

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

ABB DRIVES

RPBA-01 3ABD64606859

PROFIBUS DP ADAPTER MODULE

Used with the applicable ABB drive communication adapters configuration.

REFERENCE PACKAGE

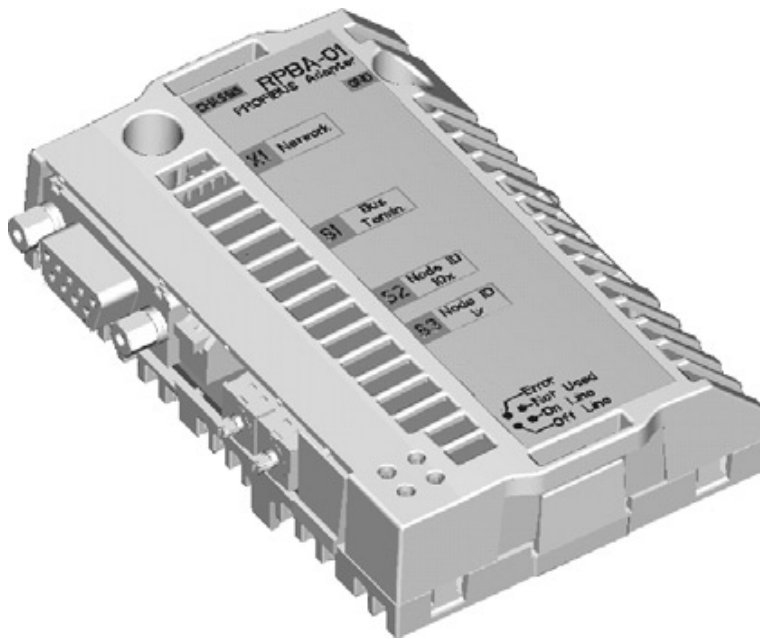
OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: ABB RPBA-01 PROFIBUS DP Adapter Module User's Manual 3AFE64504215

ABB Drives

User's Manual PROFIBUS DP Adapter Module RPBA-01



Overview

Overview

This chapter contains a short description of the PROFIBUS standard and the RPBA-01 PROFIBUS DP Adapter module, a delivery checklist and warranty information.

PROFIBUS standard

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) and PROFIBUS-PA (Process Automation). The RPBA-01 PROFIBUS DP Adapter module supports the PROFIBUS DP protocol, including its DP-V1 extension.

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 metres, depending on the selected transmission rate (see Technical data chapter). Up to 31 nodes can be connected to the same PROFIBUS network segment without the use of repeaters. With repeaters, it is possible to connect 127 nodes (including repeaters and master station) to the network.

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 the PROFIdrive Profile – The PROFIBUS Profile for Adjustable Speed

Drives. For further information on PROFIBUS, refer to the above-mentioned standards.

The RPBA-01 PROFIBUS DP Adapter module

The RPBA-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 as a slave on the PROFIBUS network. Through the RPBA-01 PROFIBUS DP Adapter module, it is possible to:

- give control commands to the drive (Start, Stop, Run enable, etc.)
- 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.

The PROFIBUS commands and services supported by the RPBA-01 PROFIBUS DP Adapter module are discussed in the chapters *DP-V0 communication* and *DP-V1 communication*. Please 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 board of the drive. See the Hardware Manual of the drive for module placement options.

Configuration of the master station requires a type definition (GSD) file. For DP-V0 communication, the file is available from **www.profibus.com** or an ABB representative (the filename is **ABB_0812.GSD**). For DP-V1 communication, the type definition (GSD) file is available from an ABB representative (the filename is **ABB10812.GSD**).

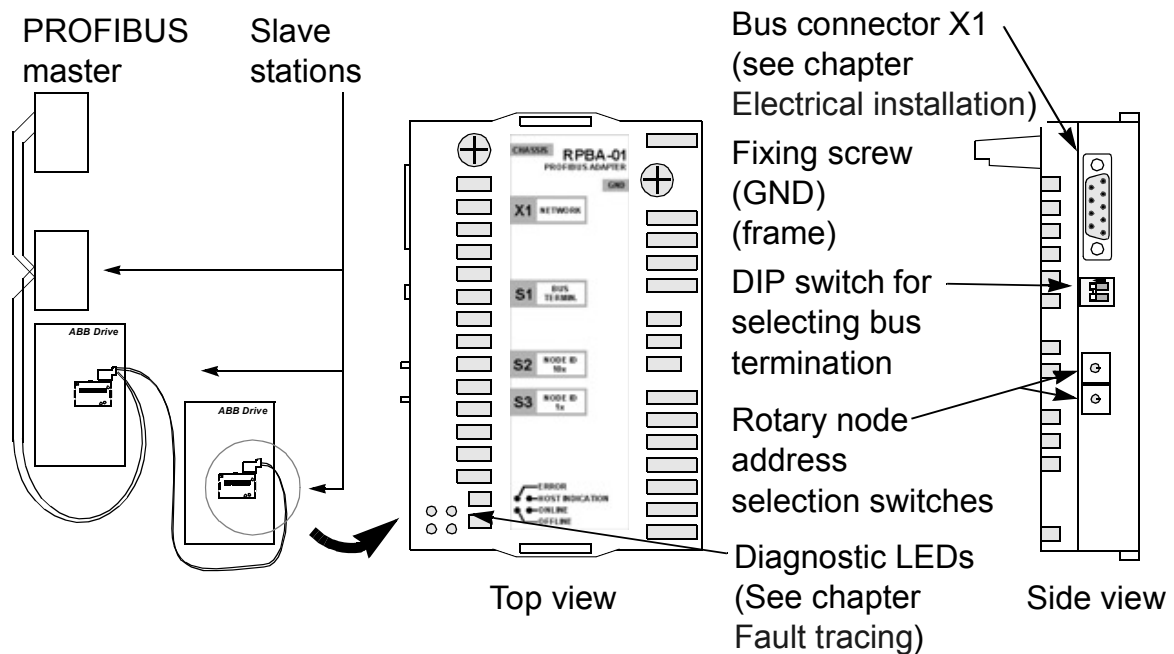


Figure 1. The construction of the PROFIBUS link and the RPBA-01 Adapter module.

Compatibility

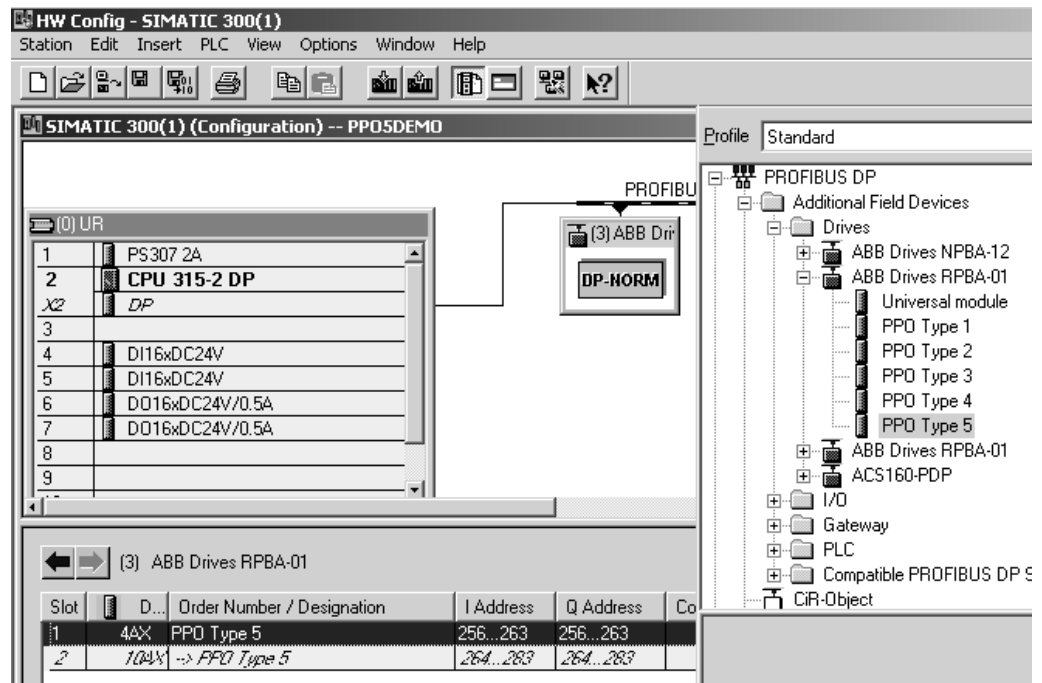
The RPBA-01 is compatible with all master stations that support the PROFIBUS DP protocol.

Delivery check

The option package for the RPBA-01 PROFIBUS DP Adapter module contains:

- PROFIBUS DP Adapter module, type RPBA-01
- two screws (M3x10)
- this manual.

- Set the PPO type, baud rate and node number.



Mechanical and electrical installation

- Set the node address using the rotary switches on the module.
(If the node address is set by software, set the switches to the "0" position.)
- Set the bus termination switch to the desired position.
- Insert the RPBA-01 into its specified slot in the drive (SLOT2 for ACS550, SLOT1 for ACS800).
- Fasten the two screws.
- Plug the fieldbus connector to the module.

Drive configuration

- Power up the drive.
- The detailed procedure of activating the drive for communication with the module is dependent on the drive type. Normally, a parameter must be adjusted to activate the communication. Refer to the *Firmware Manual* of the drive for

Mechanical installation



WARNING! Follow the safety instructions given in this manual and in the Hardware Manual.

Mounting

The RPBA-01 is to be inserted into its specific position in the drive. The module is held in place with plastic retaining clips and two screws. The screws also provide the earthing of the I/O cable shield connected to the module, and interconnect the GND signals of the module and the control board of the drive.

On installation of the module, the signal and power connection to the drive is automatically made through a 34-pin connector.

Mounting procedure:

- Insert the module carefully into its position inside the drive until the retaining clips lock the module into position.
- Fasten the two screws (included) to the stand-offs.
- Set the bus termination switch of the module to the required position.

Note: Correct installation of the screws is essential for fulfilling the EMC requirements and for proper operation of the module.

Note: Make sure the drive is properly grounded. For more information, see the drive documentation.

Electrical installation

Overview

This chapter contains:

- general cabling instructions
- instructions for setting module node address number and bus termination
- instructions for connecting the module to the PROFIBUS DP network.



WARNING! Before installation, switch off the drive power supply. Wait five minutes to ensure that the capacitor bank of the drive is discharged. Switch off all dangerous voltages connected from external control circuits to the inputs and outputs of the drive.

General cabling instructions

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

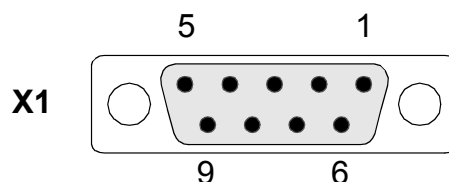
Bus termination

The DIP switch on the front of the RPBA-01 module is used to switch on bus termination. Bus termination prevents signal reflections from the cable ends. Bus termination must be set to ON if the module is the last or first module on the network. When using PROFIBUS specific D-sub connectors with built-in termination, the RPBA-01 termination must be switched off.

PROFIBUS connection

The bus cable is connected to connector X1 on the RPBA-01.

The connector pin allocation described below follows the PROFIBUS standard.



X1		Description
1		Not used
2		Not used
3	B	Data positive (Conductor 1 in twisted pair).
4	RTS	Request To Send
5	GND BUS	Isolated ground
6	+5V	Isolated 5V DC voltage supply
7		Not used
8	A	Data negative (Conductor 2 in twisted pair).
9		Not used
Housing	SHLD	PROFIBUS cable shield. Internally connected to GND BUS via an RC filter and directly to CHGND.

+5V and GND BUS are used for bus termination. Some devices, like optical transceivers (RS485 to fibre optics) might require external power supply from these pins.

RTS is used in some equipment to determine the direction of transmission. In normal applications only the line A, line B and shield are used.

Note: The new settings take effect only when the module is powered up the next time or when the module receives a 'Fieldbus Adapter parameter refresh' command from the drive.

Data transfer rates supported

The RPBA-01 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 RPBA-01 automatically detects the communication speed and PPO-type used.

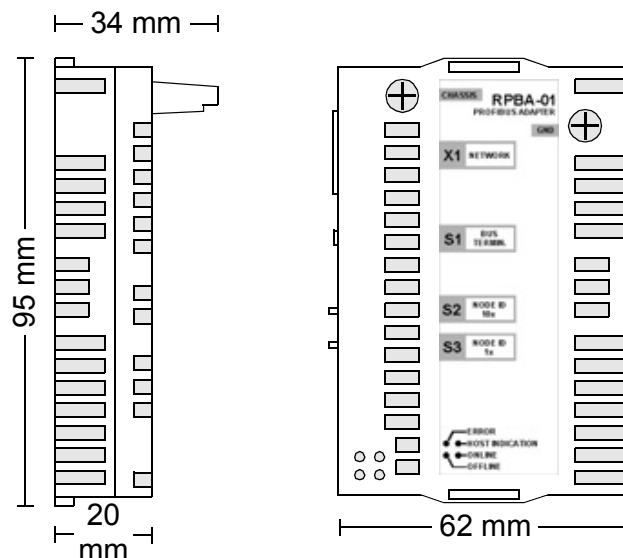
Table 5. The RPBA-01 configuration parameters.

Par. no.	Parameter name	Alternative settings	Default setting
1	MODULE TYPE	(Read-only)	PROFIBUS DP
2	NODE ADDRESS	0 to 126	3
3	BAUD RATE ¹⁾	(12000) 12 Mbit/s; (6000) 6 Mbit/s; (3000) 3 Mbit/s; (1500) 1.5 Mbit/s; (500) 500 kbit/s; (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; (Read-only)	1500
4	PPO-TYPE ¹⁾	(1) PPO 1; (2) PPO 2; (3) PPO 3; (4) PPO 4; (5) PPO 5; (6) PPO 6; (Read-only)	(1) PPO 1
5	PZD3 OUT	0 to 32767 with format xxyy, where xx = Parameter Group and yy = Parameter Index. See description below.	0
6	PZD3 IN	See PZD3 OUT above	0
7	PZD4 OUT	See PZD3 OUT above	0
8	PZD4 IN	See PZD3 OUT above	0
...	...		

Technical data

RPBA-01

Enclosure:



Mounting: Into the option slot on the control board of the drive.

Degree of protection: IP20

Ambient conditions: The applicable ambient conditions specified for the drive in its *Hardware Manual* are in effect.

Hardware settings:

- Rotary switches for node address selection (address range 00 to 99)
- DIP switch for bus termination selection

Software settings:

- Input/Output/User Parameter data/Diagnostics format
- Maximum cyclic I/O data size: 28 bytes in, max 28 bytes out, max. 56 bytes total
- Maximum acyclic I/O data size: 240 bytes in, max. 240 bytes out, max. 480 bytes total
- Maximum User Parameter data/Diagnostics length: 26 bytes

Connectors:

- 34-pin parallel bus connector
- 9-pin female DSUB connector

Current consumption:

- 350 mA max. (5 V), supplied by the control board of the drive

General:

- Estimated min. lifetime: 100 000 h
- All materials UL/CSA-approved
- Complies with EMC standards EN 50081-2 and EN 50082-2

PROFIBUS link

Compatible devices: All devices compatible with the PROFIBUS DP protocol

Size of the link: 127 stations including repeaters (31 stations and 1 repeater per segment)

Medium: Shielded, twisted pair RS-485 cable

- Termination: built in the module
- Specifications:

Parameter	Line A PROFIBUS DP	Line B DIN 19245 Part 1	Unit
Impedance	135 to 165 (3 to 20 MHz)	100 to 130 (f > 100 kHz)	W
Capacitance	< 30	< 60	pF/m
Resistance	< 110	–	Ω /km
Wire gauge	> 0.64	> 0.53	mm
Conductor area	> 0.34	> 0.22	mm ²

- Maximum bus length:

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

Topology: Multi-drop

Serial communication type: Asynchronous, half Duplex

Transfer rate: 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, or 12 Mbit/s (automatically detected by RPBA-01)

Protocol: PROFIBUS DP