Bently Nevada 136188-02

Ethernet/RS485 Modbus I/O Module



Bently Nevada 136188-02 is the Ethernet/RS485 Modbus I/O module used at the rear of a 3500/92 Communication Gateway assembly. It provides the network and serial interfaces through which the gateway shares rack measurements and status information with process-control and other automation systems. The complete gateway supports Modbus over serial communication and Modbus/TCP over Ethernet, with an RJ45 10BASE-T Ethernet connection for this generation. The 136188-02 identifies the rear interface hardware, while the separately listed 136180-01 is the front gateway module that handles the associated communication functions.

Technical Specifications

Product Identity	
Brand	Bently Nevada
Part number	136188-02
Module type	Ethernet/RS485 Modbus I/O module
Dimensions (H × W × D)	241 × 24.4 × 99.1 mm
Weight	0.44 kg
Functional Configuration	
System	3500/92 Communication Gateway
Rack position	1 full-height rear slot
Ethernet interface	RJ45, 10BASE-T, 10 Mbps
Serial interface	RS485
Gateway protocols	Modbus/TCP over Ethernet; Modbus RTU over serial
Performance & Power	
Gateway power consumption	5.6 W typical for the 3500/92 gateway with the Modbus RS485 I/O module
Environment	
Operating temperature	–30°C to +65°C
Storage temperature	–40°C to +85°C
Humidity	95%, non-condensing

Selected original manufacturer material follows on pages 3–9.

Compatibility & Selection Guide

System fit and replacement planning. Match the complete rear I/O part number, required serial interface and existing gateway firmware when replacing a module. The 136188-01 Ethernet/RS232 version and the 136188-02 Ethernet/RS485 version serve different serial interfaces. Older gateway modules may need a firmware upgrade to communicate with newer I/O hardware; confirm the required upgrade and supplied items during the quotation review.

Wiring & Installation Reference

Communication connections

Ethernet · RJ45 / 10BASE-T · Shielded Category 5 cable with RJ45 connectors; 10 Mbps

Serial · RS485 / Modbus RTU · Select cable for the actual rack-to-rack and rack-to-host arrangement; the final host connection is application-specific

Rack position and configuration

1. Identify the correct I/O variant Match the rear module label to 136188-02 and confirm that the application requires Ethernet/RS485. The 136188-01 is the Ethernet/RS232 variant.

2. Confirm the rack position Allow one full-height rear slot for the I/O module. The associated communication gateway occupies a full-height front slot.

3. Check firmware before replacement Confirm the installed front gateway firmware against the replacement I/O hardware. The manufacturer identifies firmware upgrade kit 126M4118-01 for older gateway modules requiring an upgrade.

Installation precautions

The public datasheet does not specify the pin-by-pin RS485 connections or the complete installation procedure. Use the matching 3500/92 user manual; do not derive a pinout from a similar module.

For hazardous locations, verify the actual approval option and required installation drawing. The manufacturer lists hazardous-area conditions separately from the general operating-temperature range.

View interface specifications (PDF) — page 3 · View module arrangement (PDF) — page 9

Specifications

Inputs

Power Consumption	5.0 Watts typical with ModbusRS232/ RS422 I/O Module 5.6 Watts typical with Modbus RS485 I/O Module
Data Types	Collects data from other modules in the rack, such as current measured values with time stamp, module statuses, and current alarm statuses, via a high speed internal network. Exact data types returned depend on module type and channel configuration. Update Time: The data collection rate depends on rack configuration but will not exceed 1 second for all modules in the 3500 rack.

Outputs

OK LED	Indicates when the 3500/92 is operating properly.
TX/RX LED	Indicates when the 3500/92 is communicating with other modules in the 3500 rack.

Protocols

BNC Host Protocol	Communication with 3500 Configuration Software and 3500 Data Acquisition and Display Software over Ethernet TCP/IP.
Modbus	Based on AEG Modicon PI-MBUS-300 Reference Manual. Uses Remote Terminal Unit (RTU) transmission mode.
Ethernet	
Communication Link	Ethernet, 10Mbps, and conforms to IEEE802.3
Protocol	Ethernet TCP/IP frame and Modbus/TCP
Connection	RJ-45 (telephone jack style) for 10BASE-T Ethernet cabling

Environmental Limits

Main and I/O Module	
Operating Temperature	-30°C to +65°C (-22°F to +149°F)
Storage Temperature	-40°C to +85°C (-40°F to +185°F)
Humidity	95%, non-condensing

Physical

Main Board	
Dimensions (Height x Width x Depth)	241 mm x 24.4 mm x 242 mm (9.50 in x 0.96 in x 9.52 in)
Weight	0.82 kg (1.8 lb.)
I/O Modules	
Dimensions (Height x Width x Depth)	241 mm x 24.4 mm x 99.1 mm (9.50 in x 0.96 in x 3.90 in)
Weight	0.44 kg (0.96 lb.)

Rack Space Requirements

Monitor Module	1 full-height front slot
I/O Modules	1 full-height rear slot

Compliance and Certifications

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

EMC

European Community Directive:

EMC Directive 2014/30/EU

Standards:

EN 61000-6-2; Immunity for Industrial Environments
EN 61000-6-4; Emissions for Industrial Environments

Electrical Safety

European Community Directive:

LV Directive 2014/35/EU

Standards:

EN 61010-1

RoHS

European Community Directive:

RoHS Directive 2011/65/EU

Maritime

DNV GL rules for classification – Ships, offshore units, and high speed and light craft

ABS Rules for Condition of Classification, Part 1

- Steel Vessels Rules
- Offshore Units and Structures

Hazardous Area Approvals

For the detailed listing of country and product-specific approvals, refer to the *Approvals Quick Reference Guide (108M1756)*.

For additional technical documentation, please log in to bntechsupport.com and access the Bently Nevada Media Library.

cNRTLus

Class I, Zone 2: AEx/Ex nA nC ic IIC T4 Gc;
Class I, Zone 2: AEx/Ex ec nC ic IIC T4 Gc;
Class I, Division 2, Groups A, B, C, and D;

T4 @ Ta= -20˚C to +65˚C (-4˚F to +149˚F)
When installed per drawing 149243 or 149244.

ATEX/IECEx

Ex II 3 G

Ex nA nC ic IIC T4 Gc
Ex ec nC ic IIC T4 Gc

T4 @ Ta= -20˚C to +65˚C
(-4˚F to +149˚F)
When installed per drawing 149243 or 149244.

Ordering Information

For the detailed listing of country and product-specific approvals, refer to the *Approvals Quick Reference Guide (108M1756)*.

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3500/92 Communication Gateway

3500/92-AA-BB-CC

A: I/O Module Type	
01	ModbusRS232/RS422 I/O Module
02	ModbusRS485 I/O Module
03	Ethernet/RS232 Modbus I/O Module
04	Ethernet/RS485 Modbus I/O Module
B: Memory Type	
01	Low Memory
C: Agency Approval Option	
00	None
01	CSA/NRTL/C
02	CSA/ATEX/IECEx

Additional Options

Firmware	
126M4118-01	Firmware Upgrade Kit Older Communication Gateway modules will require a Firmware Upgrade to communication with a new I/O Module. See 3500/92 manual for detailed information.

Cables

Standard 10BASE-T Shielded Category 5 Cable with RJ-45 connectors

138131-AAA

A: Length (in ft.) up to 320 ft in length.	
0 0 6	6 feet (1.8 meters)
0 1 0	10 feet (3 meters)
0 2 5	25 feet (7.3 meters)
0 4 0	40 feet (12 meters)
0 5 0	50 feet (15 meters)
0 7 5	75 feet (22.5 meters)
0 8 5	85 feet (25.5 meters)
1 0 0	100 feet (30.5 meters)
1 2 0	120 feet (36.6 meters)
1 5 0	150 feet (44.8 meters)
2 0 0	200 feet (61 meters)
2 5 0	250 feet (75 meters)
3 2 0	320 feet (98 meters)

For specific cable lengths, please order through Bently Nevada Custom Products.

30 ft. - 100 ft. is ordered in 5ft. increments only. 100 ft. - 320 ft. is ordered in 10ft. increments only

Serial Cabling (RS232): RS232 Cable, Host to 3500/92

130419-AAAA-BB

A: Cable Length	
0 0 1 0	10 feet (3 meters)
0 0 2 5	25 feet (7.5 meters)
0 0 5 0	50 feet (15 meters)
0 1 0 0	100 feet (30.5 meters)
B: Assembly Instructions	
0 1	Not Assembled
0 2	Assembled

RS232 Cable, Honeywell PLCG to 3500/92

130420-AAAA-BB

A: Cable Length	
0010	10 feet (3 meters)
0025	25 feet (7.5 meters)
0050	50 feet (15 meters)
0100	100 feet (30.5 meters)
B: Assembly Instructions	
01	Not Assembled
02	Assembled

130119-01 RS232 Cable, Host Computer to RS232/RS422 Converter

Serial Cabling (RS422/RS485):

RS422 Cables can be used for rack-to-rack connections when using ModbusRS485 I/O Modules. The final rack-to-host connection is application specific and may require a custom cable.

RS422 PVC Insulated Cable, RS232/RS422 Converter to 3500/92

130530-AAAA-BB

A: Cable Length	
0010	10 feet (3 meters)
0025	25 feet (7.5 meters)
0050	50 feet (15 meters)
0100	100 feet (30.5 meters)
0250	250 feet (75 meters)
0500	500 feet (150 meters)
B: Assembly Instructions	
01	Not Assembled
02	Assembled

RS422 PVC Insulated Cable, 3500/92 to 3500/92

129665-AAAA-BB

A: Cable Length	
0010	10 feet (3 meters)
0025	25 feet (7.5 meters)

Spares

Part Number	Description
04425545	Grounding Wrist Strap (single use)
137495-01	Firmware IC (Odd bank)
137494-01	Firmware IC (Even bank)
136180-01	3500/92 Communication Gateway Module.
125736-01	Modbus RS232/RS422 I/O Module.
133323-01	Modbus RS485 I/O Module.
136188-01	Ethernet/RS232 Modbus I/O Module*
136188-02	Ethernet/RS485 Modbus I/O Module*
Bently_ Manuals	International Technical Documentation DVD

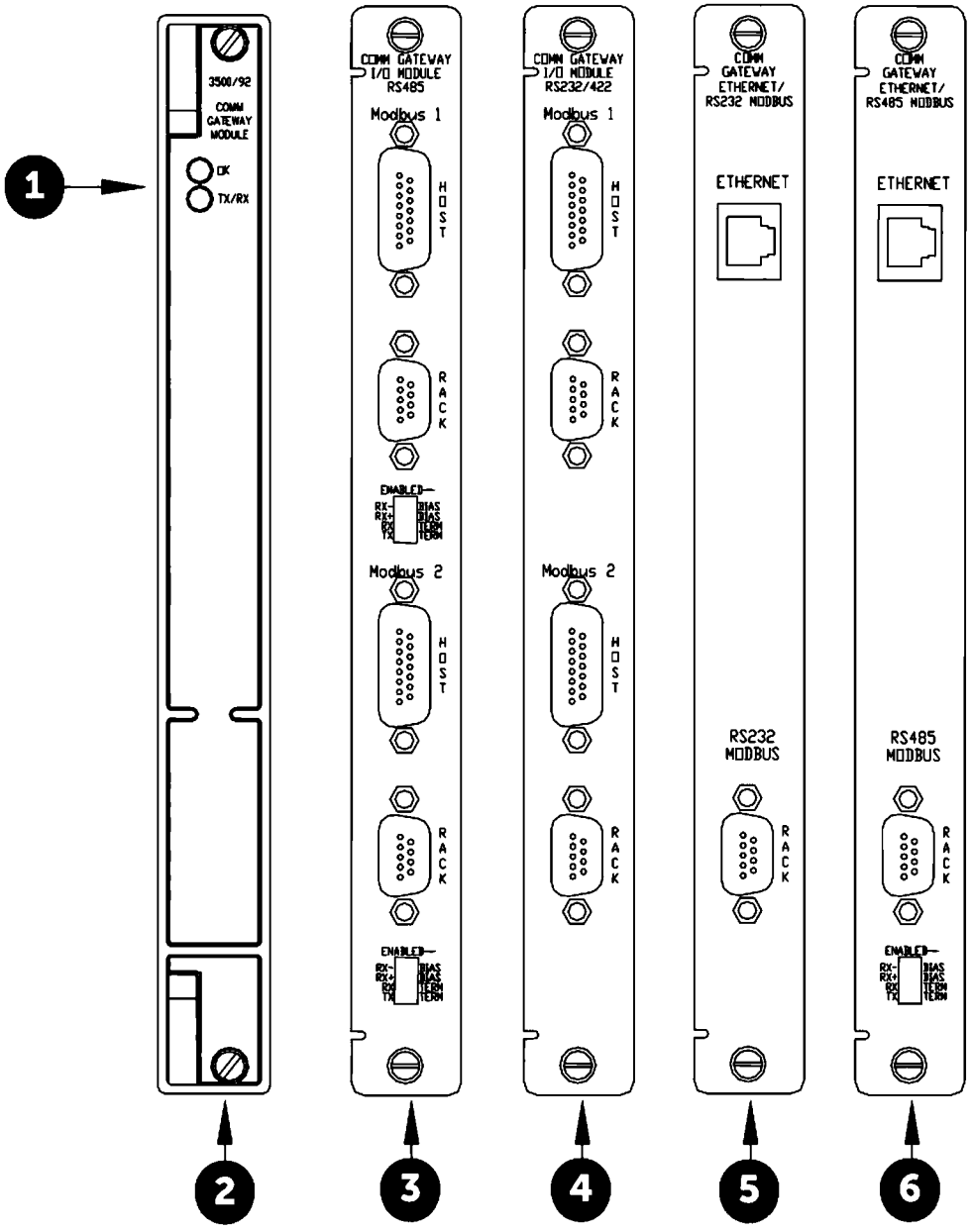


* These spares include the Firmware Upgrade Kit (126M4118-01).

Accessories

Part Number	Description
139036-01	9-pin D-SUB "Y"
Serial Converters	
02230411	RS232 to RS422 Converter - 110 Vac.
02230412	RS232 to RS422 Converter - 220 Vac.
Ethernet Hubs	
165M2516	24-port 100/1000 SFP BE based switch
Ethernet Transceivers	
02200260	15-Pin AUI male to Fiber Optic Cable (10BASE-FL) with ST connection
02200261	15-Pin AUI male to Thinnet (10BASE2)
Ethernet Cabling - Standard 10 BASE-T Shielded , Category 5 Cable with RJ-45 Connectors	
02175190	6 ft. length
02175191	10 ft. length
02175192	25 ft. length

Graphs and Figures



1. Status LEDs
2. Comm Gateway Module
3. RS485 I/O Module
4. RS232/422 I/O Module
5. Ethernet/RS232 I/O Module
6. Ethernet/RS485 I/O Module

Figure 1: Front and Rear Views of the 3500/92 Communication Gateway