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).

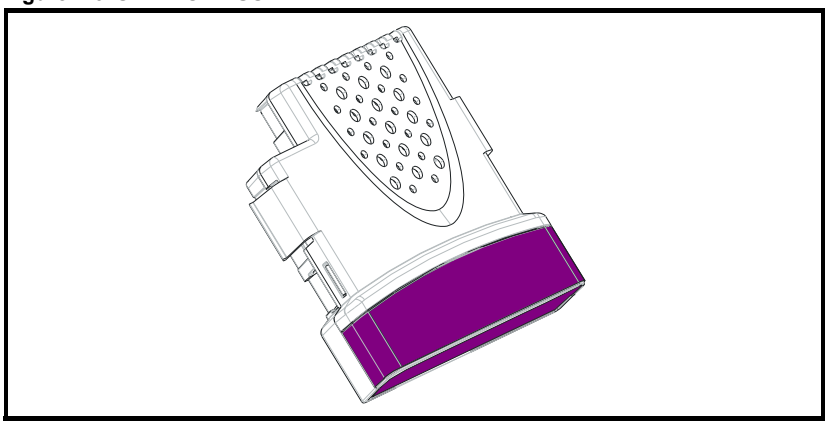
2.3 What is SM-PROFIBUS DP-V1?

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:

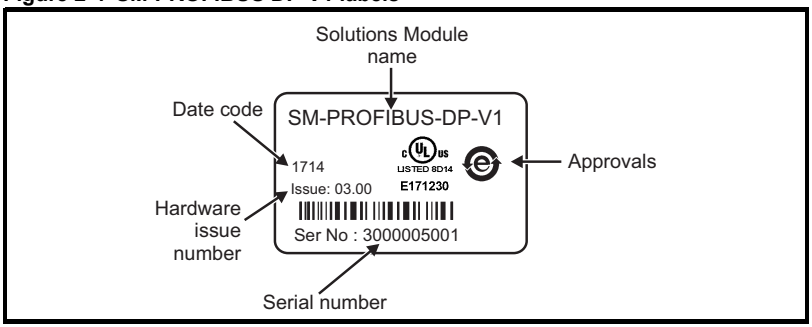
- PROFIdrive profile V4 support, which consists of
  - Standard Telegram 1
  - PROFIdrive PNU Access
  - Drive Identification
  - Fault Buffer
  - Identification and Maintenance Functions
- Non-cyclic data channel access

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.

2.5.2 Unidrive SP, Digitax ST, Affinity and Mentor MP

The required drive can be connected to a 24Vdc back-up power supply (terminals 1 and 2). This keeps the control electronics and Solutions Module powered up, allowing the SM-PROFIBUS DP-V1 to continue communicating with the PROFIBUS-DP master controller when the main supply to the drive is switched off. For every SM-PROFIBUS DP-V1 installed allow for an extra 70mA of supply current to be drawn from the back-up supply.

NOTE This feature is only available on the Unidrive SP, Digitax ST, Affinity and Mentor MP.

3 Mechanical installation

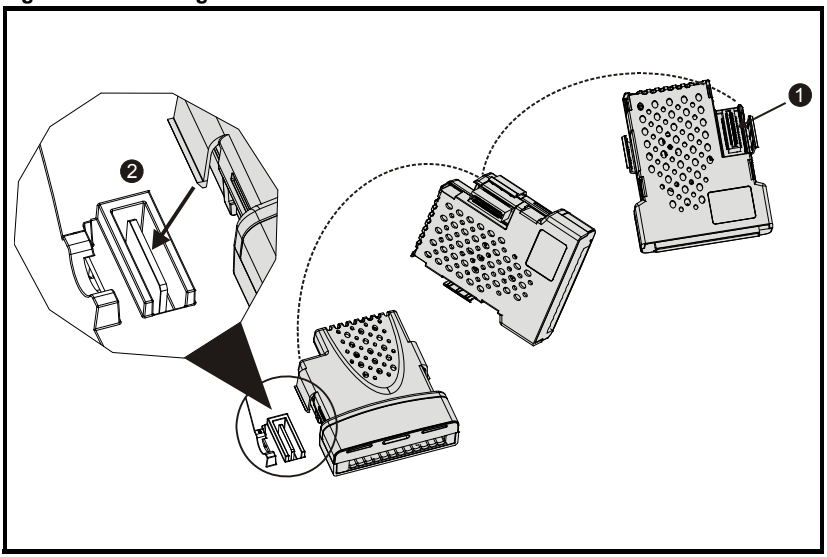


Before installing or removing a Solutions Module in any drive, ensure the AC supply has been disconnected for at least 10 minutes and refer to Chapter 1 *Safety information* on page 8. If using a DC bus supply ensure this is fully discharged before working on any drive or Solutions Module.

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

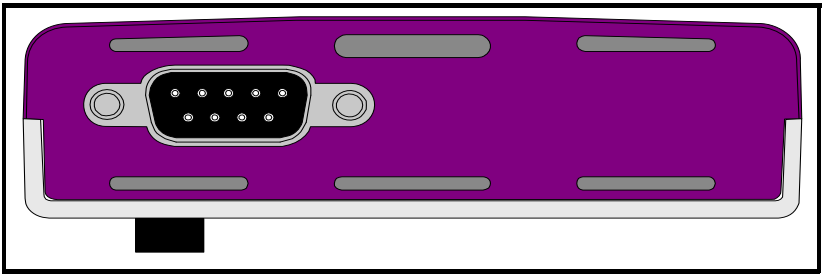


Figure 4-2 SM-PROFIBUS DP-V1 D-Type pin out

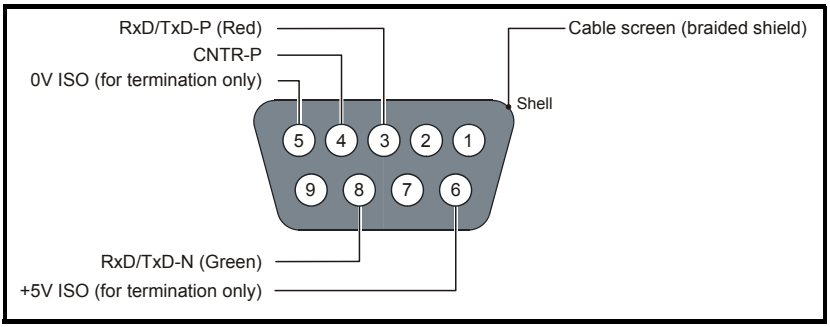


Table 4.1 D-Type connections

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.

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.

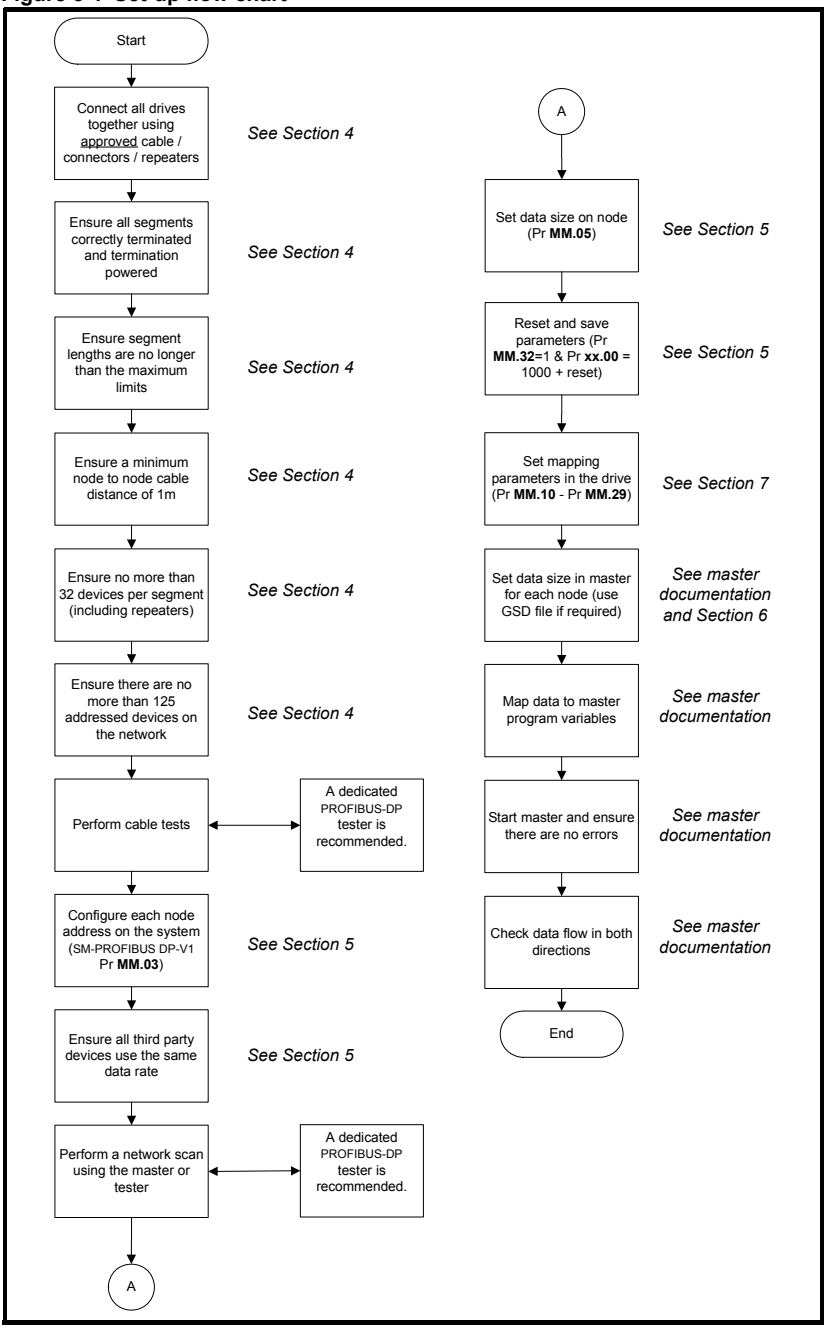
5.2 Minimum software versions required

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

5.3 Set-up flow chart

Figure 5-1 Set-up flow chart



5.4 Node address

Table 5.2 PROFIBUS-DP node address

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

Every node on a PROFIBUS-DP network must be given a unique network node address. To activate a change in the node address value the SM-PROFIBUS DP-V1 must be re-initialized (Pr **MM.32** = ON). This parameter is also available in menu 0 on the Commander SK (Pr **00.52**). Addresses 0 and 126 are reserved for system use.

5.5 Network data rate

Table 5.3 PROFIBUS-DP 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 synchronize to it. Pr **MM.04** will indicate the data rate that has been detected by the SM-PROFIBUS DP-V1. This parameter is also available in menu 0 on the Commander SK (Pr **00.53**).

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 5.4 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

6.3 Data configuration

The GSD file describes the modules of input or output words that may be combined to configure the input and output configuration for a specific node. The complete input and output configuration for the node is built by adding the required modules until all of the node's inputs and outputs are defined.

NOTE A module consists of a block of input or output data. Put simply this is a logical collection of data words.

If non-cyclic data is required and the DP-V1 non-cyclic channel is not used then the non-cyclic CT Single Word and/or the PPO 4 Word modules must be selected. A total of eight different modules can be selected to configure the input and output configuration of the node.

The number of input or output words configured in the drive must match the number of input or output words defined in the master; if the master has eight IN and four OUT words the drive must use the same settings to communicate correctly.

The SM-PROFIBUS DP-V1 module uses Pr **MM.05** to set the number of input and output words (16-bit) where there are the same number of input and output words, alternatively Pr **MM.39** and Pr **MM.40** may be used to independently set the number of input and output words. See section 12.8 *Custom data formats* for more details.

NOTE The definition of a data word is 16 bits. By default SM-PROFIBUS DP-V1 casts all data as long words/double words (32 bits), data compression can be used to reduce this size, see section 12.5 *Cyclic data compression* for more information.

6.4 GSD compatibility

For Profibus DP-V1 features to be available to the PLC, the appropriate DP-V1 GSD file must be installed and the drive configured in the master PLC as a 'DPV1' slave.

If a DP-V0 GSD file is installed then the DP-V1 features of SM-PROFIBUS DP-V1 will not be available.

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.