



*Allen-Bradley*

## **POINT I/O PROFIBUS Adapter Module**

**Cat. No. 1734-APB**

**User Manual**

**Rockwell  
Automation**

## Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this manual we use notes to make you aware of safety considerations:

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### ATTENTION



Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss

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Attention statements help you to:

- identify a hazard
- avoid a hazard
- recognize the consequences

---

### IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

---

## About This User Manual

### Purpose of This Manual

This manual describes how to install, configure and troubleshoot your PROFIBUS Adapter module.

For information about:	See:
What is the PROFIBUS Adapter	Chapter 1
Installing the PROFIBUS Adapter	Chapter 2
Configuring the POINT I/O System	Chapter 3
Communication and I/O Table Mapping	Chapter 4
Grouped Modules	Chapter 5
Troubleshooting the PROFIBUS Adapter	Chapter 6
Specifications	Appendix A
Default Data Maps	Appendix B

### Who Should Use This Manual

You must be able to use your selected configuration software to set up and calibrate these modules. You must have the capability to download and use files.

We assume you know how to do this in this manual. If you do not, refer to your software user manuals or online help before attempting to use these modules.

### Related Products and Documentation

The following table lists related 1734 products and documentation.

Description	Cat. No.	Publication
POINT I/O Technical Data	1734-Series	1734-2.1
Sink Input Module Installation Instructions	1734-IB2, -IB4	1734-IN051
Source Output Module Installation Instructions	1734-IV2, -IV4	1734-IN052
220V ac Input Module Installation Instructions	1734-IM	1734-IN008
120V ac Input Module Installation Instructions	1734-IA2	1734-IN010
120/220V ac Output Module Installation Instructions	1734-OA2	1734-IN009
Analog Current Input Module Installation Instructions	1734-IE2C	1734-IN053

<b>Description</b>	<b>Cat. No.</b>	<b>Publication</b>
Analog Current Output Module Installation Instructions	1734-OE2C	1734-IN054
Analog Voltage Input Module Installation Instructions	1734-IE2V	1734-IN001
Analog Voltage Output Module Installation Instructions	1734-OE2V	1734-IN002
Very High Speed Counter Module Installation Instructions	1734-VHSC24	1734-IN003
Very High Speed Counter Module Installation Instructions	1734-VHSC5	1734-IN004
5V Encoder/Counter Module Installation Instructions	1734-IJ	1734-IN005
24V Encoder/Counter Module Installation Instructions	1734-IK	1734-IN006
Relay Output Module Installation Instructions	1734-OW2	1734-IN055
Protected Output Module Installation Instructions	1734-OB2E, -OB4E	1734-IN056
DeviceNet Communication Interface Installation Instructions	1734-PDN	1734-IN057
POINT I/O 24V dc Expansion Power Supply Installation Instructions	1734-EP24DC	1734-IN058
Field Potential Distributor Installation Instructions	1734-FPD	1734-IN059
General Installation Instructions	All 1734	1734-IN510
Wiring Base Assembly Installation Instructions	1734-TB, -TBS	1734-5.11
Wiring Base Assembly Installation Instructions	1734-TB3, -TB3S	1734-IN013A
Cold Junction Wiring Base Assembly Installation Instruction	1734-TBCJC	1734-IN583
8 dc Input/8 Output Module Installation Instructions	1734D-IB8XOB8	1734-5.20
8 dc Input/8 Relay Output Module Installation Instructions	1734D-IB8XOW8	1734-5.21
8 ac Input/8 Output Module Installation Instructions	1734D-IA8XOA8	1734-5.22
8 ac Input/8 Relay Output Module Installation Instructions	1734D-IA8XOW8	1734-5.23
16 ac Input Module Installation Instructions	1734D-IA16	1734D-IN001
16 dc Input Module Installation Instructions	1734D-IB16	1734D-IN002

## European Communities (EC) Directive Compliance

If this product has the CE mark it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

### EMC Directive

This product is tested to meet the Council Directive 89/336/EC Electromagnetic Compatibility (EMC) by applying the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2 EMC — Generic Emission Standard, Part 2 — Industrial Environment
- EN 50082-2 EMC — Generic Immunity Standard, Part 2 — Industrial Environment

This product is intended for use in an industrial environment.

### Environmental/Safety Protection

Open style devices must be provided with environmental and safety protection by proper mounting in enclosures designed for specific application conditions. See NEMA Standards publication 250 and IEC publication 529, as applicable, for explanations of the degrees of protection provided by different types of enclosures. Refer to Allen-Bradley publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines for more information.



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## What is the PROFIBUS Adapter

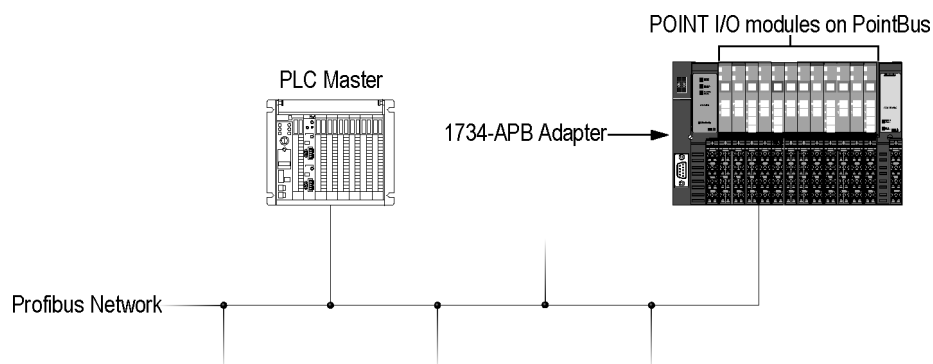
### General

This chapter describes the purpose of the POINT I/O PROFIBUS adapter, and what tasks have to be performed after installing the adapter.

For more information about:	See page:
PROFIBUS Adapter Overview	1-1
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### PROFIBUS Adapter Overview

The POINT I/O 1734-APB adapter resides on the PROFIBUS network and the POINT I/O backplane (PointBus) simultaneously. From this position, the adapter interfaces between the PROFIBUS network and the POINT I/O modules. The illustration below shows the adapter on the PROFIBUS network and the PointBus.



The adapter functions are:

- PROFIBUS - adapter serves as a slave that exchanges I/O data with a PROFIBUS master.
- PointBus - the adapter serves as a master that communicates with up to 63 POINT I/O modules

## Communicating through the Adapter

Output data is sent from the master across the PROFIBUS network to the 1734-APB adapter. The adapter automatically transfers the data across the PointBus backplane to the output modules.

Inputs from the input modules are collected by the PROFIBUS adapter via the backplane and sent across the PROFIBUS network to the master.

## I/O Module Removal and Insertion Under Power

I/O modules can be removed under power from their positions in the backplane without interfering with the communication with the other modules. When reinserting the removed module, communication is automatically started up again if the following criteria is fulfilled:

1. The inserted module is the same type as the one removed.
2. If more than one module is removed, communication will not be regained until all modules are inserted in their correct positions again.

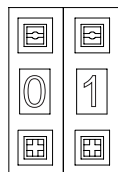
## Startup Procedure

Starting the adapter module consists of:

- Installing the adapter in the system
- setting the adapter node address
- configuring the adapter for PROFIBUS communication
- configuring the I/O modules for PointBus communication

## Set the Adapter Node Address

Set the node address using the 2-position thumbwheel switch. Valid settings range from 01 to 99. Use a pen to press either the + or – buttons to change the number.



### Configure the Adapter for PROFIBUS Communication

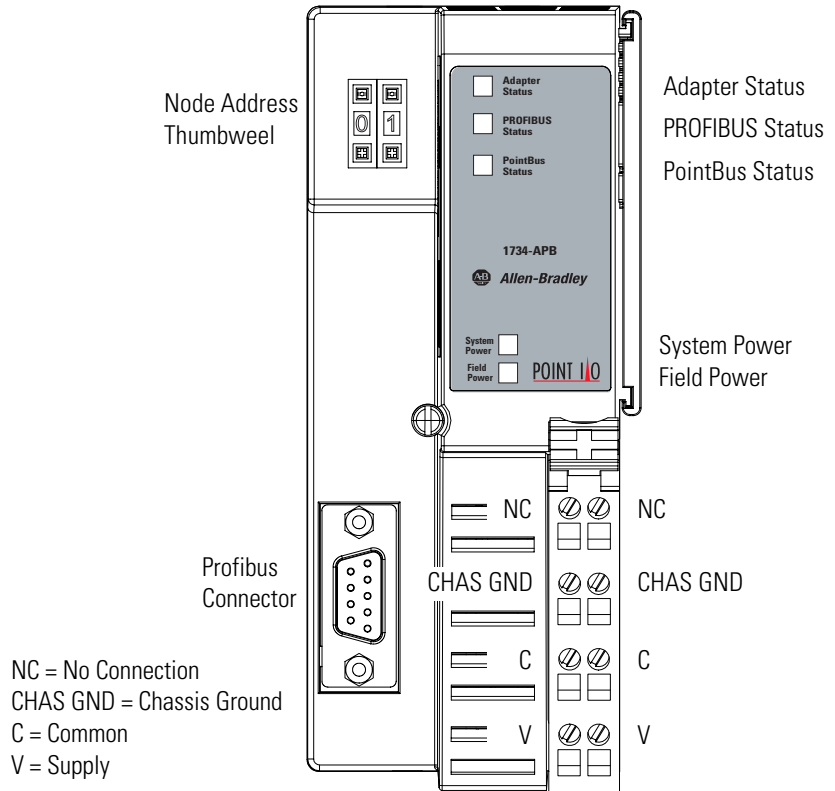
- Install the GSD file you received into your configuration tool
- add the adapter to your configuration
- select the node address and baud rate
- add I/O modules to the configuration

For more information, refer to Chapter 3 - Configuring the POINT I/O System.

### Configure the I/O Modules for PointBus Communication

You must configure each I/O module to establish its actions on the PointBus. Each module has a set of parameters that can be set (i.e. Idle value, Fault value, etc.).

For more information, refer to Chapter 3 - Configuring the POINT I/O System.



## Diagnostic Indicators

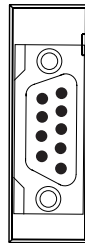
Diagnostic indicators are located on the front panel of the adapter module. They show both normal operation and error conditions in your POINT I/O system. The indicators are:

- Adapter status
- PROFIBUS status
- PointBus status
- System power
- Field power

Upon power-up, the adapter goes to an initialization state and performs a self-test (memory check, data memory clear, firmware integrity). The indicators also go through a self-test sequence. If a failure occurs, the adapter transitions to a faulted state and waits for reset (cycle power). Otherwise, the adapter begins monitoring the network (run state) for messages. Chapter 6 describes the diagnostic indicators and how to use them for troubleshooting.

## Network Connector

Use the 9-pin D-shell connector (shown below) to connect your adapter to the PROFIBUS network.



Connections are provided for connecting the required 24V dc power to the front of the module.

Refer to Chapter 2 or the Installation Instructions (pub. no. 1734-IN014) you received with your adapter to learn how to install and wire the adapter.

## Chapter Summary and What's Next

This chapter provided a brief overview of the 1734-APB PROFIBUS adapter. Go to chapter 2 to learn how to install and wire your adapter.

## Installing the PROFIBUS Adapter

### General

This chapter describes how to install and wire your adapter.

<b>For information about:</b>	<b>See page:</b>
Installing the PROFIBUS Adapter	2-2
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Wiring the PROFIBUS Adapter	2-6
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When properly installed, POINT I/O is grounded through the DIN rail to chassis ground. Use zinc plated, yellow chromated steel DIN rail to assure proper grounding.

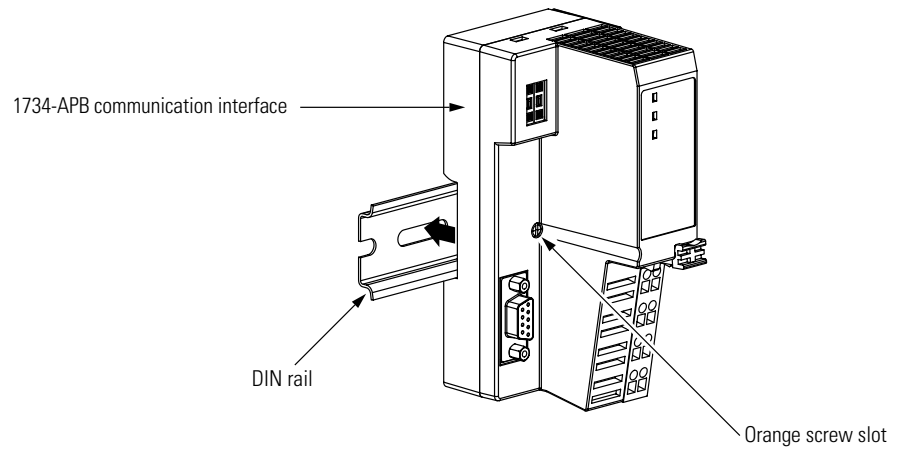
Other DIN rail material (such as aluminum, plastic, etc.) can corrode or oxidize and are poor conductors that may result in improper or intermittent platform grounding.

If you choose not to use zinc plated, yellow chromated steel DIN rail for your POINT I/O, periodically clean the DIN rail to prevent or lessen the effects of oxidation and corrosion.

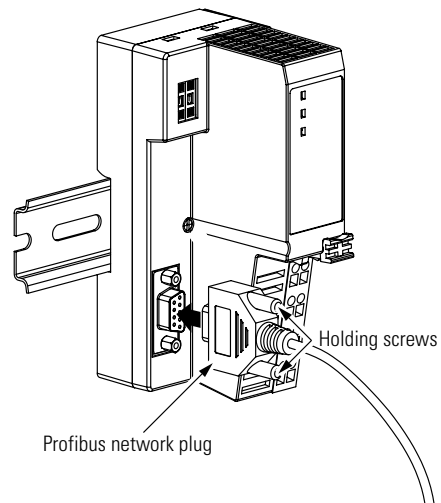
## Installing the PROFIBUS Adapter

To install the adapter on the DIN rail prior to installing other base units, proceed as follows.

1. Position the adapter vertically above the DIN rail.
2. Press down firmly to install the adapter on the DIN rail. (The locking mechanism will lock the adapter to the DIN rail.)

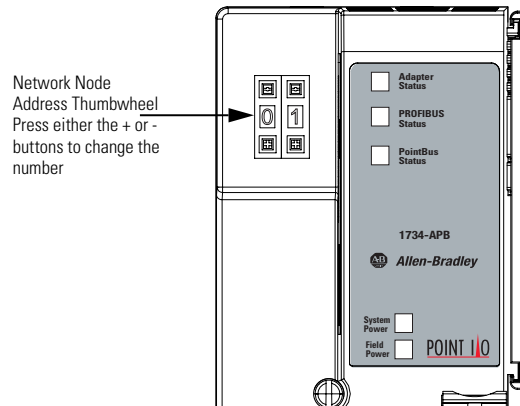


3. Insert the PROFIBUS network plug and tighten the holding screws.

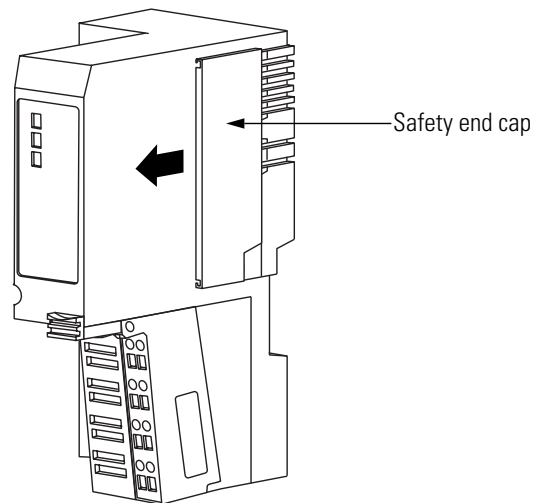




4. Set the node address using the 2-position thumbwheel switch. Valid settings range from 01 to 99. Press the + or - buttons to change the numbers.



5. Slide the safety end cap (9) up to remove. This exposes the backplane and power interconnections.

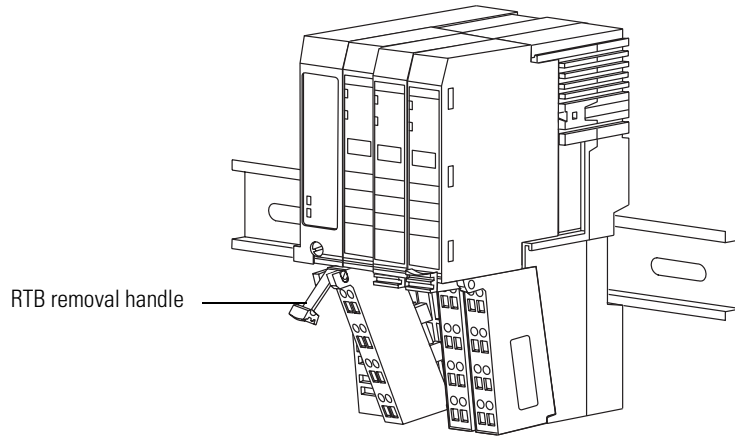
**ATTENTION**

Do not discard the safety end cap. Use this end cap to cover the exposed interconnections on the last mounting base on the DIN rail. Failure to do so could result in equipment damage or injury from electric shock.

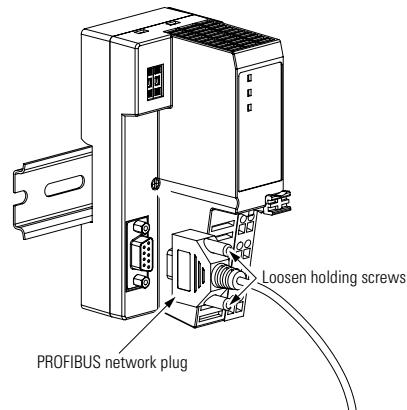
## Installing a Replacement PROFIBUS Adapter to an Existing System

1. Remove the existing adapter from the DIN rail as follows:

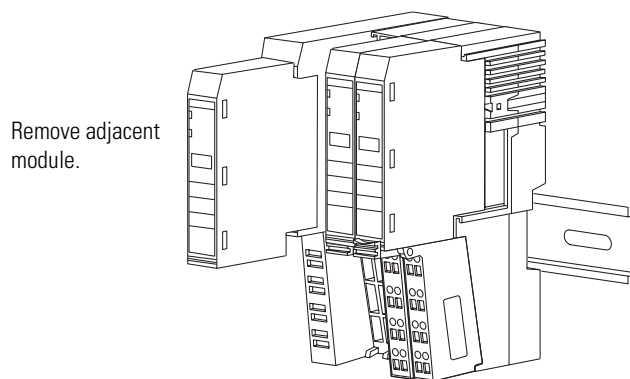
- A. Pull up on the removable terminal base (RTB) removal handle (7) to remove the terminal block.



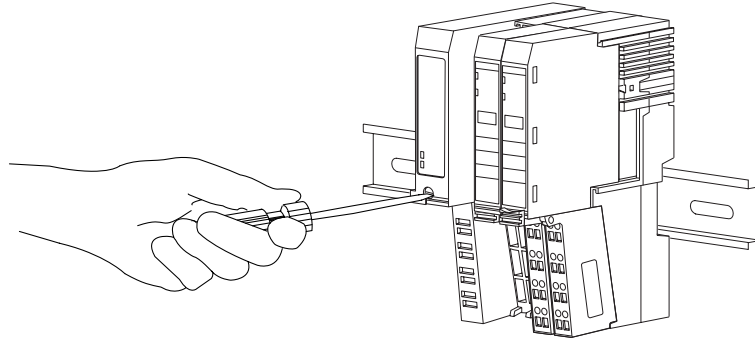
- B. Loosen the screws holding the PROFIBUS network plug and pull up to remove.



- C. Remove the adjacent module from its base.

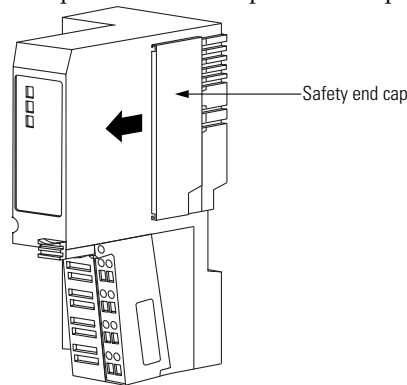


- D.** Use a small bladed screwdriver to rotate the DIN rail locking screw (5) to a vertical position. This releases the locking mechanism.

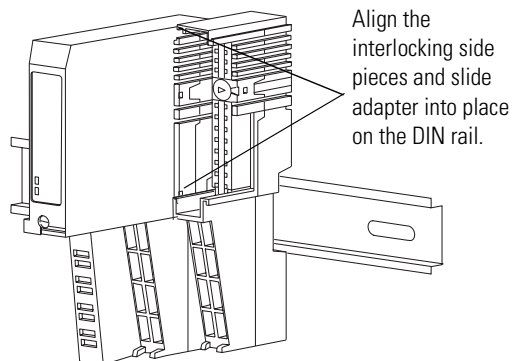


- E.** Pull straight out to remove.

2. Set the desired node address on the replacement adapter.
3. Slide the safety end cap up and remove it from the replacement adapter. This exposes the backplane and power connections.



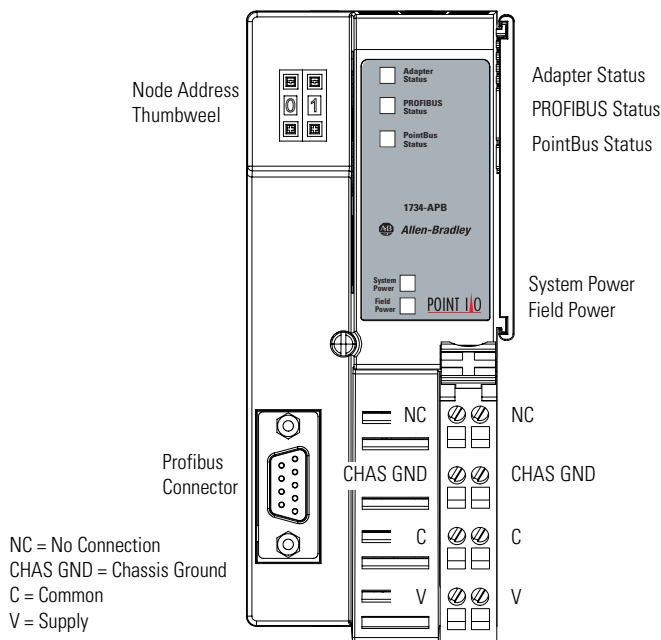
4. Position the replacement adapter vertically above the DIN rail. (Make certain the DIN rail lock is in the horizontal position.) Slide the adapter down, allowing the interlocking side pieces to engage the adjacent module.



5. Press firmly to seat the adapter (1) on the DIN rail. The adapter locking mechanism will snap into place.
6. Insert the PROFIBUS network plug and tighten the holding screws.
7. Insert the end opposite the handle into the base unit. This end has a curved section that engages with the wiring base.
8. Rotate the terminal block into the wiring base until it locks itself in place.
9. Replace the adjacent module in its base.

## Wiring the PROFIBUS Adapter

Refer to the figure below when wiring the PROFIBUS adapter.



## Module Power

The adapter supplies 5V logic power to POINT I/O modules by converting the applied 12/24V dc field power to PointBus 5V power. You can connect up to 63 I/O modules to each adapter, and you can power up to 14 I/O modules from the adapter (with a maximum of 10A of field power). Add up the current requirements of the modules you want to use, and determine that they do not exceed the amperage limit of the 1734-APB. (Note: Total expansion up to 63 modules - 14 modules (with 75mA current draw) maximum with 1734-APB - add 1734-EP24DC modules for additional 14 modules (or less based on current requirements), up to 63 module maximum)

**After the 14th (or last) module, you must insert an expansion power supply (cat. no. 1734-EP24DC) to power additional I/O modules.**

Refer to the table below for various POINT I/O modules current requirements.

POINT I/O Cat. No.	PointBus Current Requirements
1734-IB2	75mA
1734-IB4	75mA
1734-IV2	75mA
1734-IV4	75mA
1734-OB2E	75mA
1734-OB4E	75mA
1734-OW2	80mA
1734-IE2C	75mA
1734-OE2C	75mA
1734-IE2V	75mA
1734-OE2V	75mA
1734-IA2	75mA
1734-IM2	75mA
1734-OA2	75mA
1734-IJ2	160mA
1734-IK2	160mA
1734-IR2	220mA
1734-IT2	175mA
1734-VHSC5	180mA
1734-VHSC24	180mA

For more information on the Expansion Power Supply, cat. no. 1734-EP24DC, refer to:

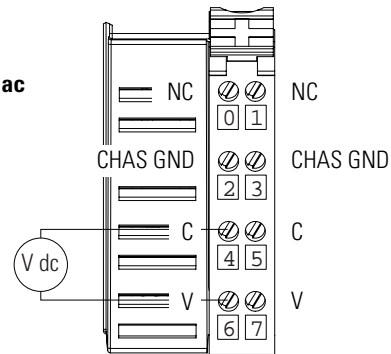
- POINT I/O Technical Data, publication 1734-TD001A
- POINT I/O Expansion Power Supply Installation Instructions, publication 1734-IN058A

## Wiring Connections

### 12/24V dc

**Do not connect 120/240V ac power to this supply.**

NC = No Connection  
 CHAS GND = Chassis Ground  
 C = Common  
 V = Supply



Terminal	Description	Notes
0	No connection	Reserved
1	No connection	
2	Chassis Ground	
3	Chassis Ground	
4	Common	
5	Common	
6	Voltage Input	Apply 12/24V dc. Connects to the internal power bus.
7	Voltage Input	

Proceed as follows. Make all connections to the removable terminal block (RTB).

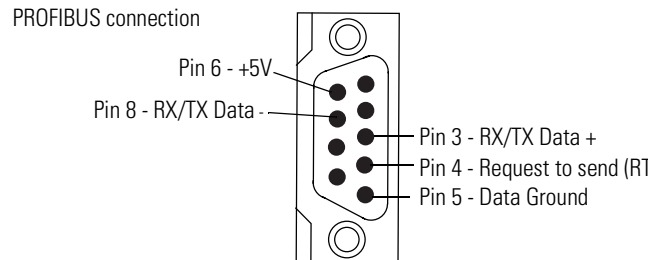
1. Connect chassis ground to terminal 2.
2. Connect 12/24V supply positive lead to terminal 6.
3. Connect 12/24V negative lead to terminal 4.

External power applied across terminal 6 (+) and 5 (-) connects to the internal power bus.

Do not connect anything to terminals 0 and 1. These are reserved terminals.

4. Connect the PROFIBUS connector plug to the D-shell on the adapter. Tighten the screws to secure.

## PROFIBUS Connection Plug Wiring



Pin Number	Name	Description
Housing	Shield	Connected to Chassis Ground
1	Not connected	
2	Not connected	
3	RX/TX Data +	Positive RX/TX data line
4	RTS	Request to send
5	Data Ground	Isolated ground
6	+5V BUS	Isolated +5V from RS485 side
7	Not connected	
8	RX/TX Data -	Negative RX/TX data line
9	Not connected	

## Chapter Summary and What's Next

In this chapter, you learned how to install and wire your adapter. Move to chapter 3 for information on configuring the POINT I/O system.





## Configuring the POINT I/O System

### In This Chapter

This chapter describes how to configure your adapter for PROFIBUS communication and how to configure the POINT I/O modules.

<b>For more information about:</b>	<b>See page</b>
Configuration Overview	3-1
Installing the GSD File	3-2
Adding the Master to the Network	3-3
Adding the Adapter to the Network	3-5
Adding I/O Modules to the Adapter	3-6
Configuring I/O Modules	3-8
Download to Master System	3-13
Chapter Summary and What's Next	3-14

### Configuration Overview

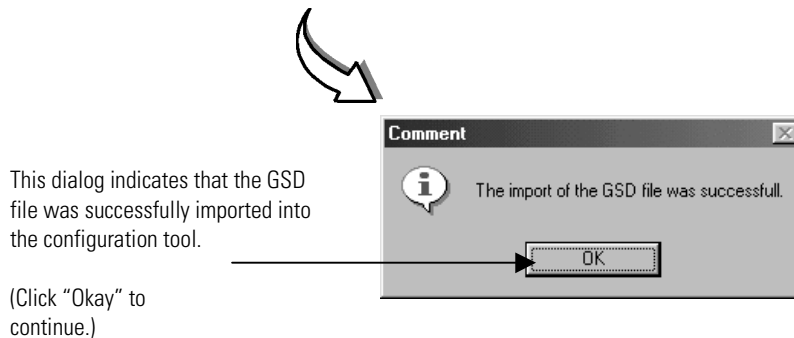
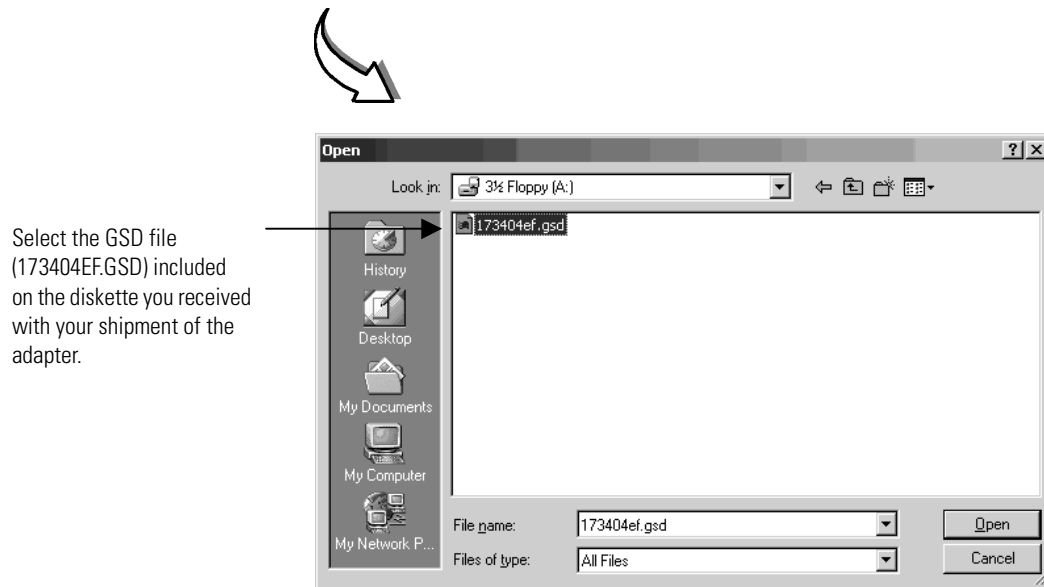
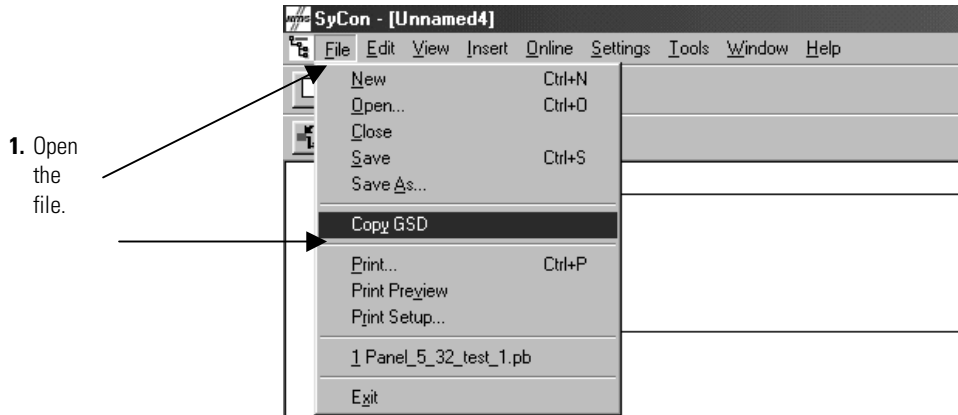
Since the POINT I/O adapter is compatible with any master system, you can use any configuration tool available on the market. Just import the GSD file included on the diskette you received with your shipment of the adapter into your configuration tool. The configuration tool uses the GSD file to help you set up the system. The file is in raw ASCII format and you can view it with any text editor.

Throughout this chapter, we use the Sycon configuration software from HMS Industrial Networks as an example of how to configure the adapter. For information on how to configure your system, refer to the documentation associated with your master and configuration tool.

You must follow these steps during configuration:

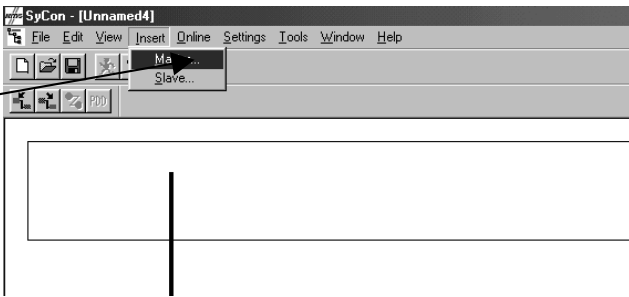
1. Install the GSD file
2. Add the adapter to your PROFIBUS network
3. Add I/O modules to the adapter
4. Configure the modules
5. Download to master system

## Installing the GSD File

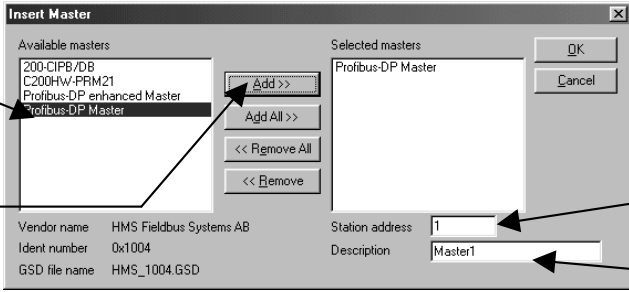


# Adding the Master to the Network

Select the "Master" entry in the "Insert" menu.



- 1. Select "PROFIBUS-DP Master" in the list called "Available Masters."
- 2. Click "Add>>".

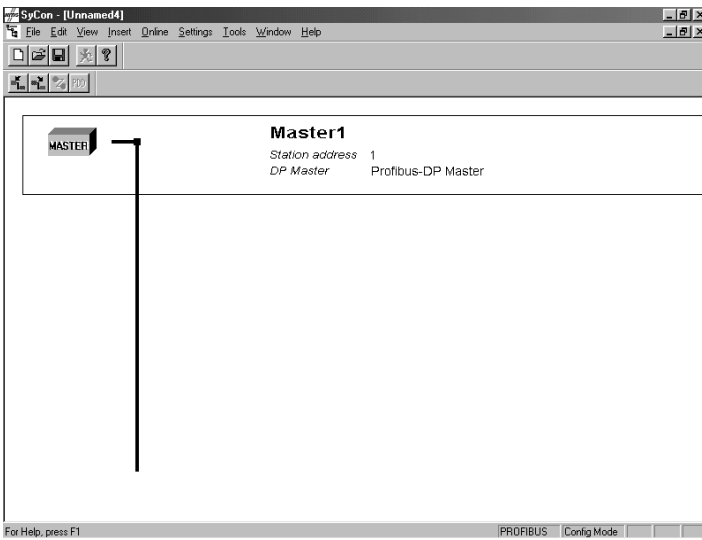


Select station address here.

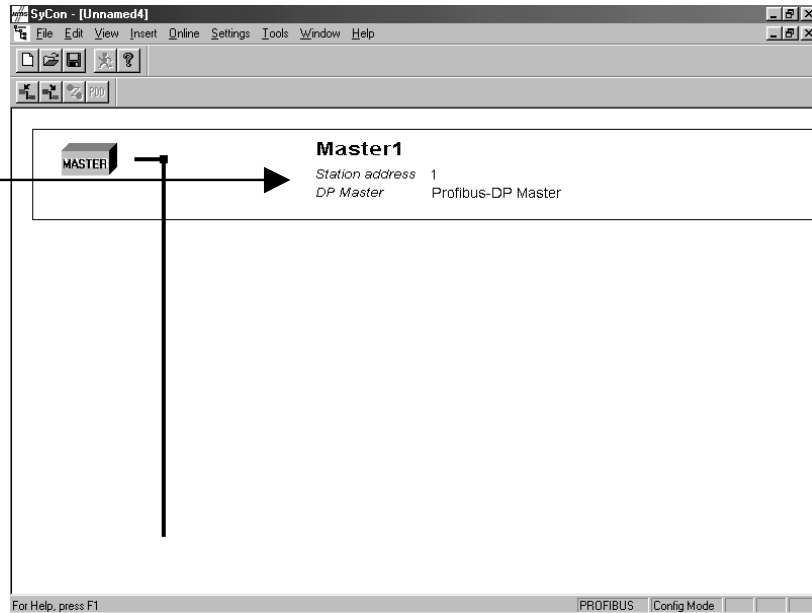
Type a description here.



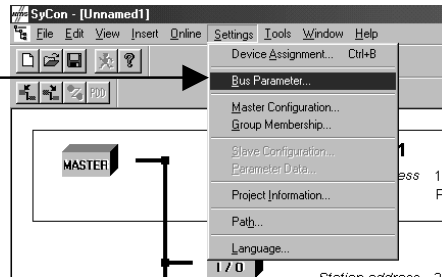
The master appears on the network.



Select the master icon

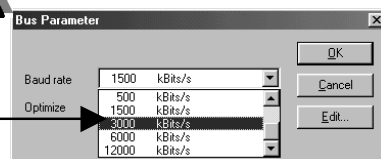


Select the "Bus Parameters" entry in the "Settings" menu



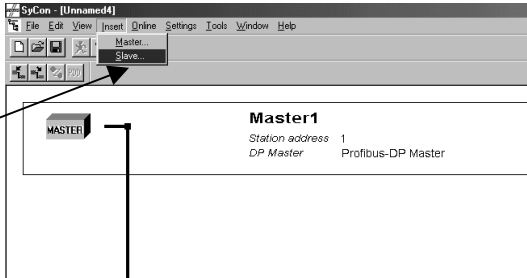
Select the required baud rate from the list.

(Click "OK" to continue.)



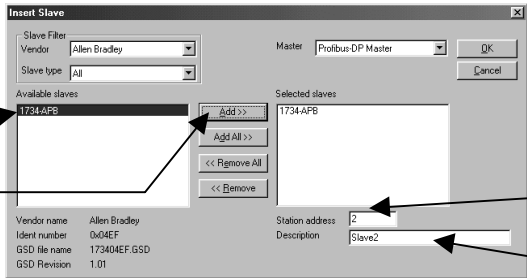
# Adding the Adapter to the Network

Select the "Slave" entry in the "Insert" menu.



- 1. Select "1734-APB" in the "Available Slaves" list.
- 2. Click "Add>>".

(Click "OK" to continue.)

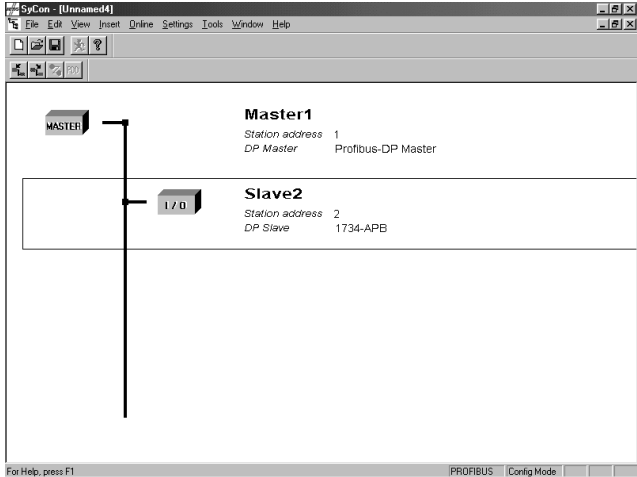


Select station address here.

Type a description here.



The slave appears on the network.



## Adding I/O Modules to the Adapter

After you add the adapter, you must add the POINT I/O modules connected to the adapter in the backplane.

You can select any of 5 different types:

### 1. Modules with Configuration Data

If you select modules with configuration data (i.e. 1734-IB2), the configuration data would be available for you to manually modify. Refer to “Configuring I/O Modules” later in this chapter.

### 2. Modules without Configuration Data

If you select modules without configuration data (i.e. 1734-IB2/ No config data), you will not be able to change the configuration data. This data would be set to a default setting. However, you can still disable the diagnostic functionality for the module.

### 3. Empty Slot Modules

If you have a gap in the backplane, you should use an empty slot module (i.e. 1734-IB2/Empty slot). The empty slot module reserves memory space in your master for addition of a module at a later date.

### 4. Grouped Modules

In order to use memory more efficiently, modules can be grouped together in a single byte. The modules must be inserted next to each other and be of the same module family. Each module will have the same configuration as the first module in the group. Eight channels (1 byte) is the maximum allowed. Refer to chapters 4 and 5 for “Grouped Mode” information.

When configured for grouped mode, you can save user parameter data and I/O data.

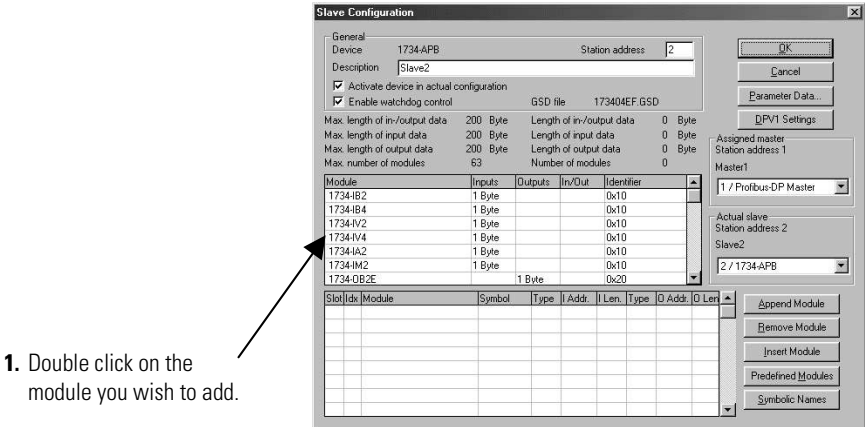
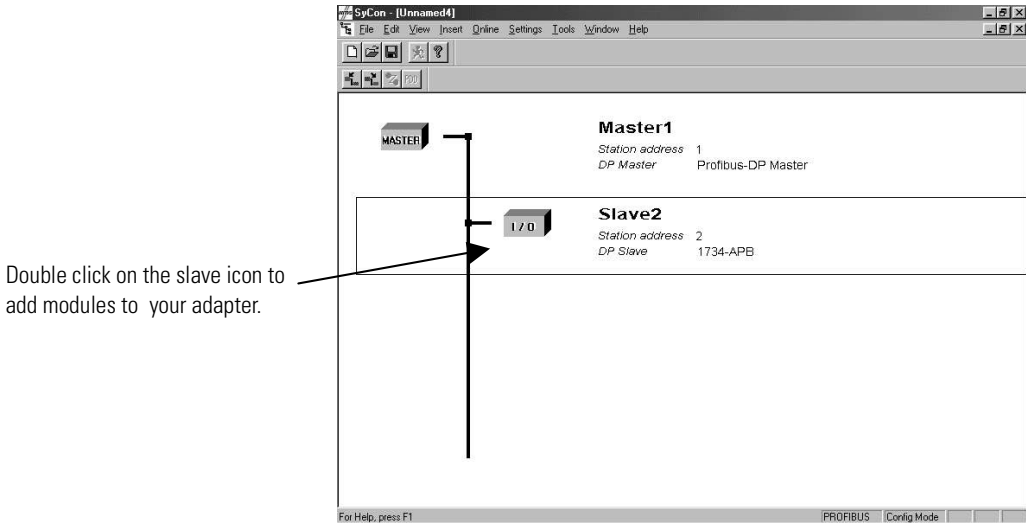
### 5. Grouped Empty Slot Modules

If you have a gap in the backplane where the missing modules belong to a group, use a grouped empty slot module. Refer to chapter 4 for more information.

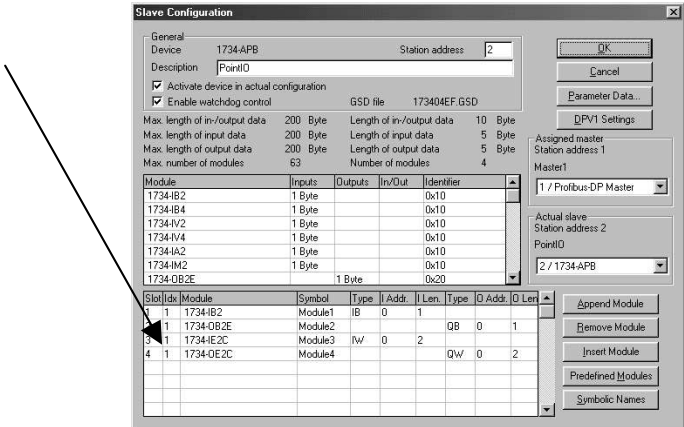
**NOTE:** In the following example, only modules with configuration data are used.

The modules you select are transferred to the adapter with the PROFIBUS Check\_Config service. For a detailed description of the Check\_Config service, refer to Chapter 4.

To add modules, double-click on the slave icon.



2. The module appears in the list below.



## Configuring I/O Modules

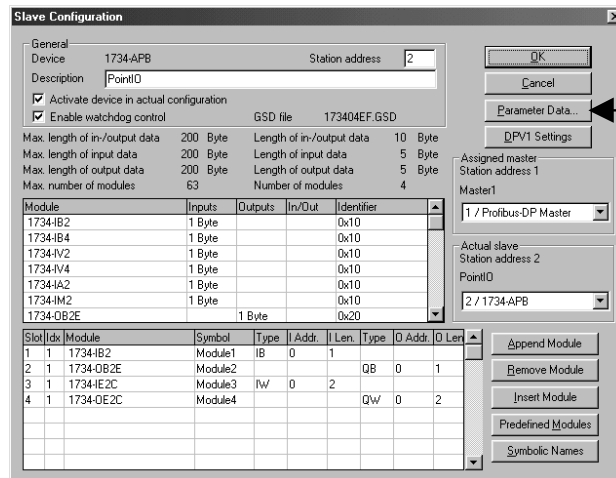
Most I/O modules have configuration data associated with them. This configuration data can be set manually. For a detailed description of the configuration data supported for different modules, refer to Appendix B.

The configuration you select is transferred to the adapter with the PROFIBUS Set\_parameter service. (Set\_parameter service is described in chapter 4.)

**Note:** Download of new configuration data is only possible in the offline mode.

**Note:** If you added modules without configuration data, the only parameter you can edit is Extended diagnostics. All other parameters retain their default settings. (Refer to Appendix B for default settings.)

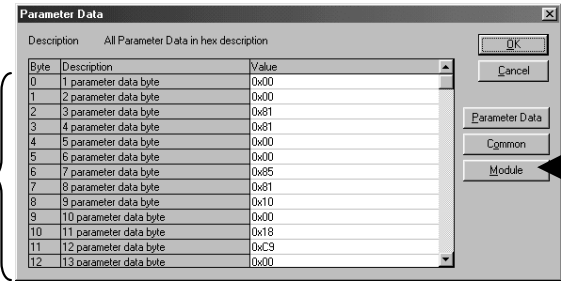
To configure I/O modules, click on the Parameter Data button in the Slave Configuration window.



Click on the "Parameter Data" button to open the Parameter Data window.



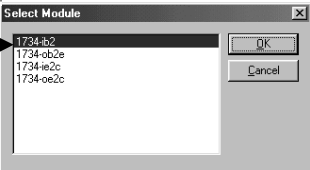
Parameter Data in hexadecimal.



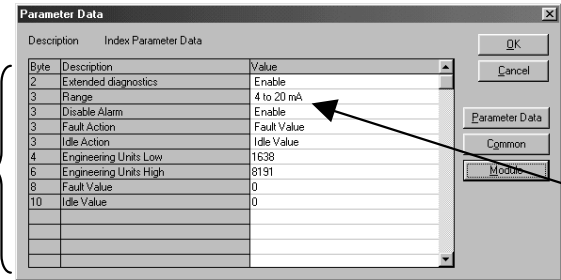
Byte	Description	Value
0	1 parameter data byte	0x00
1	2 parameter data byte	0x00
2	3 parameter data byte	0x81
3	4 parameter data byte	0x81
4	5 parameter data byte	0x00
5	6 parameter data byte	0x00
6	7 parameter data byte	0x85
7	8 parameter data byte	0x81
8	9 parameter data byte	0x10
9	10 parameter data byte	0x00
10	11 parameter data byte	0x18
11	12 parameter data byte	0xC9
12	13 parameter data byte	0x00

To configure a module, click on the "Module" button.

Select the module you wish to configure.  
(Click "OK" to continue.)



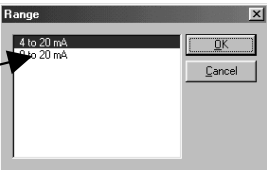
Module Parameters



Byte	Description	Value
2	Extended diagnostics	Enable
3	Range	4 to 20 mA
3	Disable Alarm	Enable
3	Fault Action	Fault Value
3	Idle Action	Idle Value
4	Engineering Units Low	1638
6	Engineering Units High	8191
8	Fault Value	0
10	Idle Value	0

From the list, select the parameter you wish to change.  
(Click "OK" to continue.)

Select the value you wish to use, and click "OK."



*Example: To change the "Range" parameter, select "Range" in the list and click "OK."*

Available parameters are module dependant. However, some parameters are common for all module types. These parameters are: Extended Diagnostics, Fault Action and Idle Action.

### Enable/Disable Diagnostic Functionality for your Modules

The diagnostic functionality is enabled at default, but may be turned off (disabled) at the module level. When the diagnostic is disabled, the module will not report any diagnostic information to the adapter. Refer to chapter 4 for more information on module diagnostics.

Module parameters

Byte	Description	Value
2	Extended diagnostics	Enable
3	Range	4 to 20 mA
3	Disable Alarm	Enable
3	Fault Action	Fault Value
3	Idle Action	Idle Value
4	Engineering Units Low	1638
6	Engineering Units High	8191
8	Fault Value	0
10	Idle Value	0

Select the "Extended Diagnostics" parameter.  
(Click on "OK" to continue.)

Select "Enable" to enable and "Disable" to disable the diagnostic functionality of an I/O module.  
(Click on "OK" to continue.)

### Configure Fault Action/Value for your Output Modules

When communication between master and adapter is lost, the adapter puts all connected I/O modules in their Fault state.

Module parameters

Byte	Description	Value
2	Extended diagnostics	Enable
3	Range	4 to 20 mA
3	Disable Alarm	Enable
3	Fault Action	Fault Value
3	Idle Action	Idle Value
4	Engineering Units Low	1638
6	Engineering Units High	8191
8	Fault Value	0
10	Idle Value	0

Select the "Fault Action" parameter.  
(Click on "OK" to continue.)

Select the desired state. Possible settings are "Fault Value," and "Hold Last State (HLS)."  
(Click on "OK" to continue.)

If you select “Hold Last State,” the module outputs are frozen in their current state. If you select “Fault Value,” you need to define the Fault Value parameter. Possible settings are: digital modules - ON/OFF; analog modules - any value within a predefined range.

Module parameters

Byte	Description	Value
2	Extended diagnostics	Enable
3	Range	4 to 20 mA
3	Disable Alarm	Enable
3	Fault Action	Fault Value
3	Idle Action	Idle Value
4	Engineering Units Low	1638
6	Engineering Units High	8191
8	Fault Value	0
10	Idle Value	0

Enter the value you wish to use.  
(Click on “OK” to continue.)

Data type	Unsigned16	OK
Offset		Cancel
Min value	0000 (hex)	Dec
Max value	FFFF (hex)	Hex
Value	3000	

### Configure Idle Action Value for your Output Modules

When the adapter receives a clear command from the master, the adapter puts all connected I/O modules into their Idle state.

Module parameters

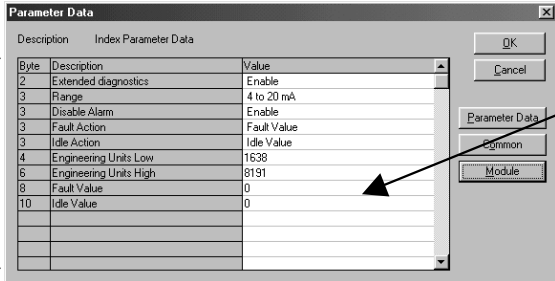
Byte	Description	Value
2	Extended diagnostics	Enable
3	Range	4 to 20 mA
3	Disable Alarm	Enable
3	Fault Action	Fault Value
3	Idle Action	Idle Value
4	Engineering Units Low	1638
6	Engineering Units High	8191
8	Fault Value	0
10	Idle Value	0

Select the desired state.  
Possible settings are “Idle Value,” and “Hold Last State (HLS).  
(Click on “OK” to continue.)

Hold Last State	OK
Idle Value	Cancel

If you select “Hold Last State,” the module outputs are frozen in their current state if power to the module is lost. If you select “Idle Value,” you need to define the Idle Value parameter. Possible settings are: digital modules - ON/OFF; analog modules - any value within a predefined range.


Module parameters



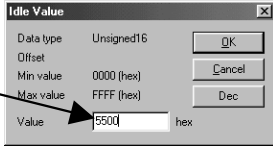
Byte	Description	Value
2	Extended diagnostics	Enable
3	Range	4 to 20 mA
3	Disable Alarm	Enable
3	Fault Action	Fault Value
3	Idle Action	Idle Value
4	Engineering Units Low	1638
6	Engineering Units High	8191
8	Fault Value	0
10	Idle Value	0

Select the “Idle Value” parameter.

(Click on “OK” to continue.)



Enter the value you wish to use.

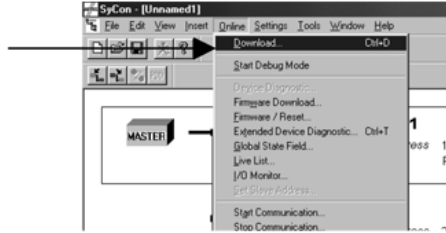


(Click on “OK” to continue.)

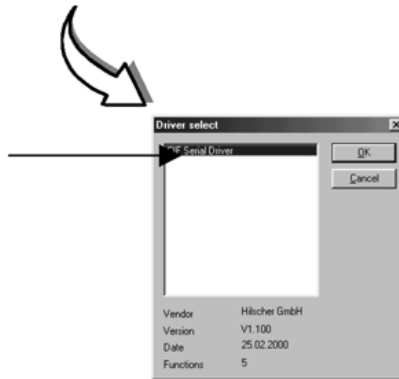
## Download to Master System

When you are finished setting parameters, you must download the configuration data into the master

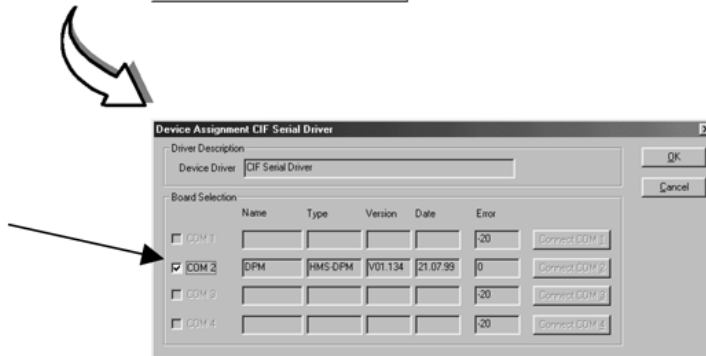
Select the "Download" entry in the "Online" menu.



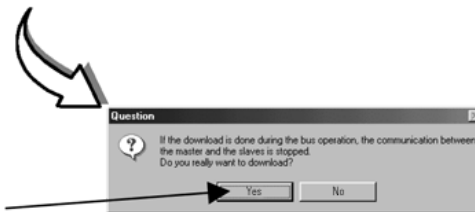
Select the "CIF Serial Driver."  
(Click "OK" to continue.)



Select port "COM 2."  
(Click "OK" to continue.)



If the download is done during bus operation, the communication between master and slave is stopped. Confirm the download by clicking "Yes."



Downloading...



## **Chapter Summary and What's Next**

In this chapter, you learned how to configure the POINT I/O system. Go to chapter 4 for information about communication and I/O table mapping.

## Communication and I/O Table Mapping

This chapter describes the communication process and I/O image table mapping as they occur through the 1734-APB adapter.

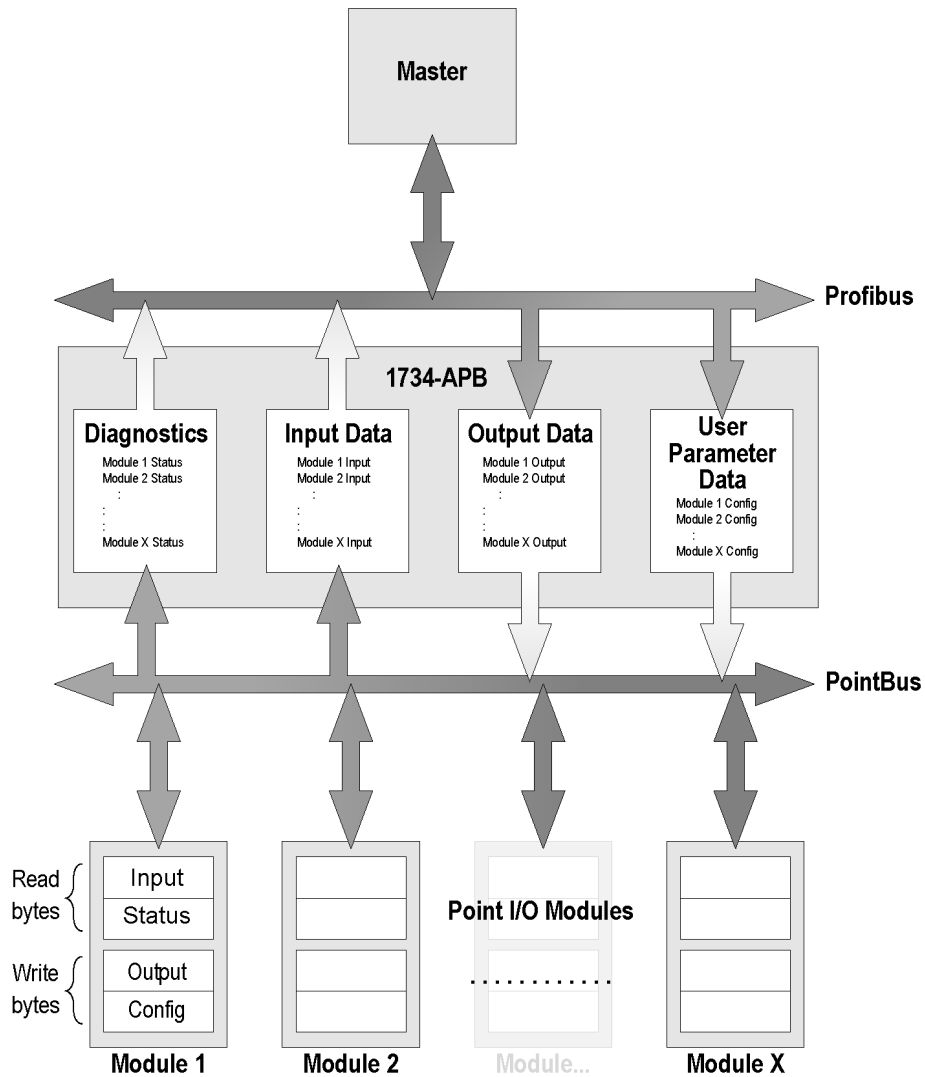
<b>For more information about:</b>	<b>See page:</b>
Image Table Mapping	4-1
How Data Communication Takes Place	4-2
Grouping Modules for Memory Management	4-16
Chapter Summary and What's Next	4-16

### Image Table Mapping

The adapter must map the data it receives to its internal memory before passing it to the appropriate module. The image table map for a module is divided into:

- Read bytes - input and status bytes
- Write bytes - output and configuration bytes

The length of each module's read bytes and write bytes vary in size depending on module complexity. The following illustration shows how the adapter maps information. Refer to appendix B for the data maps of the different POINT I/O modules.



## How Data Communication Takes Place

Before any data transfer can take place, the adapter has to verify and accept the PROFIBUS services Set\_Parameter and Check\_Configuration that are sent from the master at startup. If the adapter accepts these services, data transmission is executed automatically in a cyclic manner with the Data\_Exchange service. In addition to these 3 services, the adapter may notify the master of its current status by means of the Slave\_Diagnostic service.

The master can read the actual configuration with the Get\_Configuration service and send control commands to the adapter by means of the Global\_Command service.



This section describes how the adapter handles the following services:

- Set\_Parameter
- Check\_Configuration
- Get\_Configuration
- Data\_Exchange
- Global\_Command
- Slave\_Diagnostic

## Set\_Parameter

The master uses this service to identify itself with the adapter and to specify how the adapter is to operate. Set\_parameter data is comprised of a series of octets (maximum of 244). Octet 0-6 is defined in the DIN 19245-3 standard, while octet 7-243 contain specific information for the adapter itself (referred to as User Parameter Data). The module configuration you previously selected is passed on to the adapter and I/O modules via the User Parameter data.

Octet	Value	Description
0	-	Station Status (see DIN 19245-3)
1	1-255	Watchdog Factor 1
2	1-255	Watchdog Factor 2
3	0-255	Minimum Station Delay (TSDR)
4	4	Vendor (High byte)
5	239	Vendor (Low byte)
6	-	Group Identification (see DIN 19245-3)
7-243	See below	User Parameter Data

### User Parameter Data

Octet 7 in the parameter data is reserved for the Profibus-DP ASIC onboard and must equal 00h.

Beginning at octet 8, each configured module allocates a minimum of three bytes of user parameter data as shown in the following table.

The first two bytes define the product code for the installed module, the third byte defines the control byte followed by configuration data (if used).

Octet	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
7	Reserved							
8	Product Code High Byte of First Module							
9	Product Code Low Byte of First Module							
10	Control Byte for First Module							
11	Configuration Data for First Module*							
...	...							
X	Product Code High Byte for last Module							
X + 1	Product Code Low Byte for last Module							
X + 2	Control Byte for Last Module							
X + 3	Configuration Data for Last Module*							

\* Present only if selected module has configuration data. Refer to "Adding I/O Modules to your Configuration."

### Product Code

The product code is used to determine the identity of the module installed in each slot. The code is defined in the GSD file and is automatically extracted by the configuration tool when you add the modules to your configuration. (Refer to appendix B for module product codes.) If an installed module does not match the product code for that slot, the slot is considered faulty and the adapter will respond to the Set\_Parameter service with a negative acknowledgement. This will cause the master to set the Parameter fault bit in the Slave\_Diagnostic service.

**Note:** Data exchange is not possible if the product code and installed module do not match.

### Control Byte

The control byte is used to determine how the module should operate. The control byte is included in the GSD file.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Diagnostic ON/OFF	Module Type	Configuration data size (bytes); or number of bits allocated to the opened byte (in bit-stuffing)					

**Bit 7** - This bit is used to enable/disable the diagnostic function for the module.

Bit Value	Description
0	Disable diagnostics
1	Enable diagnostics

**Bit 6** - This bit is used to enable/disable the module grouping feature for the module.

Bit Value	Description
0	Grouped module disabled
1	Grouped module enabled

**Bit 0-5 - Without grouped modules** - Defines the number of configuration data bytes for the module. **With grouped modules** - Defines the number of bits the module should allocate in the opened byte.

### Configuration Data

Configuration data is passed on to each I/O module using User Parameter Data. The data is module dependant (see Appendix B).

#### IMPORTANT

Using your PROFIBUS configuration tool, it is possible to select modules with no configuration data. If you use this type of module, the configuration data for that module will be a default value. (See Appendix B.)

The following table is an example of how User Parameter Data might look with a 1734-OB2E in slot 1, 1734-IB4 in slot 2, and 1734-OE2C in slot 3. All modules in this example use Configuration Data.

Octet	Value	Description
7	00h	Reserved
8	00h	1734-OB2E Product Code High Byte
9	85h	1734-OB2E Product Code Low Byte
10	81h	1734-OB2E Control Byte
11	10h	1734-OB2E Configuration Data
12	00h	1734-IB4 Product Code High Byte
13	82h	1734-IB4 Product Code Low Byte
14	81h	1734-IB4 Control Byte
15	00h	1734-IB4 Configuration Data
16	00h	1734-OE2C Product Code High Byte
17	19h	1734-OE2C Product Code Low Byte
18	C9h	1734-OE2C Control Byte
19	03h	1734-OE2C Configuration Data byte 1
20	06h	1734-OE2C Configuration Data byte 2

Octet	Value	Description
21	66h	1734-0E2C Configuration Data byte 3
22	1Fh	1734-0E2C Configuration Data byte 4
23	FFh	1734-0E2C Configuration Data byte 5
24	00h	1734-0E2C Configuration Data byte 6
25	00h	1734-0E2C Configuration Data byte 7
26	00h	1734-0E2C Configuration Data byte 8
27	00h	1734-0E2C Configuration Data byte 9

### Check\_Configuration

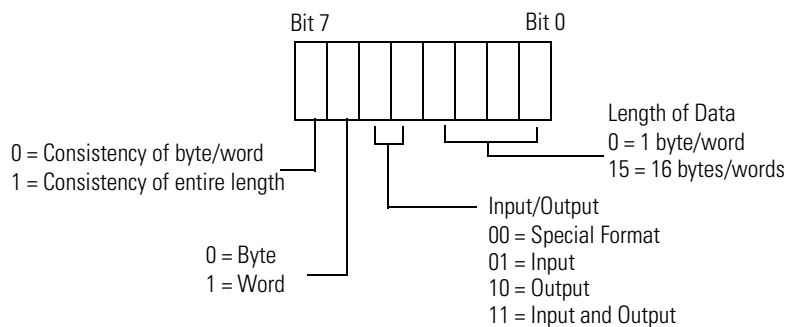
After the set\_parameter service, the master sends a check\_configuration service to the adapter. This service causes the adapter to check its default configuration (determined at powerup), against the actual configuration specified in the master configuration. If the actual configuration does not match the default configuration, the master will respond to the Check\_configuration service with a negative acknowledgement, which causes the master to set the Configuration fault bit in the Slave\_diagnostic service.

Note: Data exchange is not possible as long as the actual configuration does not match the default configuration.

The POINT I/O PROFIBUS adapter is a modular slave, which means that the size of the I/O block is flexible and not tied to a specific block length. Each I/O module is represented by an identifier byte. This byte defines the input- and/or output data length as well as the data consistency of the I/O data.

The identifier bytes for all POINT I/O modules are contained in the GSD file and are automatically extracted by the configuration tool when you add the modules to your configuration.

The identifier byte is described below. More information is contained in the PROFIBUS-DP standard (DIN 19245-3).



**Without Grouped Modules**

The table below shows an example of how the identifier bytes would look for a configuration with a 1734-OB2E in slot 1; a 1734-IE2C in slot 2; a 1734-OE2C in slot 3; and a 1734-IA2 in slot 4.

Identifier Byte	Value	Description
0	20h	1734-OB2E; 1 byte out, consistency over byte
1	51h	1734-IB4; 1 byte in, consistency over byte
2	61h	1734-OE2C; 2 words out, consistency over word
3	10h	1734-IA2, 2 byte in, consistency over byte

**With Grouped Modules**

If using grouped modules, the following table shows an example of how the identifier bytes would look for a configuration with four 1734-OB2E modules.

Slot Number	Description	Identifier Byte Buffer	User Parameter Data Buffer
1	1734-OB2E	Byte 1 = 0x20; 1 byte output	Byte 1 = 0x00; product code (high byte) Byte 2 = 0x85; product code (low byte) Byte 3 = 0x81; control byte (diagnostics enabled, no bit stuffing, 1 byte of configuration data follows) Byte 4 = 0x10; configuration data
2	1734-OB2E/grouped	Byte 2 = 0x00; 0 bytes of I/O data	Byte 5 = 0x00; product code (high byte) Byte 6 = 0x85; product code (low byte) Byte 7 = 0xC2; control byte (diagnostics enabled, bit stuffing module, 2 bits (channels) to store in the opened byte.
3	1734-OB2E/grouped	Byte 3 = 0x00; 0 bytes of I/O data	Byte 8 = 0x00; product code (high byte) Byte 9 = 0x85; product code (low byte) Byte 10 = 0xC2; control byte (diagnostics enabled, bit stuffing module, 2 bits (channels) to store in the opened byte.
4	1734-OB2E/grouped	Byte 4 = 0x00; 0 bytes of I/O data	Byte 11 = 0x00; product code (high byte) Byte 12 = 0x85; product code (low byte) Byte 13 = 0xC2; control byte (diagnostics enabled, bit stuffing module, 2 bits (channels) to store in the opened byte.

## Get\_Configuration

This service permits the master to read out the Identifier bytes for the actual adapter configuration. (Refer to the previous section for the format of the identifier byte.)

The table below shows an example of how the identifier bytes from a Get\_configuration response would look like when you have the following modules in the backplane: slot 1 = 1734-OB4E; slot 2 = 1734-IE2C; slot 3 = 1734-OE2C; and slot 4 = 1734-IA2.

Identifier Byte	Value	Description
0	20h	1734-OB4E; 1 byte out, consistency over byte
1	51h	1734-IE2C; 2 words in, consistency over word
2	61h	1734-OE2C; 2 words out, consistency over word
3	10h	1734-IA2; 1 byte in, consistency over byte

## Global\_Command

### Sync/Freeze

In addition to the cyclic data exchange, which is executed automatically by the master, the master can send control commands to a single slave, a group of slaves or all slaves simultaneously. These control commands are transmitted as multicast commands and permit use of sync and freeze modes for event-controlled synchronization of the slaves.

The POINT I/O adapter begins sync mode when it receives a sync command from the assigned master. The output channels of all I/O modules are then frozen in their current state. During subsequent user data transmissions, the output data are stored at the adapter, but the output states remain unchanged. The stored output data is not sent to the outputs until the sync command is received. Sync mode is concluded with the unsync command.

Similarly, a freeze control command causes the adapter to assume freeze mode. In this operating mode, the states of the input channels of all I/O modules are frozen at the current value. Input data is not updated again until the master sends the next freeze command. Freeze is concluded with the unfreeze command.

## **Operating States**

The general system behavior is determined by the operating status of the master. The 3 main states are:

- Stop - No data transmission occurs between the master and the slaves.
- Operate - The master is in the data transfer phase. In cyclic data communication, inputs of the slaves are read, and output information is written to the slaves.
- Clear - The master reads the information of the slaves and sets the outputs to an idle state. (Refer to “Configure Idle Action Value for Your Output Modules,” page 3-11.)

## **Data\_Exchange**

After correct set\_parameter and check\_configuration services, the master automatically starts exchanging data with the adapter by means of the data\_exchange service.

## **Slave\_Diag**

The adapter may notify the master of its current state by means of the slave\_diag service. The information received from this service request can be divided into 3 parts:

- Standard diagnostic information according to the PROFIBUS standard DIN 19245-3
- Module related diagnostics indicates which I/O module has diagnostic events pending.
- Channel related diagnostics, give more detailed information of the actual cause of the event (wire-break, overcurrent, etc.).

**Structure of Slave\_Diagnosis**

<b>Octet</b>	<b>Description</b>
0	Station Status 1
1	Station Status 2
2	Station Status 3
3	Master PROFIBUS address
4	Identifier number (high byte)
5	Identifier number (low byte)
6	Module-related header byte
7-14	Module-related diagnostic block
15-17	1st channel-related diagnostic message
18-20	2nd channel-related diagnostic message
.	.
.	.
42-44	10th channel-related diagnostic message

**IMPORTANT**

The length of the diagnostic frame varies between 15 and 45 bytes since the length of the channel-related part is dynamic in its structure.



### Station Status 1, 2 and 3

Station status 1, 2 and 3 provide an overview of the status of the slave.

#### Station Status 1

Bit	Description	Cause
0 - Station nonexistent	The master cannot be addressed by the master	<ul style="list-style-type: none"> <li>• Correct node address set on the adapter?</li> <li>• Bus connector connected?</li> <li>• Bus cable pin configuration correct (Pin 3 to 3 and pin 8 to 8)?</li> <li>• Power to the slave switched on?</li> <li>• Is the RS485 repeater set correctly?</li> </ul>
1 - Station not ready	Adapter not yet ready for data exchange	Wait for the adapter to start up.
2 - Configuration fault	Configuration data sent by the master to the adapter does not match the backplane configuration.	Do the modules installed in the backplane match the modules entered in the master configuration?
3 - Extended diagnostic	Diagnostics available for the master	Evaluate the module-related and/or channel-related diagnostics. This bit is cleared (0) when there are no diagnostic messages available.
4 - Function not supported	The requested function is not supported by the module	Trying to set PROFIBUS address over the network?
5 - Invalid slave response	The master has received an invalid response	Check the bus setup.
6 - Parameter fault	Parameters sent by the master are containing wrong or insufficient data.	Do the modules installed in the backplane match the modules entered in the master configuration?
7 - Master lock	The adapter has already been parameterized by another master and is locked in its access.	Check if another master is present on the network, and delete its assignments to the adapter or remove the other assigned master from the network to get the communication with the adapter run.

### Station Status 2

Bit	Description	Cause
0 - Parameterization requested	The slave has forced the master system to do a new parameterization.	This bit is set as long as new parameterization must be performed.
1 - Static diagnostic	The adapter cannot provide valid I/O data.	The backplane bus communication is terminated. This bit will not be cleared (0) until the power to the adapter is cycled.
2 - Not used	Always set to 1.	
3 - Watchdog on	Watchdog control is the adapter is active to supervise its corresponding master connection.	
4 - Freeze mode	The adapter has received a freeze command.	
5 - Sync mode	The adapter has received a sync command.	
6 - Reserved	Always set to 0.	
7 - Slave deactivated	The adapter has been marked inactive in its parameter set and has been removed from cyclic I/O processing.	Check bus settings in the configuration tool.

### Station Status 3

Bit	Description	Cause
0 to 6 - Not used	These bits are always 0.	
7 - Diagnostic overflow	There are more diagnostic messages than the adapter can store.	More than 10 channel-related messages present at the same time. <b>Note:</b> New messages are queued in the adapter and are passed on to the master as soon as there is space in the diagnostic buffer.

### Master PROFIBUS Address

In this octet (byte 3), the address of the master that has done the parameterization of the adapter is entered. If the adapter is not parameterized from any master, the adapter writes the address 255 (decimal) here.

### Identity Number

The identity number (byte 4-5) is a unique code that describes the type of DP-slave. The identity number for the 1734-APB adapter is 04EF (hexidecimal).

### Module-related Diagnostics

The module-related diagnostics indicates if any of the connected I/O modules reports errors. More detailed information of the error can be found by further evaluation of the channel-related diagnostic message.

Bit Value	Module Status
0	Module is OK
1	Module reports error

Octet	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
6	0	1	0	0	1	0	0	1
...								
7	Module 8	Module 7	Module 6	Module 5	Module 4	Module 3	Module 2	Module 1
8	Module 16	Module 15	Module 14	Module 13	Module 12	Module 11	Module 10	Module 9
9	Module 24	Module 23	Module 22	Module 21	Module 20	Module 19	Module 18	Module 17
10	Module 32	Module 31	Module 30	Module 29	Module 28	Module 27	Module 26	Module 25
11	Module 40	Module 39	Module 38	Module 37	Module 36	Module 35	Module 34	Module 33
12	Module 48	Module 47	Module 46	Module 46	Module 44	Module 43	Module 42	Module 41
13	Module 56	Module 55	Module 54	Module 53	Module 52	Module 51	Module 50	Module 49
14	Not used	Module 63	Module 62	Module 61	Module 60	Module 59	Module 58	Module 57

### Channel Related Diagnostics

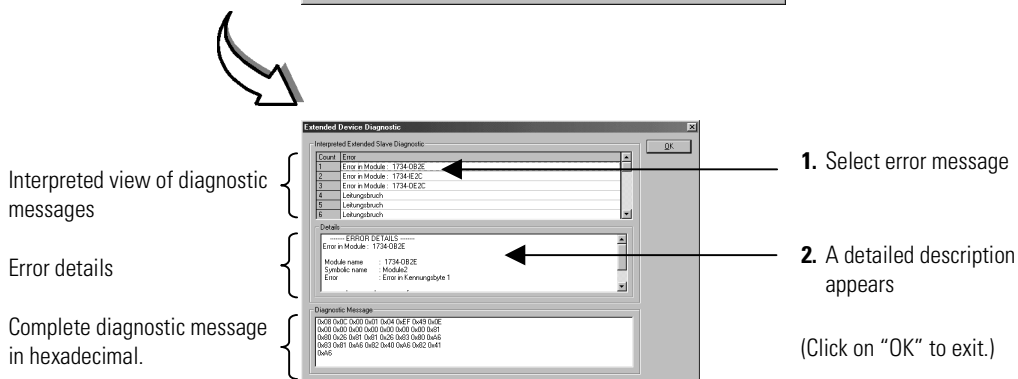
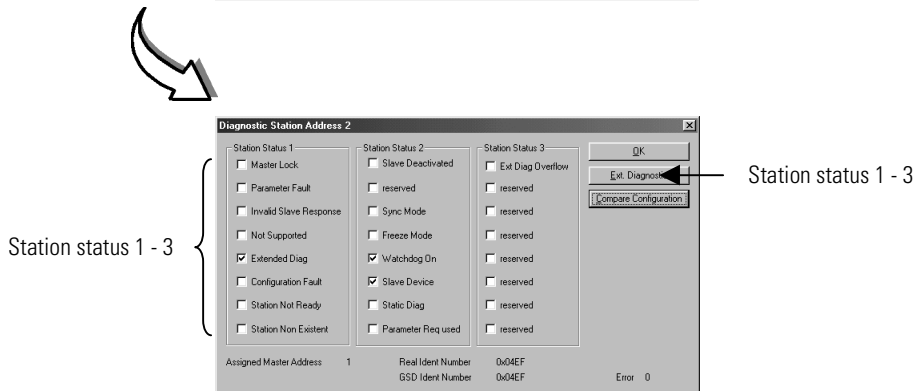
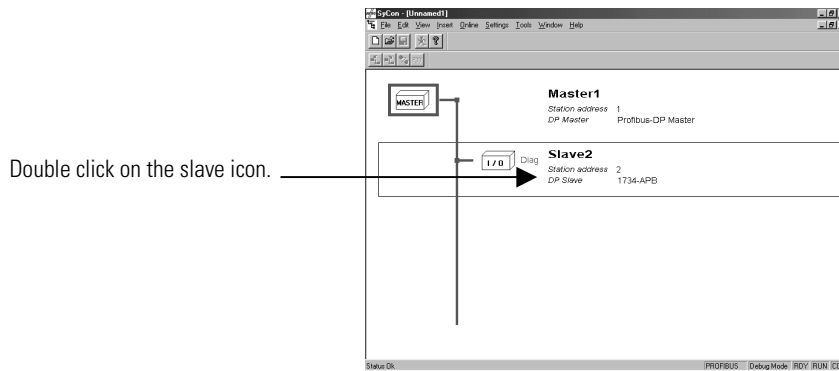
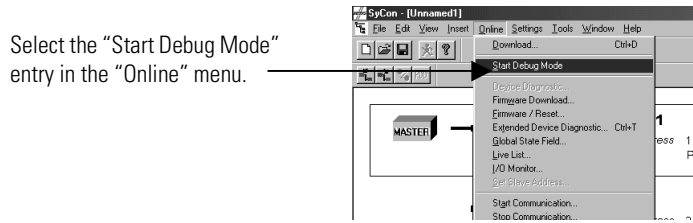
These diagnostics give information on channel errors of the I/O modules and expand on the module related diagnostics. The message entry length is 3 bytes.

A maximum of 10 channel related diagnostic messages are possible. If you exceed the limit, the diagnostic overflow bit in station status 3 will be set.

**Note:** If the diagnostic buffer is full and the adapter receives an additional error message, this new message will be queued in the adapter internally and passed on to the master as soon as space is available in the diagnostic buffer (i.e. when older messages are deleted).

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 15	1	0	Slot number of the module that reports diagnostics (1-63)					
Byte 16	Channel Direction 01 - Input 10 - Output 11 - Input/Output		Type of channel that reports diagnostics					
Byte 17	Channel Type: 001 = Bit 010 - 2 bits 011 - 4 bits 100 - Byte 101 - Word 110 - Double word			Error codes (see Appendix B)				
Byte 18-20	2nd channel specific message (same assignments as bytes 15-17)							
Byte 42-44	10th channel specific message (same assignments as bytes 15-17)							

### Viewing Diagnostic Data within the Configuration Tool



## Grouping Modules for Memory Management

You can install up to 8 of the same type of module (identical product code) next to each other and use only one word of input or output memory. The module requirements are:

- the modules must be next to each other
- the modules must be members of the same module family
- must total 8 channels or less
- the modules will share the same configuration data.

You select the option 4, bit stuffing module, in the hardware catalog in the configuration tool.

1. Select the 1734-OB2E (hardware type 1) from the hardware catalog. The adapter will open a byte and store the first 1734-OB2E module there.



2. Select the 1734-OB2E (hardware type 4 - grouped) from the hardware catalog. The adapter will store the second 1734-OB2E in the opened byte.



3. Select the 1734-OB2E (hardware type 4 - grouped) from the hardware catalog. The adapter will store the third 1734-OB2E in the opened byte.



4. Select the 1734-OB2E (hardware type 4 - grouped) from the hardware catalog. The adapter will store the fourth 1734-OB2E in the opened byte.



Note that the grouped modules will share the same configuration data as the first module in the group. If the first module has no configuration data, the other three modules will have no configuration data.

## Chapter Summary and What's Next

In this chapter, you learned about communication and I/O table mapping. Move to chapter 5 for troubleshooting.

## Grouped Mode

### In This Chapter

In this chapter, you will learn about:

For more information about:	See page:
General	5-1
How to Configure the Adapter for Grouped Mode	5-2
Configuration Example	5-3
Chapter Summary and What's Next	5-4

### General

In order to use master memory most effectively, and reduce data transfer between the POINT I/O adapter and the master, you can group several modules in a single byte.

To configure the adapter for grouped mode you must:

1. insert modules adjacent to each other
2. Modules must be in the same module family

Groups may exist as follows:

- 1734-IB2, 1734-IV2, 1734-IM2 and 1734-IA2 can be grouped together
- 1734-IB4 and 1734-IV4 can be grouped together
- 1734-OW2, 1734-OA2 and 1734-OX2 can be grouped together

The following modules **cannot** be grouped with any other module type:

- 1734-OB2E can only be grouped with 1734-OB2E modules
- 1734-OB4E can only be grouped with 1734-OB4E modules

3. A maximum of 8 channels (1 byte) per group
4. Modules in a single byte will have the configuration of the first module in the group. (Exception: Extended diagnostics can be enabled/disabled on a per module basis.)

## How to Configure the Adapter for Grouped Mode

You can select the following modules in the configuration tool:

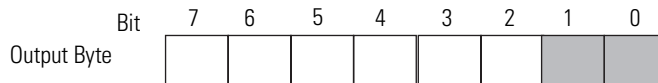
1. Module without configuration data (e.g. 1734-OB2E/no config)
2. Module with configuration data (e.g. 1734-OB2E/with config)
3. Empty slot module (e.g. 1734-OB2E/empty slot)
4. Grouped module (e.g. 1734-OB2E/grouped)
5. Grouped empty slot module (e.g. 1734-OB2E/grouped empty slot)

By combining these modules, groups can be created in 3 different ways:

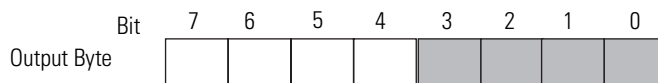
1. A group of modules with configuration data
2. A group of modules without configuration data (default configuration will be used for all modules in the group)
3. A group of empty slot modules

The following example illustrates how to group modules in a single byte.

1. Select the 1734-OB2E (hardware type 1) from the hardware catalog.  
The adapter will open a byte and store the first 1734-OB2E module there.



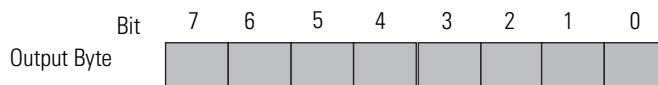
2. Select the 1734-OB2E (hardware type 4 - grouped) from the hardware catalog.  
The adapter will store the second 1734-OB2E in the opened byte.



3. Select the 1734-OB2E (hardware type 4 - grouped) from the hardware catalog.  
The adapter will store the third 1734-OB2E in the opened byte.



4. Select the 1734-OB2E (hardware type 4 - grouped) from the hardware catalog.  
The adapter will store the fourth 1734-OB2E in the opened byte.

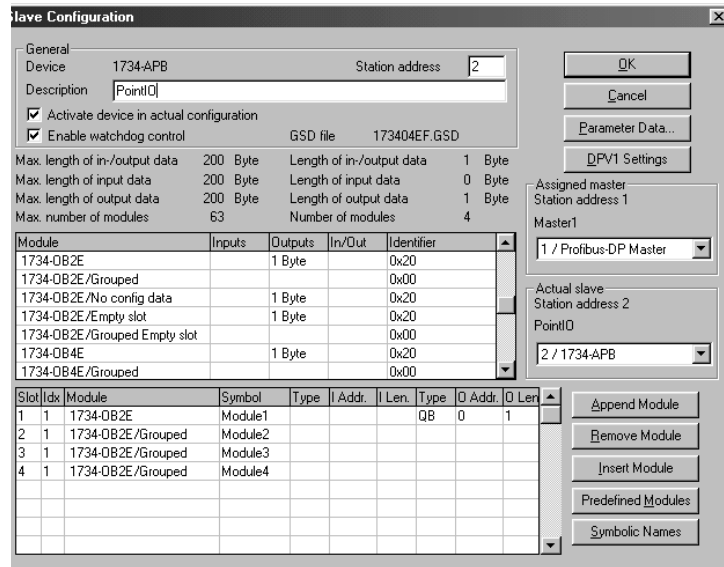


If more modules are to be grouped, a new byte has to be opened (repeat steps 1 through 4).



Note that the grouped modules will share the same configuration data as the first module in the group. If the first module has no configuration data, the other modules in the group will have no configuration data.

The configuration for the above example will look like the following in the configuration tool.



### Configuration Example

The following example shows how modules can be grouped together, and how the I/O data is mapped in the PROFIBUS adapter.

Slot	1	2	3	4	5	6	7	8	9	10	11	12	13	14
PROFIBUS Adapter	1734-OB2E Output Module	1734-OB2E Output Module/Grouped	1734-OB2E Output Module/Grouped	1734-OB2E Output Module/Grouped	1734-OB4E/Empty slot	1734-OB4E/Grouped Empty slot	1734-IB2 Input Module	1734-IB2 Input Module/Grouped	1734-IV2 Input Module/Grouped	1734-OE2C Output Module	1734-IE2C Input Module	1734-IB4 Input Module/No config	1734-IB4 Input Module/Grouped	1734-IB4 Input Module

*Configuration table and memory map*

Note the following module groups:

- slots 1, 2, 3 and 4 - A group of modules with configuration data
- Slots 7, 8 and 9 - A group of modules with configuration data
- Slots 5 and 6 - A group of empty slots
- Slots 12 and 13 - A group of modules without configuration data (default configuration data)

In this example, the input/output addresses start at byte 0.

Slot	Module	I/O Address		Notes
		Input	Output	
1	1734-OB2E		0.0 to 0.1	
2	1734-OB2E/grouped		0.2 to 0.3	Same configuration data as first module in group (slot 1).
3	1734-OB2E/grouped		0.4 to 0.5	
4	1734-OB2E/grouped		0.6 to 0.7	
5	1734-OB4E/empty slot		1.0 to 1.3	
6	1734-OB4E/grouped empty slot		1.4 to 1.7	
7	1734-IB2E	0.0 to 0.1		
8	1734-IB2E/grouped	0.2 to 0.3		Same configuration data as first module in group (slot 7).
9	1734-IV2E/grouped	0.4 to 0.5		
10	1734-OE2C		2 to 5	
11	1734-IE2C	1 to 4		
12	1734-IB4/no configuration	5.0 to 5.3		Default configuration data
13	1734-IB4/grouped	5.4 to 5.7		
14	1734-IB4	6.0 to 6.3		

## Chapter Summary and What's Next

In this chapter, you learned how to group modules for reduced memory space. Move to chapter 6 for information on troubleshooting your adapter.

## Troubleshooting the PROFIBUS Adapter

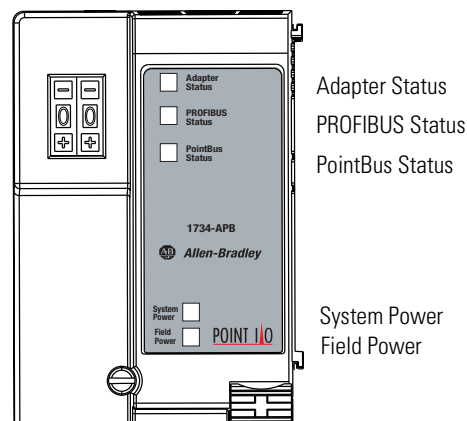
### In This Chapter

In this chapter, you will learn about:

For more information about:	See page:
Using the Status Indicators	6-1
Using PROFIBUS Diagnostics	6-3
Chapter Summary and What's Next	6-3

### Using the Status Indicators

You can use the status indicators to troubleshoot your adapter. These indicators consist of:



1734apbfrt

Use the following table to troubleshoot your adapter.

Indicator	Indication	Probable Cause
System Power	Off	Not active. Field power is off; or dc-dc converter problem.
	Green	System power on. Dc-dc converter active (5V).
Field Power	Off	Not active. Field power not applied.
	Green	Power on, 24V present.
<b>Adapter Status</b>	Off	No power supplied. Hardware check in progress. Initialization in progress.
	Green	Adapter operating normally
	Red	Hardware check fault.
<b>PROFIBUS Status</b>	Off	No power supplied. Adapter is off-line (no data exchange with the PROFIBUS master).
	Green	Adapter is online (data exchange with the PROFIBUS master).
	Flashing Green	Adapter is in CLEAR mode and has set the connected I/O modules into an idle state.
	Red	No POINT I/O modules installed in the backplane.
	Flashing Red	Set_Parameter telegram rejected. Maximum number of user parameter bytes overridden.
<b>PointBus Status</b>	Off	No power applied to adapter PointBus initialization in progress.
	Green	Normal operation.
	Flashing Red	Incorrect POINT I/O module installed or POINT I/O module removed from backplane.
	Red	Critical link failure. Adapter detected error that prevents its communication on the PointBus.

## Using PROFIBUS Diagnostics

PROFIBUS diagnostics provides detailed information about the adapter and the I/O modules. (Refer to Slave\_Diag in chapter 4 for detailed information about diagnostic capabilities of the adapter.)

Pay special attention to the following indications in the diagnostic response.

Station	Bit	Response	Reason
Station Status 1	0	Station nonexistent	Wrong node address. Bus cable problem. Incorrect pin configuration.
	2	Configuration fault	Wrong module installed. Identifier bytes for one or more modules does not match master configuration identifier bytes.
	3	Extended diagnostic	One or more modules report errors. (To find out reasons for the error indication, evaluate the module and channel related diagnostic.)
	6	Parameter fault	Wrong module installed. Product code for one or more modules does not match master configuration product code.
Station Status 2	1	Static diagnostic	PointBus communication terminated. Adapter cannot provide valid data.
Station Status 3	7	Diagnostic overflow	More than 10 channel related messages present at the same time.

## Chapter Summary and What's Next

In this chapter, you learned how to troubleshoot your adapter. Move to Appendix A for adapter specifications.



## Specifications

### Specifications - 1734-APB PROFIBUS Adapter Module

#### Communication Interface Specifications

Expansion I/O Capacity	Up to 13 modules (13 times 75mA = 0.975, just under the limit of 1.0A). The actual number of modules can vary. Add up the current requirements of the modules you want to use to make sure they do not exceed the amperage limit of the 1734-ADN. (Note: Total expansion up to 63 modules - 13 modules maximum with 1734-APB - add 1734-EP24DC modules for an additional 17 modules (or less based on current requirements), up to 63 module maximum)
------------------------	---

Cat. No.	PointBus Current Requirements
1734-IB2	75mA
1734-IB4	75mA
1734-IV2	75mA
1734-IV4	75mA
1734-OB2E	75mA
1734-OB4E	75mA
1734-OW2	80mA
1734-IE2C	75mA
1734-OE2C	75mA
1734-IE2V	75mA
1734-OE2V	75mA
1734-IA2	75mA
1734-IM2	75mA
1734-OA2	75mA
1734-IJ2	160mA
1734-IK2	160mA
1734-IR2	220mA
1734-IT2	175mA
1734-VHSC5	180mA
1734-VHSC24	180mA

Module Location	Starter module - left side of 1734 system
-----------------	---

#### Power Supply Specifications

Power Supply	<b>Note:</b> In order to comply with CE Low Voltage Directives (LVD), you must use either a NEC Class 2, a Safety Extra Low Voltage (SELV) or a Protected Extra Low Voltage (PELV) power supply to power this adapter. A SELV supply cannot exceed 30V rms, 42.4V peak or 60V dc under normal conditions and under single fault conditions. A PELV supply has the same rating and is connected to protected earth.
--------------	--

Input Voltage Rating	24V dc nominal 10-28.8V dc range
----------------------	-------------------------------------

Field Side Power Requirements	24V dc (+20% = 28.8V dc maximum) @ 400mA maximum
-------------------------------	--

Inrush Current	6A maximum for 10ms
----------------	---------------------

PointBus Output Current	1A maximum @ 5V dc $\pm 5\%$ (4.75 - 5.25)
-------------------------	--

Input Overvoltage Protection	Reverse polarity protected
------------------------------	----------------------------

Interruption	Output voltage will stay within specifications when input drops out for 10ms at 10V with maximum load.
--------------	--

**Specifications continued on next page.**

<b>General Specifications</b>	
Indicators	3 red/green status indicators Adapter status PROFIBUS status PointBus status 2 green power supply status indicators: System Power (PointBus 5V power) Field Power (24V from field supply)
Power Consumption	8.1W maximum @ 28.8V dc
Power Dissipation	2.8W maximum @ 28.8V
Thermal Dissipation	9.5 BTU/hr maximum @ 28.8V dc
Isolation Voltage	1250V rms/V ac
Field Power Bus Nominal Voltage Supply Voltage Range Supply Current	24V dc 10-28.8V dc range, 10A maximum
Dimensions Inches (Millimeters)	3.0H x 2.16W x 5.25L (76.2H x 54.9W x 133.4L)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	-10 to 55°C (14 to 131°F) -40 to 85°C (-40 to 185°F) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size  Category	14 AWG (2.5mm <sup>2</sup> ) - 22 AWG (0.25mm <sup>2</sup> ) solid or stranded copper wire rated @ 75°C or higher 3/64 inch (1.2mm) insulation maximum 2 <sup>1</sup>
Terminal Base Screw Torque	7 pound-inches (0.6Nm)
Field Wiring Terminations PROFIBUS  Power Supply	1 - Not connected 2 - Not connected 3 - +RTX/TX data line 4 - Request to send 5 - Ground Bus  6 - +5V Bus 7 - Not connected 8 - Negative RTX/TX 9 - Not connected Housing - Earth ground  0 - No Connection 1 - No Connection 2 - Chassis Ground 3 - Chassis Ground 4 - Common 5 - Common 6 - Supply 7 - Supply
Mass	9.0 oz/255 grams
Agency Certification (when product is marked)	CE marked for all applicable directives C-Tick marked for all applicable acts
<sup>1</sup> Use this conductor category information for planning conductor routing as described in publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines."	



## Default Data Maps

I/O messages are sent to (consumed) and received from (produced) the POINT I/O modules. These messages are mapped into the processor's memory. This appendix lists the default maps for 1734 POINT I/O modules.

<b>For more information:</b>	<b>See page:</b>
1734-IB2 Sink Input Module	B-2
1734-IB4 Sink Input Module	B-3
1734-IV2 Source Input Module	B-4
1734-IV4 Source Input Module	B-5
1734-OB2E Electronically Protected Output Module	B-6
1734-OB4E Electronically Protected Output Module	B-7
1734-OW2 Relay Sink/Source Output Module	B-8
1734-IE2C Analog Current Input Module	B-9
1734-OE2C Analog Current Output Module	B-11
1734-IE2V Analog Voltage Input Module	B-12
1734-OE2V Analog Voltage Output Module	B-14
1734-IA2 120V ac Input Module	B-15
1734-IM2 220V ac Input Module	B-16
1734-OA2 120/220V ac Output Module	B-17

## 1734-IB2 Sink Input Module Product Code: 0081h

### Data Map:

Output size: 0 bytes; Input size: 1 byte

	7	6	5	4	3	2	1	0
Produces (Rx)	Not used						CH1 state	CH0 state
Consumes (Tx)	No consumed data							
Where:	CH0 = input channel 0, CH1 = input channel 1; 0 = OFF, 1 = ON							

### Configuration Data:

7	6	5	4	3	2	1	0
Reserved						Filter	
Meaning of bits described below							

#### Filter Values

Value	Definition
00	1ms
01	0.33ms
10	3ms
11	10ms

Default: H00 (1ms)

### Diagnostic Data

Possible Error Codes:

Error Code	Error Type
16	Module incorrect or missing. Reported on channel 0 and applies to whole module.

**1734-IB4 Sink Input Module Product Code: 0082h****Data Map:**

Output size: 0 bytes; Input size: 1 byte

	7	6	5	4	3	2	1	0
Produces (Rx)	Not used				CH3 state	CH2 state	CH1 state	CH0 state
Consumes (Tx)	No consumed data							
Where:	CH0 = input channel 0, CH1 = input channel 1; 0 = OFF, 1 = ON							

**Configuration Data:**

7	6	5	4	3	2	1	0
Reserved						Filter	
Meaning of bits described below							

## Filter Values

Value	Definition
00	1ms
01	0.33ms
10	3ms
11	10ms

Default: H00 (1ms)

**Diagnostic Data**

Possible Error Codes:

Error Code	Error Type
16	Module incorrect or missing. Reported on channel 0 and applies to whole module.

## 1734-IV2 Source Input Module

**Product Code: 0083h**

### Data Map:

Output size: 0 bytes; Input size: 1 byte

	7	6	5	4	3	2	1	0
Produces (Rx)	Not used						CH1 state	CH0 state
Consumes (Tx)	No consumed data							
Where:	CH0 = input channel 0, CH1 = input channel 1; 0 = OFF, 1 = ON							

### Configuration Data:

7	6	5	4	3	2	1	0
Reserved						Filter	
Meaning of bits described below							

#### Filter Values

Value	Definition
00	1ms
01	0.33ms
10	3ms
11	10ms

Default: H00 (1ms)

### Diagnostic Data

Possible Error Codes:

Error Code	Error Type
16	Module incorrect or missing. Reported on channel 0 and applies to whole module.

## 1734-IV4 Source Input Module

**Product Code: 0084h**

### Data Map:

Output size: 0 bytes; Input size: 1 byte

	7	6	5	4	3	2	1	0
Produces (Rx)	Not used				CH3 state	CH2 state	CH1 state	CH0 state
Consumes (Tx)	No consumed data							
Where:	CH0, CH1, CH2, CH3 = input channel 1; 0 = OFF, 1 = ON							

### Configuration Data:

7	6	5	4	3	2	1	0
Reserved						Filter	
Meaning of bits described below							

#### Filter Values

Value	Definition
00	1ms
01	0.33ms
10	3ms
11	10ms

Default: H00 (1ms)

### Diagnostic Data

Possible Error Codes:

Error Code	Error Type
16	Module incorrect or missing. Reported on channel 0 and applies to whole module.

# 1734-OB2E Electronically Protected Output Module

**Product Code: 0085h**

## Data Map:

Output size: 1 bytes; Input size: 0 byte

	7	6	5	4	3	2	1	0
Produces (Rx)	No produced data							
Consumes (Tx)	Not used						CH1 state	CH0 state
Where:	CH0 = output channel 0, CH1 = output channel 1; 0 = OFF, 1 = ON							

## Configuration Data:

7	6	5	4	3	2	1	0
Reserved	RM	NL	IV	IA	FV	FA	

Meaning of bits described below

FA = Fault Action		FV = Fault Value	
Value	Definition	Value	Definition
0	Fault Value	0	OFF
1	Hold Last State	1	ON

IA = Idle Action		IV = Idle Value	
Value	Definition	Value	Definition
0	Idle Value	0	OFF
1	Hold Last State	1	ON

NL = No Load Enable		RM = Reset Mode	
Value	Definition	Value	Definition
0	Disable	0	Latch
1	Enable	1	Auto Retry

**Default:** H10 (Default: Fault/Idle value = OFF, No load, Latch)

## Diagnostic Data

Possible Error Codes:

Code	Error Type
4	Overload
6	Wire Break
16	Module incorrect or missing. Reported on channel 0, applies to whole module.

# 1734-OB4E Electronically Protected Output Module

**Product Code: 0086h**

## Data Map:

Output size: 1 bytes; Input size: 0 byte

	7	6	5	4	3	2	1	0
Produces (Rx)	No produced data							
Consumes (Tx)	Not used				CH3 state	CH2 state	CH1 state	CH0 state
Where:	CH0, CH1, CH2, CH3; 0 = OFF, 1 = ON							

## Configuration Data:

7	6	5	4	3	2	1	0
Reserved		RM	NL	IV	IA	FV	FA

Meaning of bits described below

FA = Fault Action		FV = Fault Value	
Value	Definition	Value	Definition
0	Fault Value	0	OFF
1	Hold Last State	1	ON

IA = Idle Action		IV = Idle Value	
Value	Definition	Value	Definition
0	Idle Value	0	OFF
1	Hold Last State	1	ON

NL = No Load Enable		RM = Reset Mode	
Value	Definition	Value	Definition
0	Disable	0	Latch
1	Enable	1	Auto Retry

**Default:** H10 (Default: Fault/Idle value = OFF, No load, Latch)

## Diagnostic Data

Possible Error Codes:

Code	Error Type
4	Overload
6	Wire Break
16	Module incorrect or missing. Reported on channel 0, applies to whole module.

**1734-OW2 Relay  
Sink/Source Output Module**

**Product Code: 0087h**

**Data Map:**

Output size: 1 bytes; Input size: 0 byte

	7	6	5	4	3	2	1	0
Produces (Rx)	No produced data							
Consumes (Tx)	Not used						CH1 state	CH0 state
Where:	CH0 = output channel 0, CH1 = output channel 1; 0 = OFF, 1 = ON							

**Configuration Data:**

7	6	5	4	3	2	1	0
Reserved				IV	IA	FV	FA

Meaning of bits described below

FA = Fault Action		FV = Fault Value	
Value	Definition	Value	Definition
0	Fault Value	0	OFF
1	Hold Last State	1	ON

IA = Idle Action		IV = Idle Value	
Value	Definition	Value	Definition
0	Idle Value	0	OFF
1	Hold Last State	1	ON

**Default:** H00 (Default: Fault/Idle value = OFF)

**Diagnostic Data**

Possible Error Codes:

Code	Error Type
16	Module incorrect or missing. Reported on channel 0, applies to whole module.



# 1734-IE2C Analog Current Input Module

**Product Code: 0018h**

## Data Map:

Output size: 0 Words; Input size: 2 Words

	7	6	5	4	3	2	1	0
Produces (Rx)	Input Channel 0							
	Input Channel 1							
Consumes (Tx)	No consumed data							

## Configuration Data:

7	6	5	4	3	2	1	0
Reserved	DF			AD	R	Notch Filter NF	
Engineering Units Low (high byte)				Default value = 06h			
Engineering Units Low (low byte)				Default value = 66h			
Engineering Units High (high byte)				Default value = 3Fh			
Engineering Units High (low byte)				Default value = FFh			
Low Alarm Threshold (high byte)				Default value = 0Ch			
Low Alarm Threshold (low byte)				Default value = 29h			
High Alarm Threshold (high byte)				Default value = 40h			
High Alarm Threshold (low byte)				Default value = A3h			
Meaning of bits described below							

NF = Notch Filter Values	
Value	Definition
00	50Hz
01	60Hz (default)
10	250Hz
11	500Hz

AD = Alarm Disable		R = Range	
Value	Definition	Value	Definition
0	Enable (default)	0	4 to 20mA (default)
1	Disable	1	0 to 20mA

<b>DF = Definition</b>	
<b>Value</b>	<b>Definition</b>
000	No filtering (default)
001	5ms
010	10ms
011	50ms
100	100ms
101	250ms
110	500ms
111	1s

## Diagnostic Data

Possible Error Codes:

<b>Code</b>	<b>Error Type</b>
2	Undercurrent
3	Overcurrent
6	Wire Break
7	High Alarm Exceed
8	Low Alarm Exceed
16	Module incorrect or missing. Reported on channel 0, applies to whole module.

# 1734-OE2C Analog Current Output Module

**Product Code: 0019h**

## Data Map:

Output size: 2 Word; Input size: 0 Word

	7	6	5	4	3	2	1	0
Produces (Rx)	Output Channel 0							
	Output Channel 1							
Consumes (Tx)	No consumed data							

## Configuration Data:

7	6	5	4	3	2	1	0
Reserved				AD	R	IA	FA
Engineering Units Low (high byte)				Default value = 06h			
Engineering Units Low (low byte)				Default value = 66h			
Engineering Units High (high byte)				Default value = 1Fh			
Engineering Units High (low byte)				Default value = FFh			
Fault Value (high byte)				Default value = 00			
Fault Value (low byte)				Default value = 00			
Idle Value (high byte)				Default value = 00			
Idle Value (low byte)				Default value = 00			

Meaning of bits described below

FA = Fault Action		IA = Idle Value	
Value	Definition	Value	Definition
0	Hold Last State	0	Hold Last State
1	Fault Value (default)	1	Idle Value (default)

R = Range		AD = Alarm Disable	
Value	Definition	Value	Definition
0	4 to 20mA (default)	0	Enable (default)
1	0 to 20mA	1	Disable

## Diagnostic Data

Possible Error Codes:

Code	Error Type
6	Wire Break
16	Module incorrect or missing. Reported on channel 0, applies to whole module.

## 1734-IE2V Analog Voltage Input Module

**Product Code: 0018h**

### Data Map:

Output size: 0 Words; Input size: 2 Words

	7	6	5	4	3	2	1	0
Produces (Rx)	Input Channel 0							
	Input Channel 1							
Consumes (Tx)	No consumed data							

### Configuration Data:

7	6	5	4	3	2	1	0
Reserved	DF			AD	R	Notch Filter NF	
Engineering Units Low (high byte)				Default value = 06h			
Engineering Units Low (low byte)				Default value = 66h			
Engineering Units High (high byte)				Default value = 3Fh			
Engineering Units High (low byte)				Default value = FFh			
Low Alarm Threshold (high byte)				Default value = 0Ch			
Low Alarm Threshold (low byte)				Default value = 29h			
High Alarm Threshold (high byte)				Default value = 40h			
High Alarm Threshold (low byte)				Default value = A3h			
Meaning of bits described below							

NF = Notch Filter Values	
Value	Definition
00	50Hz
01	60Hz (default)
10	250Hz
11	500Hz

AD = Alarm Disable		R = Range	
Value	Definition	Value	Definition
0	Enable (default)	0	-10 to +10V (default)
1	Disable	1	0 to +10V

<b>DF = Definition</b>	
<b>Value</b>	<b>Definition</b>
000	No filtering (default)
001	5ms
010	10ms
011	50ms
100	100ms
101	250ms
110	500ms
111	1s

## Diagnostic Data

Possible Error Codes:

<b>Code</b>	<b>Error Type</b>
2	Undercurrent
3	Overcurrent
6	Wire Break
7	High Alarm Exceed
8	Low Alarm Exceed
16	Module incorrect or missing. Reported on channel 0, applies to whole module.

## 1734-OE2V Analog Voltage Output Module

**Product Code: 0019h**

### Data Map:

Output size: 2 Word; Input size: 0 Word

	7	6	5	4	3	2	1	0
Produces (Rx)	Output Channel 0							
	Output Channel 1							
Consumes (Tx)	No consumed data							

### Configuration Data:

7	6	5	4	3	2	1	0
Reserved				AD	R	IA	FA
Engineering Units Low (high byte)				Default value = 06h			
Engineering Units Low (low byte)				Default value = 66h			
Engineering Units High (high byte)				Default value = 1Fh			
Engineering Units High (low byte)				Default value = FFh			
Fault Value (high byte)				Default value = 00			
Fault Value (low byte)				Default value = 00			
Idle Value (high byte)				Default value = 00			
Idle Value (low byte)				Default value = 00			

Meaning of bits described below

FA = Fault Action		IA = Idle Value	
Value	Definition	Value	Definition
0	Hold Last State	0	Hold Last State
1	Fault Value (default)	1	Idle Value (default)

R = Range		AD = Alarm Disable	
Value	Definition	Value	Definition
0	-10 to +10V (default)	0	Enable (default)
1	0 to +10V	1	Disable

### Diagnostic Data

Possible Error Codes:

Code	Error Type
6	Wire Break
16	Module incorrect or missing. Reported on channel 0, applies to whole module.

## 1734-IA2 120V ac Input Module

**Product Code: 1111h**

### Data Map:

Output size: 0 bytes; Input size: 1 byte

	7	6	5	4	3	2	1	0
Produces (Rx)	Not used						CH1 state	CH0 state
Consumes (Tx)	No consumed data							
Where:	CH0 = input channel 0, CH1 = input channel 1; 0 = OFF, 1 = ON							

### Configuration Data:

7	6	5	4	3	2	1	0
Reserved						Filter	
Meaning of bits described below							

Filter Values

Value	Definition
00	1ms
01	0.33ms
10	3ms
11	10ms

Default: H00 (1ms)

### Diagnostic Data

Possible Error Codes:

Code	Error Type
16	Module incorrect or missing. Reported on channel 0, applies to whole module.

## 1734-IM2 220V ac Input Module

**Product Code: 1112h**

### Data Map:

Output size: 0 bytes; Input size: 1 byte

	7	6	5	4	3	2	1	0
Produces (Rx)	Not used						CH1 state	CH0 state
Consumes (Tx)	No consumed data							
Where:	CH0 = input channel 0, CH1 = input channel 1; 0 = OFF, 1 = ON							

### Configuration Data:

7	6	5	4	3	2	1	0
Reserved						Filter	
Meaning of bits described below							

#### Filter Values

Value	Definition
00	1ms
01	0.33ms
10	3ms
11	10ms

Default: H00 (1ms)

### Diagnostic Data

Possible Error Codes:

Code	Error Type
16	Module incorrect or missing. Reported on channel 0, applies to whole module.



## 1734-OA2 120/220V ac Output Module

**Product Code: 1113h**

### Data Map:

Output size: 1 bytes; Input size: 0 byte

	7	6	5	4	3	2	1	0
Produces (Rx)	No produced data							
Consumes (Tx)	Not used						CH1 state	CH0 state
Where:	CH0 = output channel 0, CH1 = output channel 1; 0 = OFF, 1 = ON							

### Configuration Data:

7	6	5	4	3	2	1	0
Reserved				IV	IA	FV	FA
Meaning of bits described below							

FA = Fault Action		FV = Fault Value	
Value	Definition	Value	Definition
0	Fault Value	0	OFF
1	Hold Last State	1	ON

IA = Idle Action		IV = Idle Value	
Value	Definition	Value	Definition
0	Idle Value	0	OFF
1	Hold Last State	1	ON

**Default:** H00 (Default: Fault/Idle value = OFF)

### Diagnostic Data

Possible Error Codes:

Code	Error Type
16	Module incorrect or missing. Reported on channel 0, applies to whole module.



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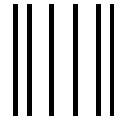
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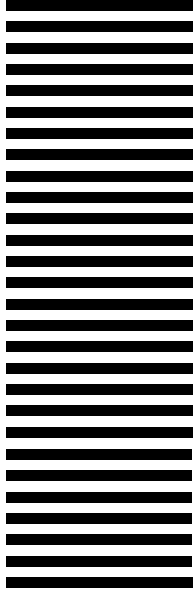
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