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# **Profibus-DP Gateway 1400 Reference Manual**

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# 1. Introduction

## PROFIBUS

Profibus is a shortened version of its full name, the **Process Field Bus**.

Profibus is a vendor-independent, open field bus standard suitable for a wide range of applications in manufacturing and process automation. This architecture enables devices produced by different manufacturers to communicate simply without requiring special interfacing equipment. Each Profibus Device requires a GSD file that contains the necessary information to describe the device.



As an industrial fieldbus, Profibus is inherently capable of handling both high-speed time critical applications and complex communication tasks.

At the hardware level, Profibus uses a two wire RS485 twisted pair network, ensuring electrical noise immunity.

Profibus uses a master / slave arrangement, whereby the master polls one or more slaves for data. The protocol has facilities for more than one master to be present on the bus. Masters usually take the form of PLCs or PCs.

More information on Profibus can be found on the Internet at [www.profibus.org](http://www.profibus.org).

### 1.1. The 1400 Profibus Gateway

The 1400 is a Profibus-DP Gateway, which allows the connection of up to two Indicator / Display Devices via indicator networking protocols to Profibus-DP.

Currently supported Digital Indicators are the 5000, 5100, WE2110 and R420. The 6500 Remote Display is also supported.

### 1.2. The Manuals

This manual covers all aspects of the 1400 Profibus-DP Gateway, including installation, configuration, operation and detailed specifications.

This manual covers only the 1400, and contains minimal detail on indicators and displays to be connected to the gateway. For information regarding these devices, refer to their respective reference manuals.

## 2. Specifications

PERFORMANCE	
Profibus-DP	Fully functional Profibus-DP
Serial Ports	Two serial communication channels
Power Supply	10VDC to 28VDC, 1.5 W (typical)
Protection Class	IP 20
Supported Modules	One to two devices
Operating Environment	Temperature -10°C to +50°C (14°F to 122°F), humidity < 90% non condensing

SERIAL PORTS	
Number of Ports	2
Formats	Full Duplex RS232 and RS485/422 on all ports
Baud Rates	9600, 19200 (default), 38400baud
Supported Devices	5000, 5100, 6500, WE2110, R420

PROFIBUS-DP PORT	
Transmission Speed	9600baud to 12Mbaud
Supported Services	Synch mode, Freeze mode, Auto baud detection, Set slave address
Isolation	>1kV optically isolated Profibus-DP interface

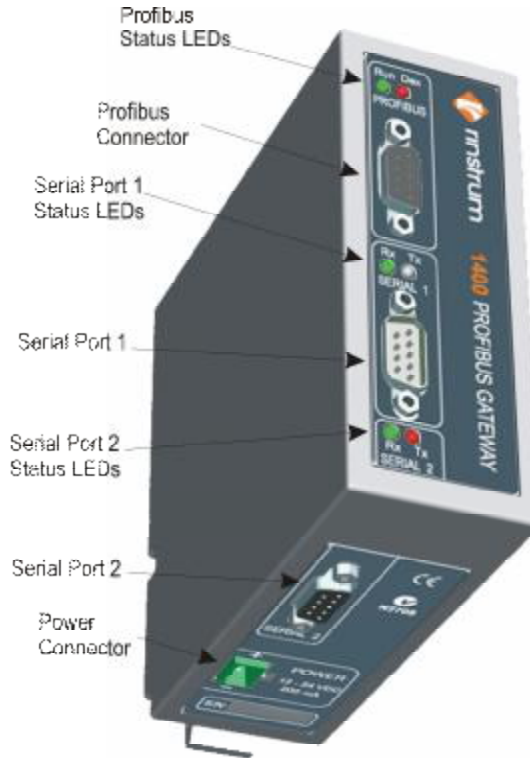
DIMENSIONS	
Body size	45mm (1.8") W x 115mm (4.5") H x 140mm (5.5") D
Weight	230g (8.1oz)
Mounting	DIN Rail (35mm/1.4")

APPROVALS	
CE Mark	
C-Tick (N2708)	

### 3. Connectors and Indicators

The front and bottom panels of the 1400, shown below, have a number of connectors and LED indicators. Function and pinout of each connector is given in Sections 4.3 and 4.4.

The indicator LEDs provide feedback on the operation and communication status of the device. The function of each led is described below.



**Figure 1: 1400 Connectors and Indicators**

#### 3.1. Profibus Status LEDs

##### 3.1.1. The Profibus Run LED (Green)

Under normal operating conditions this LED flashes at a variable rate indicating the CPU load on the device. The blink rate is about 5 times per second for no load and once every 5 seconds for 100% load.

##### 3.1.2. The Profibus Dex LED (Red)

When lit, this LED indicates that the 1400 is in Data Exchange mode with a Profibus master device, and is fully operational.

#### 3.2. Serial 1 and Serial 2 Status LEDs

The **Tx** LED (red) flashes as data is transmitted from the 1400. With one or more indicators connected, the LED will be lit almost continuously. If no indicator is attached, the LED will flash occasionally, as the 1400 searches for new devices.

The **Rx** LED (green) flashes as data is received from the connected indicators. With one or more indicators connected, the LED will be lit almost continuously.

## 4. Installation

The 1400 is designed for DIN-rail mounting only. It contains precision electronics and must not be subject to shock, excessive vibration, or extremes of temperature, either before or after installation.

The inputs of the 1400 are protected against electrical interference, but excessive levels of electro-magnetic radiation may effect reliable operation of the instrument. The 1400 should be installed away from any sources of electrical noise.

### 4.1. DIN-rail mounting

No special parts are required for DIN-rail mounting. The case simply clips onto the 35mm DIN-rail. Slide the top groove over the DIN-Rail and press the bottom of the case down until the bottom clip engages.

### 4.2. DC Power Supply

The DC supply need not be regulated, provided that it is free of excessive electrical noise and sudden transients. The 1400 can be operated from a high quality plug-pack as long as there is sufficient capacity to drive the unit. The 1400 complies with all the relevant EMC standards, and carries full CE approval.

### 4.3. Profibus-DP Port

The connection to the Profibus network is via a standard DB9 connector. The connection is fully optically isolated.

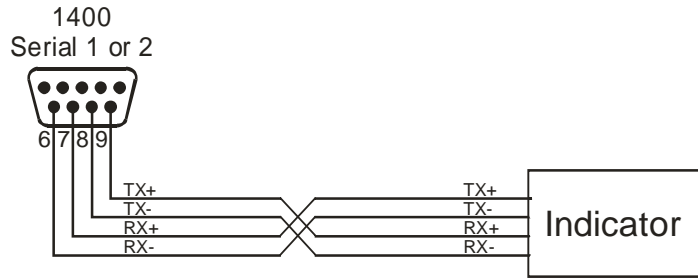
Pin	Signal name	Description
3	RXD/TXD – P	Receive/Transmit Data P
8	RXD/TXD – N	Receive/Transmit Data N

### 4.4. Serial Ports Serial 1 and Serial 2

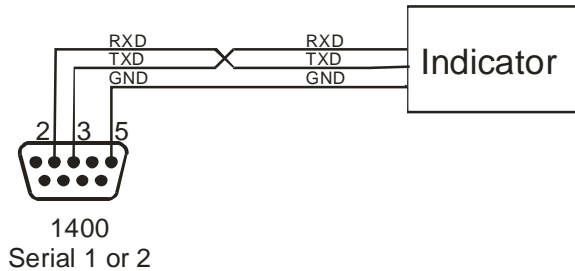
Both connectors are standard DB9 sockets requiring a female DB9 plug. The RS232 and RS422/485 interfaces are connected in parallel within the 1400, and both output exactly the same data. The connections for the outputs are shown below. Note that the 1400 only supports 4 wire full duplex RS422/485.

Pin	Function	Description	Connect To
2	RX1	RS232 Receive Line	External Device Transmitter (Usually pin 3)
3	TX1	RS232 Transmit Line	External Device Receiver (Usually Pin 2)
5	GND1	RS232 Digital Ground	External Device Digital Ground (Usually Pin 5)
6	RA	RS422/485 Receive A (-)	External Network
7	RB	RS422/485 Receive B (+)	External Network
8	TA	RS422/485 Transmit A (-)	External Network
9	TB	RS422/485 Transmit B (+)	External Network

**Note:** Connect shield as directly as possible to the metal DB9 shell.



**Figure 2: RS422/485 serial connection**



**Figure 3: RS232 serial connection**

See the relevant indicator manual for connection details.

#### 4.4.1. RS422/485 Termination

The end devices in a multi-drop RS422/485 network may need to be provided with termination resistors to balance the network loadings. These resistors are built into the 1400 Profibus-DP Gateway.

Refer to the Digital Indicator/Alphanumeric Remote Display Reference Manual on how to enable the termination resistors in the connected Device.

Termination in the 1400 can be enabled/disabled via Profibus-DP 'Set Parameter' service.

**Note:** Any changes in termination need to be followed by a system reset for the new settings to take effect. This is also indicated via a Profibus diagnostic message.



## 5. System Configuration and Setup

This section covers the configuration of the 1400 and the devices connected to the Gateway.

The 1400 is designed to accept up to a total of two devices. Two serial ports are provided as a means to increase the sample rate of the connected devices. By splitting the connected devices across the two serial ports, the 1400 can sample the devices at a higher rate. The gateway requires each unit to be given an address of either 1 or 2, matching the serial port used. On start up and when no device is present at an address, the 1400 will periodically poll the address to detect if a new device has been connected.

### 5.1. Configuration of the Devices

Before connecting the indicators/displays to the 1400, they must be configured. A brief description of the necessary settings is given below. Refer to the relevant reference manuals for information on how to access these settings.

For a Digital Indicators 5000/5100/WE2110, set the following items:

- Serial Port Type to NET (Network Operation);
- Network Address to a unique address of 1 or 2;
- Network Type to Net A (Ranger Networking);
- Baud Rate to 19200;
- Serial Format to: No parity, 8 data bits, 1 stop bit;
- Termination (RS422/485 only) to On.

For a Digital Indicator R420, set the following items:

- Serial Port Type to NET (Network Operation);
- Network Address to a unique address of 1 or 2;
- Network Type to Protocol B;
- Baud Rate to 19200;
- Serial Format to: No parity, 8 data bits, 1 stop bit;
- Termination (RS422/485 only) to On.

For a Remote Display, set the following items from General Setup:

- Data Timeout to noTMO (No Timeout);
- Serial Port Type to SLAVE (Network Slave Operation);
- Data Source to RS422 or RS232;
- Network Address to a unique address of 1 or 2;
- Baud Rate to 19200;
- Serial Format to: No parity, 8 data bits, 1 stop bit;
- Termination (RS422/485 only) to On.

#### 5.1.1. Minimum R420 Software Versions

The following list details the lowest software version of each type to support the 1400:

Software Type	Minimum Version
K401	2.01
K402	2.11
K410	2.01
K411	2.31
K481	1.11
K491	2.01

## 5.2. Configuration of 1400 Profibus-DP Gateway

Configuration of the 1400 Profibus Gateway is performed via a Profibus master, using the Profibus GSD file supplied.

The gateway is a modular Profibus-DP Slave. A maximum of two modules can be configured, where each module represents one Digital Indicator or Remote Display.

Module support is provided for the 5000, 5100, WE2110 and R420 Digital Indicators and the 6500 Remote Display.

### 5.2.1. Module Configuration

The GSD file contains the following Module definitions. Details of the data schema for each will be detailed in subsequent sections. The Profibus Master must be configured to use the appropriate module configuration.

#### GSD Module definitions

```
No Indicator Connected
WE2110 Wght+Stat+Cmd_Lv0
WE2110 Wght+Stat+Cmd_Lv1
WE2110 Wght+Stat+Cmd_Lv2
5000 Wght+Stat+Cmd_Lv0
5000 Wght+Stat+Cmd_Lv1
5000 Wght+Stat+Cmd_Lv2
5100 Wght+Stat+Cmd_Lv0
5100 Wght+Stat+Cmd_Lv1
5100 Wght+Stat+Cmd_Lv2
6500 Remote Display
R420 Basic Level
R420 Advanced Level
```

### 5.2.2. Module Selection

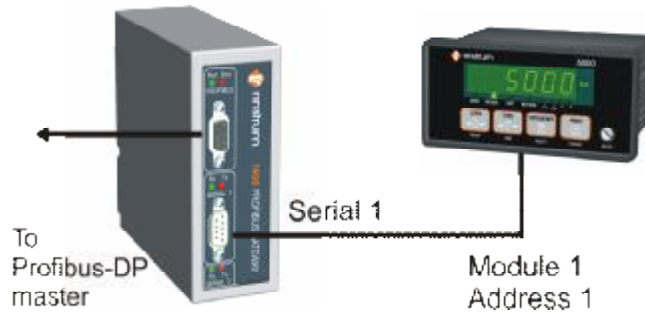
Modules of the Profibus configuration are assigned to indicators/displays by their address and serial port connection.

- Module 1 of the Profibus configuration refers to the device configured for address 1 attached to serial port 1 of the 1400;
- Module 2 of the Profibus configuration refers to the device configured for address 2 attached to serial port 2 of the 1400;
- Unused modules must be configured with "No Indicator Connected".

### 5.2.3. Configuration Examples

As shown in Figure 4, a 5000 digital indicator connected to serial 1 with Cmd\_Lv2 configured.

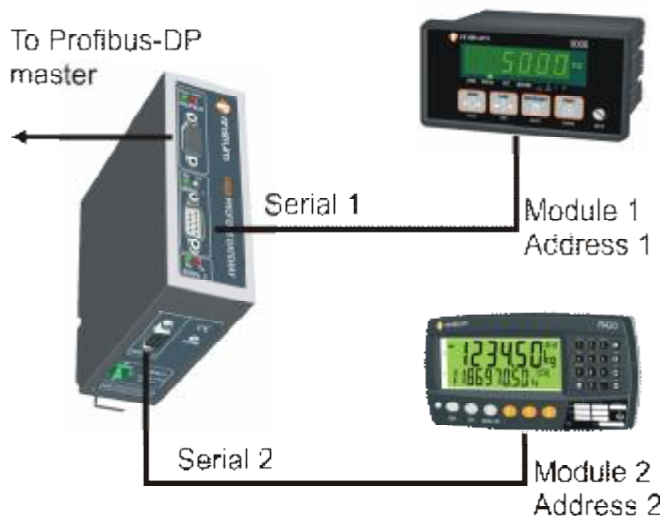
- Must have indicator address set to 1
- The Profibus-DP master must be set with:
  - Module 1: 5000 Wght+Stat+Cmd\_Lv2
  - Module 2: No Indicator Connected



**Figure 4: Single connected device**

As shown in Figure 5, one 5000 digital indicator connected to serial 1 with Cmd\_Lv3 configuration, and an R420 digital indicator connected to serial 2 with advanced configuration,

- Indicator addresses:
  - 5000: Set to address 1
  - R420: Set to address 2
- The Profibus-DP master must be set with:
  - Module 1: 5000 Wght+Stat+Cmd\_Lv2
  - Module 2: R420 Advanced Level



**Figure 5: Two connected devices**

## 6. Data Formats for 5000, 5100 and WE2110 Digital Indicators

This section describes the data format for input and output data for each connected Digital Indicator. Input information is transferred from the connected Digital Indicator to the Profibus-DP master and contains weight readings, weight status, input/output data and error status information.

Output information is data transferred from Profibus-DP to the connected Digital Indicator and contains command information such as Indicator front key panel information, calibration functions and recipe settings. Two data formats with three different command levels are available.

Each configuration has three command (output) level configuration options:

- Command Level 0 **Cmd\_Lv0** allows remote access to the front key panel via Profibus-DP and the respective functions of ZERO, TARE, GROSS/NET, PRINT and the remote buttons of the indicator.
- Command Level 1 **Cmd\_Lv1** adds the capability of zero and span calibration functions via Profibus-DP.
- Command Level 2 **Cmd\_Lv2** additionally gives access to the advanced features for recipe settings.

Commands will only be executed if the command byte is modified. Changes in command data do not take effect until a new command byte is written to the 1400. Best practice is to clear the command byte, modify the command data and then set the command that shall be executed.

### 6.1. Digital Indicator Input Format

Input information from the connected Indicators is provided in the following format to the Profibus-DP master:

#### 6.1.1. Input Data Structure

##### Format

Bytes 1-10	Description
1	Serial Port Number
2	Indicator Address
3	Weight Status 1
4	Weight Status 2
5	Input Status
6	Output Status
7	Weight Reading (MSB 32 bit signed integer)
8	Weight Reading
9	Weight Reading
10	Weight Reading (LSB 32 bit signed integer)

#### 6.1.2. Input Data Field Descriptions

##### Serial Port number

Byte 1	Serial Port Number
Bit 1-0	01 = Serial 1 10 = Serial 2

##### Indicator Address

Byte 2	Indicator Address
Bit 4-0	1 or 2

**Weight Status Byte 1**

Byte 3	Weight Status Byte 1
Bit 7	Range of Zero
Bit 6	Range 2
Bit 5	Gross
Bit 4	Motion
Bit 3	Centre of Zero
Bit 2	Underload
Bit 1	Overload
Bit 0	Error

**Weight Status Byte 2**

Byte 4	Weight Status Byte 2
Bit 0	Calibration in progress

**Input Status**

Byte 5	Input Status (of extension card)
Bit 4	Input 5
Bit 3	Input 4
Bit 2	Input 3
Bit 1	Input 2
Bit 0	Input 1

**Output Status**

Byte 6	Output Status
Bit 3	Output 4
Bit 2	Output 3
Bit 1	Output 2
Bit 0	Output 1

**Weight Reading**

Bytes 7-10	Description
7	Weight Reading (MSB 32 bit signed integer)
8	Weight Reading
9	Weight Reading
10	Weight Reading (LSB 32 bit signed integer)

**6.2. Output Format Command Level 0**

For Command Level 0, output information from the Profibus-DP master to the connected Indicators is required in the following format.

**6.2.1. Output Data Structure**

Bytes 1-3	Description
1	Serial Port Number
2	Indicator Address
3	Command

**6.2.2. Output Data Field Descriptions**

**Serial Port Number**

Byte 1	Serial Port Number
Bit 1-0	01 = Serial 1 10 = Serial 2

**Indicator Address**

Byte 2	Indicator Address
Bit 4-0	1 or 2

**Command**

Byte 3	Command Level 0																												
Bit 3-0	Function (as selected by bits 6-4) <table border="1"> <thead> <tr> <th>Fn.</th> <th>Normal</th> <th>Remote Short Press</th> <th>Remote Long Press</th> </tr> </thead> <tbody> <tr> <td>0001</td> <td>Zero</td> <td>Button 1</td> <td>Button 1</td> </tr> <tr> <td>0010</td> <td>Tare</td> <td>Button 2</td> <td>Button 2</td> </tr> <tr> <td>0011</td> <td>Gross/Net</td> <td>Button 3</td> <td>Button 3</td> </tr> <tr> <td>0100</td> <td>Print</td> <td>Button 4</td> <td>Button 4</td> </tr> <tr> <td>0101</td> <td>Save Settings</td> <td>Button 5 (5100)</td> <td>Button 5 (5100)</td> </tr> <tr> <td>0110</td> <td>Reset Indicator</td> <td>&lt;Not Available&gt;</td> <td>&lt;Not Available&gt;</td> </tr> </tbody> </table>	Fn.	Normal	Remote Short Press	Remote Long Press	0001	Zero	Button 1	Button 1	0010	Tare	Button 2	Button 2	0011	Gross/Net	Button 3	Button 3	0100	Print	Button 4	Button 4	0101	Save Settings	Button 5 (5100)	Button 5 (5100)	0110	Reset Indicator	<Not Available>	<Not Available>
Fn.	Normal	Remote Short Press	Remote Long Press																										
0001	Zero	Button 1	Button 1																										
0010	Tare	Button 2	Button 2																										
0011	Gross/Net	Button 3	Button 3																										
0100	Print	Button 4	Button 4																										
0101	Save Settings	Button 5 (5100)	Button 5 (5100)																										
0110	Reset Indicator	<Not Available>	<Not Available>																										
Bit 6-4	Function Select 000 = Normal Function (Bits 3-0) 001 = Remote Button Short Press (Bits 3-0) 010 = Remote Button Long Press (Bits 3-0) xxx = All other settings not available to Command Level 0																												
Bit 7	1 = Reset 1400 (Bits 6-0 must be 0)																												

**6.3. Output Format Command Level 1**

For Command Level 1, output information from the Profibus-DP master to the connected Indicators is required in the following format.

**6.3.1. Output Data Structure**

Bytes 1-11	Description
1	Serial Port Number (As per Command Level 0 - See Section 6.2.2)
2	Indicator Address (As per Command Level 0 - See Section 6.2.2)
3	Command
4-11	Command data

**6.3.2. Output Data Field Descriptions**

**Commands (Additional to Level 0)**

Byte 3	Command Level 1																
Bit 3-0	Function (as selected by bits 6-4) <table border="1"> <thead> <tr> <th>Fn.</th> <th>Calibration Function</th> </tr> </thead> <tbody> <tr> <td>0001</td> <td>Zero Calibration</td> </tr> <tr> <td>0010</td> <td>Span Calibration</td> </tr> <tr> <td>0011</td> <td>Zero Calibration in mV/V</td> </tr> <tr> <td>0100</td> <td>Span Calibration in mV/V</td> </tr> <tr> <td>0101</td> <td>Set Linearisation Point</td> </tr> <tr> <td>0110</td> <td>Clear Linearisation Point</td> </tr> <tr> <td>0111</td> <td>Set Span Weight</td> </tr> </tbody> </table>	Fn.	Calibration Function	0001	Zero Calibration	0010	Span Calibration	0011	Zero Calibration in mV/V	0100	Span Calibration in mV/V	0101	Set Linearisation Point	0110	Clear Linearisation Point	0111	Set Span Weight
Fn.	Calibration Function																
0001	Zero Calibration																
0010	Span Calibration																
0011	Zero Calibration in mV/V																
0100	Span Calibration in mV/V																
0101	Set Linearisation Point																
0110	Clear Linearisation Point																
0111	Set Span Weight																
Bit 6-4	Function Select 011 = Calibration Functions (Bits 3-0)																

**Zero Calibration**

Bytes 4-11	Command Data (Level 1)	Range
4-11	Don't care	

**Span Calibration**

Bytes 4-11	Command Data (Level 1)	Range
4-11	Don't care	

**Zero Calibration in mV/V**

Bytes 4-7	Command Data (Level 1)	Range
4	Dead Load Signal in mV/V (MSB 32 bit signed integer)	-20000 to +20000
5	Dead Load Signal in mV/V	Note: 20000 = 2.0mV/V
6	Dead Load Signal in mV/V	
7	Dead Load Signal in mV/V (LSB 32 bit signed integer)	

**Span Calibration in mV/V**

Bytes 4-7	Command Data (Level 1)	Range
4	Span Signal in mV/V (MSB 32 bit signed integer)	0 to 30000
5	Span Signal in mV/V	Note: 30000 = 3.0mV/V
6	Span Signal in mV/V	
7	Span Signal in mV/V (LSB 32 bit signed integer)	

**Set Linearisation Point**

Bytes 4-8	Command Data (Level 1)	Range
4	Linearisation point	1 to 5
5	Test Weight Value (MSB 32 bit signed integer)	0 to 999999
6	Test Weight Value	
7	Test Weight Value	
8	Test Weight Value (LSB 32 bit signed integer)	

**Clear Linearisation Point**

Byte	Command Data (Level 1)	Range
4	Linearisation point	1 to 5

**Set Span Weight**

Bytes 4-7	Command Data (Level 1)	Range
4	Calibration Weight (MSB 32 bit signed integer)	2% to 100% of full scale
5	Calibration Weight	
6	Calibration Weight	
7	Calibration Weight (LSB 32 bit signed integer)	

**6.4. Output Format Command Level 2**

For Command Level 2, output information from the Profibus-DP master to the connected Indicators is required in the following format.

**6.4.1. Output Data Structure**

Bytes 1-20	Description
1	Serial Port Number (As per Command Level 0 - See Section 6.2.2)
2	Indicator Address (As per Command Level 0 - See Section 6.2.2)
3	Command
4-20	Command data

6.4.2. Output Data Field Descriptions

**Commands (Additional to Level 0 and Level 1)**

Byte 3	Command Level 2
Bit 3-0	Function (as selected by bits 6-4) <b>Fn.</b> <b>Setpoint Function</b> 0001    Set Current Recipe (5100 only) 0010    Set Target Value (5100 only) 0011    Setpoint Settings
Bit 6-4	Function Select 100 = Recipe functions (Bits 3-0)

**Set Current Recipe**

Bytes 4-6	Command Data (Level 2)	Range
4	Recipe number	1 to 99
5	Proportion (MSB 16 bit unsigned integer)	1 to 10000
6	Proportion (LSB 16 bit unsigned integer)	(0.1% to 1000%)

**Set Target Value**

Bytes 4-9	Command Data (Level 2)	Range
4	Recipe number	1 to 99
5	Material number	1 to 20
6	Target Value (MSB 32 bit signed integer)	0 to fullscale
7	Target Value	
8	Target Value	
9	Target Value (LSB 32 bit signed integer)	

**Setpoint Settings**

Bytes 4-16	Command Data (Level 1)	Range
4	Setpoint number	1 to 25 (5100) 1 to 4 (WE2110, 5000)
5	Target Value (MSB 32 bit signed integer)	-999999 to
6	Target Value	+999999
7	Target Value	(don't care for 5100)
8	Target Value (LSB 32 bit signed integer)	
9	Preflight Weight (MSB 32 bit signed integer)	0 to 999999
10	Preflight Weight	
11	Preflight Weight	
12	Preflight Weight (LSB 32 bit signed integer)	
13	Hysteresis (MSB 32 bit signed integer)	0 to 999999
14	Hysteresis	
15	Hysteresis	
16	Hysteresis (LSB 32 bit signed integer)	



## 7. Data Formats for 6500 Remote Displays

This section describes the input and output data formats for each connected Alphanumeric Remote Display. Input information is transferred from the connected Alphanumeric Remote Display to the Profibus-DP master and contains the active display field.

Output information is data transferred from Profibus-DP to the connected Alphanumeric Remote Display and contains weight data and status or text information for display.

### 7.1. Remote Display Input Format

Input information from the connected Display is provided in the following format to the Profibus-DP master.

#### 7.1.1. Input Data Structure

##### Format

Bytes 1-3	Description
1	Serial Port Number (As per Command Level 0 - See Section 6.2.2)
2	Display Address (As per Command Level 0 – See Section 6.2.2)
3	Active Field Number

#### 7.1.2. Input Data Field Descriptions

##### Active Field Number

Byte 3	Active Field Number
Bit 2-0	Field 0 to 4

### 7.2. Remote Display Output Format

For connected Remote Displays, the output information from the Profibus-DP master is required in the following format.

#### 7.2.1. Output Data Structure

Bytes 1-13	Description
1	Serial Port Number (As per Command Level 0 - See Section 6.2.2)
2	Display Address (As per Command Level 0 – See Section 6.2.2)
3	Command
4	Display Field Number
5-10	Alphanumeric String or Numeric Value
11	Decimal Point
12	Status
13	Annunciators

#### 7.2.2. Input Data Field Descriptions

##### Command

Byte 3	Command
Bit 7-0	00101001 = Write data to field buffer 00101010 = Select active field

**Note:** To avoid display timeouts select the field you would like to display, and then write the data to the corresponding display field buffer.

**Set Active Display Field**

Bytes 4-13	Set Active Display Field
4	Field to Set as Active (0 to 4)
5-13	Don't care

**Send Alphanumeric String**

Bytes 4-13	Send Alphanumeric String
4	Field to set (0 to 4)
5-10	Displayable alphanumeric ASCII character string (Byte 5 is the left most character)
11-13	Don't care

**Send Numeric Data**

Bytes 5-13	Command Data (Level 1)	Range
5	Numeric Value (MSB 32 bit signed integer)	-999999 to +999999
6	Numeric Value	
7	Numeric Value	
8	Numeric Value (LSB 32 bit signed integer)	
9-10	Don't care	0 to 5
11	Decimal Point Position (from right)	
12	Status	
13	Annunciators	

**Note:** The 1400 automatically detects numeric or text data and processes it correspondingly.

**Status**

Byte 12	Status
Bit 2	1 = Error
Bit 1	1 = Under
Bit 0	1 = Over

**Annunciators**

Byte 13	Annunciators
Bit 2	1 = Centre of Zero
Bit 1	1 = Gross
Bit 0	1 = Motion

## 8. Data Formats for R420 Digital Indicators

This section describes the data format for input and output data for each connected Digital Indicator. Input information is transferred from the connected Digital Indicator to the Profibus-DP master and contains indicator status information along with read data from any of the Indicator registers which reply with numeric data (1–4 bytes). The registers may include weight readings, weight status and input/output data.

By default, the registers are:

Slot Number	Default Register Address	Description
1	0051 <sub>H</sub>	I/O status
2	0025 <sub>H</sub>	Gross/Net weight
3	0026 <sub>H</sub>	Gross weight
4	0220 <sub>H</sub>	Grand total weight
5	B000 <sub>H</sub>	Active product number
6	B102 <sub>H</sub>	Product total weight

The registers to be used can be altered by output commands. These alterations are stored permanently in the 1400.

Output information is data transferred from Profibus-DP to the connected Digital Indicator and contains command information such as Indicator front key panel information, Indicator numeric register selection, along with write and execute capability for Indicator registers.

Two data formats with different command levels are available.

Each configuration has two command (output) level configuration options:

- Command Level **Basic** allows remote access to the front key panel via Profibus-DP. It also allows for 2 Indicator register slots to be selected which are then read out to the input structure.
- Command Level **Advanced** adds a further 4 Indicator register slots which are read out to the input structure. Additionally Indicator registers may be written and executed via Profibus-DP.

Commands will only be executed if the command byte is modified. Changes in command data do not take effect until a new command byte is written to the 1400. Best practice is to clear the command byte, modify the command data and then set the command that shall be executed.

## 8.1. Digital Indicator Input Format

Input information from the connected Indicators is provided in the following format to the Profibus-DP master:

### 8.1.1. Input Data Structure

#### Format – Basic Level

Bytes 1-12	Description
1	Serial Port Number
2	Indicator Address
3	Status MSB
4	Status LSB
5	Configurable Register Slot 1 (MSB 32 bit signed integer)
6	Configurable Register Slot 1
7	Configurable Register Slot 1
8	Configurable Register Slot 1 (LSB 32 bit signed integer)
9	Configurable Register Slot 2 (MSB 32 bit signed integer)
10	Configurable Register Slot 2
11	Configurable Register Slot 2
12	Configurable Register Slot 2 (LSB 32 bit signed integer)

#### Format – Advanced Level

Bytes 1-28	Description
1	Serial Port Number
2	Indicator Address
3	Status MSB
4	Status LSB
5	Configurable Register Slot 1 (MSB 32 bit signed integer)
6	Configurable Register Slot 1
7	Configurable Register Slot 1
8	Configurable Register Slot 1 (LSB 32 bit signed integer)
9	Configurable Register Slot 2 (MSB 32 bit signed integer)
10	Configurable Register Slot 2
11	Configurable Register Slot 2
12	Configurable Register Slot 2 (LSB 32 bit signed integer)
13	Configurable Register Slot 3 (MSB 32 bit signed integer)
14	Configurable Register Slot 3
15	Configurable Register Slot 3
16	Configurable Register Slot 3 (LSB 32 bit signed integer)
17	Configurable Register Slot 4 (MSB 32 bit signed integer)
18	Configurable Register Slot 4
19	Configurable Register Slot 4
20	Configurable Register Slot 4 (LSB 32 bit signed integer)
21	Configurable Register Slot 5 (MSB 32 bit signed integer)
22	Configurable Register Slot 5
23	Configurable Register Slot 5
24	Configurable Register Slot 5 (LSB 32 bit signed integer)
25	Configurable Register Slot 6 (MSB 32 bit signed integer)
26	Configurable Register Slot 6
27	Configurable Register Slot 6
28	Configurable Register Slot 6 (LSB 32 bit signed integer)

### 8.1.2. Input Data Field Descriptions

#### Serial Port number

Byte 1	Serial Port Number
Bit 1-0	01 = Serial 1 10 = Serial 2

#### Indicator Address

Byte 2	Indicator Address
Bit 4-0	1 or 2

#### Status Byte 1

Byte 3	Weight Status Byte 1
Bit 7	Calibration in progress
Bit 6	Range of Zero
Bit 5	Gross
Bit 4	Motion
Bit 3	Centre of Zero
Bit 2	Underload
Bit 1	Overload
Bit 0	Error

#### Status Byte 2

Byte 4	Weight Status Byte 2
Bit 7-0	Reserved

#### Configurable Register Slot 1

Bytes 5-8	Configurable Register Slot 1
5	Configurable Register Slot 1 (MSB 32 bit signed integer)
6	Configurable Register Slot 1
7	Configurable Register Slot 1
8	Configurable Register Slot 1 (LSB 32 bit signed integer)

#### Configurable Register Slot 2

Bytes 9-12	Configurable Register Slot 2
9	Configurable Register Slot 2 (MSB 32 bit signed integer)
10	Configurable Register Slot 2
11	Configurable Register Slot 2
12	Configurable Register Slot 2 (LSB 32 bit signed integer)

#### Configurable Register Slot 3 (Advanced Level only)

Bytes 13-16	Configurable Register Slot 3
13	Configurable Register Slot 3 (MSB 32 bit signed integer)
14	Configurable Register Slot 3
15	Configurable Register Slot 3
16	Configurable Register Slot 3 (LSB 32 bit signed integer)

#### Configurable Register Slot 4 (Advanced Level only)

Bytes 17-20	Configurable Register Slot 4
17	Configurable Register Slot 4 (MSB 32 bit signed integer)
18	Configurable Register Slot 4
19	Configurable Register Slot 4
20	Configurable Register Slot 4 (LSB 32 bit signed integer)

**Configurable Register Slot 5 (Advanced Level only)**

Bytes 21-24	Configurable Register Slot 5
21	Configurable Register Slot 5 (MSB 32 bit signed integer)
22	Configurable Register Slot 5
23	Configurable Register Slot 5
24	Configurable Register Slot 5 (LSB 32 bit signed integer)

**Configurable Register Slot 6 (Advanced Level only)**

Bytes 25-28	Configurable Register Slot 6
25	Configurable Register Slot 6 (MSB 32 bit signed integer)
26	Configurable Register Slot 6
27	Configurable Register Slot 6
28	Configurable Register Slot 6 (LSB 32 bit signed integer)

**8.2. Output Format – Basic Level**

For Basic Level, output information from the Profibus-DP master to the connected Indicators is required in the following format.

**8.2.1. Output Data Structure – Basic Level**

**Format - Basic Level**

Bytes 1-5	Description
1	Serial Port Number
2	Indicator Address
3	Command
4 -5	Command Data

**8.2.2. Output Data Field Descriptions – Basic Level**

**Serial Port Number**

Byte 1	Serial Port Number
Bit 1-0	01 = Serial 1 10 = Serial 2

**Indicator Address**

Byte 2	Indicator Address
Bit 4-0	1 or 2

**Command**

Byte 3	Command – Basic Level
1	Send Key
2	Set Configurable Register Slot 1
3	Set Configurable Register Slot 2

**Command Data – Send Key Command**

Byte 4	Command Data	Range
4	Key Code	Refer to R420 manual

**Command Data – Set Configurable Register Slot 1 or 2 Command**

Bytes 4-5	Command Data	Range
4	RegID (MSB 16 bit unsigned integer)	Refer to R420 manual
5	RegID (LSB 16 bit unsigned integer)	manual

### 8.3. Output Format – Advanced Level

For Advanced Level, output information from the Profibus-DP master to the connected Indicators is required in the following format.

#### 8.3.1. Output Data Structure – Advanced Level

##### Format – Advanced Level

Bytes 1-9	Description
1	Serial Port Number (as per Basic Level – See Section 8.2.2)
2	Indicator Address (as per Basic Level – See Section 8.2.2)
3	Command
4 -9	Command Data

#### 8.3.2. Output Data Field Descriptions – Advanced Level

##### Command (Additional to Basic Level)

Byte 3	Command – Advanced Level
4	Set Configurable Register Slot 3
5	Set Configurable Register Slot 4
6	Set Configurable Register Slot 5
7	Set Configurable Register Slot 6
8	Set Passcode
9	Write Register
10	Execute Register

##### Command Data – Set Configurable Register Slot 3, 4, 5 or 6 Command

Bytes 4-5	Command Data	Range
4	RegID (MSB 16 bit unsigned integer)	Refer to R420 manual
5	RegID (LSB 16 bit unsigned integer)	

##### Command Data – Set Passcode

Bytes 4-7	Command Data	Range
4	Passcode (MSB 32 bit unsigned integer)	Refer to R420 manual
5	Passcode	
6	Passcode	
7	Passcode (LSB 32 bit unsigned integer)	

##### Command Data – Write Register

Bytes 4-9	Command Data	Range
4	RegID (MSB 16 bit unsigned integer)	Refer to R420 manual
5	RegID (LSB 16 bit unsigned integer)	
6	Data (MSB 32 bit signed integer)	Refer to R420 manual
7	Data	
8	Data	
9	Data (LSB 32 bit signed integer)	

**Command Data – Execute Register**

Bytes 4-9	Command Data	Range
4	RegID (MSB 16 bit unsigned integer)	Refer to R420
5	RegID (LSB 16 bit unsigned integer)	manual
6	Optional Data (MSB 32 bit signed integer)	Refer to R420
7	Optional Data	manual
8	Optional Data	
9	Optional Data (LSB 32 bit signed integer)	



## 9. DIAGNOSTIC DATA

Diagnostic information includes error and warning messages, which can be displayed as a text message via Profibus-DP diagnostic services. The messages are predefined in the supplied GSD file and are outlined in the following section.

The diagnostic data structure is described below:

Bytes 1-12	Description
1-4	1400 Specific Diagnostics
5-8	Module 1 (First Indicator) Diagnostics
9-12	Module 2 (Second Indicator) Diagnostics

### 9.1. 1400 Specific Diagnostics

Byte 1	Unit Diagnostics
Bit 5	EEPROM storage failure
Bit 4	System Reboot Required (after parameter changes of baudrate and/or serial port termination)
Bit 3	Power supply voltage too high (>28VDC)
Bit 2	Power supply voltage too low (<10VDC)

Byte 2	Reserved
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Byte 3	Reserved
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Byte 4	Module Diagnostic Flags
Bit 7	One or more modules (indicators/displays) have diagnostics pending

9.2. Indicator / Display Specific Diagnostics

Byte 5 Byte 9	Indicator Address and Serial Channel Number
Bit 7-2	000001 = Indicator 1 000010 = Indicator 2
Bit 1-0	01 = Serial 1 10 = Serial 2

Byte 6 Byte 10	Indicator Status Byte 1	Action
Bit 7	- Sense Not Connected	Check sense line connection
Bit 6	+ Sense Not Connected	Check sense line connection
Bit 5	Scale Build Error	Check calibration
Bit 4	Over Temperature Error	Check location/ventilation
Bit 3	Excitation Voltage High	Check scale supply
Bit 2	Excitation Voltage Low	Check scale supply
Bit 1	Power Supply Voltage High	Check power supply
Bit 0	Power Supply Voltage Low	Check power supply

Byte 7 Byte 11	Indicator Status Byte 2	Action
Bit 7	Program Storage Failure	Service
Bit 6	Runtime Information Lost	Service
Bit 5	Clock Failure	Service
Bit 4	ADC Out Of Range	Check loadcell connections
Bit 3	Non Volatile Storage Failure	Service
Bit 2	Factory Data Lost	Service
Bit 1	Calibration Data Lost	Recalibrate
Bit 0	Digital Setup Lost	Re-enter setup

Byte 8 Byte 12	Indicator Status Byte 3	Action
Bit 3	Indicator Type Mismatch	Check GSD configuration and network addressing
Bit 2	Indicator Not Connected	Check network connection
Bit 1	Command Error	Check for correct command level, valid command
Bit 0	Module Error	Check modules

## 10. ADDRESS SETTER SOFTWARE

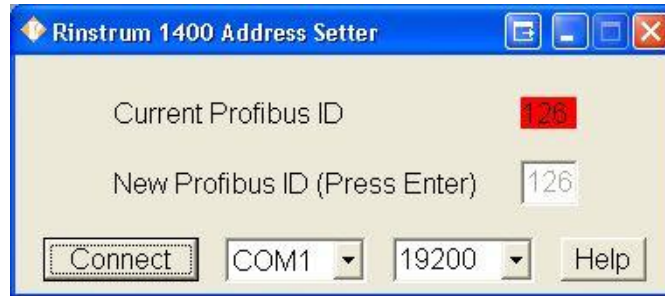
The Address Setter software can be used to set the Profibus address of the 1400 without the need for a Profibus Management Tool.

### 10.1. Initial Installation

It is possible to execute this program either straight from the supplied disc (cd), or install it to the PC which creates a copy on the PC and an associated menu item.

The following items need only be performed if installing to PC:

1. Navigate to the cd media drive and select "setup.exe" and open.
2. Follow the prompts of the installer.



### 10.2. Editing

1. Disconnect all serial and Profibus cables from the 1400.
2. Connect serial cable between PC serial port and Serial 1 on the 1400.
3. Connect power to the 1400.
4. Execute the software program on PC:
  - a. Straight from supplied disc – Navigate to the cd media drive and select "editaddr.exe" and open.
  - b. As installed application – Select the "1400 Address Setter" menu item.
5. Select the COM port that the serial cable is connected to with drop-down box.
6. Select the baudrate that the 1400 Serial 1 port is operating at with drop-down box (19200 baud is default).
7. Press "Connect" button to go online with the 1400. If connection is successful, the current profibus ID field will change from red to black and indicate the current ID.
8. Enter the new Profibus ID in the edit box and press the 'enter' key. If change is successful, the Current Profibus ID field will change to reflect the new address.
9. Press "Disconnect" button to go offline with the 1400.
10. Disconnect power to the 1400.
11. The serial and Profibus cables disconnected in step 1 may now be reconnected.
12. Power may now be reapplied.

