

Solutions for integrating your automated valves

Stonel™ FieldLink™ process
networking components



DeviceNet™



MODBUS

PROFIBUS

HART
COMMUNICATION PROTOCOL








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Product guide




Stonel offers a complete array of networking products. Please use this guide to locate the components needed for your network based on protocol and product type.



PROTOCOL	NETWORK DESCRIPTIONS	MASTERS AND GATEWAYS	POWER SUPPLIES	INPUT/OUTPUT MODULES
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	pages 58-59		pages 60-58	pages 62-63
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Enclosure guide

Stonel offers a variety of enclosures to protect components from the process environment. Match the components with the appropriate enclosure using the chart below.

ENCLOSURE	ENCLOSURE DESCRIPTIONS	MASTERS AND GATEWAYS	POWER SUPPLIES	INPUT/OUTPUT MODULES
FieldBlock	pages 116-121			
Junction Module	pages 122-131			
FieldRack	pages 132-134			



DROP CONNECTORS

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POWER CONDITIONERS AND REPEATERS

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(Tuners, Terminators, Hand-helds etc.)

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(Commissioning kits and software)

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DROP CONNECTORS



POWER CONDITIONERS AND REPEATERS



SPECIAL MODELS



TYPE

- Nonincendive equipment
- Nema 4, 4x, and 6

- Explosionproof and nonincendive equipment
- Nema 4, 4x, and 6

- Nonincendive equipment
- Nema 4, 4x, and 6

AS-Interface

Contents

AS-Interface description <i>Overview and economic analysis of AS-Interface network</i>	8-10
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AS-Interface

Overview and analysis

Stonel AS-Interface networking products are part of the FieldLink line and are fully compliant with AS-Interface bus specifications. AS-Interface networks up to 62 field devices onto a single pair of wires that delivers both signal and power.

Actuator Sensor Interface, or AS-Interface, was developed by a group of sensor manufacturers and introduced into the market in 1994. Since that time, it has become the de facto standard for discrete sensors in process industries throughout the world.

AS-Interface features

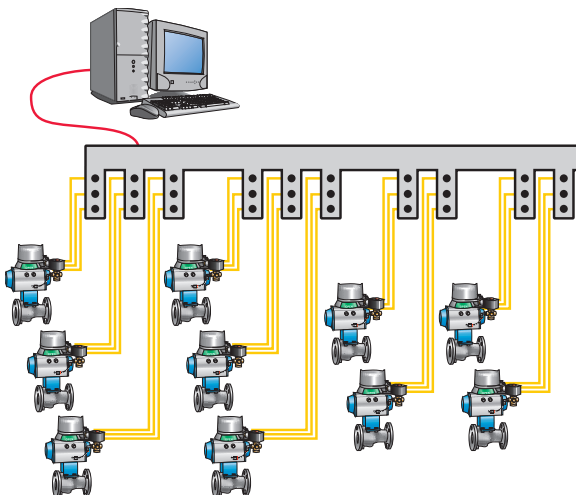
- Ideally suited for on/off batch process valves and other discrete applications.
- 62 field devices per network master.
- Simple electronics for economical and robust performance.
- Transfer medium is unshielded two-wire cable for both data and power supply.
- Signal transmission has high tolerance to EMI.
- Easy to install providing the greatest cost savings with the least complexity.
- Free choice of network topology allows optimized wiring network.
- Variety of gateways available to seamlessly tie into high level bus networks.

AS-Interface offers an easy path for network upgrades

AS-Interface gateways may be easily replaced for new upgrades in your plant fieldbus network. For example, you may network your current AS-Interface bus into a Modbus network. However, if you migrate to an Ethernet backbone later, you may install a new gateway and conveniently tie your entire AS-Interface network into the Ethernet network.

Figure 1

Conventional system



AS-Interface is reliable

The AS-Interface Alternating Pulse Modulation (APM) with Manchester II coding and decoding minimizes electromagnetic emissions and is highly tolerant of electromagnetic interference. AS-Interface has a very high level of data integrity and is classified as I3 according to DIN 19244. These networks are robust and perform reliably under the most strenuous environments. AS-Interface networks are recommended for “mission critical” applications.

AS-Interface vs conventional system

AS-Interface is a versatile, low cost alternative to traditional hard wired I/O. It can replace traditional point-to-point wiring with a better, more flexible solution that is easier to install, operate and maintain and easier to re-configure.

Conventional system

Typical batching valve wiring networks attach each of the inputs and outputs (I/O) to a central location resulting in multiple wire runs for each field device. See figure 1. Large expenditures are needed for cabling conduit, installation and I/O points. Space for I/O racks and cabling must be accommodated in order to attach only a few field devices.

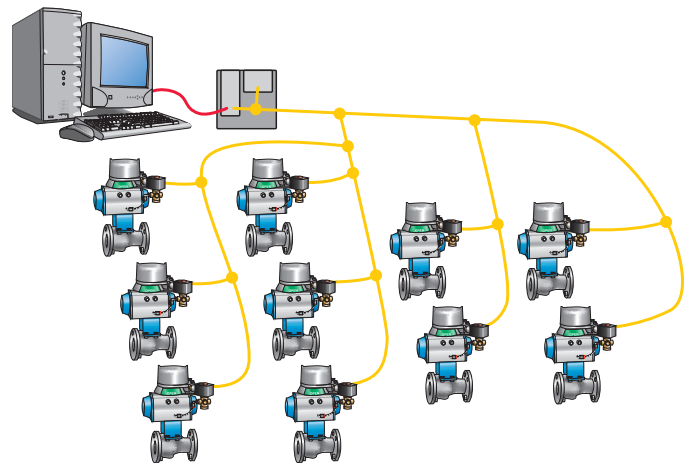
AS-Interface network

A simple gateway interfaces the network into the field communication bus. See figure 2. Data and power are transferred over the two-wire network to each of the AS-Interface compatible field devices.

Each valve communication module contains an AS-Interface ASIC and other electronics to gather open or closed position status and power solenoid or other ancillary devices on or off. Other AS-Interface modules are available to gather inputs and switch power outputs.

Figure 2

AS-Interface network



AS-Interface economic analysis

Using a network with 16 valve communication terminals (VCTs), the following economic analysis may be performed (costs are listed in the amount per automated valve):

Installation cost comparison		
(calculated per field device)	Conventional	AS-Interface
Computer I/O; master/gateway	\$70	\$65
Conduit, cable tray, wiring and fittings	\$1,500	\$350
Valve monitor/VCT and pneumatic valve	\$510	\$610
Switched protected drop connector	NA	\$90
Installation and commissioning labor	\$700	\$300
Power supply	\$50	\$30
Total installed cost	\$2,780	\$1,445
Total installation savings \$1,335 per automated valve		

There is a net savings of \$1,335 per automated valve with AS-Interface communication over the conventional system (52% reduction in installed cost). This savings does not include other cost reductions due to less space consumption for wiring, conduit and I/O racks, as well as greater flexibility in adding field devices or reconfiguring later.

Technical information

Power and data

In an AS-Interface network, data and power are carried over a single two-wire cable that links up to 62 field devices. Each of the field devices may have up to 4 inputs and 4 outputs for a total of 248 binary inputs and outputs per string. Analog inputs and outputs are also available. Stonel AS-Interface I/O modules have 4 inputs and 4 outputs (power output for up to four solenoids or other power consuming accessories).

Transmission media

Two-wire unshielded, untwisted cable, 2 x 1.5 mm² (16 AWG) is recommended for data and power in the process environment.

Conductor length

100 meters (328 feet) total length of cabling may be used for each master/gateway. Additional length of 100 meters for each repeater with up to two repeaters in series. Parallel repeaters can be used to construct long networks, provided there are no more than two repeater hops from each device to the master. Total number of field devices must remain at 62 regardless of number of repeaters for each master.

In addition to the repeater, some new devices have been created that allow you to add distance to your AS-i network. The AS-i terminator is a passive device that can be placed near the end of a segment to extend the AS-i network up to 200m without repeaters. The terminator places a specially designed impedance at the end of the AS-i segment which serves to optimize the signal and therefore increase the network length. The tuner is a device that actively looks at the network signal and determines the best impedance level to optimize the signal. It also has diagnostic LED's to show signal level

quality. The tuner can allow networks to extend up to 300m without repeaters and has diagnostic LED's. Please note that it is important that voltage drop be considered when extending networks with these new tools.

Topologies

AS-Interface is capable of supporting any topology. Any combinations of star, ring, tree and linear are possible. Use of a repeater in a ring is not permitted.

AS-Interface system specifications	
Topology	Linear, star, tree or ring
Number field devices	62 per network, maximum
Addressing	AS-i master or handheld
Cabling	Unshielded 2-wire for data and power (30 VDC up to 8 amps) standard round or AS-i flat
Cable length	100 meters per master or 300 meters with two repeaters
Transmission rate	167 kbits/second
Signal coding	Manchester type with alternating pulse modulation
Cycle time	10 msec. maximum with 62 devices
Data per message	4 bit bi-directional
Access procedure	Master/slave
Error detection	1 parity bit + signal quality monitoring

Data integrity

When classifying the bus in terms of data integrity (according to EN608 70-5-4-DIN), the AS-Interface network falls into the highest data integrity class even with a bit error rate of 10⁻³. Such accuracy is suitable for the transmission of mission critical information.

Standards and user groups

AS-Interface technology has been standardized in EN 50295 and IEC 62026-2. There are over 400 different products available from 50+ vendors. And, as of this writing, there are estimated to be over 12,000,000 installed nodes (field devices) throughout the world.

Stonel AS-Interface gateways

AS-Interface gateways seamlessly interface the AS-Interface network to a higher level fieldbus. For communication, the protocol of the respective fieldbus (Modbus, Profibus, DeviceNet, etc.) will be used. To configure a gateway using an RS485 interface, only a simple RS232C/RS485 converter is needed. In this fashion, the gateway can be operated with a notebook PC via the respective fieldbus interface without need for additional hardware or software.

The operation of all Stonel AS-Interface gateways is identical. Complete configuration and debugging of the network can be accomplished with the included push-buttons, LED and display. Slave addresses can be programmed, faulty AS-Interface field devices can be detected and actual configuration of the AS-Interface network can be stored.

AS-Interface is NOT a competitor to higher-level field buses. AS-Interface is a complementary system to them.

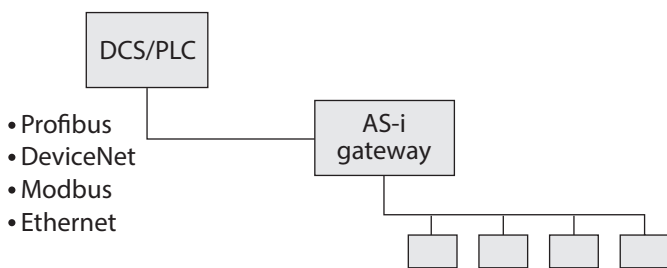
AS-Interface gateways are readily available to the following high level field buses:

- Modbus (RS485)
- Modbus+
- Profibus (DP)
- ProfiNet
- DeviceNet
- Ethernet (TCP/IP)
- Ethernet/IP

Dual channel gateways are available for many of these protocols allowing greater efficiency.

Please contact Valmet for availability since new gateways are becoming available regularly.

Figure 5
AS-Interface gateway to higher level protocol



Host computer interface

AS-Interface can be easily interfaced with standard PC, PLC and DCS platforms. Variations are as follows:

AS-Interface gateway to higher level protocol

Many PLCs and DCSs have communication cards available that utilize protocols such as Profibus, DeviceNet, Modbus, Modbus+, Ethernet, etc. The appropriate AS-Interface gateway would simply act as a node on the higher level network. See figure 5.

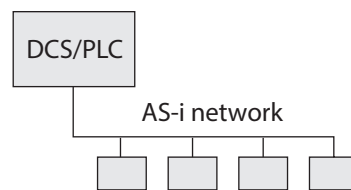
AS-Interface master in DCS/PLC

Many PLCs have AS-Interface scanners available, which enable direct connection without an AS-Interface gateway. See figure 6.

PC

An AS-Interface ISA card may be installed directly into the PC, which acts as the AS-Interface master. Or, a gateway can be used if the PC has the ability to communicate via Modbus, Modbus+, DeviceNet, Profibus, etc.

Figure 6
AS-Interface master in DCS/PLC



Masters and gateways

Model number
GW458159A



AS-Interface to Profibus-DP gateway

The AS-Interface/Profibus gateway interfaces the AS-Interface to Profibus-DP. The gateway acts as a master for AS-Interface and as a slave for Profibus. AS-Interface functions can be called up via Profibus. Commissioning can be accomplished with a hand-held addressing unit or with the push buttons on the gateway.

Features

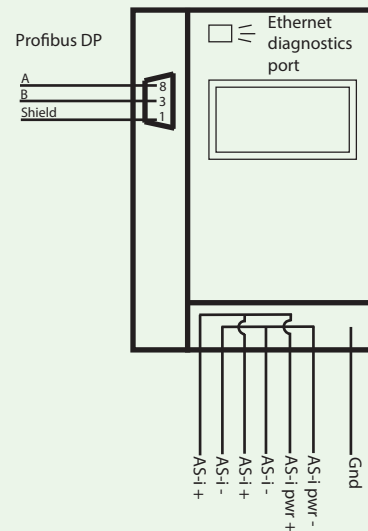
- Duplicate address detection
- Version 3.0 master-compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- AS-Interface peripheral fault diagnostics
- Ethernet web server for diagnostics
- Integrated GSD file
- Chip card for storing configuration



Specifications	
AS-Interface master version	3.0
Interface	Profibus-DP
Diagnostic interface	RJ45 Ethernet
Operating current	200mA (from AS-Interface circuit)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Baud rate	9.6k - 12000k Baud (automatic recognition)
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +2)
Displays	LCD display Power on, green LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 75mm, 93mm
Ingress protection	IP20, field enclosure required
Weight	460g (1.0 pounds)



Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
GW458110A



AS-Interface to Profibus-DP gateway

The AS-Interface/Profibus gateway interfaces the AS-Interface to Profibus-DP. The gateway acts as a master for AS-Interface and as a slave for Profibus. AS-Interface functions can be called up via Profibus. Commissioning can be accomplished with a hand-held addressing unit or with the push buttons on the gateway.

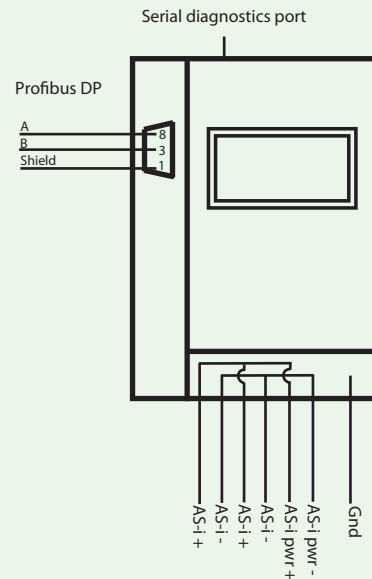
Features

- Duplicate address detection
- Version 3.0 master-compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- AS-Interface peripheral fault diagnostics
- Serial diagnostics port: see SW462008A for software and cable
- ETL approved for Class I Division 2



Specifications	
AS-Interface master version	3.0
Interface	Profibus-DP
Diagnostic interface	Serial RS232
Operating current	200mA (from AS-Interface circuit)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Baud rate	9.6k - 12000k Baud (automatic recognition)
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +2)
Displays	LCD display Power on, green LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 75mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	460g (1.0 pounds)
Approvals	ETL approved Class I Division 2, groups A,B,C,D

Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter



Masters and gateways

Model number
GW458160A



Dual channel AS-Interface to Profibus-DP gateway

The AS-Interface/Profibus gateway interfaces two (2) AS-Interface networks to Profibus-DP. The gateway acts as a master for two (2) AS-Interface networks and as a single slave for Profibus. AS-Interface functions can be called up via Profibus. Commissioning can be easily accomplished with the use of a hand-held addressing unit or with the push buttons on the gateway.

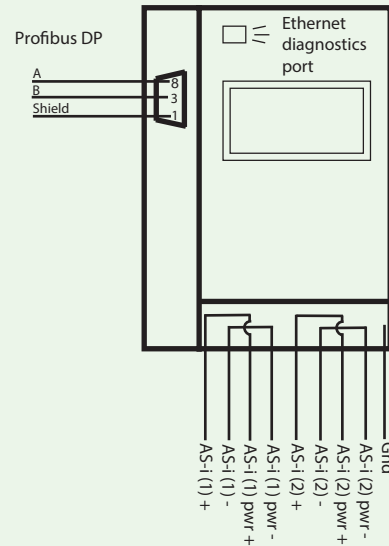
Features

- Duplicate address detection
- Version 3.0 master-compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- AS-Interface peripheral fault diagnostics
- Ethernet web server for diagnostics
- Integrated GSD file
- Chip card for storing configuration



Specifications	
AS-Interface master version	3.0
Interface	Profibus-DP
Diagnostic interface	RJ45 Ethernet
Operating current	200mA (from AS-Interface 1) 70mA (from AS-Interface 2)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Baud rate	9.6k - 12000k baud (automatic recognition)
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +2)
Displays	LCD display Display network1/network2, green LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +82°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 75mm, 93mm
Ingress protection	IP20, field enclosure required
Weight	460g (1.0 pounds)

Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter



Masters and gateways

Model number
GW458112A



Dual channel AS-Interface to Profibus-DP gateway

The AS-Interface/Profibus gateway interfaces two (2) AS-Interface networks to Profibus-DP. The gateway acts as a master for two (2) AS-Interface networks and as a single slave for Profibus. AS-Interface functions can be called up via Profibus. Commissioning can be easily accomplished with the use of a hand-held addressing unit or with the push buttons on the gateway.

Features

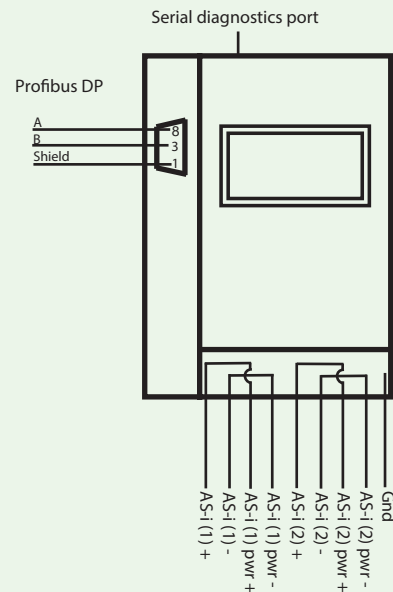
- Duplicate address detection
- Version 3.0 master-compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- AS-Interface peripheral fault diagnostics
- Serial diagnostics port: see SW462008A for software and cable
- ETL approved for Class I Division 2



Specifications	
AS-Interface master version	3.0
Interface	Profibus-DP
Operating current	200mA (from AS-Interface 1) 70mA (from AS-Interface 2)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Baud rate	9.6k - 12000k baud (automatic recognition)
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +2)
Displays	LCD display Display network1/network2, green LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +82°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 75mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	460g (1.0 pounds)
Approvals	ETL approved Class I Division 2 groups A,B,C,D



Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
GW458161A



Dual channel AS-Interface to Profibus-DP gateway with single power supply feature

The AS-Interface/Profibus gateway interfaces the AS-Interface to Profibus-DP. The gateway acts as a master for AS-Interface and as a slave for Profibus. AS-Interface functions can be called up via Profibus. Commissioning can be accomplished with a hand-held addressing unit or with the push buttons on the gateway.

Features

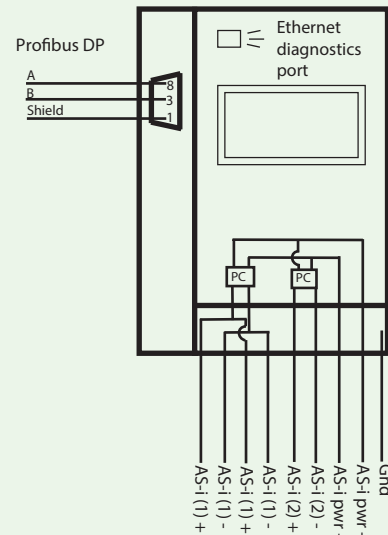
- AS-Interface peripheral fault diagnostics
- Duplicate address detection
- Version 3.0 master-compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- Ethernet web server for diagnostics
- Integrated GSD file
- Chip card for storing configuration
- Single power supply for two (2) networks



Specifications	
AS-Interface master version	3.0
Interface	Profibus-DP
Diagnostic interface	RJ45 Ethernet
Operating current	250mA
Operating voltage	30 VDC requires (1) 30 VDC power supply
Baud rate	9.6k - 12000k baud (automatic recognition)
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +2)
Displays	LCD display Display network1/network2, green LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 75mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	460g (1.0 pounds)



Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
GW458114A



Dual channel AS-Interface to Profibus-DP gateway with single power supply feature

The AS-Interface/Profibus gateway interfaces the AS-Interface to Profibus-DP. The gateway acts as a master for AS-Interface and as a slave for Profibus. AS-Interface functions can be called up via Profibus. Commissioning can be accomplished with a hand-held addressing unit or with the push buttons on the gateway.

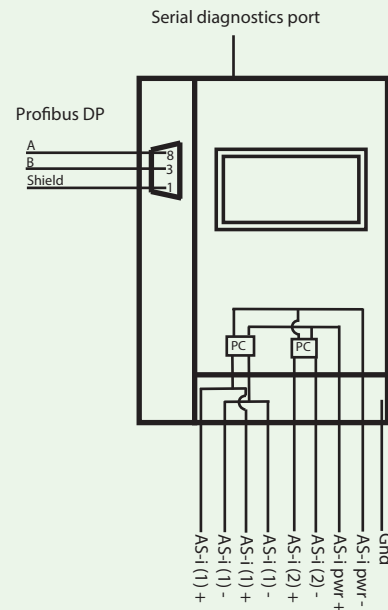
Features

- AS-Interface peripheral fault diagnostics
- Duplicate address detection
- Version 3.0 master-compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- Serial diagnostics port: see SW462008A for software and cable
- ETL approved for Class I Division 2
- Single power supply for two (2) networks



Specifications	
AS-Interface master version	3.0
Interface	Profibus-DP
Operating current	250mA
Operating voltage	30 VDC requires (1) 30 VDC power supply
Baud rate	9.6k - 12000k baud (automatic recognition)
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +2)
Displays	LCD display Display network1/network2, green LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 75mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	460g (1.0 pounds)
Approvals	ETL approved Class I Division 2, groups A,B,C,D

Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter



Masters and gateways

Model number
GW458116A



AS-Interface to ProfiNet gateway

The AS-Interface/ProfiNet gateway interfaces the AS-Interface to ProfiNet. The gateway acts as a master for AS-Interface and as a slave for ProfiNet. AS-Interface functions can be called up via ProfiNet. Commissioning can be accomplished with a hand-held addressing unit or with the push buttons on the gateway.

Features

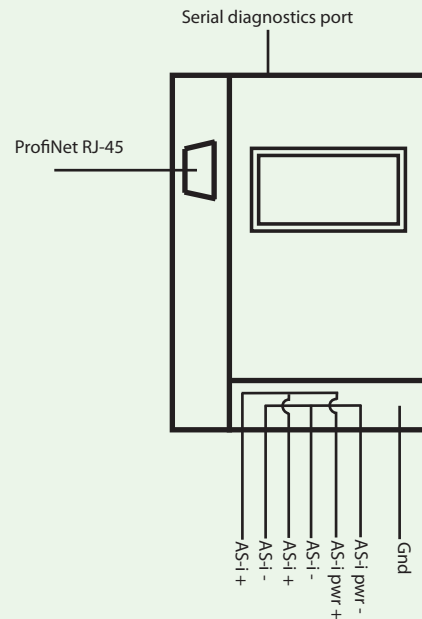
- Duplicate address detection
- Version 3.0 master-compatible with all 2.0 and 3.0 slaves and 7.3 profile analog modules
- AS-Interface peripheral fault diagnostics
- Serial diagnostics port: see SW462008A for software and cable



Specifications	
AS-Interface master version	3.0
Interface	ProfiNet (RJ-45 Ethernet)
Operating current	300mA (from AS-Interface circuit)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Baud rate	10/100m baud (automatic recognition)
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +2)
Displays	LCD display Power on, green LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 100mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	550g (1.2 pounds)



Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
 GW458094A
 GW458118A (ETL)



AS-Interface to DeviceNet gateway

The AS-Interface/DeviceNet gateway serves to connect the AS-Interface to a DeviceNet network. The gateway acts as a complete master for the AS-Interface network and as a slave for DeviceNet (group 2 slave only). All AS-Interface functions can be called up via DeviceNet.

Features

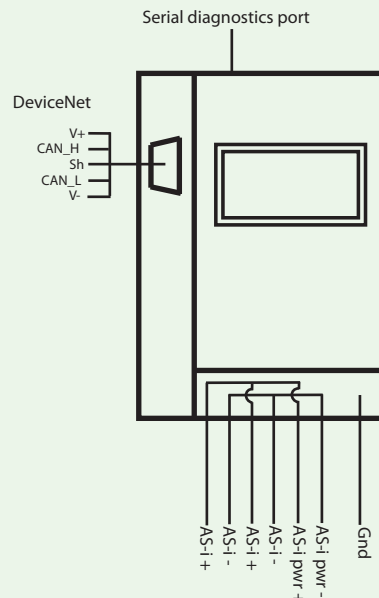
- Duplicate address detection
- AS-Interface peripheral fault diagnostics
- Version 3.0 master-compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- Serial diagnostics port: see SW462008A for software and cable
- ETL approved for Class I Division 2 (GW458118A)



Specifications	
AS-Interface master version	3.0
Interface	DeviceNet (5 pin plug)
Operating current	200mA (from AS-Interface)
Operating voltage	30 VDC AS-Interface voltage
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface Slaves +2)
Displays	LCD display DeviceNet voltage on, green LED AS-Interface power on, green LED Module/Net Status (MNS), green/red LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 85mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	520g (1.1 pounds)
Approvals (GW458118A)	ETL approved Class I Division 2, groups A,B,C,D



Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
 GW458098A
 GW458120A (ETL)



Dual channel AS-Interface to DeviceNet gateway

The dual channel AS-Interface/DeviceNet gateway serves to connect the AS-Interface to a DeviceNet network. The gateway acts as a complete master for two AS-Interface networks and as a slave for DeviceNet (group 2 slave only). All AS-Interface functions can be called up via DeviceNet.

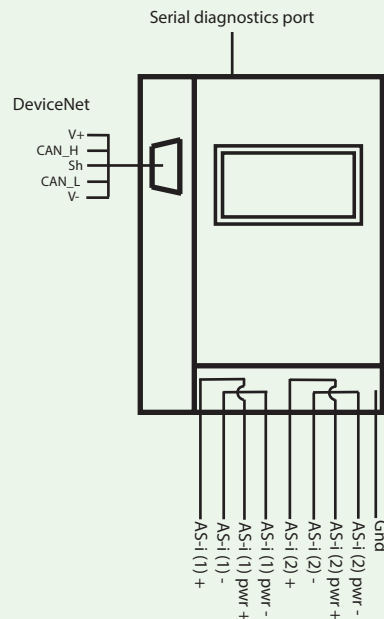
Features

- Duplicate address detection
- AS-Interface peripheral fault diagnostics
- Version 3.0 master-compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- Serial diagnostics port: see SW462008A for software and cable
- ETL approved for class 1 division 2 (GW458120A)



Specifications	
AS-Interface master version	3.0
Interface	DeviceNet (5 pin plug)
Operating current	200mA (from AS-Interface 1) 70mA (from AS-Interface 2)
Operating voltage	30 VDC AS-Interface voltage
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +2)
Displays	LCD display DeviceNet voltage on, green LED AS-Interface power on, green LED Module/Net Status (MNS), green/red LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 85mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	520g (1.1 pounds)
Approvals (GW458120A)	ETL approved Class I Division 2, groups A,B,C,D

Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
 GW458096A
 GW458122A (ETL)



Dual channel AS-Interface to DeviceNet gateway and single power supply feature

The dual channel AS-Interface/DeviceNet gateway serves to connect the AS-Interface to a DeviceNet network. The gateway acts as a complete master for two AS-Interface networks and as a slave for DeviceNet (group 2 slave only). All AS-Interface functions can be called up via DeviceNet.

Features

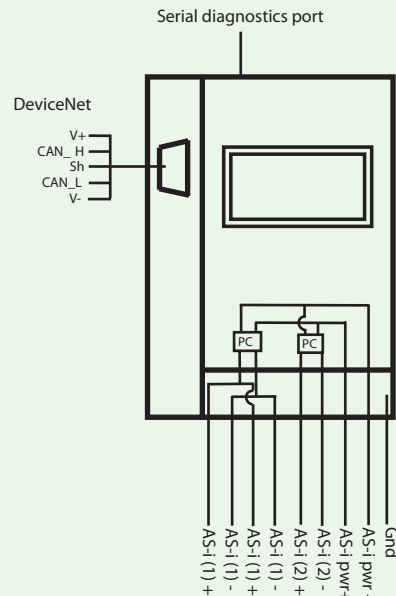
- Duplicate address detection
- AS-Interface peripheral fault diagnostics
- Version 3.0 master-compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- Serial diagnostics port: see SW462008A for cable and software
- ETL approved Class I Division 2 (GW458122A)
- Single power supply for 2 networks



Specifications	
AS-Interface master version	3.0
Interface	DeviceNet
Operating current	250mA
Operating voltage	30 VDC, requires (1) 30 VDC power supply
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +2)
Displays	LCD display DeviceNet voltage on, green LED AS-Interface power on, green LED Module/Net Status (MNS), green/red LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 85mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	590g (1.3 pounds)
Approvals (GW458122A)	ETL approved Class I Division 2, groups A,B,C,D



Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
GW458162A



AS-Interface to Ethernet (EtherNet/IP and Modbus TCP) gateway

This AS-Interface/Ethernet gateway interfaces the AS-Interface network to the Ethernet network. The gateway acts as a master for the AS-Interface network and as a node on the Ethernet Network.

Features

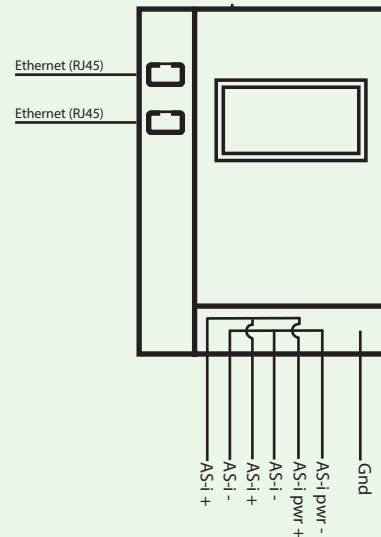
- Gateway works with Ethernet/IP and Modbus/TCP
- Integrated Ethernet switch
- Device level ring (DLR) Ethernet/IP
- Version 3.0 master
- Ethernet web server for diagnostics
- Duplicate address detection
- Chip card for storing configuration



Specifications	
AS-Interface master version	3.0
Interface	RJ45 10/100 MBaud Ethernet, integrated switch
Operating current	300mA
Operating voltage	30VDC AS-Interface voltage
Baud rate	10/100 MBaud
AS-Interface cycle time	150 microsec x (AS-i slaves +2)
Displays	LCD display Power on, green LED Ethernet active, green LED Config error, red LED Voltage ok, green LED AS-i ok, green LED Auto address enabled, green LED Config mode, yellow LED
Operating temperature	0° to 55°C (32° to 131°F)
Dimensions (L,W,H)	120mm, 85mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	500g



Schematic drawing



Graphical display

The new interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
GW458163A



Dual channel AS-Interface to Ethernet (EtherNet/IP and Modbus TCP) gateway

This dual channel AS-Interface/Ethernet gateway interfaces two AS-Interface networks to the Ethernet network. The gateway acts as a master for the AS-Interface network and as a node on the Ethernet network.

Features

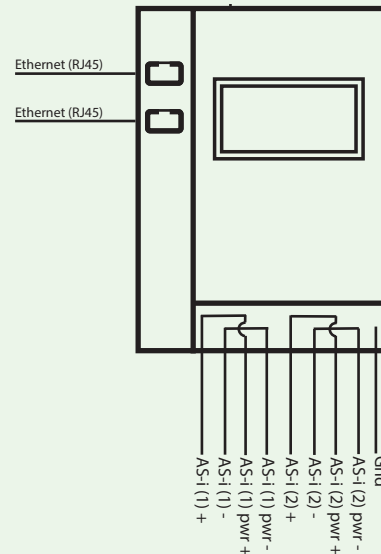
- Gateway works with Ethernet/IP and Modbus/TCP
- Integrated Ethernet switch
- Device level ring (DLR) Ethernet/IP
- Version 3.0 master
- Ethernet web server for diagnostics
- Duplicate address detection
- Chip card for storing configuration



Specifications	
AS-Interface master version	3.0
Interface	RJ45 10/100 MBaud Ethernet, integrated switch
Operating current	200mA from AS-i Channel 1 70mA from AS-i Channel 2
Operating voltage	30VDC AS-Interface voltage
Baud rate	10/100 MBaud
AS-Interface cycle time	150 microsec x (AS-i slaves +2)
Displays	LCD display AS-i channel 1/2, green LED Ethernet active, green LED Config error, red LED Voltage ok, green LED AS-i ok, green LED Auto address enabled, green LED Config mode, yellow LED
Operating temperature	0° to 55°C (32° to 131°F)
Dimensions (L,W,H)	120mm, 85mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	500g



Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
GW458164A



Dual channel AS-Interface to Ethernet (EtherNet/IP and Modbus TCP) with single power supply feature

This dual channel AS-Interface/Ethernet gateway interfaces (2) AS-Interface network to the Ethernet network. The gateway acts as a master for the AS-Interface network and as a node on the Ethernet network.

Features

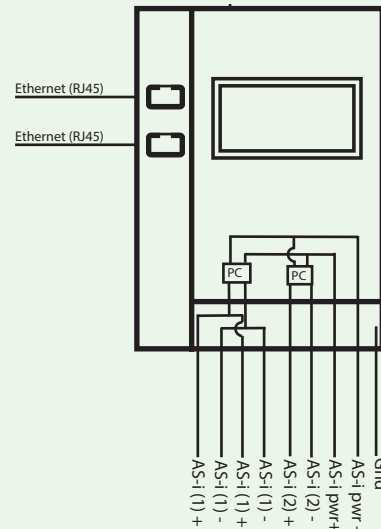
- Gateway works with Ethernet/IP and Modbus/TCP
- Integrated Ethernet switch
- Device level ring (DLR) Ethernet/IP
- Version 3.0 master
- Ethernet web server for diagnostics
- Single power supply for 2 AS-i networks
- Chip card for storing configuration



Specifications	
AS-Interface master version	3.0
Interface	RJ45 10/100 MBaud Ethernet, integrated switch
Operating current	250mA
Operating voltage	30VDC
Baud rate	10/100 MBaud
AS-Interface cycle time	150 microsec x (AS-i slaves +2)
Displays	LCD display AS-i channel 1/2, green LED Ethernet active, green LED Config error, red LED Voltage ok, green LED AS-i ok, green LED Auto address enabled, green LED Config mode, yellow LED
Operating temperature	0° to 55°C (32° to 131°F)
Dimensions (L,W,H)	120mm, 85mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	500g



Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
 GW458086A
 GW458126A (ETL)



AS-Interface to Modbus RS485 gateway

Serial AS-Interface master with Modbus communication protocol for operation with host.

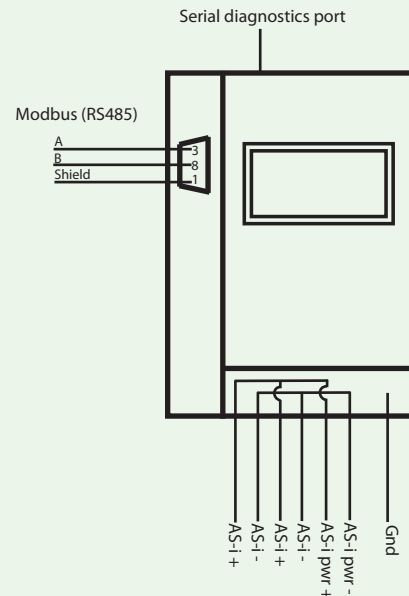
Features

- Version 3.0 master, compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- Duplicate address detection
- AS-Interface peripheral fault diagnostics
- Serial diagnostics port: see SW462008A for cable and software
- ETL approved Class I Division 2 (GW458126A)



Specifications	
AS-Interface master version	3.0
Serial interface	RS485 (9-pin female DB9)
Operating current	200mA (from AS-Interface circuit)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Baud rate	1200k - 115000 baud
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves + 2)
Displays	LCD display Power on, green LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Buttons	4
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 75mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	460g (1 pound)
Approvals (GW458126A)	ETL approved Class I Division 2, groups A,B,C,D

Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter



Masters and gateways

Model number
 GW458088A
 GW458128A (ETL)



Dual channel AS-Interface to Modbus RS485 gateway

Serial AS-Interface master with Modbus communication protocol for operation with host.

Features

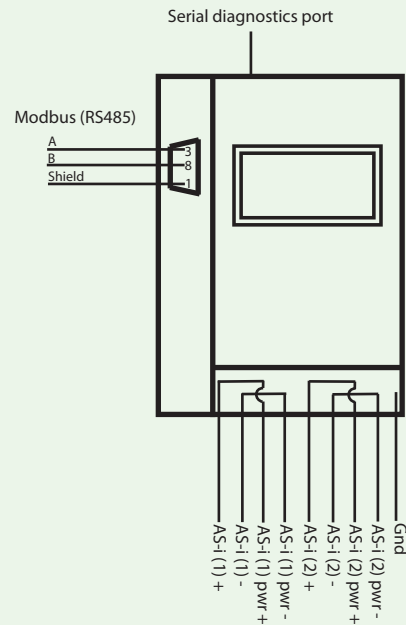
- Version 3.0 master, compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- Duplicate address detection
- AS-Interface peripheral fault diagnostics
- Serial diagnostics port: see SW462008A for cable and software
- ETL approved Class I Division 2 (GW458128A)



Specifications	
AS-Interface master version	3.0
Serial interface	RS485 (9-pin female DB9)
Operating current	200mA (from AS-Interface circuit 1) 70mA (from AS-Interface circuit 2)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Baud rate	1200k - 115,000 baud
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +2)
Displays	Slave addresses and error messages LCD Power on, green LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Buttons	4
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 75mm, 83mm
Ingress protection	IP20, field enclosure required
Weight	460g (1 pound)
Approvals (GW458128A)	ETL approved Class I Division 2, groups A,B,C,D



Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
 GW458124A
 GW458130A (ETL)



Dual channel AS-Interface to Modbus RS485 gateway with single power supply feature

Serial dual channel AS-Interface master with Modbus communication protocol for operation with host.

Features

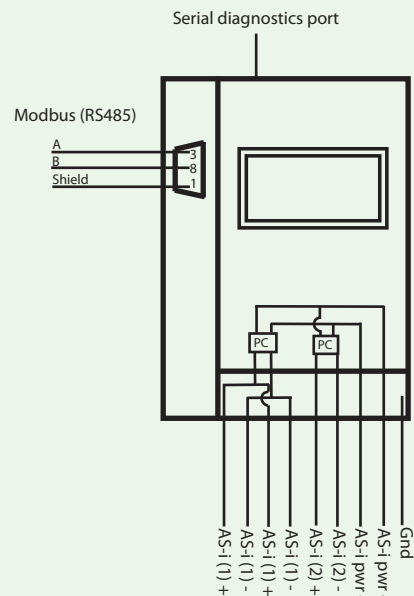
- Version 3.0 master, compatible with all 2.0-3.0 slaves and 7.3 profile analog modules
- Duplicate address detection
- AS-Interface peripheral fault diagnostics
- Serial diagnostics port: see SW462008A for cable and software
- ETL approved Class I Division 2 (GW458130A)
- Single power supply for two AS-Interface networks



Specifications	
AS-Interface master version	3.0
Serial interface	RS485 (9-pin female DB9)
Operating current	250mA
Operating voltage	30 VDC requires (1) 30VDC power supply
Baud rate	1200k - 115,000 Baud
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +2)
Displays	Slave addresses and error messages LCD Power on, green LED Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Buttons	4
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Stainless steel, DIN rail mounting
Dimensions (L, W, H)	120mm, 75mm, 83mm
Ingress protection	IP20
Weight	460g (1 pound)
Approvals (GW458130A)	ETL approved Class I Division 2, groups A,B,C,D



Schematic drawing



Graphical display

The interactive graphical display on this gateway enables the entire AS-Interface network to be commissioned and the connected devices to be completely tested without a PC, PLC or host system. It also enables the user to complete all tasks previously requiring the “AS-Interface Control Tools” software package or hand-held. This allows for simpler and faster commissioning.

Features

- Set device addresses
- Test inputs and outputs
- Perform network diagnostics
- View error counter

Masters and gateways

Model number
GW458132A



AS-Interface to Modbus+ gateway

Serial AS-Interface master with Modbus+ protocol for operation with the host.

Features

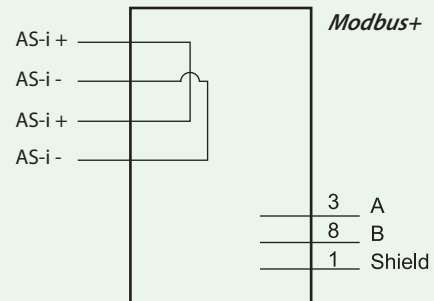
- Direct connection into Modbus+ protocol
- No special software with standard Modbus+ drivers

- Easy programming for slave addresses
- Error diagnostics



Specifications	
AS-Interface master version	2.1
Interface	RS485 (9-pin DB9)
Operating current	200mA (from AS-Interface circuit)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Baud rate	1 mbit/sec - Modbus+
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface slaves +1)
Displays	Slave addresses and error messages, 2-digit LCD Serial communication active, green LED Configuration error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +82°C (-13° to +180°F)
Housing	Engineered resin, DIN rail mounting
Dimensions (L, W, H)	75mm, 100mm, 110mm
Ingress protection	IP20, field enclosure required
Weight	420g (0.93 pounds)

Schematic drawing



Masters and gateways

Model number
GW458043A



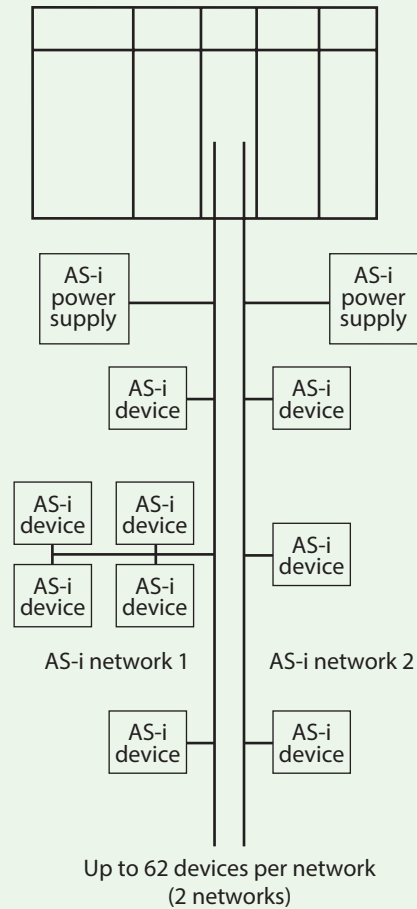
AS-Interface for Allen Bradley SLC500 PLC

The AS-Interface scanner module serves to connect the AS-Interface to an Allen Bradley SLC 5/03 or later. The scanner takes one slot of the PLC backplane and acts as a complete master for two (2) AS-Interface networks. All I/O data is mapped to the SLC's I/O files and all status bits are mapped to the M0 and M1 files. The module also features an RS232 serial port for uploading configuration files.



Specifications	
AS-Interface master version	2.1
PLC chassis	SLC 5/03 or later
AS-Interface channels	2
Maximum I/O	I/O: 32 words in, 32 words out MO file: words in-typical (113) max (461) M1 file: words in-typical (113) max (461)
Communication ports	2- 4pin Phoenix connectors (1 per network) 1- 9pin serial configuration port
Displays	Fault LED, overall scanner status Comm LED (channel 1), status of network Comm LED (channel 2), status of network 2
Backplane current	500mA @ 5 VDC
Processor	Intel 80C188
RAM	28K bytes
Flash memory	512K bytes (firmware and config storage)
Operating temperature	0° to +60°C (32° to +140°F)
Storage temperature	-40° to +85°C (-40° to +185°F)

Schematic drawing



Masters and gateways

Model number
GW458076A



AS-Interface for Allen Bradley CompactLogix and MicroLogix 1500 PLCs

The AS-Interface scanner module serves to connect the AS-Interface to Allen Bradley CompactLogix and MicroLogix1500 PLCs. The scanner takes one slot of the PLC and acts as a complete master for one (1) AS-Interface network. All I/O data and status bits are mapped to the PLC's I/O files.

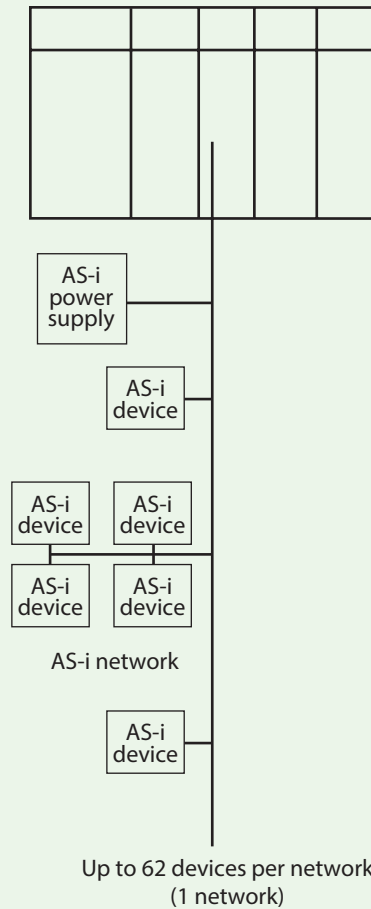
Features

- Serial diagnostics port: see SW462006A for cable and software



Specifications	
AS-Interface master version	3.0
PLC chassis	compactLogix or MicroLogix 1500
AS-Interface channels	1
Operating current	100mA (from AS-Interface) 450mA (from PLC backplane)
Operating voltage	30.5VDC (AS-Interface voltage)
AS-Interface cycle time	150 microsec. x (# of AS-interface slaves + 2)
Displays	Slave addresses and error messages, 2-digit LED AS-Interface power on, green LED Communication active, green LED Communication error, red LED AS-I voltage ok, green LED AS-I ok, green LED Auto address enabled Master in config mode, yellow LED
Operating temperature	0° to +55°C (32° to +131°F)
Stock temperature	-25° to +85°C (-13° to +185°F)
Housing	Engineered resin, PLC rack mount
Dimensions (L, W, H)	102mm, 35mm, 132mm
Ingress protection	IP20, field enclosure required
Weight	420g (0.93 pounds)

Schematic drawing



Masters and gateways

Model number
GW458074A



AS-Interface for Allen Bradley ControlLogix PLC's

The AS-Interface scanner module serves to connect the AS-Interface to Allen Bradley ControlLogix PLCs. The scanner takes one slot of the PLC and acts as a complete master for two (2) AS-Interface networks. All I/O data and status bits are mapped to the PLC's I/O files.

Features

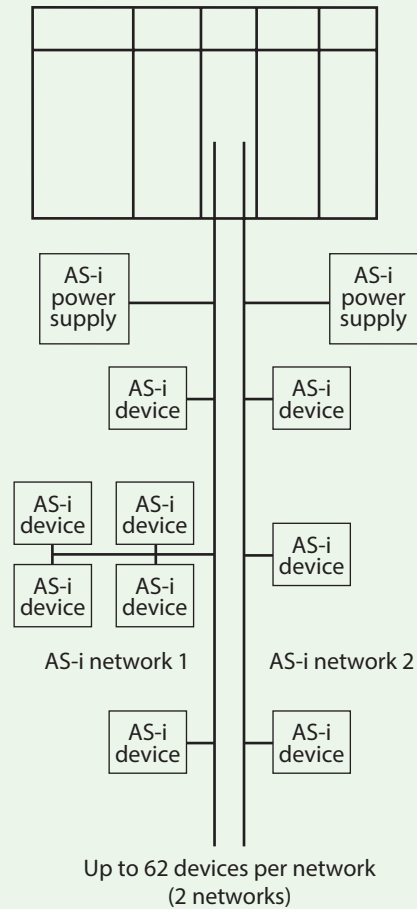
- Serial diagnostics port: see SW462006A for cable and software



Specifications	
AS-Interface master version	3.0
PLC chassis	ControlLogix
AS-Interface channels	2
Operating current	70mA (from AS-Interface 1) 70mA (from AS-Interface 2)
Operating voltage	30 VDC AS-Interface voltage
AS-Interface cycle time	Cycle time = 150 microsec. x (AS-Interface salves +2)
Displays	Slave addresses and error messages, 2-digit LED AS-Interface power on, green LED Communication active, green LED Communication error, red LED AS-Interface voltage normal, green LED AS-Interface normal operation, green LED Automatic address program enabled, green LED Master in configuration mode, yellow LED
Operating temperature	-0° to +55°C (-32° to +131°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Engineered resin, DIN rail mounting
Dimensions (L, W, H)	146mm, 35mm, 132mm
Ingress protection	IP20, field enclosure required
Weight	420g (0.93 pounds)
Approvals (GW458100A)	ETL approved Class I Division 2, groups A,B,C,D



Schematic drawing



Power supplies

Model number
PS459002A



2.8 amp AS-Interface power supply

This compact power supply is designed for use with AS-Interface systems where power and data share the same wires. The 2.8 amp power supply provides power to the AS-Interface bus for operation of masters and slaves for output devices. Integrated into the supply is a power conditioner which decouples data from the power supply enabling signal and power to be carried on the same pair of wires.

Features

- NEC Class 2
- Hazardous location approvals
- Current limited/short circuit protected
- Regulated to $\pm 3\%$
- Power decoupled from communication signal

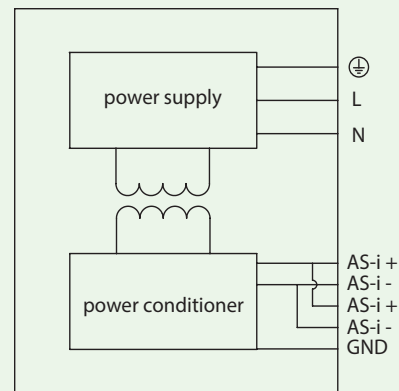


Specifications	
Output voltage	30.55 VDC $\pm 3\%$
Output current	2.8 amps (85 watts)
Output inductance	100 mH $\pm 10\%$
Input voltage	Selectable 120 / 240 VAC (47-63 Hz)
Displays	Power on, green LED
Current limits	3.2 amp (min) 4.6 amp (max)
Operating temperature	-10° to +70°C (+14° to +158°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Al/Mg alloy, DIN rail mounting
Dimensions (L, W, H)	124mm, 49mm, 112mm
Ingress protection	IP20, IP54 field enclosure required
Weight	500g (1.1 pounds)
Approvals	NEC class 2 power supply



See www.valmet.com/flowcontrol for details and certificates

Schematic drawing



Power supplies

Model number
PS459004A



8.0 amp AS-Interface power supply

This compact power supply is designed for use with AS-Interface systems where power and data share the same wires. The 8.0 amp power supply provides power to the AS-Interface bus for operation of masters and slaves for output devices. Integrated into the supply is a power conditioner which decouples data from the power supply enabling signal and power to be carried on the same pair of wires.

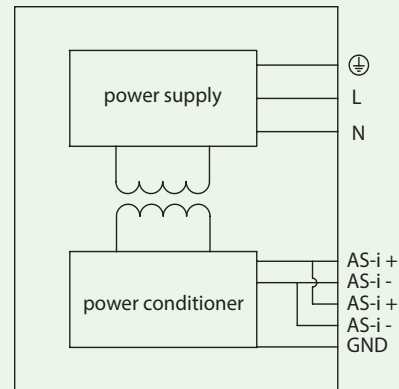
Features

- Current limited/short circuit protected
- Regulated to $\pm 3\%$
- Power decoupled from communication signal



Specifications	
Output voltage	30.55 VDC $\pm 3\%$
Output current	8.0 amps (244 watts)
Output inductance	100 mH $\pm 10\%$
Input voltage	Selectable 120 / 240 VAC (47-63 Hz)
Displays	Power on, green LED
Current limits	8.4 amp (min)
Operating temperature	-10° to +70°C (+14° to +158°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Al/Mg alloy, DIN rail mounting
Dimensions (L, W, H)	124mm, 91mm, 112mm
Ingress protection	IP20, field enclosure required
Weight	890g (2.0 pounds)

Schematic drawing



Power supplies

Model number
 PS459042A
 PS459046A (ETL)



8.0 amp 30 VDC power supply

This compact power supply is designed for use with dual channel AS-Interface gateways with single power supply feature. The 8.0 amp power supply provides power to both AS-Interface channels.

Features

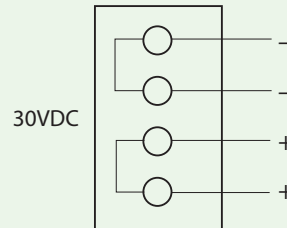
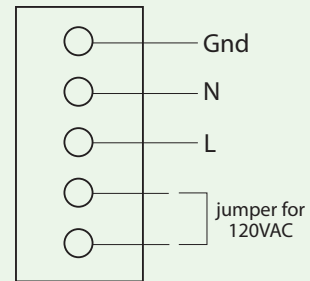
- Current limited/short circuit protected
- Regulated to $\pm 1\%$
- ETL approved for Class I Division 2 (PS459046A)



Specifications	
Output voltage	30.05 VDC $\pm 1\%$
Output current	8.0 amps
Input voltage	120 / 240 VAC (47-63 Hz)
Displays	Power on, green LED
Current limits	12.0 amp (max)
Operating temperature	0° to +60°C (+32° to +140°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Al/Mg alloy, DIN rail mounting
Dimensions (L, W, H)	148mm, 70mm, 154mm
Ingress protection	IP20, field enclosure required
Weight	1200g (2.65 pounds)
Approvals (PS459046A)	ETL approved Class I, Division 2, groups A, B, C, D



Schematic drawing



Power conditioners

Model number

PS461089A

Redundant

PS465024A

Redundant; DIN

PS461090A

Daisy chain

PS465025A

Daisy chain; DIN



AS-Interface power conditioner

The AS-Interface power conditioner converts any 30VDC power source to an AS-Interface power supply by providing the data decoupling function. It may be used to power an AS-Interface segment with redundant power supplies or with remote placement of power supply.

This device can be used for

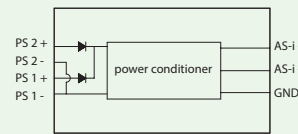
- Redundant power supplies for single AS-Interface segment
- Remote location of power supply (distance from power supply to power conditioner does not add to AS-i network length)
- Power multiple segments with 1 power supply



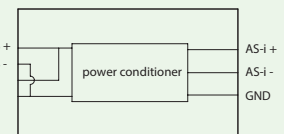
Specifications	
Connection	Redundant inputs (diode protection) Daisy chain inputs (common terminals)
Max voltage	35 VDC
Max current	3 amps
Input voltage	26 VDC to 32 VDC
Indication	Green LED indicates bus power is good ($\geq 26V$) Red LED indicates bus power is low ($< 26V$)
Dimensions (L, W, H)	75mm, 26mm, 40mm
Operating temperature	-40° to +80°C (-40° to +176°F)

Schematic drawings

Redundant

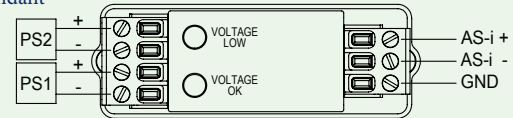


Daisy chain

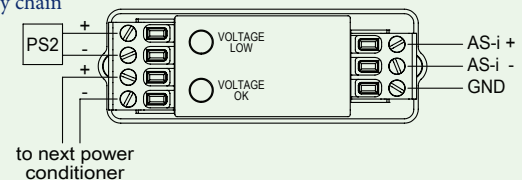


Wiring diagrams

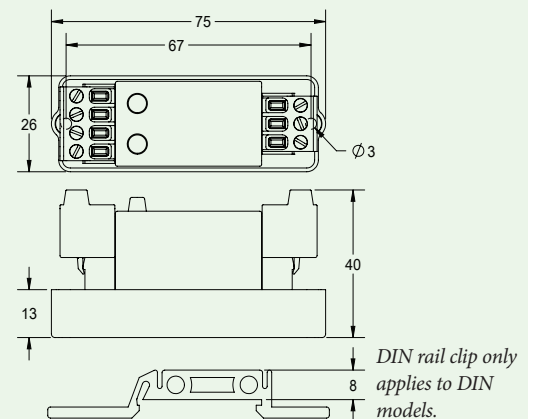
Redundant



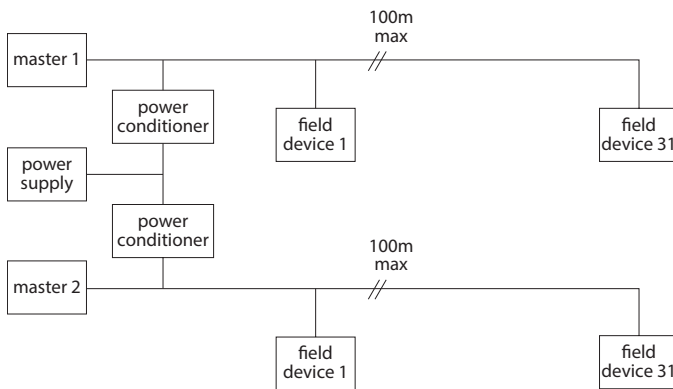
Daisy chain



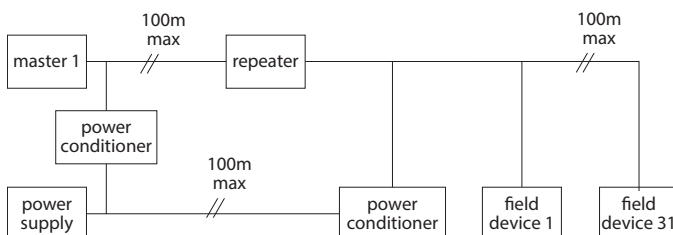
Dimensions (mm)



Network 1



Network 2



Repeaters/network tuners

Model number
AC461091A
AC465026A (DIN)



AS-Interface repeater

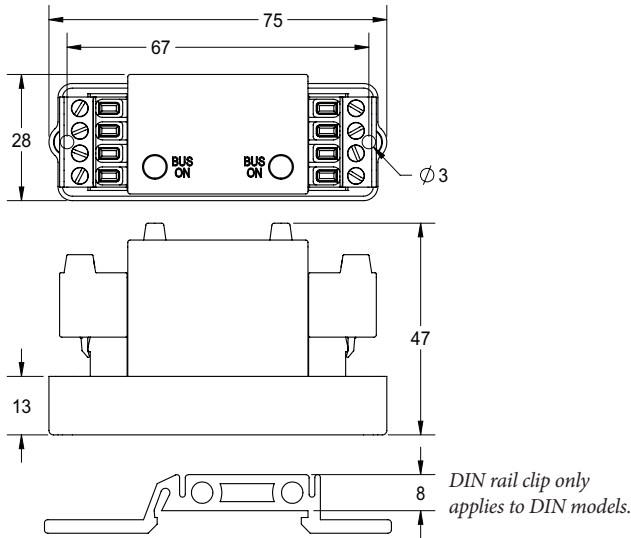
The AS-Interface repeater extends the AS-Interface network by 100 meters. The repeater requires no configuration and has no address on the bus. The repeater requires an AS-Interface power supply.



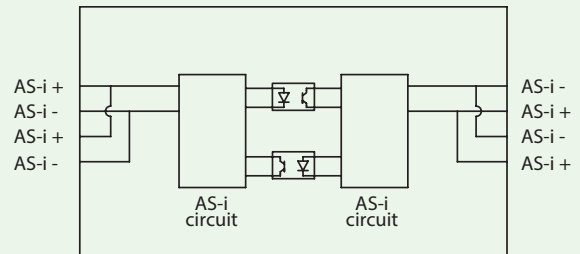
Specifications	
Operating voltage	AS-Interface voltage
Operating current	60mA (per segment) 120mA total
AS-Interface cycle time	0.15ms X (AS-i Slaves +1)
Indication	Green LED indicates bus power on each segment
Dimensions (L, W, H)	75mm, 28mm, 47mm
Operating temperature	-40° to + 80°C (-40° to 176°F)



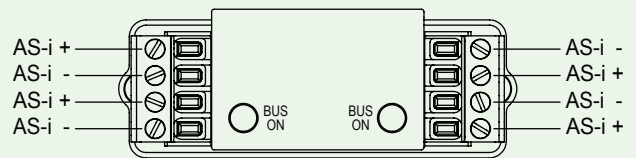
Dimensions (mm)



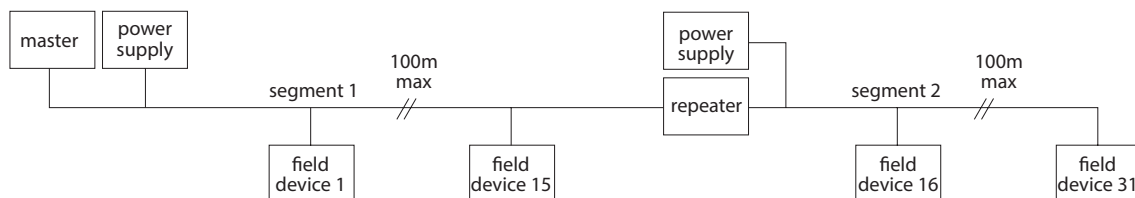
Schematic drawing



Wiring diagram



Network



Repeaters/network tuners

Model number
AC461142A
AC461150A (ETL)



AS-Interface network tuner

The AS-Interface tuner enables longer cable length and improves network communication quality. This tuner monitors the telegram traffic and adjusts its capacitive, inductive, and resistive characteristics to optimize communication. LEDs display network signal quality.

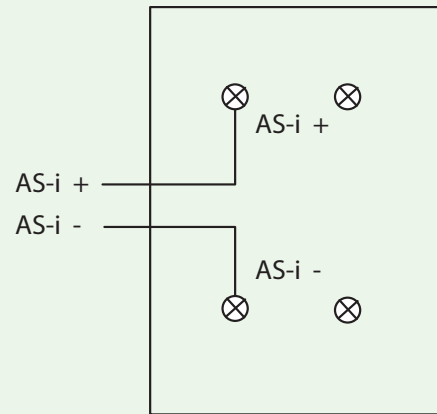
Features

- Extend AS-i networks
- Improve signal quality
- ETL approved for Class I Division 2 (AC461150A)
- LED indication
- Easy commissioning
- DIN rail mounting
- IP65

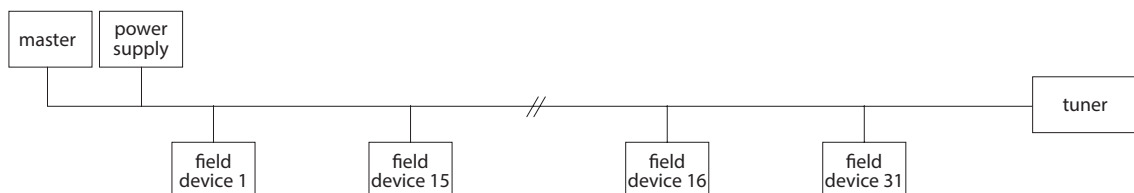


Specifications	
Device profile	Passive (no address)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Operating current	60mA
Displays	Power: voltage ok green LED Tuning active: green LED Error, red LED Warning: yellow LED Green: green LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +75°C (-13° to +167°F)
Housing	Engineered resin, DIN rail mounting
Housing dimensions (L, W, H)	80mm, 115mm, 65mm
Ingress protection	IP65
Weight	244g (0.54 pounds)
Approvals (AC461150A)	ETL approved Class I, Division 2, groups A, B, C, D

Schematic drawing



Network



Repeaters/network tuners

Model number
AC461144A



AS-Interface network terminator

The AS-Interface terminator enables longer cable length and improves network communication quality. The terminator applies a fixed capacitive, inductive, and resistive component to the network to optimize communication. Signal quality should be verified by an AS-Interface analyzer.

Features

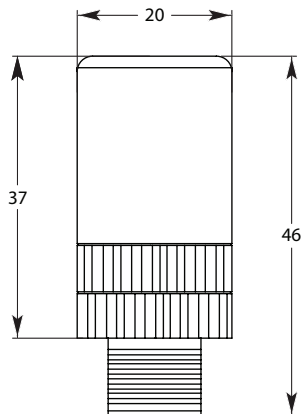
- Extend AS-i networks
- Improve signal quality
- Simple LED indication
- M12 4pin connector
- IP65 housing



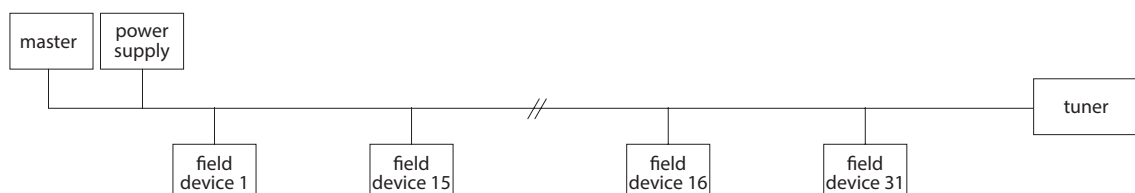
Specifications	
Device profile	Passive (no address)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Operating current	10mA
Displays	AS-i voltage > 26V : green LED AS-i voltage > 18.5V : yellow LED
Operating temperature	0° to +55°C (+32° to +131°F)
Storage temperature	-25° to +75°C (-13° to +167°F)
Housing	Engineered resin, DIN rail mounting
Housing dimensions	20mm, 46mm (diameter, length)
Ingress protection	IP20
Weight	44g (0.10 pounds)



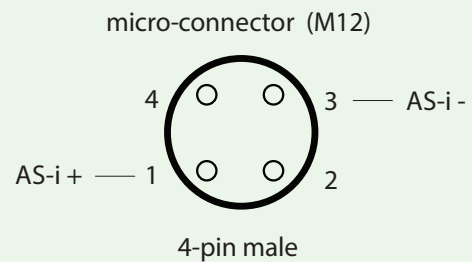
Dimensions (mm)



Network



Schematic drawing



Addressing units

Model number
PG460002A



Handheld addressing unit

The handheld addressing unit is a compact device for quickly addressing AS-Interface slave devices. The LCD display provides visual address verification. The connection to the slave devices is short circuit and overload protected.

Features

- Compact
- Durable
- Easy to use



Specifications	
Display	LCD
Keypad	5 key membrane keypad
Power supply	Battery powered (charger included)
Charger power	120 VAC
Operating temperature	0° to +50°C (+32° to +125°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Dimensions (L, W, H)	80mm, 30mm, 209mm
Ingress protection	IP20
Weight	550g (1.21 pounds)



Handheld addressing unit

Keypad

- ↑ = increment slave address
- ↓ = decrement slave address

PRG = program new address

ADR = current slave address

Display

The LCD shows address of currently connected slave or an error code.

Error codes

- F1 = short circuit or overload
- F2 = slave not connected or faulty slave
- F3 = programming error
- LOBAT = low battery

Operation

To view current slave address: press ADR.

To program new address: press ↑ or ↓ to select desired address then press PRG to assign address, then press ADR to confirm changed.

To assign address “0”: press and hold ADR and PRG simultaneously.

Input/output modules

Model number
 IO96Y03FA
 IO96W03FA (DIN)



These I/O modules are designed to function as an AS-Interface slave device with termination points for connecting switches/sensors as well as output devices, such as solenoid valves and relays.

Features

- Four (4) discrete inputs
- Four (4) power outputs
- LED input and output status displays
- AS-Interface power ok LED
- Direct mount or DIN rail mount available



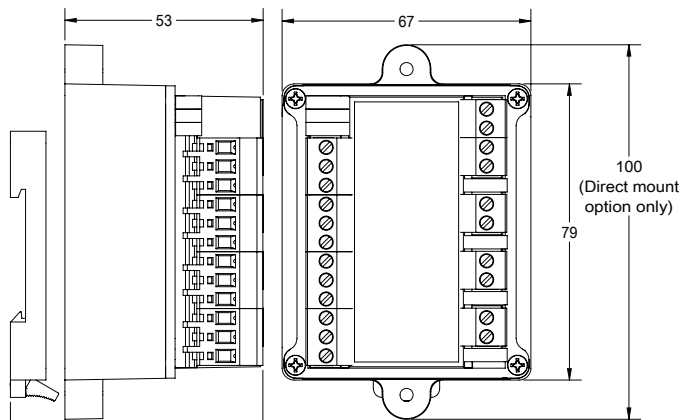
Specifications	
AS-Interface profile	ID = F, I/O = 7 (4DI, 4DO)
Discrete inputs	(4) 3 mA @ 28 VDC; gold contact mechanical, low power reed, or proximity sensor
Discrete outputs	(4) 28 VDC (4 watts total power available)
Operating voltage	AS-Interface voltage
Current consumption	< 40 mA (with no outputs energized)
Indication	(4) input state LEDs (green) (4) output state LEDs (green) (1) AS-i power OK LED (green)
Dimensions (L, W, H)	100mm, 67mm, 63mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

AS-Interface profile and data locations

Input data
 Input 0 = DIO
 Input 1 = DI1
 Input 2 = DI2
 Input 3 = DI3

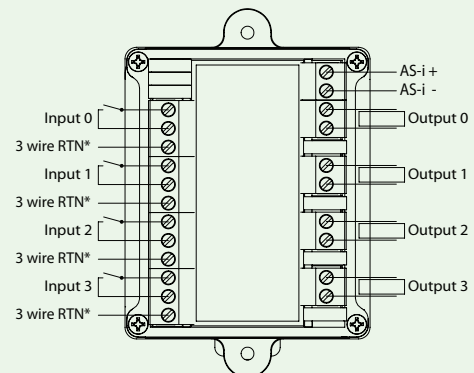
Output data
 Output 0 = DO0
 Output 1 = DO1
 Output 2 = DO2
 Output 3 = DO3

Dimensions (mm)



DIN rail clip only applies to DIN models.

Wiring diagram



*Only for use with 3 wire PNP sensors

Input/output modules

Model number
 IO97Y02FA
 IO97W02FA (DIN)



These I/O modules are designed to function as an AS-Interface slave device with termination points for connecting switches/sensors as well as output devices, such as solenoid valves and relays.

Features

- Four (4) discrete inputs
- Three (3) power outputs
- LED input and output status displays
- AS-Interface power ok LED
- Direct mount or DIN rail mount available
- Extended addressing feature (A/B addresses) 62 per network

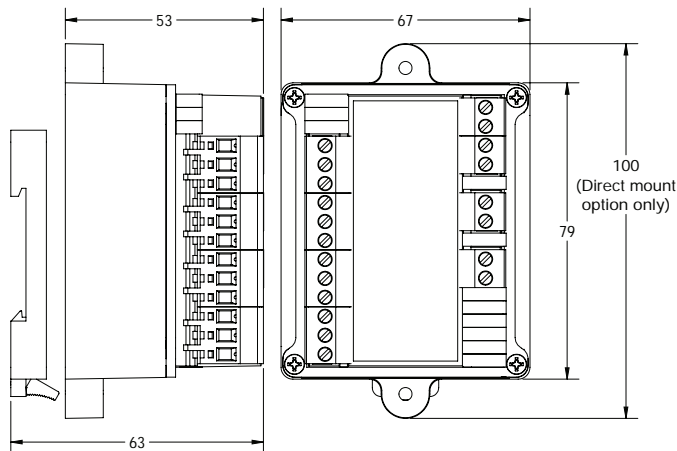


Specifications	
AS-Interface profile	ID = A, I/O = 7 (4DI, 3DO)
Discrete inputs	(4) 3 mA @ 28 VDC; gold contact mechanical, low power reed, or proximity sensor
Discrete outputs	(3) 28 VDC (4 watts total power available)
Operating voltage	AS-Interface voltage
Current consumption	< 40 mA (with no outputs energized)
Indication	(4) input state LEDs (green) (3) output state LEDs (green) (1) AS-i power ok LED (green)
Dimensions (L, W, H)	100mm, 67mm, 63mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

AS-Interface profile and data locations

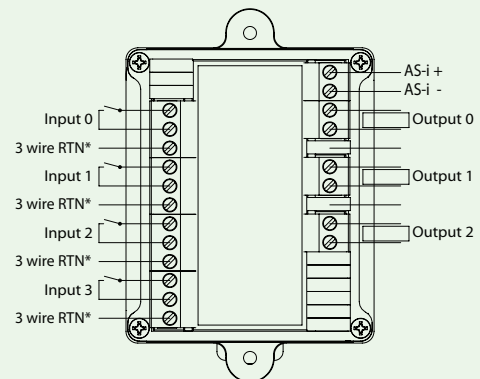
- | | |
|---------------|----------------|
| Input data | Output data |
| Input 0 = DIO | Output 0 = DO0 |
| Input 1 = DI1 | Output 1 = DO1 |
| Input 2 = DI2 | Output 2 = DO2 |
| Input 3 = DI3 | Output 3 = N/A |

Dimensions (mm)



DIN rail clip only applies to DIN models

Wiring diagram



*Only for use with 3 wire PNP sensors

Input/relay output modules

Model number

IO96Y11FA

Interlocking

IO96W11FA (DIN)

Interlocking

IO96Y08FA

Independent

IO96W08FA (DIN)

Independent



Input/output module with externally-powered relay outputs

This I/O module is designed to function as an AS-Interface node with termination points for connecting switches/sensors, as well as relay outputs to operate devices like motors and other high power devices. Available with interlocked outputs to operate AC motors, or independent outputs to operate independent AC loads.

Features

- Four (4) discrete inputs
- Two (2) relay outputs and two (2) discrete outputs
- LED input and output displays
- Direct mount or DIN rail mount available



Specifications	
AS-Interface profile	ID = F, I/O = 7 (4DI, 4DO)
Discrete inputs	(4) 3mA @ 28VDC gold contact mechanical, low power reed, or proximity sensor
Discrete outputs (relay)	(2) 120/250VAC fused @ 2A independent for other AC loads
	(2) 120/250VAC fused @ 2A interlocked for motor operation
Bus powered outputs	(2) 28VDC (4 watts total power available)
Operating voltage	AS-Interface voltage
Current consumption	<40mA (with no outputs energized)
Indication	(4) input state LEDs (green)
	(4) output state LEDs (green)
	(1) AS-i power OK LED (green)
External voltage (relay outputs)	Up to 250 VAC; 30 VDC
Dimensions (L, W, H)	100mm, 67mm, 63mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

AS-Interface profile and data locations

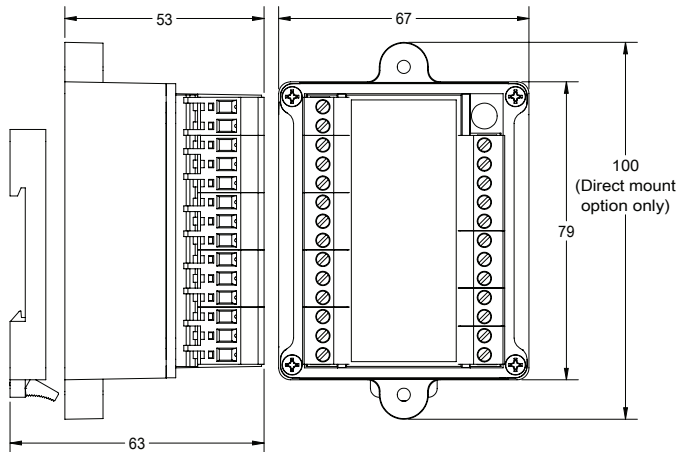
Input data

- Input 0 = DIO
- Input 1 = DI1
- Input 2 = DI2
- Input 3 = DI3

Output data

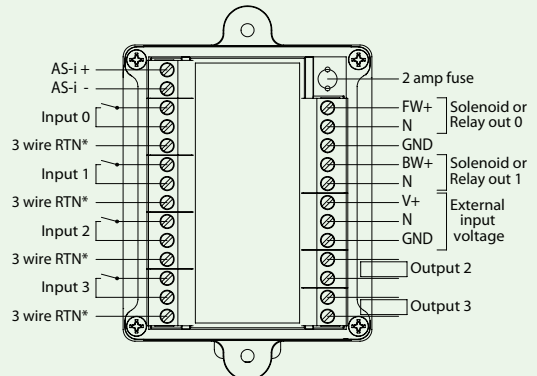
- Relay output 0 = DO0
- Relay output 1 = DO1
- Output 2 = DO2
- Output 3 = DO3

Dimensions (mm)



DIN rail clip only applies to DIN models

Wiring diagram



*Only for use with 3 wire PNP sensors

Input/relay output modules

Model number

IO97Y12FA

Interlocking

IO97W12FA (DIN)

Interlocking

IO97Y07FA

Independent

IO97W07FA (DIN)

Independent



Input/output module with externally-powered relay outputs

This I/O module is designed to function as an AS-Interface node with termination points for connecting switches/sensors, as well as relay outputs to operate devices like motors and other high power devices. Available with interlocked outputs to operate AC motors, or independent outputs to operate independent AC loads.

Features

- Four (4) discrete inputs
- Two (2) relay outputs and one (1) discrete output
- LED input and output displays
- Direct mount or DIN rail mount available
- Extended addressing feature (A/B addresses) 62 per network



Specifications	
AS-Interface profile	ID = A, I/O = 7 (4DI, 3DO)
Discrete inputs	(4) 3mA @ 28VDC gold contact mechanical, low power reed, or proximity sensor
Discrete outputs (relay)	independent (2) 120/250VAC fused @ 2A independent for other AC loads
	interlocking (2) 120/250VAC fused @ 2A interlocked for motor operation
Bus powered outputs	(1) 28VDC (4 watts total power available)
Operating voltage	AS-Interface voltage
Current consumption	<40mA (with no outputs energized)
Indication	(4) input state LEDs (green)
	(3) output state LEDs (green)
	(1) AS-i power ok LED (green)
External voltage (relay outputs)	Up to 250 VAC; 30 VDC
Dimensions (L, W, H)	100mm, 67mm, 63mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

AS-Interface profile and data locations

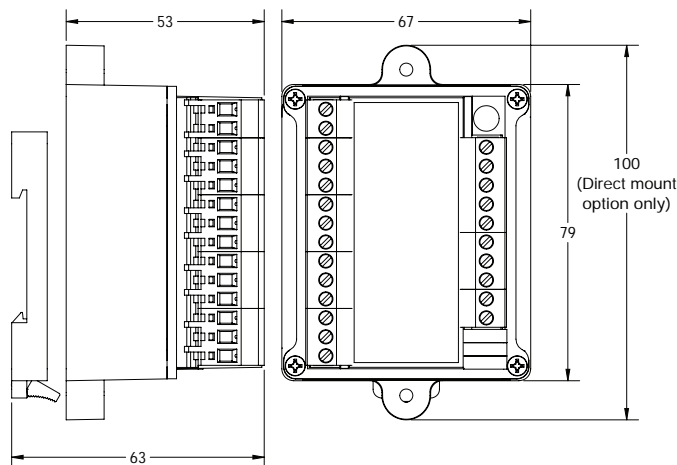
Input data

- Input 0 = DIO
- Input 1 = DI1
- Input 2 = DI2
- Input 3 = DI3

Output data

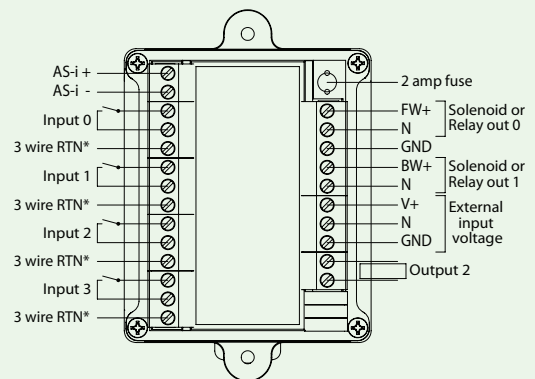
- Relay output 0 = DO0
- Relay output 1 = DO1
- Output 2 = DO2
- Output 3 = Not used

Dimensions (mm)



DIN rail clip only applies to DIN models.

Wiring diagram



*Only for use with 3 wire PNP sensors

Input/output modules

Model number
IM461124A



Analog input module (IP20)

The AS-Interface analog input module enables 4-20mA analog signals to be monitored via AS-Interface. Once described as a bus for discrete I/O only, AS-Interface has devised a method to send these signals via AS-Interface using the new device profile (7.3).

Features

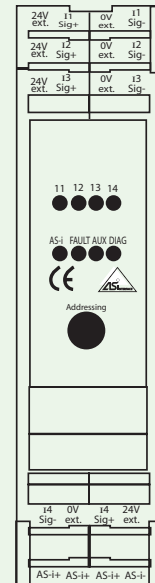
- Four (4) analog 4-20mA inputs
- 16-bit resolution
- Peripheral fault indication
- Easy commissioning via AS-Interface
- DIN rail mounting
- IP20



Specifications	
Device profile	ID=3, ID2=E, I/O = 7
Master requirement	AS-Interface 2.1 or later
Inputs	4 analog inputs (4-20mA)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Operating current	<80mA
Voltage supply, sensors	Via AS-Interface or external 24VDC
Internal resistance	50 ohms
Max current per input	40mA
Resolution	16-bit (4000 - 20000)
Displays	AS-Interface voltage (AS-i), green LED AS-Interface communication error (fault), red LED Voltage supply 24VDC (AUX), green LED Diagnostics (DIAG), yellow LED Analog signal 1 (I1), yellow LED Analog signal 2 (I2), yellow LED Analog signal 3 (I3), yellow LED Analog signal 4 (I4), yellow LED
Operating temperature	0° to +70°C (+32° to +158°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Engineered resin, DIN rail mounting
Dimensions (L, W, H)	105mm, 23mm, 114mm
Ingress protection	IP20



Schematic drawing



Programming

Parameter P0

- 0: 60hz filter in a/d converter
- 1: 50hz filter in a/d converter

Parameter P1 & P2

Indicates which AI channels to enable

P1	P2	AI1	AI2	AI3	AI4
0	0	on	off	off	off
0	1	on	on	off	off
1	0	on	on	on	off
1	1	on	on	on	on

Parameter P3

- 0: peripheral fault not enabled
- 1: peripheral fault enabled

Input/output modules

Model number
IM461122A



Analog output module (IP20)

The AS-Interface analog output module enables 0-20mA analog signals to be sent via AS-Interface. Once described as a bus for discrete I/O only, AS-Interface has devised a method to send these signals via AS-Interface using the new device profile (7.3).

Kit Contents

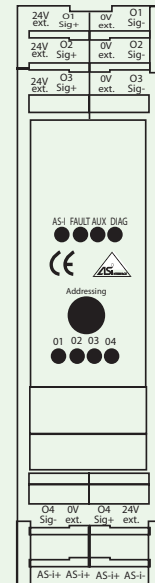
- Four (4) analog 0-20mA outputs
- 16-bit resolution
- Peripheral fault indication
- Easy commissioning via AS-Interface
- DIN rail mounting
- IP20 housing



Specifications	
Device profile	ID=3, ID2=6, I/O = 7
Master requirement	AS-Interface 2.1 or later
Outputs	4 analog outputs (0-20mA)
Operating voltage	30 VDC AS-Interface voltage (AS-Interface power supply)
Operating current	<80mA
Voltage supply, sensors	Via AS-Interface or external 24VDC
Resolution	16-bit (0 - 20000)
Displays	AS-Interface voltage (AS-i), green LED AS-Interface communication error (fault), red LED Voltage supply 24VDC (AUX), green LED Diagnostics (DIAG), yellow LED Analog signal 1 (O1), yellow LED Analog signal 2 (O2), yellow LED Analog signal 3 (O3), yellow LED Analog signal 4 (O4), yellow LED
Operating temperature	0° to +70°C (+32° to +158°F)
Storage temperature	-25° to +85°C (-13° to +185°F)
Housing	Engineered resin, DIN rail mounting
Dimensions (L, W, H)	105mm, 23mm, 114mm
Ingress protection	IP20



Schematic drawing



Programming

Parameter P0

- 0: profile 7.3 is not monitored
- 1: profile 7.3 is monitored

Parameter P1

Not used

Parameter P2

- 0: peripheral fault not enabled
- 1: peripheral fault enabled

Parameter P3

Not used

Drop connectors

Model number

DR461059A

Passive

DR465001A (DIN)

Passive

DR461017A

Protected

DR465005A (DIN)

Protected



Drop connector (passive or protected)

Drop connectors provide a reliable, safe method of connecting slave devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus.

Passive (2 drops)

- 8 amp capacity
- Direct mount or DIN rail mount available

Protected (1 drop)

- 8 amp capacity on bus trunk line
- Short circuit protection (240mA)
- LED indicates drop fault
- Automatically resets when drop fault is cleared



Passive

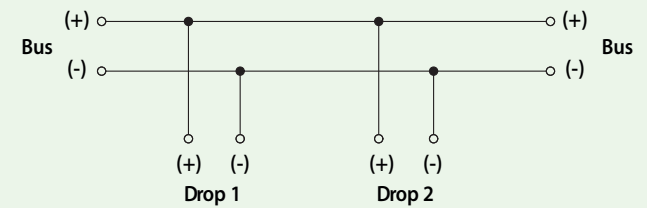


Protected

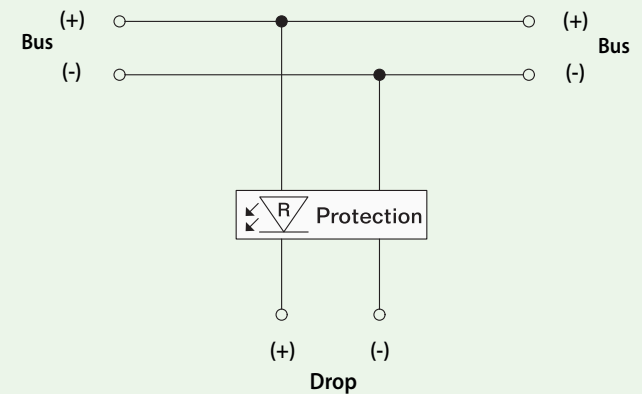
Specifications	
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Passive: negligible Protected: < 1V
Trip current (drop)	Passive: no trip current Protected: 240 mA
Holding current (after trip)	Protected: 28 mA
Reset current level	Protected: current falls below 28 mA
Maximum devices per drop	Passive: no limit Protected: 1
Current consumption	None
Dimensions (L, W, H)	Passive: 75mm, 36mm, 40mm Protected: 75mm, 26mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Schematic drawings

Passive

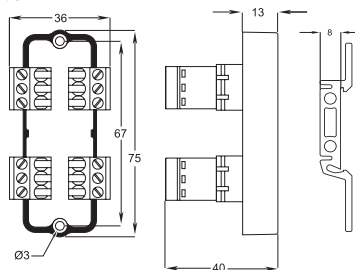


Protected



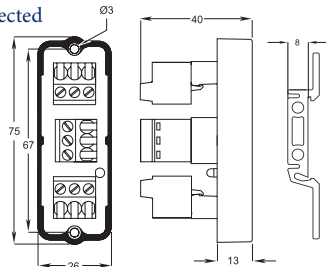
Dimensions (mm)

Passive



DIN rail clip only applies to DIN models.

Protected

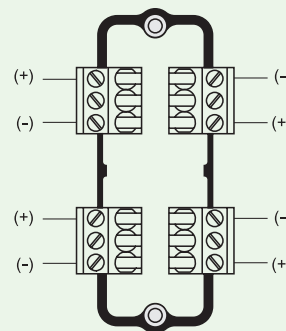


DIN rail clip only applies to DIN models.

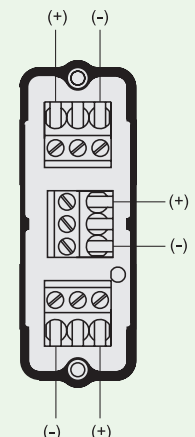


Wiring diagrams

Passive



Protected



Drop connectors

Model number

- DR461066A
- DR465007A (DIN)
- DR461146A
- DR465033A (DIN)



Protected drop switch (1 drop)

Designed for AS-Interface networks, this switched drop connector offers a very convenient method to remove, replace, or repair a device while the balance of the network remains on-line. It allows the user to disconnect a drop segment from the rest of the bus by flipping a switch.

Features

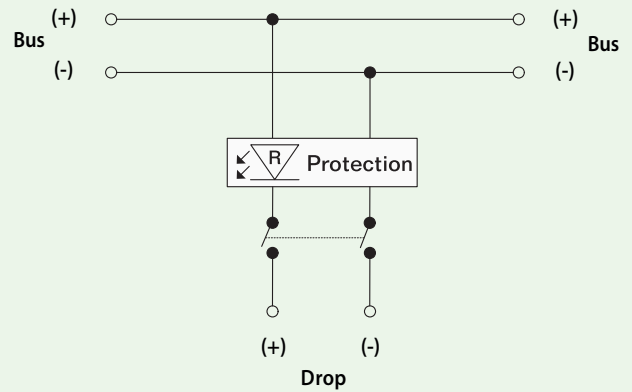
- Disconnects segment
- Compact modular design
- Short circuit protection
- Direct mount and DIN rail mount available
- LED indicates drop fault



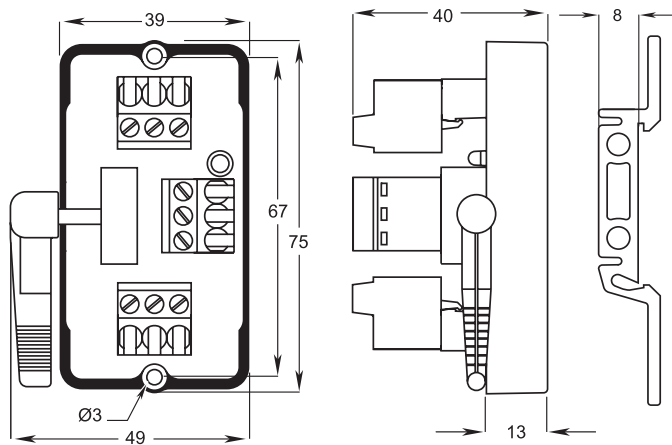
Specifications	
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	< 1V
Trip current (drop)	240 mA (DR461066A, DR465007A) 100 mA (DR461146A, DR465033A)
Holding current (after trip)	28 mA
Reset current level	Current falls below 28 mA
Maximum devices per drop	1
Current consumption	None
Dimensions (L, W, H)	75mm, 49mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)



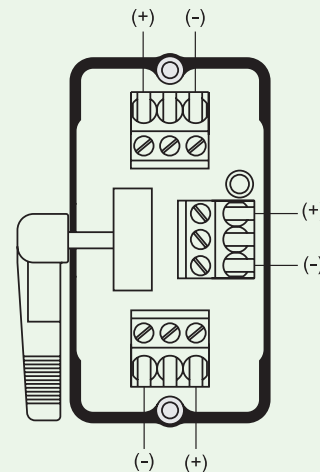
Schematic drawing



Dimensions (mm)



Wiring diagram



Drop connectors (DIN)

Model number

DR465036A

Passive

DR465040A

Protected



Multi-drop connector (6 drops)

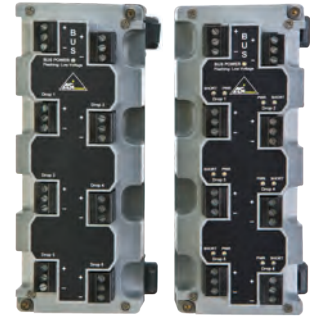
Drop connectors provide a reliable, safe method of connecting field devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

Passive

- 8 amp capacity
- LED indicates bus power

Protected

- Short circuit protection
- LEDs indicate drop fault, bus power, and drop power
- Automatically resets when drop fault is cleared



Passive

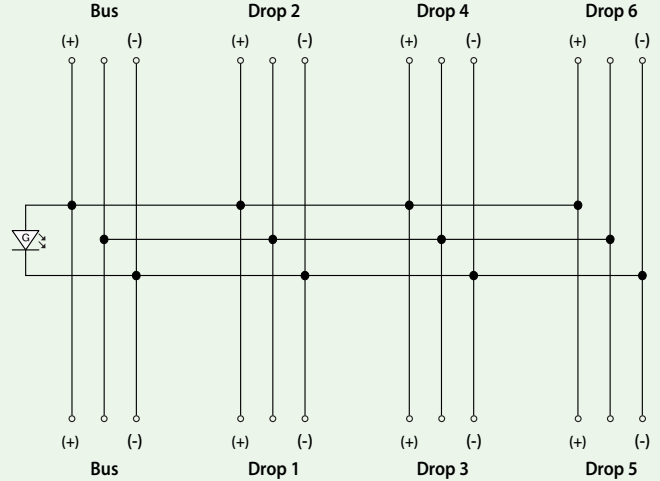
Protected

Specifications

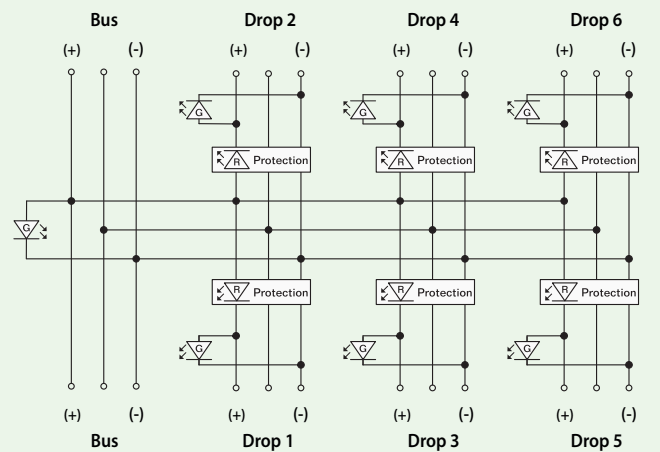
LED displays	Bus power on - green LED Drop power on - green LED (protected) Drop short circuit - red LED (protected)
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Passive: negligible Protected: 1 volt maximum
Trip current (drop)	Passive: no trip current Protected: 240mA
Holding current (after trip)	Passive: n/a Protected: 28mA
Reset current level	Current falls below 28mA
Current consumption	20mA for all nodes
Dimensions (L, W, H)	165mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Schematic drawings

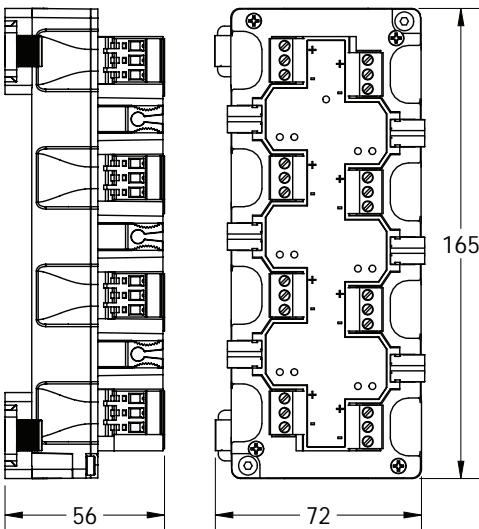
Passive



Protected



Dimensions (mm)



Drop connectors (DIN)

Model number

DR465044A

Switch protected



Multi-drop connector (6 drops)

Drop connectors provide a reliable, safe method of connecting field devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

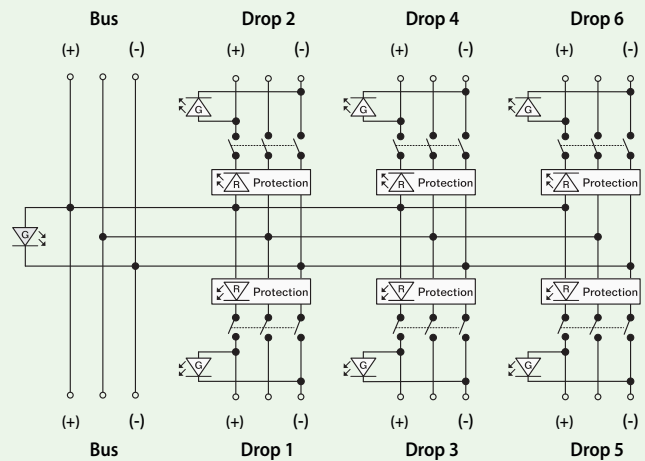
Switched protected

- Disconnects each drop
- LEDs indicate drop fault, bus power, and drop power status
- Short circuit protection
- Automatically resets when drop fault is cleared

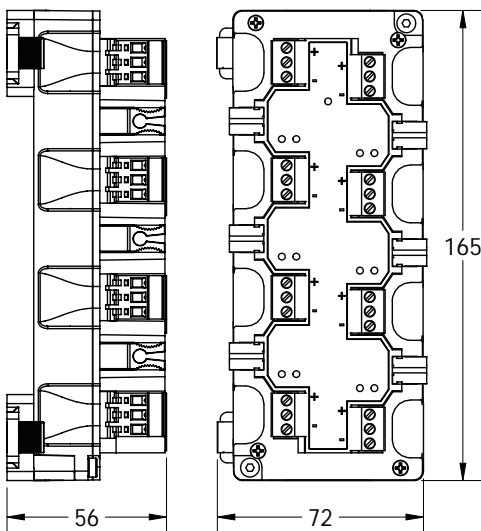


Specifications	
LED displays	Bus power on - green LED Drop power on - green LED Drop short circuit - red LED
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	1 volt maximum
Trip current (drop)	240mA
Holding current (after trip)	28mA
Reset current level	Current falls below 28mA
Current consumption	20mA for all nodes
Dimensions (L, W, H)	165mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Schematic drawing



Dimensions (mm)



Commissioning kits and software

Model number
CK464001A



AS-Interface commissioning kit

This AS-Interface commissioning kit contains all the hardware and software needed to fully configure and test AS-Interface devices. This kit can be used to bench test single AS-Interface devices or commission entire segments. This kit is a must for shop testing and for stroke testing AS-Interface devices.

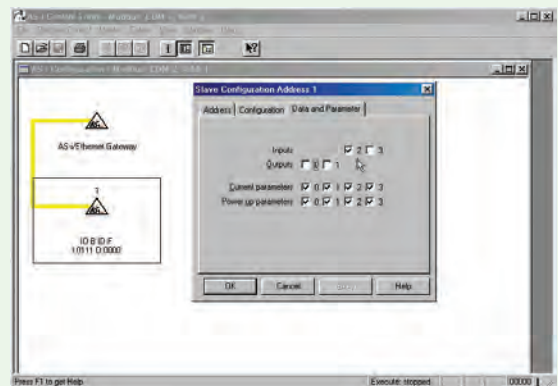
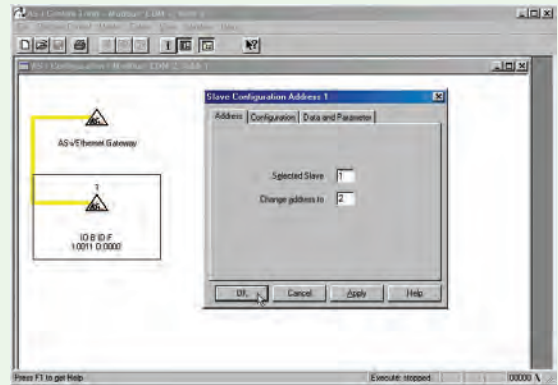
Kit contents

- Modbus RS485 gateway
- 2.8 amp AS-Interface power supply
- AS-Interface control tools software
- Serial cable
- USB to Serial converter



Specifications	
Gateway	GW458086A Modbus RS485/ AS-Interface gateway
Power supply	PS459015A AS-Interface 2.8 amp
Cable description	6' 9-pin male x 9-pin female serial cable, USB to Serial converter included
Software	AS-Interface control tools
Operating temperature	-25° to +55°C (-13° to +131°F)

Commissioning kit



Commissioning kits and software

Model number
AC464010A



AS-Interface analyzer

This AS-Interface analyzer tool allows for diagnostics and network verification tests. This device can be used to help diagnose network problems and verify network integrity. Works with a windows PC.

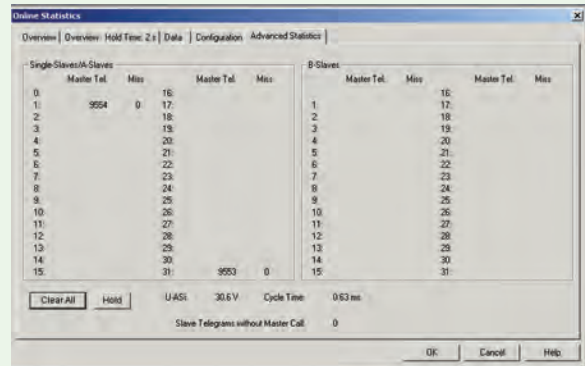
Functions

- Statistics mode: statistical analysis of all telegrams sent on the network.
- Data mode: provides I/O values for each slave.
- Trace mode: this mode records all network traffic for analysis with a PC.

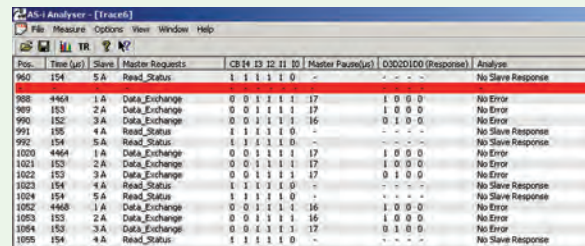


Specifications	
Interface	RS232 interface with cable, USB to Serial converter included
Operating systems	Windows 98, Me, 2000, XP, NT4, Vista (32 bit), Windows 7, 8, 10 (32 or 64 bit)
Type	Passive AS-i member
Memory	256,000 telegrams
Operating current	70ma out of AS-i
Indication LED's	Power on RS232 active Test mode
Power supply	30 VDC from AS-i
Software	AS-i analyzer
Operating temperature	0° to +55°C (32° to +131°F)

Statistics mode



Trace mode



Commissioning kits and software

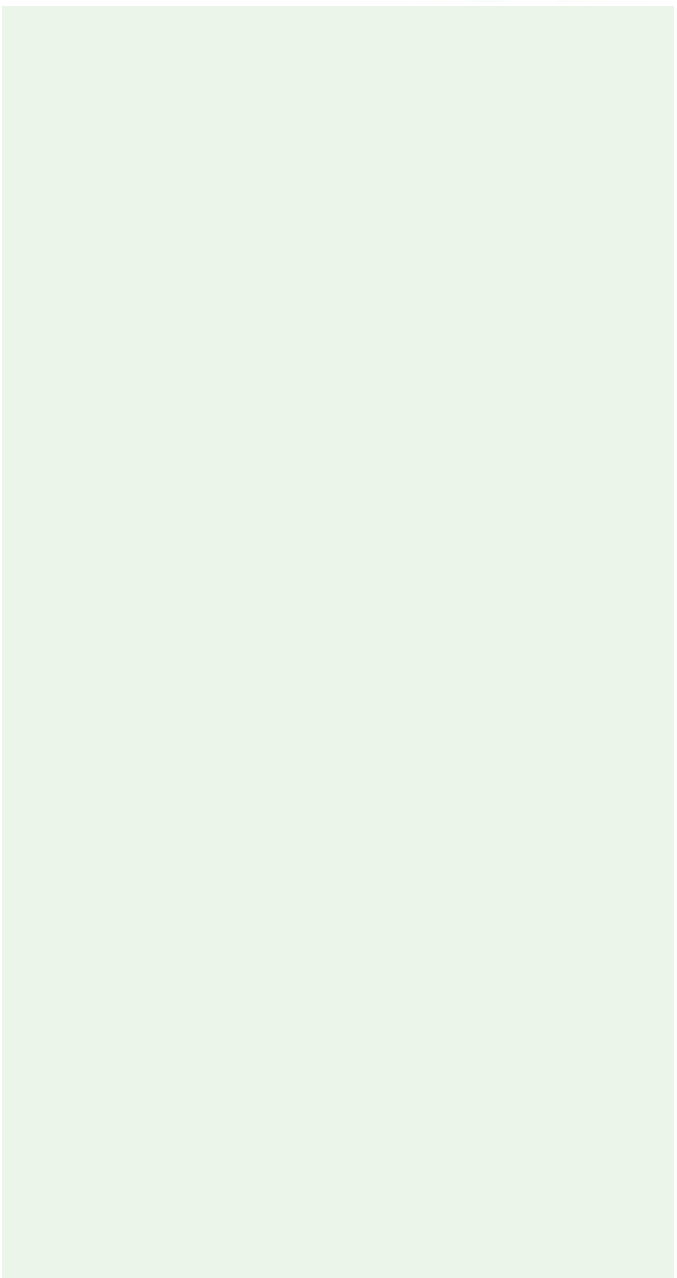
Model number
SW462004A



AS-Interface control tools software
SW462004A AS-i control tools with advanced diagnostics.



Specifications	
Operating systems	Windows 98, Me, 2000, XP, NT4, Vista (32 bit), Windows 7, 8, 10 (32 or 64 bit)
Compatible with	Profibus Modbus DeviceNet Ethernet TCP/IP
Functions	Graphical or text view of AS-i Network Set device addresses Read inputs Write outputs Write parameters
Diagnostics functions	Show slaves that have caused configuration errors Show error counters for all devices



Commissioning kits and software

Model number
SW462008A



AS-Interface control tools software with cable for stainless steel gateways

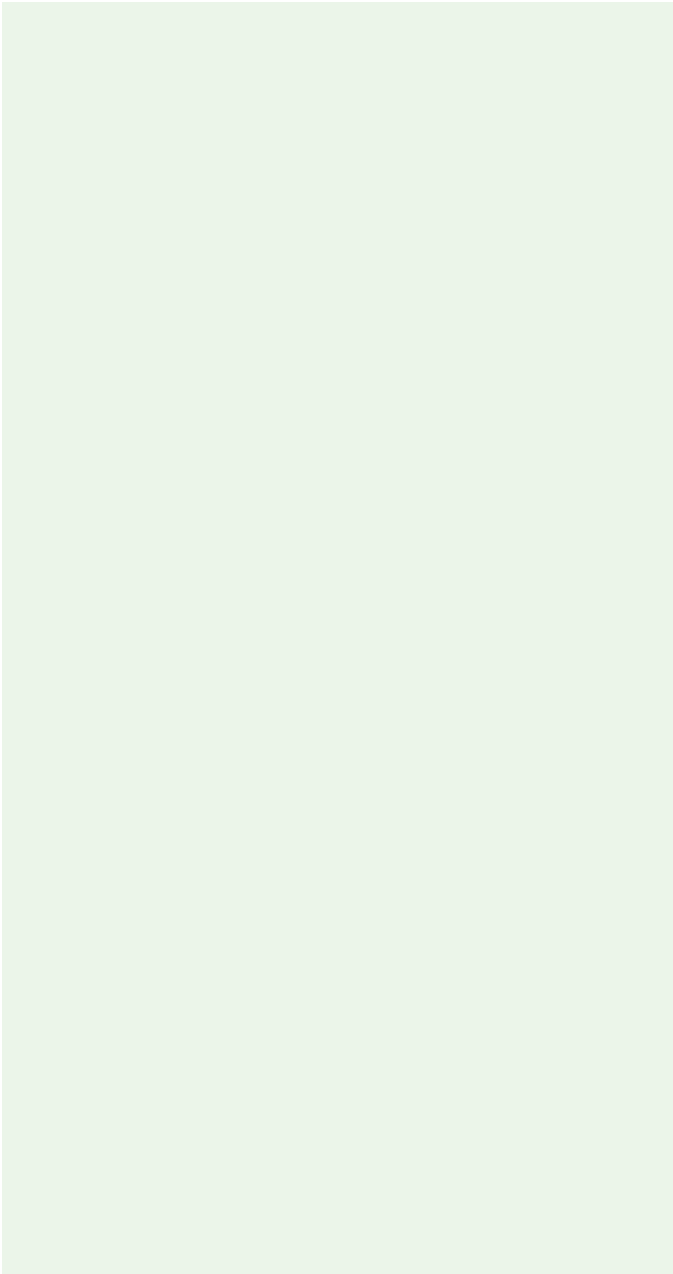
Software and cable for configuration and testing AS-Interface networks.

Kit contents

- Software CD
- Serial connection cable for our stainless steel gateways



Specifications	
Operating systems	Windows 98, Me, 2000, XP, NT4, Vista (32 bit), Windows 7, 8, 10 (32 or 64 bit)
Compatible with Stonel Gateways	Profibus Modbus DeviceNet Ethernet TCP/IP
Functions	Graphical or text view of AS-i Network Set device addresses Read inputs Write outputs Write parameters
Diagnostics Functions	Show slaves that have caused configuration errors Show error counters for all devices
Cable	Serial cable for connection to our stainless steel gateways with commissioning port (see gateways for details)



Commissioning kits and software

Model number
SW462006A

AS-Interface control tools software with cable for AB masters

Software and cable for configuration and testing AS-Interface networks.

Kit contents

- Software CD
- Serial connection cable for AB masters



Specifications

Operating systems	Windows 98, Me, 2000, XP, NT4, Vista (32 bit), Windows 7, 8, 10 (32 or 64 bit)
Compatible with Stonel AB masters	Control Logix Compact Logix/MicroLogix
Functions	Graphical or text view of AS-i Network Set device addresses Read inputs Write outputs Write parameters
Diagnostics functions	Show slaves that have caused configuration errors Show error counters for all devices
Cable	Serial cable for connection to Stonel AB masters (GW458076A, GW458074A, GW458100A)

Commissioning kits and software

Model number
AC462014A



AS-i handbook

This bound, hardcover book is a very complete source of information about the AS-Interface protocol. It begins by discussing the historical development of the protocol and the needs of typical users of this type of technology. At the heart of the book is a thorough discussion about the technical details of the AS-Interface communication protocol, including topology, physical layer, message structure, and more. The book also includes several practical examples and installation tips.

Device developers, network designers, and users will find this book to be the premier source of information about AS-Interface.



Specifications	
Title	AS-Interface, The Automation Solution A compilation of technology, functionality and applications
Authors	Rolf Becker Dr. Bernhard Muller Dr. Arndreas Schiff Tilman Schinke Heinz Walker
Published by	AS-International Association Rolf Becker (CEO)
# of pages	196

Chapter list

- Milestones
- User criteria
- AS-Interface technology
- Safety at work
- Applications
- The AS-interface product solutions
- Installation tips
- References
- Index

Cable and wiring

Model number
CB463002A

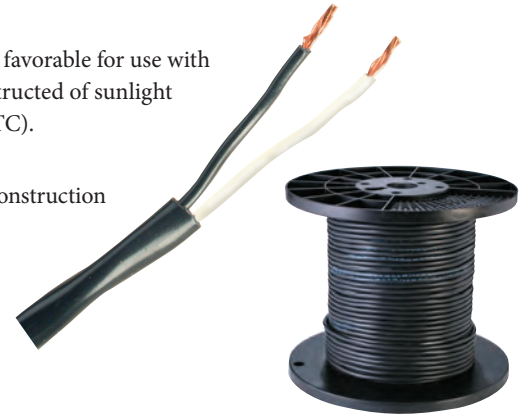


AS-Interface bus cable

This cable is selected for its rugged design and specifications favorable for use with the AS-Interface communication protocol. The cable is constructed of sunlight resistant PVC and is UL type Power Limited Tray Cable (PLTC).

Kit contents

- Two (2) conductor cable for AS-Interface networks
- Rugged PVC construction
- UL type PLTC



Specifications	
Conductors	2 (stranded copper)
Length	100m (328')
Wire gauge	16 AWG
Max voltage	300 V RMS
DC resistance	0.012 ohms/m (@ 20°C)
Nominal capacitance	65.6 pf/m (@ 1khz)
Nominal inductance	0.59 µH/m
Jacket material	sunlight resistant PVC
Max pulling tension	71.4 lbs
Cable diameter	6mm
Applicable specifications	UL type PLTC, ITC, CMG, CL2, CL3 C(UL) CMG, FT4
Weight	6.4 kg (14 lbs)

Cable and wiring

Model number

- CCAS1EA-2M**
- CCAS1EA-4M**
- CCAS1EA-6M**



AS-Interface cordsets

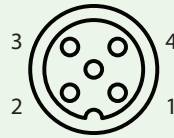
These single ended female cordsets allow for quick connection using a convenient micro (M12) connector.

- CCAS1EA-2M single ended female cordset (2 meters)
- CCAS1EA-4M single ended female cordset (4 meters)
- CCAS1EA-6M single ended female cordset (6 meters)



Specifications	
Conductors	2x 18AWG
Insulation material	PVC
Insulation color	Black
Coupling nut	Stainless steel
Rated voltage	250V
Rated current	4.0A
Contact material/plating	Brass/gold
Operating temperature	-40° to +105°C (-40° to +221°F)
Ratings	Meets NEMA 1, 3, 4, 6P and IEC IP68

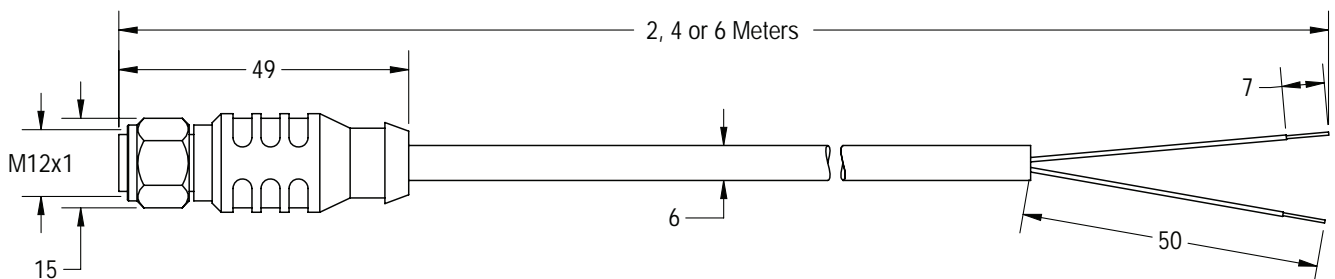
Pinout drawing



Pins

- 1 AS-i + (brown)
- 2 N/C
- 3 AS-i - (blue)
- 4 N/C

Dimensions (mm)



DeviceNet

Contents

DeviceNet description <i>Overview and economic analysis of DeviceNet network</i>	58-59
Power supplies	60-61
Input/output modules	62-63
Drop connectors	64-68
Commissioning kits and software	69
Cable and wiring	70
Terminator	71

DeviceNet[™]

www.odva.org

DeviceNet™

Overview and analysis

The DeviceNet protocol dramatically reduces costs by integrating up to 62 devices on a 4-wire trunk network. Communications data is carried over two wires with a second pair of wires carrying power. Discrete and analog devices may be connected into the DeviceNet protocol.

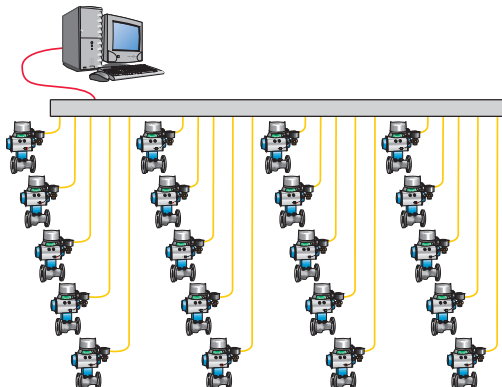
DeviceNet is based on CAN (Controller Area Network) technology originally developed by Bosch to replace expensive wire harnesses with low cost network cable in automotive applications. The fast response and high reliability of the CAN system makes it ideal for “mission critical” applications.

DeviceNet has high noise immunity, and the communication electronics are available with wide temperature ranges, making the protocol desirable for industrial and process automation. Systems may be installed in hazardous environments by using acceptable explosionproof wiring or power limited wiring practices with nonincendive or explosionproof enclosures. Plug-in connectors are readily available for heavy washdown, general purpose environments.

DeviceNet system features

- More than 30% savings in installation costs over conventional systems.
- Capability to handle both analog and discrete valve and instrument applications.
- Power and communication supplied over the 4-wire bus. Capability to install up to 62 devices on the same bus network.
- Electronic Data Sheet provides accurate device configuration details.
- Hot insertion of field devices without dropping power. (General purpose environments.)
- Message prioritizing to enable fast throughput rate for critical information.
- Technology with proven reliability in millions of mission critical applications.

Figure 1
Conventional system



DeviceNet vs conventional systems

The DeviceNet protocol uses a trunk wiring network that may directly connect to field devices containing analog as well as discrete information. PLCs and/or PCs may also be attached directly to the trunk network.

Conventional systems

Conventional systems have racks of inputs and outputs (I/O) located in distributed panels or in a centrally located control room. See figure 1. Discrete automated control valves typically have individual output control and feedback wiring from the I/O. When installing instruments and controls in a conventional system, substantial costs may be incurred for:

1. Design layout time for I/O cabinetry and conduit runs.
2. Space allocation for cabinets and conduit.
3. Conduit, wiring and fittings cost and installation time.
4. System commissioning and trouble-shooting time.

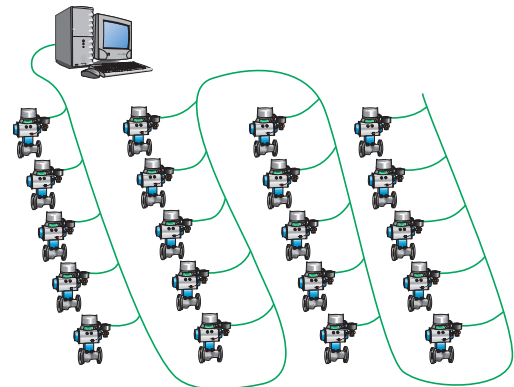
DeviceNet systems

In a DeviceNet system, up to 62 valve communication terminals, process instruments and PLC/PCs may be connected via drops or branches on a trunk network. See figure 2. Power and signal are carried over the 4-wire network. Each device has its own address and it may have several I/O points. Any discrete or analog instruments may be connected into the network provided it is DeviceNet compatible. Passive field devices may also connect into the network via Stonel DeviceNet VCTs and I/O modules, which have provisions for auxiliary inputs and outputs.

DeviceNet economic analysis

Sizable installation savings are realized over conventional systems when installing a DeviceNet network. The following is an estimate of installation costs of a conventional system versus DeviceNet (costs are listed in the amount per device):

Figure 2
DeviceNet system



Installation cost comparison		
	Conventional	DeviceNet
Valve monitor; VCT and solenoid	\$510	\$720
Conduit and wiring (\$8/ft)	\$1,200	\$160
I/O cards; DeviceNet scanner	\$30	\$100
Power supply	\$20	\$30
Total installed cost	\$1,760	\$1,010
Total installation savings \$750 per device		

This analysis is typical of an installation of 20 automated valve systems located in a cluster approximately 150 feet from the I/O rack. Each of the automated valves is located 20 feet apart in the cluster.

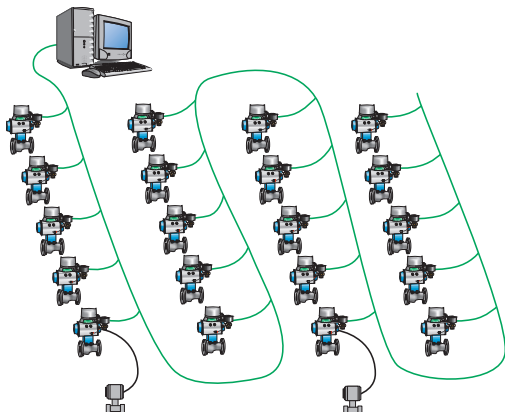
The Stonel DeviceNet I/O module and VCT have an auxiliary 4 to 20mA input that is bus powered. (No additional power is needed.) Other analog instrumentation such as flow meters, level controls, pressure sensors, etc. may be wired directly into the module, cutting installation costs further.

DeviceNet analog point addition to Stonel VCTs or I/O modules

When adding an analog device to an existing Stonel DeviceNet VCT, a convenient connection may be made to the nearest device. In the example in figure 3, the level control was 20 feet from the Stonel DeviceNet VCT and 150 feet from the central controller.

Analog installation cost comparison		
	Conventional	DeviceNet
Conduit and wiring (\$8/ft)	\$1,200	\$160
Analog input point	\$30	\$ —
Total installed cost	\$1,230	\$160
Total installation savings \$1,070 per added analog device		

Figure 3
DeviceNet analog point addition



As mentioned earlier, there are several other considerations that have not been quantified as follows:

- Design time may be cut in half.
- Conduit and cabinetry space may be cut by two-thirds.
- Right first-time wiring may become the norm and trouble-shooting time dramatically reduced during commissioning.
- Stonel DeviceNet modules have onboard diagnostics to help maintain equipment.

DeviceNet network specifications				
Topology	Trunk line with drops and/or branches			
Cabling	Two (2) separate shielded twisted pairs contained in one (1) shielded cable; may be thick trunk, thin trunk or flat cable.			
Base technology	CAN (Controller Area Network)			
Number of devices	62 per network			
Data delivery	8 bytes of data for I/O; more if device supports fragmentation			
Power	8 amps @ 24 VDC (thick cable) 4 amps @ 24 VDC (thin cable)			
Cable length (thick)	Dependent on data rate and cable type (see table below)			
		Drop length		
	<u>Data rate</u>	<u>Trunk length</u>	<u>Maximum</u>	<u>Cumulative</u>
	125 Kbaud	500 m (1,640 ft)	6 m (20 ft)	156 m (512 ft)
	250 Kbaud	250 m (820 ft)	6 m (20 ft)	78 m (78 ft)
	500 Kbaud	100 m (328 ft)	6 m (20 ft)	39 m (129 ft)
Cable length (thin)	100 m (328 ft)			
Communication methods	<ul style="list-style-type: none"> • Master/slave polling • Cyclic polling • Change of state • Strobed I/O • Explicit messaging 			
Data signal	Square wave digital with non return to zero encoding.			
Error detection	Automatic retransmission of corrupted messages and autonomous switching off of defective nodes.			
Address setting	On-line via DeviceNet configuration software and PC interface module; off-line with dip switches.			
Support organization	Open DeviceNet vendor Assn. www.odva.org .			

Power supplies

Model number
PS459038A

8.0 amp power supply

This power supply is designed to provide power to the DeviceNet network and attached devices. This power supply meets all ODVA specifications for use with thick or thin cable.

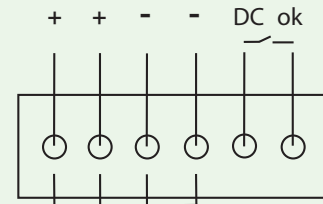
Features

- NEC Class 1 and UL Class I, Division 2 approved
- Spring clamp terminals
- DC output ok (dry contact)



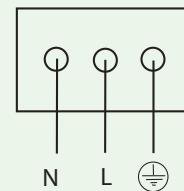
Specifications	
Output voltage	24.1 VDC ±0.2%
Output current	8.0 amps
Output ripple	50mVpp (max)
Input voltage	Universal 100 - 240VAC (50-60Hz)
Input current	2.3A - 1.0A (100VAC / 240VAC)
Power factor	0.99 / 0.92 (100VAC / 240VAC)
Efficiency	92.3% / 92.7% (100VAC / 240VAC)
Over voltage protection	29.5 VDC (max)
Over current protection	9.5 amp (max)
Turn-on time	85ms
Turn-on delay	600ms
Holdup time	32ms
NEC power class	NEC Class 1
Area approvals	Class I, Division 2; T4; groups A,B,C,D
Displays	Power OK, green LED Overload, red LED
Operating temperature	-25°C to +70°C (+14°F to +140°F)
Storage temperature	-40°C to +85°C (-40°F to +185°F)
Housing	Al/Mg alloy DIN rail mounting
Dimensions (L, W, H)	124mm, 60mm, 117mm
Ingress protection	IP20, field enclosure required
Approvals	UL508, UL1950, cULus, CE
Weight	900g (2.0 pounds)

Schematic drawing



output voltage
24 VDC

input line voltage



Power supplies

Model number
PS459036A

3.8 amp power supply

This DeviceNet power supply is designed to provide power to the DeviceNet network and attached devices. This power supply meets all ODVA specifications for use with thick or thin cable. This supply carries the class 2 limited power source rating necessary for installations to meet National Electric Code (NEC) or Canadian Electric Code (CEC) without the need for secondary fusing.

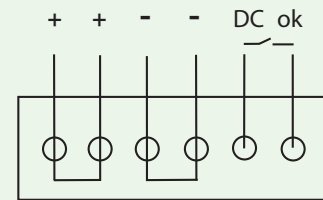
Features

- NEC class 2 and UL class I, Division 2 approved
- Spring clamp terminals
- DC output ok (dry contact)



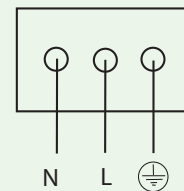
Specifications	
Output voltage	24.1 VDC ±0.2%
Output current	3.8 amps
Output ripple	50mVpp (max)
Input voltage	Universal 100 - 240VAC (50-60Hz)
Input current	1.1A / 0.5A (100VAC / 240VAC)
Power factor	0.99 / 0.91 (100VAC / 240VAC)
Efficiency	91.9% / 92.4% (100VAC / 240VAC)
Over voltage protection	29 VDC (max)
Over current protection	4.15 amp (max)
Turn-on time	100ms
Turn-on delay	200ms
Holdup time	44ms
NEC power class	NEC class 2
Area approvals	Class I, Division 2; T4; groups A,B,C,D
Displays	Power OK, green LED Overload, red LED
Operating temperature	-25°C to +70°C (+14°F to +140° F)
Storage temperature	-40°C to +85°C (-40°F to +185° F)
Housing	Al/Mg alloy DIN rail mounting
Dimensions (L, W, H)	124mm, 40mm, 117mm
Ingress protection	IP20, field enclosure required
Approvals	UL508, UL1950, cULus, CE, Class 2
Weight	620g (1.4 pounds)

Schematic drawing



output voltage
24 VDC

input line voltage



Input/output modules

Model number

IM461007A

IM465012A (DIN)

This I/O module is designed to function as a DeviceNet node (group 2 slave) with termination points for connecting switches/sensors as well as output devices such as solenoid valves and relays. Outputs can be configured to fail on or off.

Inputs and outputs

- Two (2) discrete inputs
- Two (2) discrete outputs
- One (1) analog (4 to 20 mA) input

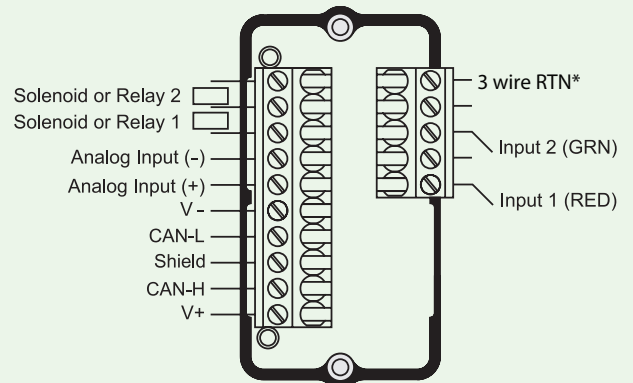
Other data

- Pre-determined output fail state



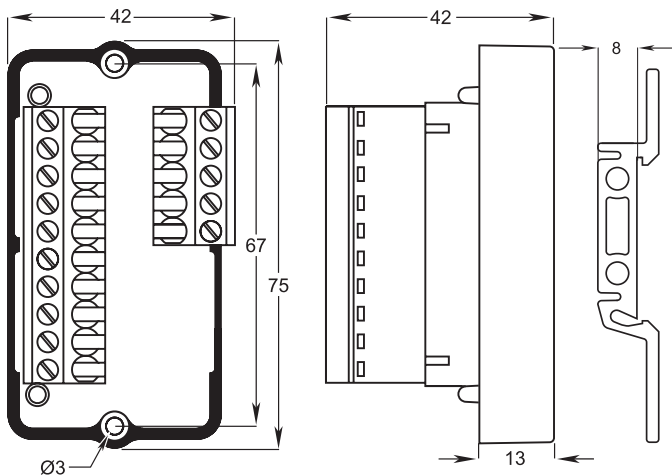
Specifications	
Discrete inputs	(2) 7 mA @ 24 VDC gold contact mechanical, low power reed, or proximity sensor
Discrete outputs	(2) 24 VDC (4 watts total power available)
Analog input	(1) Analog (4-20 mA) input 10-bit resolution (0.1%)
Operating voltage	24 VDC via DeviceNet voltage
Current consumption	< 60 mA (with no outputs energized)
Indication	(2) LEDs indicate discrete input status (red/green)
Data rate	125, 250, 500 Kb/s
Dimensions (L, W, H)	75mm, 42mm, 42mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Wiring diagram



**Only for use with 3 wire PNP sensors*

Dimensions (mm)



DIN rail clip only applies to DIN models.

DeviceNet features

Device type	Generic
Explicit peer-to-peer messaging	N
I/O peer-to-peer messaging	N
Configuration consistency value	N
Faulted node recovery	N
Baud rates	125K, 250K, 500K
Master/scanner	N

I/O slave messaging

Device type	Generic
Bit strobe	N
Polling	Y
Cyclic	Y
Change of state	Y

Input/relay output modules

Model number

IM461083A

Interlocking

IM465018A (DIN)

Interlocking

IM461084A

Independent

IM465019A (DIN)

Independent



This I/O module is designed to function as a DeviceNet node with termination points for connecting switches/sensors, as well as relay outputs, to operate devices like motors and other high power devices. Outputs can be interlocked to operate AC motors or independent to operate independent AC loads. Outputs can be configured to fail on or off.

Inputs and outputs

- Two (2) discrete inputs
- Two (2) discrete (relay) outputs
- One (1) analog input state

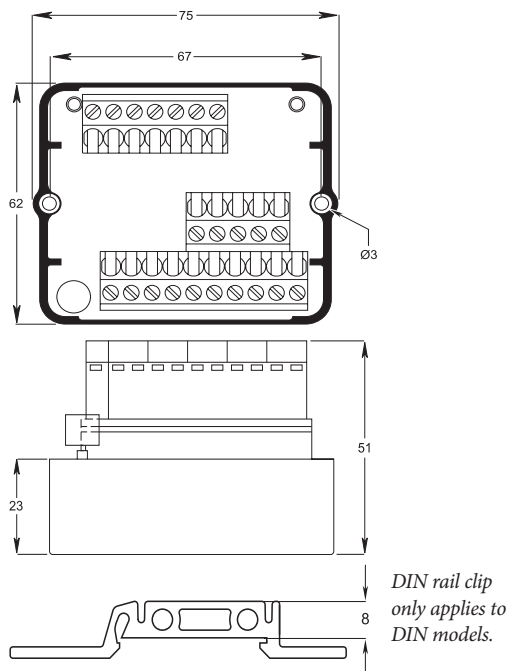
Other data

- Pre-determined output fail state

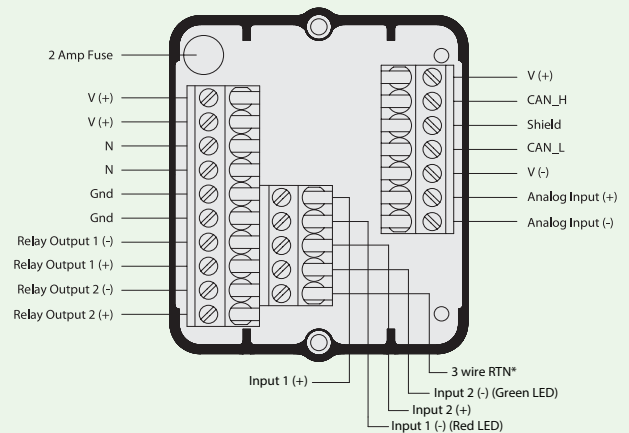


Specifications	
Discrete inputs	(2) 7 mA @ 24 VDC gold contact mechanical, low power reed, or proximity sensor
Discrete outputs (relay)	independent (2) 120/250 VAC @ 2A independent for other AC loads
	interlocking (2) 120/250 VAC @ 2A interlocked for motor operation
Analog input	(1) analog (4-20 mA) input 10-bit resolution (0.1%)
Operating voltage	24 VDC via DeviceNet voltage
Current consumption	< 60 mA (with no outputs energized)
Indication	(2) LEDs indicate discrete input status (red/green)
External voltage (relay outputs)	Up to 250 VAC; 30 VDC
Dimensions (L, W, H)	75mm, 62mm, 51mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Dimensions (mm)



Wiring diagram



**Only for use with 3 wire PNP sensors*

DeviceNet features

Device type	Generic
Explicit peer-to-peer messaging	N
I/O peer-to-peer messaging	N
Configuration consistency value	N
Faulted node recovery	N
Baud rates	125K, 250K, 500K
Master/scanner	N

I/O slave messaging

Device type	Generic
Bit strobe	N
Polling	Y
Cyclic	Y
Change of state	Y

Drop connectors

Model number
DR461053A
DR465002A (DIN)

Passive multi-drop connector (2 drops)

This multi-drop connector is compact with direct-mount for wiring DeviceNet networks. This device provides terminations for bus in, bus out, and two (2) individual drops or spurs.

Features

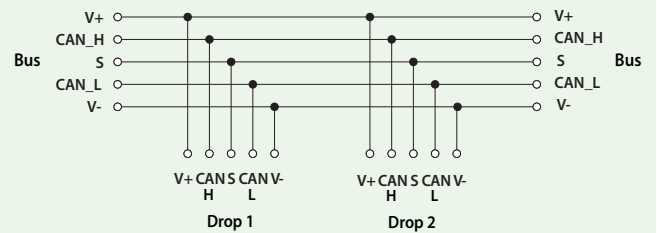
- IP20 housing
- Direct mount or DIN rail mount available



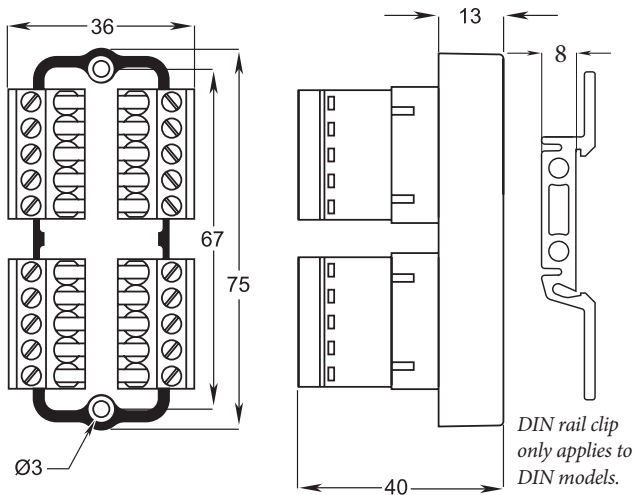
Specifications	
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Negligible
Trip current (drop)	No trip current
Maximum devices per drop	No limit
Current consumption	None
Dimensions (L, W, H)	75mm, 36mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)



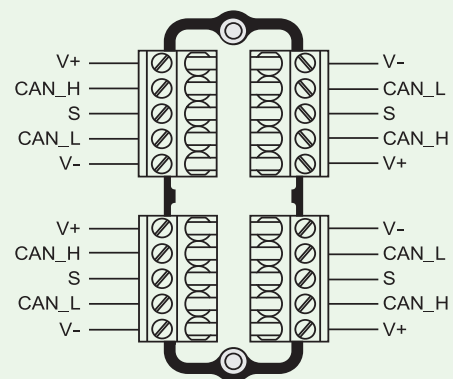
Schematic drawing



Dimensions (mm)



Wiring diagram



Drop connectors

Model number
DR461117A
DR465009A (DIN)

Power protected drop switch (1 drop)

This disconnect switch is a compact drop connector for wiring DeviceNet networks. It has a disconnect switch that allows the user to disconnect a drop from the trunk. This device also provides current limiting on the power leg to prevent power losses.

Features

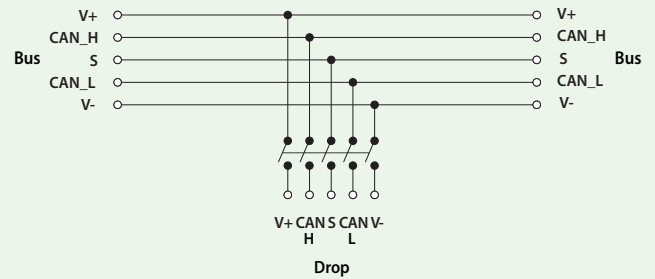
- Current limit on power drop
- Disconnects bus segment
- Direct mount or DIN rail mount available



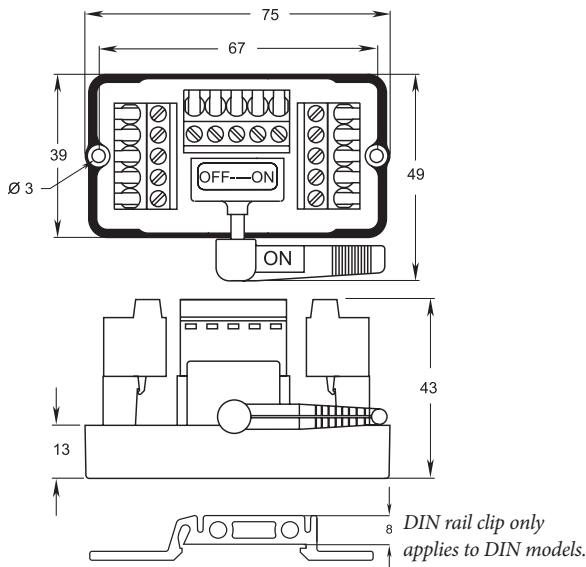
Specifications	
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	< 1V
Trip current (drop)	200 mA
Holding current (after trip)	28 mA
Reset current level	Current falls below 28 mA
Maximum devices per drop	1
Current consumption	None
Dimensions (L, W, H)	75mm, 49mm, 43mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)



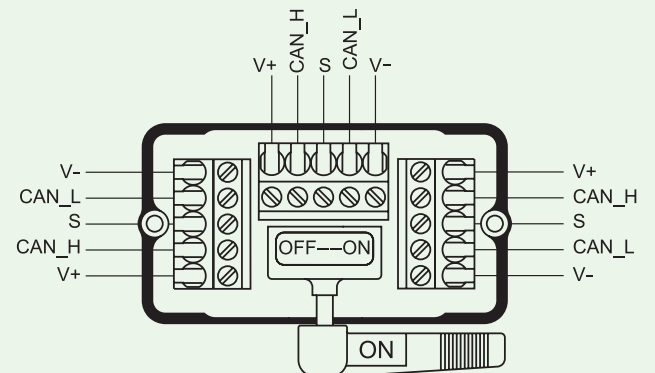
Schematic drawing



Dimensions (mm)



Wiring diagram



Drop connectors (DIN)

Model number
DR461077A

Passive multi-drop connector (4 drops)

Drop connectors provide a reliable, safe method of connecting slave devices to the bus cable. DIN rail mounting is standard.

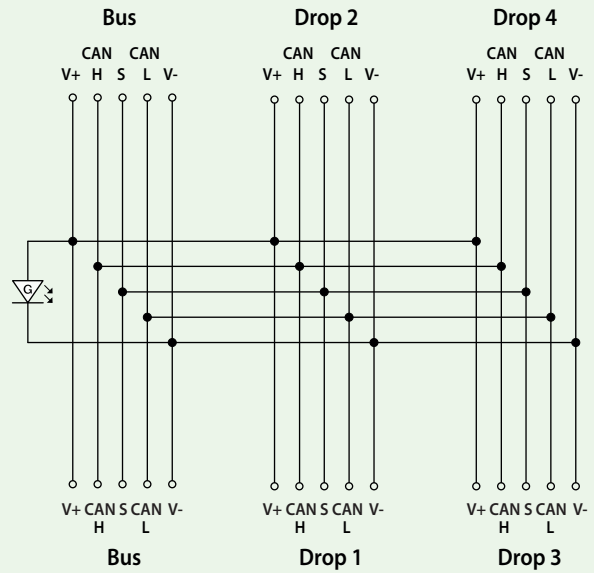
Features

- 8 amp capacity
- LED indicates bus power

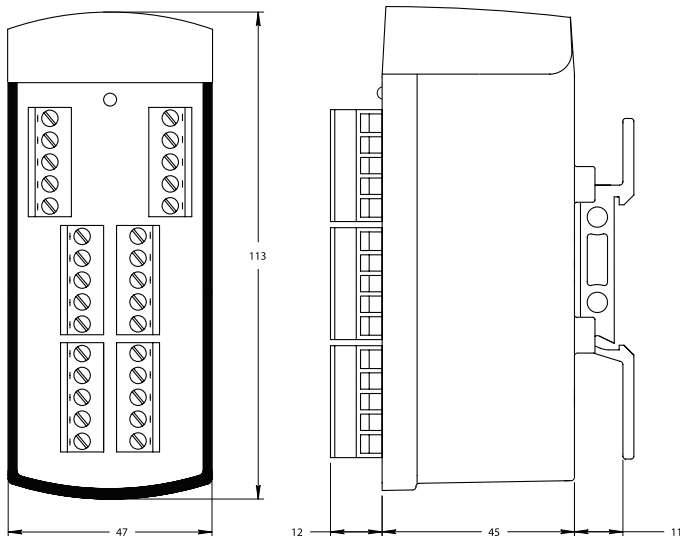


Specifications	
LED displays	Bus power on - green LED
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Negligible
Trip current (drop)	No trip current
Holding current (after trip)	n/a
Reset current level	Current falls below 28mA
Current consumption	2mA
Dimensions (L, W, H)	113mm, 47mm, 68mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Schematic drawing



Dimensions (mm)



Drop connectors (DIN)

Model number

DR465038A
Passive

DR465042A
Protected



Multi-drop connector (6 drops)

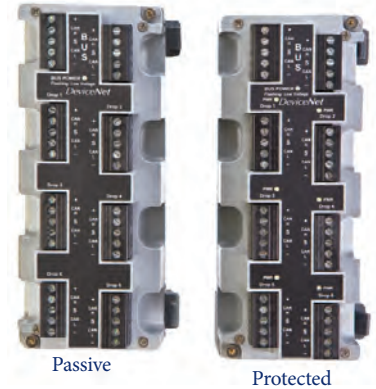
Drop connectors provide a reliable, safe method of connecting slave devices to the bus cable. Protected drop connectors limit the current passing from the bus to the power leg (V+) of the drop to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

Passive

- 8 amp capacity
- LED indicates bus power

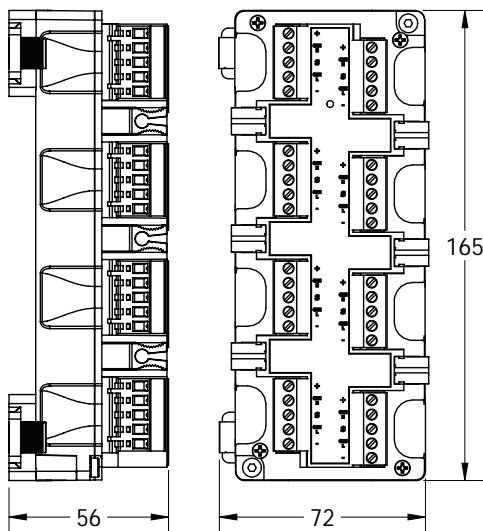
Power protected

- Short circuit protection
- LEDs indicate drop fault, bus power, and drop power
- Automatically resets when drop fault is cleared



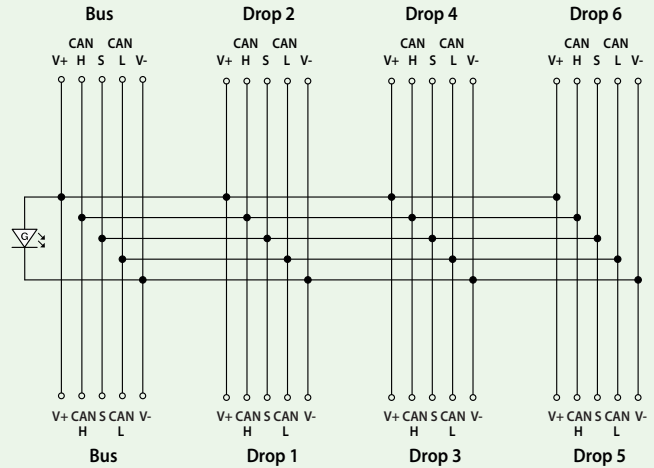
Specifications	
LED displays	Bus power on - green LED Drop power on - green LED (protected) Drop short circuit - red LED (protected)
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Passive: negligible Protected: <1 Volt
Trip current (drop)	Passive: no trip current Protected: 240mA (on V+)*
Holding current (after trip)	Passive: n/a Protected: 28mA
Reset current level	Current falls below 28mA
Current consumption	10mA for all nodes
Dimensions (L, W, H)	165mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)
*Short circuit protection only on V+. Communication wires are passive.	

Dimensions (mm)

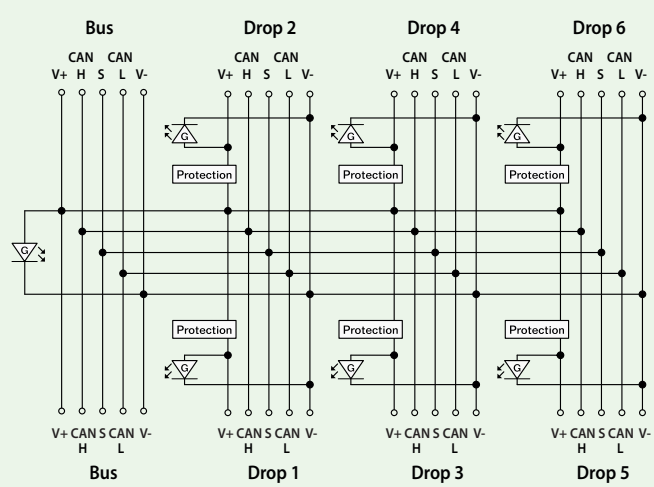


Schematic drawings

Passive



Protected



Drop connectors (DIN)

Model number

DR465046A

Switched protected

Multi-drop connector (6 drops)

Drop connectors provide a reliable, safe method of connecting slave devices to the bus cable. Protected drop connectors limit the current passing from the bus to the power leg (V+) of the drop to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

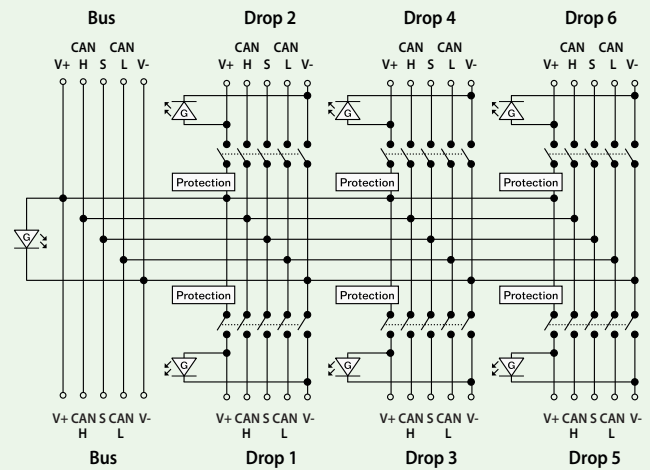
Switched power protected

- Disconnects each drop
- Short circuit protection on the power leg
- LEDs indicate drop fault, bus power, and drop power status
- Automatically resets when drop fault is cleared

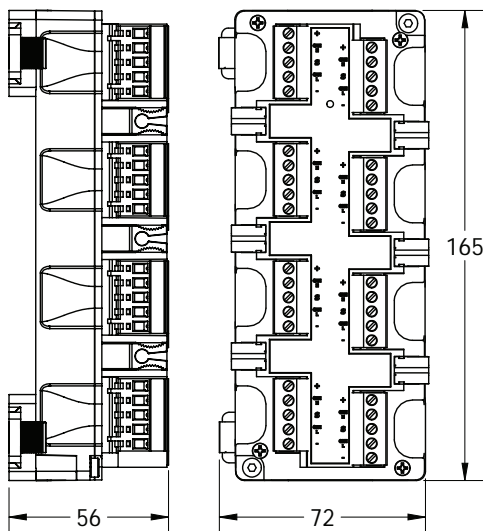


Specifications	
LED displays	Bus power on - green LED Drop power on - green LED Drop short circuit - red LED
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	<1 Volt
Trip current (drop)	240mA (on V+)*
Holding current (after trip)	28mA
Reset current level	Current falls below 28mA
Current consumption	10mA for all nodes
Dimensions (L, W, H)	165mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)
*Short circuit protection only on V+. Communication wires are passive.	

Schematic drawing



Dimensions (mm)



Commissioning kits and software

Model number
CK464002A

DeviceNet commissioning kit

This DeviceNet commissioning kit contains all the hardware and software needed to fully configure and test DeviceNet devices. This kit can be used to bench test and commission single DeviceNet devices. This kit is a must for shop testing and for stroke testing DeviceNet devices.

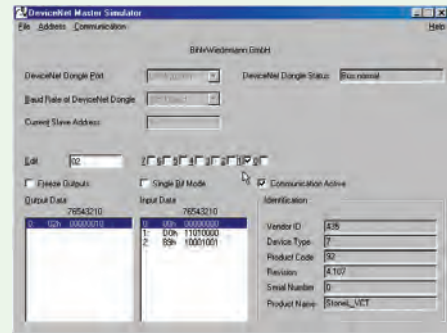
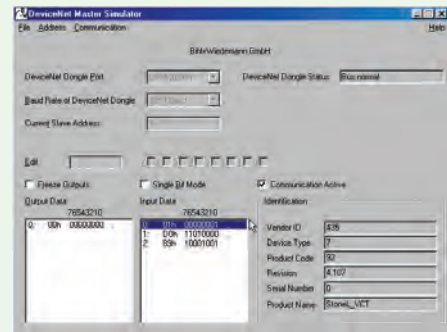
Kit contents

- DeviceNet commissioning cable assembly
- Portable 24VDC power supply
- DeviceNet master simulator software
- Carrying case



Specifications	
Hardware	Master simulator hardware (USB Interface)
Power supply	120VAC input (24VDC 0.75A output)
Software	DeviceNet master simulator
Operating temperature	-0° to +55°C (-32° to +131°F)

DeviceNet commissioning kit screen



Cable and wiring

Model number

CB463006A

Thick

CB463004A

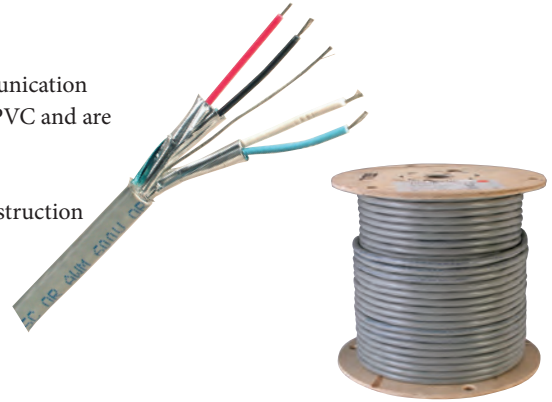
Thin

DeviceNet bus cable

These cables were selected for their rugged design and specifications favorable for use with the DeviceNet communication protocol. The cables are constructed of sunlight resistant PVC and are UL type Power Limited Tray Cable (PLTC).

Features

- 4-conductor + shield for DeviceNet networks
- Rugged PVC construction
- UL type PLTC



Specifications (CB463006A) thick trunk cable	
Conductors	4 (stranded tinned copper) plus shield
Length	100m (328')
Wire gauge	15 AWG power pair / 18 AWG signal pair
DC resistance	(15) .012 Ohms/m / (18) .023 Ohms/m
Nominal capacitance	39.4 pf/m
Jacket material	PVC
Cable diameter	12.2mm
Applicable specifications	DeviceNet thick trunk cable UL type PLTC, CMG C(UL) CMG, FT4 CSA
Weight	19 kg (42 lbs)

Specifications (CB463004A) thin drop cable	
Conductors	4 (stranded tinned copper) plus shield
Length	100m (328')
Wire gauge	22 AWG power pair / 24 gauge signal pair
DC resistance	(22) .057 Ohms/m / (24) .091 Ohms/m
Nominal capacitance	39.4 pf/m
Jacket material	PVC
Cable diameter	7mm
Applicable specifications	DeviceNet thin trunk cable UL type PLTC, CMG CL2 C(UL) CMG, FT4 CSA
Weight	8 kg (17 lbs)

Terminator

Model number
AC461139A

This DeviceNet terminator contains the 121 Ohm resistor required for terminating a DeviceNet segment. This device is designed to be very compact and easy to use. The terminator is used to prevent reflections on the cable resulting from the ends of the segment. One terminator should be located at each end of the segment.

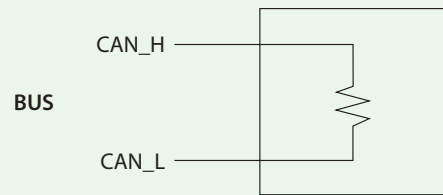
Features

- 121 ohm resistor
- Compact, moisture resistant shell

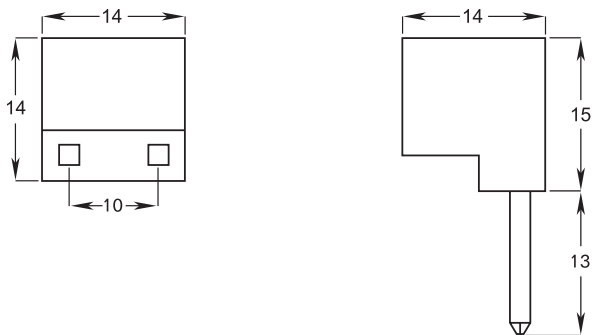


Specifications	
Resistor	121 ohms +/-1%
Housing material	ABS
Pins	2 (not polarity sensitive)
Dimensions (L, W, H)	28mm, 14mm, 14mm
Operating temperature	-40°C to + 80°C (-40°F to 176°F)

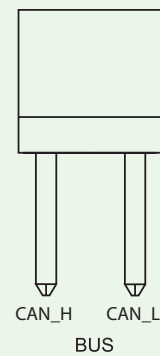
Schematic drawing



Dimensions (mm)



Wiring diagram



Foundation Fieldbus

Contents

Foundation Fieldbus description	74-75
<i>Overview and economic analysis of Foundation Fieldbus network</i>	
Power conditioner	76
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Drop connectors	81-85
Terminator	86
Cable and wiring	87



FOUNDATION

www.fiedbus.org

Foundation Fieldbus

Overview and analysis

Foundation Fieldbus H1 level has been designed as a digital replacement of the 4 to 20mA standard in the process industries. Foundation Fieldbus is also a LAN (Local Area Network) for instruments used in both process and manufacturing automation with built-in capability to distribute the control application across the network. The physical wiring is also fully compatible with intrinsic safety (IS) or nonincendive wiring standards and may be used in hazardous, as well as general purpose areas. In hazardous areas standard explosionproofing or power limited concepts may be used, as well as IS concepts, offering greater cabling design flexibility. Foundation Fieldbus has a unique user layer that defines the interface by which users can communicate with devices through a set of blocks. These blocks are 1) resource blocks, 2) function blocks and 3) transducer blocks. Resource blocks provide on-line information of name, manufacturer, and serial number. Function blocks describe control and I/O behavior. Transducer blocks decouple the function blocks from the functions required to read/write inputs and outputs. With Foundation Fieldbus, the user is able to interconnect the function blocks and schedule the running of the blocks to create control algorithms. The control may reside in the field devices rather than in the centralized controller depending on the capability of the field device.

Foundation Fieldbus (FF) features

- Reduce field wiring costs.
- Intrinsic safety wiring option available to further reduce costs in hazardous environments.
- Same bus used for analog and discrete devices.
- Control (LAS) for the segment may reside in the field devices freeing up space in central controllers.
- Time stamping of control parameters performed in field devices and coupled to control data to optimize operating performance.
- Provides greater controllability and process information.
- Standardized function blocks, representing control and I/O; speed set up.
- Long bus length of 1900m (6,175 ft) and spurs up to 120m (390 ft) span most process systems.
- Supported by over 80% of the world's process instrumentation suppliers.

Foundation Fieldbus vs conventional systems

The Foundation Fieldbus network may consist of 16 instruments connected to a 2-wire bus. This translates into significant savings over conventional point-to-point wiring due to less expensive wiring, reduced space, and greater flexibility. In control loops, Foundation Fieldbus offers greater controllability and transfers control to the field for better reliability.

Conventional System

Analog and discrete instruments are wired individually to centralized controllers in a conventional system. Control functions are processed in the centralized controller with passive devices accepting commands and providing feedback. See figure 1. No on-line diagnostics may be performed and instrument parameters, as well as descriptive device information, is recorded manually.

Critical factors to consider in evaluating a conventional system include:

1. Design layout for I/O racks and conduit runs.
2. Space allocation for cabinets and conduit.
3. Conduit, wiring and fittings cost and installation time.
4. System commissioning and trouble-shooting.

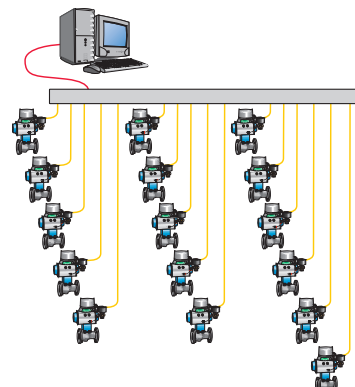
Foundation Fieldbus system

In a Foundation Fieldbus system, typically from 2 to 16 devices may be included on a common network. See figure 2. One of the devices must be a Link Active Scheduler (LAS) or Link Master, which manages the communication network. There may be multiple Link Masters on the same bus. If the current LAS fails, another Link Master may take over the LAS function and the operation of the fieldbus will continue. Wiring topology may be bus or tree topology with the bus topology illustrated. Since Foundation Fieldbus has limited power delivery capability, two more power wires are used in the example to provide power for solenoid coils. Any Foundation Fieldbus compliant device may be connected into the network.

Foundation Fieldbus economic analysis

When using a Stonel VCT module and integrating it into the Foundation Fieldbus (FF) network illustrated, there are significant savings. This system consists of 16 automated valve systems located in a cluster approximately 200 feet from the I/O rack. Each of the automated valves is located 20 feet apart in the cluster. Following is an estimated comparison:

Figure 1
Conventional system



Installation cost comparison (per field device)		
	Conventional	FF*
Computer I/O; Master/Gateway	\$70	\$160
Conduit, cable tray, wiring, and fittings	\$1,400	\$290
Valve monitor/VCT and pneumatic valve	\$510	\$1,130
Switch protected drop connector	NA	\$90
Installation and commissioning labor	\$600	\$250
Power supply	\$50	\$40
Total installed cost	\$2,630	\$1,960
Total installation savings \$670 per device		
* Foundation Fieldbus is not directly comparable. Analog instruments require minimal adder over conventional 4 to 20mA system making this system cost effective when combining analog and discrete field instruments on the same segment. Functionality for Foundation Fieldbus devices is also significantly greater, offering increased diagnostic and operational capabilities.		

Foundation Fieldbus analog point addition to Stonel I/O modules

The Stonel Foundation Fieldbus I/O modules have an auxiliary 4 to 20mA input and a 4 to 20mA output which is powered from the supplemental 24VDC supply bus. Additional savings may result from connecting the 4 to 20mA device directly to the Stonel I/O instead of running wires back to I/O at the controller. See figure 3. The additional analog input would be represented as an AI (Analog Input) function block as part of our device description. Stonel I/O analog 4 to 20mA point addition is illustrated.

The 4 to 20mA instrument may be conveniently wired directly into the Stonel I/O module. With a conventional system the control would need a 200 foot run back to the controller. Other savings would result from:

- Reduction in design time because of simpler conduit and cabling systems.
- Reduction in conduit and cabinetry space.
- Right first-time wiring and easier trouble-shooting.
- Faster commissioning.

Analog installation cost comparison		
	Conventional	FF
Conduit and wiring (\$8/ft)	\$1,600	\$160
Analog input point	\$30	\$650
Total installed cost	\$1,630	\$810
Total installation savings \$820 per device		

Foundation Fieldbus network specifications		
Topology	Bus/tree; terminators required	
Cabling	Shielded twisted pair	
Bus power	Typically 20 mA/device @ 9 to 32 VDC	
Number of devices	2 to 16 typical (theoretically 32)	
Data delivery	Unlimited	
Max. cable length	1900 m (6,125 ft) total of trunk length and all spurs.	
Spur length	<u># of devices</u>	<u>Max length</u>
	15 to 16	60 m (197 ft)
	13 to 14	90 m (295 ft)
	2 to 12	120 m (394 ft)
Transmission rate	31.25 kbit/second	
Cycle time	Link active scheduler determines priority	
Communication method	Publisher/subscriber: delegated token passing with cyclic and acyclic options.	
Link active scheduler	Acts as master for bus; schedules communication; maintains live list of segment devices.	
Data signal	Manchester Biphasic-L with synchronous serial signaling.	
Error checking	Frame check sequence comparison	
Addressing	May be done off-line or performed on-line automatically by system management	
Support organization	Fieldbus Foundation www.fieldbus.org	

Figure 2
Foundation Fieldbus network

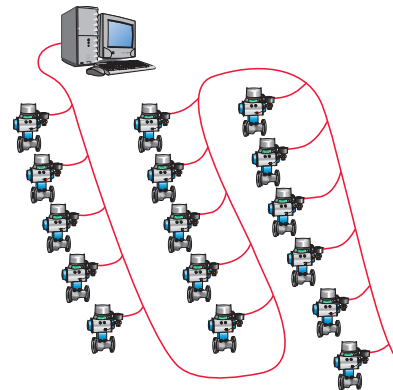
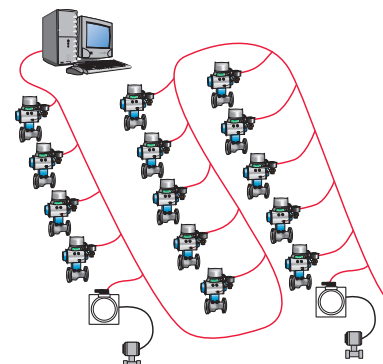


Figure 3
Foundation Fieldbus analog point addition



Power conditioner

Model number
PS459050A

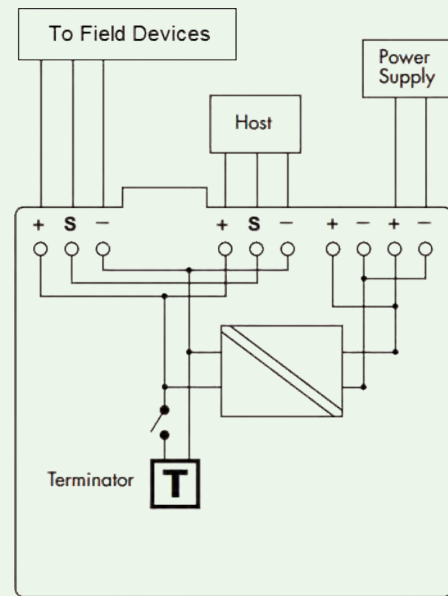
.50 amp power conditioner

This Foundation Fieldbus power conditioner is designed to provide power to the Fieldbus network and attached devices. This power supply meets all Foundation Fieldbus specifications and complies with the requirements of a type FF-831 power supply. (Non-IS power supply) For I.S. applications it must be used with appropriate I.S. barriers.

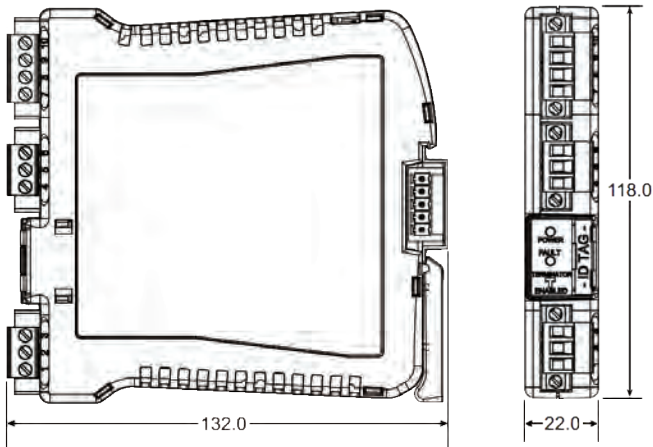


Specifications	
Output voltage	21.5 VDC to 24.0 VDC
Output current	0.50 amps
Input voltage	19.2 to 30.0 VDC
Displays	Power OK, green LED Fault, red LED Terminator enabled, white 'T'
Terminator	Switchable
Operating temperature	-40°C to +65°C (-40° to +149°F)
Housing	Polycarbonate, DIN rail mounting
Dimensions (L, W, H)	22mm, 132mm, 118mm
Ingress protection	IP20, field enclosure required
Approvals	ATEX: Ex nA IIC T4 FM: Class 1 Division 2 groups A,B,C,D CSA: Class 1 Division 2 groups A,B,C,D

Schematic drawing



Dimensions (mm)



Input/output modules

Model number
IM461052A
IM465014A (DIN)



Input/bus powered output module

This I/O module is designed to function as a Foundation Fieldbus node with termination points for connecting switches/sensors as well as output devices such as solenoid valves and relays. Outputs can be configured to fail on or off.

Inputs and outputs

- Two (2) discrete inputs
- Two (2) discrete outputs

Features

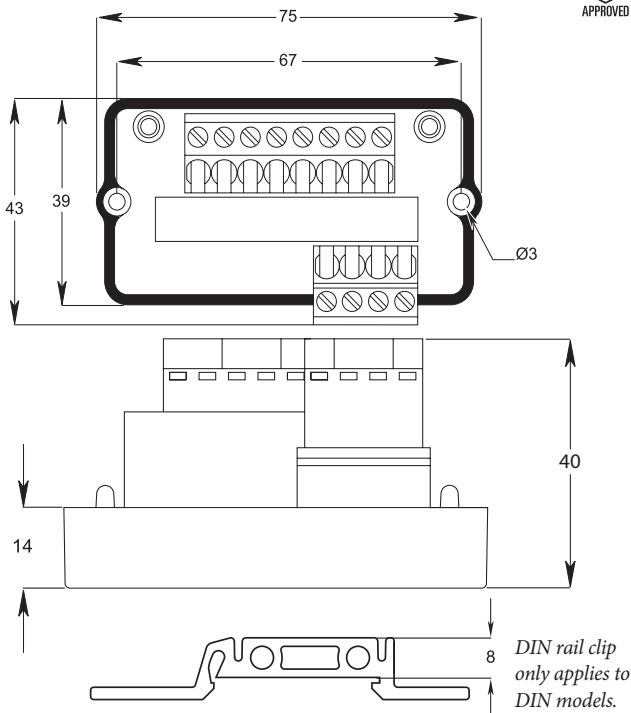
- Pre-determined output fail state



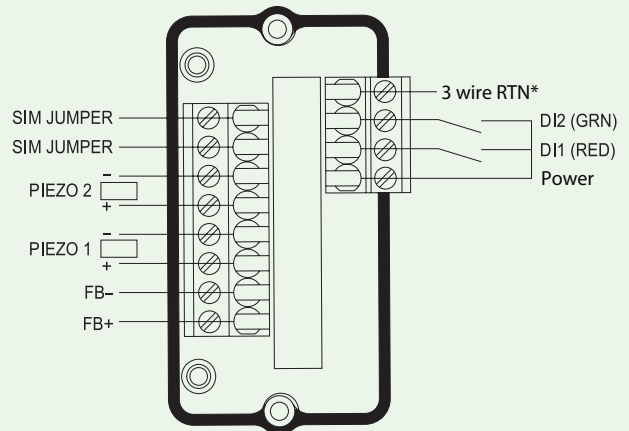
Specifications

Discrete inputs	(2) 6.5 VDC < .045 mA, must be low power dry contact capable of operating at < .045 mA @ 6.5 VDC or solid state pnp capable of operating at 6.5 VDC and < 1 mA
Discrete outputs	(2) 6.5 VDC 2 mA. Suitable for Stonel piezo valve
Operating voltage	9 to 32 VDC via Foundation Fieldbus voltage
Current consumption	< 17 mA
Indication	(2) LEDs indicate discrete input status (red/green)
Data rate	31.25 Kb/s
Dimensions (L, W, H)	75mm, 43mm, 42mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Dimensions (mm)



Wiring diagram



*Only for use with 3 wire PNP sensors

Input/output modules

Model number

IM461054A

IM465015A (DIN)



Input/externally powered output module

This I/O module is designed to function as a Foundation Fieldbus node with termination points for connecting switches/sensors, as well as output devices such as solenoid valves and relays. This module is also capable of reading one (1) analog input and controlling one (1) analog output via Foundation Fieldbus. This device requires external 24VDC power supply.

Inputs and outputs

- Two (2) discrete inputs
- Two (2) discrete outputs
- One (1) analog input (4-20mA)
- One (1) analog output (4-20mA)

Features

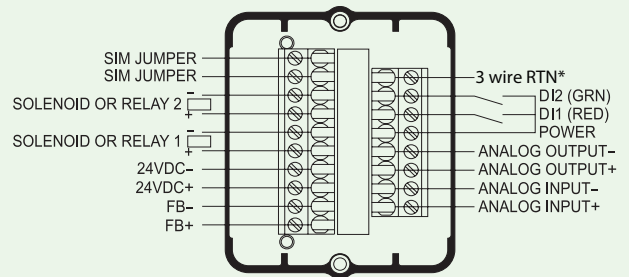
- Pre-determined output fail state



Specifications

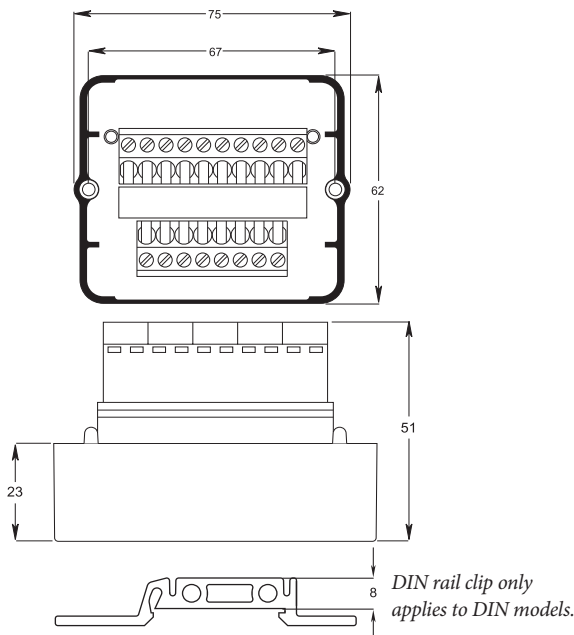
Discrete inputs	(2) 6.5 VDC < .045 mA, must be low power dry contact capable of operating at < .045 mA @ 6.5 VDC or solid state pnp capable of operating at 6.5 VDC and < 1 mA
Discrete outputs	(2) 24 VDC (4 watts total power)
Analog input	(1) analog (4-20 mA) input 10-bit resolution (0.1%)
Analog output	(1) analog (4-20 mA) output 10-bit resolution (0.1%)
Operating voltage	9 to 32 VDC via Foundation Fieldbus voltage
Current consumption	< 17 mA from Foundation Fieldbus
Indication	(2) LEDs indicate discrete input status (red/green)
External voltage	24 VDC via external power
Data rate	31.25 Kb/s
Dimensions (L, W, H)	75mm, 62mm, 51mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Wiring diagram



**Only for use with 3 wire PNP sensors*

Dimensions (mm)



Input/relay output modules

Model number

IM461087A

Interlocking

IM465022A (DIN)

Interlocking

IM461088A

Independent

IM465023A (DIN)

Independent



This I/O module is designed to function as a Foundation Fieldbus node with termination points for connecting switches/sensors, as well as relay outputs to operate devices like motors and other high power devices. Outputs can be interlocked to operate AC motors or independent to operate independent AC loads. Outputs can be configured to fail on or off.

Inputs and outputs

- Two (2) discrete inputs
- Two (2) discrete (relay) outputs
- One (1) analog input (4-20mA)
- One (1) analog output (4-20mA)

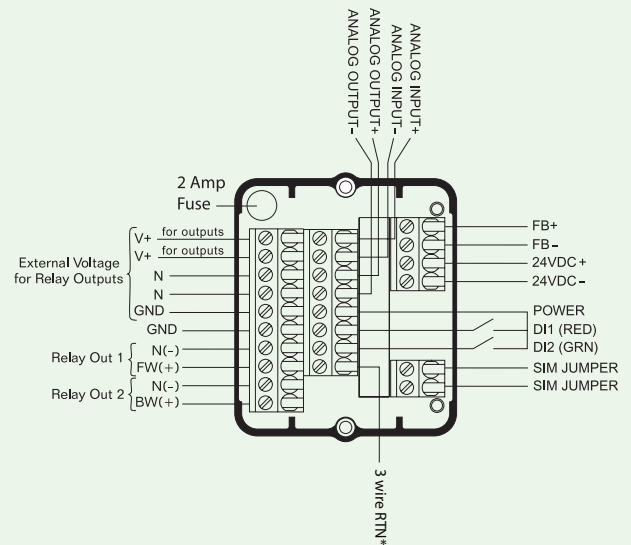
Features

- Pre-determined output fail state



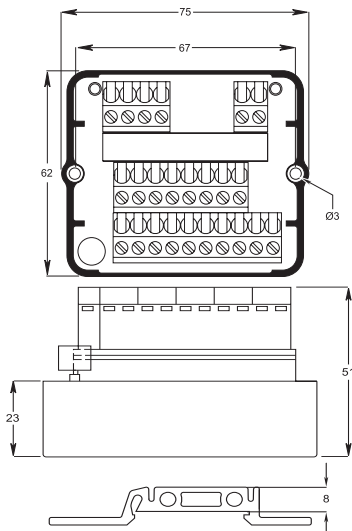
Specifications	
Discrete inputs	(2) 6.5 VDC < .045 mA, must be low power dry contact capable of operating at < .045 mA @ 6.5 VDC or solid state pnp capable of operating at 6.5 VDC and < 1 mA
Discrete outputs (relay)	independent (2) 120/250 VAC @ 2A independent for other AC loads
	interlocking (2) 120/250 VAC @ 2A interlocked for motor operation
Analog input	(1) analog (4-20 mA) input 10-bit resolution (0.1%)
Analog output	(1) analog (4-20 mA) output 10-bit resolution (0.1%)
Operating voltage	9 to 32 VDC via Foundation Fieldbus voltage
Current consumption	< 17 mA
Indication	(2) LEDs indicate discrete input status (red/green)
External voltage (analog I/O)	24 VDC via external power
External voltage (relay outputs)	Up to 250 VAC; 30 VDC
Dimensions (L, W, H)	75mm, 62mm, 51mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Wiring diagram



*Only for use with 3 wire PNP sensors

Dimensions (mm)



DIN rail clip only applies to DIN models.

Input/output modules

Model number

IM461134A

IM465027A (DIN)



Input/externally powered (24VDC) output module

This I/O module is designed to function as a Foundation Fieldbus node with termination points for connecting switches/sensors as well as output devices such as solenoid valves and relays. Outputs can be configured to fail on or off.

Inputs and outputs

- Two (2) discrete inputs (LED indication)
- Two (2) discrete 24VDC outputs (externally powered)

Features

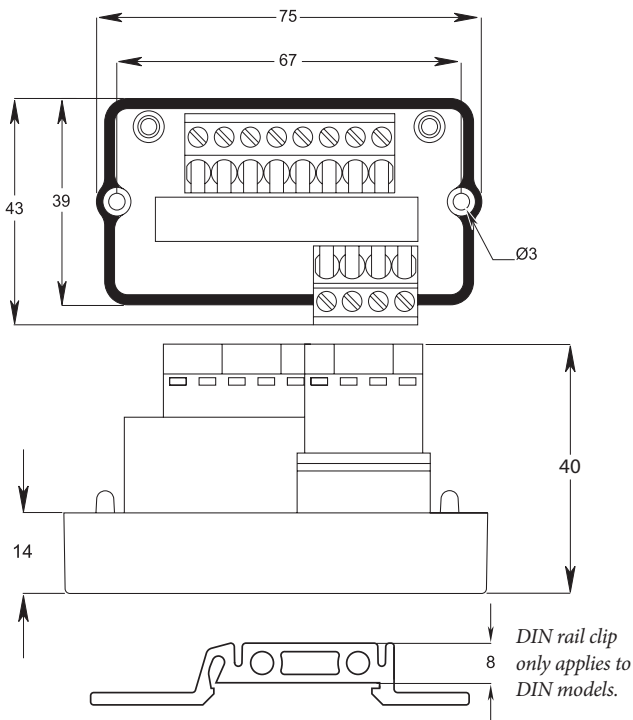
- Pre-determined output fail state
- Date of last service



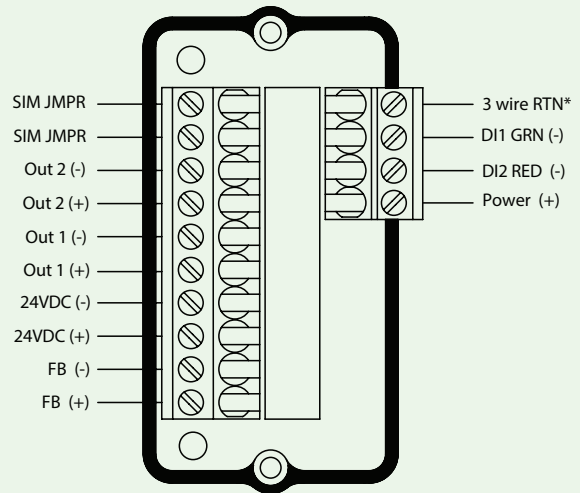
Specifications

Discrete inputs	(2) 6.5 VDC < .045 mA, must be low power dry contact capable of operating at < .045 mA @ 6.5 VDC or solid state pnp capable of operating at 6.5 VDC and < 1 mA
Discrete outputs	(2) 24 VDC (4 watts total power)
Operating voltage	9 to 32 VDC via Foundation Fieldbus voltage
Current consumption	< 17 mA from Foundation Fieldbus
Indication	(2) LEDs indicate discrete input status (red/green)
External voltage	24 VDC via external power
Data rate	31.25 Kb/s
Dimensions (L, W, H)	75mm, 43mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Dimensions (mm)



Wiring diagram



**Only for use with 3 wire PNP sensors*

Drop connectors

Model number

DR461110A

Passive

DR465003A (DIN)

Passive

DR461057A

Protected

DR465006A (DIN)

Protected



Multi-drop connector/device coupler

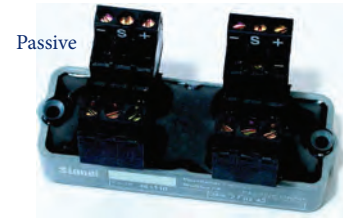
Drop connectors for Foundation Fieldbus/Profibus-PA networks provide a reliable, safe method of connecting slave devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus.

Passive (2 drops)

- 8 amp capacity
- Direct mount or DIN rail mount available

Protected (1 drop)

- 8 amp capacity on bus trunk line
- Limits currents on drop leg to protect against short circuits without affecting bus performance
- LED indicates drop fault
- Automatically resets when drop fault is cleared



Passive



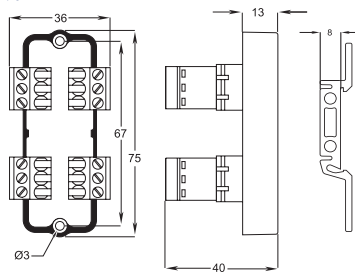
Protected

Specifications	
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Passive: negligible Protected: < 1V
Trip current (drop)	Passive: no trip current Protected: 40 mA
Holding current (after trip)	Protected: 28 mA
Reset current level	Protected: current falls below 28 mA
Maximum devices per drop	Passive: no limit Protected: 1
Current consumption	None
Dimensions (L, W, H)	Passive: 75mm, 36mm, 40mm Protected: 75mm, 26mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)



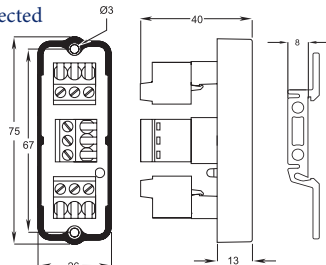
Dimensions (mm)

Passive



DIN rail clip only applies to DIN models.

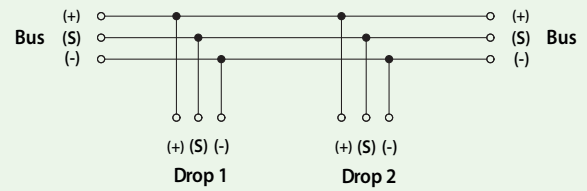
Protected



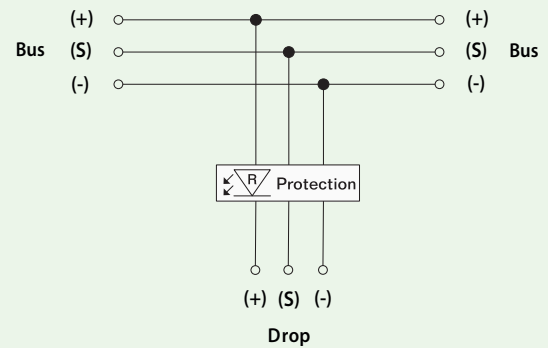
DIN rail clip only applies to DIN models.

Schematic drawings

Passive

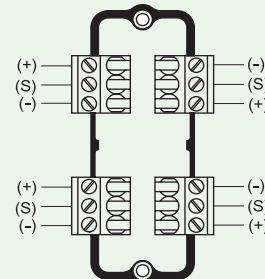


Protected

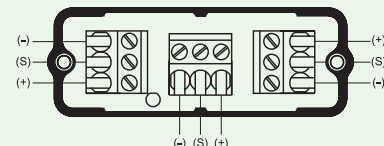


Wiring diagrams

Passive



Protected



Drop connectors

Model number

DR461068A

DR465008A (DIN)



Switched multi-drop connector/device coupler

This switched drop connector offers a very convenient method to remove, replace, or repair a device while the balance of the network remains on-line. It allows the user to disconnect a drop segment from the rest of the bus by flipping a switch.

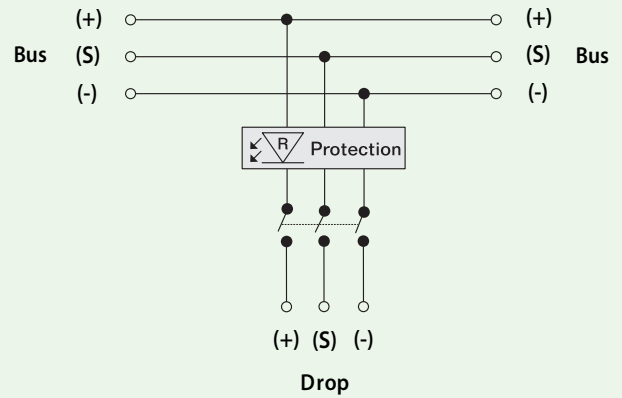
Features

- Disconnect bus segments
- Short circuit protection
- LED indicates drop fault
- Direct mount or DIN rail mount available

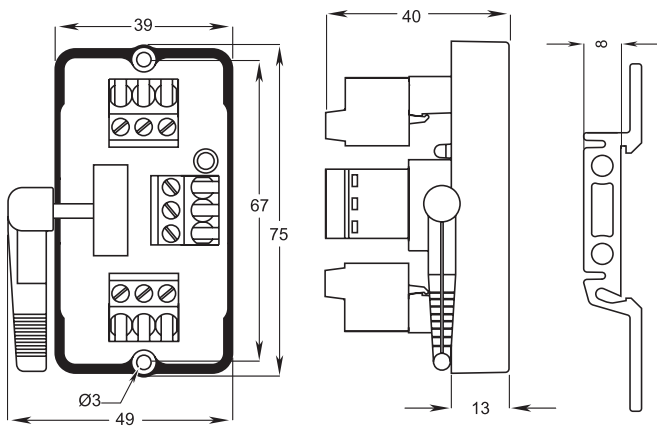


Specifications	
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	< 1V
Trip current (drop)	40 mA
Holding current (after trip)	28 mA
Reset current level	Current falls below 28 mA
Maximum devices per drop	1
Current consumption	None
Dimensions (L, W, H)	75mm, 49mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Schematic drawing

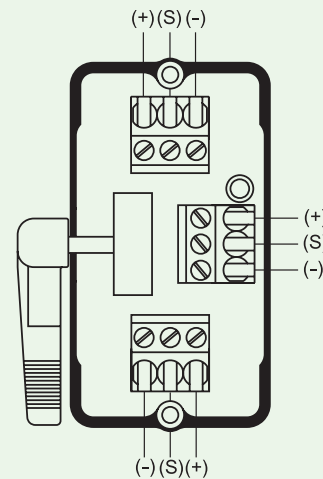


Dimensions (mm)



DIN rail clip only applies to DIN models.

Wiring diagram



Drop connectors (DIN)

Model number

DR461080A

Switch protected



Multi-drop connector/device coupler (4 drops)

Drop connectors provide a reliable, safe method of connecting field devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

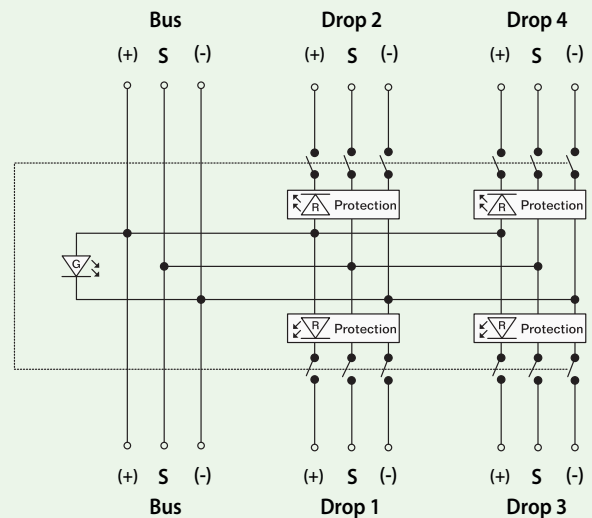
Switched protected

- Disconnects each drop
- LEDs indicate bus power and drop short circuit
- Short circuit protection
- Automatically resets when drop fault is cleared



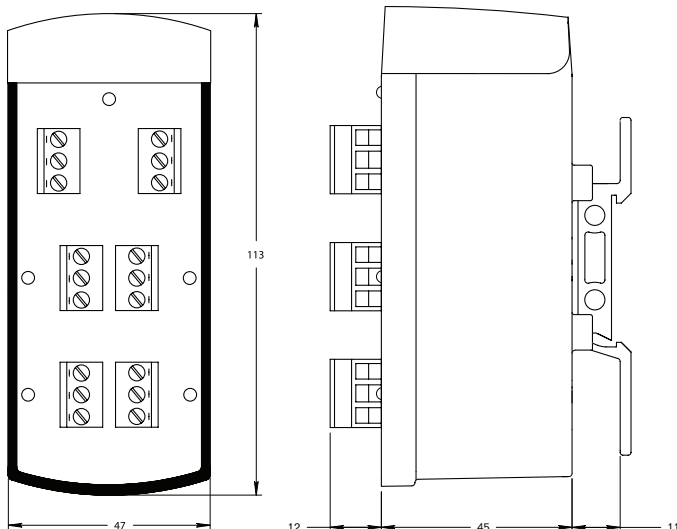
Specifications	
LED displays	Bus power on - green LED Drop short circuit - red LED
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	1 volt maximum
Trip current (drop)	40mA
Holding current (after trip)	28mA
Reset current level	Current falls below 28mA
Current consumption	2mA
Dimensions (L, W, H)	113mm, 47mm, 68mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Schematic drawing



Switches operate concurrently.

Dimensions (mm)



Drop connectors (DIN)

Model number

DR465037A
Passive

DR465041A
Protected



Multi-drop connector/device coupler (6 drops)

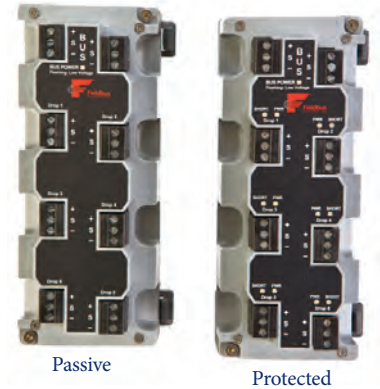
Drop connectors provide a reliable, safe method of connecting field devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

Passive

- 8 amp capacity
- LED indicates bus power

Protected

- Short circuit protection
- LEDs indicate drop fault, bus power, and drop power
- Automatically resets when drop fault is cleared



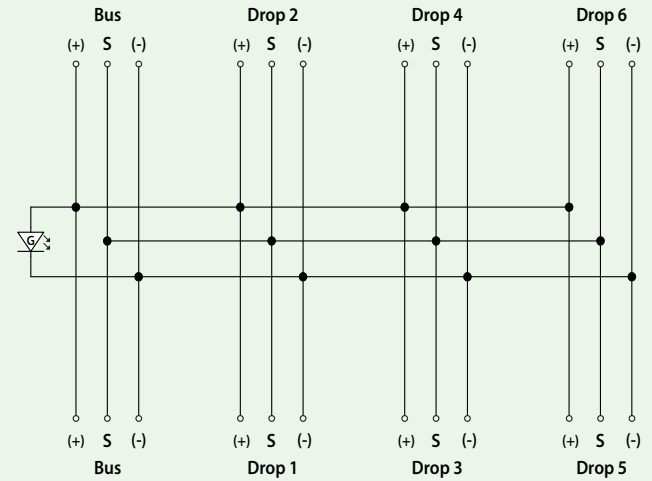
Passive

Protected

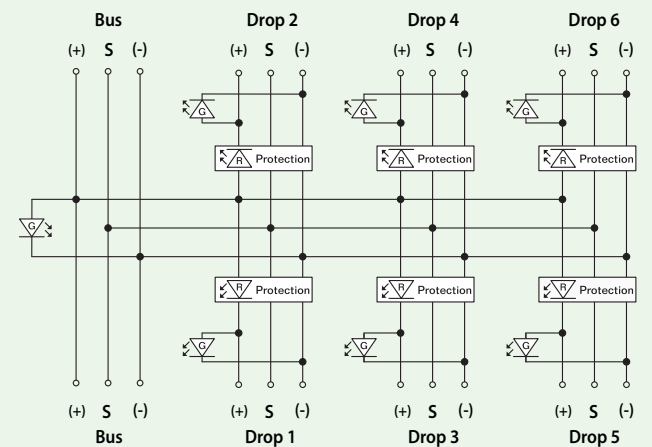
Specifications	
LED displays	Bus power on - green LED Drop power on - green LED (protected) Drop short circuit - red LED (protected)
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Passive: negligible Protected: 1 volt maximum
Trip current (drop)	Passive: no trip current Protected: 40mA
Holding current (after trip)	Passive: n/a Protected: 28mA
Reset current level	Current falls below 28mA
Current consumption	2mA
Dimensions (L, W, H)	165mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Schematic drawings

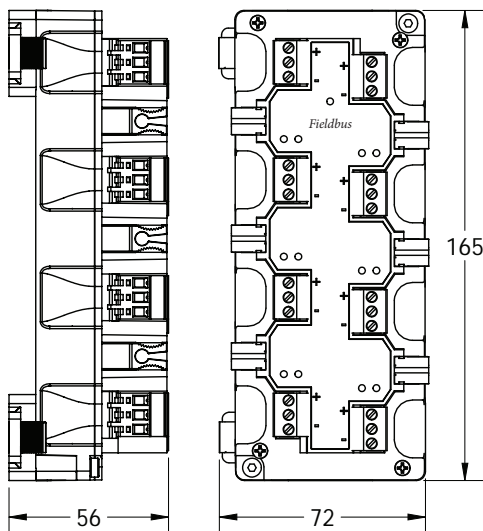
Passive



Protected



Dimensions (mm)



Drop connectors (DIN)

Model number

DR465045A

Switch protected

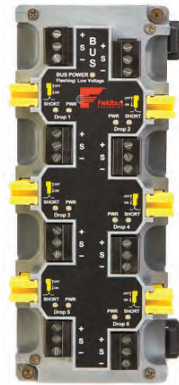


Multi-drop connector/device coupler (6 drops)

Drop connectors provide a reliable, safe method of connecting field devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

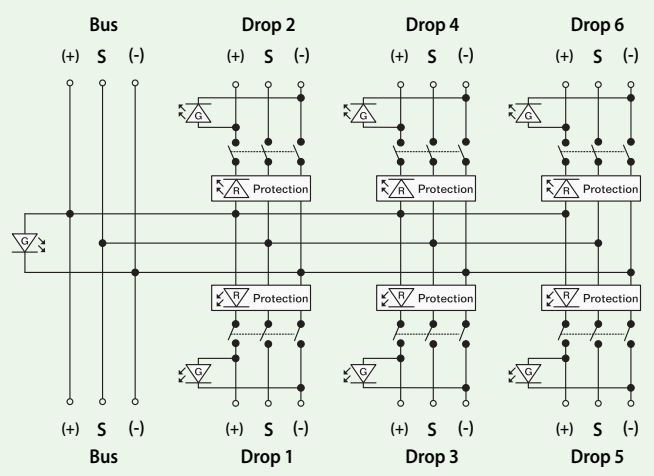
Switched protected

- Disconnects each drop
- Short circuit protection
- LEDs indicate drop fault, bus power, and drop power status
- Automatically resets when drop fault is cleared

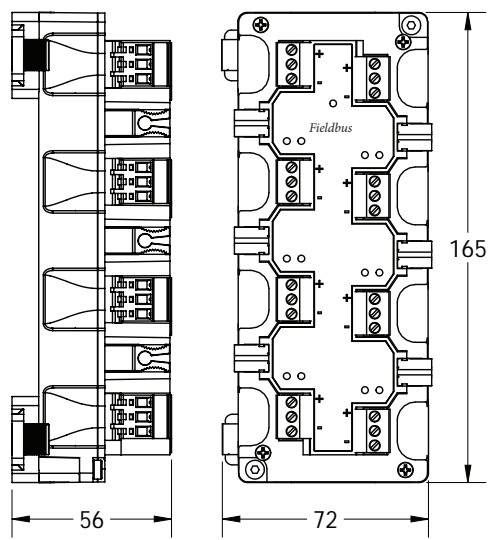


Specifications	
LED displays	Bus power on - green LED Drop power on - green LED Drop short circuit - red LED
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	1 volt maximum
Trip current (drop)	40mA
Holding current (after trip)	28mA
Reset current level	Current falls below 28mA
Current consumption	20mA
Dimensions (L, W, H)	165mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Schematic drawing



Dimensions (mm)



Terminator

Model number
AC461111A

This Foundation Fieldbus terminator contains all of the components required for terminating a Foundation Fieldbus segment. This device is designed to be very compact and easy to use. The terminator is used to prevent reflections on the Fieldbus cable resulting from the ends of the segment. One terminator should be located at each end of the Fieldbus segment.

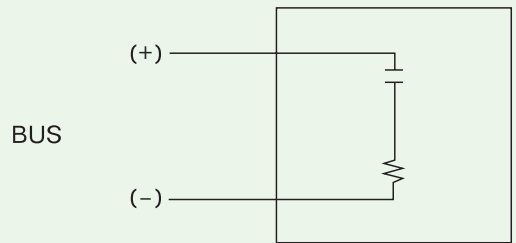
Features

- 100 ohm resistor
- 1 microfarad capacitor
- Compact, moisture resistant shell

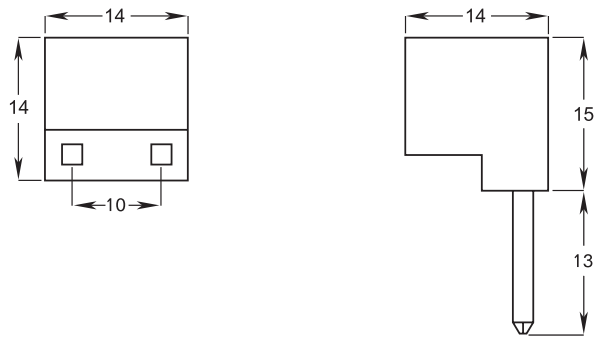


Specifications	
Resistor	100 ohms +/-1%
Capacitor	1 micro farad +/- 5%
Housing material	ABS
Pins	2 (not polarity sensitive)
Dimensions (L, W, H)	28mm, 14mm, 14mm
Operating temperature	-40°C to + 80°C (-40°F to 176°F)

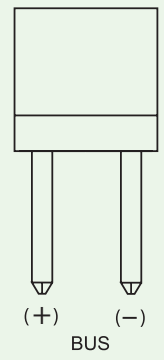
Schematic drawing



Dimensions (mm)



Wiring diagram



Cable and wiring

Model number

- CCFFMA-2M**
- CCFFMA-4M**
- CCFFMA-6M**



Foundation Fieldbus cordsets

These single ended female cordsets allow for quick connection to Foundation Fieldbus devices using a convenient mini (7/8") connector.

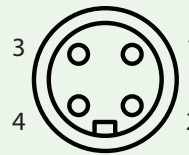
- CCFF1MA-2M single ended female cordset (2 meters)
- CCFF1MA-4M single ended female cordset (4 meters)
- CCFF1MA-6M single ended female cordset (6 meters)



Specifications

Conductors	3x 18AWG; 1x 20AWG (shield)
Insulation material	PVC
Insulation color	Yellow
Coupling nut	Stainless steel
Rated voltage	300 V
Rated current	9.0 A
Contact material/plating	Brass / gold
Shielding	Aluminum / polyester foil
Operating temperature	-40° to +105°C (-40° to +221°F)
Ratings	Meets NEMA 1,3,4,6P and IEC IP67

Pinout drawing

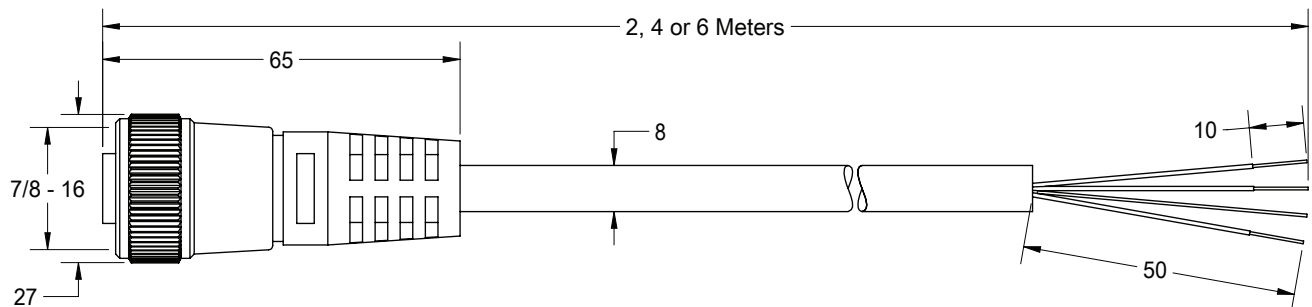


Pins

- 1 FF - (blue)
- 2 FF + (brown)
- 3 Shield (bare)
- 4 Ground (green / yellow)

female (sockets)

Dimensions (mm)



Profibus Contents

Profibus description <i>Overview and economic analysis of Profibus network</i>	90-91
Drop connectors <i>Profibus DP</i>	92-95
Drop connectors <i>Profibus PA</i>	96-99



www.profibus.com

Profibus

Overview and analysis

Profibus originated in the European market and has become a worldwide standard because of its performance attributes. Profibus consists of several variations which are designed for use in special applications. The two Profibus versions most commonly used are Profibus-DP (Distributed Peripherals) and Profibus-PA (Process Automation).

Profibus-DP is recognized as a high performance bus network capable of transmitting thousands of I/O point information in less than a few milliseconds. For that reason it has been used extensively for fast response control applications such as turbine servos and variable speed drives.

Profibus-PA was developed to connect directly into Profibus-DP and may be used in intrinsically safe applications. DP uses the RS485 physical layer while PA uses the IEC 61158-2 physical layer designed primarily for process applications.

Profibus-DP features

- High speed data access capable of handling time critical functions.
- Networks up to 32 devices (up to 126 with repeaters) on a 4-wire network; (2 wires for signal and 2 wires for power).
- Trunk network may extend up to 4,000 feet (1220 meters) per segment.
- Dramatically cuts wiring costs and commissioning over conventional applications.
- Interfaces readily into newer control systems.
- Used extensively throughout Europe with support in North America.

Profibus-DP description

The DP version of Profibus uses the RS485 physical layer with its unique data link layer and a direct data link mapper connecting the data link layer directly to application functions.

Profibus uses a medium access control which includes token-passing for multi-master applications and the master slave interaction.

Networks may be multi-master, multi-master with slaves, or single-master with slaves. In a multi-master network the token is passed to each master in a predetermined time frame. The master with the token is active and communicates with other masters or accesses its assigned slaves.

Communication occurs on a peer-to-peer basis for data communication or on a multi-cast basis for control commands. Cyclic polling may also be used for data communication between the master and its designated slaves. DP also offers acyclic communication services for the parameterization, operation, monitoring, and alarm-handling of intelligent field devices. These acyclic services may be handled in parallel to data transfer with the master taking some additional time to carry out this function. Acyclic extended functions are optional.

Profibus-DP handles large amounts of I/O data at very high speeds. DP requires about 1 millisecond to handle 1024 I/O points over 32 devices at the 12Mbit/sec rate. This is possible due to the efficient mapping of the data from the data link layer directly to the user layer by means of the SRD service of the data link layer.

For configuration of DP devices a GSD file (Electronic device data sheet) is used which describes the characteristics of a device type in a precisely defined format. Vendors provide specific GSD files to users. The system simply reads the GSD file for each device and automatically configures the bus system using this information.

An EDD (Electronic Data Description) file, which is not vendor specific, is also used to describe each device. These files, also provided by vendors, are read by the engineering tools to simplify the Profibus systems configuration, commissioning, and maintenance.

Profibus-DP specifications				
Physical layer	RS-485			
Cabling	(1) shielded twisted pair for signal and (1) pair for 24 VDC supply			
Topology	Trunk with drops			
Cable length	93.75	187.5	500	1500
Baud rate (Kbits/sec)	12000			
Length (meters)	1200	1000	400	200
	100			
Number of devices	32 per segment; up to 126 with 4 repeaters			
Bus power	Must have auxiliary 24 VDC supply			
Transmission rate	9.6 K to 12 M bits/second			
Data access	Token sharing for multi-masters; peer-to-peer; multicast and cyclic polling for data transfer; acyclic for asset management			
Data transfer size	Up to 246 bytes of input & 246 bytes of output depending on device type.			
Device identity	Specific ID number for each device			
Error detection	HD4 CRC (Cyclic Redundancy Check)			
Support organization	Profibus users group www.profibus.com			

Profibus-PA description

Profibus-PA was designed as a substitute for HART and 4 to 20mA signal transmission in the process industries. It uses function blocks designed around process industry requirements and uses the IEC 61158-2 physical layer, making it compatible with intrinsic safety circuits. See figure 1.

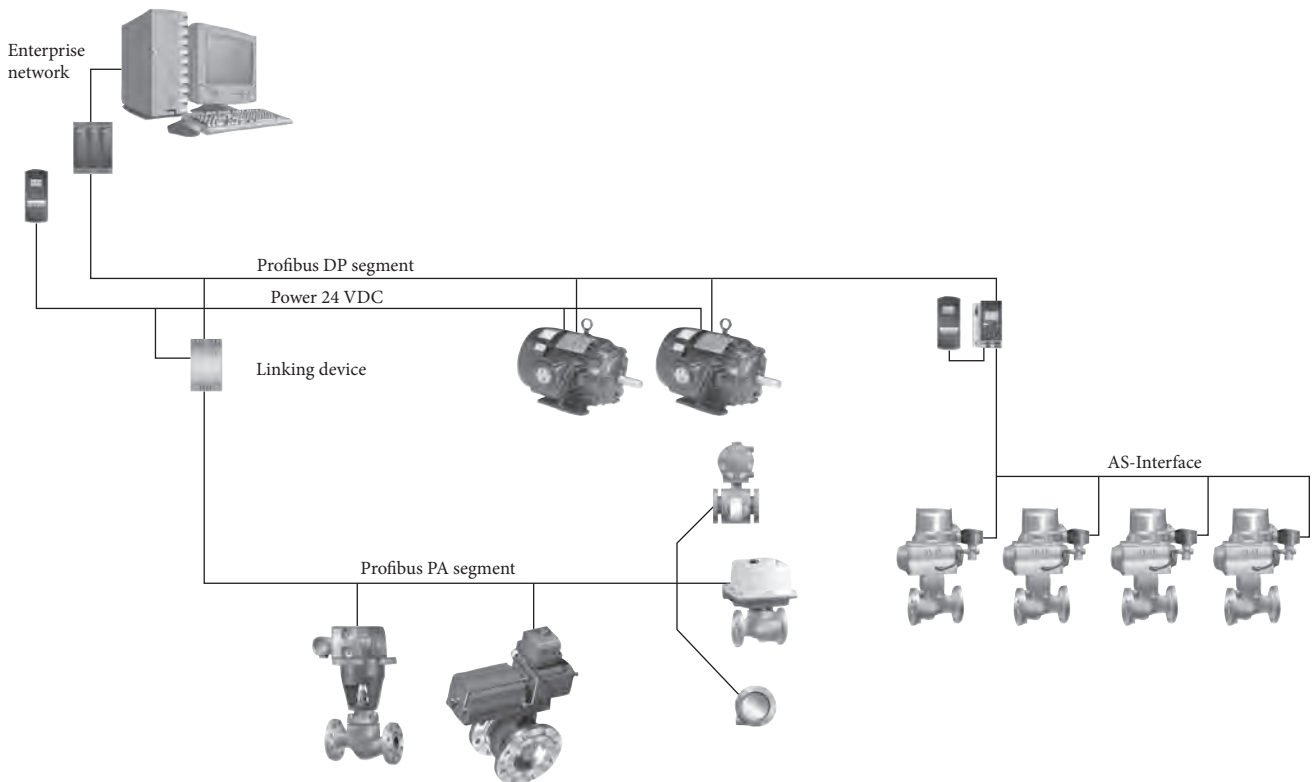
Profibus-PA links to the control architecture via Profibus-DP with a segment coupler or link as shown. Segment couplers are signal converters that adapt the RS-485 signals to the 61158-2 signal level. They are transparent from the bus protocol point of view. If segment couplers are used, the baud rate on the DP (RS-485) segment must be restricted to 45 Kbits/sec. The segment coupler also injects power into the PA network for the segment instrumentation.

Links are independent slaves on the DP network which represent all devices connected to the 61158-2 segment. When PA segments are connected using links there is no limit to the baud rate on the DP segment which enables faster overall bus network performance.

The measured values and status of the PA devices are transmitted cyclically, with high priority between the DCS and the measuring transducers using the DP basic functions. This provides timely transfer of values into the control system. Asset management parameters are transmitted with low-priority, acyclic DP functions.

Profibus-PA specifications	
Physical layer	IEC 61158-2
Cabling	Shielded twisted pair
Topology	Trunk with branching
Cable length	1900 m (6200 ft)
Number of devices	32 (practical limit of 0.50 amp divided by current used/device)
Bus power	Up to 0.5 A per segment
Transmission rate	31.25 Kbits/second

Figure 1
Profibus PA



Drop connectors

Model number

DR461119A

DR465010A (DIN)



Protected drop switch (1 drop)

This disconnect switch is a compact, drop connector for wiring Profibus-DP/Modbus networks. It has a disconnect switch that allows the user to disconnect a drop from the trunk. This device also provides current limiting on the power leg to prevent power losses.

Features

- Current limit on power drop
- Direct mount or DIN rail mount available

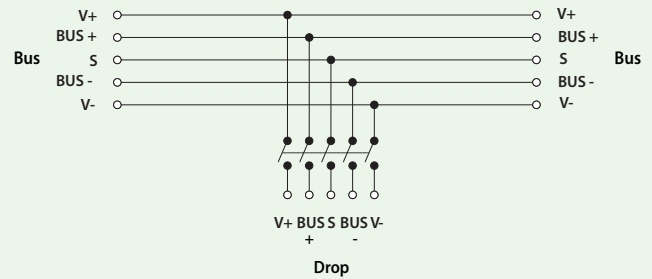


Specifications

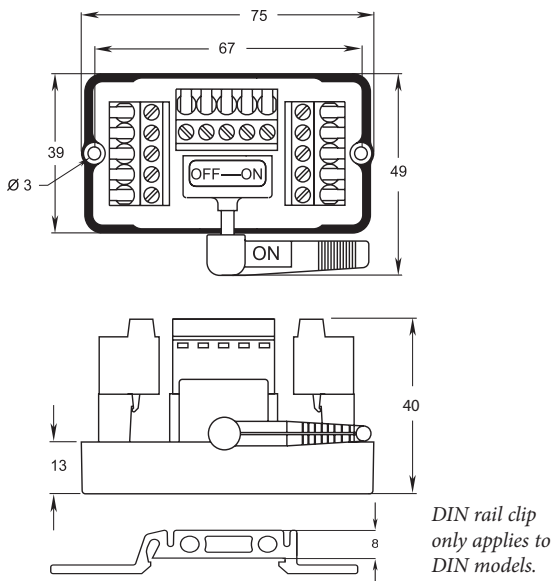
Protocol	Profibus-DP
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	< 1V
Trip current (drop)	200 mA
Holding current (after trip)	28 mA
Reset current level	Current falls below 28 mA
Maximum devices per drop	1
Current consumption	None
Dimensions (L, W, H)	75mm, 49mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)



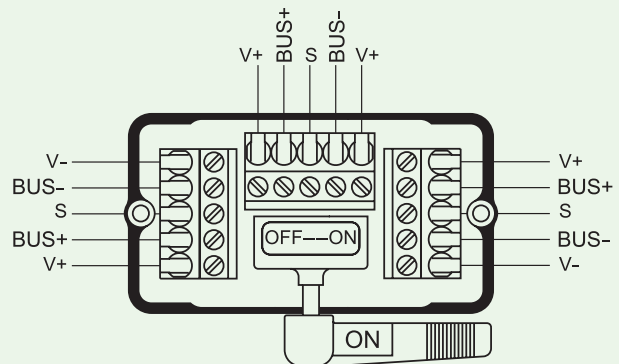
Schematic drawing



Dimensions (mm)



Wiring diagram



Drop connectors

Model number

DR461056A

DR465004A (DIN)



Passive multi-drop connector (2 drops)

This multi-drop connector is compact with direct mount for wiring Profibus-DP/Modbus networks. It provides terminations for bus in, bus out, and two (2) individual drops or spurs.

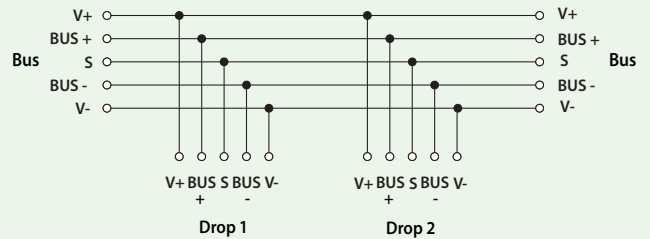
Features

- Direct mount or DIN rail mount available
- IP20 housing

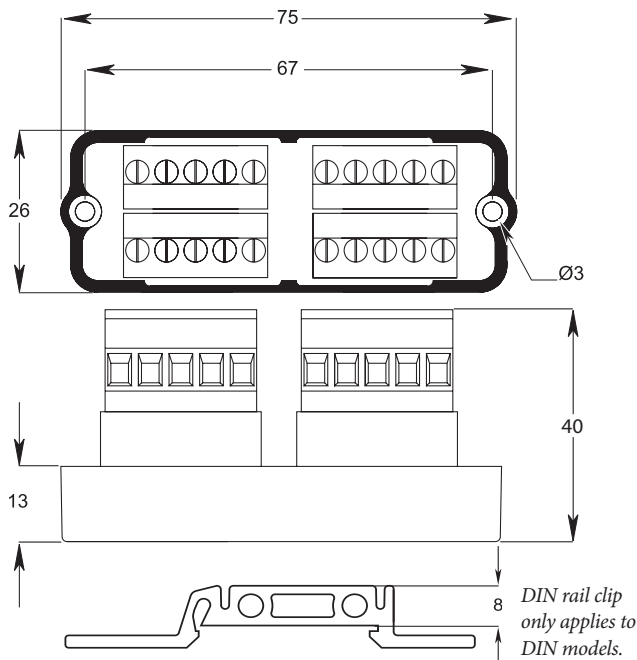


Specifications	
Protocol	Profibus-DP
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Negligible
Trip current (drop)	No trip current
Maximum devices per drop	No limit
Current consumption	None
Dimensions (L, W, H)	75mm, 26mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

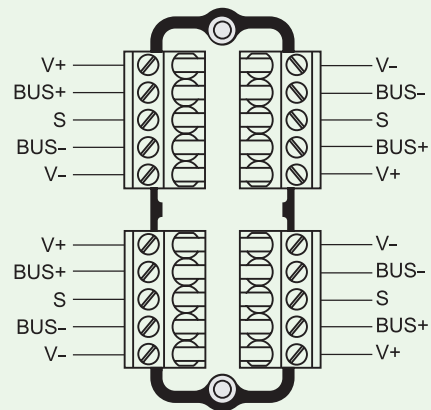
Schematic drawing



Dimensions (mm)



Wiring diagram



Drop connectors (DIN)

Model number

DR465039A

Passive

DR465043A

Protected



Multi-drop connector (6 drops)

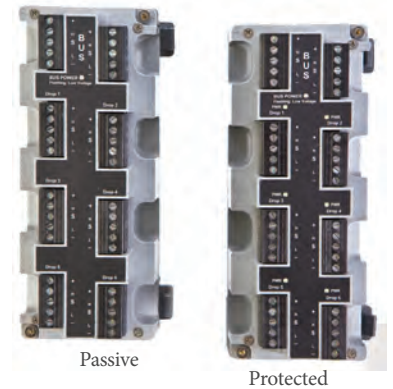
Drop connectors provide a reliable, safe method of connecting slave devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

Passive

- 8 amp capacity
- LED indicates bus power

Protected

- Short circuit protection
- LEDs indicate drop fault, bus power, and drop power
- Automatically resets when drop fault is cleared

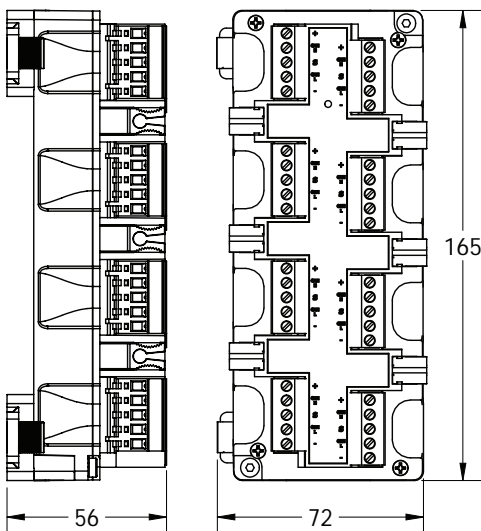


Passive

Protected

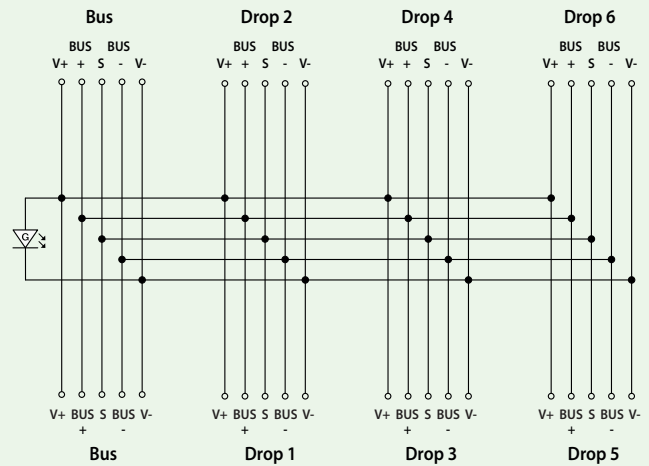
Specifications	
Protocol	Profibus-DP
LED displays	Bus power on - green LED Drop power on - green LED (protected) Drop short circuit - red LED (protected)
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Passive: negligible Protected: <1 Volt
Trip current (drop)	Passive: no trip current Protected: 240mA (on V+)*
Holding current (after trip)	Passive: n/a Protected: 28mA
Reset current level	Current falls below 28mA
Current consumption	10mA for all nodes
Dimensions (L, W, H)	165mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)
*Short circuit protection only on V+. Communication wires are passive.	

Dimensions (mm)

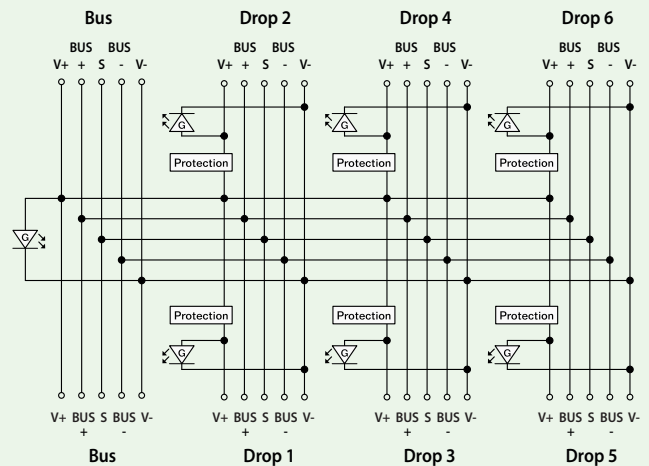


Schematic drawings

Passive



Protected



Drop connectors (DIN)

Model number
DR465047A
Switch protected



Multi-drop connector (6 drops)

Drop connectors provide a reliable, safe method of connecting slave devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

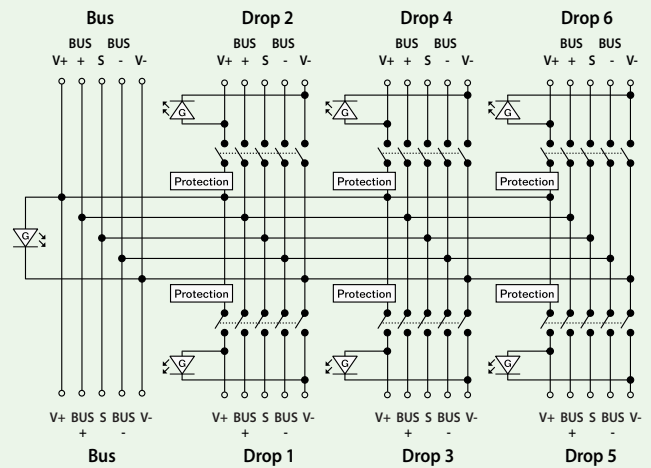
Switched protected

- Disconnects each drop
- Short circuit protection on the power leg
- LEDs indicate drop fault, bus power, and drop power status
- Automatically resets when drop fault is cleared

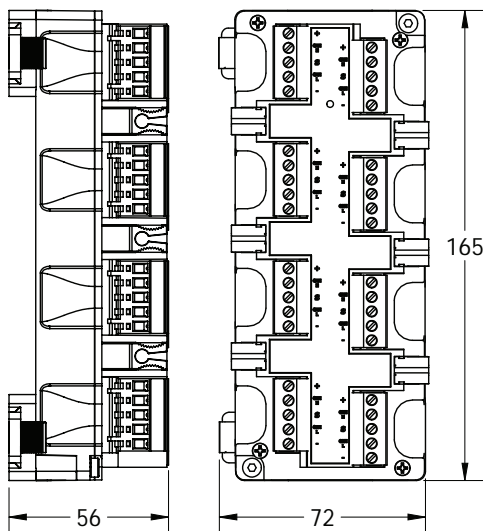


Specifications	
Protocol	Profibus-DP
LED displays	Bus power on - green LED Drop power on - green LED Drop short circuit - red LED
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	<1 Volt
Trip current (drop)	240mA (on V+)*
Holding current (after trip)	28mA
Reset current level	Current falls below 28mA
Current consumption	10mA for all nodes
Dimensions (L, W, H)	165mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)
*Short circuit protection only on V+. Communication wires are passive.	

Schematic drawing



Dimensions (mm)



Drop connectors

Model number

DR461110A

Passive

DR465003A (DIN)

Passive

DR461057A

Protected

DR465006A (DIN)

Protected



Multi-drop connector/device coupler

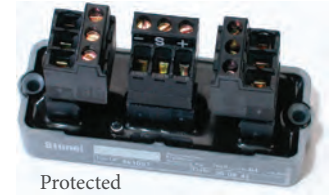
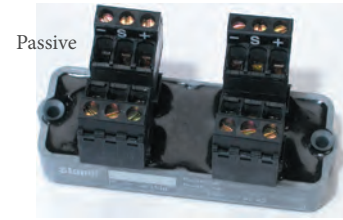
Drop connectors for Foundation Fieldbus/Profibus-PA networks provide a reliable, safe method of connecting slave devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus.

Passive (2 drops)

- 8 amp capacity
- Direct mount or DIN rail mount available

Protected (1 drop)

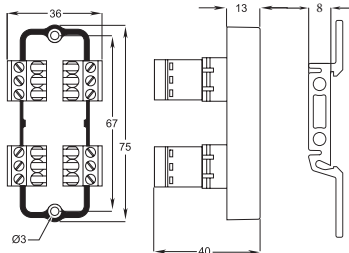
- 8 amp capacity on bus trunk line
- Limits currents on drop leg to protect against short circuits without affecting bus performance
- LED indicates drop fault
- Automatically resets when drop fault is cleared



Specifications	
Protocol	Profibus-PA
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Passive: negligible Protected: < 1V
Trip current (drop)	Passive: no trip current Protected: 40 mA
Holding current (after trip)	Protected: 28 mA
Reset current level	Protected: current falls below 28 mA
Maximum devices per drop	Passive: no limit Protected: 1
Current consumption	None
Dimensions (L, W, H)	Passive: 75mm, 36mm, 40mm Protected: 75mm, 26mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

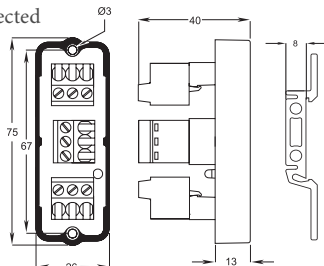
Dimensions (mm)

Passive



DIN rail clip only applies to DIN models.

Protected

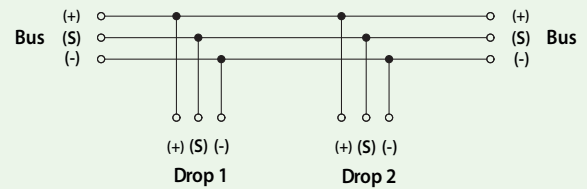


DIN rail clip only applies to DIN models.

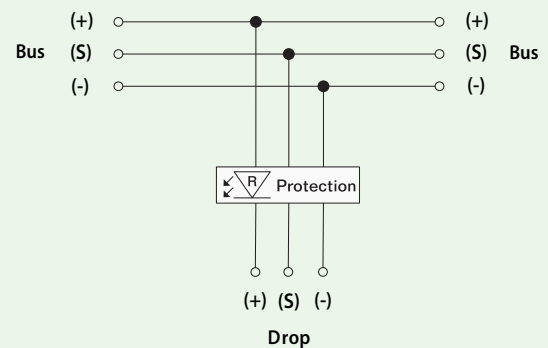


Schematic drawings

Passive

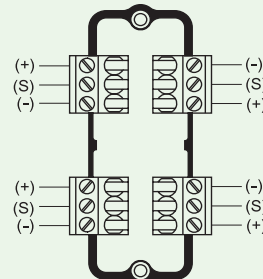


Protected

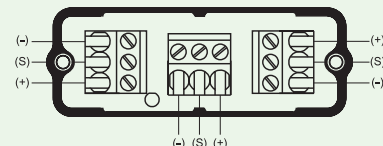


Wiring diagrams

Passive



Protected



Drop connectors

Model number
DR461068A
DR465008A (DIN)



Switched multi-drop connector/device coupler

This switched drop connector offers a very convenient method to remove, replace, or repair a device while the balance of the network remains on-line. It allows the user to disconnect a drop segment from the rest of the bus by flipping a switch.

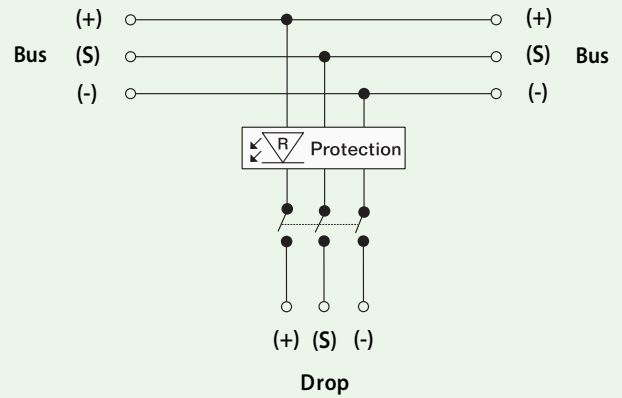
Features

- Disconnect bus segments
- Short circuit protection
- LED indicates drop fault
- Direct mount or DIN rail mount available

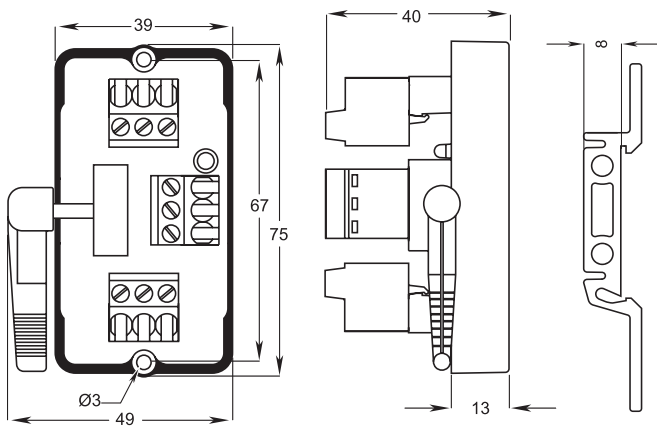


Specifications	
Protocol	Profibus-PA
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	< 1V
Trip current (drop)	40 mA
Holding current (after trip)	28 mA
Reset current level	Current falls below 28 mA
Maximum devices per drop	1
Current consumption	None
Dimensions (L, W, H)	75mm, 49mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Schematic drawing

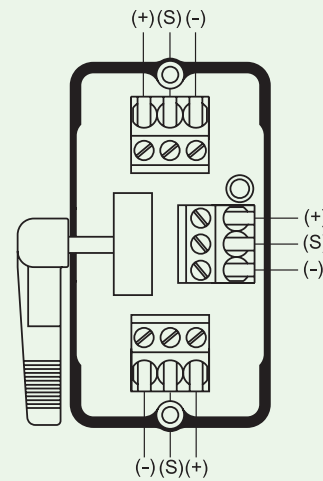


Dimensions (mm)



DIN rail clip only applies to DIN models.

Wiring diagram



Drop connectors (DIN)

Model number

DR465037A
Passive

DR465041A
Protected



Multi-drop connector/device coupler (6 drops)

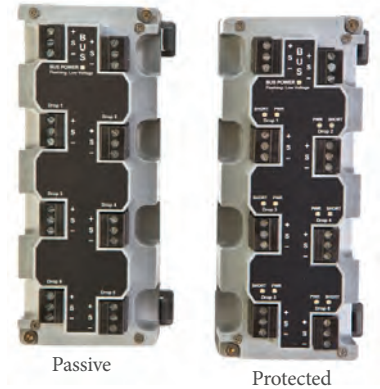
Drop connectors provide a reliable, safe method of connecting field devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

Passive

- 8 amp capacity
- LED indicates bus power

Protected

- Short circuit protection
- LEDs indicate drop fault, bus power, and drop power
- Automatically resets when drop fault is cleared

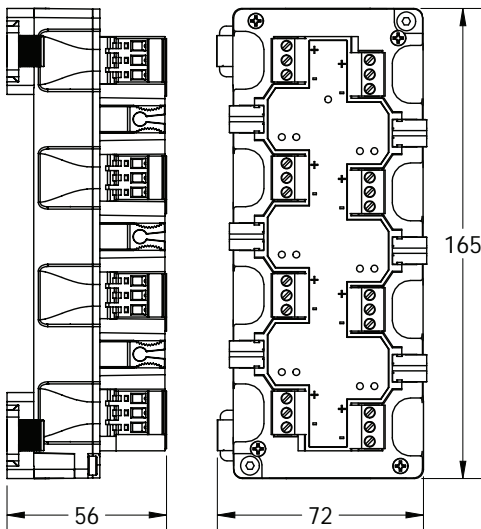


Passive

Protected

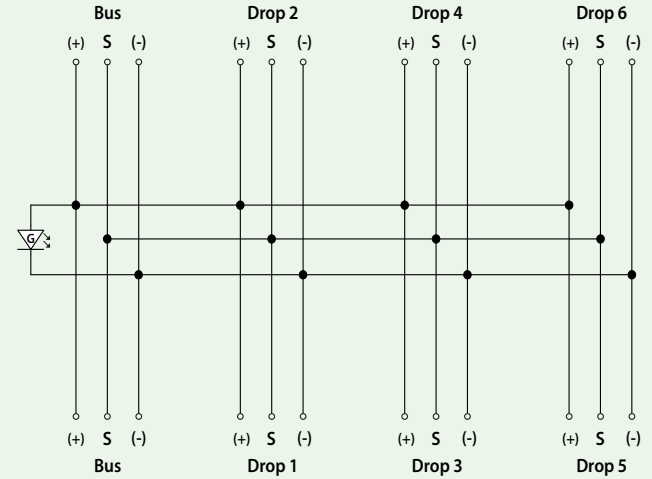
Specifications	
Protocol	Profibus-PA
LED displays	Bus power on - green LED Drop power on - green LED (protected) Drop short circuit - red LED (protected)
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Passive: negligible Protected: 1 volt maximum
Trip current (drop)	Passive: no trip current Protected: 40mA
Holding current (after trip)	Passive: n/a Protected: 28mA
Reset current level	Current falls below 28mA
Current consumption	20mA for all nodes
Dimensions (L, W, H)	135mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Dimensions (mm)

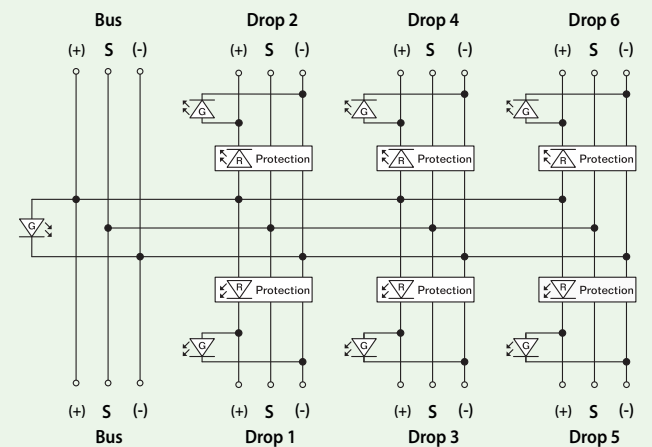


Schematic drawings

Passive



Protected



Drop connectors (DIN)

Model number
DR465045A
Switch protected



Multi-drop connector/device coupler (6 drops)

Drop connectors provide a reliable, safe method of connecting field devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

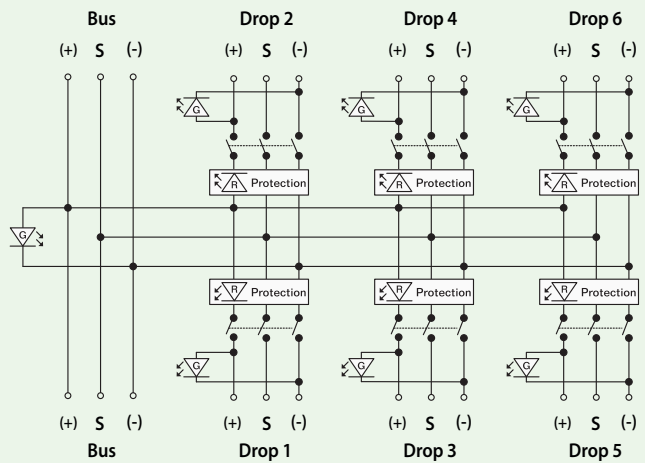
Switched protected

- Disconnects each drop
- Short circuit protection
- LEDs indicate drop fault, bus power, and drop power status
- Automatically resets when drop fault is cleared

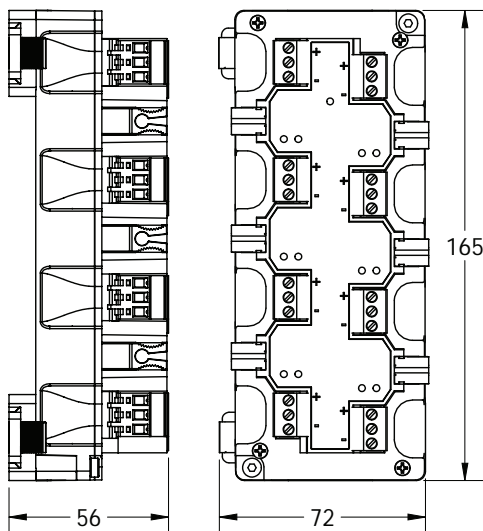


Specifications	
Protocol	Profibus-PA
LED displays	Bus power on - green LED Drop power on - green LED (protected) Drop short circuit - red LED (protected)
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	1 volt maximum
Trip current (drop)	40mA
Holding current (after trip)	28mA
Reset current level	Current falls below 28mA
Current consumption	20mA for all nodes
Dimensions (L, W, H)	165mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

Schematic drawing



Dimensions (mm)



Modbus Contents

Modbus description	102
<i>Overview and economic analysis of Modbus network</i>	
Drop connectors	103-106

The logo for Modbus, with the word 'MODBUS' in a bold, sans-serif font. The letters 'MOD' are blue and 'BUS' are green.

www.modbus.com

Modbus

Overview and analysis

Modbus, developed by Schneider/Modicon, has been the defacto standard for interfacing remote I/O and PLCs into the process DCS system for the past 15 years. Because of this strong history, most legacy control systems interface conveniently with the Modbus standard. Numerous actuator and instrument manufacturers support the protocol, therefore, it is used extensively as a “fieldbus” network as well. The following discussion focuses primarily on the protocol use for field networking purposes.

Modbus features

- Interfaces conveniently into most existing plant control architectures.
- Networks up to 32 devices on a 4-wire network (2-wires for signal and 2-wires for power).
- Trunk network may extend up to 4,000 feet (1220 meters) per segment.
- Dramatically cut wiring costs and commissioning over conventional applications.
- Protocol has been proven in thousands of “mission critical” process applications over the last 20 years.
- Capable of supporting both simple discrete devices as well as sophisticated analog applications.
- May be supported without additional training since most plants are already using the protocol extensively.
- Popular among instrument manufacturers for a wide variety of applications.

Optimal Modbus applications

Modbus is ideally suited for process applications where up to 32 devices (31 field devices and 1 master) may be connected over a 4,000 foot span into an existing control system. The RS485 version is used for multi-drop field applications with other versions, RS232 and RS422, relegated to point-to-point installations.

Modbus RS485 field devices must be separately powered since the signal wire pair does not transmit sufficient power. Signal wires may be shielded twisted pair. An additional 16 gauge pair is recommended for power transmission and may be run in the same tray or conduit with the shielded twisted signal pair.

Both discrete and analog applications are supported by the Stonel Modbus modules. So in addition to directly connecting valve communication terminals into the bus, conventional 4-20mA analog devices may be interfaced as well.

Modbus economic analysis

Since many PLCs and DCSs integrate a Modbus master with Modbus drivers there is minimal cost for plugging in the Modbus line and mapping I/O to the application software. A conventional 24VDC power supply may be used for powering the field devices. (Power for the master is typically incorporated into the PLC or DCS rack.)

Modbus provides significant savings in upfront wiring cost. It is recommended for long cable runs between field devices.

With the exceptional distance capabilities of the Modbus RS485 protocol there are dramatic wiring savings as noted above. Analog input capabilities further improve the economic benefits.

Modbus modules have a 4 to 20 mA input which digitizes the signal with a resolution to 0.1%. Power for the circuit is available from the bus power pair wired to the module. Process flow, temperature, pressure, and any other 4-20mA input signal, may be input directly into the bus, eliminating wiring and input modules at the controller!

Installation cost comparison		
	Conventional	Modbus
Valve monitor; VCT with solenoid	\$510	\$730
Conduit and wiring (\$8/ft)*	\$600	\$250
I/O cards; Modbus master	\$4,000	\$100
Power supply	\$10	\$960
Protection drop connectors	\$0	\$80
Total installed cost	\$4,550	\$1,890
Net installation savings \$2,660		
* Wiring 10 field devices that are located an average of 500 ft from the controller in a Class 1 Division 2 environment.		

Modbus specifications			
Physical layer options	RS232, RS422 RS485 (RS485 recommended for field devices)		
	<u>RS232</u>	<u>RS422</u>	<u>RS485</u>
Max drivers	1	1	32
Max receivers	1	10	32
Max cable length	50 ft	4000 ft	4000 ft
Topology (RS485)	Trunk with drops		
Cabling (RS485)	(1) shielded twisted pair for signal and (1) pair for 24 VDC supply		
Bus power	Must have auxiliary 24 VDC supply		
Transmission rate	1.2 K to 115 K bits/second		
Data access	Broadcast by master (no response by slave) or master/slave query with slave response (cyclic polling is typically used)		
Data transfer size	Variable size in 1 byte increments		
Transmission modes	RTU or ASCII (Stonel products use RTU)		
Addresses	From 1 to 255		
Approximate cycle time	74 msec for 32 field devices @ 32.4 kbits/second		
Error detection	CRC (Cyclic Redundancy Check)		
Support organization	Modbus organization www.modbus.org		

Drop connectors

Model number
DR461056A
DR465004A (DIN)

Passive multi-drop connector (2 drops)

This multi-drop connector is compact with direct mount for wiring Profibus-DP/Modbus networks. It provides terminations for bus in, bus out, and two (2) individual drops or spurs.

Features

- Direct mount or DIN rail mount available
- IP20 housing

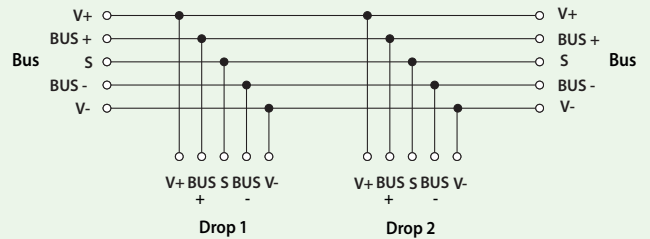
MODBUS



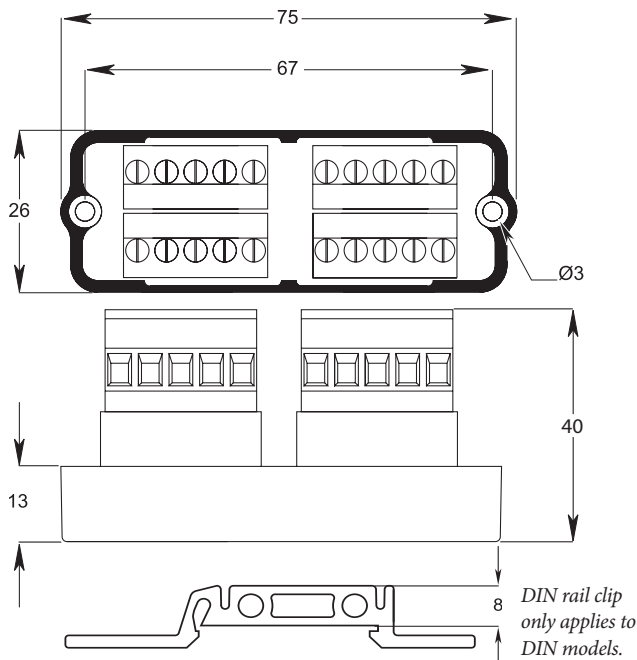
Specifications	
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Negligible
Trip current (drop)	No trip current
Maximum devices per drop	No limit
Current consumption	None
Dimensions (L, W, H)	75mm, 26mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)



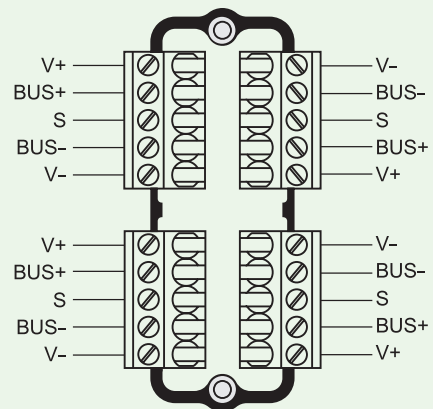
Schematic drawing



Dimensions (mm)



Wiring diagram



Drop connectors

Model number

DR461119A

DR465010A (DIN)

Protected drop switch (1 drop)

This disconnect switch is a compact, drop connector for wiring Profibus-DP/Modbus networks. It has a disconnect switch that allows the user to disconnect a drop from the trunk. This device also provides current limiting on the power leg to prevent power losses.

Features

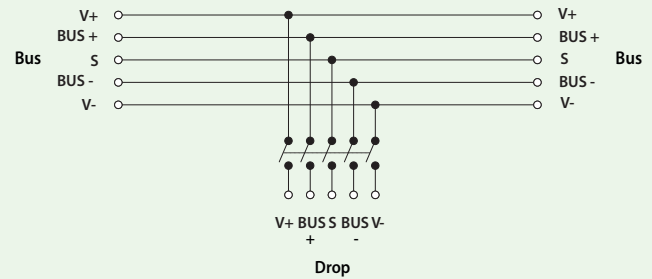
- Current limit on power drop
- Direct mount or DIN rail mount available



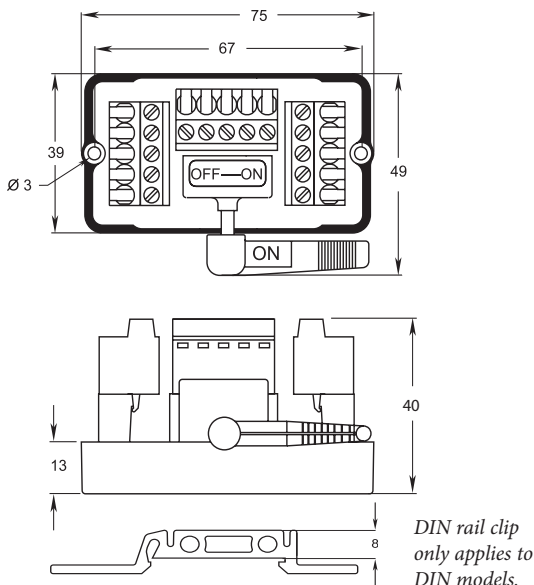
MODBUS

Specifications	
Maximum voltage	35 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	< 1V
Trip current (drop)	200 mA
Holding current (after trip)	28 mA
Reset current level	Current falls below 28 mA
Maximum devices per drop	1
Current consumption	None
Dimensions (L, W, H)	75mm, 49mm, 40mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

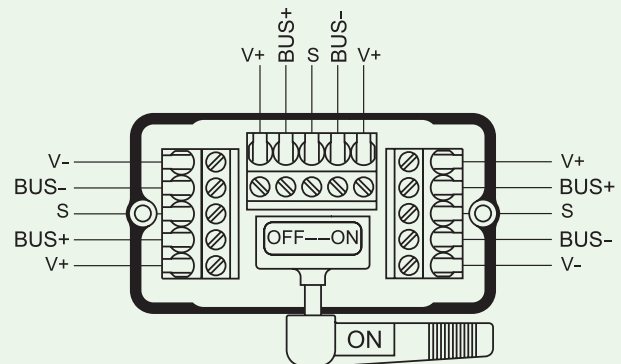
Schematic drawing



Dimensions (mm)



Wiring diagram



Drop connectors (DIN)

Model number

DR465039A

Passive

DR465043A

Protected



Multi-drop connector (6 drops)

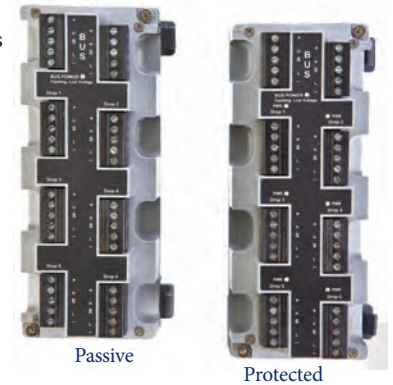
Drop connectors provide a reliable, safe method of connecting slave devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

Passive

- 8 amp capacity
- LED indicates bus power

Protected

- Short circuit protection
- LEDs indicate drop fault, bus power, and drop power
- Automatically resets when drop fault is cleared



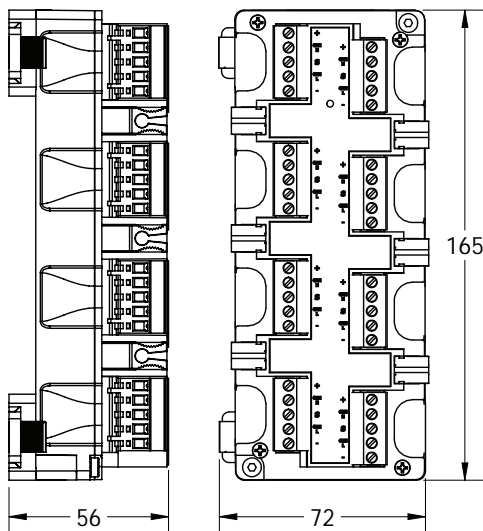
Passive

Protected

Specifications	
LED displays	Bus power on - green LED Drop power on - green LED (protected) Drop short circuit - red LED (protected)
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Passive: negligible Protected: 1 volt maximum
Trip current (drop)	Passive: no trip current Protected: 240mA (on V+)*
Holding current (after trip)	Passive: n/a Protected: 28mA
Reset current level	Current falls below 28mA
Current consumption	10mA for all nodes
Dimensions (L, W, H)	165mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

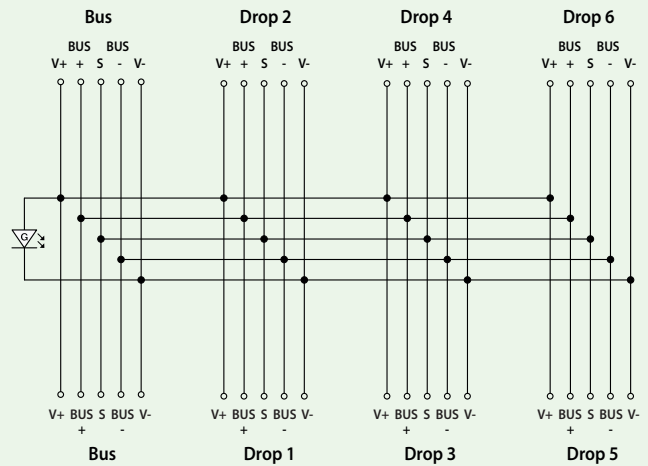
*Short circuit protection only on V+. Communication wires are passive.

Dimensions (mm)

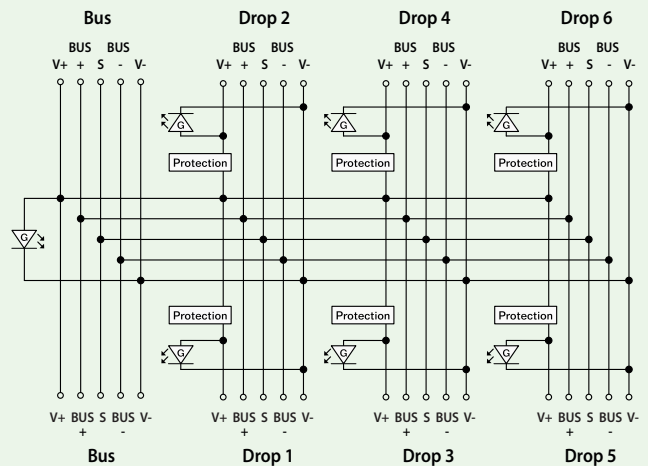


Schematic drawings

Passive



Protected



Drop connectors (DIN)

Model number

DR465047A

Switch protected

Multi-drop connector (6 drops)

Drop connectors provide a reliable, safe method of connecting slave devices to the bus cable. Protected drop connectors limit the current passing from the bus to the drop leg to prevent fault conditions on the drop from affecting the bus. DIN rail mounting is standard.

Switched protected

- Disconnects each drop
- Short circuit protection on the power leg
- LEDs indicate drop fault, bus power, and drop power status
- Automatically resets when drop fault is cleared

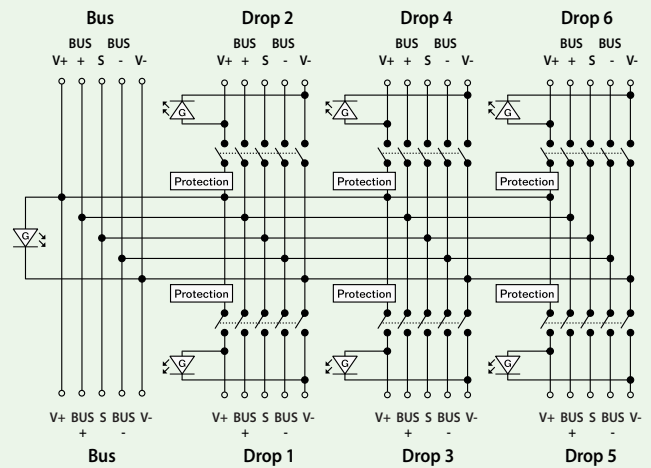


Specifications

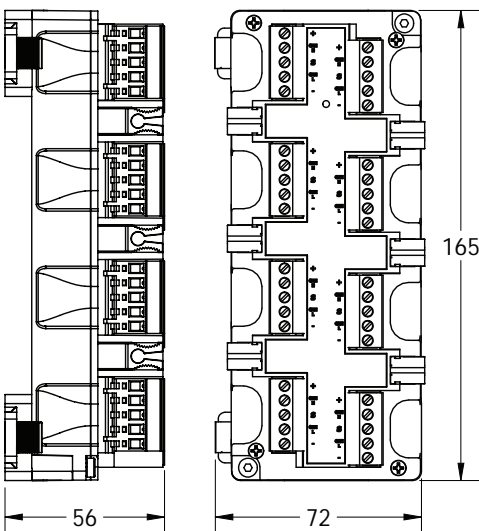
LED displays	Bus power on - green LED Drop power on - green LED Drop short circuit - red LED
Maximum voltage	35 VDC
Maximum current (trunk)	8 amp
Voltage drop (trunk)	Negligible
Voltage drop (drop)	<1 volt
Trip current (drop)	240mA (on V+)*
Holding current (after trip)	28mA
Reset current level	Current falls below 28mA
Current consumption	10mA for all nodes
Dimensions (L, W, H)	165mm, 72mm, 56mm
Housing	Engineered resin
Operating temperature	-40° to +80°C (-40° to +176°F)

*Short circuit protection only on V+. Communication wires are passive.

Schematic drawing



Dimensions (mm)



Power Supplies Contents

Power Supplies

107-114

The Stonel logo is rendered in a bold, blue, sans-serif font. The letter 'L' is significantly larger than the other letters and features a small trademark symbol (TM) at its top right corner. The logo is positioned in the lower right quadrant of the page, set against a background of a faded industrial plant and a complex network of white lines and text labels.

Valve Communication Solutions

26271 US Highway 59, Fergus Falls, MN 56537
USA
Tech hotline 1-218-737-0701
Tel. 1-218-739-5774, fax 1-218-739-5776
Email: sales@stoneL.com
StoneL.com

Power supplies

Model number
PS459022A

3.4 amp 24 VDC power supply

The latest in DIN rail switch mode power supplies. This compact general purpose 24 VDC power supply has active filtering of input transients, extra low inrush current, and full output power up to +60°C.

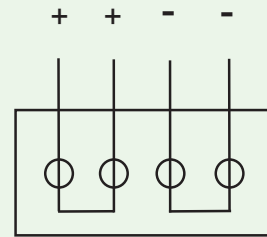
Features

- LED status indications
- UL Class I, Division 2 approved
- Spring clamp terminals



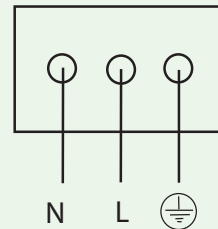
Specifications	
Output voltage	24-28 VDC (externally adjustable)
Output current	3.4 amps
Output ripple	50mVpp (max)
Input voltage	Universal 100 - 240VAC (50-60Hz)
Input current	1.8A / 1.0A (100VAC / 240VAC)
Power factor	0.55 / 0.47 (100VAC / 240VAC)
Efficiency	88.7% / 90.0% (100VAC / 240VAC)
Over voltage protection	36 VDC (max)
Overload protection	Yes
Over temperature protection	Yes
Holdup time	28ms
Area approvals	Class I, Division 2; T4; groups A,B,C,D
Displays	Power ok, green LED Overload, red LED
Operating temperature	-25°C to +70°C (+14°F to +140° F)
Storage temperature	-40°C to +85°C (-40°F to +185° F)
Housing	Al/Mg alloy DIN rail mounting
Dimensions (L, W, H)	124mm, 32mm, 102mm
Ingress protection	IP20, field enclosure required
Approvals	UL508, UL1950, cULus, CE
Weight	420 (1.0 pounds)

Schematic drawing



output voltage
24 VDC

input line voltage



Power supplies

Model number
PS459024A

5.0 amp 24 VDC power supply

The latest in DIN rail switch mode power supplies. This compact general purpose 24 VDC power supply has active filtering of input transients, extra low inrush current, and full output power up to +60°C.

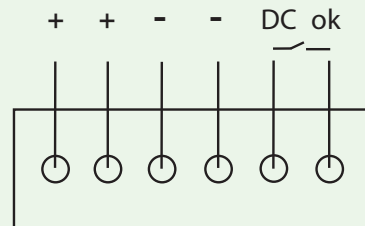
Features

- UL Class I, Division 2 approved
- DC output ok (dry contact)
- LED status indications
- Spring clamp terminals



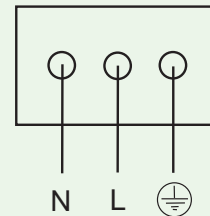
Specifications	
Output voltage	24-28 VDC (externally adjustable)
Output current	5.0 amps
Output ripple	50mVpp (max)
Input voltage	Universal 100 - 240VAC (50-60Hz)
Input current	1.4A / 0.65A (100VAC / 240VAC)
Power factor	0.99 / 0.91 (100VAC / 240VAC)
Efficiency	91.6% / 92.7% (100VAC / 240VAC)
Over voltage protection	36 VDC (max)
Overload protection	Yes
Over temperature protection	Yes
Holdup time	34ms
Area approvals	Class I, Division 2; T4; groups A,B,C,D
Displays	Power ok, green LED Overload, red LED
Operating temperature	-25°C to +70°C (+14°F to +140° F)
Storage temperature	-40°C to +85°C (-40°F to +185° F)
Housing	Al/Mg alloy DIN rail mounting
Dimensions (L, W, H)	124mm, 40mm, 117mm
Ingress protection	IP20, field enclosure required
Approvals	UL508, UL1950, cULus, CE
Weight	620g (1.4 pounds)

Schematic drawings



output voltage
24 VDC

input line voltage



Power supplies

Model number
PS459026A

10.0 Amp 24 VDC power supply

The latest in DIN rail switch mode power supplies. This compact general purpose 24 VDC power supply has active filtering of input transients, extra low inrush current, and full output power up to +60°C.

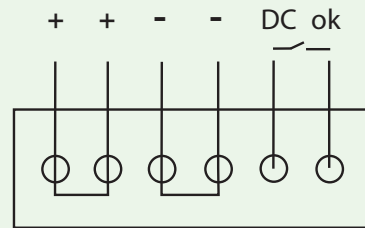
Features

- UL Class I, Division 2 approved
- DC output ok (dry contact)
- LED status indications
- Spring clamp terminals



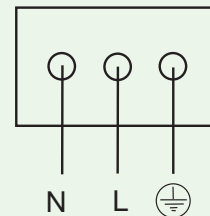
Specifications	
Output voltage	24-28 VDC (externally adjustable)
Output current	10.0 amps
Output ripple	50mVpp (max)
Input voltage	Universal 100 - 240VAC (50-60Hz)
Input current	2.8A / 1.2A (100VAC / 240VAC)
Power factor	0.99 / 0.92 (100VAC / 240VAC)
Efficiency	92.3% / 93.0% (100VAC / 240VAC)
Over voltage protection	39 VDC (max)
Overload protection	Yes
Over temperature protection	Yes
Holdup time	27ms
Area approvals	Class I, Division 2; T4; groups A,B,C,D
Displays	Power ok, green LED Overload, red LED
Operating temperature	-25°C to +70°C (+14°F to +140° F)
Storage temperature	-40°C to +85°C (-40°F to +185° F)
Housing	Al/Mg alloy DIN rail mounting
Dimensions (L, W, H)	124mm, 60mm, 117mm
Ingress protection	IP20, field enclosure required
Approvals	UL508, UL1950, cULus, CE
Weight	900g (2.0 pounds)

Schematic drawings



output voltage
24 VDC

input line voltage



Power supplies

Model number
PS459032A

2.1 amp 24 VDC power supply

This compact general purpose 24 VDC power supply has an innovative DIN rail mounting system that holds even at vibration or lateral pressure. Spring clamp terminals are clearly arranged and user-oriented.

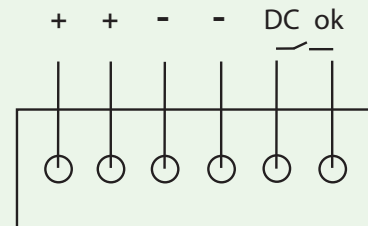
Features

- NEC Class 2 supply
- UL Class I, Division 2 approved
- LED status indication
- DC output ok (dry contact)
- Spring clamp terminals



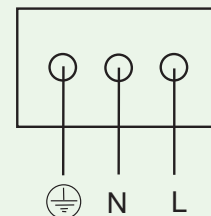
Specifications	
Output voltage	24-28 VDC (externally adjustable)
Output current	2.1 amps
Output ripple	50mVpp (max)
Input voltage	Universal 100 - 240VAC (50-60Hz)
Input current	1.0A / 0.6A (100VAC / 240VAC)
Efficiency	88.5% (100VAC)
Over voltage protection	40 VDC (max)
Overload protection	Yes
Over temperature protection	Yes
Holdup time	17ms
NEC power class	NEC class 2
Area approvals	Class I, Division 2; T4; groups A,B,C,D
Displays	Power ok, green LED
Operating temperature	-10°C to +70°C (+14°F to +140° F)
Storage temperature	-25°C to +85°C (-13°F to +185° F)
Housing	Non-metallic; DIN rail mounting
Dimensions (L, W, H)	91mm, 45mm, 75mm
Ingress protection	IP20, field enclosure required
Approvals	UL508, UL1950, cULus, CE, Class 2
Weight	240g (0.5 pounds)

Schematic drawings



output voltage
24 VDC

input line voltage



Power supplies

Model number
PS459034A

4.2 amp power supply

This compact general purpose 24 VDC power supply has an innovative DIN rail mounting system that holds even at vibration or lateral pressure. Spring clamp terminals are clearly arranged and user-oriented.

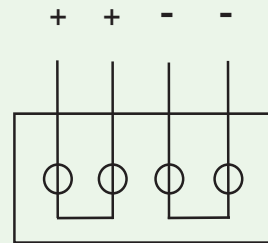
Features

- UL Class I, Division 2 approved
- Spring clamp terminals
- LED status indication



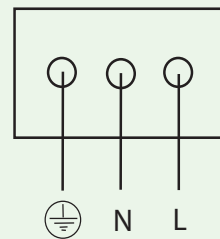
Specifications	
Output voltage	24-28 VDC (externally adjustable)
Output current	4.2 amps
Output ripple	50mVpp (max)
Input voltage	100 -120/200-240VAC (selectable)
Input current	2.1A / 1.0A (100VAC / 240VAC)
Efficiency	90.0% (100VAC)
Over voltage protection	36 VDC (max)
Over current protection	Yes
Over temperature protection	Yes
Holdup time	20ms
Area approvals	Class I, Division 2; T4A; groups A,B,C,D
Displays	Power ok, green LED
Operating temperature	-10°C to +70°C (+32°F to +140° F)
Storage temperature	-25°C to +85°C (-13°F to +185° F)
Housing	Non-metallic; DIN rail mounting
Dimensions (L, W, H)	103mm, 73mm, 75mm
Ingress protection	IP20, field enclosure required
Approvals	UL508, UL1950, cULus, CE,
Weight	360g (0.8 pounds)

Schematic drawing



output voltage
24 VDC

input line voltage



Power supplies

Model number
PS459028A

10.0 amp power supply

This general purpose 24 VDC power supply has an innovative DIN rail mounting system that holds even at vibration or lateral pressure. Large robust screw terminals are clearly arranged and user-oriented.

Features

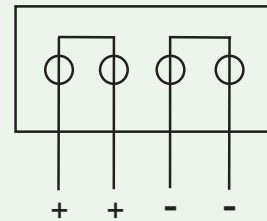
- UL Class I, Division 2 approved
- LED status indication



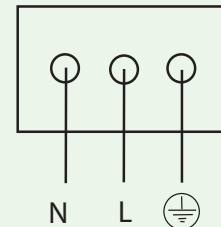
Specifications	
Output voltage	24-28 VDC (externally adjustable)
Output current	10.0 amps
Output ripple	30mVpp (max)
Input voltage	100 -120/200-240VAC (selectable)
Input current	6.0A / 2.8A (100VAC / 240VAC)
Efficiency	90.0% (100VAC)
Over voltage protection	35 VDC (max)
Over current protection	Yes
Over temperature protection	Yes
Turn-on time	200ms
Turn-on delay	100ms
Holdup time	25ms
Area approvals	Class I, Division 2; T3C; groups A,B,C,D
Displays	Power ok, green LED
Operating temperature	0°C to +70°C (+32°F to +140° F)
Storage temperature	-25°C to +85°C (-13°F to +185° F)
Housing	Al/Mg alloy DIN rail mounting
Dimensions (L, W, H)	102mm, 120mm, 124mm
Ingress protection	IP20, field enclosure required
Approvals	UL508, UL1950, cULus, CE,
Weight	980g (2.2 pounds)

Schematic drawing

output voltage
24 VDC



input line voltage



Power supplies

Model number
PS459030A

20.0 amp power supply

This general purpose 24 VDC power supply has an innovative DIN rail mounting system that holds even at vibration or lateral pressure. Large robust screw terminals are clearly arranged and user-oriented.

Features

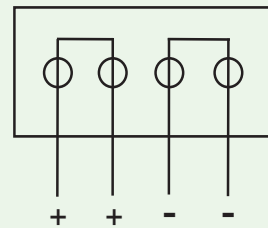
- LED status indication



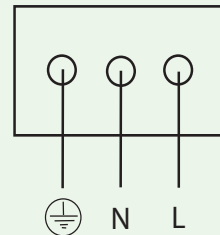
Specifications	
Output voltage	24-28 VDC (externally adjustable)
Output current	20.0 amps
Output ripple	20mVpp (max)
Input voltage	Universal 100 - 240VAC (50-60Hz)
Input current	10.0A / 5.0A (100VAC / 240VAC)
Efficiency	91.0% (100VAC)
Over voltage protection	33 VDC (max)
Over current protection	Yes
Over temperature protection	Yes
Turn-on time	80ms
Turn-on delay	500ms
Holdup time	20ms
Displays	Power ok, green LED Overload, red LED
Operating temperature	0°C to +70°C (+32°F to +140° F)
Storage temperature	-25°C to +85°C (-13°F to +185° F)
Housing	Al/Mg alloy DIN rail mounting
Dimensions (L, W, H)	102mm, 220mm, 124mm
Ingress protection	IP20, field enclosure required
Approvals	UL508, UL1950, cULus, CE,
Weight	2.5kg (5.5 pounds)

Schematic drawing

output voltage
24 VDC



input line voltage





Enclosures Contents

FieldBlock (FN)	116-121
Junction Module (JX)	122-131
FieldRack	131-134

StoneL™

Valve Communication Solutions

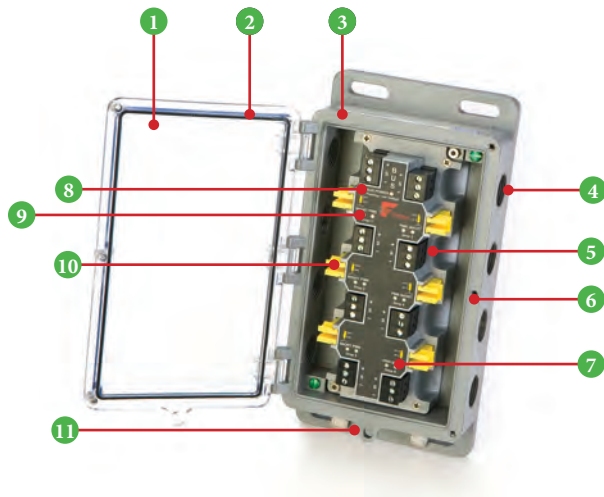
26271 US Highway 59, Fergus Falls, MN 56537
USA
Tech hotline 1-218-737-0701
Tel. 1-218-739-5774, fax 1-218-739-5776
Email: sales@stoneL.com
StoneL.com

FieldBlock (FN)



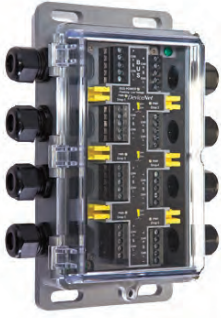
StoneL's FieldBlock enclosure is designed for use in general purpose, nonincendive and intrinsically safe process applications. It may be used with flexible or hard conduit wiring systems. With its rugged corrosion proof enclosure, variety of module and connector configurations, and its mounting adaptability, it will prove invaluable for field networking projects.

Features



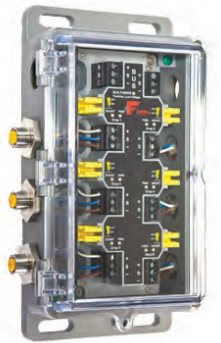
1. Durable corrosion proof enclosure is made of epoxy-coated anodized aluminum with an impact-resistant Lexan polycarbonate cover.
2. Sealed for heavy washdown applications the enclosure is rated for NEMA 4, 4X & 6 (IP67).
3. Suitable for hazardous environments in nonincendive (Div 2/Zone 2) or intrinsically safe (Div 1/Zone 0) applications.
4. Multiple connector/cable gland options include quick connectors (mini or micro), cable glands, ½" NPT or M20. Special models with varying combinations may also be specified for unique requirements.
5. Fast, convenient wiring is possible with easy access fully labeled terminal blocks, and the quick entry durable hinged cover.
6. Space-efficient design minimizes external dimensions while offering ample room for wire connection and drop switching.
7. Clear operation status is displayed using LED system to show drop connector, bus power, and short circuit status. LED display may also be conveniently viewed while the enclosure cover is closed and sealed.
8. Bus power monitoring system provides a flashing LED warning display if voltage levels fall outside specified limits. This aids in trouble-shooting and preempts potential problems.
9. Wide variety of drop connectors includes passive, protected, and switched options.
10. Individually switched drops enable each circuit to be independently energized or de-energized from the bus, saving valuable maintenance and set-up time.
11. Safety lock provision adds an extra measure of security for lock out, tag out conditions.

Flexible wiring systems



Cable glands

General purpose nonincendive and intrinsically safe wiring may be connected into the FieldBlock via compression sealed cable glands. Glands with rubber grommets will compress wires tightly, providing excellent mechanical strength and a waterproof seal. Cable glands also include plugs to seal any unused entries.



Connectors

Mini-connectors designed for four-wire bus networks (fifth wire for shield/ground) and micro-connectors for two-wire buses (third wire for shield/ground) are standard options. Mini- and micro-connectors provide a convenient, secure method for disconnecting spurs from the bus trunk. And, with the switched drop connectors, field devices may be conveniently removed without dropping power to the network.



NPT or M20 conduits

1/2" NPT or M20 conduits are available to attach to traditional hard conduit systems. Liquid tight flexible conduit may also be used with conventional conduit entries providing support for PLTC/ITC cable used in tray systems.

Individually switched drop connector features



Each drop connection (device coupler) may be individually energized or de-energized with an hermetically sealed proximity switching mechanism. As a result

users may realize several benefits including:

Reduced maintenance costs

Each instrument may be separately disconnected while keeping all other instruments live, even in hazardous areas.

Improved safety

With hermetically sealed proximity switches on each drop connection (device coupler) circuit no arcs or sparks are possible in the atmosphere. Wiring changes may also be performed on a de-energized drop with live bus connection.

Reduced set-up and commissioning costs

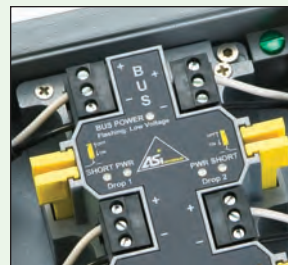
As the network is initially energized each instrument may be individually powered up on the network. Physical confirmation of electronically addressed instruments is quick and convenient.

Greater convenience for quick connectors in hazardous areas

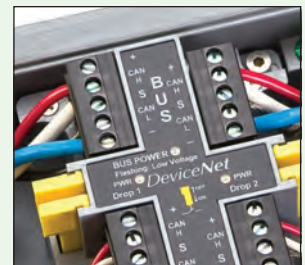
For removal of quick connectors in circuits with significant current flow the circuit must be powered down. Individually switched drop circuits make that convenient and foolproof.



MODBUS DeviceNet



Two-wire networks



Four-wire networks

FieldBlock (FN) functions

Drop connectors

Drop connectors enable individual spurs to be securely wired to the bus trunk. Drop connectors are available in either passive or protected versions. The FieldBlock (FN) offers 6 drops from the bus trunk as standard.



Passive drop connectors directly interconnect bus and wiring for all spurs with no protection circuitry.

Protected drop connectors include a solid state protection circuit which detects a fault condition on each of the spurs individually and isolates the affected spur from the bus. Bus operation and the other spurs are unaffected, yet the bus master will be able to detect the faulted spur. Local LED indication may be viewed through the clear Lexan cover indicating a fault condition.

Specifications (passive)	
Protocols	FNT models AS-i, FF/PB-PA, DN, MB/PB-DP
Configuration	6 drops from bus trunk
Maximum rated voltage	35VDC
Maximum drop current	2.0 amps
Maximum voltage drop	Negligible
Current consumption	20mA (AS-i & FF/PB-PA) 10mA (DN & MB/PB-DP)

Specifications (protected)	
Protocols	FNT models AS-i, FF/PB-PA, DN, MB/PB-DP
Configuration	6 individual drops from bus trunk
Maximum rated voltage	35VDC
Maximum trunk current	8 amps
Maximum trunk voltage drop	Negligible
Maximum drop current	limited to rated value
Maximum drop voltage drop	1.0V
Rated drop currents	Select from 40mA or 240mA
Holding current (after break)	28mA
Reset current level	Current falls below 28mA
Current consumption	20mA

Switched drop connectors

Individual switches enable each circuit to be independently energized or de-energized from the bus. Protection circuitry comes standard in each two-wire bus drop connection providing fault protection for the bus while the spurs are energized.

The FieldBlock (FN) switched drop connector may be locked, and/or tagged out, assuring safe working conditions for the maintenance of field devices attached to the spurs while the bus trunk remains energized.



Specifications (protected)	
Protocols	FNS models AS-i & FF/PB-PA
Configuration	6 drops from bus trunk
Maximum rated voltage	35VDC
Maximum trunk current	8 amps
Maximum trunk voltage drop	Negligible
Maximum drop current	Limited to rated value
Maximum drop voltage drop	1.0V
Rated drop currents	Select from 40mA or 240mA
Holding current (after break)	28mA
Reset current level	Current falls below 28mA
Current consumption	20mA

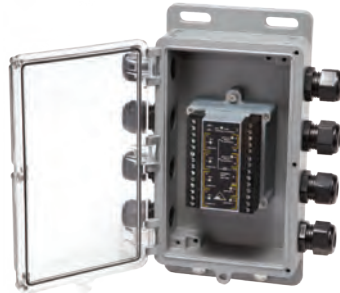
Specifications (protected)	
Protocols	FNS models DN & PB-DP/MB
Configuration	6 drops from bus trunk
Maximum rated voltage	35VDC
Maximum trunk current	8 amps
Maximum trunk voltage drop	Negligible
Maximum drop current (on V+)	240 mA*
Maximum drop voltage drop	1.0V
Holding current (after break)	28mA
Reset current level	Current falls below 28mA
Current consumption	10mA

*Short circuit protection only on V+. Communication wires are passive.

FieldBlock (FN) I/O and relay I/O modules

I/O modules

Interface field devices into the bus network in hazardous environments with FN I/O modules. Connect discrete inputs and outputs to the module and take advantage of incredible installation savings.



Specifications (I/O modules)	
Protocols	AS-Interface
Models	FNM96 and FNM97 (extended addressing)
AS-Interface profile	96: ID = F, I/O = 7 (4DI, 4D) 97: ID = A, I/O = 7 (4DI, 3DO)
Discrete inputs	(4) 3mA @ 28VDC gold contact mechanical, low power reed, or proximity sensor
Discrete outputs	96: (4) 28VDC (4 watts total power available) 97: (3) 28VDC (4 watts total power available)
Operating voltage	AS-Interface voltage
Current consumption	<40mA (with no outputs energized)
Indication (96)	(4) input state LEDs (green) (4) output state LEDs (green) (1) AS-i power OK LED (green)
Indication (97)	(4) input state LEDs (green) (3) output state LEDs (green) (1) AS-i power OK LED (green)

Relay modules

Independent or Interlocked relay modules are integrated with each of the I/O modules to provide high power output switching capabilities. The 2-DO from the I/O modules drive the two relays providing high power switching operation to separate high power circuits. All other functions of the I/O modules remain the same.



Specifications (Relay I/O modules)	
Protocols	AS-Interface
Models	Independent relays: FNR96 and FNR97 (extended addressing) Interlocking relays: FNI96 and FNI97 (extended addressing)
AS-Interface profile	96: ID = F, I/O = 7 (4DI, 4DO) 97: ID = A, I/O = 7 (4DI, 3DO)
Discrete inputs	(4) 3mA @ 28VDC gold contact mechanical, low power reed, or proximity sensor
Discrete outputs (relay)	independent (2) 120/250VAC fused @ 2A independant for other AC/DC loads interlocking (2) 120/250VAC fused @ 2A interlocked for motor operation
Bus powered outputs	96: (2) 28VDC (4 watts total power available) 97: (1) 28VDC (4 watts total power available)
Operating voltage	AS-Interface voltage
Current consumption	<40mA (with no outputs energized)
Indication (96)	(4) input state LEDs (green) (4) output state LEDs (green) (1) AS-i power OK LED (green)
Indication (97)	(4) input state LEDs (green) (3) output state LEDs (green) (1) AS-i power OK LED (green)
External voltage (relay outputs)	Up to 250VAC; 30VDC

Model selector					
Series					
FN	FieldBlock nonincendive				
Functions					
Drop connectors - passive					
T02	AS-i; 6 drop				
T04	FF & Profibus-PA; 6 drop				
T06	DeviceNet™; 6 drop				
T08	Profibus-DP & Modbus; 6 drop				
Drop connectors - protected					
P02	AS-i; 6 drop				
P04	FF & Profibus-PA; 6 drop				
P06	DeviceNet™; 6 drop (power protected)				
P08	Profibus-DP & Modbus; 6 drop (power protected)				
Drop connectors - switched protected					
S02	AS-i (240 mA); 6 drop				
S04	FF & Profibus-PA (40 mA); 6 drop				
S06	DeviceNet™ (240 mA); 6 drop (power protected)				
S08	Profibus-DP & Modbus (240 mA); 6 drop (power protected)				
I/O modules					
M96	AS-i; 4-DI, 4-DO				
M97	AS-i; 4-DI, 3-DO (extended addressing)				
I/O modules - Independent relays					
R96	AS-i; 4-DI, 2-DO, 2-DO (relay)				
R97	AS-i; 4-DI, 2-DO, 2-DO (relay) [extended addressing]				
I/O modules - Interlocking relays					
I96	AS-i; 4-DI, 2-DO, 2-DO (relay)				
I97	AS-i; 4-DI, 2-DO, 2-DO (relay) [extended addressing]				
ENCLOSURE					
C	North American (NEC/CEC)				
Entry options					
C01A	(2) 1/2" NPT & (6) M20 cable glands [available with all protocols]				
C02A	(2) 1/2" NPT & (6) 4-pin mini-connectors [available with AS-i and FF/PB-PA]				
C03A	(2) 1/2" NPT & (6) 5-pin mini-connectors [available with DeviceNet™ and PB-DP/MB]				
C04A	(2) 1/2" NPT & (6) 4-pin micro-connectors [available with AS-i and FF/PB-PA]				
C05A	(2) 1/2" NPT & (6) 5-pin micro-connectors [available with DeviceNet™ and PB-DP/MB]				
G01A	(8) Cable glands [available with all protocols]				
M01A	(8) 4-pin micro-connectors, (1) male [available with AS-i and FF/PB-PA]				
M02A	(8) 5-pin micro-connectors, (1) male [available with DeviceNet™ and PB-DP/MB]				
N01A	(8) 4-pin mini-connectors, (1) male [available with AS-i and FF/PB-PA]				
N02A	(8) 5-pin mini-connectors, (1) male [available with DeviceNet™ and PB-DP/MB]				
P01A	(8) 1/2" NPT [available with all protocols]				
P02A	(8) M20 [available with all protocols]				
Model number example					
FN	S04	C	G01A	-	OPTIONAL
model number		partnership ID			
Some models may include 5-digit identification suffix.					

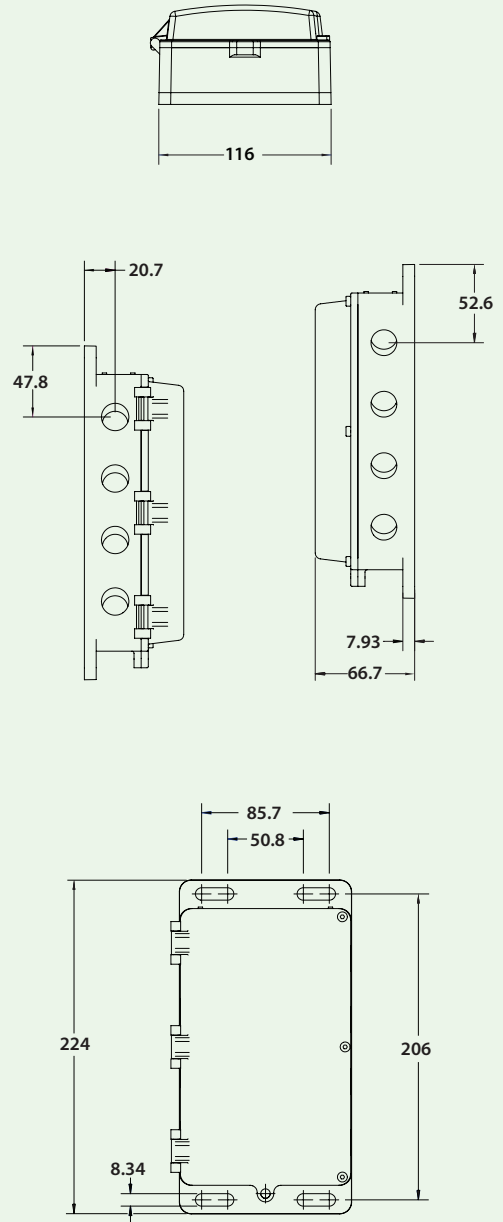
FieldBlock (FN) specifications and ratings

Materials of construction	
Housing	Anodized aluminum with epoxy-coating
Cover	Lexan® polycarbonate
Elastomer seals	Buna-N
Fasteners	Stainless steel
Enclosures protection	NEMA 4, 4X, 6 & 7; IP 67
Approvals	See StoneL.com/approvals

Temperature ratings	
Drop connectors, switched drop connectors, I/O modules and relay I/O modules	-40° to +80°C (-40° to +176°F)

Warranty	
Complete assemblies	Two years

Dimensions (mm)

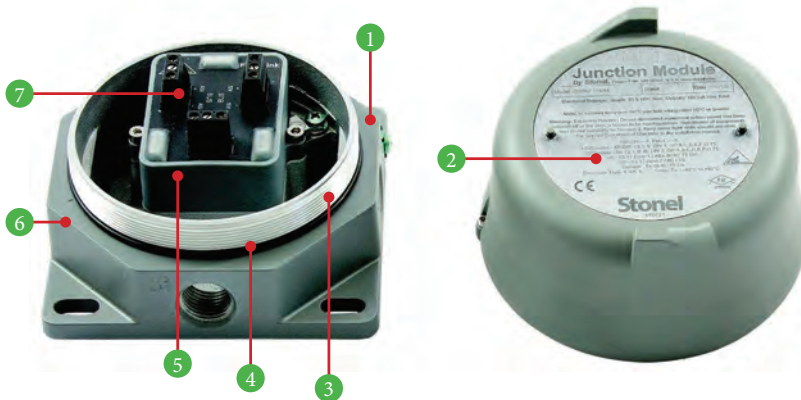


Junction module (JX)



StoneL's Junction Module (JX) enclosure is an environmentally hardened platform which is suitable for use in the most extreme corrosive and hazardous process environments. The JX features a wide variety of bus networking capabilities for protocols used in the process industries. Because of its flexibility and functionality it has become an essential building block for bus network users in the processing industries.

Features



1. Rugged enclosure
This enclosure is constructed of durable, marine grade anodized aluminum with two coats of epoxy. Optional clear polycarbonate cover enables observation of circuit status without opening the enclosure.
2. Hazardous approval ratings
JX may be used in explosionproof, nonincendive, dust ignition-proof, and general purpose applications.
3. Quick access
Screw-on cover enables convenient access to the enclosure.
4. Vapor tight and submersible
Rated for IP66/67 and NEMA 4, 4X and 6, the JX withstands rigorous washdowns and corrosive environments.

5. Wide variety of functions
Select from drop connectors, switched drop connectors, relay modules, I/O modules, I/O modules with integral solenoid valve, power conditioners, and special module configurations.
6. Compact design
JX's size minimizes space requirements for wiring and conduit layout.
7. Convenient wiring
Experience quick and secure wiring with the clearly labeled, top insertion terminal strips.



JX enclosure functions

Drop connectors (JXT and JXP models)

Drop connectors enable individual spurs to be conveniently wired to the bus trunk. They are available in either passive or protected versions.

Passive drop connectors directly connect bus and spur wiring via standard pre-labeled wire terminals.

Protected drop connectors include a solid state protection circuit which detects a fault condition on the spur and isolates the spur from the bus. Local LED indication may be viewed through the clear Lexan cover indicating a fault condition.



Specifications	
Protocols	AS-Interface, DeviceNet, Foundation Fieldbus, Profibus-PA, Profibus-DP and Modbus
Passive	JXT models
Protected	JXP models
Maximum voltage	32 VDC
Maximum current, trunk	8 amps
Voltage drop	Passive: Negligible (trunk and drop) Protected: Negligible (trunk) Protected: 1 volt (drop)
Trip current (drop)	Passive: no trip current Protected: 40 mA (FF/PB-PA) Protected: 240 mA (AS-i, DN, PB-DP, MB)
Holding current (after trip)	Protected: 28 mA (FF/PB-PA) Protected: 35 mA (AS-i, DN, PB-DP, MB)
Reset current level	Protected: drop current falls below 28 mA (FF/PB-PA) Protected: drop current falls below 35 mA (AS-i, DN, PB-DP, MB)
Maximum devices per drop	Passive: no limit Protected: 1
Current consumption	Passive: 5 mA Protected: 10 mA

Switched drop connectors (JXS models)

Each spur may be individually energized or de-energized using the switched drop connector. Protection circuitry comes standard in the drop connection providing fault protection for the bus while the spur is energized. The JX switched drop connector may be locked and/or tagged out assuring safe working conditions for the maintenance of field device(s) attached to the spur while the bus remains energized. The bold on and off labeling may be seen clearly up to 20 feet away, making bus status clearly viewable in the plant environment.






Specifications	
Protocols	AS-Interface, DeviceNet, Foundation Fieldbus, Profibus-PA, Profibus-DP, & Modbus
Protected	JXS models (AS-i & FF/PB-PA)
Power protected	JXS models (DN & MB/PB-DP)
Maximum voltage	32 VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	<1V
Trip current (drop)	40 mA (FF/PB-PA) 240 mA (AS-i, DN & MB/PB-DP)
Holding current (after trip)	28 mA (FF/PB-PA) 35 mA (AS-i, DN, PB-DP, MB)
Reset current level	Current falls below 28 mA (FF/PB-PA) Current falls below 35 mA (AS-i, DN & MB/PB-DP)
Maximum devices per drop	1
Current consumption	None

JX enclosure functions

I/O modules (JXM models)

Interface field devices into the bus network in hazardous environments with JX I/O modules. Connect analog 4 to 20 mA instrumentation inputs and outputs or discrete inputs and outputs to the module and take advantage of incredible installation savings.





Specifications for I/O modules			
Protocol			
Models	JXM96 JXM97 (extended addressing)	JXM92	JXM93 (bus powered) JXM94 (externally powered)
AS-Interface profile	JXM96: ID = F, I/O = 7 (4DI, 4DO) JXM97: ID = A, I/O = 7 (4DI, 3DO)		
Discrete inputs	(4) 3 mA @ 28 VDC gold contact mechanical, low power reed, or proximity sensor	(2) 7 mA @ 24 VDC gold contact mechanical, low power reed, or proximity sensor	(2) 6.5 VDC <.045 mA, must be low power dry contact capable of operating at <.045 mA @ 6.5 VDC or solid state pnp capable of operating at 6.5 VDC and <1 mA
Discrete outputs	JXM96: (4) 28 VDC (4 Watts total power available) JXM97: (3) 28 VDC (2.4 Watts total power available)	(2) 24 VDC (4 watts total power available)	JXM93: (2) 6.5 VDC 2 mA. Suitable for StoneL piezo valve JXM94: (2) 24 VDC (4 watts total power)
Analog input		(1) Analog (4-20 mA) input 10-bit resolution (0.1%)	JXM94: (1) analog (4-20 mA) input 10-bit resolution (0.1%)
Analog output			JXM94: (1) analog (4-20 mA) output 10-bit resolution (0.1%)
Operating voltage	AS-Interface voltage	24 VDC via DeviceNet voltage	9 to 32 VDC via Foundation Fieldbus voltage
Current consumption	<40 mA (with no outputs energized)	<60 mA (with no outputs energized)	<17 mA
Indication	(2) LEDs indicate discrete input status (red/green)	(2) LEDs indicate discrete input status (red/green)	(2) LEDs indicate discrete input status (red/green)
External voltage			JXM94: 24 VDC via external power
Data rate	167 kb/s	125, 250, 500 kb/s	31.25 kb/s

JX enclosure functions

Relay modules (JXR and JXI models)

Independent or Interlocked relay modules are integrated with each of the I/O modules to provide high power output switching capabilities. (AS-Interface, DeviceNet and Foundation Fieldbus externally powered I/O modules are available with relay outputs.) The 2-DO from the I/O modules drive the two relays providing high power switching operation to separate high power circuits. All other functions of the I/O modules remain the same.



Specifications for relay modules												
Protocol												
Models: independent	JXR96 JXR97 (extended addressing)	JXR92	JXR94 (externally powered)									
Models: interlocking	JXI96 JXI97 (extended addressing)	JXI92	JXI94 (externally powered)									
AS-Interface profile	JX_96 ID = F, I/O = 7 (4DI, 4DO) JX_97 ID = A, I/O = 7 (4DI, 3DO)											
Discrete inputs	(4) 3 mA @ 28 VDC gold contact mechanical, low power reed, or proximity sensor	(2) 7 mA @ 24 VDC gold contact mechanical, low power reed, or proximity sensor	(2) 6.5 VDC <.045 mA, must be low power dry contact capable of operating at <.045 mA@6.5 VDC or solid state pnp capable of operating at 6.5 VDC and <1 mA									
Discrete outputs (relay)	<table border="0"> <tr> <td>Independent</td> <td>(2) 120/250 VAC fused @ 2A independent for other AC loads</td> </tr> <tr> <td>Interlocking</td> <td>(2) 120/250 VAC fused @ 2A interlocked for motor operation</td> </tr> </table>	Independent	(2) 120/250 VAC fused @ 2A independent for other AC loads	Interlocking	(2) 120/250 VAC fused @ 2A interlocked for motor operation	<table border="0"> <tr> <td>(2) 120/250 VAC @ 2A independent for other AC loads</td> </tr> <tr> <td>(2) 120/250 VAC @ 2A interlocked for motor operation</td> </tr> </table>	(2) 120/250 VAC @ 2A independent for other AC loads	(2) 120/250 VAC @ 2A interlocked for motor operation	<table border="0"> <tr> <td>(2) 120/250 VAC @ 2A independent for other AC loads</td> </tr> <tr> <td>(2) 120/250 VAC @ 2A interlocked for motor operation</td> </tr> </table>	(2) 120/250 VAC @ 2A independent for other AC loads	(2) 120/250 VAC @ 2A interlocked for motor operation	
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(2) 120/250 VAC @ 2A independent for other AC loads												
(2) 120/250 VAC @ 2A interlocked for motor operation												
Bus powered outputs	96: (2) 28 VDC (4 Watts total power available) 97: (1) 28 VDC (2.4 Watts total power available)											
Analog input		(1) analog (4-20 mA) input 10-bit resolution (0.1%)	(1) analog (4-20 mA) input 10-bit resolution (0.1%)									
Analog output			(1) analog (4-20 mA) output 10-bit resolution (0.1%)									
Operating voltage	26.5 to 31.6 VDC	11 to 25 VDC	9 to 32 VDC									
Current consumption	<40 mA (with no outputs energized)	<60 mA (with no outputs energized)	<17 mA									
Indication	(2) LEDs indicate discrete input status (red/green)	(2) LEDs indicate discrete input status (red/green)	(2) LEDs indicate discrete input status (red/green)									
External voltage (analog I/O)			24 VDC via external power									
External voltage (relay outputs)	Up to 250 VAC; 30 VDC	Up to 250 VAC; 30 VDC	Up to 250 VAC; 30 VDC									

JX enclosure functions

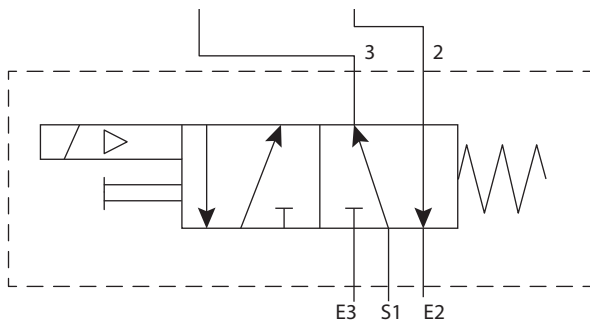
Models with integral solenoid valves

An integral Cyclone™ pneumatic valve may be selected that is precisely designed to be powered by the I/O module outputs. Single coil and dual coil versions are available. The high flow rate (1.2 Cv) solenoid operated spool valve provides reliable valve control for most any size of valve/actuator.

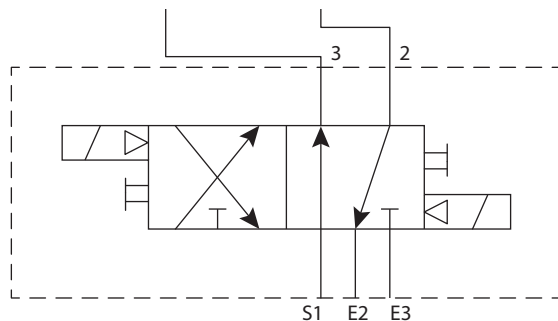


Schematics

Single pilot spring return pneumatic valve on spring return actuator



Dual coil shuttle piston pneumatic valve on double acting actuator



Specifications, JXB and JXM models

General pneumatic specifications		
Valve design	Pilot operated spool valve	
Configuration	Single pilot	5-way, 2-position, spring return
	Dual pilot	5-way, 2-position, shuttle piston
Flow rating	1.2 Cv (Kv = 1.04 based on flow m3/hr)	
Porting	3/8" NPT (1.2 Cv)	
Medium	Air or inert gas	
Medium temperature range (TS)	-40° C to 80° C	
Operating pressure	45 psi to 120 psi (3.1 to 8.2 bar)	
Operating temperature	-40° C to 80° C (-40° F to 176° F)	
Operating life	500,000 cycles (1.2 Cv)	
Manual override	Internal momentary Optional external momentary available Optional external latching available	
Material of construction		
Aluminum enclosure	Spool Body	Nickel plated aluminum Epoxy coated anodized aluminum
Stainless steel enclosure	Spool	Stainless steel
	Body	Stainless steel
	Seal spacers	Polysulfone
	Spool seals	Nitrile compound
	O-rings	Nitrile compound
	End caps and fasteners	316 stainless steel
Solenoid coil specifications		
JXB		
Operating voltage	20 - 250 VAC 50/60 Hz; 20 - 55 VDC	
Power consumption	12 mA @ 20 - 250 VAC (1.0 watt typical)	
	20 mA @ 20 - 55 VDC (0.5 watts typical)	
Inrush current	3.75 A @ 125 VAC (typical)	
	3.0 A @ 220 VAC (typical)	
	0.15 A @ 24 VDC (typical)	
Filtration requirements	50 microns	
JXM92, JXM94, JXM96		
Operating voltage	24 VDC	
Power consumption	0.5 watts	
Filtration requirements	50 microns	

Special modules

A variety of other functions are available with the JX. The following options provide essential networking capabilities in hazardous or general purpose environments.

12 pole terminal block (JXB models)

This convenient option is a junction box with a 12 pole terminal block inside. This be used to securely terminate and connect wires for a wide range of applications.



AS-Interface combination repeater and power conditioner (JXX models)

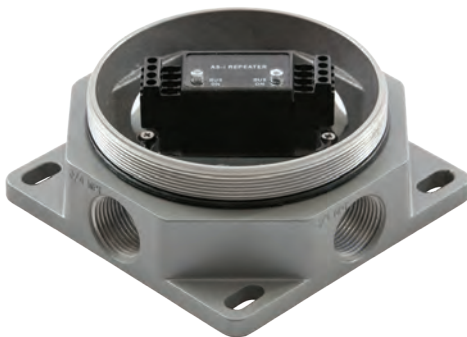
AS-Interface combination repeater and power conditioner extends your network length easily in hazardous and general purpose locations.

AS-Interface power conditioner

Power for two-wire bus networks must be decoupled from the communication signal for proper operation. With the JX power conditioner, the power supply may be located in a safe area with the power conditioner located in the field. Distance from the power supply to the power conditioner does not add to effective bus length.

AS-Interface repeater

This repeater extends the usable length of the AS-Interface network by 100 meters. The repeater requires one (1) AS-Interface power supply or an AS-Interface power conditioner.



Specifications		
12 pole terminal block		
Models	JXB12	
Current ratings	10 amps, 300 volts UL/C8A	
Number of poles	12	
Wire size	AWG #12-22 CU	
AS-Interface power conditioner		
Models	JXX01 and JXX02 (redundant) JXX05 and JXX06 (daisy chain)	
Maximum operating voltage	35 VDC	
Maximum current	3 amps	
LED displays	Voltage low LED	Solid red < 25.5 volts
	Voltage OK LED	Solid green > 26.1 volts
AS-Interface repeater		
Models	JXX00, JXX01 and JXX06	
Communication protocol	AS-Interface v3.0	
Operating voltage	26.5 - 31.6 VDC (AS-I voltage)	
Maximum current	3 amps	
AS-interface cycle time	0.15 ms X(number of slaves +1)	
Current usage	60 mA per segment, 120 mA total	
Bus on LEDs	Green if AS-i power applied	

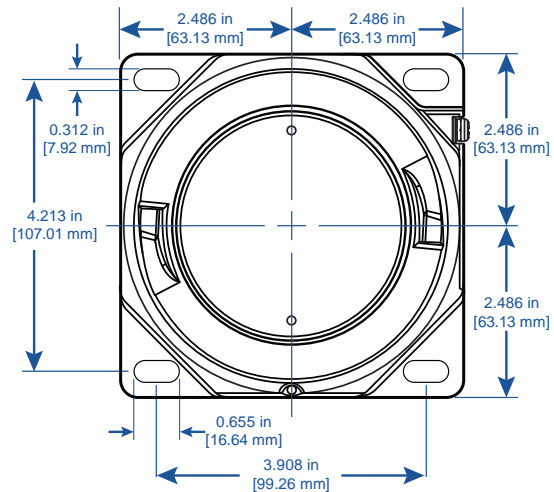
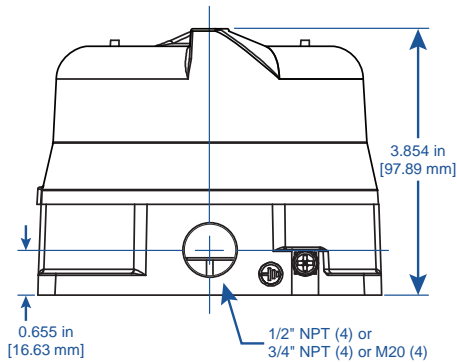
JX specifications and ratings

Specifications	
Materials of construction	
Housing & cover	Epoxy-coated anodized aluminum or CF3M stainless steel
Clear cover	Polycarbonate
Elastomer seals	Buna-N
Fasteners	Stainless steel
Operating life	Unlimited
Temperature range	-40° C to 80° C (-40° F to 176° F) +60° C (+140° F) maximum ambient for special function modules X00, X01 and X06
Enclosure protection	Type 4, 4X and 6 and IP66/67
Warranty	
Mechanical components	Two years

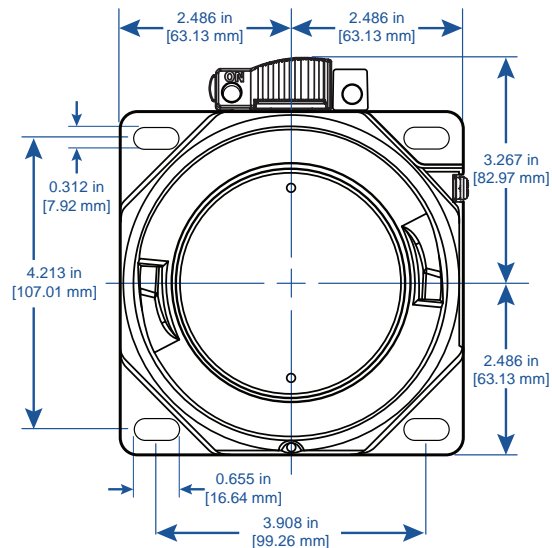
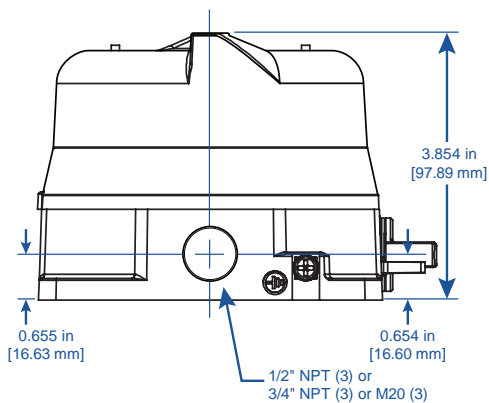
Specifications		
Modules	Five years	
Unit weights	Without solenoid	With solenoid
Aluminum housing and cover	1.40 kg / 3.10 lbs	2.10 kg / 4.60 lbs
Aluminum housing and clear cover	1.20 kg / 2.65 lbs	1.90 kg / 4.10 lbs
Stainless steel housing and cover	3.40 kg / 7.50 lbs	4.90 kg / 10.9 lbs
Stainless steel housing and clear cover	2.72 kg / 6.00 lbs	3.90 kg / 8.60 lbs
Unit dimensions		
Unit height	97.89 mm [3.85 in]	
Cover removal clearance	25.40 mm [1.00 in]	
Hazardous area ratings	US and CA (XP) Class I,II,III, Division 1 US and CA (NI) Class I,II,III, Division 2 ATEX/IECEX Ex db ATEX/IECEX Ex tb	
Approvals*		
cFMus, ATEX, IECEx See StoneL.com/approvals for details		
* Only models listed on StoneL's official website are approved per specific rating.		

Dimensions

Without switch

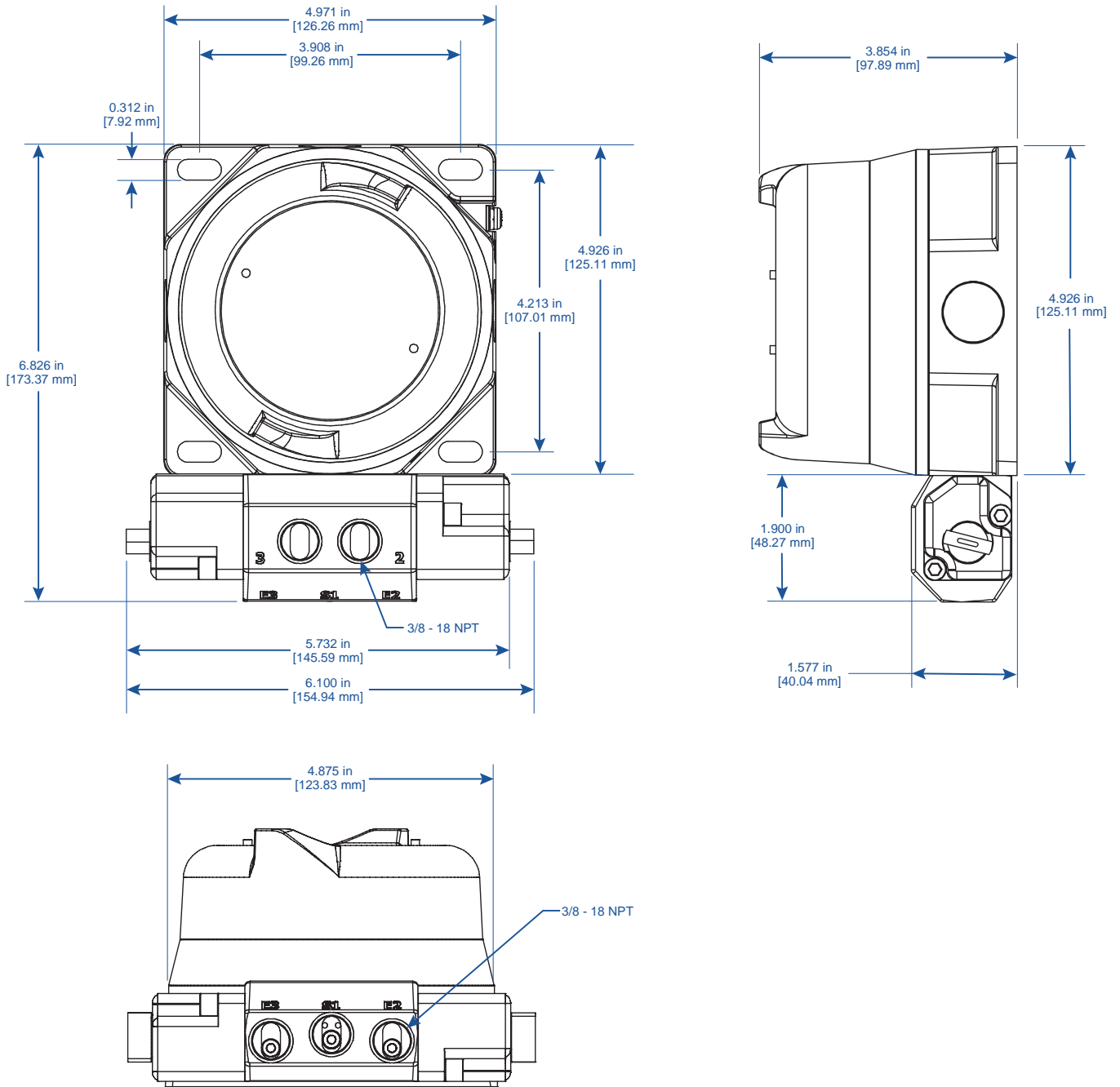


With switch - "S"



Dimensions

With pneumatic valve



Model selector

Series

JX Junction module

Functions

Drop connectors - passive

T02 AS-Interface

T04 Foundation Fieldbus and Profibus PA

T06 DeviceNet™

T08 Modbus and Profibus DP

Drop connectors - protected

P02 AS-Interface (240 mA)

P04 Foundation Fieldbus and Profibus PA (40 mA)

P06 DeviceNet™ (240 mA power protected)

P08 Modbus and Profibus DP (240 mA power protected)

Drop connectors - switch protected

S02 AS-Interface (240 mA)

S04 Foundation Fieldbus and Profibus PA (40 mA)

S06 DeviceNet™ (240 mA power protected)

S08 Modbus and Profibus DP (240 mA power protected)

PNEUMATIC VALVE

11 No pneumatics

ENCLOSURE

Epoxy-coated aluminum housing

C Clear cover North American (NEC/CEC)

D Clear cover International (IEC)

E Aluminum cover North American (NEC/CEC)

R Aluminum cover International (IEC)

Stainless steel housing

Y Clear cover North American (NEC/CEC)

Z Clear cover International (IEC)

S Stainless steel cover North American (NEC/CEC)

T Stainless steel cover International (IEC)

CONDUIT/CONNECTORS

Drop connectors

03A (3) 1/2" NPT

06A (3) M20

09A (3) 3/4" NPT

Model number example

JX T02 11 C 03A _____ OPTIONAL

model number partnership ID

Mounting hardware required and sold separately. Some models may include 5-digit identification suffix.

Model selector

Series

JX Junction module

Functions

I/O modules

M92 DeviceNet™

M93 Foundation Fieldbus (bus powered outputs)

M94 Foundation Fieldbus (externally powered outputs)

M96 AS-Interface

M97 AS-Interface with extended addressing

I/O modules - relay outputs

R92 DeviceNet™ (independent)

R94 Foundation Fieldbus (independent)

R96 AS-Interface (independent)

R97 AS-Interface with extended addressing (independent)

I92 DeviceNet™ (interlocked)

I94 Foundation Fieldbus (interlocked)

I96 AS-Interface (interlocked)

I97 AS-Interface with extended addressing (interlocked)

Special function modules

000 Empty enclosure

B12 (12) pole terminal block

X00 AS-Interface repeater

X01 AS-Interface repeater and power conditioner 'redundant'

X02 AS-Interface power conditioner 'redundant'

X05 AS-Interface power conditioner 'daisy chain'

X06 AS-Interface repeater and power conditioner 'daisy chain'

PNEUMATIC VALVE

11 No pneumatics

ENCLOSURE

Epoxy-coated aluminum housing

C Clear cover North American (NEC/CEC)

D Clear cover International (IEC)

E Aluminum cover North American (NEC/CEC)

R Aluminum cover International (IEC)

Stainless steel housing

Y Clear cover North American (NEC/CEC)

Z Clear cover International (IEC)

S Stainless steel cover North American (NEC/CEC)

T Stainless steel cover International (IEC)

CONDUIT/CONNECTORS

I/O and special function modules

0NA (4) 1/2" NPT

0MA (4) M20

0TA (4) 3/4" NPT

Model number example

JX M96 11 C 0NA _____ OPTIONAL

model number partnership ID

Mounting hardware required and sold separately. Some models may include 5-digit identification suffix.

Model selector

Series
 JX Junction module [aluminum enclosure and pneumatic valve]

Functions

I/O modules
 M92 DeviceNet™
 M94 Foundation Fieldbus (externally powered outputs with no analogs)
 M96 AS-Interface

Special function modules
 B12 (12) pole terminal block

PNEUMATIC VALVE [Aluminum]

Single pilot
 1E Internal momentary override only / 1.2 Cv
 1Y External momentary & internal override / 1.2 Cv
 1G External latching & internal override / 1.2 Cv

Dual pilot
 2E Internal momentary override only / 1.2 Cv
 2Y External momentary & internal override / 1.2 Cv
 2G External latching & internal override / 1.2 Cv

ENCLOSURE [Epoxy-coated aluminum housing]

C Clear cover North American (NEC/CEC)
 D Clear cover International (IEC)
 E Aluminum cover North American (NEC/CEC)
 R Aluminum cover International (IEC)

CONDUIT/CONNECTORS

I/O and special function modules
 03A (3) 1/2" NPT
 06A (3) M20
 09A (3) 3/4" NPT

Model number example
 JX M96 2E C 03A _____ OPTIONAL

_____ model number _____ partnership ID

Mounting hardware required and sold separately. Some models may include 5-digit identification suffix.

Model selector

Series
 JX Junction module [stainless steel enclosure and pneumatic valve]

Functions

I/O modules
 M92 DeviceNet™
 M94 Foundation Fieldbus (externally powered outputs with no analogs)
 M96 AS-Interface

Special function modules
 B12 (12) pole terminal block

PNEUMATIC VALVE [Stainless steel]

Single pilot
 1E Internal momentary override only / 1.2 Cv
 1Y External momentary & internal override / 1.2 Cv
 1G External latching & internal override / 1.2 Cv

Dual pilot
 2E Internal momentary override only / 1.2 Cv
 2Y External momentary & internal override / 1.2 Cv
 2G External latching & internal override / 1.2 Cv

ENCLOSURE [Stainless steel housing]

Y Clear cover North American (NEC/CEC)
 Z Clear cover International (IEC)
 S Stainless steel cover North American (NEC/CEC)
 T Stainless steel cover International (IEC)

CONDUIT/CONNECTORS

I/O and special function modules
 03A (3) 1/2" NPT
 06A (3) M20
 09A (3) 3/4" NPT

Model number example
 JX M96 2E S 03A _____ OPTIONAL

_____ model number _____ partnership ID

Mounting hardware required and sold separately. Some models may include 5-digit identification suffix.

FieldRack enclosure



StoneL's FieldRack enclosure is designed for a multitude of wiring systems in general purpose and nonincendive process applications. With its rugged corrosion proof enclosure and its variety of uses, the FieldRack proves invaluable for bus projects.

Features

1. **Durable corrosion proof enclosure**
The enclosure is constructed of Lexan® Polycarbonate, also used for jet fighter canopies, high impact parts, and nonincendive instrumentation enclosures. The FieldRack enclosure will withstand attack from acids, basic solutions, and salts.
2. **Wide variety of applications and uses**
The FieldRack provides a convenient housing for many FieldLink network components. The FieldRack may house gateways, power supplies, repeaters, and connection modules.
3. **Fully sealed**
The enclosure is fully sealed and may be used in heavy washdown environments. Complete with a side-hinged clear cover, this enclosure provides excellent protection while maintaining easy access.
4. **Space-efficient design**
The space-efficient design minimizes external dimensions while providing ample internal space for wiring and function modules. The FieldRack comes standard with an aluminum backplate inside with DIN rail attached and positioned for convenient location of FieldLink components.



Valmet's professionals around the world work close to our customers and are committed to moving our customers' performance forward – every day.

Valmet Flow Control Oy

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