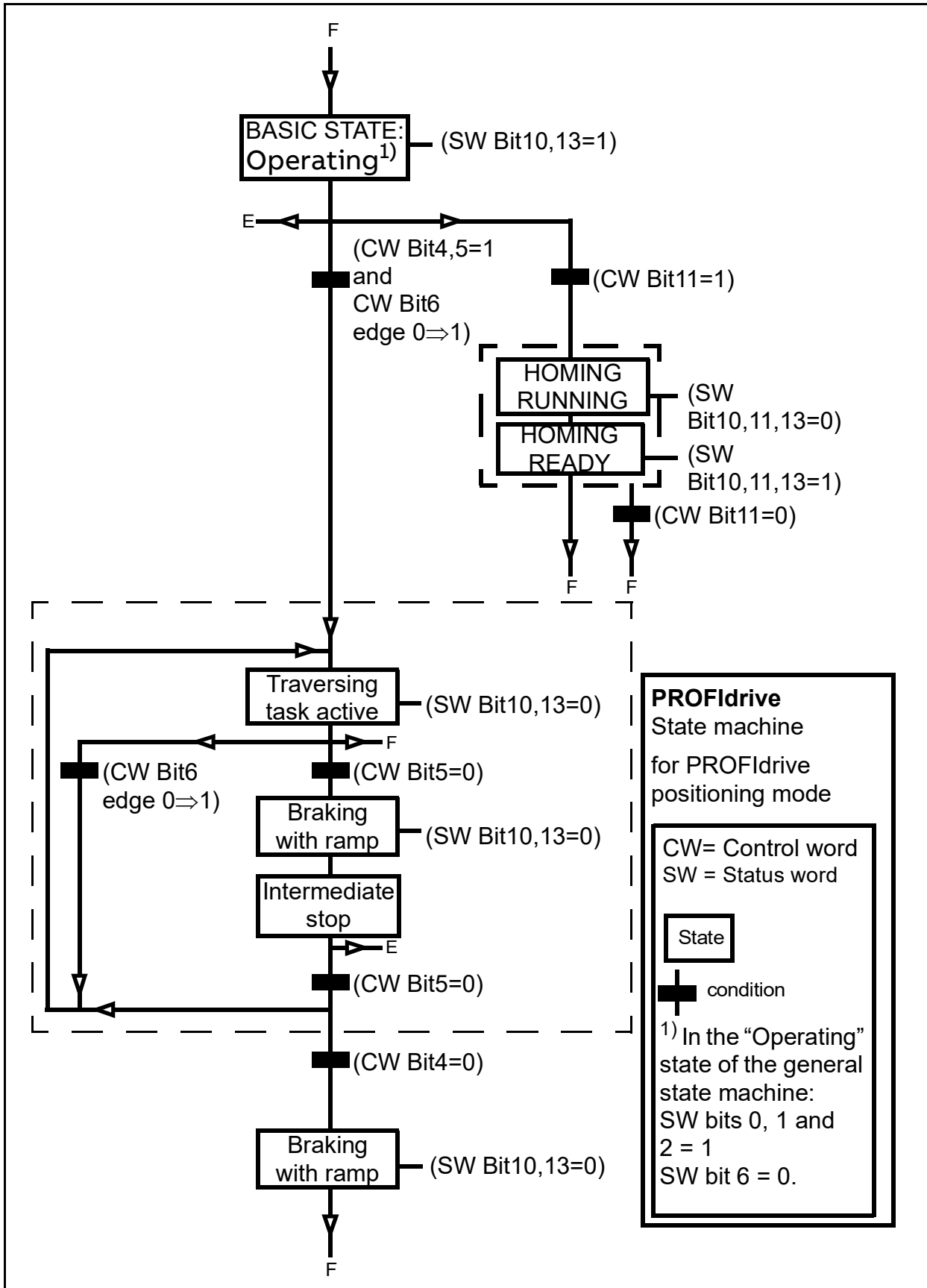
### State machine for all operating modes

The general PROFIdrive state machine for all operating modes is shown below.



### State machine for positioning mode

The PROFIdrive state machine for the positioning mode is shown below.





## ■ References

ABB drives can receive control information from multiple sources including analog and digital inputs, the drive control panel and a communication module (for example, FPBA-01). In order to have the drive controlled through PROFIBUS, the communication module must be defined as the source for control information, for example, reference.

### References in speed control mode

In the speed control mode, references are 16-bit or 32-bit words containing a sign bit and a 15-bit or 31-bit integer. A negative reference (indicating reversed direction of rotation) is formed by calculating the two's complement from the corresponding positive reference.

A 16-bit speed reference (REF or NSOLL\_A) in hexadecimal (0...4000h) corresponds to 0...100% of speed scaling value (as defined with a drive parameter).

A 32-bit speed reference (NSOLL\_B) in hexadecimal (0...4000 0000h) corresponds to 0...100% of speed scaling value (as defined with a drive parameter).

### References in positioning mode (ACSM1 only)

In the positioning mode, references are 16-bit or 32-bit words. A 32-bit reference contains a sign bit and a 31-bit integer. A negative reference (indicating reversed direction of rotation) is formed by calculating the two's complement from the corresponding positive reference.

For a 32-bit position reference (XSOLL\_A), the unit and scaling are defined with drive parameters (for example, **POS UNIT**, **POS2INT SCALE** and **FEED CONST**).

For a 32-bit velocity reference (VELOCITY\_A), the unit and scaling are defined with drive parameters (for example, **POS SPEED UNIT** and **POS SPEED2INT**).

---

## ■ Actual values

Actual values are 16-bit or 32-bit words containing information on the operation of the drive. The functions to be monitored are selected with a drive parameter.

### **Actual values in speed control mode**

The scaling of 16-bit actual speed values (ACT or NIST\_A) in hexadecimal (0...4000h) corresponds to 0...100% of speed scaling value (as defined with a drive parameter).

The scaling of 32-bit actual speed values (NIST\_B) in hexadecimal (0...4000 0000h) corresponds to 0...100% of speed scaling value (as defined with a drive parameter).

### **Actual values in positioning mode (ACSM1 only)**

For a 32-bit actual position value (XIST\_A), the unit and scaling are defined with drive parameters (for example, **POS UNIT**, **POS2INT SCALE** and **FEED CONST**).

---

## ABB Drives communication profile


### ■ Control word and Status word

The Control word is the principal means for controlling the drive from a fieldbus system. It is sent by the fieldbus master station to the drive through the adapter module. The drive switches between its states according to the bit-coded instructions in the Control word and returns status information to the master in the Status word.

The contents of the Control word and the Status word are detailed below. The drive states are presented on page [120](#).

### Control word contents

The table below shows the contents of the Control word for the ABB Drives communication profile. The upper case boldface text refers to the states shown on page [120](#).

| Bit | Name             | Value | STATE/Description  |
|-----|------------------|-------|--|
| 0   | OFF1_<br>CONTROL | 1     | Proceed to <b>READY TO OPERATE</b> .   |
|     |                  | 0     | Stop along currently active deceleration ramp. Proceed to <b>OFF1 ACTIVE</b> ; proceed to <b>READY TO SWITCH ON</b> unless other interlocks (OFF2, OFF3) are active.   |
| 1   | OFF2_<br>CONTROL | 1     | Continue operation (OFF2 inactive).  |
|     |                  | 0     | Emergency OFF, coast to stop. Proceed to <b>OFF2 ACTIVE</b> , proceed to <b>SWITCH-ON INHIBITED</b> .  |
| 2   | OFF3_<br>CONTROL | 1     | Continue operation (OFF3 inactive).  |
|     |                  | 0     | Emergency stop, stop within time defined by drive parameter. Proceed to <b>OFF3 ACTIVE</b> ; proceed to <b>SWITCH-ON INHIBITED</b> .<br><br> <b>WARNING!</b> Make sure that the motor and driven machine can be stopped using this stop mode. |

| Bit   | Name  | Value | STATE/Description   |
|-------|---|-------|---|
| 3     | INHIBIT_ OPERATION  | 1     | Proceed to <b>OPERATION ENABLED</b> .<br><b>Note:</b> Run enable signal must be active; see drive documentation. If the drive is set to receive the Run enable signal from the fieldbus, this bit activates the signal. |
|       |   | 0     | Inhibit operation. Proceed to <b>OPERATION INHIBITED</b> .  |
| 4     | RAMP_OUT_ ZERO  | 1     | Normal operation. Proceed to <b>RAMP FUNCTION GENERATOR: OUTPUT ENABLED</b> .   |
|       |   | 0     | Force Ramp Function Generator output to zero. Drive ramps to stop (current and DC voltage limits in force).   |
| 5     | RAMP_HOLD   | 1     | Enable ramp function. Proceed to <b>RAMP FUNCTION GENERATOR: ACCELERATOR ENABLED</b> .  |
|       |   | 0     | Halt ramping (Ramp Function Generator output held).   |
| 6     | RAMP_IN_ ZERO   | 1     | Normal operation. Proceed to <b>OPERATING</b> .<br><b>Note:</b> This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters.  |
|       |   | 0     | Force Ramp Function Generator input to zero.  |
| 7     | RESET   | 0 → 1 | Fault reset if an active fault exists. Proceed to <b>SWITCH-ON INHIBITED</b> .<br><b>Note:</b> This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters.           |
|       |   | 0     | Continue normal operation.  |
| 8...9 | Drive-specific (For information, see the drive documentation) |       |   |

| Bit         | Name   | Value | STATE/Description  |
|-------------|--|-------|--|
| 10          | REMOTE_CMD   | 1     | Fieldbus control enabled   |
|             |  | 0     | Control word and reference not getting through to the drive, except for CW bits OFF1, OFF2 and OFF3.             |
| 11          | EXT_CTRL_LOC   | 1     | Select External Control Location EXT2. Effective if control location parameterized to be selected from fieldbus. |
|             |  | 0     | Select External Control Location EXT1. Effective if control location parameterized to be selected from fieldbus. |
| 12...<br>15 | Drive-specific (For information, see the drive documentation.) |       |  |

## Status word contents

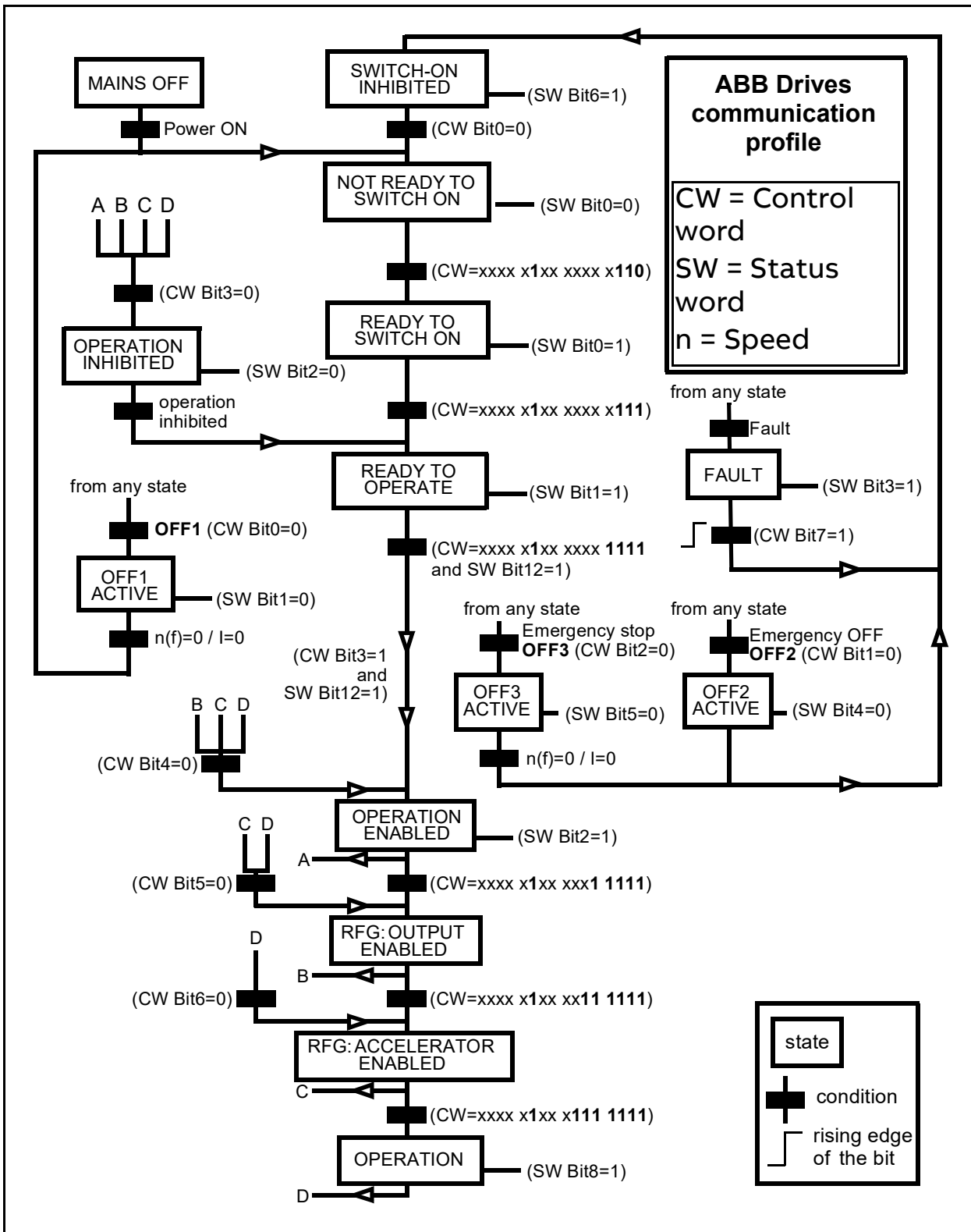
The table below shows the contents of the Status word for the ABB Drives communication profile. The upper case boldface text refers to the states shown on page [120](#).

| Bit | Name         | Value | STATE/Description   |
|-----|--------------|-------|---|
| 0   | RDY_ON       | 1     | READY TO SWITCH ON  |
|     |              | 0     | NOT READY TO SWITCH ON  |
| 1   | RDY_RUN      | 1     | READY TO OPERATE  |
|     |              | 0     | OFF1 ACTIVE   |
| 2   | RDY_REF      | 1     | OPERATION ENABLED   |
|     |              | 0     | OPERATION INHIBITED   |
| 3   | TRIPPED      | 1     | FAULT   |
|     |              | 0     | No fault  |
| 4   | OFF_2_STA    | 1     | OFF2 inactive   |
|     |              | 0     | OFF2 ACTIVE   |
| 5   | OFF_3_STA    | 1     | OFF3 inactive   |
|     |              | 0     | OFF3 ACTIVE.  |
| 6   | SWC_ON_INHIB | 1     | SWITCH-ON INHIBITED   |
|     |              | 0     | –   |
| 7   | ALARM        | 1     | Warning/alarm   |
|     |              | 0     | No warning/alarm  |
| 8   | AT_SETPOINT  | 1     | <b>OPERATION.</b> Actual value equals reference value (= is within tolerance limits, i.e., in speed control, speed error is 10% maximum of the nominal motor speed). Note that tolerance limit can be configured in the drive side, for example, speed window in this case. |
|     |              | 0     | Actual value differs from reference (= is outside tolerance limits).  |

| Bit         | Name   | Value | STATE/Description   |
|-------------|--|-------|---|
| 9           | REMOTE   | 1     | Drive control location: REMOTE (EXT1 or EXT2)   |
|             |  | 0     | Drive control location: LOCAL   |
| 10          | ABOVE_LIMIT  | 1     | Actual frequency or speed equals or exceeds supervision limit (set by drive parameter). Valid in both directions of rotation. |
|             |  | 0     | Actual frequency or speed within supervision limit  |
| 11          | EXT_CTRL_LOC   | 1     | External Control Location EXT2 selected   |
|             |  | 0     | External Control Location EXT1 selected   |
| 12          | EXT_RUN_ENABLE   | 1     | External Run Enable signal received   |
|             |  | 0     | No External Run Enable signal received  |
| 13...<br>14 | Drive-specific (For information, see the drive documentation.) |       |   |
| 15          | FBA_ERROR  | 1     | Communication error detected by fieldbus adapter module   |
|             |  | 0     | Fieldbus adapter communication OK   |

### State machine

The state machine for the ABB Drives communication profile is shown below.





## References

References are 16-bit words containing a sign bit and a 15-bit integer. A negative reference (indicating reversed direction of rotation) is formed by calculating the two's complement from the corresponding positive reference.

ABB drives can receive control information from multiple sources including analog and digital inputs, the drive control panel and a communication module (for example, FPBA-01). In order to have the drive controlled through the fieldbus, the module must be defined as the source for control information, for example, reference.

### Scaling

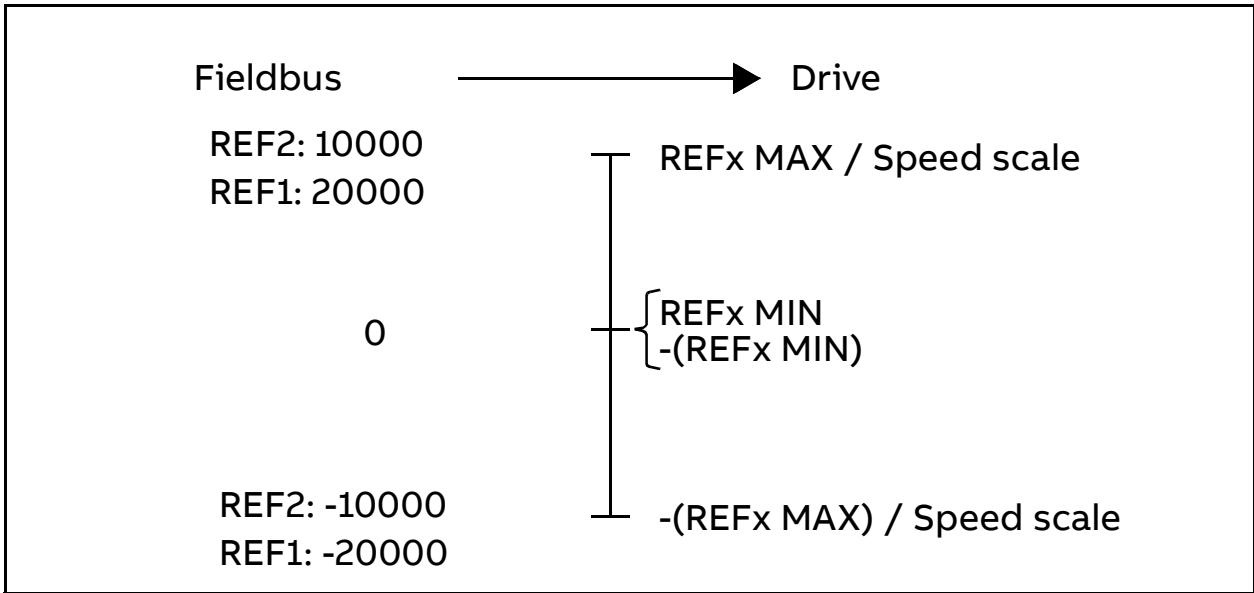
References are scaled as shown below.

**Note:** The values of REF1 MAX and REF2 MAX are set with drive parameters. See the drive manuals for further information.

In ACSM1, ACS850 and ACQ810, the speed reference (REFx) in decimal (0...20000) corresponds to 0...100% of the speed scaling value (as defined with a drive parameter).

In ACS880 and ACS580 the speed reference (REFx) in decimal 0 corresponds to the speed ref min parameter (**46.06 Speed ref zero scaling** in ACS880) or 0 if this parameter does not exist and the speed reference (REFx) in decimal 20000 corresponds to the speed scaling value (as defined with a drive parameter).

In ACS355, drive parameter REFx MIN may limit the actual minimum reference.



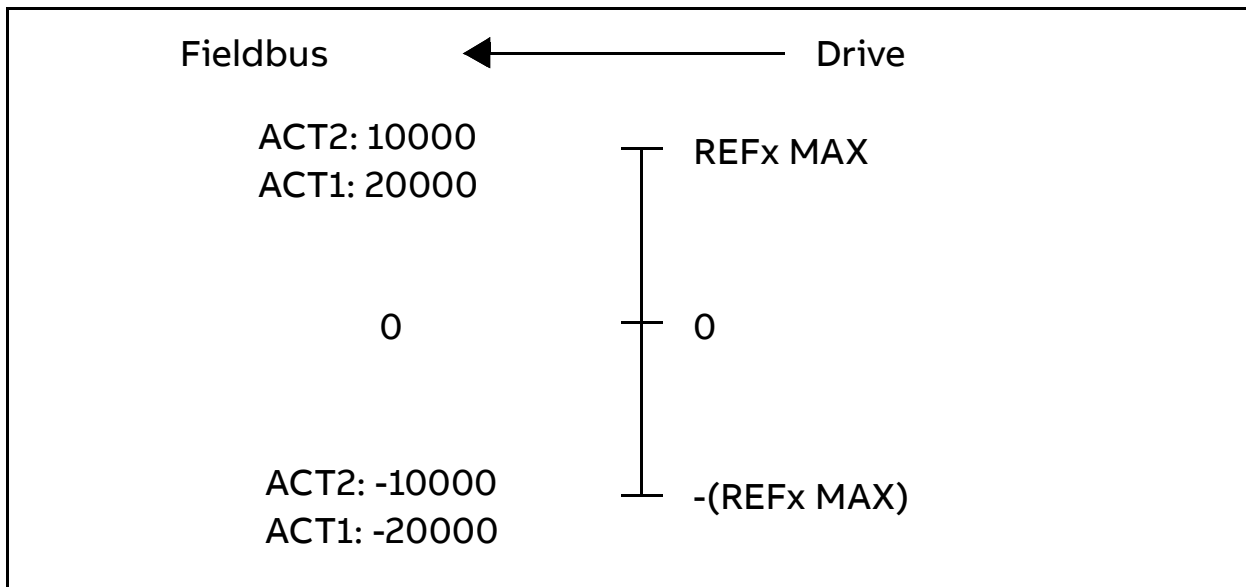
## ■ Actual values

Actual values are 16-bit words containing information on the operation of the drive. The functions to be monitored are selected with a drive parameter.

### Scaling

Actual values are scaled as shown below.

**Note:** The values of REF1 MAX and REF2 MAX are set with drive parameters. See the drive manuals for further information.



## PROFIdrive v4.2 communication profile

### ■ Supported drives

PROFIdrive v4.2 full state machine is supported with ACS880, ACS580 and ACS380 drives with specific version of the drive's software. For more information, refer to the drive's firmware manual.

### ■ Control word and Status word


The Control word (PROFIdrive parameter 967) is the principal means for controlling the drive from a fieldbus system. It is sent by the fieldbus master station to the drive through the adapter module. The drive switches between its states according to the bit-coded instructions in the Control word and returns status information to the master in the Status word (PROFIdrive parameter 968).

The contents of the Control word and the Status word are detailed below. See the drives documentation for information on drive-specific bits. The drive states are shown on page [127](#).

### Control word contents

The table below shows the contents of the Control word for the PROFIdrive v4.2 communication profile. The upper case boldface text refers to the states shown on page [127](#).

| Bit | Name | Value | STATE/Description  |
|-----|------|-------|--|
| 0   | ON   | 1     | Proceed to <b>READY TO OPERATE</b> .   |
|     | OFF1 | 0     | Emergency OFF, stop by the selected deceleration ramp. Proceed to <b>RAMP STOP</b> ; proceed further to <b>READY TO SWITCH ON</b> unless other interlocks (OFF2, OFF3) are active. |
| 1   | OFF2 | 1     | Continue operation (OFF2 inactive).  |
|     |      | 0     | Emergency OFF, coast to stop. Proceed to <b>SWITCHING ON INHIBITED</b> .   |

| Bit | Name                    | Value | STATE/Description   |
|-----|-------------------------|-------|---|
| 2   | OFF3                    | 1     | Continue operation (OFF3 inactive).   |
|     |                         | 0     | Emergency stop, stop according to the fastest possible deceleration mode. Proceed to <b>QUICK STOP</b> ; proceed further to <b>SWITCHING ON INHIBITED</b> .<br><br> <b>WARNING!</b> Make sure that the motor and driven machine can be stopped using this stop mode. |
| 3   | OPERATION_ENABLE        | 1     | Proceed to <b>ENABLE OPERATION</b> .  |
|     |                         | 0     | Inhibit operation. Proceed to <b>READY TO OPERATE</b> .   |
| 4   | ENABLE_RAMP_GENERATOR   | 1     | Normal operation. Enables the ramp function generator's output.   |
|     |                         | 0     | Ramp function generator's output is forced to zero.   |
| 5   | UNFREEZE_RAMP_GENERATOR | 1     | Normal operation. Turns on the ramp function generator.   |
|     |                         | 0     | Ramp function generator's output is frozen to its current value.  |
| 6   | ENABLE_SETPOINT         | 1     | Normal operation. Sets the velocity reference as the ramp function generator's input.   |
|     |                         | 0     | Ramp function generator's input is forced to zero.  |
| 7   | RESET                   | 0 → 1 | Fault reset if an active fault exists.  |
|     |                         | 0     | Continue normal operation.  |
| 8   | JOGGING_1               |       | Not supported in PROFIdrive v4.2 profile.   |
| 9   | JOGGING_2               |       | Not supported in PROFIdrive v4.2 profile.   |
| 10  | REMOTE_CMD              | 1     | Fieldbus control enabled  |
|     |                         | 0     |   |

| Bit | Name         | Value | STATE/Description                                    |
|-----|--------------|-------|--|
| 11  | EXT_CTRL_LOC |       | Vendor-specific bit.                                 |
| 12  |              |       | Vendor-specific bit. Mapped to Drive Main CW bit 12. |
| 13  |              |       | Vendor-specific bit. Mapped to Drive Main CW bit 13. |
| 14  |              |       | Vendor-specific bit. Mapped to Drive Main CW bit 14. |
| 15  |              |       | Vendor-specific bit. Not used.                       |

### Status word contents




The table below shows the contents of the Status word for the PROFIdrive v4.2 communication profile. The upper case boldface text refers to the states shown on page [127](#).

| Bit | Name         | Value | STATE/Description                 |
|-----|--------------|-------|-----------------------------------|
| 0   | RDY_ON       | 1     | <b>READY TO SWITCH ON</b>         |
|     |              | 0     | Not <b>READY TO SWITCH ON</b>     |
| 1   | RDY_RUN      | 1     | <b>READY TO OPERATE</b>           |
|     |              | 0     | Not <b>READY TO OPERATE</b>       |
| 2   | RDY_REF      | 1     | <b>OPERATION ENABLED</b>          |
|     |              | 0     | Operation disabled                |
| 3   | TRIPPED      | 1     | <b>FAULT</b>                      |
|     |              | 0     | No fault                          |
| 4   | OFF_2_STA    | 1     | OFF2 inactive                     |
|     |              | 0     | OFF2 active                       |
| 5   | OFF_3_STA    | 1     | OFF3 inactive                     |
|     |              | 0     | OFF3 active                       |
| 6   | SWC_ON_INHIB | 1     | <b>SWITCHING ON INHIBITED</b>     |
|     |              | 0     | Not <b>SWITCHING ON INHIBITED</b> |
| 7   | ALARM        | 1     | Warning/alarm                     |
|     |              | 0     | No warning/alarm                  |

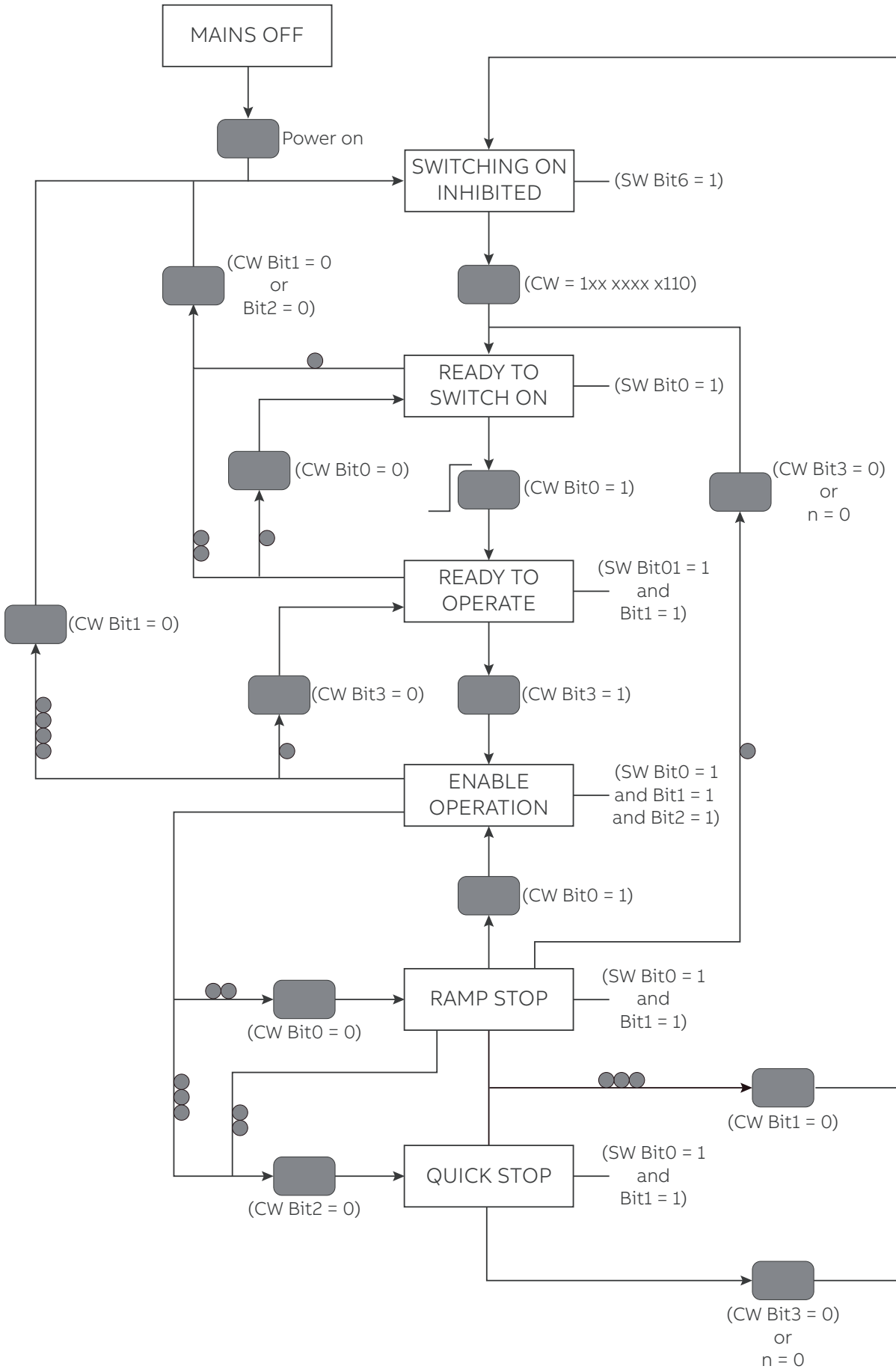
| Bit | Name                               | Value | STATE/Description   |
|-----|------------------------------------|-------|---|
| 8   | SPEED_ERROR_WITHIN_TOLERANCE_RANGE | 1     | Actual value is within tolerance limits of ramp function generator's output.<br><b>Note:</b> The behavior is different from PROFIdrive's status word bit 8 (AT_SETPOINT). |
|     |                                    | 0     | Actual value is outside tolerance limits of ramp function generator's output.   |
| 9   | REMOTE                             | 1     | Automation system is requested to assume control.   |
|     |                                    | 0     | Control by automation system is not possible. Control is possible only at the device or by another interface.   |
| 10  | ABOVE_LIMIT                        | 1     | Actual frequency or speed value equals or is larger than supervision limit.   |
|     |                                    | 0     | Actual frequency or speed value is within supervision limit.  |
| 11  |                                    |       | Vendor-specific bit. Mapped to Drive Main SW bit 11.  |
| 12  |                                    |       | Vendor-specific bit. Mapped to Drive Main SW bit 12.  |
| 13  |                                    |       | Vendor-specific bit. Mapped to Drive Main SW bit 13.  |
| 14  |                                    |       | Vendor-specific bit. Mapped to Drive Main SW bit 14.  |
| 15  |                                    |       | Vendor-specific bit. Not used.  |

## State machine

The state machine and definitions for the PROFIdrive v4.2 communication profile are shown below. The jogging mode is not available in PROFIdrive v4.2.

| Symbol  | Definition   |
|---|--|
| n   | Speed  |
|  | State transition priority. Transitions with more circles have a higher priority. A transition with no circles has the lowest priority. |
|  | Rising edge of the bit   |
|  | Condition  |

# 128 Communication profiles





For PROFIdrive v4.2, the ramp function generator operates the same as in the PROFIdrive profile. The only difference is that if the PROFIdrive control word bit4 is set to false while in the **RAMP STOP** state, the drive stops as fast as possible within the current and DC voltage limits. This occurs because setting bit4 to false forces the output of the ramp function generator to 0.

## ■ References

ABB drives can receive control information from multiple sources including analog and digital inputs, the drive control panel and a fieldbus adapter module. To have the drive controlled through PROFINET, you must select the module as the source for control information, for example, reference.

### References in speed control mode

In the speed control mode, references are 16-bit or 32-bit words containing a sign bit and a 15-bit or 31-integer. A negative reference (indicating reversed direction of rotation) is formed by calculating the two's complement from the corresponding positive reference.

A 16-bit speed reference (REF or NSOLL\_A) in hexadecimal (0...4000h) corresponds to 0...100% of Maximum Reference (as defined with a drive parameter).

A 32-bit speed reference (NSOLL\_B) in hexadecimal (0...4000 0000h) corresponds to 0...100% of Maximum Reference (as defined with a drive parameter).

## ■ Actual values

Actual values are 16-bit or 32-bit words containing information on the operation of the drive. The functions to be monitored are selected with a drive parameter.

---

## **Actual values in speed control mode**

The scaling of 16-bit actual speed values (ACT or NIST\_A) in hexadecimal (0...4000h) corresponds to 0...100% of the maximum reference (as defined with a drive parameter, for example, speed scaling in ACS880).

The scaling of 32-bit actual speed values (NIST\_B) in hexadecimal (0...4000 0000h) corresponds to 0...100% of the maximum reference (as defined with a drive parameter, for example, speed scaling in ACS880).



# Communication protocol

---

## Contents of this chapter

This chapter describes the PROFIBUS messaging used in the communication with the drive and in PROFIBUS slave device configuration messages.

## PROFIBUS DP

The FPBA-01 module supports the PROFIBUS DP-V0 and DP-V1 protocols according to the IEC 61158, IEC 61784 and EN 50170 standards. PROFIBUS DP-V0/DP-V1 is a distributed I/O system which enables the master to use a large number of peripheral modules and field devices. The data transfer is mainly cyclic: the master reads the input information from the slaves and sends the output information back to the slaves.

The FPBA-01 module uses so-called PPOs (parameter/process data objects) in cyclic communication and also supports standard telegrams 1 and 2. See section [Cyclical message types](#) on page 149 for the supported PPO messages and standard telegrams.

---

## ■ Service access points (SAPs)

The services of the PROFIBUS Data Link Layer (Layer 2) are used by PROFIBUS DP through service access points (SAPs). Precisely defined functions are assigned to individual SAPs.

For further information on SAPs, refer to the manual of the PROFIBUS master, *PROFIDRIVE – The PROFIBUS Profile for Adjustable Speed Drives V2.0 and V3.1*, or the EN 50170 and IEC 61784 standards.

## ■ Communication start-up

The following service access points (SAPs) are used to initiate DP communication:

| SAP no.         | Short name     | Name                                     |
|-----------------|----------------|--|
| Default SAP (0) | Data_Exch      | Cyclical Data Exchange (Write_Read_Data) |
| 58              | Global_Control | Global Control Service                   |
| 59              | Get_Cfg        | Read Configuration Data                  |
| 60              | Slave_Diag     | Read Diagnostic Data                     |
| 61              | Set_Prm        | Send Parameter Data                      |
| 62              | Chk_Cfg        | Check Configuration Data                 |

## PROFIBUS SD2 telegram for Default SAP (0) and SAP 58-62

PROFIBUS typically uses SD2 telegrams for DP communication. The structure of an SD2 telegram is shown below.

| DP header |    |     |     |    |    |    |       |       | DP trailer |     |     |
|-----------|----|-----|-----|----|----|----|-------|-------|------------|-----|-----|
| SD        | LE | LEr | SD  | DA | SA | FC | *DSAP | *SSAP | DU         | FCS | ED  |
| 68h       | x  | x   | 68h | xx | xx | x  | xx    | xx    | x...       | xx  | 16h |

SD = Start delimiter  
 LE = Length  
 LEr = Length repeated  
 DA = Destination address  
 SA = Source address  
 FC = Function code  
 \*DSAP = Destination service access point  
 \*SSAP = Source service access point  
 DU = Data unit for DP services  
 FCS = Frame checking sequence  
 ED = End delimiter

\*Not present with Default SAP (0)

Data unit  
See the descriptions of each SAP on the following pages.

**Default SAP (SAP 0) (Data\_Exch)**

This SAP allows the master to send output data to a slave station and to simultaneously request input data from the same station.

|                  | <b>Output Data</b>  | <b>Input Data</b> |
|------------------|---|-------------------|
| <b>Data</b>      | Outp_Data   | Inp_Data          |
| <b>DU length</b> | 4 to 32 bytes (depending on the selected PPO message or standard telegram type) |                   |

In addition to Default SAP, any master can read the I/O data of any slave at any time using the “Read\_Inputs” (SAP 56) and “Read\_Outputs” (SAP 57) telegrams. These telegrams have otherwise the same structure as the cyclic Data\_Exchange telegram, but include the DSAP and SSAP bytes. In these telegrams, the MSB of the DA and SA bytes is set to 1 to indicate that a DSAP/SSAP byte follows in the telegram header.

For more information, see section [PROFIBUS SD2 telegram for Default SAP \(0\) and SAP 58-62](#) on page 133.

## SAP 58 (Global\_Control)

This SAP is used to send special commands addressed to a single slave, a special group of slaves, or all slaves at once (broadcast).

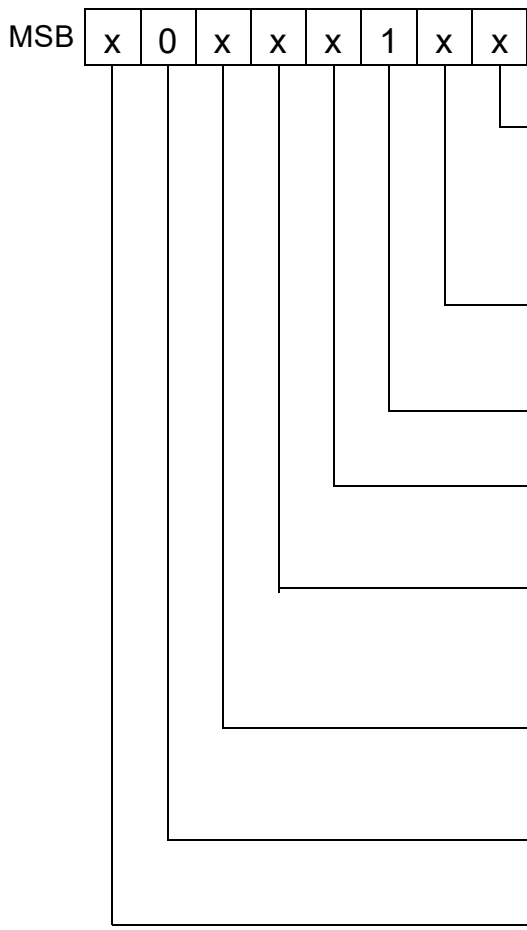
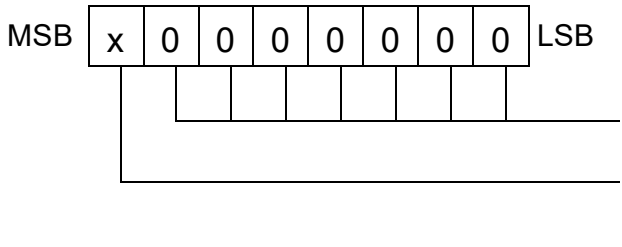
| Global_Control                 |  |
|--------------------------------|--|
| Type: Octet String - Length: 2 |  |
| DU Byte                        | Description  |
| 0                              | <p>GC_Command</p> <p>MSB 0 0 x x x x x 0 LSB</p> <p>Reserved</p> <p>Clear Data<br/>0 = Do not clear output<br/>1 = Clear output</p> <p>Unfreeze } 00 = No function<br/>Freeze } 10 = Activated<br/>          } x1 = Deactivated</p> <p>Un_Sync } 00 = No function<br/>Sync } 10 = Activated<br/>          } x1 = Deactivated</p> <p>Reserved</p> |
| 1                              | <p>Group_Select</p> <p>0...255. The value must match the Group Identification number of SAP 61 (DU Byte 6).</p>  |

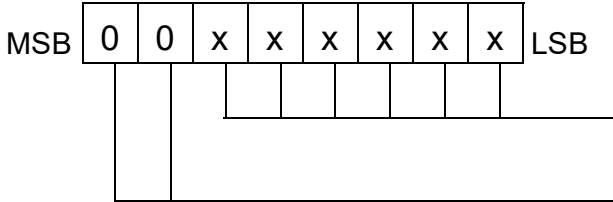
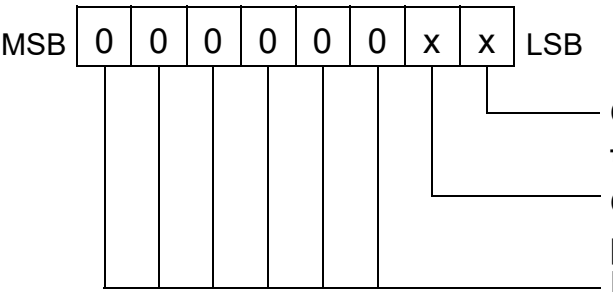
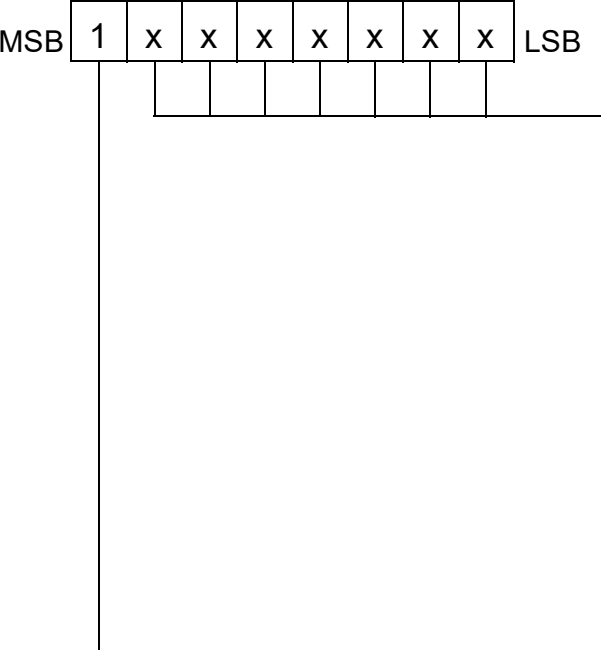
### SAP 60 (Slave\_Diag)

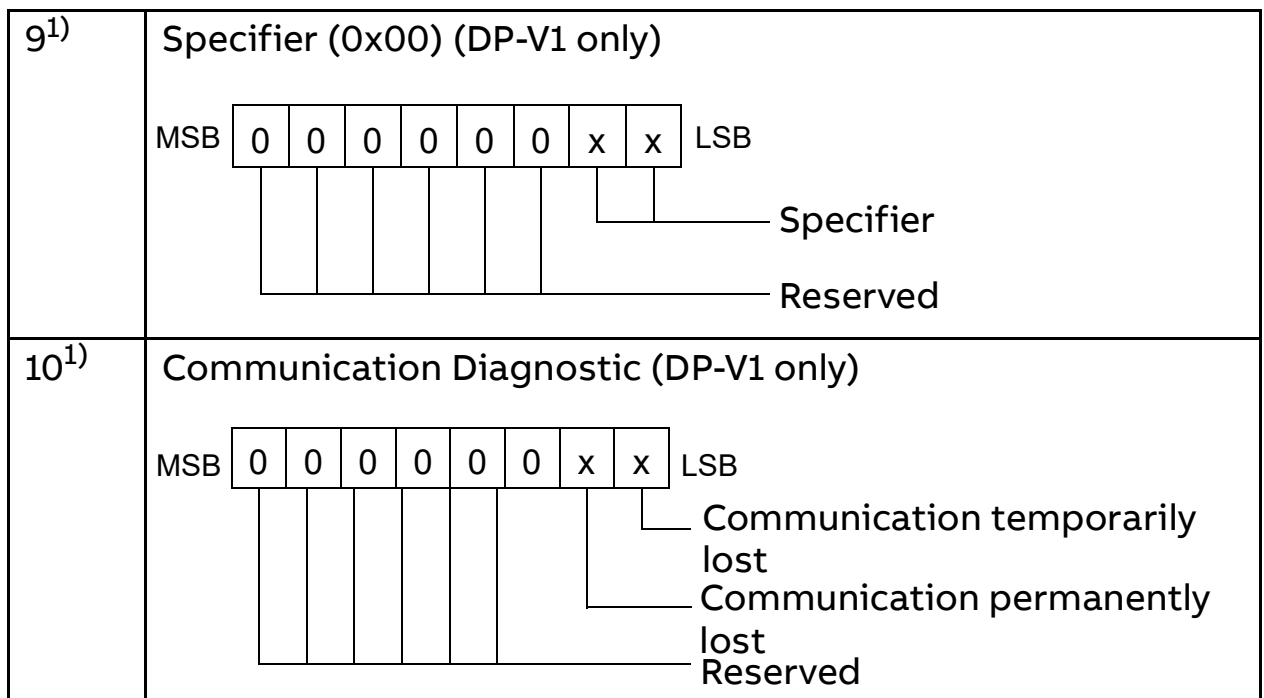
This SAP gives diagnostic information on the slave station.

| <p><b>Diag_Data</b> (Diagnostic Data)<br/>                 Type: Octet String - Length: 6 (Standard)<br/>                 + 2 (Extended Diagnosis) (DP-V0 mode)<br/>                 + 5 (Extended Diagnosis) (DP-V1 mode)<br/> <b>Note:</b> During initialization, the module only sends the standard part of the message.</p> |  |   |   |   |   |   |   |   |   |
|---|--|---|---|---|---|---|---|---|---|
| DU Byte   | Description  |   |   |   |   |   |   |   |   |
| 0   | <p style="text-align: center;">Station_Status_1</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 5px;">MSB</div> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px; height: 20px;">x</td> <td style="width: 20px; height: 20px;">x</td> <td style="width: 20px; height: 20px;">x</td> <td style="width: 20px; height: 20px;">x</td> <td style="width: 20px; height: 20px;">x</td> <td style="width: 20px; height: 20px;">x</td> <td style="width: 20px; height: 20px;">x</td> <td style="width: 20px; height: 20px;">x</td> </tr> </table> <div style="margin-left: 5px;">LSB</div> </div><br><ul style="list-style-type: none"> <li style="margin-bottom: 10px;"> <span style="display: inline-block; width: 150px; border-left: 1px solid black; border-bottom: 1px solid black; margin-right: 5px;"></span> <b>Diag.Station_Non_Existent</b><br/>                     (Set by Master, reset by Slave)<br/>                     Slave not found                 </li> <li style="margin-bottom: 10px;"> <span style="display: inline-block; width: 150px; border-left: 1px solid black; border-bottom: 1px solid black; margin-right: 5px;"></span> <b>Diag.Stagion_Not_Ready</b><br/>                     (Set by Slave) Slave not ready for data exchange                 </li> <li style="margin-bottom: 10px;"> <span style="display: inline-block; width: 150px; border-left: 1px solid black; border-bottom: 1px solid black; margin-right: 5px;"></span> <b>Diag.Cfg_Fault</b> (Set by Slave)<br/>                     Received configuration data does not match original config. data                 </li> <li style="margin-bottom: 10px;"> <span style="display: inline-block; width: 150px; border-left: 1px solid black; border-bottom: 1px solid black; margin-right: 5px;"></span> <b>Diag.Ext_Diag</b> (Set by Slave)<br/>                     Diagnostic entry present in slave-specific diagnostic area                 </li> <li style="margin-bottom: 10px;"> <span style="display: inline-block; width: 150px; border-left: 1px solid black; border-bottom: 1px solid black; margin-right: 5px;"></span> <b>Diag.Not_Supported</b> (Set by Slave)<br/>                     Service not supported by slave                 </li> <li style="margin-bottom: 10px;"> <span style="display: inline-block; width: 150px; border-left: 1px solid black; border-bottom: 1px solid black; margin-right: 5px;"></span> <b>Diag.Invalid_Slave_Response</b><br/>                     (Set by Master, reset by Slave)<br/>                     Invalid response by slave                 </li> <li style="margin-bottom: 10px;"> <span style="display: inline-block; width: 150px; border-left: 1px solid black; border-bottom: 1px solid black; margin-right: 5px;"></span> <b>Diag.Prm_Fault</b> (Set by Slave)<br/>                     Invalid parameter or parameter value                 </li> <li style="margin-bottom: 10px;"> <span style="display: inline-block; width: 150px; border-left: 1px solid black; border-bottom: 1px solid black; margin-right: 5px;"></span> <b>Diag.Master_Lock</b><br/>                     (Set by Master, reset by Slave)<br/>                     Slave is parameterized by another master                 </li> </ul> | x | x | x | x | x | x | x | x |
| x   | x  | x | x | x | x | x | x |   |   |



|                 |  |
|-----------------|--|
| 1               | <p><b>Station_Status_2</b></p>  <p>MSB <span style="border: 1px solid black; padding: 2px;">x</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">x</span> <span style="border: 1px solid black; padding: 2px;">x</span> <span style="border: 1px solid black; padding: 2px;">x</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">x</span> <span style="border: 1px solid black; padding: 2px;">x</span> LSB</p> <ul style="list-style-type: none"> <li><b>Diag.Prm_Req</b> (Set by Slave)<br/>Slave requires re-configuration and re-parameterization</li> <li><b>Diag.Stat_Diag</b> (Set by Slave)<br/>Static diagnosis. Slave (temporarily) unable to provide valid data.</li> <li>Always set to 1 by slave</li> <li><b>Diag.WD_On</b> (Set by Slave)<br/>Watchdog on</li> <li><b>Diag.Freeze_Mode</b><br/>(Set by Slave) Freeze command received by slave</li> <li><b>Diag.Sync_Mode</b> (Set by Slave)<br/>Sync command received by slave</li> <li>Reserved</li> <li><b>Diag.Deactivated</b><br/>(Set by Master, reset by Slave)<br/>Slave is inactive</li> </ul> |
| 2               | <p><b>Station_Status_3</b></p>  <p>MSB <span style="border: 1px solid black; padding: 2px;">x</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> LSB</p> <ul style="list-style-type: none"> <li>Reserved</li> <li><b>Diag.Ext_Diag_Overflow</b><br/>(Set by slave)</li> </ul>   |
| 3               | <p><b>Diag.Master_Add</b><br/>The address of the master that parameterized this slave</p>  |
| 4...5           | <p><b>Ident_Number</b> (for FPBA-01: <b>0959h</b>)</p>   |
| 6 <sup>2)</sup> | <p><b>Ext_Diag_Data</b> (0x02) (DP-V0 only)<br/>The number of bytes (including this byte) reserved for Extended Diagnosis</p>  |

|                       |  |
|-----------------------|--|
| <p>6<sup>1)</sup></p> | <p><b>Header Byte (DP-V1 only)</b><br/>                 The complete header consists of 5 bytes with FPBA-01.</p>  <p>Block length in bytes including header<br/>                 Diagnostic type<br/>                 00 = Device-related diagnostic according to PROFIdrive 3.1.</p>  |
| <p>7<sup>2)</sup></p> | <p><b>Communication Diagnostic (DP-V0 only)</b></p>  <p>Communication temporarily lost<br/>                 Communication permanently lost<br/>                 Reserved</p>   |
| <p>7<sup>1)</sup></p> | <p><b>Status Type = Status Message (0x81) (DP-V1 only)</b></p>  <p><b>Diagnostic type</b><br/>                 0 = Reserved<br/>                 1 = Status_Message (normal alarm message)<br/>                 2 = Module_Status<br/>                 3 = DXB_Link_Status<br/>                 4 to 29 = Reserved<br/>                 30 = PrmCmdAck<br/>                 31 = Red_State<br/>                 32 to 126 = Manufacturer-specific<br/>                 127 = Reserved</p> <p>Set to 1</p> |
| <p>8<sup>1)</sup></p> | <p><b>Slot Number (0x00) (DP-V1 only)</b><br/>                 Slot Number (0...244).</p>  |



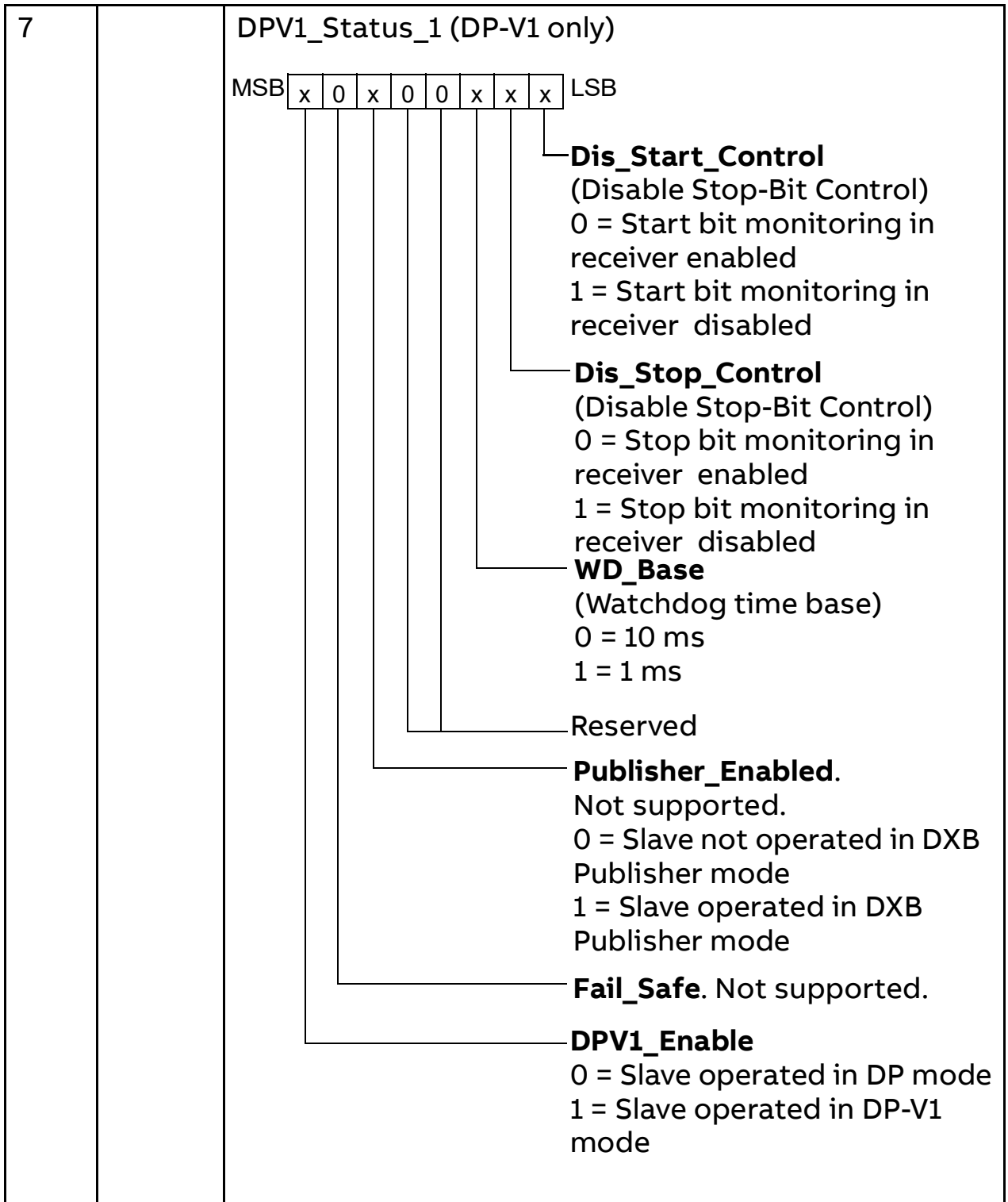
<sup>1)</sup> The FPBA-01 module is operated in the DP-V1 mode. The diagnostic information is according to PROFIdrive 3.1.

<sup>2)</sup> The FPBA-01 module is operated in the DP-V0 (DP) mode. The diagnostic information is according to PROFIdrive 2.0.

### SAP 61 (Set\_Prm)

This SAP is used in the parameterization of the drive.

| Prm_Data (Parameter Data Standard)                                |                                    |   |   |   |   |   |   |   |   |   |
|---|------------------------------------|---|---|---|---|---|---|---|---|---|
| Type: Octet String  |                                    |   |   |   |   |   |   |   |   |   |
| Total length: 37 – Prm_Data length: 14 – User_Prm_Data length: 23 |                                    |   |   |   |   |   |   |   |   |   |
| DU Byte   | Value                              | Description   |   |   |   |   |   |   |   |   |
| 0   | B8h<br>(Recommended default value) | <p>Station status</p> <p>MSB <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>x</td><td>x</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td></tr></table> LSB</p> <p>Reserved</p> <p><b>WD_ON</b><br/>1 = Watchdog ON</p> <p><b>Freeze_Req</b><br/>1 = Slave is requested to process in freeze mode</p> <p><b>Sync_Req</b><br/>1 = Slave is requested to process in SYNC mode</p> <p>Unlock_Req }<br/>Lock_Req } 1)</p> <p>1)00 = Min TSDR and slave-related parameters may be overwritten.<br/>10 = Slave locked for other masters. All parameters can be carried over.<br/>x1 = Slave released for other masters.</p> | x | x | 1 | 1 | 1 | 0 | 0 | 0 |
| x   | x                                  | 1   | 1 | 1 | 0 | 0 | 0 |   |   |   |
| 1...2   |                                    | <p><b>WD_Fact_1 and WD_Fact_2</b> – Watchdog Factors 1 and 2 (set by the PROFIBUS master)</p> <p><math>WdFactor1 \times WdFactor2 \times 10 \text{ ms}</math> = monitoring time of the slave to verify that the master is still active</p>  |   |   |   |   |   |   |   |   |
| 3   | 0Bh<br>(Default)                   | <p><b>MinTSDR</b> – Minimum Station Delay Respond Time</p> <p>Time after which a slave station is allowed to send response frames to the master. Calculated by multiplying the hex value with <math>t_{\text{Bit}}</math> (time required for transmitting one bit).</p>   |   |   |   |   |   |   |   |   |
| 4...5   | 0959h                              | Vendor Identification (for FPBA-01: 0959h)  |   |   |   |   |   |   |   |   |
| 6   | 00h                                | Group Identification  |   |   |   |   |   |   |   |   |



|          |   |   |   |   |   |   |   |   |   |   |
|----------|---|---|---|---|---|---|---|---|---|---|
| <p>8</p> |   | <p>DPV1_Status_2 (DP-V1 only) (Not supported)</p> <p>MSB <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td><td>0</td><td>x</td></tr></table> LSB</p> <ul style="list-style-type: none"> <li><b>Chk_Cfg_Mode</b><br/>0 = Chk_Cfg according to EN 50170 (default state)<br/>1 = User-specific evaluation of Chk_Cfg<br/>Reserved.<br/>To be parameterized with '0'.</li> <li><b>Enable_Update_Alarm</b><br/>0 = Enable_Update_Alarm disabled<br/>1 = Enable_Update_Alarm enabled</li> <li><b>Enable_Status_Alarm</b><br/>0 = Enable_Status_Alarm disabled<br/>1 = Enable_Status_Alarm enabled</li> <li><b>Enable_Manufacturer_Specific_Alarm</b><br/>0 = Enable_Manufacturer_Specific_Alarm disabled<br/>1 = Enable_Manufacturer_Specific_Alarm enabled</li> <li><b>Enable_Diagnostic_Alarm</b><br/>0 = Enable_Diagnostic_Alarm disabled<br/>1 = Enable_Diagnostic_Alarm enabled</li> <li><b>Enable_Process_Alarm</b><br/>0 = Enable_Process_Alarm disabled<br/>1 = Enable_Process_Alarm enabled</li> <li><b>Enable_Pul_Plug_Alarm</b><br/>0 = Enable_Pull_Plug_Alarm disabled<br/>1 = Enable_Pull_Plug_Alarm enabled</li> </ul> | x | x | x | x | x | x | 0 | x |
| x        | x | x   | x | x | x | 0 | x |   |   |   |

|    |                   |   |
|----|-------------------|---|
| 9  |                   | <p>DPV1_Status_3 (DP-V1 only)</p> <p>MSB 0 0 0 x 1 x x x LSB</p> <p><b>Alarm_Mode.</b><br/>Not supported.<br/>Limits the number of active alarms.<br/>0 = 1 alarm of each type<br/>1 = 2 alarms in total<br/>2 = 4 alarms in total<br/>3 = 8 alarms in total<br/>4 = 12 alarms in total<br/>5 = 16 alarms in total<br/>6 = 24 alarms in total<br/>7 = 32 alarms in total</p> <p><b>Prm_Structure</b><br/>0 = Prm telegram according to EN 50170<br/>1 = Prm telegram in structure form (DPV2 extension)</p> <p><b>IsoM_Req</b><br/>(Isochron Mode Request)<br/>Not supported.<br/>0 = Isochron Mode disabled<br/>1 = Isochron Mode enabled</p> <p>Reserved.<br/>To be parameterized with '0'.</p> |
| 10 | 1Bh<br>(Default ) | <p><b>Structured_Length</b><br/>Length of the structured Prm telegram. (User parameter length is 23 bytes + 4 header bytes.)</p>  |
| 11 | 81h               | <p><b>Structure_Type</b><br/>129: USER_PRM_DATA</p>   |
| 12 | 0                 | <p><b>Slot_Number</b><br/>Set to 0</p>  |
| 13 | 0                 | Reserved  |

| <b>User_Prm_Data</b> (Parameter Data Extended)<br>Type: Octet String - Length: 23 |                      |  |
|---|----------------------|--|
| 14  | 00h<br>(Default<br>) | Header byte<br><p>MSB 0 0 0 0 0 x 0 x LSB</p> <p><b>Fail-safe mode.</b><br/>                     Defines the action taken when the PLC is switched from 'RUN' to 'STOP' mode.<br/>                     00 = STOP (default)<br/>                     01 = LAST REFERENCE<br/>                     02 = USE FAIL-SAFE.<br/>                     The values of the PZDs are defined by bytes 11-30 in the Prm_Data telegram.</p> <p><b>Control zero mode.</b><br/>                     Defines the action taken if a PROFIBUS telegram containing only zeros is received.<br/>                     00 = USE FRAME (default).<br/> <b>Note:</b> With this setting, the drive may not be stopped (if it is running) since bit 10 (Remote Command) in the control word is also zero. However, the other PZDs may still be updated, but have the value zero.<br/>                     01 = IGNORE</p> <p>Reserved</p> |
| 15...<br>16   | 0...<br>65536        | Cut off time out in milliseconds. 0 = Cut off disabled.  |
| 17...<br>18   | 0...<br>65536        | Fail-safe, PZD1 (typically CW)   |
| 19...<br>20   | 0...<br>65536        | Fail-safe, PZD2 (typically REF)  |



|             |               |                  |
|-------------|---------------|------------------|
| 21...<br>22 | 0...<br>65536 | Fail-safe, PZD3  |
| 23...<br>24 | 0...<br>65536 | Fail-safe, PZD4  |
| 25...<br>26 | 0...<br>65536 | Fail-safe, PZD5  |
| 27...<br>28 | 0...<br>65536 | Fail-safe, PZD6  |
| 29...<br>30 | 0...<br>65536 | Fail-safe, PZD7  |
| 31...<br>32 | 0...<br>65536 | Fail-safe, PZD8  |
| 33...<br>34 | 0...<br>65536 | Fail-safe, PZD9  |
| 35...<br>36 | 0...<br>65536 | Fail-safe, PZD10 |

The extended parameter data bytes are configured through the PROFIBUS network configuration tool. The functions are defined in the GSD file.

---

**SAP 62 (Chk\_Cfg)**

With this telegram, the master sends the selected data exchange (Write\_Read\_Data) telegram type code to the slave. The table below gives the typical hexadecimal values (DU Byte 0...n) that are sent to the drive in order to select the PPO type or standard telegram (ST).

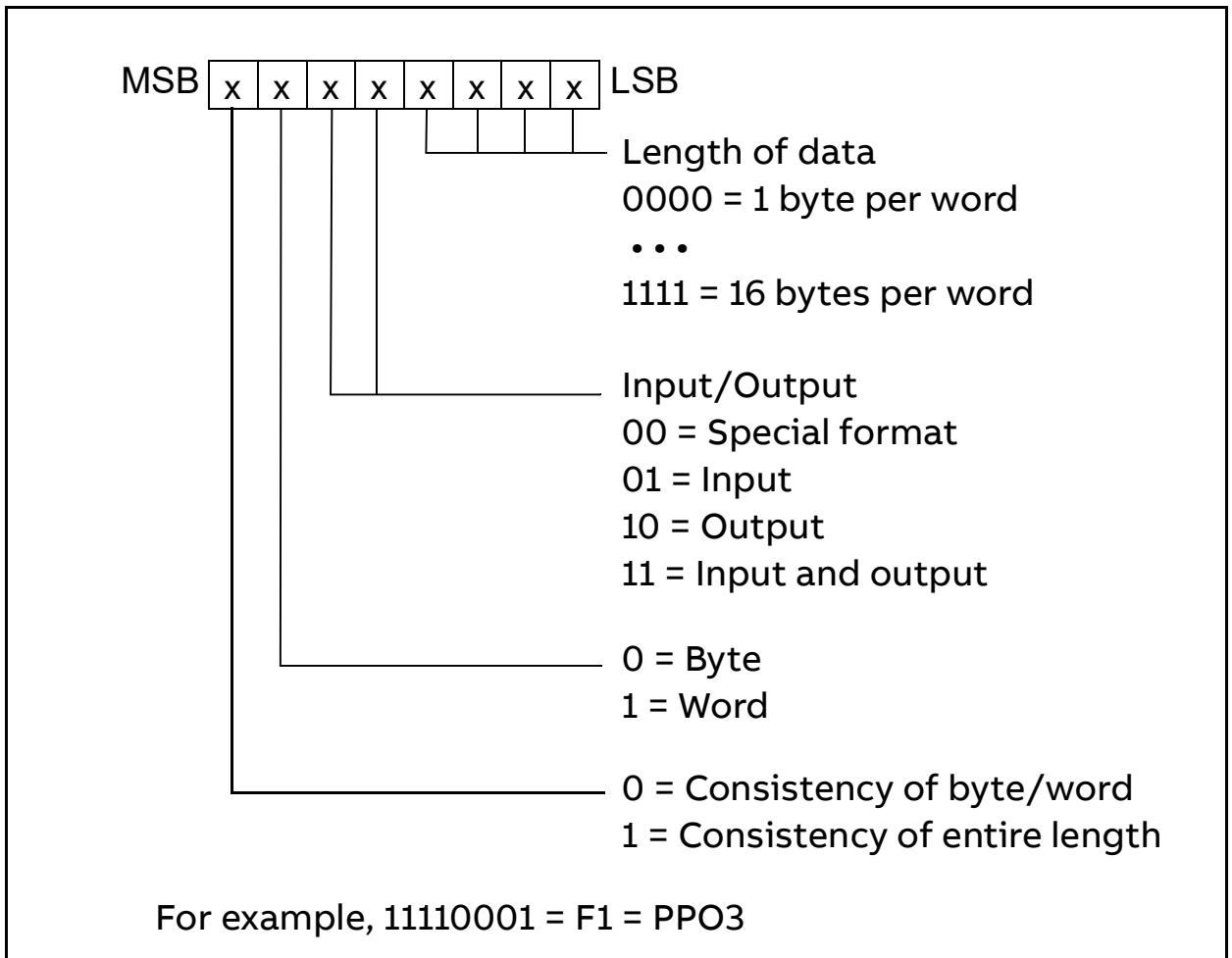
| <b>Telegram name</b> | <b>Cyclical telegram length (in words)</b> | <b>Default code for message type (see figure below)</b> | <b>Supported parameter channel access mode</b> |
|----------------------|--|---|--|
| PPO 1                | 4 PKW + 2 PZD<br>in/out                    | F3 F1   | DP-V0 / DP-V1 <sup>1)</sup>                    |
| PPO 2                | 4 PKW + 6 PZD<br>in/out                    | F3 F5   | DP-V0 / DP-V1 <sup>1)</sup>                    |
| PPO 3                | 0 PKW + 2 PZD<br>in/out                    | F1  | DP-V1 <sup>1)</sup>                            |
| PPO 4                | 0 PKW + 6 PZD<br>in/out                    | F5  | DP-V1 <sup>1)</sup>                            |
| PPO 5                | 4 PKW + 10 PZD<br>in/out                   | F3 F9   | DP-V0 / DP-V1 <sup>1)</sup>                    |
| PPO 6                | 0 PKW + 10 PZD<br>in/out                   | F9  | DP-V1 <sup>1)</sup>                            |
| PPO 7                | 4 PKW + 12 PZD<br>in/out                   | 0xF3, 0xFB  | DP-V0 / DP-V1 <sup>1)</sup>                    |
| PPO 8                | 0 PKW + 12 PZD<br>in/out                   | 0xFB  | DP-V1 <sup>1)</sup>                            |
| ST 1                 | 2 PZD in / 2 PZD out                       | C3 C1 C1 FD 00 01                                       | DP-V1  |
| ST 2                 | 4 PZD in / 4 PZD out                       | C3 C3 C3 FD 00 02                                       | DP-V1  |

<sup>1)</sup> DP-V1 mode selected by the user.

PKW: "Parameter-Kennung-Wert" (Parameter ID value)

PZD: "Prozeßdaten" (Process data, cyclically transferred)

The default codes for the PPO types in the table above define data consistency over the message as follows:



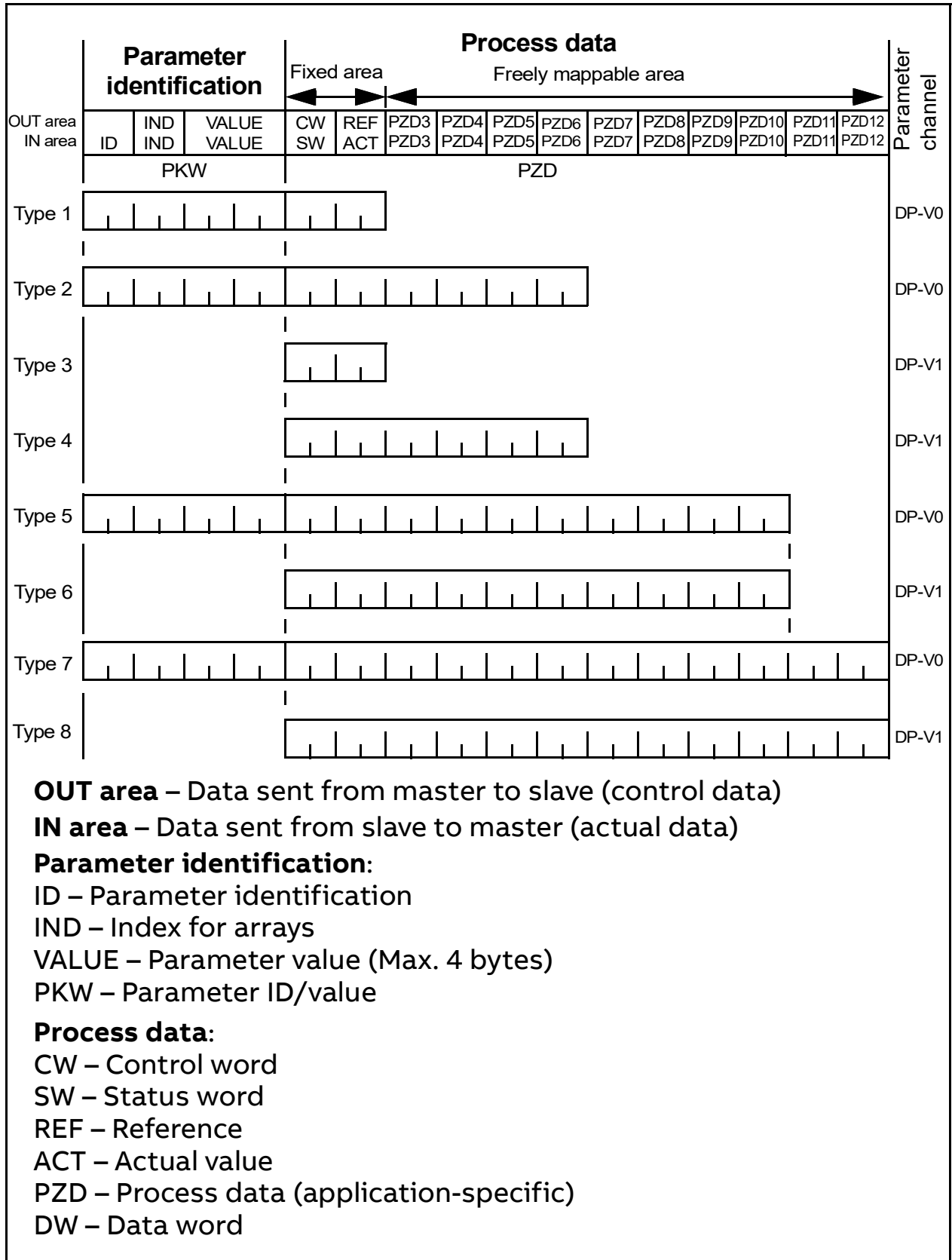
Data non-consistent over the entire message is also supported by the FPBA-01 module. The cyclical frame types supported by the module are defined in the GSD file.

### ■ Other SAPs for DP-V1 communication

| Master class | Master SAP | Slave SAP | Short name         | Meaning                            |
|--------------|------------|-----------|--------------------|------------------------------------|
| C1           | 51         | 51        | Server SAP         | Read, Write, Alarm                 |
| C1           | 51         | 50        | Alarm SAP          | Alarm                              |
| C2           | 50         | 49        | Resource Mgmt. SAP | Req PDU                            |
| C2           | 50         | 48...0    | Communication SAP  | Abort, Read/Write, Data_Transfer   |
| C2           | 62         | 55        | Set_Slave_Add      | Change Station Address (C2 Master) |

# Cyclical message types

## ■ PPO types



## ■ Standard telegram (ST) types (DP-V1)

|     |                 |                           |                                |
|-----|-----------------|---------------------------|--------------------------------|
| ST1 |                 | <b>PZD1</b>               | <b>PZD2</b>                    |
|     | <b>OUT area</b> | STW1<br>Control word<br>1 | NSOLL_A<br>Speed set point A   |
|     | <b>IN area</b>  | ZSW1<br>Status word 1     | NIST_A<br>Speed actual value A |

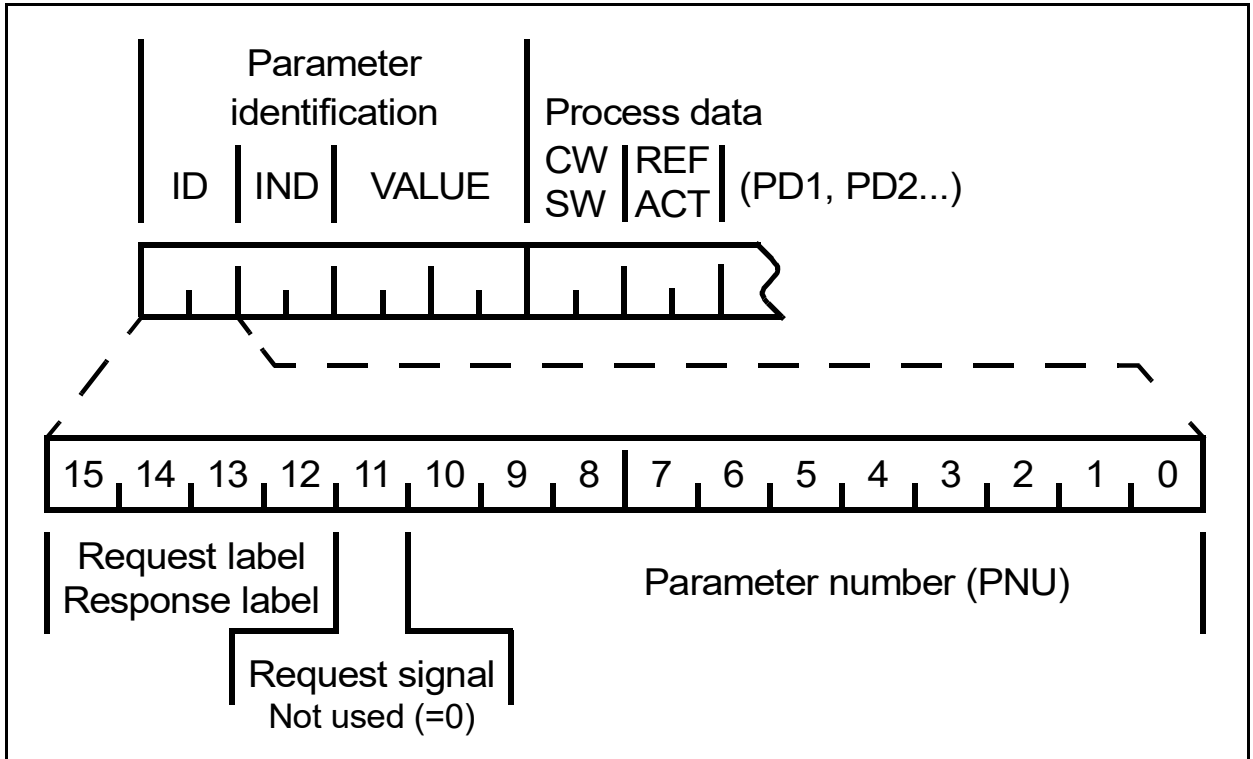
|     |                 |                           |                                   |                           |
|-----|-----------------|---------------------------|-----------------------------------|---------------------------|
| ST2 |                 | <b>PZD1</b>               | <b>PZD2...3</b>                   | <b>PZD4</b>               |
|     | <b>OUT area</b> | STW1<br>Control word<br>1 | NSOLL_B<br>Speed set point B      | STW2<br>Control word<br>2 |
|     | <b>IN area</b>  | ZSW1<br>Status word 1     | NIST_B<br>Speed actual value<br>B | ZSW2<br>Status word 2     |

**Note:** For the contents of the Control word, the Status word, references and actual values, see chapter [Communication profiles](#).

## Parameter handling in cyclic communication (DP)

**Note:** Parameter handling in cyclic communication is not defined in PROFIdrive v4.2. All parameter handling requests in cyclic communication are handled by PROFIdrive.

In cyclic PROFIBUS DP communication, parameter data is transferred in PPO message types 1, 2 and 5, as shown in section [PPO types](#) on page 149. The parameter identification part consists of eight bytes, as shown below.



The Request label is used by the master when transmitting data to the slave, while the Response label is used by the slave as a positive or negative acknowledgement. The tables below show the Request/Response functions.

| Request labels (from master to slave) |                                      |                 |           |
|---------------------------------------|--------------------------------------|-----------------|-----------|
| Request                               | Function                             | Response labels |           |
|                                       |                                      | Ackn. (+)       | Ackn. (-) |
| 0                                     | No task                              | 0               | –         |
| 1                                     | Request parameter value              | 1, 2            | 7         |
| 2                                     | Change parameter value (word)        | 1               | 7, 8      |
| 3                                     | Change parameter value (double word) | 2               | 7, 8      |
| 4                                     | Request description element          | 3               | 7         |

| <b>Request labels (from master to slave)</b> |  |                        |                  |
|--|--|------------------------|------------------|
| <b>Request</b>                               | <b>Function</b>                            | <b>Response labels</b> |                  |
|  |  | <b>Ackn. (+)</b>       | <b>Ackn. (-)</b> |
| 5  | Change description element                 | 3                      | 7, 8             |
| 6  | Request parameter value (array)            | 4, 5                   | 7, 8             |
| 7  | Change parameter value (array word)        | 4                      | 7, 8             |
| 8  | Change parameter value (array double word) | 5                      | 7, 8             |
| 9  | Request number of array elements           | 6                      | 7                |

| <b>Response label (Acknowledgement from slave to master)</b> |  |
|--|--|
| <b>Ackn.</b>   | <b>Function</b>                              |
| 0  | No response                                  |
| 1  | Transfer parameter value (word)              |
| 2  | Transfer parameter value (double word)       |
| 3  | Transfer description element                 |
| 4  | Transfer parameter value (array word)        |
| 5  | Transfer parameter value (array double word) |
| 6  | Transfer number of array elements            |



| <b>Response label (Acknowledgement from slave to master)</b> |  |
|--|--|
| <b>Ackn.</b>   | <b>Function</b>  |
| 7  | <p>Task cannot be executed, followed by error number</p> <ul style="list-style-type: none"> <li>0 = Illegal parameter number</li> <li>1 = Parameter value cannot be changed</li> <li>2 = Lower or upper limit violated</li> <li>3 = Erroneous subindex</li> <li>4 = No array</li> <li>5 = Incorrect data type</li> <li>6 = Setting not allowed (can only be reset)</li> <li>7 = Descriptive element cannot be changed</li> <li>9 = Descriptive data not available</li> <li>11 = No parameter change rights</li> <li>15 = Text array not available</li> <li>17 = Task cannot be executed due to operating status (eg, parameter is currently read-only)</li> <li>18 = Other error</li> <li>101 = Vendor-specific error</li> <li>102 = Request not supported</li> <li>103 = Request cannot be completed due to communication error</li> <li>110 = Failure during write to non-volatile memory</li> <li>111 = Request aborted due to time-out</li> <li>120 = Parameter cannot be mapped to PZD (size mismatch or non-existent)</li> <li>121 = Parameter cannot be mapped to PZD (end of memory)</li> <li>122 = Parameter cannot be mapped to PZD (multiple PZD write)</li> <li>130 = Cannot map Control word bit (parameter 933...937, eg, double mapping of bits)</li> <li>140 = Cannot change mode to TORQUE (frequency is used)</li> <li>150 = Internal buffer overflow</li> <li>160... = Internal communication error</li> <li>255</li> </ul> |
| 8  | No parameter change rights for PKW interface   |
| 9  | Parameter data signal (word)   |
| 10   | Parameter data signal (double word)  |

The allocation of drive control/actual words, drive parameters and PROFIdrive parameters to the parameter identification part of the PPO type is shown below.

- The **Index** column corresponds to the parameter number (PNU) in the ID part of parameter identification.
- The **Sub-index** column corresponds to the IND part of parameter identification.
- The **Example No.** column refers to the examples on the following pages.

| Virtual drive control area |           |                    |               |                     |             |
|----------------------------|-----------|--------------------|---------------|---------------------|-------------|
| Index                      | Sub-index | Par. No. (Decimal) | Request label |                     | Example No. |
| 0h                         | 1h        | 1                  | R/W           | 6/7/8 <sup>1)</sup> | 1, 2        |
| 0h                         | 2h        | 2                  |               |                     |             |
| ...                        |           |                    |               |                     |             |
| 0h                         | 63h       | 99                 |               |                     |             |

<sup>1)</sup> Supported with an ACSM1 drive only

| Drive parameters |           |                    |               |                     |             |
|------------------|-----------|--------------------|---------------|---------------------|-------------|
| Index            | Sub-index | Par. No. (Decimal) | Request label |                     | Example No. |
| 1                | 1         | 101                | R/W           | 6/7/8 <sup>1)</sup> | 1, 2        |
| 1                | 2         | 102                |               |                     |             |
| ...              |           |                    |               |                     |             |
| 63h              | 63h       | 9999               |               |                     |             |

<sup>1)</sup> Supported with an ACSM1 drive only

| PROFIdrive parameters |           |                      |     |               |     |                |
|-----------------------|-----------|----------------------|-----|---------------|-----|----------------|
| Index                 | Sub-index | Par. No<br>(Decimal) |     | Request label |     | Example<br>No. |
| 393h                  | 2h        | 915                  | 2   | R/W           | 6/7 | 6              |
|                       | 3h        |                      | 3   |               |     |                |
|                       | ...       |                      | ... |               |     |                |
|                       | 9h        |                      | 9   |               |     |                |
| 394h                  | 2h        | 916                  | 2   | R/W           | 6/7 | 7              |
|                       | 3h        |                      | 3   |               |     |                |
|                       | ...       |                      | ... |               |     |                |
|                       | 9h        |                      | 9   |               |     |                |
| 396h                  | 0h        | 918                  |     | R/W           | 1/2 | 3, 4           |
| ...                   |           |                      |     |               |     |                |
| 3B3h                  | 0h        | 947                  | 1   | R             | 6   | 5              |
|                       | 9h        |                      | 9   |               |     |                |
|                       | 11h       |                      | 17  |               |     |                |
|                       | 19h       |                      | 25  |               |     |                |
|                       | 21h       |                      | 33  |               |     |                |
|                       | 29h       |                      | 41  |               |     |                |
| ...                   |           |                      |     |               |     |                |
| 3CCh                  | 0h        | 972                  |     | R/W           | 1/2 | 3, 4           |

For a complete PROFIdrive parameter list, see [Appendix A – PROFIdrive parameters](#).

**Note:** Continuous (cyclic) writing of PROFIdrive parameters should be avoided as the values of these parameters are stored in the flash memory of the adapter module. The estimated lifetime of the flash memory is 100,000 program/erase cycles, and continuous writing will cause the memory to fail prematurely.

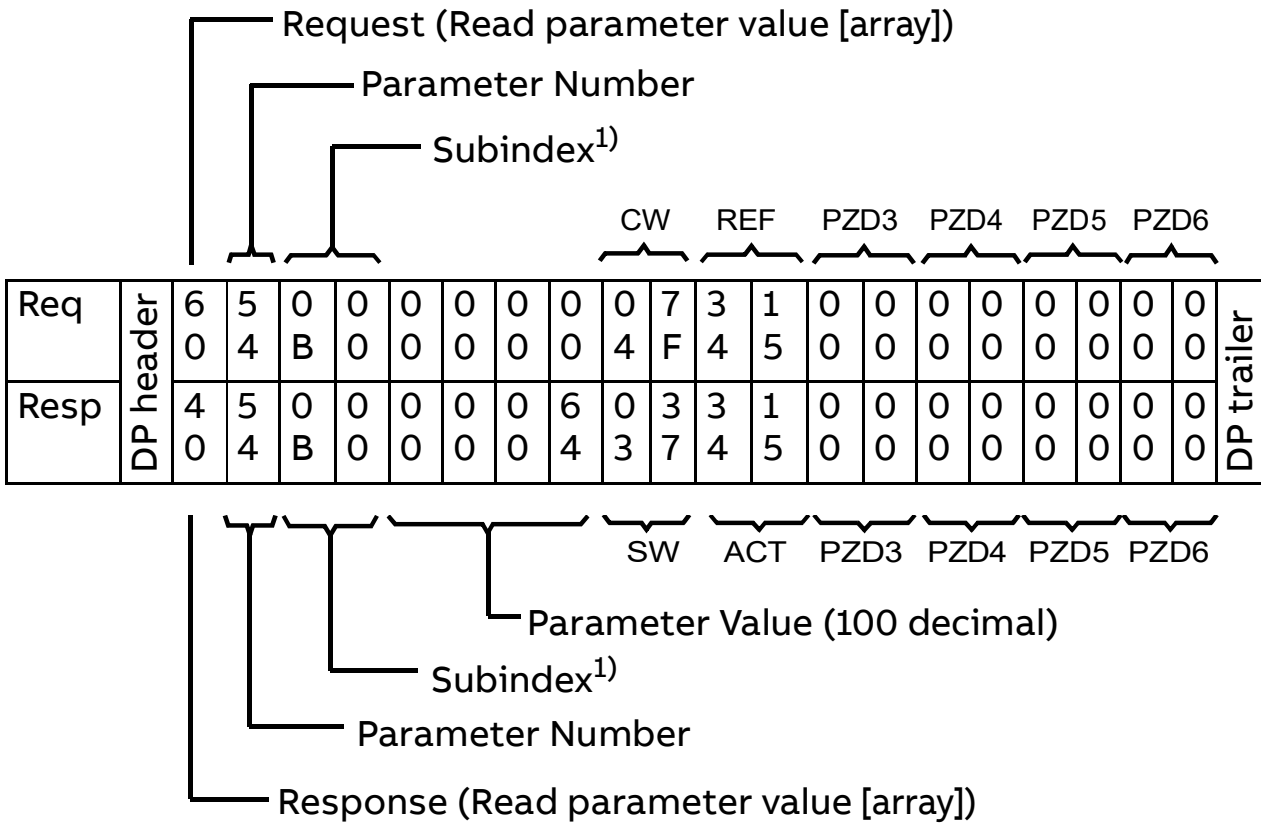
## ■ Parameter data transfer examples (DP-V0)

**Note:** Only the 'data unit' part of the telegram is presented in the examples. See section [PROFIBUS SD2 telegram for Default SAP \(0\) and SAP 58-62](#) on page 133.

### Example 1: Reading a drive parameter (or data set)

To determine the parameter number and subindex for drive parameter reading, convert the drive parameter group number and the parameter index number to hexadecimal. The index number is the Subindex (IND), and the group number is the Parameter Number (PNU). For example, to read parameter **84.11** from the drive:

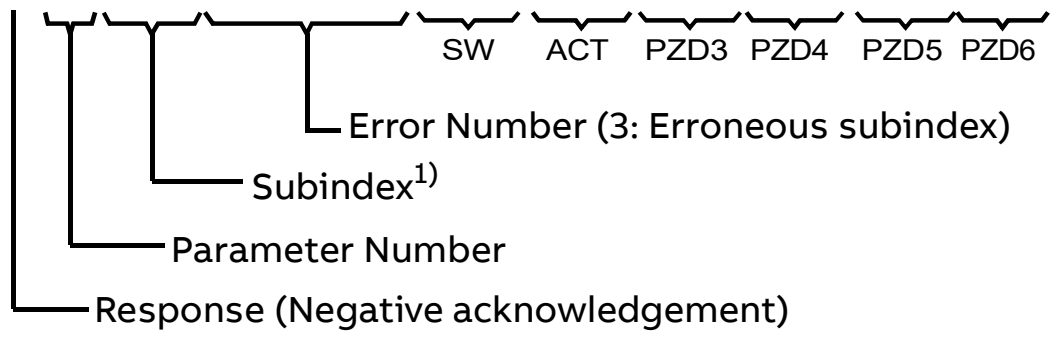
**84.11** = 54h.0Bh => Parameter Number = 54h, Subindex = 0Bh.



<sup>1)</sup> 2nd byte reserved

Error response

|      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |            |
|------|-----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------|
| Resp | DP header | 7 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | DP trailer |
|      |           | 0 | 4 | B | 0 | 0 | 0 | 0 | 3 | 3 | 7 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0          |



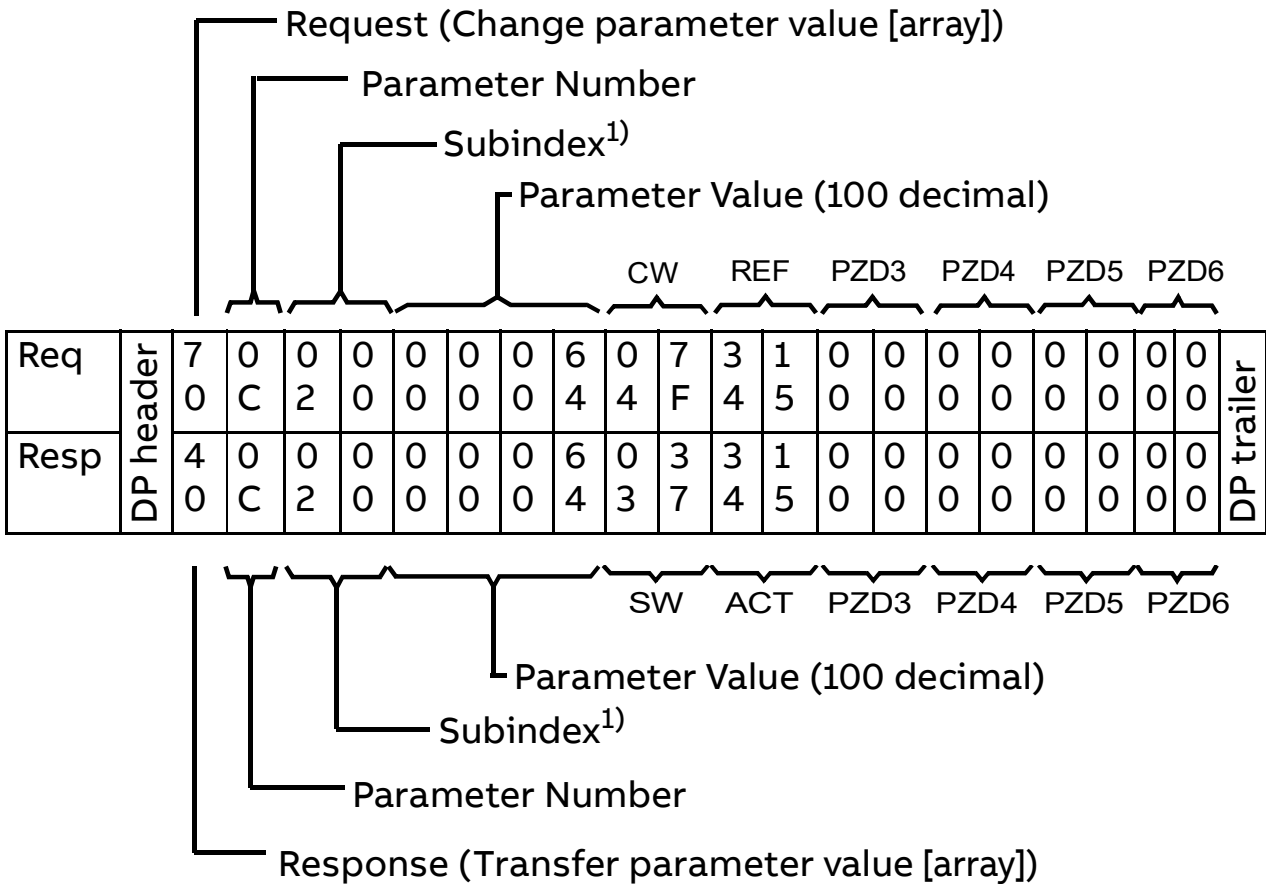
¹) 2nd byte reserved

### Example 2: Writing a drive parameter (or data set)

To determine the parameter number and subindex for drive parameter writing, convert the drive parameter group number and the parameter index number to hexadecimal. The index number is the Subindex (IND), and the group number is the Parameter Number (PNU). For example, to write parameter **12.02** to the drive:

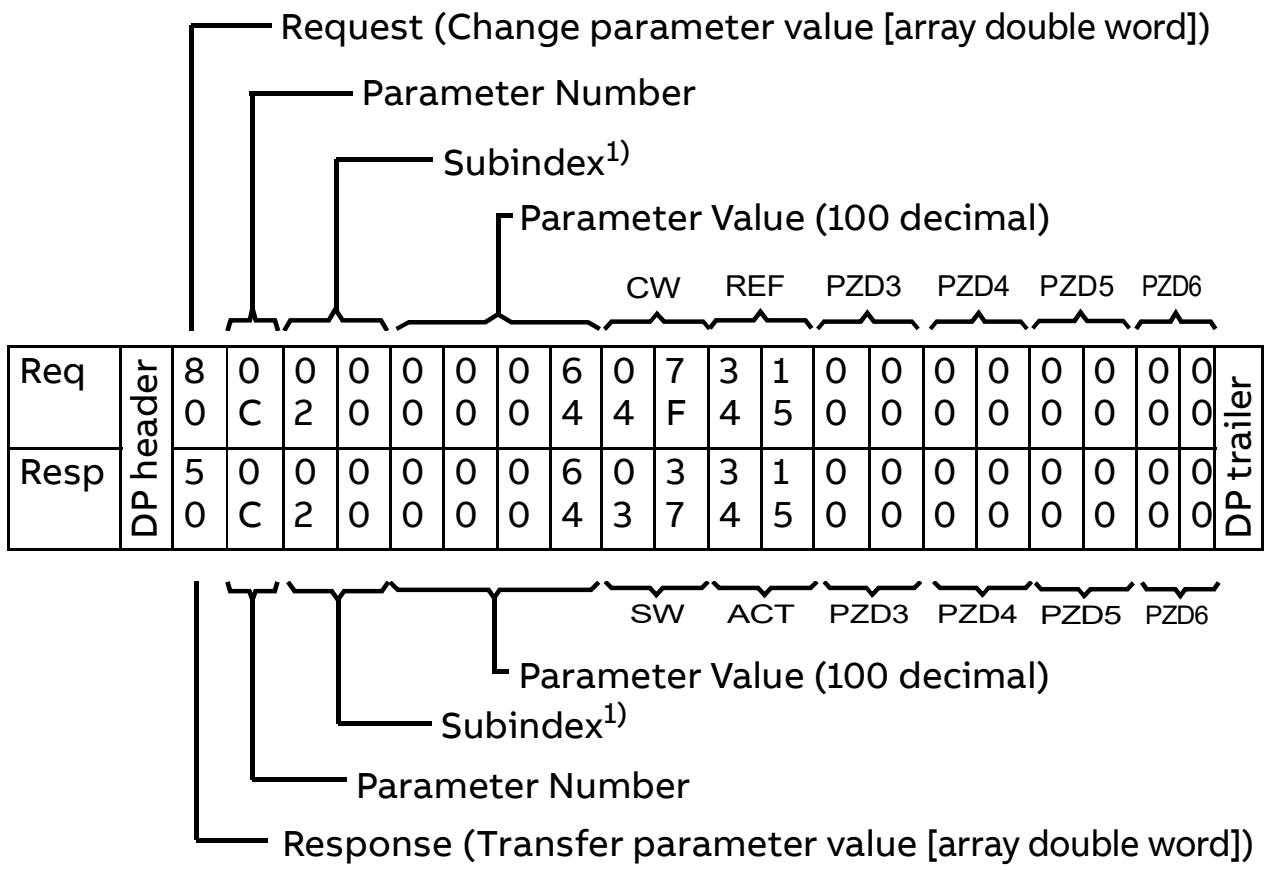
**12.02** = 0Ch.02h => Parameter number = 0Ch, Subindex = 02h.

The following is an example of writing a 16-bit parameter.



<sup>1)</sup> 2nd byte reserved

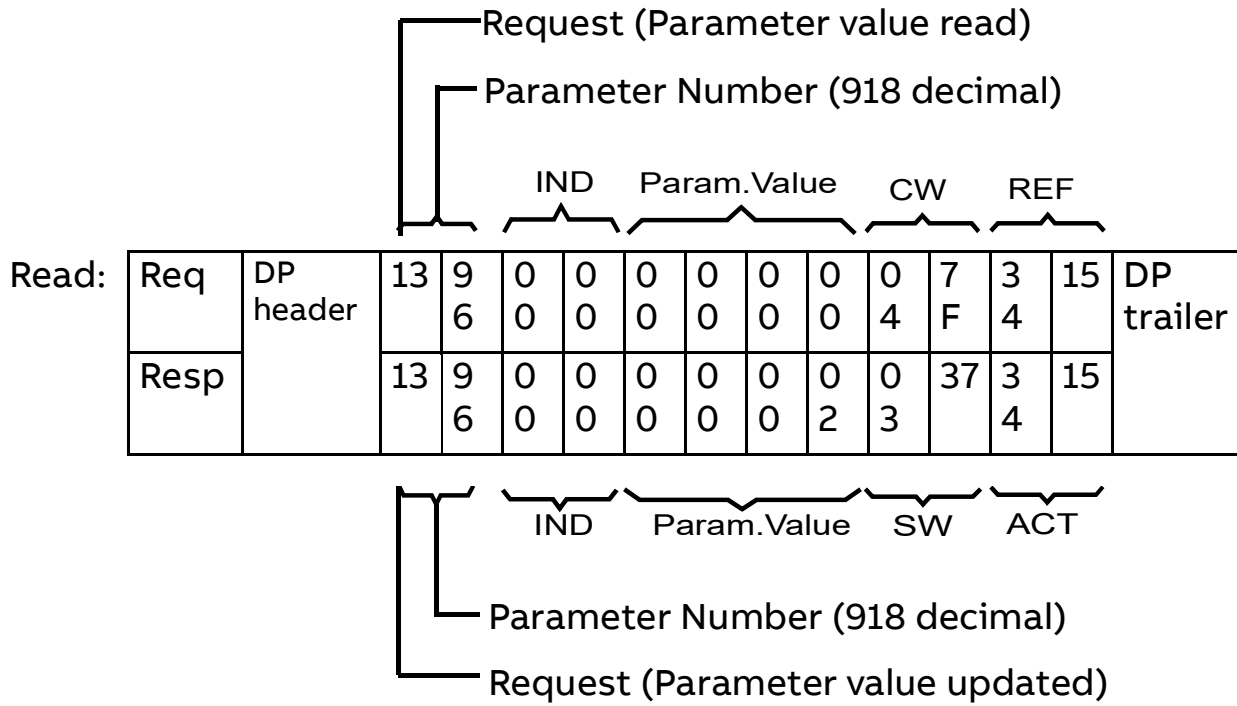
The following is an example of writing a 32-bit parameter:



¹) 2nd byte reserved

### Example 3: Reading a PROFIdrive parameter (word)

In this example, PROFIdrive parameter 918 is used to read the station number of the slave.



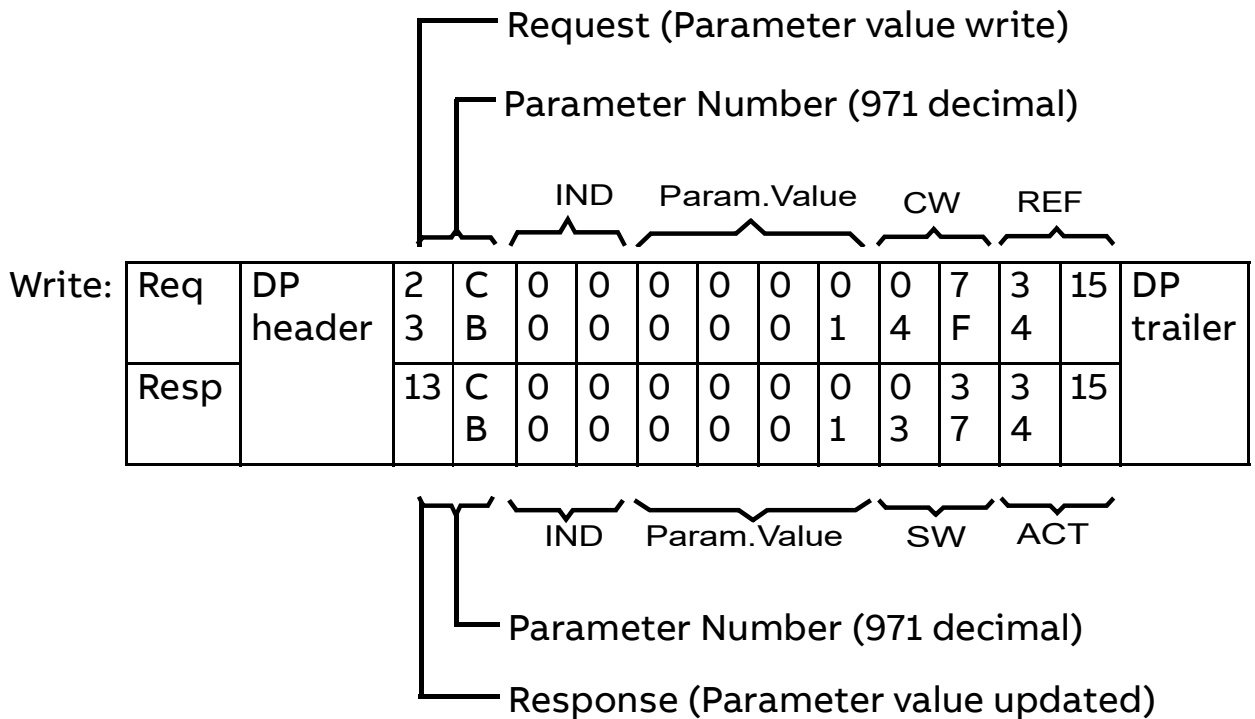
The slave returns its station number (2).



### Example 4: Writing a PROFIdrive parameter (word)

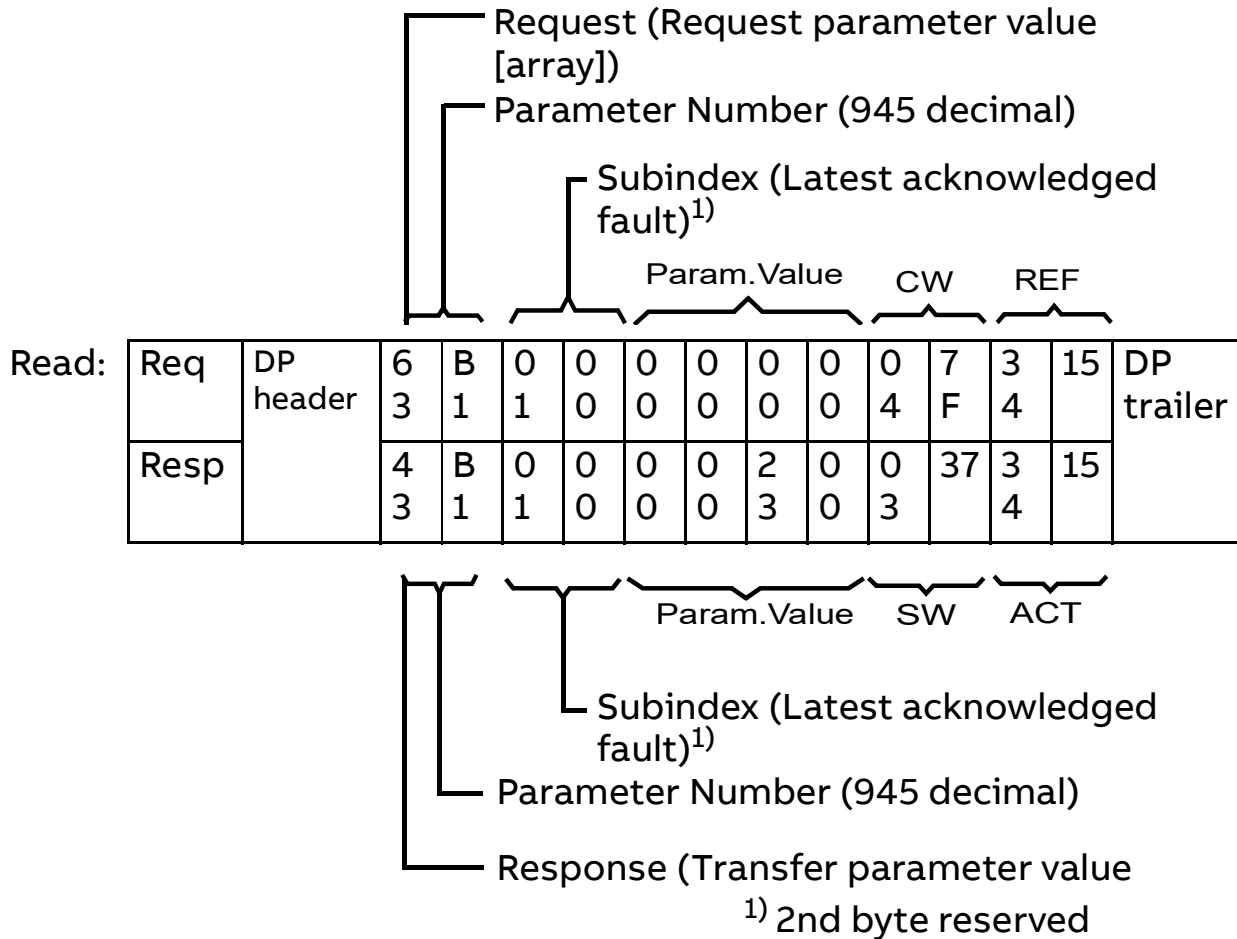
In this example, current parameter settings are saved to the FLASH memory of the drive. This is done by setting the value of PROFIdrive parameter 971 (3CBh) to 1.

**Note that the drive always observes the Control word (CW) and reference (REF) bytes.** The values shown below are examples.



### Example 5: Reading a PROFIdrive parameter (array)

In this example, PROFIdrive parameter 945 is used to read the code of the active fault. As shown on page 207, parameter 945 is of the array type with subindexes 0 and 1.



The slave returns the code of the active fault (2300h). The fault codes are according to the DRIVECOM® standard. See the drive firmware manual for drive-specific fault codes.

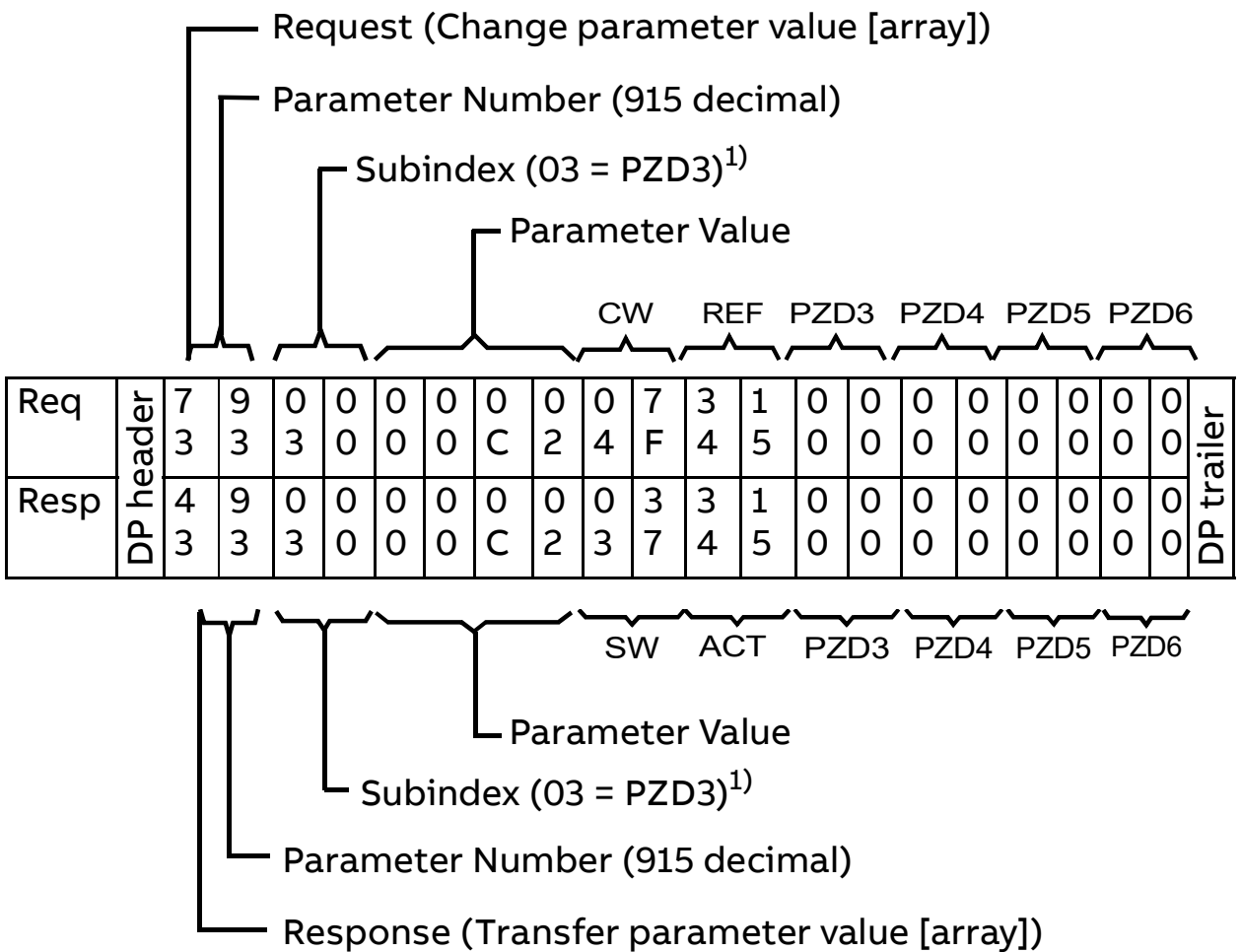
The implementation of the PROFIdrive profile in the adapter module supports the storage of the active and the five latest occurred different faults in the fault buffer. The fault codes can be accessed by PROFIdrive parameters 945 and 947 (see page 207). The value zero indicates no fault. The subindexes of these parameters are related to each other, that is, parameter 945 with subindex 1 relates to the subindex of parameter 947.

### Example 6: Configuring the process data written to the drive

PROFIdrive parameter 915 can be used to define which data is written cyclically to a drive parameter as application-specific process data.

In the example below, the value of drive parameter **12.02** (0Ch.02h) is selected to be taken from PZD3. The parameter will continue to be updated with the contents of PZD3 in each Request frame until a different selection is made.

Subindex (IND) defines which process data word (PZD) the required data is taken from. Parameter Value selects the drive parameter to which that word is mapped.



<sup>1)</sup> 2nd byte reserved

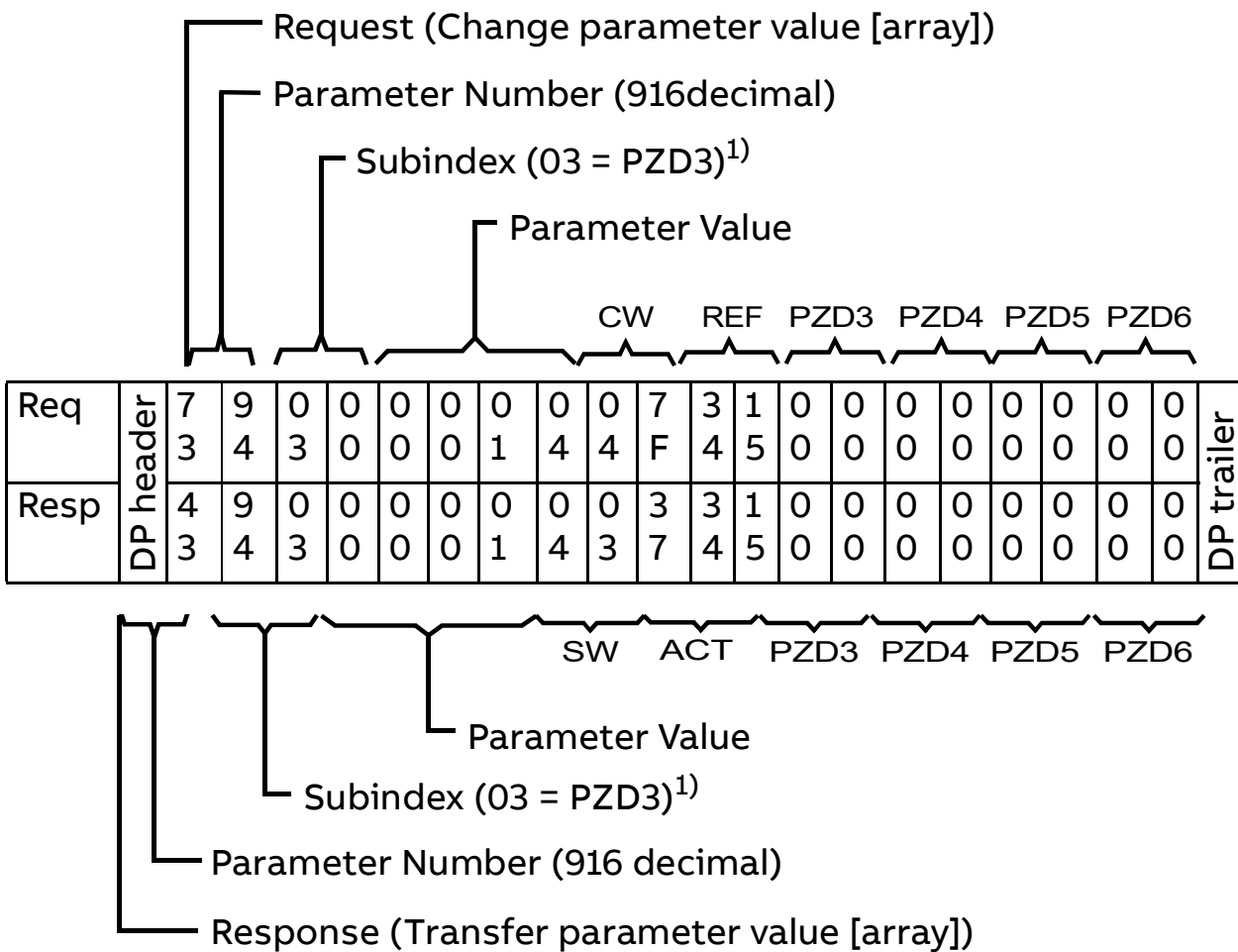
Subsequently, the contents of PZD3 in each Request frame are written to drive parameter **12.02 CONSTANT SPEED 1** until a different selection is made.

### Example 7: Configuring the process data read from the drive

PROFIdrive parameter 916 can be used to define which data is read cyclically from the drive as application-specific process data.

In the example below, drive parameter **1.04** (01h.04h) is selected to be transmitted by the drive as PZD3. The selection is in force until it is superseded by another selection.

Subindex (IND) defines which process data word the required data is transmitted in, and Parameter Value defines which drive parameter is mapped to that word.



<sup>1)</sup> 2nd byte reserved

Subsequent response frames:

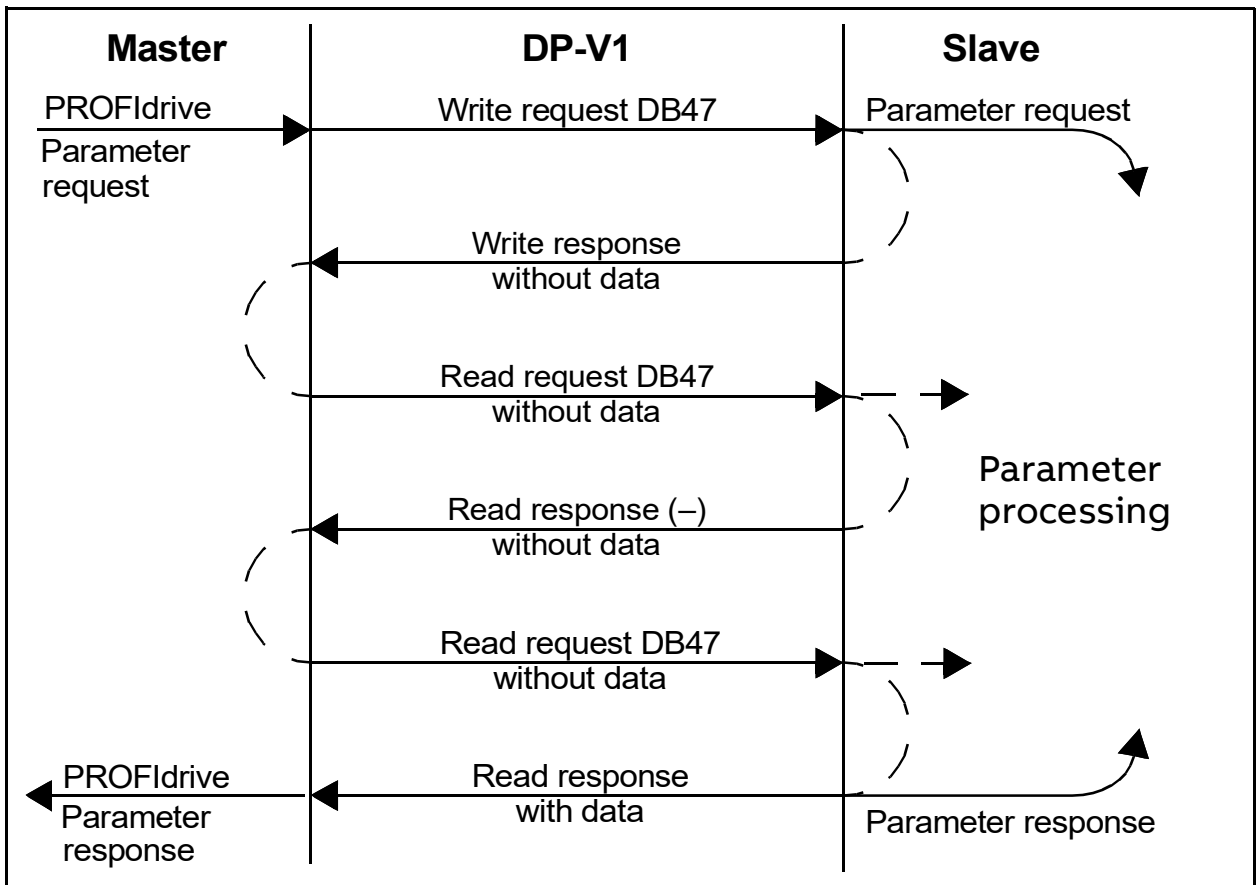
|      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |            |
|------|-----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------|
| Resp | DP header | x | x | x | x | x | x | x | x | x | x | x | x | 0 | 0 | 0 | B | x | x | x | x | x | x | DP trailer |
|------|-----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------|

PZD3 (Value of drive parameter 1.04)



### ■ DP-V1 read/write request sequence

A read/write service on a drive parameter is illustrated below.



The messaging employs DP-V1 data units. The PROFIdrive parameter request is included within the DP-V1 request as data. Likewise, the DP-V1 response contains the PROFIdrive parameter response as data.

A write request (Function number 5Fh – see page 168) is first sent containing the parameter request.

If the write request is valid, the adapter module acknowledges it with DP-V1 write response code 5Fh with no data. The

master will then send a read request. If the adapter module is still busy performing the internal parameter request, it will return a negative response with the DP-V1 error code B5h (State conflict). In this case, the read request will be repeated by the master until the adapter module has the PROFIdrive response data ready.

If the write request is invalid, a negative response is returned with a DP-V1 error code (see page [169](#)).

## PROFIBUS SD2 telegram for SAP 51

The read/write service uses a variable-length PROFIBUS SD2 telegram shown below.

| DP header |    |     |     |    |    |    |      |      | DP trailer |     |     |
|-----------|----|-----|-----|----|----|----|------|------|------------|-----|-----|
| SD        | LE | LEr | SD  | DA | SA | FC | DSAP | SSAP | DU         | FCS | ED  |
| 68h       | x  | x   | 68h | xx | xx | x  | xx   | xx   | x...       | xx  | 16h |

SD = Start delimiter  
 LE = Length  
 LEr = Length repeated  
 DA = Destination address  
 SA = Source address  
 FC = Function code  
 DSAP = Destination service access point  
 SSAP = Source service access point  
 DU = Data unit for DP services  
 FCS = Frame checking sequence  
 ED = End delimiter

| Data unit              |     |     |     |  |      |
|------------------------|-----|-----|-----|--|------|
| DP-V1 Command/Response |     |     |     | PROFIdrive V3 Parameter Channel  |      |
| DU0                    | DU1 | DU2 | DU3 | Request/Response header<br>(See the tables on pages <a href="#">170</a> and <a href="#">172</a> .) | Data |

| Byte                  | Meaning         | Value   |
|-----------------------|-----------------|---|
| DU0                   | Function number | See page <a href="#">168</a> .                  |
| DU1                   | Slot number     | 0 = Module itself<br>1 = Drive parameter access |
| DU2                   | Index           | 47 (0x2F)                                       |
| DU3                   | Data length     | (Depends on type of message)                    |
| DU4...DU <sub>n</sub> | PROFIdrive data |   |

The table below lists the DP-V1 function numbers.

| <b>Value</b> | <b>Meaning</b>                   |
|--------------|----------------------------------|
| 0x48         | Idle REQ, RES                    |
| 0x51         | Data transport REQ, RES          |
| 0x56         | Resource manager REQ             |
| 0x57         | Initiate REQ, RES                |
| 0x58         | Abort REQ                        |
| 0x5C         | Alarm REQ, RES                   |
| 0x5E         | Read REQ, RES                    |
| 0x5F         | Write REQ, RES                   |
| 0xD1         | Data transport negative response |
| 0xD7         | Initiate negative response       |
| 0xDC         | Alarm negative response          |
| 0xDE         | Read negative response           |
| 0xDF         | Write negative response          |

The table below lists the DP-V1 error responses.

| <b>Byte</b> | <b>Meaning and value</b>   |
|-------------|--|
| DU0         | Function number = 0xDF (Error Write) = 0xDE (Error Read)             |
| DU1         | Error_Decode: PROFIdrive: Always 0x80 (DP-V1 codes)                  |
| DU2         | Error_Code_1: Error class/error code (see page <a href="#">169</a> ) |
| DU3         | Error_Code_2: Always 0   |



The table below lists the error codes for the DP-V1 error responses.

| Error class | Meaning       | Error code   |
|-------------|---------------|--|
| 0...9       | (Reserved)    |  |
| 10 (0x0A)   | Application   | 0 = Read error<br>1 = Write error<br>2 = Module failure<br>3...7 = Reserved<br>8 = Version conflict<br>9 = Feature not supported<br>10...15 = User-specific  |
| 11 (0x0B)   | Access        | 0 = Invalid index<br>1 = Write length error<br>2 = Invalid slot<br>3 = Type conflict<br>4 = Invalid area<br>5 = State conflict<br>6 = Access denied<br>7 = Invalid range<br>8 = Invalid parameter<br>9 = Invalid type<br>10...15 = User-specific |
| 12 (0x0C)   | Resource      | 0 = Read constraint conflict<br>1 = Write constraint conflict<br>2 = Resource busy<br>3 = Resource unavailable<br>4...7 = Reserved<br>8...15 = User-specific   |
| 13...15     | User-specific |  |

The table below shows the contents of the PROFIdrive Request header.

| Field(s)          | Description  | Range   | Byte/Word |
|-------------------|--|---|-----------|
| Request Reference | Unique identification set by the master. Changed for each new request.                                     | 1...255   | Byte      |
| Request ID        | Request type for the issued block  | Request Parameter (01h)<br>Change Parameter (02h) | Byte      |
| Drive Object ID   | To be set to 0 or 1.   | 0...255   | Byte      |
| No. of Parameters | Number of parameters that are present in the request   | 1...37  | Byte      |
| Attribute         | Type of object being accessed<br><b>Note:</b> "Description" and "Text" are not supported.                  | Value (10h)<br>Description (20h)<br>Text (30h)    | Byte      |
| No. of Elements   | Number of array elements accessed or length of string accessed. Set to 0 if non-array parameters are used. | 0, 1...234  | Byte      |
| Parameter Index   | Address of the parameter that is being accessed. "0" is allowed by FPBA-01.                                | 1...65535   | Word      |

| Field(s)                       | Description  | Range                      | Byte/Word             |
|--------------------------------|--|----------------------------|-----------------------|
| Subindex                       | Addresses <ul style="list-style-type: none"> <li>• the first array element of the parameter or</li> <li>• the beginning of a string access or</li> <li>• the text array or</li> <li>• the description element that is being accessed.</li> </ul> | 0...65535                  | Word                  |
| Format <sup>1)</sup>           | See the table on page 173.   | See the table on page 173. | Byte                  |
| Number of Values <sup>1)</sup> | Number of values following   | 0...234                    | Byte                  |
| Values <sup>1)</sup>           | The values of the request. In case of an odd number of bytes, a zero byte is appended to ensure the word structure of the telegram.  | –                          | See the Format field. |

<sup>1)</sup> Only if Request ID is 02h (Change Parameter). The Format, Number of Values and Values fields are repeated for other parameters.

The table below shows the contents of the PROFIdrive Response header.

| Field(s)                       | Description   | Range  |
|--------------------------------|---|--|
| Request Reference (mirrored)   | Mirrored from the request   | 1...255  |
| Response ID                    | Response from the slave. In case any requested services fail, a “not acknowledged” (NAK) response will be indicated.                | Request Param OK (01h)<br>Request Param NAK (81h)<br>Change Param OK (02h)<br>Change Param NAK (82h) |
| Drive Object ID                | To be set to 1.   | 0...255  |
| No. of Parameters              | Number of parameters that are present in the response   | 1...37   |
| Format <sup>1)</sup>           | See the table on page <a href="#">173</a> .   | See the table on page <a href="#">173</a> .  |
| Number of Values <sup>1)</sup> | Number of values following  | 0...234  |
| Values <sup>1)</sup>           | The values of the request. In case of an odd number of bytes, a zero byte is appended to ensure the word structure of the telegram. | –  |

<sup>1)</sup> Only if Response ID is 01h (Request Parameter OK). The Format, Number of Values and Values fields are repeated for other parameters.

The table below shows the data types for the Format field.

| <b>Code</b> | <b>Type</b>                      |
|-------------|----------------------------------|
| 0x00        | (Reserved)                       |
| 0x01...0x36 | Standard data types              |
|             | 1 Boolean (not supported)        |
|             | 2 Integer8 (not supported)       |
|             | 3 Integer16                      |
|             | 4 Integer32                      |
|             | 5 Unsigned8 (not supported)      |
|             | 6 Unsigned16                     |
|             | 7 Unsigned32                     |
|             | 8 Floating point (not supported) |
|             | 9 Visible string (not supported) |
|             | ...                              |
| 0x37...0x3F | (Reserved)                       |
| 0x40        | Zero                             |
| 0x41        | Byte                             |
| 0x42        | Word                             |
| 0x43        | Double word                      |
| 0x44        | Error                            |
| 0x45...0xFF | (Reserved)                       |

The table below shows the PROFIdrive parameter request error codes.

| <b>Error #</b> | <b>Meaning</b>                                       | <b>Used at</b>   |
|----------------|--|--|
| 00h            | Impermissible parameter number                       | Access to an unavailable parameter   |
| 01h            | Parameter value cannot be changed                    | Change access to a parameter value that cannot be changed  |
| 02h            | Low or high limit exceeded                           | Change access with a value outside the limits  |
| 03h            | Invalid subindex                                     | Access to an unavailable subindex  |
| 04h            | No array   | Access with a subindex to a non-indexed parameter  |
| 05h            | Incorrect data type                                  | Change access with a value that does not match the data type of the parameter  |
| 06h            | Setting not permitted (can only be reset)            | Change access with a value unequal to 0 when this is not permitted   |
| 07h            | Description element cannot be changed                | Change access to a description element that cannot be changed  |
| 09h            | No description data available                        | Access to an unavailable description (Parameter value is available.)   |
| 0Bh            | No operation priority                                | Change access rights without rights to change parameters   |
| 0Fh            | No text array available                              | Access to a text array that is not available (Parameter value is available.)   |
| 11h            | Request cannot be executed because of operating mode | Access is temporarily not possible for reasons that are not specified in detail.   |
| 14h            | Value impermissible                                  | Change access with a value that is within limits but is not permissible for other long-term reasons (parameter with defined single values) |

| <b>Error #</b> | <b>Meaning</b>                   | <b>Used at</b>  |
|----------------|----------------------------------|---|
| 15h            | Response too long                | The length of the current response exceeds the maximum transmittable length.  |
| 16h            | Parameter address impermissible  | Illegal value or value that is not supported for the attribute, number of elements, parameter number or sub-index, or a combination |
| 17h            | Illegal format                   | Write request: Illegal format or format of parameter data that is not supported   |
| 18h            | Number of values inconsistent    | Write request: Number of values of parameter data does not match number of elements at the parameter address                        |
| 65h...FF       | Manufacturer-specific error area | –   |
| 65h            | Vendor-specific error            | Vendor-specific error   |
| 66h            | Request not supported            | Request not supported   |
| 67h            | Communication error              | Request cannot be completed because of a communication error.   |
| 6Eh            | Non-volatile error               | Failure during write to non-volatile memory   |
| 6Fh            | Time-out error                   | Request aborted because of timeout  |
| 78h            | PZD map failure                  | Parameter cannot be mapped to PZD (size mismatch or non-existent).  |
| 79h            | PZD memory failure               | Parameter cannot be mapped to PZD (out of memory).  |
| 7Ah            | Multiple PZD map                 | Parameter cannot be mapped to PZD (multiple PZD write).   |

| Error # | Meaning                | Used at  |
|---------|------------------------|--|
| 82h     | Control word bit map   | Cannot map Control word bit (parameter 933...937, eg, double mapping of bits). |
| 8Ch     | Set torque mode error  | Cannot change mode to TORQUE (frequency is used).                              |
| 90h     | Illegal Request ID     | The request ID of the response is illegal.                                     |
| 96h     | Internal buffer        | Buffer overflow  |
| A0h     | Internal communication | Communication error between the module and the drive                           |

### ■ Parameter data transfer examples (DP-V1)

The following examples show how parameter data is transferred using the DP-V1 mechanisms READ and WRITE.

**Note:** Only the “data unit” part of the SD2 telegram is presented in the examples. See [PROFIBUS SD2 telegram for SAP 51](#) on page 167.

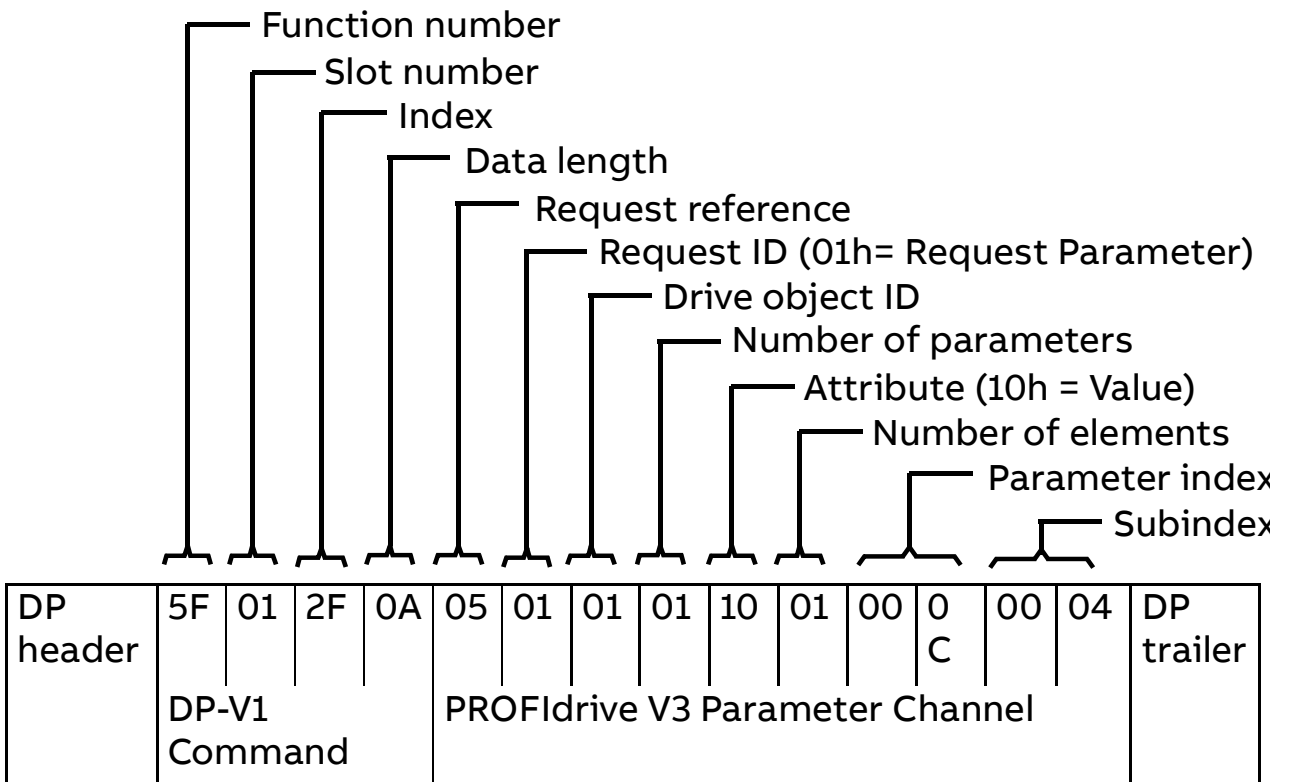


### Example 1a: Reading a drive parameter (array element)

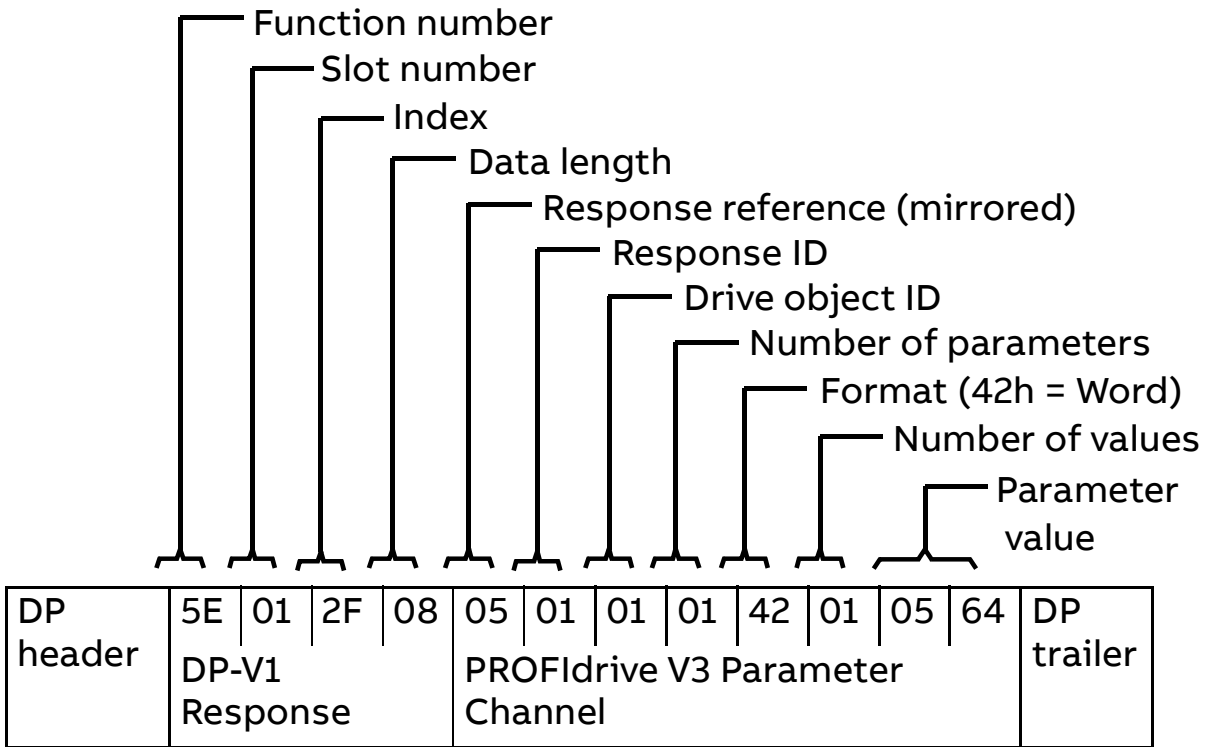
**Note:** Drive parameter access is not available in PROFIdrive v4.2 profile. See parameter [05 Profile](#).

Drive parameters are addressed so that the drive parameter group corresponds to the Parameter index (PNU), and the drive parameter number within the group corresponds to the Subindex (IND). In the following example, a value is read from drive parameter number **12.04** (0C.04h).

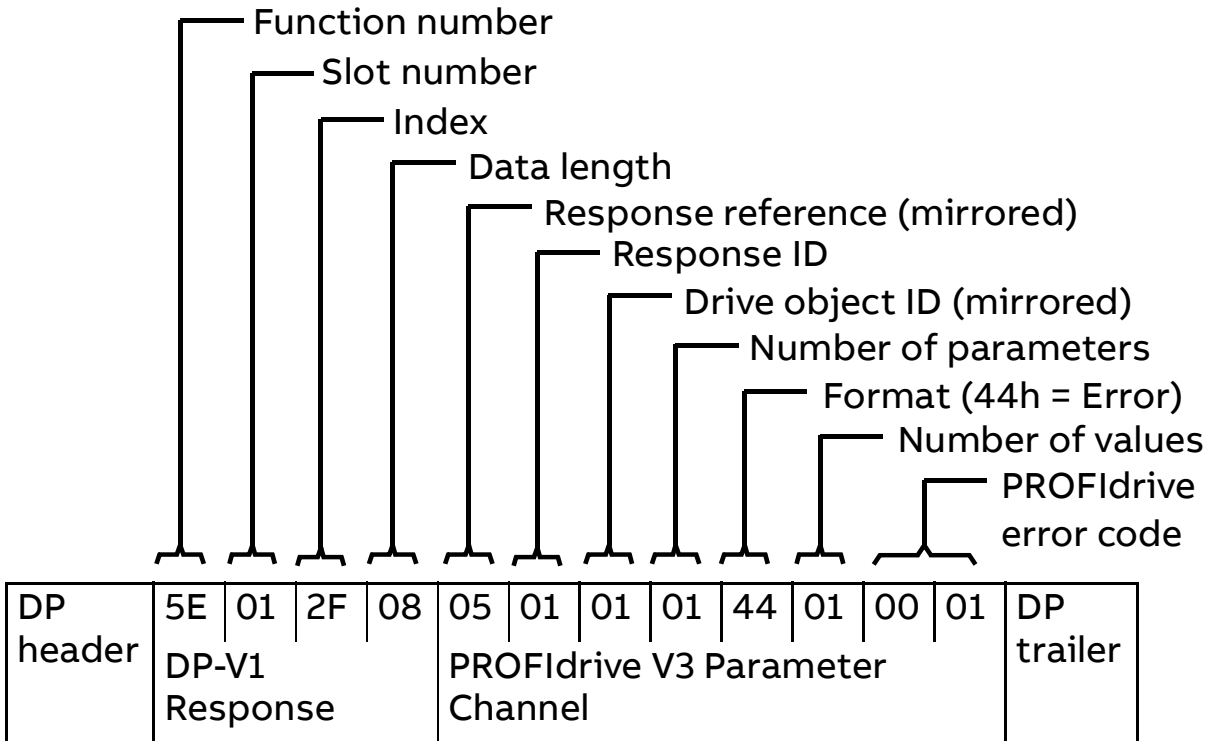
- DP-V1 Write request (Read parameter value):



- Positive Read response to DP-V1 Read request:



- Negative response to PROFIdrive Read request:



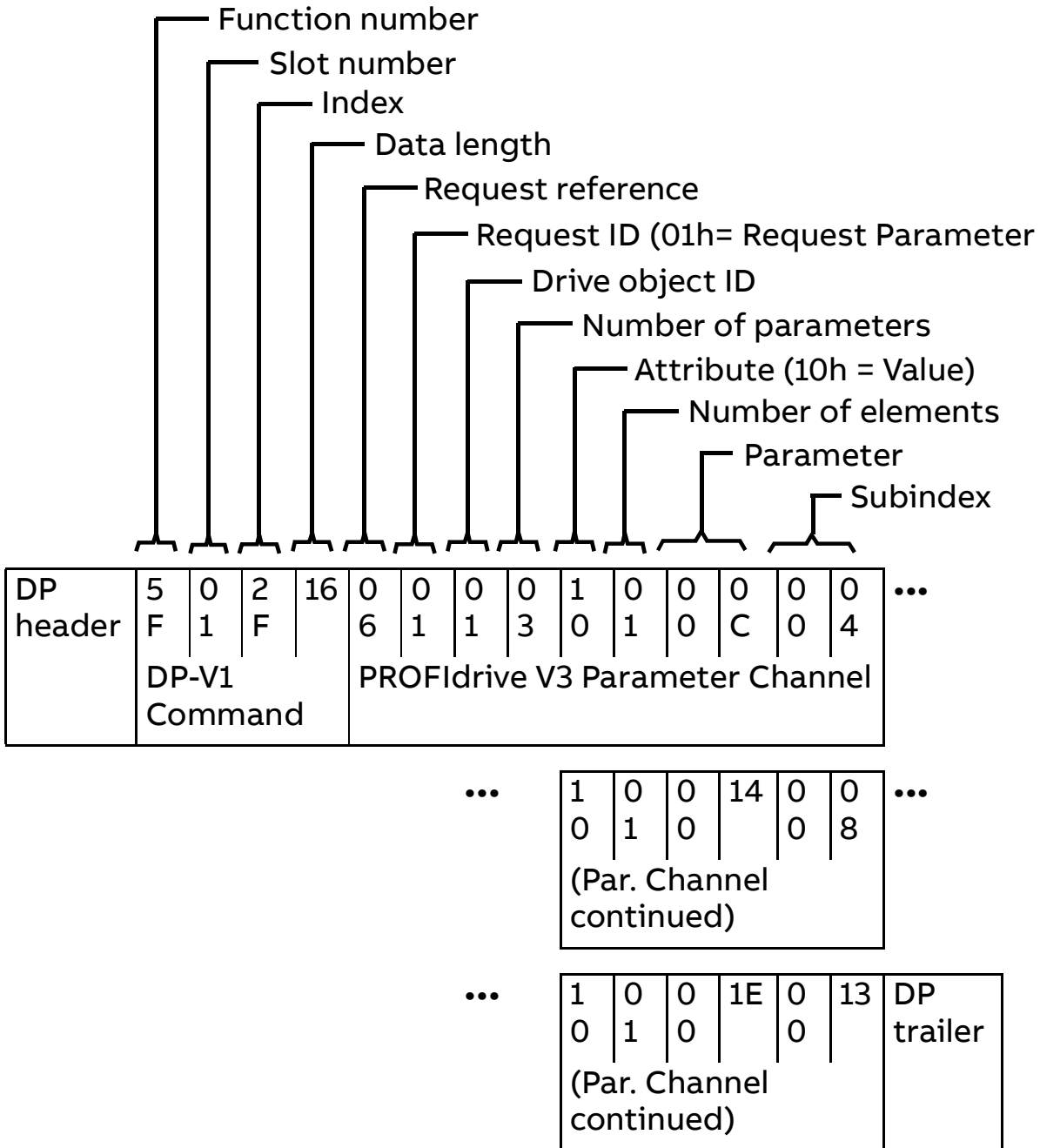
### **Example 1b: Reading 3 drive parameters (multi-parameter)**

**Note:** Drive parameter access is not available in PROFIdrive v4.2 profile. See parameter [05 Profile](#).

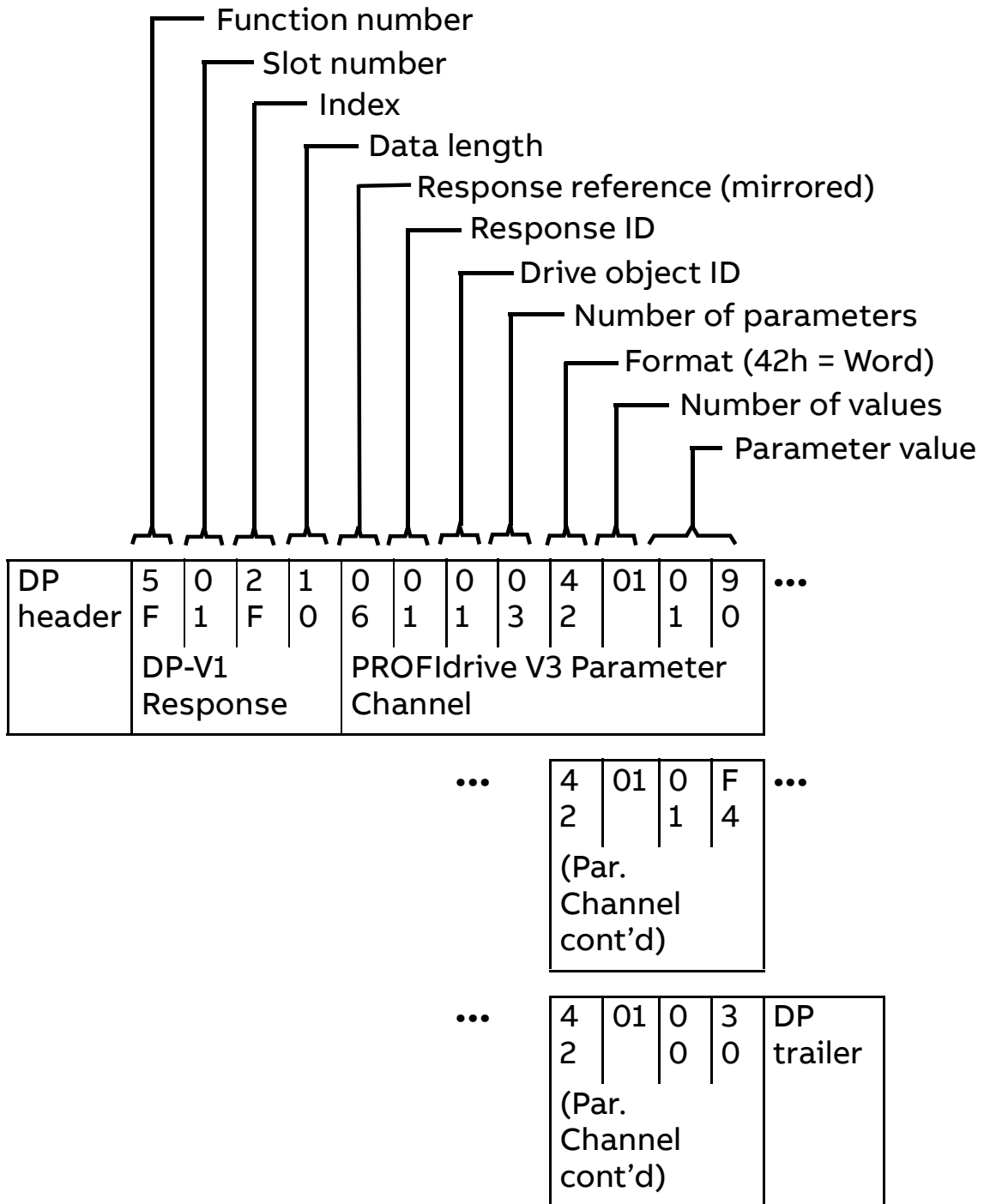
In this example, three parameters (**12.04**, **20.08** and **30.19**) are read using one telegram.

---

- DP-V1 Write request (Read parameter value):



- Positive Read response to DP-V1 Read request:

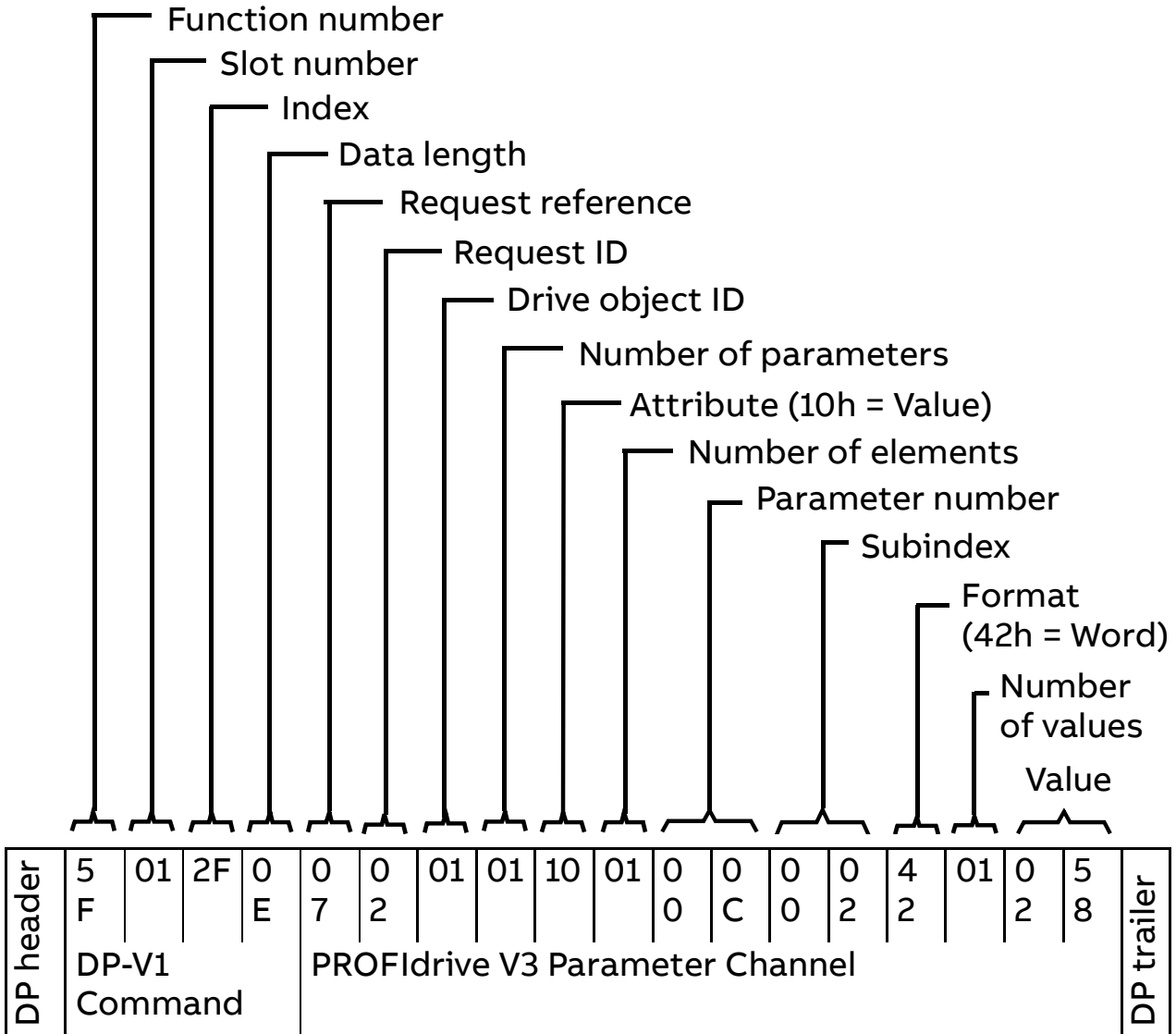


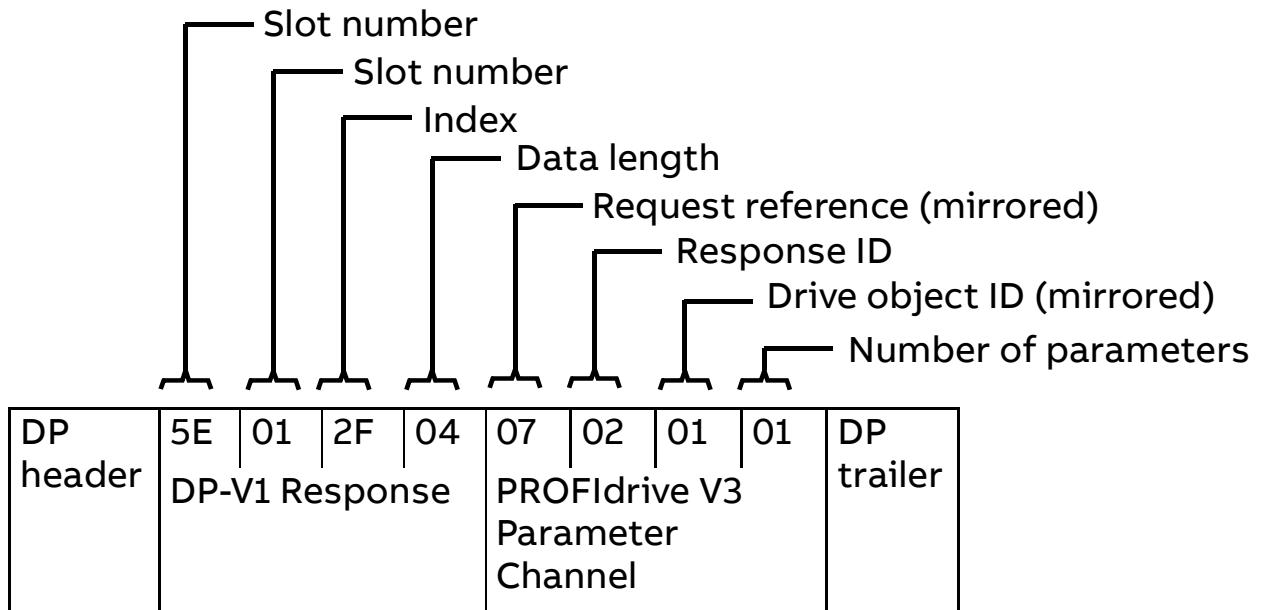
The values 190h (400), 1F4h (500) and 1Eh (30) are returned.

### Example 2a: Writing a drive parameter (one array element)

**Note:** Drive parameter access is not available in PROFIdrive v4.2 profile. See parameter [05 Profile](#).

Drive parameters are addressed so that the drive parameter group corresponds to the Parameter index (PNU), and the drive parameter number within that group corresponds to the Subindex (IND). In the following example, a value is written to drive parameter **12.02** (0C.02h).

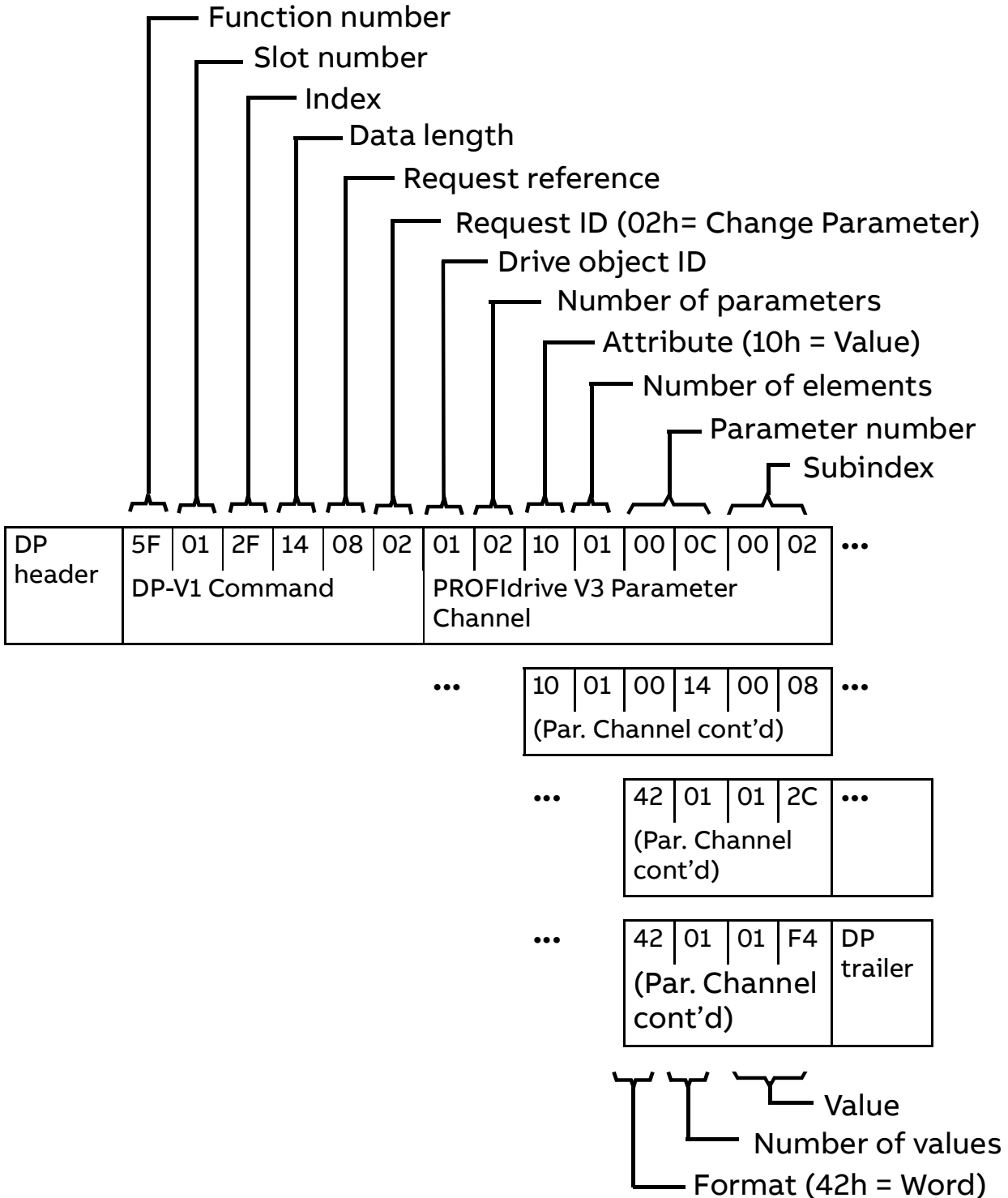




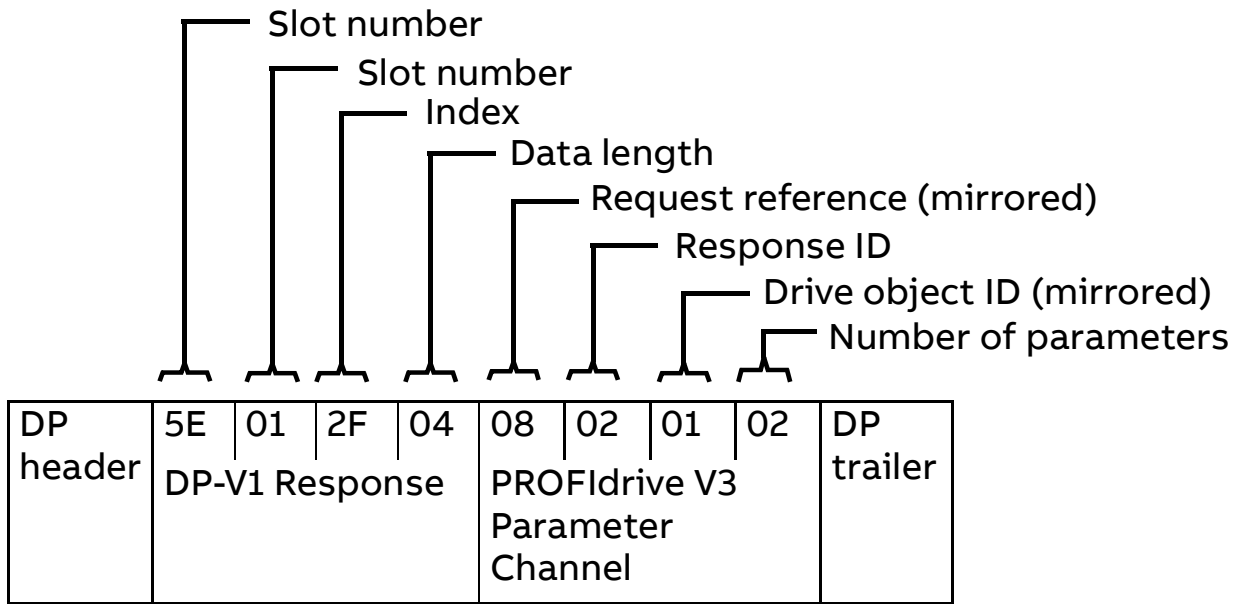
### Example 2b: Writing 2 drive parameters (multi-parameter)

**Note:** Drive parameter access is not available in PROFIdrive v4.2 profile. See parameter [05 Profile](#).

In this example, the values 300 (12Ch) and 500 (1F4h) are written to drive parameters **12.02** (0C.02h) and **20.08** (14.08h) respectively using one telegram.



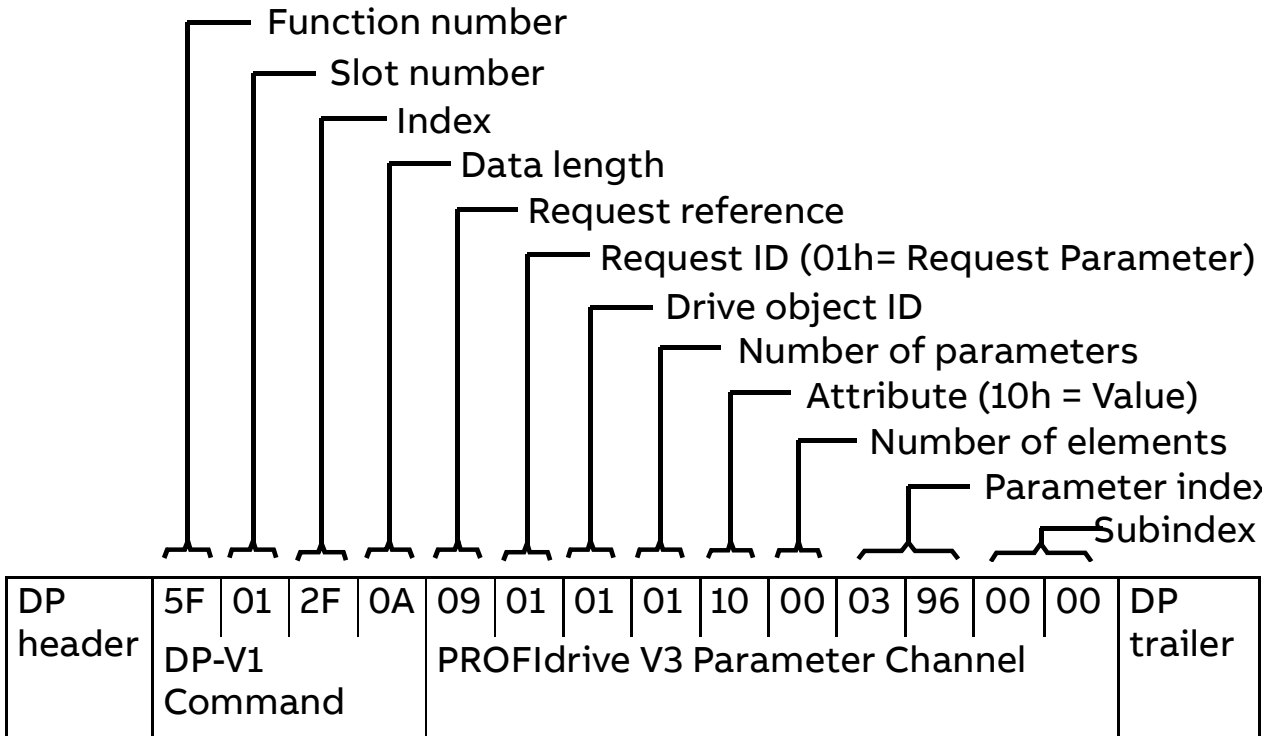




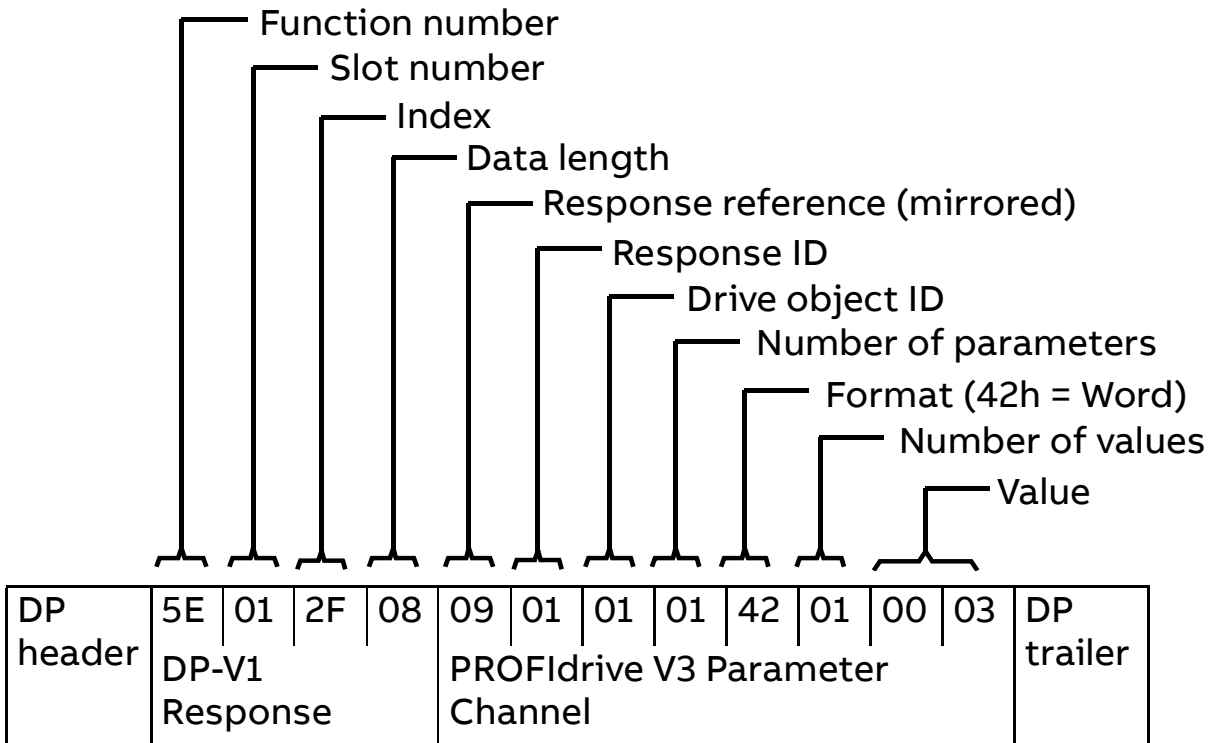
### Example 3: Reading a PROFIdrive parameter

In this example, PROFIdrive parameter 918 (396h) is used to read the station number of the slave.

- DP-V1 Write request (Reading a PROFIdrive parameter):



- DP-V1 Read response:



The slave returns the station number of the slave (0003h in this example).

**Example 4: Configuring the process data written to the drive**

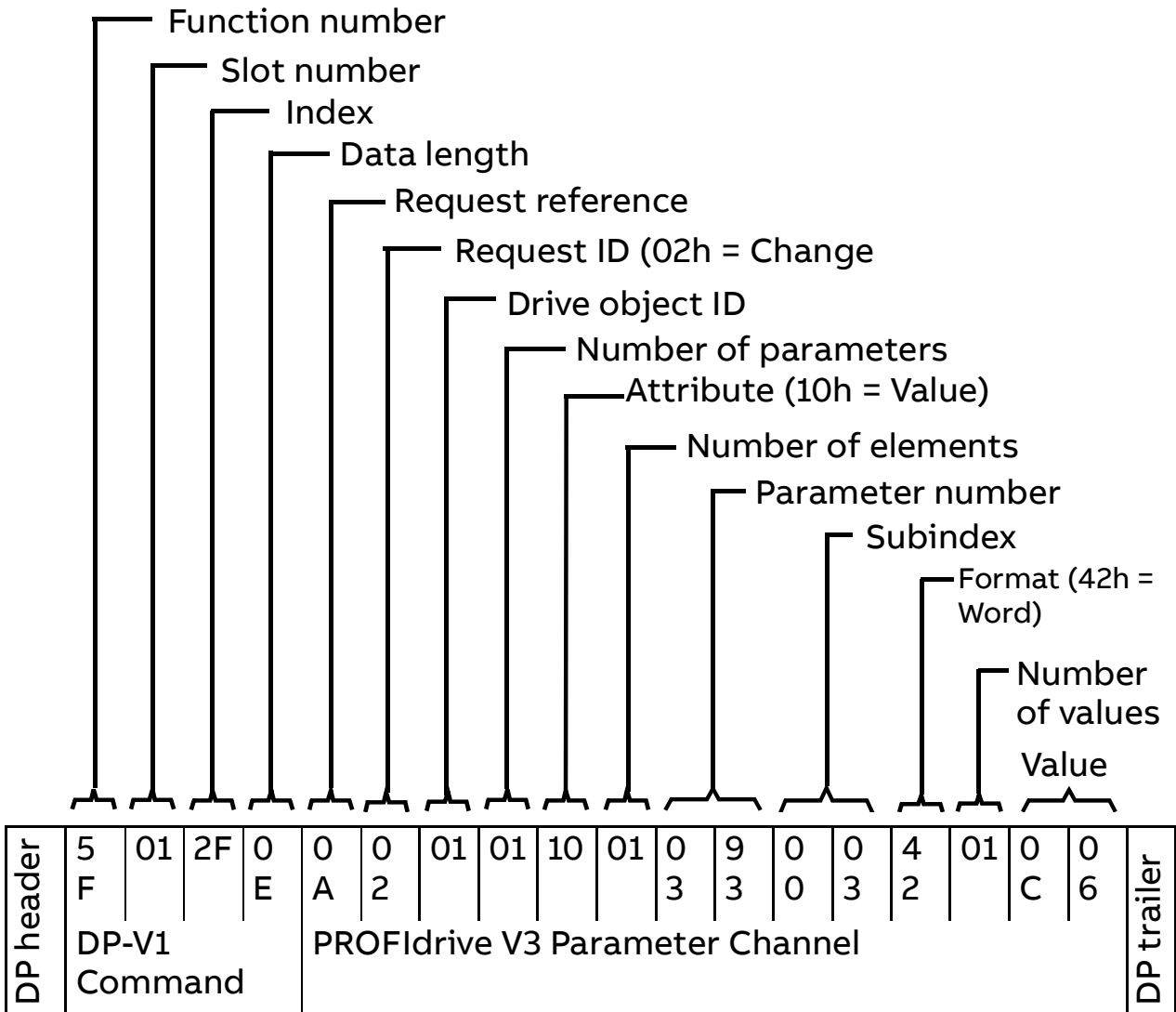
PROFIdrive parameter 915 (393h) can be used to define which data is written cyclically to a drive parameter as application-specific process data.

In the example below, the value of drive parameter **12.06** (0C.06h) is selected to be taken from PZD3. The parameter will continue to be updated with the contents of PZD3 in each Request frame until a different selection is made.

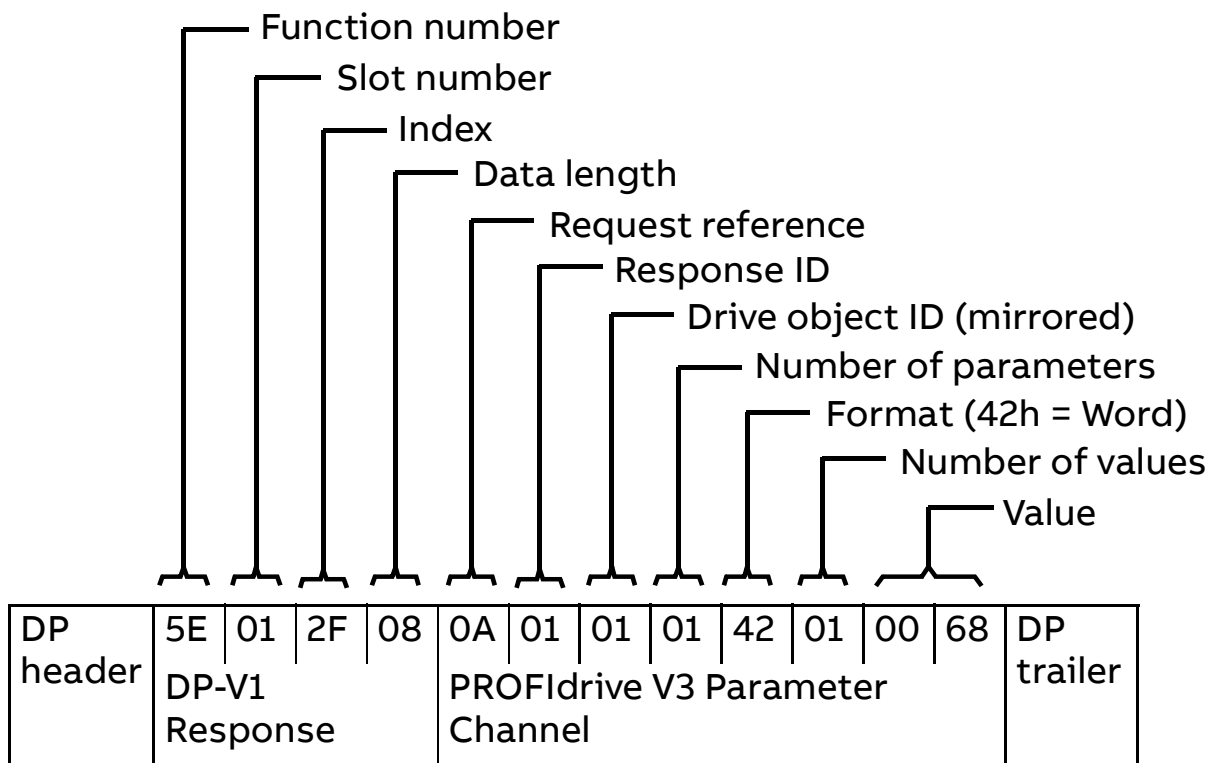
---

Subindex (IND) defines which process data word the required data is taken from. Value selects the drive parameter to which that word is mapped.

- DP-V1 Write request:



- DP-V1 Read response:

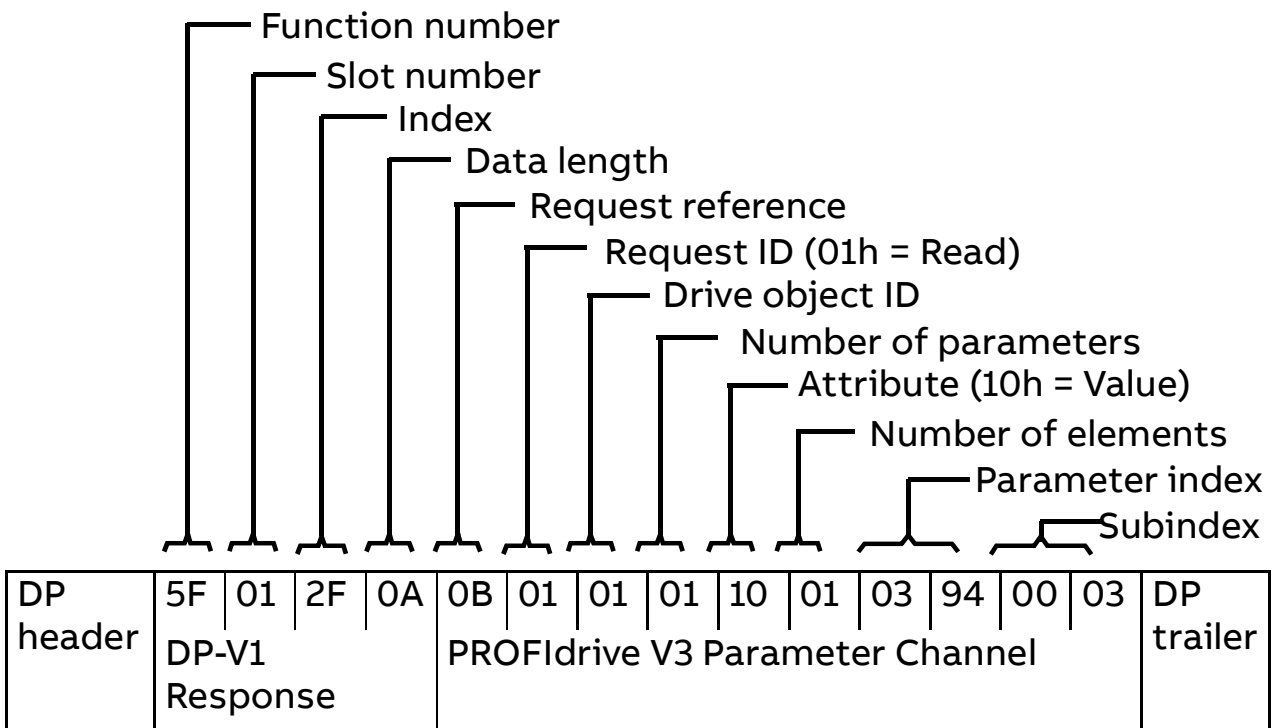


Subsequently, the contents of PZD3 in each Request frame are written to drive parameter **12.06** until a different selection is made.

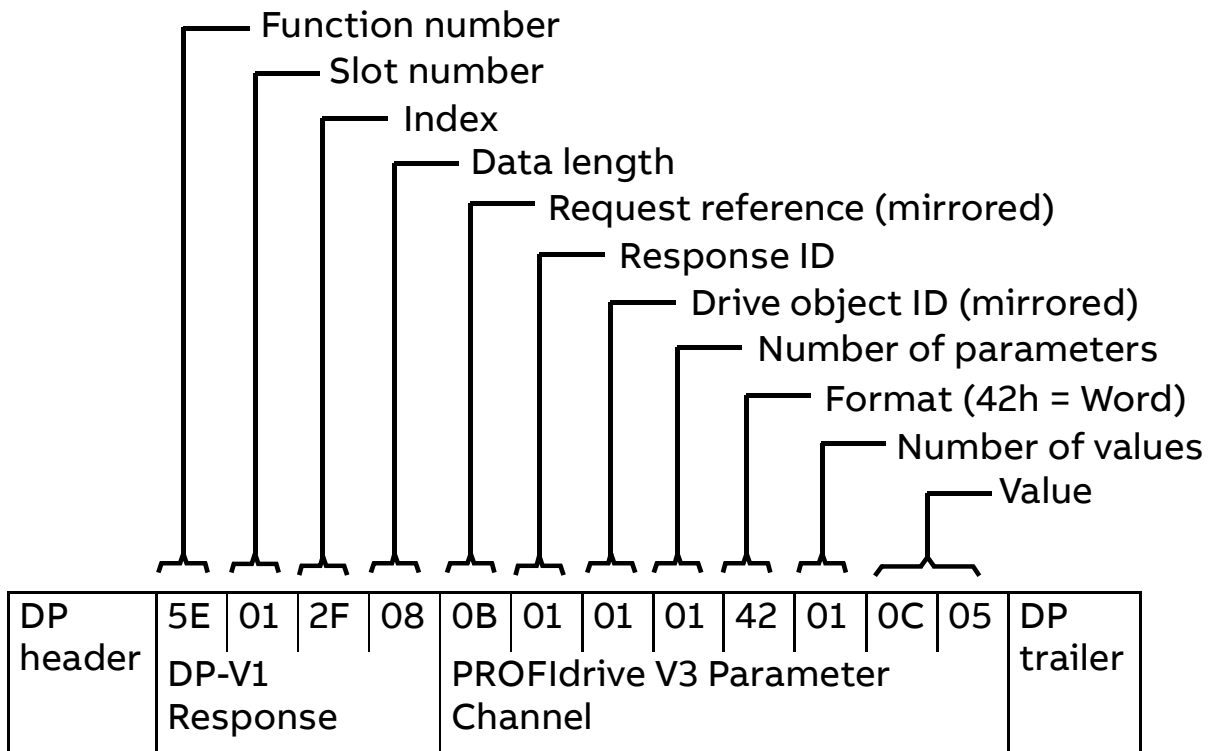
### Example 5: Determining the source of process data read from the drive

PROFIdrive parameter 916 (394h) can be used to define which data is read cyclically from the drive as application-specific process data. In the example below, the parameter is used to determine which drive parameter the contents of PZD3 are taken from. Subindex (IND) defines which process data word the required data is transmitted in.

- DP-V1 Write request:



- DP-V1 Read response:



Value indicates the source of PZD3 as drive parameter **12.05** (0C.05h).





## 9

# Diagnostics

---

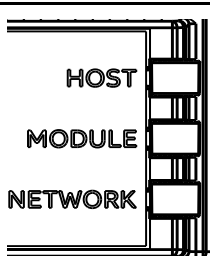
## Contents of this chapter

This chapter explains how to trace faults with the status LEDs on the adapter module.

## LED indications

The adapter module is equipped with three bicolor diagnostic LEDs. The LEDs are described below.

| Name | Color  | Function   |
|------|--|--|
| HOST | Green  | Connection to host OK  |
|      | Blinking red   | Establishing communication to host, or communication to host lost  |
|      | Flashing orange, alternating with the MODULE flashing orange | Internal file system error. The error may be cleared by cycling drive power. If the error persists, contact your local ABB representative. |



| Name    | Color   | Function   |
|---------|---|--|
| MODULE  | Green   | Module status OK   |
|         | Blinking red  | Configuration mismatch   |
|         | Blinking red in unison with HOST (blinking red)             | Establishing communication to host   |
|         | Blinking green in unison with NETWORK (blinking red)        | Network connection lost  |
|         | Blinking green once per second with NETWORK steady green    | No communication with this node  |
|         | Blinking green 3 times per second with NETWORK steady green | Only Class 2 master connection (no cyclic communication established)   |
|         | Red   | Module fault   |
|         | Flashing orange, alternating with the HOST flashing orange  | Internal file system error. The error may be cleared by cycling drive power. If the error persists, contact your local ABB representative. |
| NETWORK | Blinking green  | Establishing network connection  |
|         | Green   | Network connection OK  |
|         | Blinking red  | Network connection lost  |

# 10

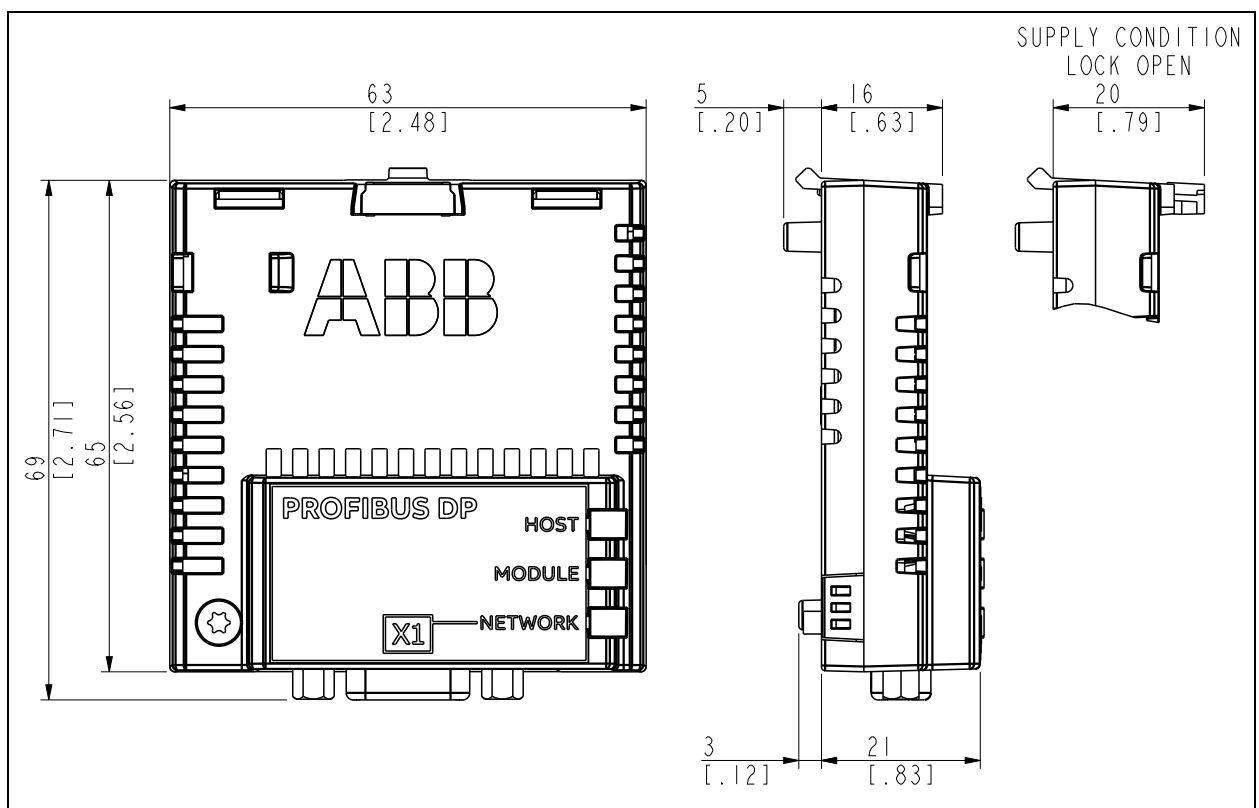
## Technical data

### Contents of this chapter

This chapter contains the technical data of the adapter module and the PROFIBUS link.

### FPBA-01

The figure below shows the enclosure of the adapter module from the front and side.



|                             |   |
|-----------------------------|---|
| <b>Mounting</b>             | Into the option slot on the drive   |
| <b>Degree of protection</b> | IP20  |
| <b>Ambient conditions</b>   | The applicable ambient conditions specified for the drive in its manuals are in effect.   |
| <b>Indicators</b>           | Three bicolor LEDs (HOST, MODULE, NETWORK)  |
| <b>Connectors</b>           | <ul style="list-style-type: none"> <li>• 20-pin connector to drive (X2)</li> <li>• 9-pin D-SUB connector to bus (X1)</li> </ul>   |
| <b>Power supply</b>         | <ul style="list-style-type: none"> <li>• +3.3 V <math>\pm</math>5% max. 450 mA (supplied by the drive)</li> <li>• Isolated +5 V supply available for bus termination circuitry (X1 pins 5 and 6). 30 mA max.</li> </ul> |
| <b>General</b>              | <ul style="list-style-type: none"> <li>• Complies with EMC standard EN 61800-3:2004</li> <li>• Bus interface functionally isolated from drive</li> <li>• Coated circuit board.</li> </ul>                               |

## PROFIBUS link

**Compatible devices:** All PROFIBUS-compliant devices

**Medium:** Shielded twisted pair RS-485 cable (PROFIBUS-approved cable recommended)

- Termination: 220 ohms, or active termination circuitry at each end of trunk cable (termination not built in the FPBA-01 module)
- Specifications:

| Parameter      | Line A<br>PROFIBUS DP    | Line B<br>DIN 19245 Part 1 | Unit            |
|----------------|--------------------------|----------------------------|-----------------|
| Impedance      | 35...165<br>(3...20 MHz) | 100...130<br>(f > 100 kHz) | ohm             |
| Capacitance    | < 30                     | < 60                       | pF/m            |
| Resistance     | < 110                    | –                          | ohm/k<br>m      |
| Wire gauge     | > 0.64                   | > 0.53                     | mm              |
| Conductor area | > 0.34                   | > 0.22                     | mm <sup>2</sup> |

- Maximum bus length:

|                               |         |       |     |      |      |      |       |
|-------------------------------|---------|-------|-----|------|------|------|-------|
| <b>Transfer rate (kbit/s)</b> | ≤ 93.75 | 187.5 | 500 | 1500 | 3000 | 6000 | 12000 |
| <b>Line A (m)</b>             | 1200    | 1000  | 400 | 200  | 100  | 100  | 100   |
| <b>Line B (m)</b>             | 1200    | 600   | 200 | –    | –    | –    | –     |

**Topology:** Trunk line, drop lines allowed. Max. 126 nodes with repeaters (31 nodes + repeater per section)

**Transfer rate:** 12 Mb/s max., automatically detected by the adapter module

**Serial communication type:** Asynchronous, half-duplex RS-485

**Protocol:** PROFIBUS DP

## License information for 3<sup>rd</sup> party components

Format - lightweight string formatting library.

Copyright (C) 2010-2013, Neil Johnson

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- Neither the name of nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

---

\*\*\*\*\*

Source code for the "strtod" library procedure.

Copyright (c) 1988-1993 The Regents of the University of California.

Copyright (c) 1994 Sun Microsystems, Inc.

This software is copyrighted by the Regents of the University of California, Sun Microsystems, Inc., Scriptics Corporation, and other parties. The following terms apply to all files associated with the software unless explicitly disclaimed in individual files.

The authors hereby grant permission to use, copy, modify, distribute, and license this software and its documentation for any purpose, provided that existing copyright notices are retained in all copies and that this notice is included verbatim in any distributions. No written agreement, license, or royalty fee is required for any of the authorized uses. Modifications to this software may be copyrighted by their authors and need not follow the licensing terms described here, provided that the new terms are clearly indicated on the first page of each file where they apply.

IN NO EVENT SHALL THE AUTHORS OR DISTRIBUTORS BE LIABLE TO ANY PARTY FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS SOFTWARE, ITS DOCUMENTATION, OR ANY DERIVATIVES THEREOF, EVEN IF THE AUTHORS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

THE AUTHORS AND DISTRIBUTORS SPECIFICALLY DISCLAIM ANY WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT. THIS SOFTWARE IS PROVIDED ON AN "AS IS" BASIS, AND THE AUTHORS AND DISTRIBUTORS HAVE NO OBLIGATION TO PROVIDE MAINTENANCE, SUPPORT, UPDATES, ENHANCEMENTS, OR MODIFICATIONS.

GOVERNMENT USE: If you are acquiring this software on behalf of the U.S. government, the Government shall have only "Restricted Rights" in the software and related documentation as defined in the Federal Acquisition Regulations (FARs) in Clause 52.227.19 (c) (2). If you are acquiring the software on behalf of the Department of Defense, the software shall be

---

classified as "Commercial Computer Software" and the Government shall have only "Restricted Rights" as defined in Clause 252.227-7013 (c) (1) of DFARs. Notwithstanding the foregoing, the authors grant the U.S. Government and others acting in its behalf permission to use and distribute the software in accordance with the terms specified in this license.

---





# Appendix A – PROFIdrive parameters

---

## Contents of this chapter

This chapter contains a list of the PROFIdrive profile parameters.

## PROFIdrive parameters

| Par. no. | R/W <sup>1)</sup> | Data type                | Description   |
|----------|-------------------|--------------------------|---|
| 915      | R/W               | Array [10]<br>Unsigned16 | Assignment PZD1 to PZD10 in PPO-write<br><b>Note:</b> In PROFIdrive v4.2 mode, the first elements of this parameter have subindex 0. In the PROFIdrive mode, the subindex is 1. |
| 916      | R/W               | Array [10]<br>Unsigned16 | Assignment PZD1 to PZD10 in PPO-read<br><b>Note:</b> In PROFIdrive v4.2 mode, the first elements of this parameter have subindex 0. In the PROFIdrive mode, the subindex is 1.  |
| 918      | R/W               | Unsigned16               | Node address. Writing this parameter will change the node address. Module re-start required.  |

---

202 Appendix A – PROFIdrive parameters

| Par. no. | R/W <sup>1)</sup>           | Data type  | Description  |       |             |   |                             |   |     |   |     |
|----------|-----------------------------|--|--|-------|-------------|---|-----------------------------|---|-----|---|-----|
| 919      | R                           | PROFIdrive:<br>Octet<br>String4<br>PROFIdrive<br>v4.2: Visible<br>String | ABB drive product code.  |       |             |   |                             |   |     |   |     |
| 922      | R                           | Unsigned16   | Telegram selection. <table border="1" data-bbox="666 589 1318 770"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Not standard telegram (PPO)</td> </tr> <tr> <td>1</td> <td>ST1</td> </tr> <tr> <td>2</td> <td>ST2</td> </tr> </tbody> </table> | Value | Description | 0 | Not standard telegram (PPO) | 1 | ST1 | 2 | ST2 |
| Value    | Description                 |  |  |       |             |   |                             |   |     |   |     |
| 0        | Not standard telegram (PPO) |  |  |       |             |   |                             |   |     |   |     |
| 1        | ST1                         |  |  |       |             |   |                             |   |     |   |     |
| 2        | ST2                         |  |  |       |             |   |                             |   |     |   |     |

| Par. no. | R/W <sup>1)</sup>                                    | Data type               | Description  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
|----------|--|-------------------------|--|-----|-------------|------|---|-----------------------|------------|---|----------------------|------------|---|-----------------------|------------|---|----------------------|------------|---|-----------------------------|----------|---|-------------------------------|----------|---|-----------------------------|----------|---|-------------------------------|----------|----|--------------------------------|----------|----|----------------------------------|----------|----|--|------------|----|---|------------|----|--|----------|
| 923      | R  | Array [n]<br>Unsigned16 | <p>List of all parameters for signals. Mandatory if process data normalization is used and/or parameters 915 and 916 are implemented.</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Signal name</th> <th>Type</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Control word 1 (STW1)</td> <td>Unsigned16</td> </tr> <tr> <td>2</td> <td>Status word 1 (ZSW1)</td> <td>Unsigned16</td> </tr> <tr> <td>3</td> <td>Control word 2 (STW2)</td> <td>Unsigned16</td> </tr> <tr> <td>4</td> <td>Status word 2 (ZSW2)</td> <td>Unsigned16</td> </tr> <tr> <td>5</td> <td>Speed set point A (NSOLL_A)</td> <td>Signed16</td> </tr> <tr> <td>6</td> <td>Speed actual value A (NIST_A)</td> <td>Signed16</td> </tr> <tr> <td>7</td> <td>Speed set point B (NSOLL_B)</td> <td>Signed32</td> </tr> <tr> <td>8</td> <td>Speed actual value B (NIST_B)</td> <td>Signed32</td> </tr> <tr> <td>27</td> <td>Position set point A (XSOLL_A)</td> <td>Signed32</td> </tr> <tr> <td>28</td> <td>Position actual value A (XIST_A)</td> <td>Signed32</td> </tr> <tr> <td>32</td> <td>Traversing block selection (SATZANW) (not supported)</td> <td>Unsigned16</td> </tr> <tr> <td>33</td> <td>Actual traversing block (AKTSATZ) (not supported)</td> <td>Unsigned16</td> </tr> <tr> <td>34</td> <td>Target position (TARPOS_A) (not supported)</td> <td>Signed32</td> </tr> </tbody> </table> | No. | Signal name | Type | 1 | Control word 1 (STW1) | Unsigned16 | 2 | Status word 1 (ZSW1) | Unsigned16 | 3 | Control word 2 (STW2) | Unsigned16 | 4 | Status word 2 (ZSW2) | Unsigned16 | 5 | Speed set point A (NSOLL_A) | Signed16 | 6 | Speed actual value A (NIST_A) | Signed16 | 7 | Speed set point B (NSOLL_B) | Signed32 | 8 | Speed actual value B (NIST_B) | Signed32 | 27 | Position set point A (XSOLL_A) | Signed32 | 28 | Position actual value A (XIST_A) | Signed32 | 32 | Traversing block selection (SATZANW) (not supported) | Unsigned16 | 33 | Actual traversing block (AKTSATZ) (not supported) | Unsigned16 | 34 | Target position (TARPOS_A) (not supported) | Signed32 |
| No.      | Signal name  | Type                    |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 1        | Control word 1 (STW1)                                | Unsigned16              |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 2        | Status word 1 (ZSW1)                                 | Unsigned16              |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 3        | Control word 2 (STW2)                                | Unsigned16              |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 4        | Status word 2 (ZSW2)                                 | Unsigned16              |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 5        | Speed set point A (NSOLL_A)                          | Signed16                |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 6        | Speed actual value A (NIST_A)                        | Signed16                |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 7        | Speed set point B (NSOLL_B)                          | Signed32                |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 8        | Speed actual value B (NIST_B)                        | Signed32                |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 27       | Position set point A (XSOLL_A)                       | Signed32                |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 28       | Position actual value A (XIST_A)                     | Signed32                |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 32       | Traversing block selection (SATZANW) (not supported) | Unsigned16              |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 33       | Actual traversing block (AKTSATZ) (not supported)    | Unsigned16              |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |
| 34       | Target position (TARPOS_A) (not supported)           | Signed32                |  |     |             |      |   |                       |            |   |                      |            |   |                       |            |   |                      |            |   |                             |          |   |                               |          |   |                             |          |   |                               |          |    |                                |          |    |                                  |          |    |  |            |    |   |            |    |  |          |

| Par. no. | R/W <sup>1)</sup>   | Data type     | Description   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
|----------|---|---------------|---|-------|----------|---------------|---|------|---|---|------|----------|---|------|-----|---|------|-----|---|------|----------|---|------|-----|---|------|------------|---|------|------|
| 927      | R/W   | Unsigned16    | <p>Operator control rights (parameter identification, PKW)</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Parameters cannot be written, only read (927 can be written).</td> </tr> <tr> <td>1</td> <td>Parameters can be written and read (default).</td> </tr> </tbody> </table>  | Value | Mode     | 0             | Parameters cannot be written, only read (927 can be written).   | 1    | Parameters can be written and read (default). |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| Value    | Mode  |               |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 0        | Parameters cannot be written, only read (927 can be written).   |               |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 1        | Parameters can be written and read (default).                   |               |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 928      | R/W   | Unsigned16    | <p>Control rights (process data, PZD).</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>PZD part is disabled, i.e., Receipt of new PZD data is ignored.</td> </tr> <tr> <td>1</td> <td>PZD part is enabled (default).</td> </tr> </tbody> </table>   | Value | Mode     | 0             | PZD part is disabled, i.e., Receipt of new PZD data is ignored. | 1    | PZD part is enabled (default).                |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| Value    | Mode  |               |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 0        | PZD part is disabled, i.e., Receipt of new PZD data is ignored. |               |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 1        | PZD part is enabled (default).                                  |               |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 929      | R   | Unsigned16    | <p>Selected PPO type</p> <table border="1"> <thead> <tr> <th>Value</th> <th>PPO type</th> <th>Configuration</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>PPO1</td> <td>F3h, F1h</td> </tr> <tr> <td>2</td> <td>PPO2</td> <td>F3h, F5h</td> </tr> <tr> <td>3</td> <td>PPO3</td> <td>F1h</td> </tr> <tr> <td>4</td> <td>PPO4</td> <td>F5h</td> </tr> <tr> <td>5</td> <td>PPO5</td> <td>F3h, F9h</td> </tr> <tr> <td>6</td> <td>PPO6</td> <td>F9h</td> </tr> <tr> <td>7</td> <td>PPO7</td> <td>0xF3, 0xFB</td> </tr> <tr> <td>8</td> <td>PPO8</td> <td>0xFB</td> </tr> </tbody> </table> <p><b>Note:</b> This parameter is not available if standard telegram ST1 or ST2 is selected.</p> <p><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.</p> | Value | PPO type | Configuration | 1   | PPO1 | F3h, F1h                                      | 2 | PPO2 | F3h, F5h | 3 | PPO3 | F1h | 4 | PPO4 | F5h | 5 | PPO5 | F3h, F9h | 6 | PPO6 | F9h | 7 | PPO7 | 0xF3, 0xFB | 8 | PPO8 | 0xFB |
| Value    | PPO type  | Configuration |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 1        | PPO1  | F3h, F1h      |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 2        | PPO2  | F3h, F5h      |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 3        | PPO3  | F1h           |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 4        | PPO4  | F5h           |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 5        | PPO5  | F3h, F9h      |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 6        | PPO6  | F9h           |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 7        | PPO7  | 0xF3, 0xFB    |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |
| 8        | PPO8  | 0xFB          |   |       |          |               |   |      |   |   |      |          |   |      |     |   |      |     |   |      |          |   |      |     |   |      |            |   |      |      |

| Par. no. | R/W <sup>1)</sup>                    | Data type  | Description   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
|----------|--------------------------------------|------------|---|-------|-------------------------|---|------------------|--------|--------------------------------------|-------|----------------|-------|----------------|-------|-----------------------------|-------|------------|-------|------|---|------------|-------|------------|-------|----------------|-------|----------------|-------|-----------------------------|-------|------------------|
| 930      | R/W                                  | Unsigned16 | <p>Selection switch for communication profile.</p> <p>Behavior when PROFIdrive v.4.2 is active:</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>PROFIdrive v.4.2</td> </tr> <tr> <td>8001h</td> <td>ABB Drives</td> </tr> <tr> <td>8002h</td> <td>Transparent 16</td> </tr> <tr> <td>8003h</td> <td>Transparent 32</td> </tr> <tr> <td>8004h</td> <td>PROFIdrive positioning mode</td> </tr> <tr> <td>8005h</td> <td>PROFIdrive</td> </tr> </tbody> </table> <p>Behavior when any other profile is active:</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>PROFIdrive</td> </tr> <tr> <td>8001h</td> <td>ABB Drives</td> </tr> <tr> <td>8002h</td> <td>Transparent 16</td> </tr> <tr> <td>8003h</td> <td>Transparent 32</td> </tr> <tr> <td>8004h</td> <td>PROFIdrive positioning mode</td> </tr> <tr> <td>8005h</td> <td>PROFIdrive v.4.2</td> </tr> </tbody> </table> | Value | Mode                    | 1 | PROFIdrive v.4.2 | 8001h  | ABB Drives                           | 8002h | Transparent 16 | 8003h | Transparent 32 | 8004h | PROFIdrive positioning mode | 8005h | PROFIdrive | Value | Mode | 1 | PROFIdrive | 8001h | ABB Drives | 8002h | Transparent 16 | 8003h | Transparent 32 | 8004h | PROFIdrive positioning mode | 8005h | PROFIdrive v.4.2 |
| Value    | Mode                                 |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 1        | PROFIdrive v.4.2                     |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 8001h    | ABB Drives                           |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 8002h    | Transparent 16                       |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 8003h    | Transparent 32                       |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 8004h    | PROFIdrive positioning mode          |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 8005h    | PROFIdrive                           |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| Value    | Mode                                 |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 1        | PROFIdrive                           |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 8001h    | ABB Drives                           |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 8002h    | Transparent 16                       |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 8003h    | Transparent 32                       |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 8004h    | PROFIdrive positioning mode          |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 8005h    | PROFIdrive v.4.2                     |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 933      | R/W                                  | Unsigned16 | <p>Selection switch for Control word, bit 11.</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Module Control word bit</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>None</td> </tr> <tr> <td>1 to 5</td> <td>Vendor-specific 1 to 5<sup>2)</sup></td> </tr> </tbody> </table> <p><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.</p>  | Value | Module Control word bit | 0 | None             | 1 to 5 | Vendor-specific 1 to 5 <sup>2)</sup> |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| Value    | Module Control word bit              |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 0        | None                                 |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 1 to 5   | Vendor-specific 1 to 5 <sup>2)</sup> |            |   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |
| 934      | R/W                                  | Unsigned16 | <p>Selection switch for Control word, bit 12. (See parameter <a href="#">933</a> for coding.)</p> <p><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.</p>   |       |                         |   |                  |        |                                      |       |                |       |                |       |                             |       |            |       |      |   |            |       |            |       |                |       |                |       |                             |       |                  |

| Par. no. | R/W <sup>1)</sup>                    | Data type  | Description  |       |                        |   |      |        |                                      |
|----------|--------------------------------------|------------|--|-------|------------------------|---|------|--------|--------------------------------------|
| 935      | R/W                                  | Unsigned16 | Selection switch for Control word, bit 13. (See parameter 933 for coding.)<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.   |       |                        |   |      |        |                                      |
| 936      | R/W                                  | Unsigned16 | Selection switch for Control word, bit 14. (See parameter 933 for coding.)<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.   |       |                        |   |      |        |                                      |
| 937      | R/W                                  | Unsigned16 | Selection switch for Control word, bit 15. (See parameter 933 for coding.)<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.   |       |                        |   |      |        |                                      |
| 939      | R/W                                  | Unsigned16 | Selection switch for Status word, bit 11.<br><table border="1" data-bbox="666 952 1317 1086"> <thead> <tr> <th>Value</th> <th>Module Status word bit</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>None</td> </tr> <tr> <td>1 to 4</td> <td>Vendor-specific 1 to 4<sup>2)</sup></td> </tr> </tbody> </table><br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile. | Value | Module Status word bit | 0 | None | 1 to 4 | Vendor-specific 1 to 4 <sup>2)</sup> |
| Value    | Module Status word bit               |            |  |       |                        |   |      |        |                                      |
| 0        | None                                 |            |  |       |                        |   |      |        |                                      |
| 1 to 4   | Vendor-specific 1 to 4 <sup>2)</sup> |            |  |       |                        |   |      |        |                                      |
| 940      | R/W                                  | Unsigned16 | Selection switch for Status word, bit 12. (See parameter 939 for coding.)<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.  |       |                        |   |      |        |                                      |
| 941      | R/W                                  | Unsigned16 | Selection switch for Status word, bit 13. (See parameter 939 for coding.)<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.  |       |                        |   |      |        |                                      |
| 942      | R/W                                  | Unsigned16 | Selection switch for Status word, bit 14. (See parameter 939 for coding.)<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.  |       |                        |   |      |        |                                      |
| 943      | R/W                                  | Unsigned16 | Selection switch for Status word, bit 15. (See parameter 939 for coding.)<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.  |       |                        |   |      |        |                                      |
| 944      | R                                    | Unsigned16 | Fault message counter  |       |                        |   |      |        |                                      |

| Par. no.                            | R/W <sup>1)</sup>          | Data type                | Description  |          |          |                                     |                            |   |                          |
|-------------------------------------|----------------------------|--------------------------|--|----------|----------|-------------------------------------|----------------------------|---|--------------------------|
| 945                                 | R                          | Array[64]<br>Unsigned16  | <p>Fault code (coded according to DRIVECOM profile). Supported with ACS355 drives only.</p> <p><b>Note:</b> The drive may limit the actual number of the faults recorded.</p> <table border="1"> <thead> <tr> <th>Subindex</th> <th>Contents</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Active fault</td> </tr> </tbody> </table> | Subindex | Contents | 1                                   | Active fault               |   |                          |
| Subindex                            | Contents                   |                          |  |          |          |                                     |                            |   |                          |
| 1                                   | Active fault               |                          |  |          |          |                                     |                            |   |                          |
| 946                                 | R                          | Array [n]<br>Unsigned16  | <p>Fault code list. Contains the mapping between DRIVECOM fault codes and Channel Error Types.</p> <p>If you use a DRIVECOM fault code as an index when reading PNU946, the corresponding Channel Error Type is returned.</p>  |          |          |                                     |                            |   |                          |
| 947                                 | R                          | Array [64]<br>Unsigned16 | <p>Fault number.</p> <table border="1"> <thead> <tr> <th>Subindex</th> <th>Contents</th> </tr> </thead> <tbody> <tr> <td colspan="2">See parameter <a href="#">945</a>.</td> </tr> </tbody> </table>   | Subindex | Contents | See parameter <a href="#">945</a> . |                            |   |                          |
| Subindex                            | Contents                   |                          |  |          |          |                                     |                            |   |                          |
| See parameter <a href="#">945</a> . |                            |                          |  |          |          |                                     |                            |   |                          |
| 950                                 | R                          | Array [2]<br>Unsigned16  | <p>Size of the fault buffer</p> <table border="1"> <thead> <tr> <th>Subindex</th> <th>Contents</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Amount of fault situations</td> </tr> <tr> <td>1</td> <td>Amount of fault messages</td> </tr> </tbody> </table>   | Subindex | Contents | 0                                   | Amount of fault situations | 1 | Amount of fault messages |
| Subindex                            | Contents                   |                          |  |          |          |                                     |                            |   |                          |
| 0                                   | Amount of fault situations |                          |  |          |          |                                     |                            |   |                          |
| 1                                   | Amount of fault messages   |                          |  |          |          |                                     |                            |   |                          |
| 952                                 | R/W                        | Unsigned16               | <p>Number of faults occurred. Writing a zero clears the value.</p> <p><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.</p>   |          |          |                                     |                            |   |                          |
| 953                                 | R                          | Unsigned16               | <p><sup>3)</sup> Last alarm</p> <p><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.</p>  |          |          |                                     |                            |   |                          |
| 954                                 | R                          | Unsigned16               | <p><sup>3)</sup> Second last alarm</p> <p><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.</p>   |          |          |                                     |                            |   |                          |

| Par. no. | R/W <sup>1)</sup> | Data type  | Description  |
|----------|-------------------|------------|--|
| 955      | R                 | Unsigned16 | <sup>3)</sup> Third last alarm<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.   |
| 956      | R                 | Unsigned16 | <sup>3)</sup> Fourth last alarm<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.  |
| 957      | R                 | Unsigned16 | <sup>3)</sup> Fifth last alarm<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.   |
| 958      | R                 | Unsigned16 | Sixth last alarm (not supported)<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.   |
| 959      | R                 | Unsigned16 | Seventh last alarm (not supported)<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.   |
| 960      | R                 | Unsigned16 | Eighth last alarm (not supported)<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.  |
| 963      | R                 | Unsigned16 | Detected baud rate:<br><b>0</b> = 9.6 kbit/s<br><b>1</b> = 19.2 kbit/s<br><b>2</b> = 93.75 kbit/s<br><b>3</b> = 187.5 kbit/s<br><b>4</b> = 500 kbit/s<br><b>6</b> = 1.5 Mbit/s<br><b>7</b> = 3 Mbit/s<br><b>8</b> = 6 Mbit/s<br><b>9</b> = 12 Mbit/s<br><b>11</b> = 45.45 kbit/s<br><b>255</b> = Invalid baud rate |



| Par. no. | R/W <sup>1)</sup>               | Data type               | Description  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
|----------|---------------------------------|-------------------------|--|----------|-------------|---|---------------------------------|---|--------------------------|---|-----------------------|---|----------------------|---|------------------------------|---|----------------|---|---------------------------------|
| 964      | R                               | Array [7]<br>Unsigned16 | <table border="1"> <thead> <tr> <th>Subindex</th> <th>Contents</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Manufacturer code<br/>(ABB = 1A)</td> </tr> <tr> <td>1</td> <td>Device type = 1</td> </tr> <tr> <td>2</td> <td>FW version of FPBA-01</td> </tr> <tr> <td>3</td> <td>Firmware date (year)</td> </tr> <tr> <td>4</td> <td>Firmware date<br/>(day/month)</td> </tr> <tr> <td>5</td> <td>Number of Axes</td> </tr> <tr> <td>6</td> <td>Identification (<b>0959h</b>)</td> </tr> </tbody> </table> | Subindex | Contents    | 0 | Manufacturer code<br>(ABB = 1A) | 1 | Device type = 1          | 2 | FW version of FPBA-01 | 3 | Firmware date (year) | 4 | Firmware date<br>(day/month) | 5 | Number of Axes | 6 | Identification ( <b>0959h</b> ) |
| Subindex | Contents                        |                         |  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 0        | Manufacturer code<br>(ABB = 1A) |                         |  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 1        | Device type = 1                 |                         |  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 2        | FW version of FPBA-01           |                         |  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 3        | Firmware date (year)            |                         |  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 4        | Firmware date<br>(day/month)    |                         |  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 5        | Number of Axes                  |                         |  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 6        | Identification ( <b>0959h</b> ) |                         |  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 965      | R                               | Octet<br>String2        | Profile number of this device.<br>E.g.: 0302h = Profile 3, Version 2   |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 967      | R                               | Unsigned16              | Control word (CW)  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 968      | R                               | Unsigned16              | Status word (SW)   |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 970      | R/W                             | Unsigned16              | <p>Load parameter record</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No action</td> </tr> <tr> <td>1</td> <td>Restore factory settings</td> </tr> </tbody> </table> <p>The parameter must do a zero-to-one transition and the motor must be stopped.</p> <p><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.</p>  | Value    | Description | 0 | No action                       | 1 | Restore factory settings |   |                       |   |                      |   |                              |   |                |   |                                 |
| Value    | Description                     |                         |  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 0        | No action                       |                         |  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |
| 1        | Restore factory settings        |                         |  |          |             |   |                                 |   |                          |   |                       |   |                      |   |                              |   |                |   |                                 |

| Par. no.   | R/W <sup>1)</sup>  | Data type              | Description   |          |             |   |                |   |  |
|------------|--|------------------------|---|----------|-------------|---|----------------|---|--|
| 971        | R/W  | Unsigned16             | <p>Save parameter record</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No action</td> </tr> <tr> <td>1</td> <td>Save the drive parameters to non-volatile memory</td> </tr> </tbody> </table> <p>The parameter must do a zero-to-one transition and the motor must be stopped.</p> <p><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.</p> | Value    | Description | 0 | No action      | 1 | Save the drive parameters to non-volatile memory                                       |
| Value      | Description  |                        |   |          |             |   |                |   |  |
| 0          | No action  |                        |   |          |             |   |                |   |  |
| 1          | Save the drive parameters to non-volatile memory                                       |                        |   |          |             |   |                |   |  |
| 972        | R/W  | Unsigned16             | <p>Software reset</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No action</td> </tr> <tr> <td>1</td> <td>Re-boot PROFIBUS module</td> </tr> </tbody> </table> <p>The parameter must do a zero-to-one transition and the motor must be stopped.</p>   | Value    | Description | 0 | No action      | 1 | Re-boot PROFIBUS module  |
| Value      | Description  |                        |   |          |             |   |                |   |  |
| 0          | No action  |                        |   |          |             |   |                |   |  |
| 1          | Re-boot PROFIBUS module  |                        |   |          |             |   |                |   |  |
| 975        | R  | Array[n]<br>Unsigned16 | <p>DO identification. For subindexes 0...4, see parameter <a href="#">964</a>.</p> <table border="1"> <thead> <tr> <th>Subindex</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>Value 2 = Axis</td> </tr> <tr> <td>6</td> <td>Bit 0 = 1 → Application Class 1 supported<br/>Bit 2 = 1 → Application Class 3 supported</td> </tr> </tbody> </table>   | Subindex | Meaning     | 5 | Value 2 = Axis | 6 | Bit 0 = 1 → Application Class 1 supported<br>Bit 2 = 1 → Application Class 3 supported |
| Subindex   | Meaning  |                        |   |          |             |   |                |   |  |
| 5          | Value 2 = Axis   |                        |   |          |             |   |                |   |  |
| 6          | Bit 0 = 1 → Application Class 1 supported<br>Bit 2 = 1 → Application Class 3 supported |                        |   |          |             |   |                |   |  |
| 980<br>981 | R  | Array[n]<br>Unsigned16 | <p>Number list of the defined parameters. If the subindex is 0, the end of the list has been reached. If the subindex is the number of the next list parameter, the list is continued there.</p> <p><b>Note:</b> parameter 981 is not available with PROFIdrive v4.2 profile.</p>   |          |             |   |                |   |  |

| Par. no. | R/W <sup>1)</sup> | Data type | Description   |
|----------|-------------------|-----------|---|
| 60000    | R/W               | Float32   | Velocity reference scaling value.<br><b>Note:</b> Available for PROFIdrive v4.2 profile only. |

<sup>1)</sup> Read and/or Write

<sup>2)</sup> The meaning of vendor-specific bits is defined by the drive application program.

<sup>3)</sup> Support depends on the drive type.

---



A large, bold, black number '12' is centered within a light grey square with rounded corners.

# Appendix B – I&M records

---

## Contents of this chapter

This chapter contains the telegram and response structures for I&M (Identification & Maintenance) records.

## I&M records

I&M records can be read, for example, with the DTM tool. The FPBA-01 module supports the mandatory I&M0 record as well as the optional I&M1 and I&M2 records.

---

## ■ Call-REQ-PDU telegram for read/write access to I&M records

|                     | Contents              | Size      | Coding       | Notes   |
|---------------------|-----------------------|-----------|--------------|---|
| <b>DP-V1 header</b> | Function_Num          | 1 Octet   | 5Fh          | fixed   |
|                     | Slot_Number           | 1 Octet   | 0...255      | variable  |
|                     | Index                 | 1 Octet   | 255          | fixed   |
|                     | Length                | 1 Octet   | 4 / 68       | Call Header only / Write  |
| <b>Call Header</b>  | Extended_Function_Num | 1 Octet   | 08h          | Indicates “Call”, fixed   |
|                     | reserved              | 1 Octet   | 00h          | fixed   |
|                     | FI_Index              | 2 Octets  | 65000<br>... | Subindex of I&M0 Record<br>65000 = I&M0<br>65001 = I&M1<br>65002 = I&M2 |
|                     | IM_Function           | 64 Octets | Data         | Write only (I&M1 or I&M2)   |

## ■ Response structure for I&M0 (Read-only)

|                      | Contents              | Size      | Coding  |
|----------------------|-----------------------|-----------|---|
| <b>Header</b>        | Manufacturer-specific | 10 Octets | “FPBA-01”   |
| <b>I&amp;M block</b> | MANUFACTURER_ID       | 2 Octets  | 0x1A = ABB Automation   |
|                      | ORDER_ID              | 20 Octets | “68469325” (for FPBA-01 kit)  |
|                      | SERIAL_NUMBER         | 16 Octets | Serial number of FPBA module  |
|                      | HARDWARE_REVISION     | 2 Octets  | Hardware version of FPBA module                                     |
|                      | SOFTWARE_REVISION     | 4 Octets  | Format: <b>V255.255.255</b><br>E.g., V1.0.0 = software version 1.00 |
|                      | REVISION_COUNTER      | 2 Octets  | (Marks a change of hardware or its parameters)                      |
|                      | PROFILE_ID            | 2 Octets  | 3A00 (...3AFF)<br>PROFIdrive  |
|                      | PROFILE_SPECIFIC_TYPE | 2 Octets  | 0 = no specific type  |
|                      | IM_VERSION            | 2 Octets  | 0x0101 = version 1.1  |
|                      | IM_SUPPORTED          | 2 Octets  | 3 = I&M0, I&M1 and I&M2 supported                                   |

### ■ Response structure for I&M1 (Read/Write)

|                       | Contents              | Size      | Coding                  |
|-----------------------|-----------------------|-----------|-------------------------|
| <b>Header</b>         | Manufacturer-specific | 10 Octets | –                       |
| <b>I&amp;M0 block</b> | TAG_FUNCTION          | 32 Octets | Device function or task |
|                       | TAG_LOCATION          | 22 Octets | Device location         |

### ■ Response structure for I&M2 (Read/Write)

|                       | Contents              | Size      | Coding  |
|-----------------------|-----------------------|-----------|---|
| <b>Header</b>         | Manufacturer-specific | 10 Octets | –   |
| <b>I&amp;M0 block</b> | INSTALLATION_DATE     | 16 Octets | Installation date.<br>E.g., <b>2011-01-01 16:23</b> |
|                       | RESERVED              | 38 Octets | Reserved  |

**Note:** I&M1 and I&M2 are blank (0x20) by default.



---

# Further information

## Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to [abb.com/searchchannels](http://abb.com/searchchannels).

## Product training

For information on ABB product training, navigate to [new.abb.com/service/training](http://new.abb.com/service/training).

## Providing feedback on ABB manuals

Your comments on our manuals are welcome. Navigate to [new.abb.com/drives/manuals-feedback-form](http://new.abb.com/drives/manuals-feedback-form).

## Document library on the Internet

You can find manuals and other product documents in PDF format on the Internet at [abb.com/drives/documents](http://abb.com/drives/documents).



[abb.com/drives](https://abb.com/drives)



3AFE68573271H