MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

CONTROL TECHNIQUES

SM-PROFIBUS DP-V1

PROFIBUS DP-V1 COMMUNICATIONS OPTION MODULE

Used with the applicable Control Techniques fieldbus option modules configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Control Techniques SM-PROFIBUS DP-V1 User Guide

Nidec

All for dreams



User Guide

SM-PROFIBUS DP-V1

Solutions Module for:

- Unidrive SP
- Commander SK
- Affinity
- Digitax ST
- Mentor MP

Part Number: 0471-0008-11
Issue Number: 11

The second method of transfer is called non-cyclic data and is used for sending values that only need to be changed occasionally or where the source or destination of the signal changes. This is the equivalent of a temporary patch lead that is removed after use.

2.2 Software Statement

This Solutions Module (SM) is supplied with the latest software version. When retro-fitting to an existing system, all software versions should be verified to confirm the same functionality as Solutions Modules of the same type already present. This also applies to products returned from a Control Techniques Service Centre or Repair Centre. If there is any doubt please contact the supplier of the product.

The software version of the Solutions Module can be identified by looking at Pr **MM.02** and Pr **MM.51**, where **MM** is the relevant menu number for the Solutions Module slot being used.

See Pr **MM.02** and Pr **MM.51** description later in this manual for more information.

The software version takes the form of xx.yy.zz, where Pr **MM.02** displays xx.yy and Pr **MM.51** displays zz (e.g. for software version 01.01.00 Pr **MM.02** will display 1.01 and Pr **MM.51** will display 0).

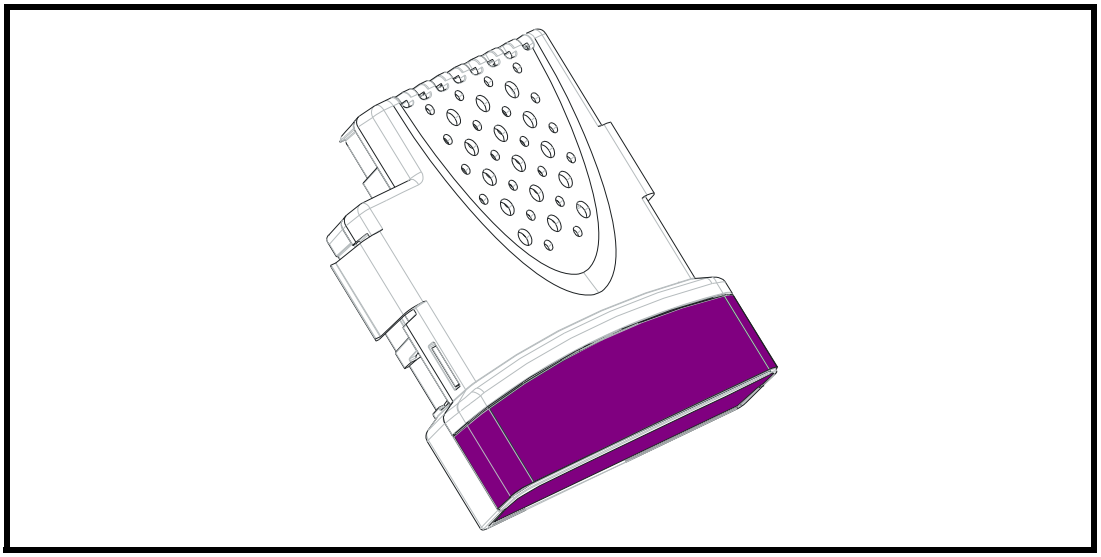
2.3 What is SM-PROFIBUS DP-V1?

The SM-PROFIBUS DP-V1 is a fieldbus Solutions Module that can be installed to the expansion slot(s) in any of the following drives to provide PROFIBUS-DP slave connectivity:

- Unidrive SP
- Commander SK
- Affinity
- Digitax ST
- Mentor MP

With the exception of the Commander SK drive, it is possible to use more than one SM-PROFIBUS DP-V1 or a combination of SM-PROFIBUS DP-V1 and other Solution Modules to add additional functionality such as extended I/O, gateway functionality, or additional PLC features.

Figure 2-3 SM-PROFIBUS DP-V1



2.4 General specification

2.4.1 Features

The following section gives a brief overview of the functionality available within SM-PROFIBUS DP-V1.

- Supported data rates (bits/s): 12M, 6.0M, 3.0M, 1.5M, 500k, 187.5k, 93.75k, 45.45k, 19.2k, 9.6k.
- Maximum of 32 input and 32 output cyclic data words supported
- PROFIdrive profiles (V2 and V4) supported
- Non-cyclic data channel supported
- Parallel acyclic/cyclic data communication

The SM-PROFIBUS DP-V1 is powered from the host drive's internal power supply.

2.4.2 Main differences between DP-V0 and DP-V1

The main differences between DP-V0 and DP-V1 supported by SM-PROFIBUS DP-V1 are:

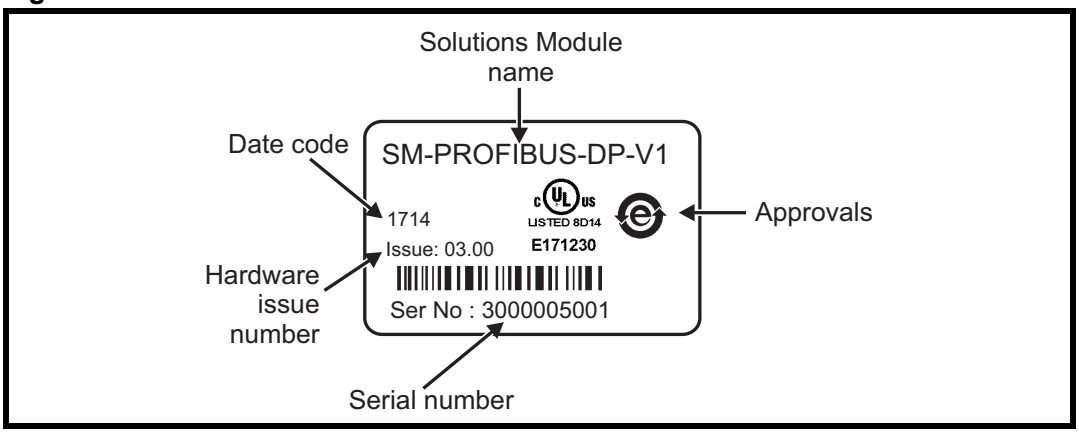
- PROFIdrive profile V4 support, which consists of
  - Standard Telegram 1
  - PROFIdrive PNU Access
  - Drive Identification
  - Fault Buffer
  - Identification and Maintenance Functions
- Non-cyclic data channel access

2.5 Solutions Module identification

The SM-PROFIBUS DP-V1 can be identified by:

1. The label located on the underside of the Solutions Module.
2. The color coding across the front of the SM-PROFIBUS DP-V1 (purple).

Figure 2-4 SM-PROFIBUS DP-V1 labels



2.5.1 Date code format

The date code is four numbers. The first two numbers indicate the year and the remaining numbers indicate the week of the year in which the drive was built.

Example:

A date code of 1710 would correspond to week 10 of year 2017.

3 Mechanical installation

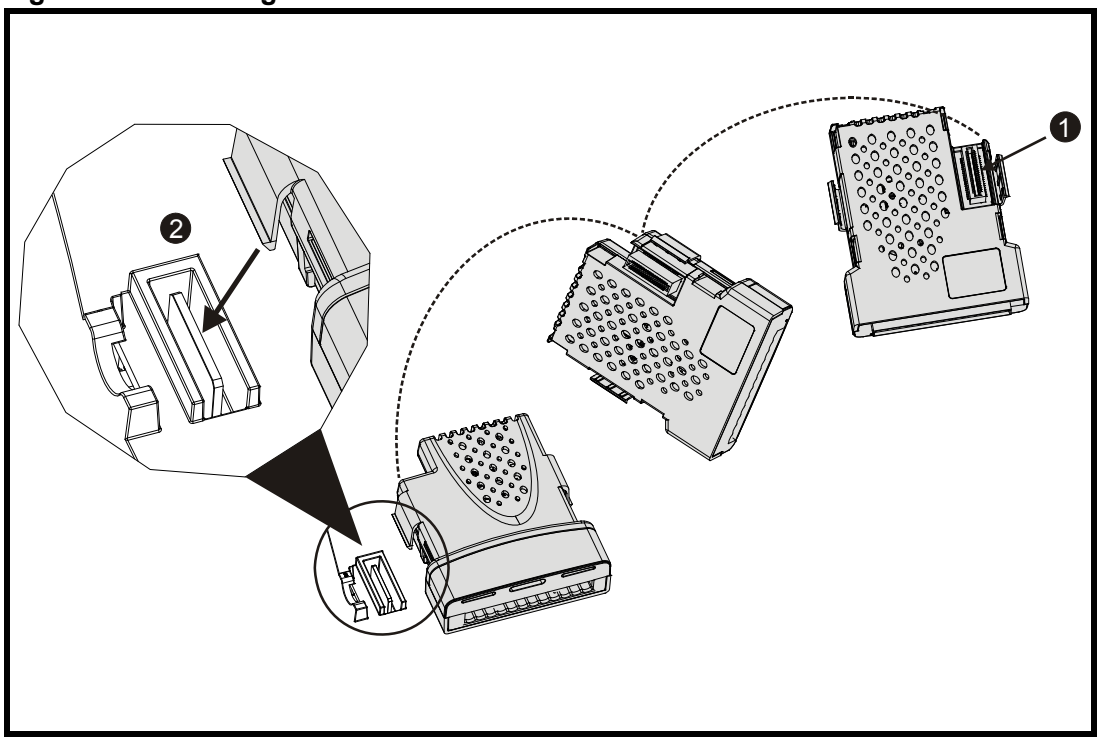


Before installing or removing a Solutions Module in any drive, ensure the AC supply has been disconnected for at least 10 minutes and refer to Chapter 1 *Safety information* on page 8. If using a DC bus supply ensure this is fully discharged before working on any drive or Solutions Module.

3.1 General Installation

The installation of a Solutions Module is illustrated in Figure 3-1.

Figure 3-1 Installing a Solutions Module



The Solutions Module connector is located on the underside of the module (1). Push this into the Solutions Module slot located on the drive until it clicks into place (2). Note that some drives require a protective tab to be removed from the Solutions Module slot. For further information, refer to the appropriate drive documentation.

4 Electrical installation

4.1 Terminal descriptions

The SM-PROFIBUS DP-V1 has a standard 9-way female D-type connector for the PROFIBUS-DP network.

Figure 4-1 SM-PROFIBUS DP-V1 terminals

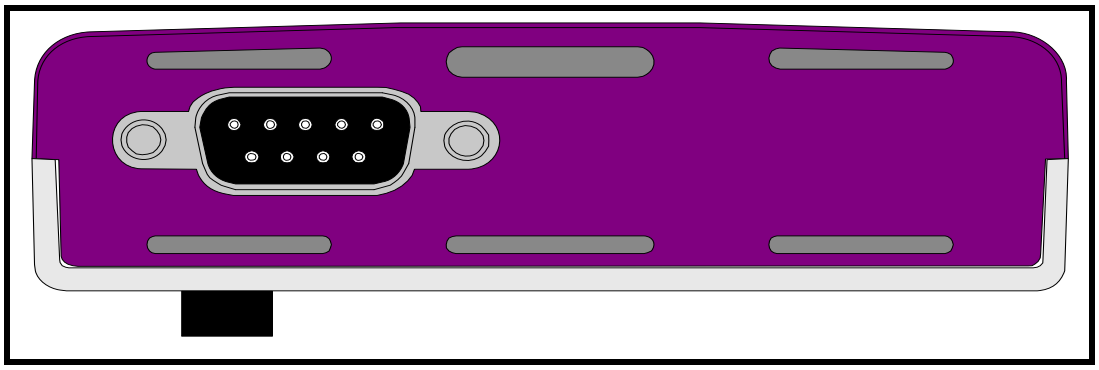


Figure 4-2 SM-PROFIBUS DP-V1 D-Type pin out

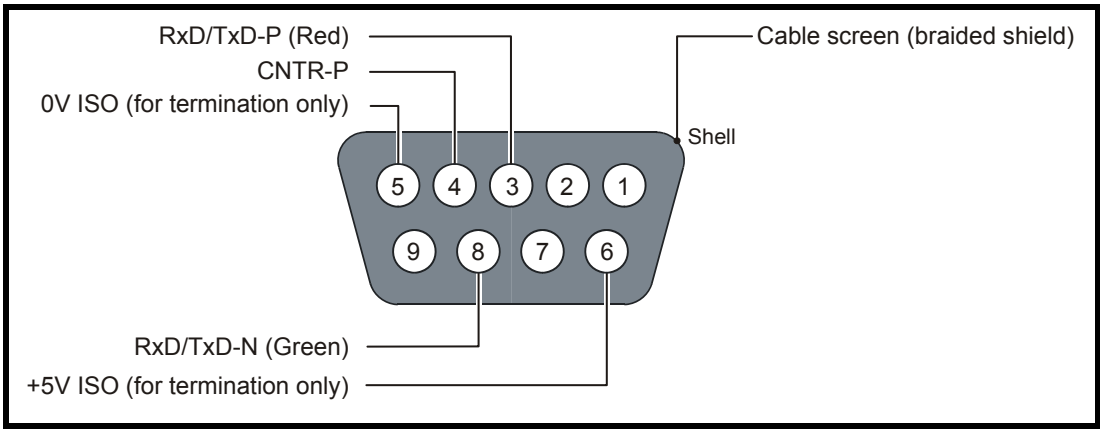


Table 4.1 D-Type connections

D-type Terminal	Function	Description
3	RxD/TxD-P	Positive data line (B) - Red
8	RxD/TxD-N	Negative data line (A) - Green
6	+5V ISO	+5V isolated, use only for termination resistors
5	0V ISO	0V isolated, use only for termination resistors
4	CNTR-P	RTS line
1, Shell	Shield	Cable shield connection

Control Techniques recommend using connectors approved by Profibus International at all times.

4.2 PROFIBUS-DP connectors

There are many manufacturers of PROFIBUS-DP connectors. Always ensure that any connectors used on the network are fully approved for use with PROFIBUS-DP. Some of the connector types available include built in termination that allows the network to be isolated, this can be very useful when fault finding. For data rates above 1.5Mbs connectors installed with integrated inductors should be used.

4.3 PROFIBUS-DP cable

PROFIBUS-DP networks can run at high data rates and require cable specifically designed to carry high frequency signals. Low quality cable will attenuate the signals, and may render the signal unreadable for the other nodes on the network. Cable specifications and a list of approved manufacturers of cable for use on PROFIBUS-DP networks are available on the PROFIBUS Nutzerorganization (PNO) web site at *www.profibus.com*.

NOTE Control Techniques can only guarantee correct and reliable operation of the SM-PROFIBUS DP-V1 if all other equipment on the PROFIBUS-DP network (including the network cable) has been approved by the PNO and is correctly installed.

4.4 Cable shielding

Correct shielding of the PROFIBUS-DP cable is required for reliable operation at high data rates, this can be achieved by exposing the cable shield of each PROFIBUS-DP cable and ensuring that they are clamped to the drive grounding metalwork as close as possible to the drive termination, contact your supplier or local Control Techniques Drive Centre for more information.

NOTE Unless there are specific reasons for not grounding the network it is recommended that all drive network connections are correctly grounded. Failure to do so may reduce the noise immunity of the system. If there are specific issues with grounding, alternative methods of connection should be considered such as the use of fibre optic cable.

4.5 General grounding considerations

It is essential that good grounding is provided not only for network stability but more importantly electrical safety. In all instances electrical regulations should be adhered to. As a guide the network cable should be grounded at least once per cabinet, ideally on each drive.

4.6 Network termination

It is very important in high-speed communications networks that the network communications cable is installed with the specified termination resistor network at each end of each segment. This prevents signals from being reflected back down the cable and causing interference.

Most ranges of connectors provide specific parts that incorporate the termination network. Such connectors derive the power from the host device and if the host device is switched off the termination will be lost. To avoid this situation a separate termination device is available that is powered independently of the network devices. For more information go to *www.profibus.com*.

NOTE Failure to terminate a network correctly can seriously affect the operation of the network. If the correct termination networks are not installed, the noise immunity of the network is greatly reduced. Each network segment must be correctly terminated.

4.7 Maximum network length / device loading

The maximum number of devices that can be connected to a single PROFIBUS-DP network segment is 32, this includes all nodes and any repeaters. The maximum lengths of cable for a segment depend on the data rate and are shown in Table 4.2.

Repeaters or fiber optic segments can be used to extend the network, allowing more than 32 nodes to be connected on the network. The maximum number of nodes on a single network is 125.

NOTE For full details on designing and installing a PROFIBUS-DP network, refer to *Installation Guidelines for PROFIBUS-DP/FMS*. This document is available from the PROFIBUS web site at *www.profibus.com*.

Table 4.2 PROFIBUS-DP maximum network lengths

Data rate (bits/s)	Maximum trunk length (m)
12M	100
6.0M	100
3.0M	100
1.5M	200
500k	400
187.5k	1000
93.75k	1200
45.45k	1200
19.2k	1200
9.6K	1200

4.8 Node addressing

SM-PROFIBUS DP-V1 has a valid address range of 1 to 125. Addresses 126 and 0 are reserved for system use and should not be used. The addressing scheme used is at the discretion of the end user however it is recommended that nodes are numbered in order as they appear on the physical network. It is not necessary to use consecutive numbers and gaps in the addressing scheme may be left to allow for future expansion.

4.9 Spurs

The PROFIBUS-DP specification allows spurs at data rates less than 1.5Mbits/s. At data rates below 1.5Mbits/s there are specific requirements for capacitance and length of cable allowed when using spurs. Control Techniques recommend that spurs are not used as extreme care is required at the design stage to avoid network problems. More information on spurs can be found on the PROFIBUS web site at *www.profibus.com*.

4.10 Minimum node to node cable length

The minimum recommended node to node distance is one metre of network cable. This distance is necessary to avoid multiple nodes generating a single large reflection on the network, using less than one metre of cable between nodes can have serious implications for network reliability.

5 Getting started

This section is intended to provide a generic guide for setting up SM-PROFIBUS DP-V1 and a master controller. Figure 5-1 is intended as a guide only and is provided to detail the stages that are required to achieve a functioning network. It is recommended that all of this chapter is read, before attempting to configure a system.

NOTE Due to the large number of PLCs/masters that support PROFIBUS-DP only generic details can be provided. Support is available through your supplier or local Control Techniques Drive Centre.

NOTE Before contacting your supplier or local Control Techniques Drive Centre for support ensure you have read Chapter 10 *Diagnostics* on page 59 of this manual and check you have configured all parameters correctly.
Ensure the following information is available before calling:

- A list of all parameters in SM-PROFIBUS DP-V1.
- The drive firmware version (*see the relevant drive user guide*).
- The SM-Profibus DP-V1 firmware version.

5.1 Conventions used in this guide

The configuration of the host drive and Solutions Module is done using menus and parameters. A menu is a logical collection of parameters that have similar functionality. In the case of a Solutions Module, the parameters will appear in menu 15 for the Commander SK, and in menu 15, 16, or 17 for the Unidrive SP, Affinity, Mentor MP and Digitax ST depending on the slot the module is installed in.

The menu is determined by the number before the decimal point and the parameter by the number following the decimal point.

The method used to determine the menu or parameter is as follows:

- Pr **MM.xx** - Menu corresponding to the Solution Module and any parameter.
- Pr **xx.00** - signifies parameter number 00 in any menu.

5.2 Minimum software versions required

Table 5.1 Minimum software versions required for use with SM-PROFIBUS

Product	Software Version	SM-PROFIBUS Version
Unidrive SP	V01.06.00 or later	V01.00.00 or later
Affinity	V01.00.00 or later	V03.00.00 or later
Digitax ST	V01.00.00 or later	V03.00.00 or later
Commander SK	V01.06.00 or later	V03.00.00 or later
Mentor MP	V01.02.00 or later	V03.02.00 or later

6 GSD Files

6.1 What are GSD Files?

GSD files are text files that are used by the PROFIBUS-DP network configuration software tools. They contain information about the device timings, supported features and available data formats for the PROFIBUS-DP device. Drive icon files are also supplied for use with the PROFIBUS-DP configuration software. GSD files are available from your supplier, local Control Techniques Drive Centre or the Control Techniques website (www.controltechniques.com).

6.2 Data consistency

There is a potential problem with data skew when transferring blocks of data to and from a PROFIBUS-DP master controller. Data skew happens when a value is spread across multiple words; when this occurs it is possible that only half of the correct value reaches the destination. Consider the following example:

- The PLC has a value of 0xFFFFFFFF to send to the drive.
- The drive currently has a value of 0x00000000 in a 32-bit parameter.
- The master sends the word without consistency.
- The drive receives one 16-bit word and now has the value 0x0000FFFF.
- The drive receives the next 16-bit word and now has the value 0xFFFFFFFF.

To prevent data skew PROFIBUS-DP has a feature known as ‘data consistency’. Consistent data defines a block of data words that must ALL be updated before ANY of the new data values are transmitted. Consequently, the message sent over the PROFIBUS-DP network will have a true representation of the required data. Some PLCs have special functions available to transfer blocks of consistent data to a PROFIBUS-DP master controller and guarantee that data skew cannot occur.

6.2.1 Limitations of non-cyclic data Mode 1 - CT Single Word with GSD

CT Single Word non-cyclic data uses only 1 word of data, however when used without data compression (see section 12.5 *Cyclic data compression*) this requires two 16-bit words (a single 32-bit word). When used without compression only the lower 16 bits of the 32-bit word are used.

6.2.2 Using non-cyclic data Mode 2 - PPO 4 Word

Data consistency is important when using PPO4 word (Mode 2) non-cyclic data as each non-cyclic message consists of four words. If there is data skew between any of the non-cyclic words this could result in the wrong data value being written to the wrong parameter.

The GSD file provides the PPO 4 Word which consists of four IN/OUT words with consistency.

7 Cyclic data

7.1 What is cyclic data?

Cyclic data transfer is a method of transferring data on a regular time period, often known as ‘polled data’. High-speed data transfer is achieved by transmitting only data bytes over the PROFIBUS-DP network and using local mapping information within the SM-PROFIBUS DP-V1 and PROFIBUS-DP master controller to ensure that the correct data is sent to the correct locations. The flexibility of the SM-PROFIBUS DP-V1 means that each cyclic data OUT channel can be directed to any read/write drive parameter. Similarly each cyclic data IN channel can use any drive parameter as a source of data.

NOTE

- The term OUT data refers to data that is transmitted out of the master to the slave.
- The term IN data refers to data that is returned from a slave into the master.
- Cyclic data mapping cannot be changed dynamically, as changes to the configuration (mapping parameters, etc.) will only take effect during initialization of the SM-PROFIBUS DP-V1.
- The maximum number of 16-bit mappings that is possible is: 32 with only cyclic data, 31 with CT Single Word (Mode 1) non-cyclic data and 28 with PPO4 Word (Mode 2). This requires data compression to be enabled, see section 12.5 *Cyclic data compression* for more information.
- The maximum number of 32-bit mappings that is possible is: 16 with only cyclic data, 15 with CT Single Word (Mode 1) non-cyclic data and 14 with PPO4 Word (Mode 2).

See section 12.5 *Cyclic data compression* for information on using data compression with 16-bit parameters.

7.2 Data formats

The SM-PROFIBUS DP-V1 can be configured with up to sixteen 32-bit or thirty-two 16-bit cyclic IN and OUT data words. IN and OUT cyclic data words are mapped using ten mapping (pointer) parameters, one for each mapping.

To utilize the full range of thirty-two cyclic IN and OUT data words the ‘block mapping’ mode must be used (see section 12.6 *Block mapping*).

NOTE By default all drive parameters are cast as 32-bit (two 16-bit words) therefore thirty-two cyclic words gives sixteen possible drive parameters. Data compression reduces the number of cyclic words required for drive parameters of 16-bit (or less) to 16 bits thus allowing for thirty-two possible 16-bit parameters. Any 32-bit parameters mapped will still require two 16-bit words even with compression turned on.

In addition to cyclic data, non-cyclic data (see section 8.1 *What is non-cyclic data?*) exchange is also possible by the following methods:

- DP-V1 parameter access mode.
- Mode 1 - CT single word mode
- Mode 2 - PPO 4 Word mode.

8 Non-cyclic data

8.1 What is non-cyclic data?

Non-cyclic data allows access to any parameter without the need to use cyclic data transfers. This is particularly useful when accessing many different parameters for set-up or archiving of drive settings. There are three methods of using non-cyclic data on the SM-PROFIBUS DP-V1:

- DP-V1 Parameter Access
- Mode 1 - CT Single Word
- Mode 2 - PPO 4 Word

8.1.1 DP-V1 Parameter Access

Non-cyclic data is transmitted after all the cyclic data within the PROFIBUS-DP cycle, depending on the length of the non-cyclic data, this may take several cycles to complete.

8.1.2 Mode1 - CT Single Word

This mode uses an additional data word to implement the CT Single Word protocol, allowing access any drive parameter. See section 8.6 *Mode 1 - CT Single Word mode* for more information.

8.1.3 Mode 2 - PPO 4 Word

This mode uses four data words to access any drive parameter. See section 8.8 *Mode 2 - PPO 4 Word mode* for more information.

8.2 Configuration using non-cyclic data

The SM-PROFIBUS DP-V1 can be configured using the DP-V1 Parameter Access channel, CT Single Word or PPO 4 Word non-cyclic data. This is useful when using a master controller to configure the drive; when a drive is initialized only the node address **MM.03** and the data mode **MM.05**, need to be set manually. The master can now use the desired mode to setup the remainder of the parameters.

The configuration parameters for the slot in which the SM-PROFIBUS DP-V1 is located can be accessed as Pr **60.PP**. Any changes made to the configuration parameters will not take effect until the SM-PROFIBUS DP-V1 has been reset. SM-PROFIBUS DP-V1 can be reset by writing a value of 1 to Pr **60.32**. A brief interruption in PROFIBUS-DP communications may be seen while the reset sequence is in progress.

8.3 PROFIBUS DP-V1 Compatibility

The additional features that PROFIBUS DP-V1 provide are only available on drives installed with SM-PROFIBUS DP-V1, with firmware V03.02.00 or later.

NOTE When the network compatibility mode is used (Pr **MM.41** = 1 or 2), DP-V1 functionality and the PROFIdrive (V4) profiles will not be available.

NOTE In order to use the DP-V1 features, the appropriate DP-V1 GSD file must be installed in the master PLC.

10 Diagnostics

This section provides basic diagnostic information intended to enable resolution of the most common problems encountered when setting up a SM-PROFIBUS DP-V1 on a PROFIBUS-DP network.

A high percentage of problems reported are basic set-up problems that can be avoided by using the information in this chapter. Start by using the *Diagnostic flow chart* on page 66 to determine the possible cause of a problem. If after following the flow chart you are still experiencing problems please contact your supplier or local Control Techniques Drive Centre for support.

NOTE Please note that support will be limited to the setting up and networking of the drive.

10.1 Module ID code

Table 10.1 Module ID code

Pr **MM.01**	**Default**	403 (SM-PROFIBUS DP-V1)
	Range	0 to 499
	Access	RO

The module ID code indicates the type of module installed in to the slot corresponding to menu **MM**. The module ID code for SM-PROFIBUS DP-V1 is 403.

10.2 Module firmware version

Table 10.2 SM-PROFIBUS DP-V1 firmware - major version (xx.yy)

Pr **MM.02**	**Default**	N/A
	Range	00.00 to 99.99
	Access	RO

Table 10.3 SM-PROFIBUS DP-V1 firmware - minor version (zz)

Pr **MM.51**	**Default**	N/A
	Range	0 to 99
	Access	RO

Unidrive SP (Sizes 1 to 6) / Unidrive SPM / Mentor MP
The software version of the Solutions Modules can be identified by looking at Pr **15.02** or Pr **16.02** or Pr **17.02** and Pr **15.51** or Pr **16.51** or Pr **17.51**.

Menu 15,16 or 17 is Solutions Module slot dependent with menu 17 being the lowest position nearest the control terminal connections.

The software version takes the form of xx.yy.zz, where Pr **15.02** or Pr **16.02** or Pr **17.02** displays xx.yy and Pr **15.51** or Pr **16.51** or Pr **17.51** displays zz (e.g. for software version 01.01.00 on a module in the middle Solutions Module slot, Pr **16.02** will display 1.01 and Pr **16.51** will display 0).

Unidrive SP (Size 0) / Digitax ST / Unidrive ES / Affinity
The software version of the Solutions Modules can be identified by looking at Pr **15.02** or Pr **16.02** and Pr **15.51** or Pr **16.51**.

Menu 15 or 16 is Solutions Module slot dependent with menu 15 (Unidrive SP size 0 and Digitax ST) or menu 16 (Unidrive ES and Affinity) being the position nearest the control terminal connections.

The software version takes the form of xx.yy.zz, where Pr **15.02** or Pr **16.02** displays xx.yy and Pr **15.51** or Pr **16.51** displays zz (e.g. for software version 01.01.00 on a module in the middle Solutions Module slot (Unidrive ES and Affinity) or for Unidrive SP size 0 and Digitax ST, the Solutions Module slot nearest the incoming supply terminals), Pr **16.02** will display 1.01 and Pr **16.51** will display 0).

Commander SK (Sizes B to D and 2 to 6)
The software version of the Solutions Module can be identified by looking at Pr **15.02** and Pr **15.51**. The software version takes the form of xx.yy.zz, where Pr **15.02** displays xx.yy and Pr **15.51** displays zz (e.g. for software version 01.01.00 Pr **15.02** will display 1.01 and Pr **15.51** will display 0).

The full version of the SM-PROFIBUS DP-V1 firmware can be assembled by combining the major version (xx.yy) and the minor version (zz) as follows: xx.yy.zz.

10.3 PROFIBUS-DP node address

Table 10.4 PROFIBUS-DP node address

Pr **MM.03**	**Default**	126
	Range	0 to 126
	Access	RW

Each node on a PROFIBUS-DP network must be given a unique network node address. The SM-PROFIBUS DP-V1 must be re-initialized to make a change of node address active. Addresses 0 and 126 are reserved for system use and should not be used.

10.4 Network data rate

Table 10.5 Network data rate

Pr **MM.04**	**Default**	N/A
	Range	-1 to 9
	Access	RO

The SM-PROFIBUS DP-V1 will automatically detect the PROFIBUS-DP network data rate and synchronise to it. Pr **MM.04** will indicate the data rate that has been detected by the SM-PROFIBUS DP-V1.

A value of -1 indicates that the SM-PROFIBUS DP-V1 has not detected any activity on the PROFIBUS-DP network and is waiting for the master controller to start communicating.

NOTE The PROFIBUS-DP data rate parameter can be changed, but this will not affect the data rate at which the SM-PROFIBUS DP-V1 communicates. The data rate display will be updated when SM-PROFIBUS DP-V1 is re-initialized.

Table 10.6 Network data rate status

Pr MM.04	bits/s
-1	Auto-detecting
0	12M
1	6.0M
2	3.0M
3	1.5M
4	500k
5	187.5k
6	93.75k
7	45.45k
8	19.2k
9	9.6k

10.5 Data format

Table 10.7 Data format

Pr **MM.05**	**Default**	4
	Ranges	0-32,100-131& 200 to 228
	Access	RW

The default data format is four cyclic words, each cyclic data channel is mapped to a drive parameter.

NOTE The maximum number of 16-bit data words that is possible is thirty-two (in and out) with only cyclic data, thirty-one (in and out) with Mode 1 non-cyclic data and twenty-eight (in and out) with PPO4 word mode.

10.6 Operating status

Table 10.8 Operating status

Pr **MM.06**	**Default**	N/A
	Range	-3 to 9999
	Access	RO

The operating status of the SM-PROFIBUS DP-V1 can be viewed in the operating status parameter (Pr **MM.06)**. When the SM-PROFIBUS DP-V1 is communicating successfully with the PROFIBUS-DP master controller, Pr **MM.06** will give an indication of the number of cyclic data messages that are being processed per second.

Table 10.11 Mapping error codes

Mapping status	Error	Description
220	Too many OUT data objects mapped	After expanding ranges of block mappings, too many OUT cyclic data channels configured.
221	Mapping over length	Total size of all OUT cyclic data mappings has exceeded the total size of the cyclic data.
222	Register mode objects exceeded	More than ten cyclic OUT data channels have been selected with direct data mapping mode.

10.8 Drive trip display codes

If the SM-PROFIBUS DP-V1 detects an error during operation, it will force a trip on the drive. However, the trip code displayed on the drive will only indicate which slot initiated the trip. The exact reason for the trip will be indicated in the SM-PROFIBUS DP-V1 error code parameter, Pr **MM.50**.

Table 10.12 shows the possible trip codes that will be displayed on the drive when a problem is detected with the SM-PROFIBUS DP-V1 or when the SM-PROFIBUS DP-V1 initiates a trip.

Table 10.12 Drive trip display codes

Trip Code	Fault	Description
SLX.HF	Hardware fault	The drive has detected that a Solutions Module is present, but is unable to communicate with it.
SLX.Er	Error	User trip generated by the SM-PROFIBUS DP-V1
SLX.nF	Not installed	This trip will occur if a drive slot was previously configured with an options module but on power up, no options module was detected.
SLX.dF	Different module installed	The slot configuration parameters stored in the drive are not valid SM-PROFIBUS DP-V1 configuration parameters. This trip will also occur if an SM-PROFIBUS DP-V1 module is installed to a previously unused slot.

NOTE Commander SK will show SL.Er without a slot number.

10.9 Module error code

Table 10.13 Module error code

Pr **MM.50**	**Default**	N/A
	Range	0 to 255
	Access	RO

If the SM-PROFIBUS DP-V1 detects an error during operation, it will force a trip on the drive and update the error code parameter, Pr **MM.50**. Table 10.14 shows the possible SM-PROFIBUS DP-V1 error codes

Table 10.14 SM-PROFIBUS DP-V1 error codes

Error code	Fault	Description
0	No error detected	Indicates that the SM-PROFIBUS DP-V1 module is ok. It is possible to trip the drive externally via various communication channels.
52	User control word trip	The TRIP bit has been set in the drive control word.
61	Configuration error	An invalid configuration has been detected. Refer to Pr **MM.49** for mapping error codes.
65	Network loss	No new messages have been received for the specified network loss trip time.
66	Critical link failure	Internal error
70	Flash transfer error	The SM-PROFIBUS DP-V1 was unable to upload the configuration parameters from its flash memory to the drive.
71	Invalid fieldbus specific data	SM-PROFIBUS DP-V1 has detected an invalid data record. E.g. the stored I&M data has an invalid checksum.
74	SM-PROFIBUS DP-V1 overtemperature	If the temperature inside the SM-PROFIBUS DP-V1 exceeds 82°C, the SM-PROFIBUS DP-V1 will trip the drive.
80	Inter-option communication error	An inter-option communications time-out has occurred, but SM-PROFIBUS DP-V1 is unable to determine the reason for the error.
81	Communication error to slot 1	***(Not Commander SK)*** Direct communications between the SM-PROFIBUS DP-V1 and an SM-Applications in another slot has timed out.
82	Communication error to slot 2	
83	Communication error to slot 3	
97	Firmware incompatible	The hardware revision level does not support the installed firmware version. If DP-V1 functionality is required then replace the module with a DP-V1 compatible module. If DP-V1 functionality is not required then install firmware version V03.01.01 or earlier.
98	Internal watchdog error	Internal error. Cycle power to the drive to reset from this trip. If trip persists, replace the SM-PROFIBUS DP-V1.
99	Internal software error	

10.10 Module serial number

Table 10.15 Module serial number

Pr **MM.35**	**Default**	N/A
	Range	32-bit
	Access	RO

The serial number is a loaded into the SM-PROFIBUS DP-V1 during manufacture and cannot be changed. It contains the last six digits of the ten digit serial number on the label.

10.11 Troubleshooting

In order to assist in configuring the network, the *Diagnostic flow chart* on page 66 could be used.