Anybus-E300-DPV1 - E300 Communication Module for PROFIBUS

USER MANUAL

Important User Information

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1. Preface

1.1. About This Document

This manual describes the installation and configuration of the E300-DPV1.

For information on how to configure the E300 Electronic Overload Relay, refer to the user manual for the E300 Electronic Overload Relay.

For additional documentation and resources, please visit www.anybus.com/support and www.rockwellautomation.com/support.

1.2. Document Conventions

Lists

Numbered lists indicate tasks that should be carried out in sequence:

1. First do this
2. Then do this

Bulleted lists are used for:

• Tasks that can be carried out in any order
• Itemized information

User Interaction Elements

User interaction elements (buttons etc.) are indicated with bold text.

Program Code and Scripts

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Program code and script examples
```

Cross-References and Links

Cross-reference within this document: Document Conventions (page 1)

External link (URL): www.anybus.com

Safety Symbols

> ⚠ **DANGER**
> Instructions that must be followed to avoid an imminently hazardous situation which, if not avoided, will result in death or serious injury.

> ⚠ **WARNING**
> Instructions that must be followed to avoid a potential hazardous situation that, if not avoided, could result in death or serious injury.

> ⚠ **CAUTION**
> Instruction that must be followed to avoid a potential hazardous situation that, if not avoided, could result in minor or moderate injury.

> ❗ **IMPORTANT**
> Instruction that must be followed to avoid a risk of reduced functionality and/or damage to the equipment, or to avoid a network security risk.

Information Symbols

> 📝 **NOTE**
> Additional information which may facilitate installation and/or operation.

> 💡 **TIP**
> Helpful advice and suggestions.

1.3. Trademarks

Anybus® is a registered trademark of HMS Networks.

All other trademarks are the property of their respective holders.

2. Safety

2.1. Intended Use

The intended use of this equipment is as a communication interface. The communication module allows an E300 Relay to be integrated into an automation system.

The communication module has one PROFIBUS-D-SUB connector.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

2.2. General Safety

⚠️ **WARNING**
To prevent electrical shock, disconnect from power source before installing or servicing. Follow NFPA 70E requirements. Install in suitable enclosure. Keep free from contaminants.

⚠️ **WARNING**
Installation, adjustments, putting into service, use, assembly, disassembly, and maintenance shall be carried out by suitably trained personnel in accordance with applicable code of practice.

⚠️ **WARNING**
In case of malfunction or damage, no attempts at repair should be made. The product should be returned to the manufacturer for repair. Do not dismantle the product.

3. Preparation

3.1. Recommended Cables and Connectors

> **IMPORTANT**
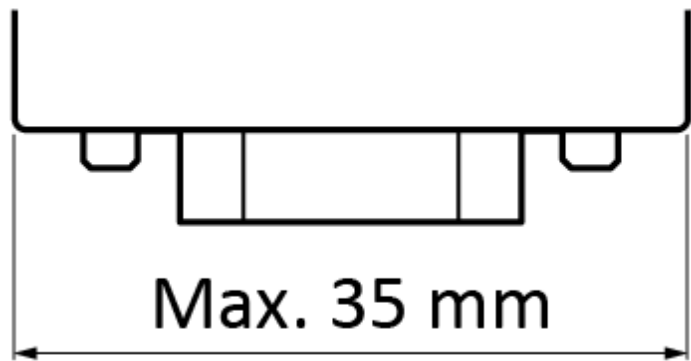> Use only PROFIBUS approved cables and connectors.

Figure 1. Straight, 45° and 90° connectors

Supported versions of PROFIBUS connectors: Straight, 45° and 90°

Maximum supported PROFIBUS connector width: 35 mm.

Table 1. Supported PROFIBUS connectors, examples

Manufacturer	Variant	Article
Siemens	0°	6GK1500-0EA02
Siemens	90°	6ES7972-0BB12-0XA0
Erni	90°	104050
Erni	90°	174048
Phoenix Contact	0°	SUBCON-PLUS-PROFIB/AX/SC - 2744380
Phoenix Contact	45°	SUBCON-PLUS-PROFIB (2744348)
Phoenix Contact	90°	SUBCON-PLUS-PROFIB/90/IDC (2313672)

Maximum cable length depends on the configured Baud rate. For more information refer to www.profibus.com.

3.2. E300 Communication Module Network Information

Label with Serial Number and Firmware Revision.
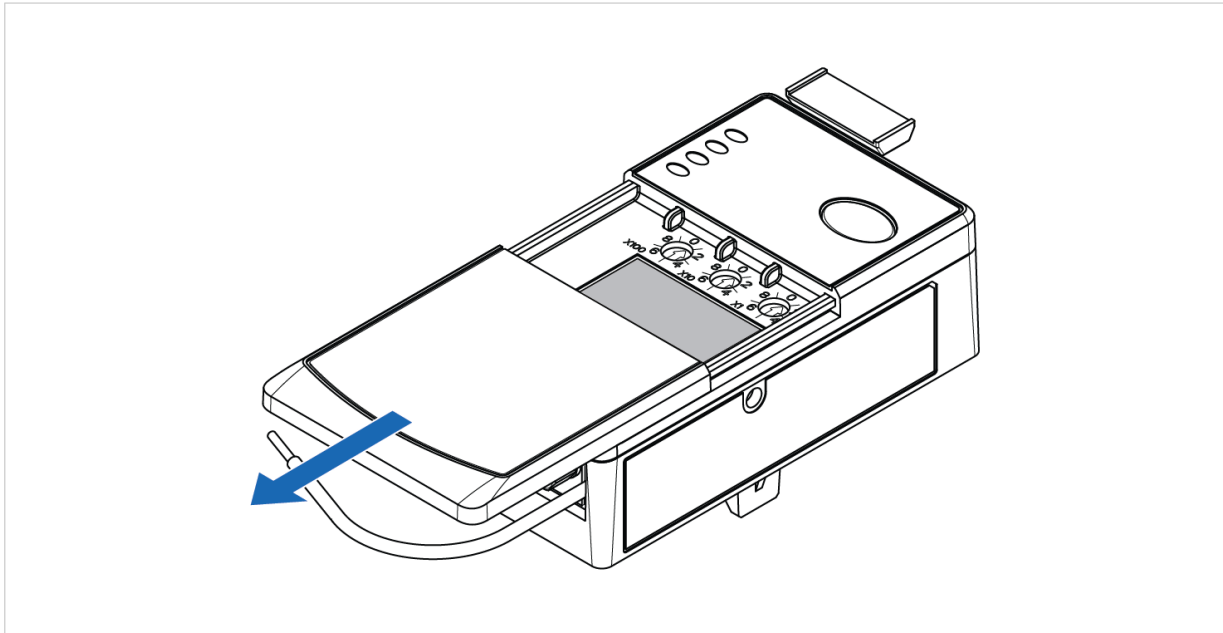
3.3. Support and Resources

For additional documentation and technical support, please visit www.anybus.com/support and www.rockwellautomation.com/support.

3.4. HMS Software Applications

The following HMS software applications are needed to update the CompactCom C40 NP40 Chip firmware:

• Anybus Transport Provider
• Anybus Firmware Manager II

Download the installation files and documentation from www.anybus.com/support.

3.5. Third-Party Software Applications

The Flash Magic tool is needed to update the E300-DPV1 firmware.
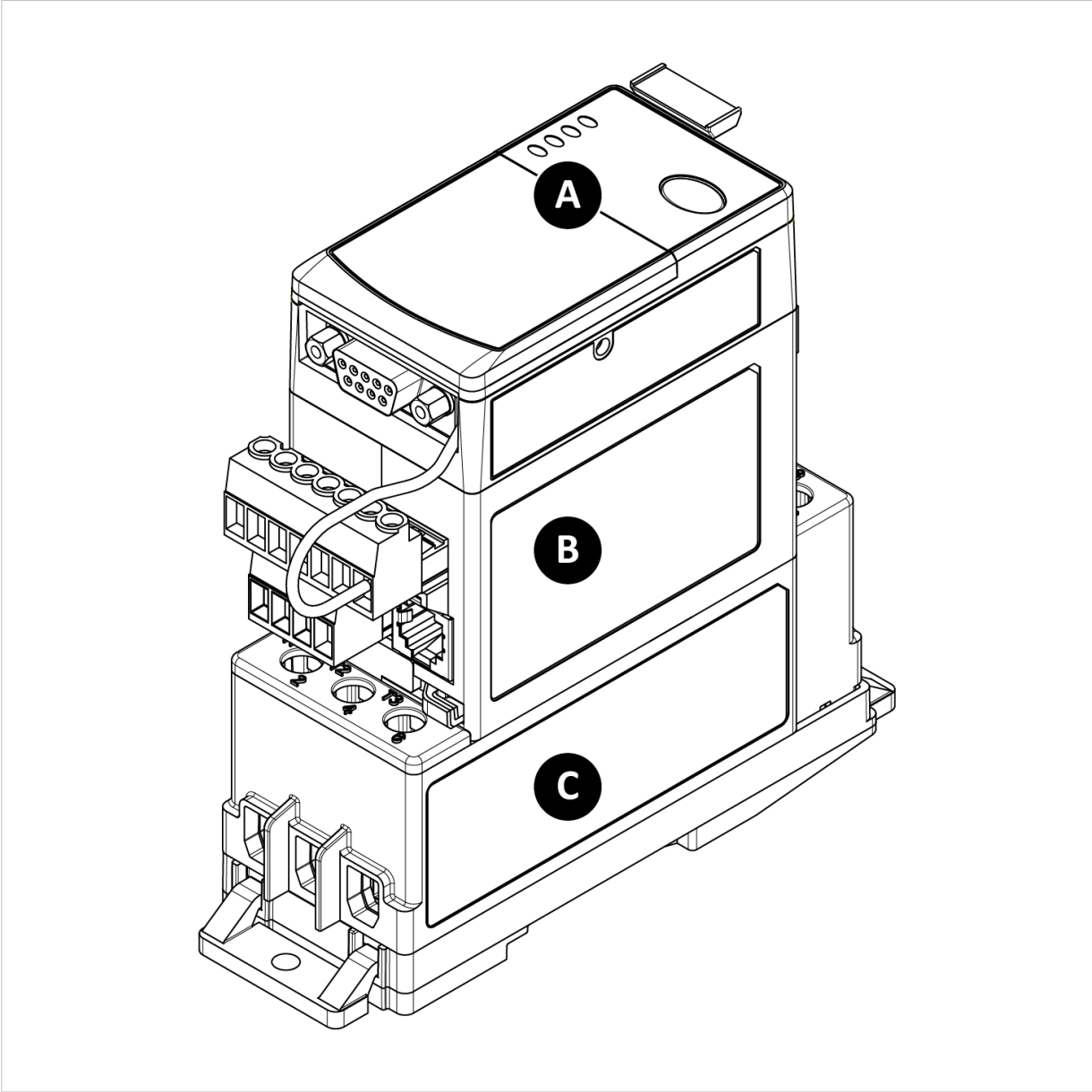
Visit www.flashmagictool.com and download the installation files for the current version of the Flash Magic tool.

4. Installation

4.1. E300 Relay Modules

Three modules comprise the E300 Relay.

All three modules are required to make a functional overload relay.

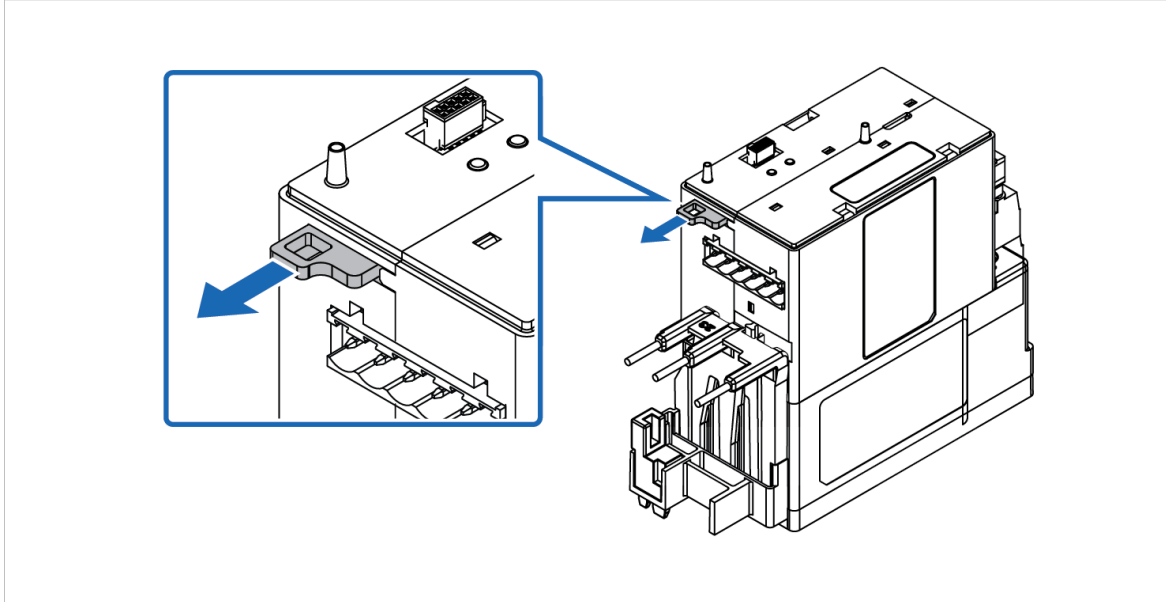| Position	Module
A	E300-DPV1
B	E300 Relay Control Module
C	E300 Relay Sensing Module

4.2. Attach E300 Communication Module

Procedure

To attach the E300 Communication Module to the E300 Relay Control Module:

1. Pull out the locking tab located on the upper left side of the E300 Relay Control Module.

2. Attach the E300 Communication Module to the E300 Relay Control Module.
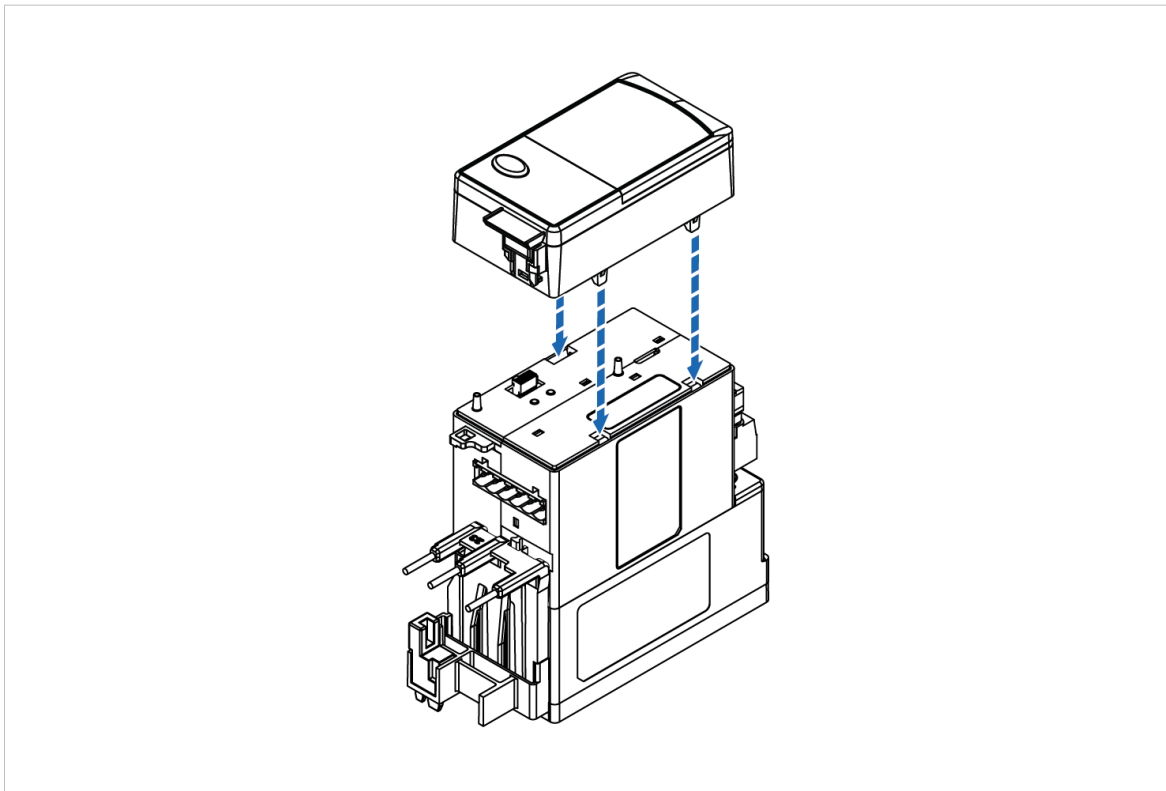
3.   To lock the modules, push in the locking tab located on the upper left side of the E300 Relay Control Module.
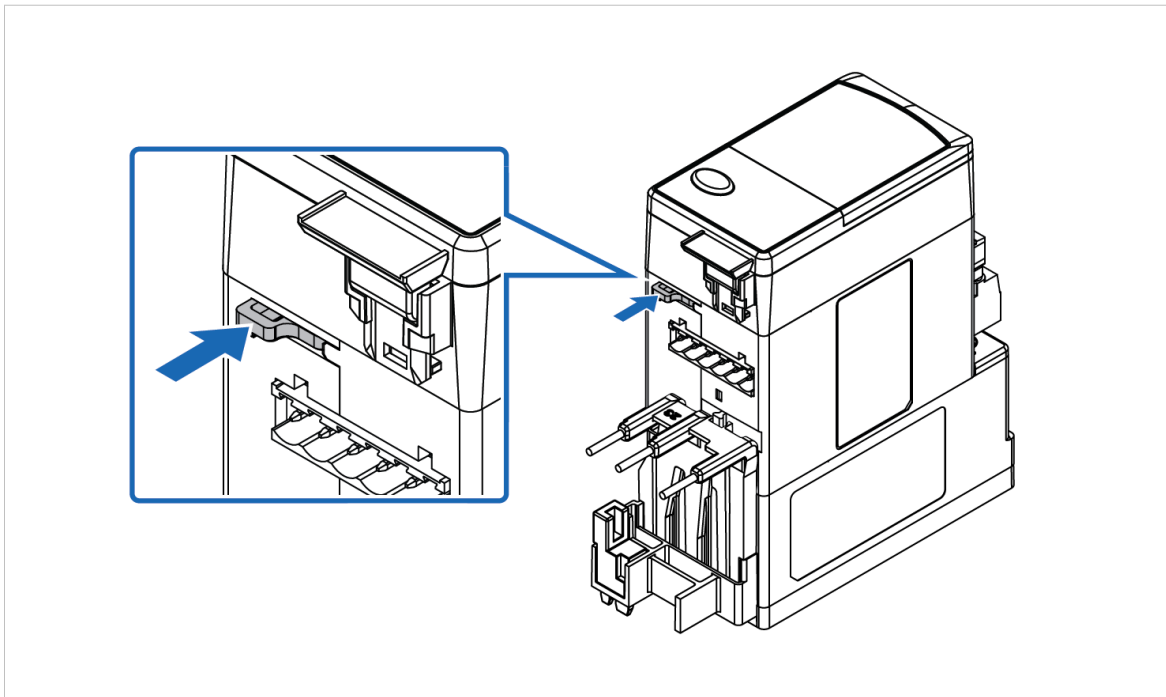
4.3. Connect to PROFIBUS Network

The E300 Communication Module has one PROFIBUS D-SUB connector.

> **!** **IMPORTANT**
> If a node is the last on a bus segment, use a PROFIBUS connector with built-in and activated terminating resistors.

For more information about PROFIBUS design and installation, refer to www.profibus.com.

4.4. Connect to Ground

Connect the Green Wire to Functional Earth (Ground).
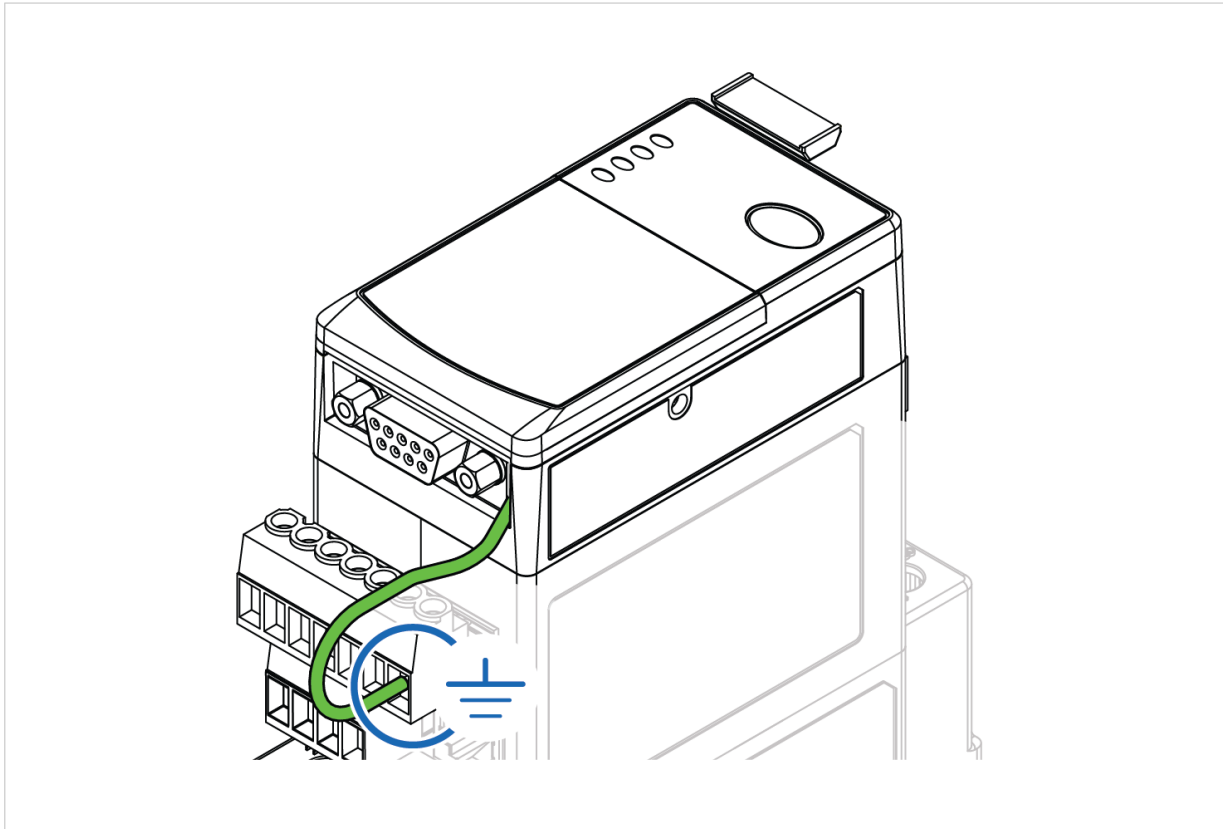
4.5. PROFIBUS Address Setting Via Rotary Switches

Use the three rotary switches to select the PROFIBUS address.

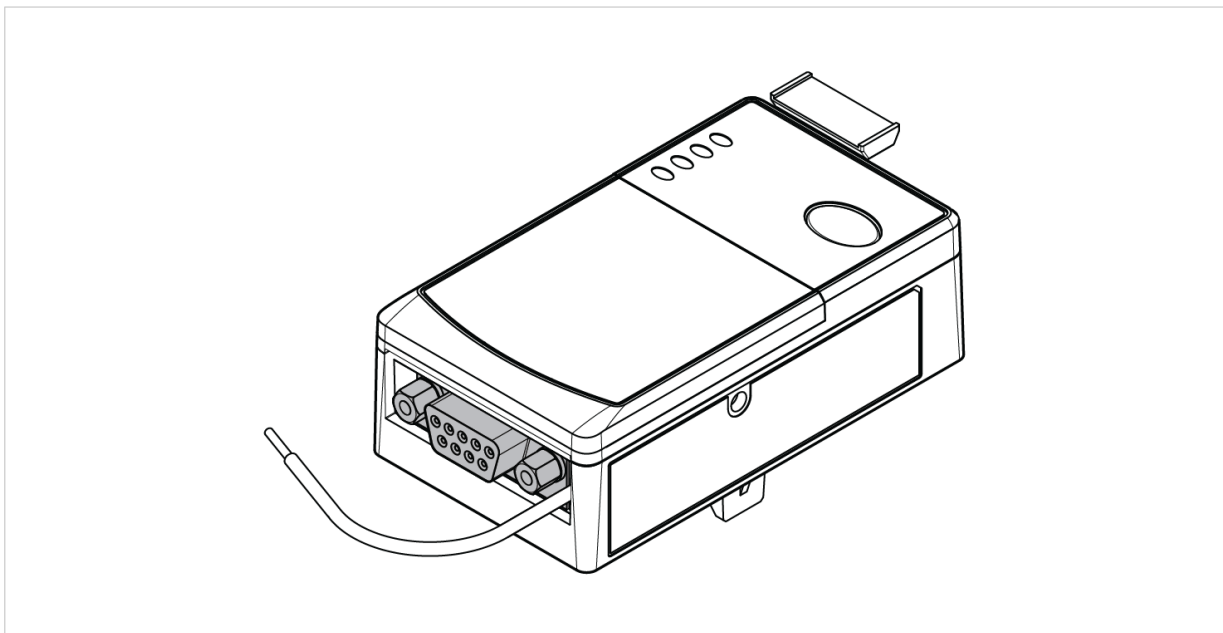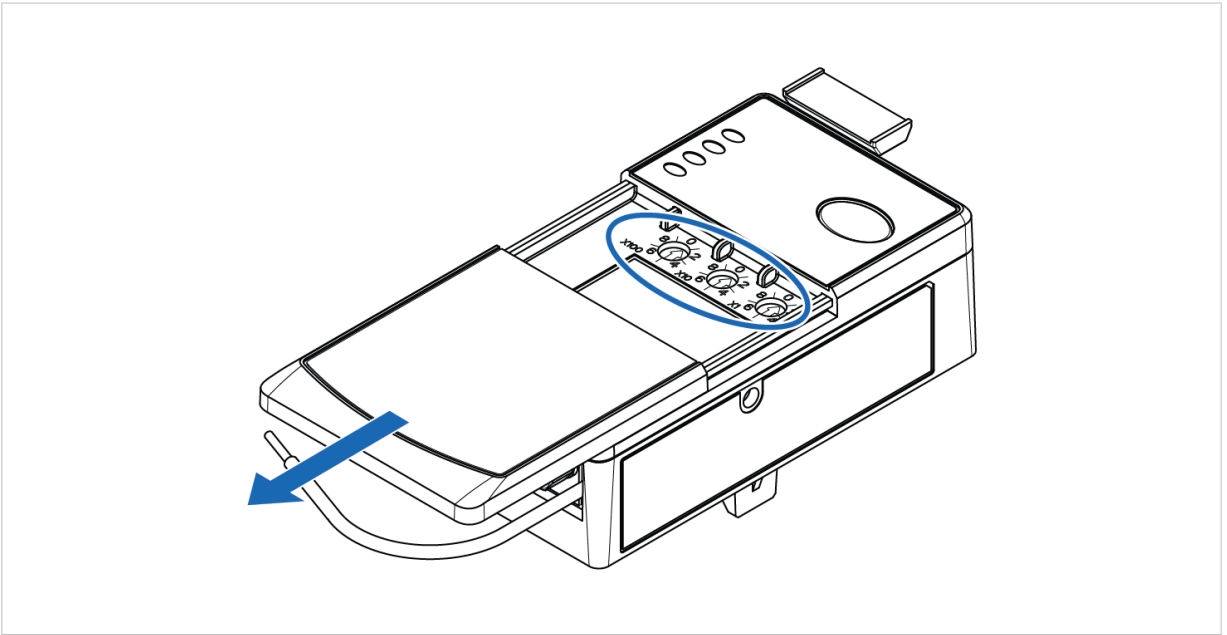| Rotary Switch Setting	Function
000 - 125	User configured PROFIBUS address
126	PROFIBUS address configured by PROFIBUS Master (SSA)
600 - 699	NP40-Update-Mode
700 - 799	Host-Update-Mode

> **NOTE**
> All other rotary switch settings are treated as invalid and result in a red TRIP/WARN LED.

A power cycle is required for the changes to take effect.

PROFIBUS address setting example

When the left dial is set to **1**, the middle dial is set to **2**, and the right dial is set to **3**, the resulting PROFIBUS station address is: **123**.

5. Verify Operation

5.1. LED Guide

E300 Communication Module LED Indicators
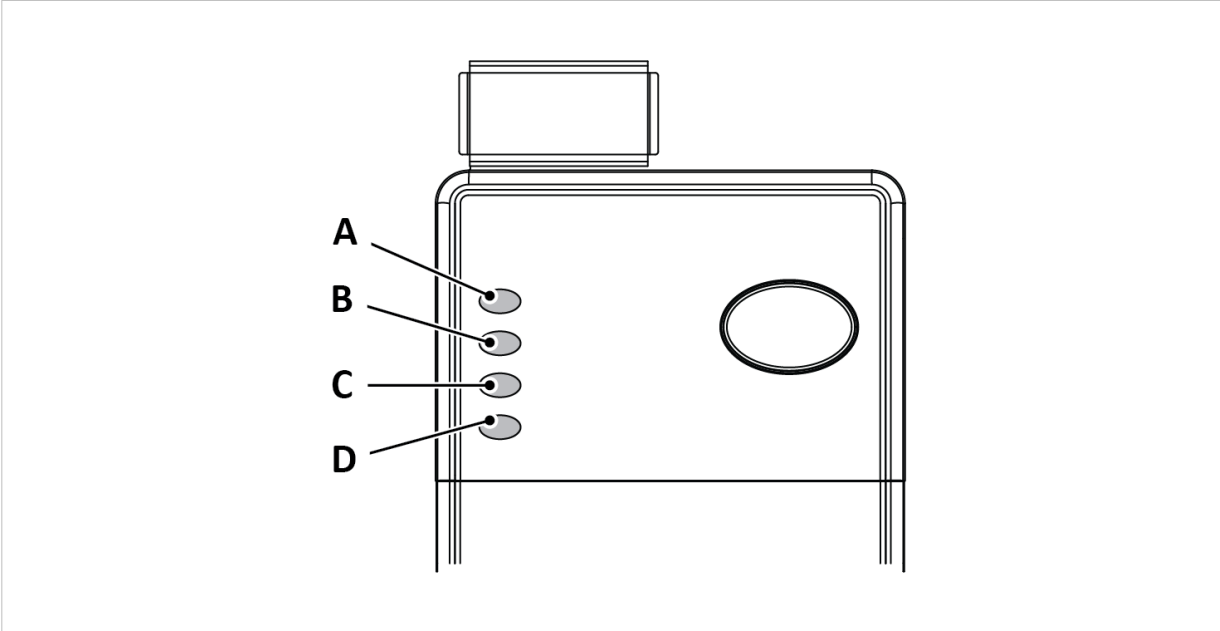
	LED A	LED C	LED D
Indicator State	**POWER**	**MODE - Network Status**	**STATUS - Module Status**
Off	Device off	Not online/No power	Not initialized
Green	Device Active (Current Detected)/Run Mode	Online, data exchange	Initialized
Green, flashing	Device Ready/ Ready Mode	Online, clear	Initialized, diagnostic event(s) present
Red	N/A	N/A	Exception error
Red, 1 flash	N/A	Parameterization error	N/A
Red, 2 flashes	N/A	PROFIBUS configuration error	N/A

LED B: Indicates status for TRIP/WARN. For more information, refer to the E300 Relay Control Module User Manual.

6. Maintenance

6.1. Firmware Update for Host Controller

Before You Begin

Download Flash Magic Tool Installation Files
The Flash Magic tool is needed to update the E300-DPV1 firmware.

Visit www.flashmagictool.com and download the installation files for the current version of the Flash Magic tool.

E300-DPV1 Firmware Update Files
Download the current E300-DPV1 firmware update files from www.anybus.com/support.

Procedure
Install firmware update for Host Controller

1. Install the Flash Magic tool on your PC.

2. Disconnect the E300-DPV1 from power.

3. Remove the E300-DPV1 from the E300 Relay Control Module.
    See Attach E300 Communication Module (page 7).

4. Set the E300-DPV1 rotary switches to **700**.
    See PROFIBUS Address Setting Via Rotary Switches (page 10).

5. To access the **TTL pin header connector** located on the E300-DPV1 PCB, remove the E300-DPV1 top lid.
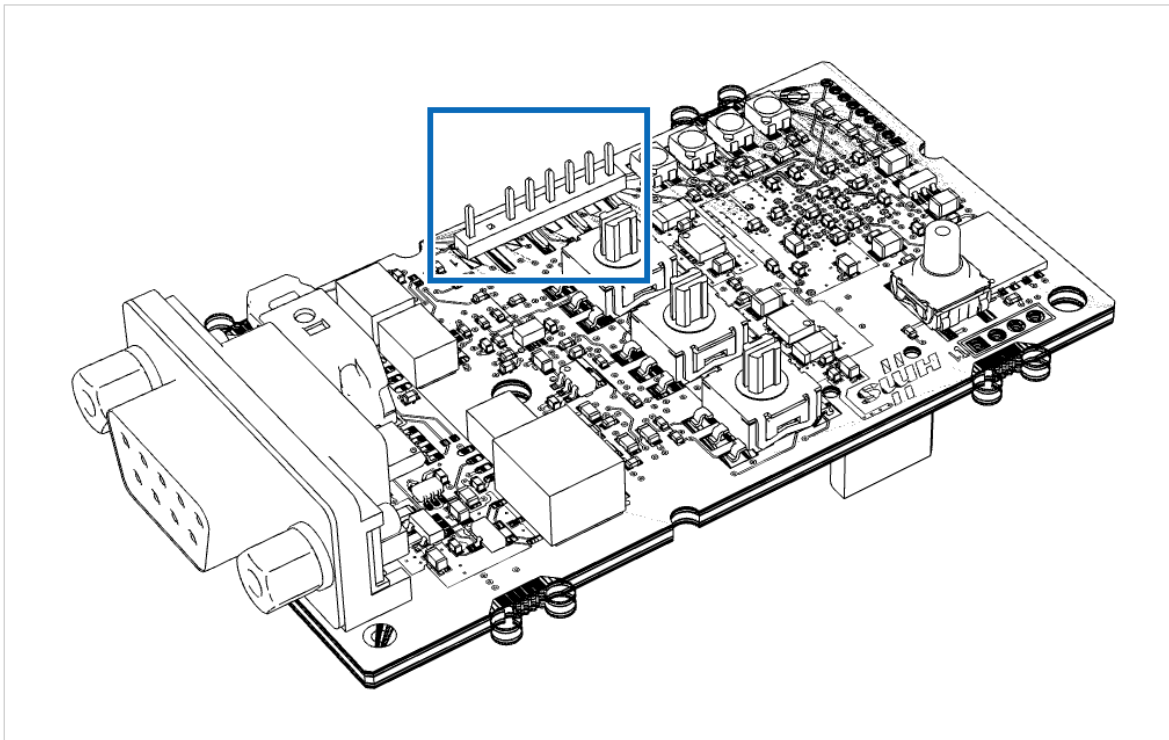
Figure 2. TTL pin header connector

6. Connect an **TTL-USB cable** to the **TTL pin header connector** and to your PC

7. Start the Flash Magic tool and configure the following settings:
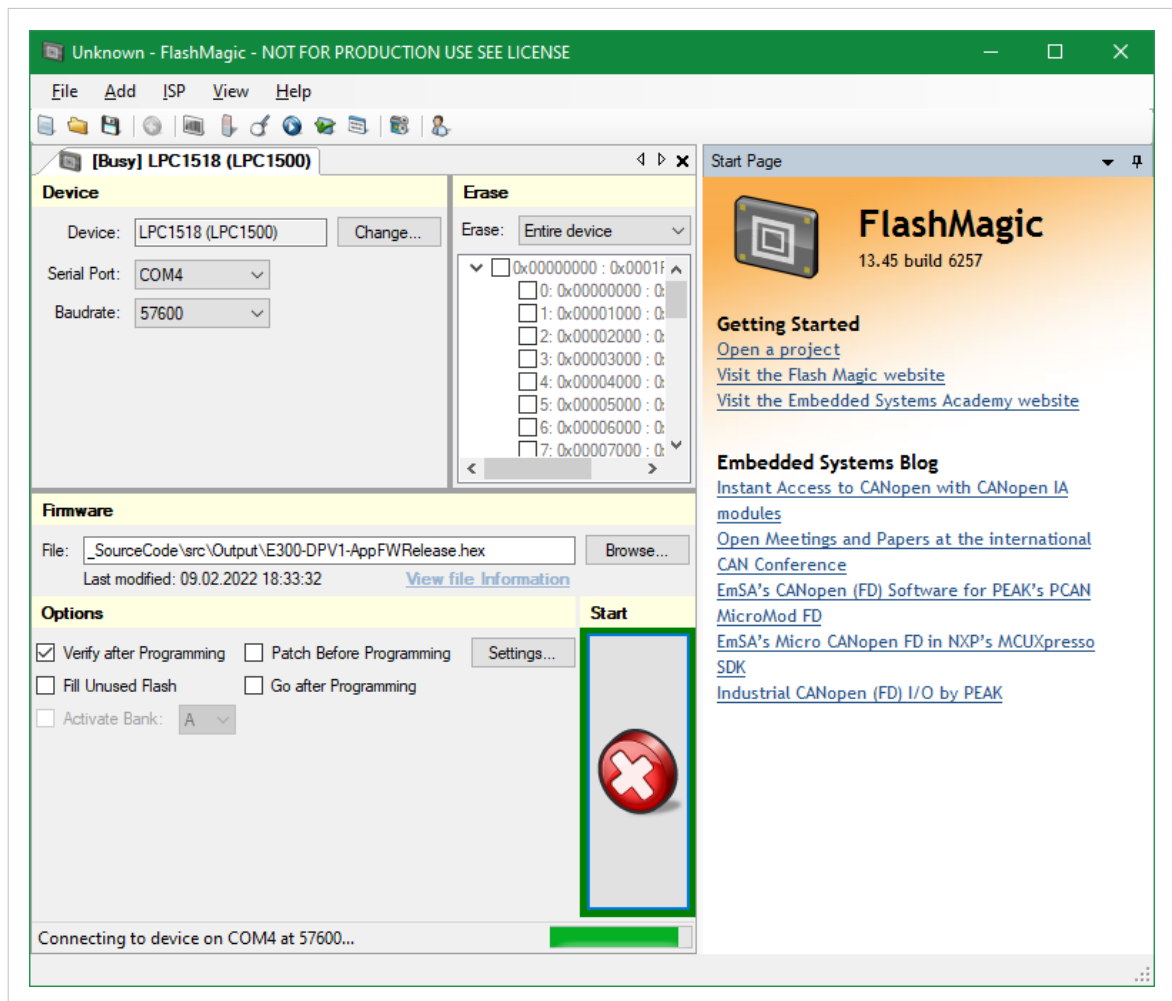
Figure 3. Flash Magic tool firmware update

a. Set **Device** to UART/LPC1518.

b. Select a **Serial Port** to connect to on your PC.

c. Keep the default **Baud rate** setting 57600.

d. In the **Firmware** section, browse to and open the firmware HEX file.

e. In the **Options** section, select the **Verify after Programming** checkbox.

8. Click **Start** and wait for the firmware update to complete.

9. Disconnect the **TTL-USB cable** and close the E300-DPV1 top lid.

10. Attach the E300-DPV1 to the E300 Relay Control Module.
See Attach E300 Communication Module (page 7).

11. Set the E300-DPV1 rotary switches to the desired PROFIBUS address.
See PROFIBUS Address Setting Via Rotary Switches (page 10).

12. Reconnect the E300-DPV1 to power.
The firmware update is now complete.

6.2. Firmware Update for the CompactCom C40 NP40 Chip

Before You Begin

Download HMS Software Applications
The following HMS software applications are needed to update the CompactCom C40 NP40 Chip firmware:

• Anybus Transport Provider

• Anybus Firmware Manager II

Download the installation files and documentation from www.anybus.com/support.

Download CompactCom C40 NP40 Chip Firmware Update Files
Download the CompactCom C40 NP40 Chip firmware update HIFF files from www.anybus.com/support.

Procedure

Install firmware update for CompactCom C40 NP40 Chip

1. Install the Transport Provider on your PC.

2. Install the Firmware Manager II on your PC.

3. In the Firmware Manager II:
  a. Click **File** > **Firmware Archive**.
  b. Locate the firmware update HIFF file on your PC
  c. Drag and drop the firmware HIFF file into the **Firmware Archive** window.
   A new entry appears.
  d. Close the **Firmware Archive** window.

4. Disconnect the E300-DPV1 from power.

5. Remove the E300-DPV1 from the E300 Relay Control Module.

6. Set the E300-DPV1 rotary switches to **600**.

7.   To access the **TTL pin header connector** located on the E300-DPV1 PCB, remove the E300-DPV1 top lid.
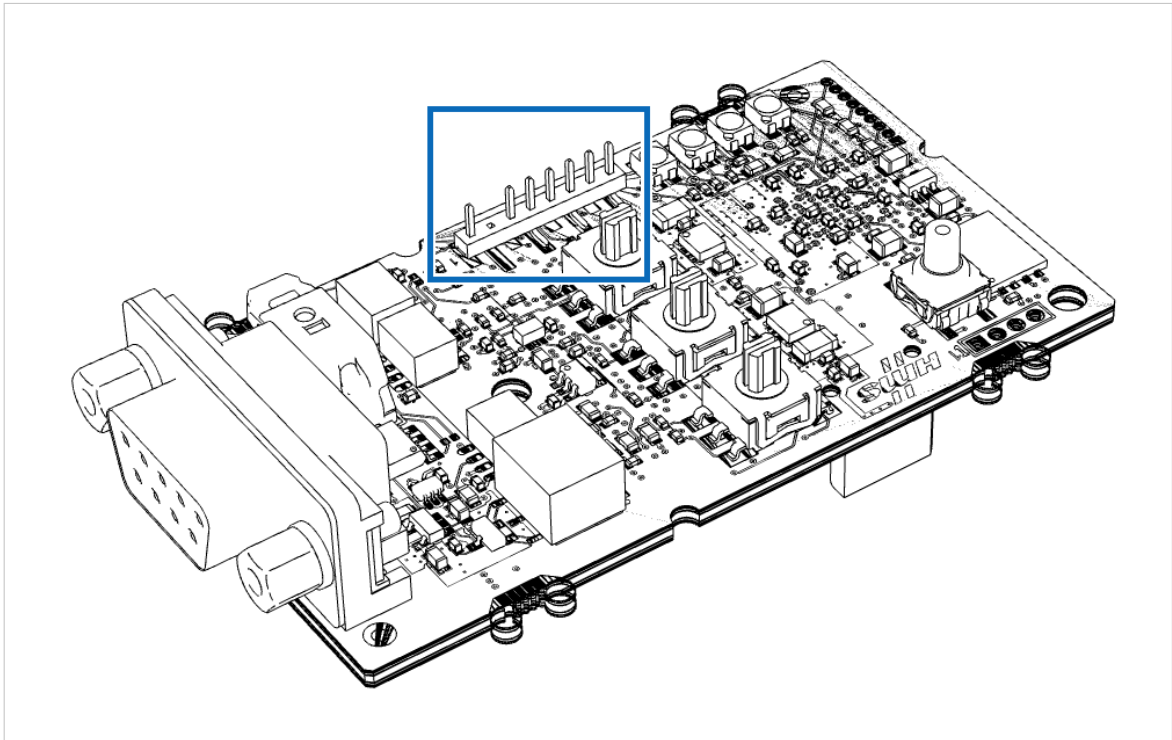
Figure 4. TTL pin header connector

8.   Connect a **TTL-USB cable** to the E300-DPV1 **TTL pin header connector**.

> **(!) IMPORTANT**
> Do not connect the **TTL-USB cable** to your computer in this step. The E300-DPV1 is powered on when connected to a computer. If power is turned on too early in the firmware update process, the firmware update process may time out or fail.

9. In the Firmware Manager II:
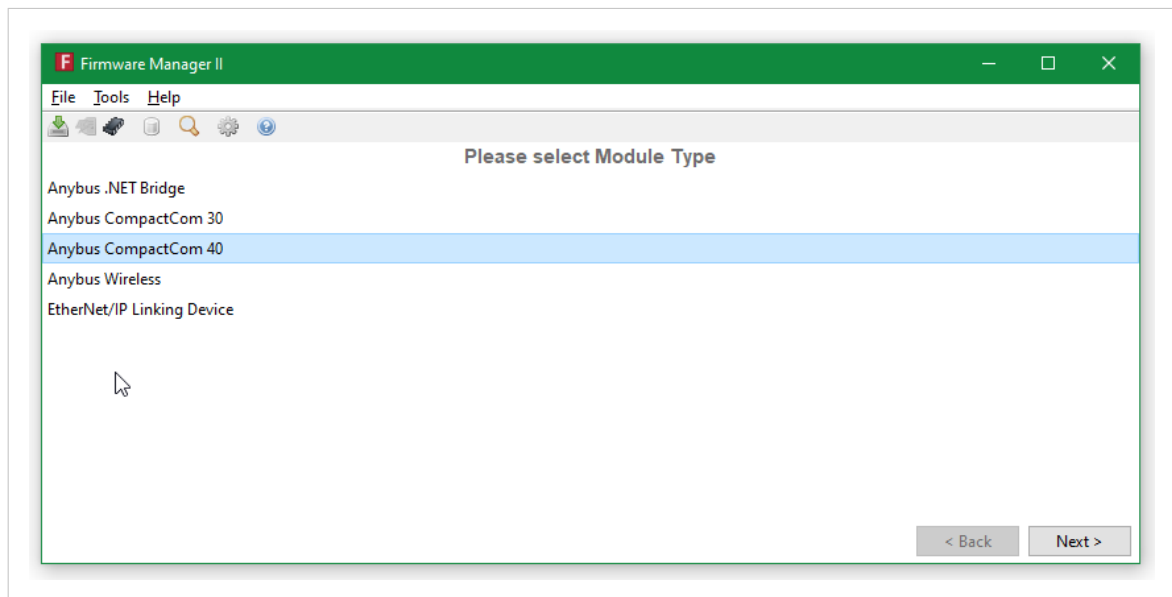
Figure 5. Firmware Manager II Manual Update Wizard

a. Click **File** > **Manual Update Wizard**.

b. Select **Anybus CompactCom 40** and click **Next**.

c. Select **Transport Provider** and click **Next**.

d. In the new window, click **Create**.

e. Select **COM-Port Transport Provider** and click **Ok**.

f. Connect the **TTL-USB cable** to your computer.
   The E300-DPV1 LED indicators flash green and yellow.

g. Enter a **Path name** for the new path and click **Ok**.

> **❗ IMPORTANT**
> For the new COM port to appear in the **Select Transport Provider Path** drop-down list, ensure that the **TTL-USB cable** is connected to your computer before you click **Ok**.

h. Within the next 2 minutes, select a **COM-Port** from the **Select Transport Provider Path** drop-down list and click **Ok**.

10. In the Firmware Manager II:
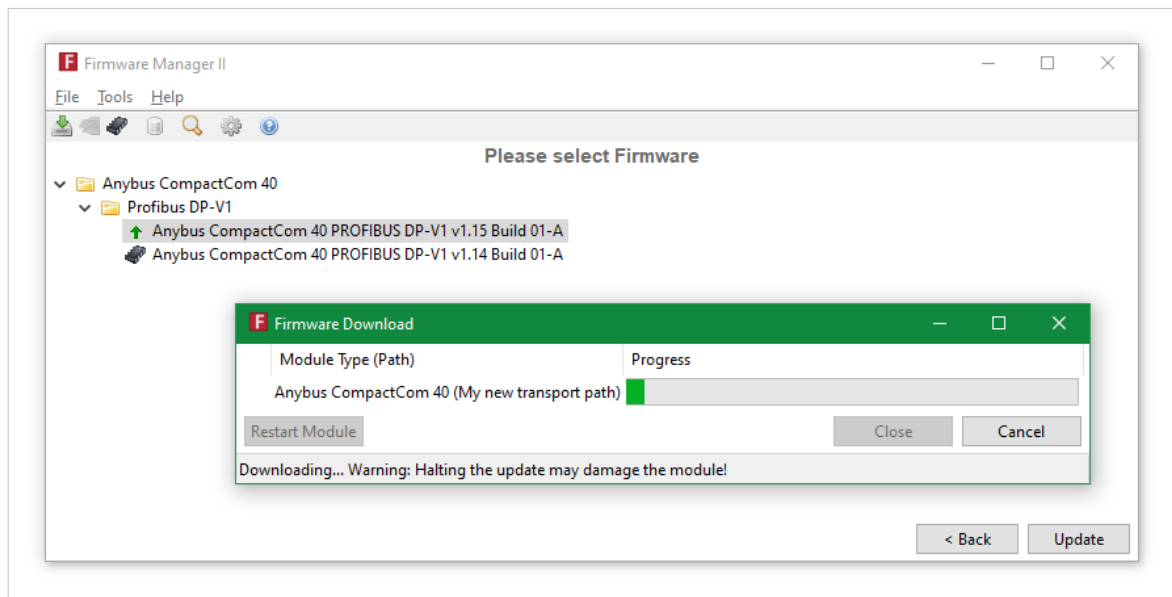
Figure 6. Firmware Manager II update firmware

a. Select the imported E300-DPV1 firmware update.

b. Click **Update** and wait until the update is completed.

c. Close the Firmware Manager II.

11. Disconnect the TTL-USB cable and close the E300-DPV1 top lid.

12. Attach the E300-DPV1 to the E300 Relay Control Module.
    See Attach E300 Communication Module (page 7).

13. Set the E300-DPV1 rotary switches to the desired PROFIBUS address.
    See PROFIBUS Address Setting Via Rotary Switches (page 10).

14. Reconnect the E300-DPV1 to power.
    The firmware update is now complete.

7. Troubleshooting

7.1. Additional Diagnostic information

The E300 Communication Module for PROFIBUS offers additional internal diagnostic information.

States and statistics describing the internal DeviceNet and CAN communication between the E300 Communication Module and the E300 Relay Control Module, as well as internal firmware versions are parts of the internal diagnostic information.

The internal diagnostic information is offered by acyclic access.

The following tables define the data layout of these data areas.

FW Versions (Slot 4, Index 70)

Byte offset	Bit 31..24 (MSB)	Bit 23..16	Bit 15..8	Bit 7..0 (LSB)
0	Host FW Major	Host FW Minor	(not used)	(not used)
4	NP40 FW Major	NP40 FW Minor	NP40 FW Build	(not used)

DeviceNet Status (Slot 4, Index 72)

| Byte offset	Name	Data Type	Description
0	Last EM read error	UDINT	Table 2. Most recent error code of any Explicit Message read: | MSB			LSB
N/A	additional status code		status code | Cleared after reading.
4	Last EM write error	UDINT	Table 3. Most recent error code of any Explicit Message written: | MSB			LSB
N/A	additional status code		status code | Cleared after reading.
8	I/O status	UDINT	Table 4. Current status of implicit IO connection | MSB			LSB
More data (if Cnct. state is Failed)			Cnct. state | Connection state values: 0 = Offline 1 = Running 2 = First input data received from E300 3 = Timeout 4 = Connection failed (Get connection phase) 5 = Connection failed (IO allocation failed) 6 = Connection failed (Set Inhibit time failed) 7 = Connection failed (Establishing failed)
12	Start-up status	UDINT	Table 5. State of start-up configuration with E300 | MSB			LSB
additional status code		status code	Start-up state | Start-up state values: 0 = E300 configuration not started 1 = Writing Vendor ID 2 = Writing ECM ID 3 = Writing ECM Revision 4 = Writing ECM Misc (Physical Rotary Switch) 5 = Reading System Configuration String 6 = Configuration done If CIP errors appear during a Start-up state, they are shown in the status and additional status code fields
16	CAN status register	USINT	Table 6. Bit0-Bit2 Last Error Code 	Value	Error
---	---
0	No Error
1	Stuff Error
2	Form Error
3	ACK Error
4	Bit1 Error
5	Bit0 Error
6	CRC Error	 Bit3 = Transmit OK Bit4 = Receive OK Bit5 = Error passive

Byte offset	Name	Data Type	Description
			Bit6 = Error warning
			Bit7 = Bus-Off
17	DeviceNet IO connection timeout count	UDINT	Count of occurred DeviceNet IO connection timeouts since start-up
21	DeviceNet IO messages consumed	UDINT	Count of incoming DeviceNet IO messages consumed since start-up. Fragmented frames excluded.
25	DeviceNet IO messages produced	UDINT	Count of outgoing DeviceNet IO messages produced since start-up. Fragmented frames included.
29	DeviceNet Explicit messages sent	UDINT	Count of sent Explicit Messaging requests since start-up. Fragmented frames excluded.
33	DeviceNet Explicit messages received	UDINT	Count of received Explicit Messaging responds since start-up. Fragmented frames excluded.

CAN Statistics (Slot 4, Index 73)

Byte offset	Name	Data Type	Description
0	NoErrPassiveInt	UINT	Number of CAN error passive interrupts
2	NoWarnStatInt	UINT	Number of CAN error warning level interrupts
4	NoBusOffErrInt	UINT	Number of CAN bus off interrupts
6	TxInterrupts	UDINT	Number of CAN transmit interrupts
10	TxAttempts	UDINT	Number of CAN transmit attempts
14	RxInterrupts	UDINT	Number of CAN receive interrupts
18	TxErrCnt	USINT	Number of CAN error frames
19	RxErrCnt	USINT	Number of CAN error frames
20	NumDroppedIoIn	UDINT	Number of dropped incoming I/O connections
24	NumDroppedEmIn	UDINT	Number of dropped incoming Explicit Messages
28	MaxInIoBufferDepth	UINT	Size of buffer for incoming I/O connections
30	MaxInEmBufferDepth	UINT	Size of buffer for incoming Explicit Messages

7.2. Protection Trip Status
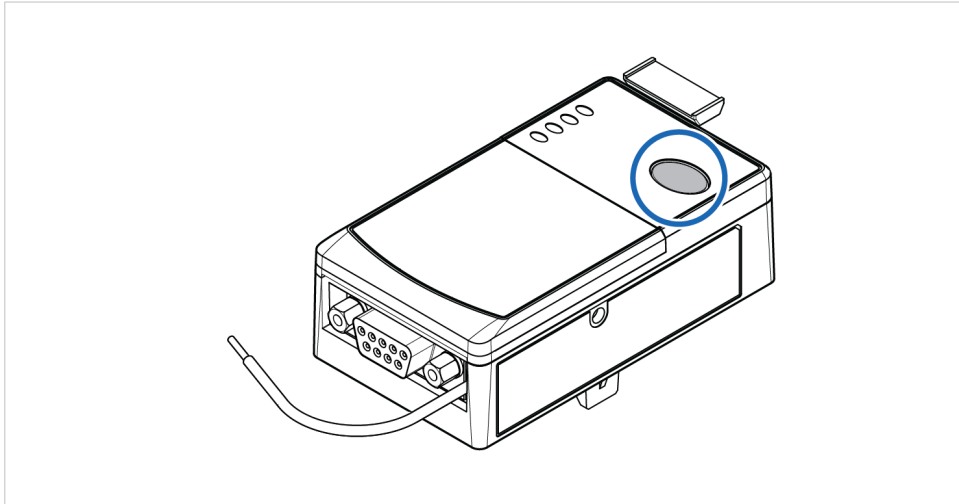
Procedure

To **Test** the E300 Relay:

1. Ensure that the E300 Relay is *untripped*.
2. To open the trip relay contact, press the **Test/Reset** button for 2 seconds and then release it.

To **Reset** the test:

3. To close the trip relay contact, press and immediately release the **Test/Reset** button.

8. Technical Data

For complete technical specifications and regulatory compliance information, please visit
www.anybus.com/support.

8.1. Technical Specifications

Article identification	029300-B
Communication connector	9-pin D-sub
Power consumption	Typical: 200 mA @ 5 VDC, Termination active
Storage temperature	-25 to +90 °C
Operating temperature	-25 to +70 °C
Humidity	5-95 % non-condensing
Cooling method	Natural convection
Protection class	IP20
Product weight	85 g
Dimensions	32 x 44,8 x 89,3 mm (W x H x D)

9. Reference Guides

9.1. Cyclic Input Data

Cyclic data sent by the E300-DPV1 to the PLC.

Byte Offset	Datatype	Read/ Write	Description	Also accessible via	
				Slot	Index
0	UDINT	R	Reserved for Logix	4	84
4	UINT	R	Device Status 0	0	20
6	UINT	R	Device Status 1	0	21
8	UINT	R	Input Status 0	0	16
10	UINT	R	Input Status 1	0	17
12	UINT	R	Output Status	0	18
14	UINT	R	Op Station Status	0	19
16	UINT	R	Trip Sts Current	0	4
18	UINT	R	Warn Sts Current	0	10
20	UINT	R	Trip Sts Voltage	0	5
22	UINT	R	Warn Sts Voltage	0	11
24	UINT	R	Trip Sts Power	0	6
26	UINT	R	Warn Sts Power	0	12
28	UINT	R	Trip Sts Control	0	7
30	UINT	R	Warn Sts Control	0	13
32	UINT	R	Trip Sts Analog	0	8
34	UINT	R	Warn Sts Analog	0	14
36	UINT	R	Reserved	4	83
38	UINT	R	Reserved	0	40
40	USINT	R	Therm Utilized Pct	0	1
41	USINT	R	Current Im balance	0	52
42	UINT	R	Avg Percent FLA	0	50
44	DINT	R	Average Current	0	46
48	DINT	R	L1 Current	0	43
52	DINT	R	L2 Current	0	44
56	DINT	R	L3 Current	0	45

9.2. Cyclic Output Data

Cyclic data received by the E300-DPV1 from the PLC.

Byte Offset	Datatype	Read/ Write	Description	Also accessible via	
				Slot	Index
0	UINT	RW	Output Status 0	0	18
2	UINT	RW	Default Consumed Bits	4	75
4	UINT	RW	DLXPtDeviceIn	4	77
6	UINT	RW	DLXAnDeviceIn	4	78

9.3. Acyclic Data

Slot	Index	Datatype	Length in bytes	Read/ Write	Description
0	1	USINT	1	R	%TCU
0	2	UINT	2	R	Time to Trip
0	3	UINT	2	R	Time to Reset
0	4	WORD	2	R	Current Trip Status
0	5	WORD	2	R	Voltage Trip Status
0	7	WORD	2	R	PTC Trip Input / Control Trip
0	10	WORD	2	R	Current Warning Status
0	11	WORD	2	R	Voltage Warning Status
0	16	WORD	2	R	Input Status 0
0	17	WORD	2	R	Input Status 1
0	20	WORD	2	R	Device Status 0
0	21	WORD	2	R	Device Status 1
0	43	DINT	4	R	Phase A current
0	44	DINT	4	R	Phase B current
0	45	DINT	4	R	Phase C current
0	50	UINT	2	R	Average % FLA
0	51	UINT	2	R	Ground Current
0	53	UINT	2	R	Phase A-B voltage
0	54	UINT	2	R	Phase B-C voltage
0	55	UINT	2	R	Phase C-A voltage
0	62	UINT	2	R	Frequency
0	67	DINT	4	R	Real Power (P)
0	71	DINT	4	R	Reactive Power (Q)
0	75	DINT	4	R	Apparent Power (S)
0	127	UINT	2	R	Last Fault Code
0	163	USINT	1	RW	Network Trip Reset
0	164	USINT	1	RW	Config Preset
0	165	USINT	1	RW	Clear command
0	171	UDINT	4	RW	FLA Setting
0	183	WORD	2	RW	Current Trip Enable
0	184	WORD	2	RW	Voltage Trip Enable
0	186	WORD	2	RW	Control Trip Enable
0	189	WORD	2	RW	Current Warn Enable
0	190	WORD	2	RW	Voltage Warn Enable
0	192	WORD	2	RW	Control Warning Enable
0	195	USINT	1	RW	Operating Mode
0	196	USINT	1	RW	Input Pt00 assignment
0	197	USINT	1	RW	Input Pt01 assignment
0	198	USINT	1	RW	Input Pt02 assignment
0	199	USINT	1	RW	Input Pt03 assignment
0	200	USINT	1	RW	Input Pt04 assignment
0	201	USINT	1	RW	Input Pt05 assignment
0	202	USINT	1	RW	Output Pt00 assignment
0	203	USINT	1	RW	Output Pt01 assignment
0	204	USINT	1	RW	Output Pt02 assignment
0	241	USINT	1	RW	Ground Fault Type
0	242	USINT	1	RW	Ground Fault Inhibit Time

Slot	Index	Datatype	Length in bytes	Read/ Write	Description
0	243	USINT	1	RW	Ground Trip Delay
0	244	UINT	2	RW	Ground Fault Trip Level
0	245	USINT	1	RW	Ground Fault Warning Delay
0	246	UINT	2	RW	Ground Fault Warning Level
0	247	USINT	1	RW	Ground Fault Filter
0	248	USINT	1	RW	Ground Fault Max Inhibit
0	251	USINT	1	RW	Jam Inhibit Time
0	252	USINT	1	RW	Jam Trip Delay
0	253	UINT	2	RW	Jam Trip Level
0	254	UINT	2	RW	Jam Warning Level
1	8	UINT	2	RW	Current Transformer Primary
1	9	UINT	2	RW	Current Transformer Secondary
1	36	DUINT	4	RW	Data Link 0
1	37	DUINT	4	RW	Data Link 1
1	38	DUINT	4	RW	Data Link 2
1	39	DUINT	4	RW	Data Link 3
1	40	DUINT	4	RW	Data Link 4
1	41	DUINT	4	RW	Data Link 5
1	42	DUINT	4	RW	Data Link 6
1	43	DUINT	4	RW	Data Link 7
1	98	UINT	2	RW	Potential Transformer Primary
1	99	UINT	2	RW	Potential Transformer Secondary
1	100	USINT	1	RW	Undervoltage Inhibit Time
1	101	USINT	1	RW	Undervoltage Trip Delay
1	102	UINT	2	RW	Undervoltage Trip Level
1	103	UINT	2	RW	Undervoltage Warning Level
1	104	USINT	1	RW	Overvoltage Inhibit Time
1	105	USINT	1	RW	Overvoltage Trip Delay
1	106	UINT	2	RW	Overvoltage Trip Level
1	107	UINT	2	RW	Overvoltage Warning Level
4	70	STRUCT	8	R	FW Versions*
4	71	STRING	240	R	System Configuration Namestring
4	72	STRUCT	37	R	DeviceNet Status*
4	73	STRUCT	32	R	CAN Statistics*
4	75	UINT	2	R	DefaultConsumedBits
4	77	UINT	2	R	PtDeviceIns
4	78	UINT	2	R	AnDeviceIns
4	83	UINT	2	R	Reserved
4	84	DINT	4	R	Reserved_for_Logix
4	86	UINT	2	R	Reserved2

*For details about the FW Versions data layout, DeviceNet Status and CAN Statistics see Additional Diagnostic information (page 18).

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