

# Fieldbus Active Repeater RP312-S Datasheet

HART®  
Fieldbus  
Profibus  
Intrinsic Safety  
Configuration Tools  
Semiconductors  
Training  
Custom Design



## Features

- 1500 VAC Isolation between networks
- Very Low DC leakage at repeater inputs
- Each unit can extend the Fieldbus network length up to 1900 meters
- Provides up to 125 mA at 18 V to the Fieldbus network for field devices
- Includes terminators on network side
- 8 bit preamble can use 4 repeaters; 16 bit preamble can use 8 repeaters in series
- Accommodates conductors up to 2.5mm<sup>2</sup> (12 AWG)
- Fast snap-on DIN mounting rail assembly
- Conforms to IEC 61158-2, 31.25 Kbit/s standard for Foundation Fieldbus and PROFIBUS

## General Description

As cable lengths increase control signals deteriorate and can become unreadable by devices on the network. Signal repeaters can be used to avoid deterioration in large networks or over long network cable runs.

The RP312-S takes an incoming signal from one network segment, "cleans" it for errors, and re-transmits the signal at full strength to another network segment, maintaining signal quality and message integrity throughout all network segments. The RP312-S performs this function in a bi-directional fashion to support Fieldbus Networks. It is fully compliant with the IEC1158-2/ISA-S50.02 physical layer definition and specifications for Foundation Fieldbus and PROFIBUS.

An H1 bus topology Fieldbus network with DC power can support a network segment cable length of up to 1900 meters. Up to 4 repeaters may be used in series, providing for the total cable length of any particular network trunk or spur to be increased up to 5 times the cable length of one segment. This allows for a Fieldbus device to be located up to 9.5 Km (5.9 miles) away from a control room.

**Note:** *Distances may vary according to the application and field device characteristics. Consult the appropriate specifications from device manufacturers when designing a Fieldbus network.*

## Technical Characteristics

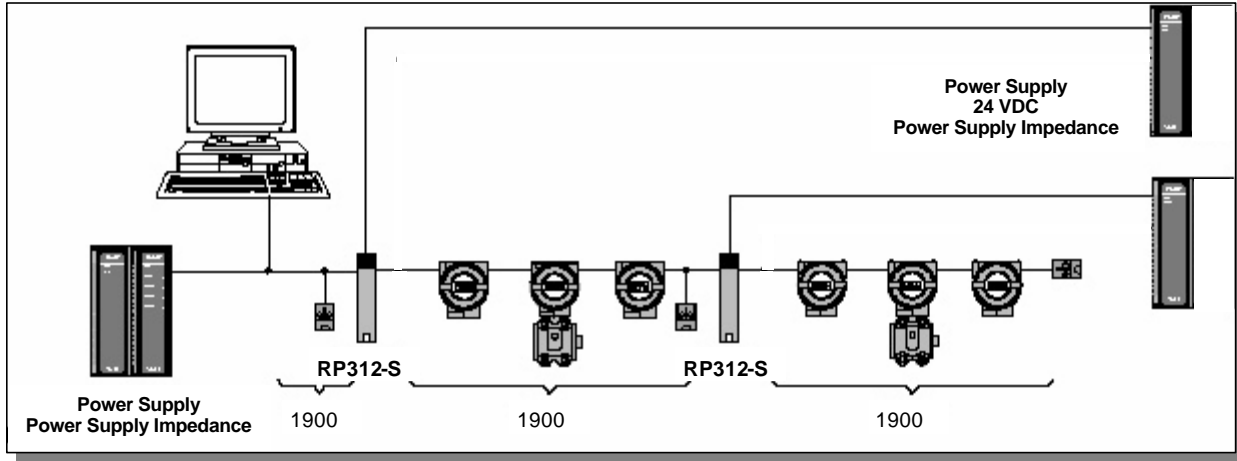
<b>Power</b>	
<b>Power Supply Input</b>	Rated Input Voltage: 24 VDC $\pm$ 5 %
<b>Network B Area</b>	
<b>Power Supply</b>	Maximum Voltage available at the barrier terminals at maximum  Maximum current: 125 mA @ 18V Short Circuit Electronic Protection: Trigger @ 145 mA;
<b>Internal Dissipation</b>	<b>3W maximum @ 24V input, nominal conditions</b>
<b>Digital Signal Transmission</b>	Compatible with 31.25kbit/sec – Fieldbus systems
<b>Fuse</b>	<b>Power Supply: 400mA</b> <b>Network A area: 100mA</b>
<b>Terminals</b>	Accommodate conductors up to 2.5 mm <sup>2</sup> (12AWG)
<b>Isolation</b>	<b>2500V galvanic isolation between input, output, and power supply terminals. Tested at 1500Vrms minimum between</b>
* Complies with the IEC61158-2 Physical Layer definition for Fieldbus.	
<b>Physical</b>	
<b>Ambient Temperature</b>	-20° to + 60°C (Continuous operation) -40° to + 80°C (storage - off line)
<b>Humidity</b>	-5% to 95% relative humidity

## Network Applications

### Series Topology

A serial architecture permits a series of up to 4 repeaters along a single Fieldbus network trunk or segment, each extending the network up to an additional

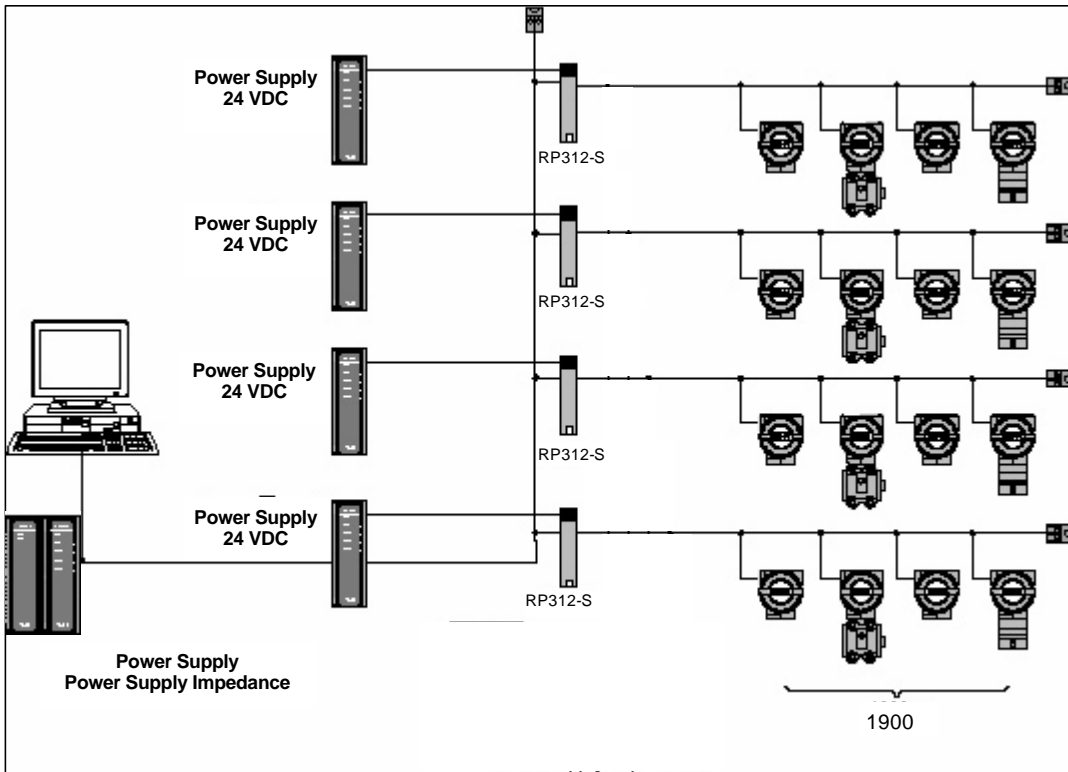
1900 meters. The example below shows the application of two SmarResearch RP312-S Fieldbus Repeater in a series topology.



### Parallel Topology

A parallel architecture permits almost an unlimited number of repeaters in parallel along the main trunk within the limits of the IEC1158-2/ISA-S50.02

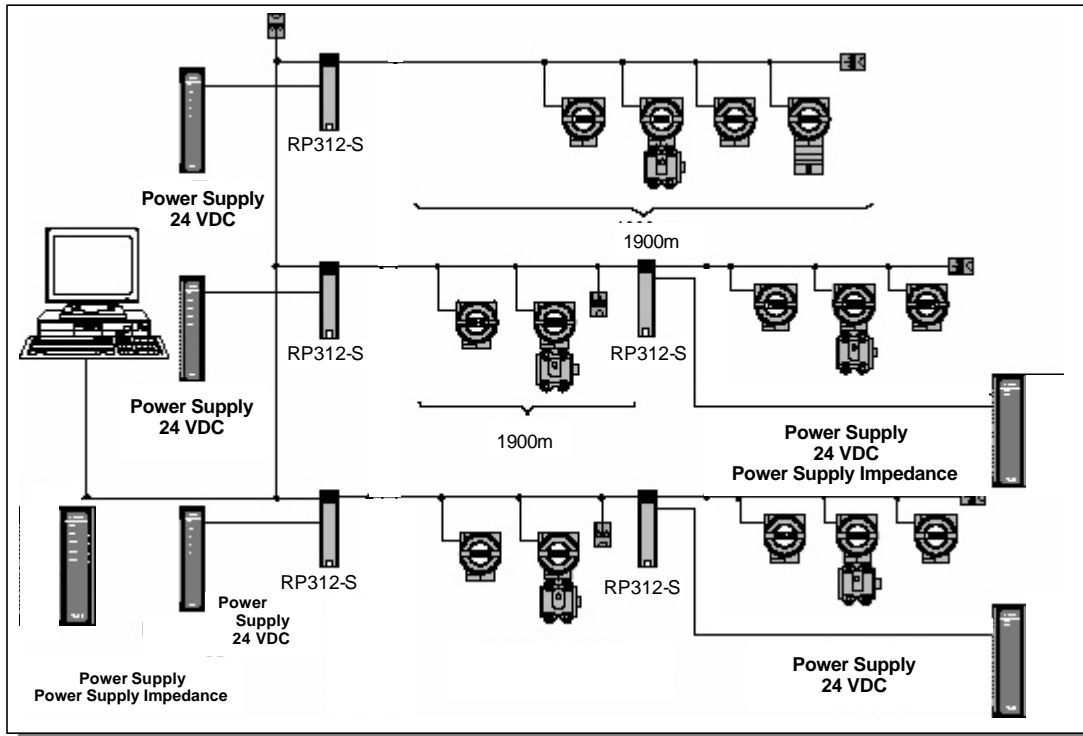
physical layer definition. The example below uses four SmarResearch RP312-S Fieldbus Repeater to extend the cable length of each network spur up to 1900 meters.



**Mixed Topology**

A mixed architecture combines series and parallel topologies for a virtually unlimited number of network configurations. The diagram below shows three SmarResearch RP312-S's in parallel originating from the main trunk with additional RP312-S's being used in series to extend the cable

lengths of individual network spurs. The Host is connected in parallel to each RP312-S on the main trunk. Although only a two RP312-S's are shown in series in the example, up to 4 can be used on each network spur, extending the cable length up to 9.5 Km from the main trunk.



**Note:**

*Distances and network configuration specifications may vary according to the application and field device characteristics. The network representations shown are simple examples to illustrate the types of configurations that can be implemented. Consult the appropriate device specifications when designing a Fieldbus network application.*

*To preserve the isolation provided by the SmarResearch RP312-S Fieldbus Repeater each network segment requires it's own power supply and power supply impedance to power the field devices connected to that particular segment.*

## Physical Attributes

### Installation

SmarResearch RP312-S Fieldbus Repeater, should always be installed by competent technical personnel. Contact SmarResearch or your local representative for further information.

*Before proceeding to install and wire the RP312-S. Please, read and thoroughly understand these instructions.*

### Location

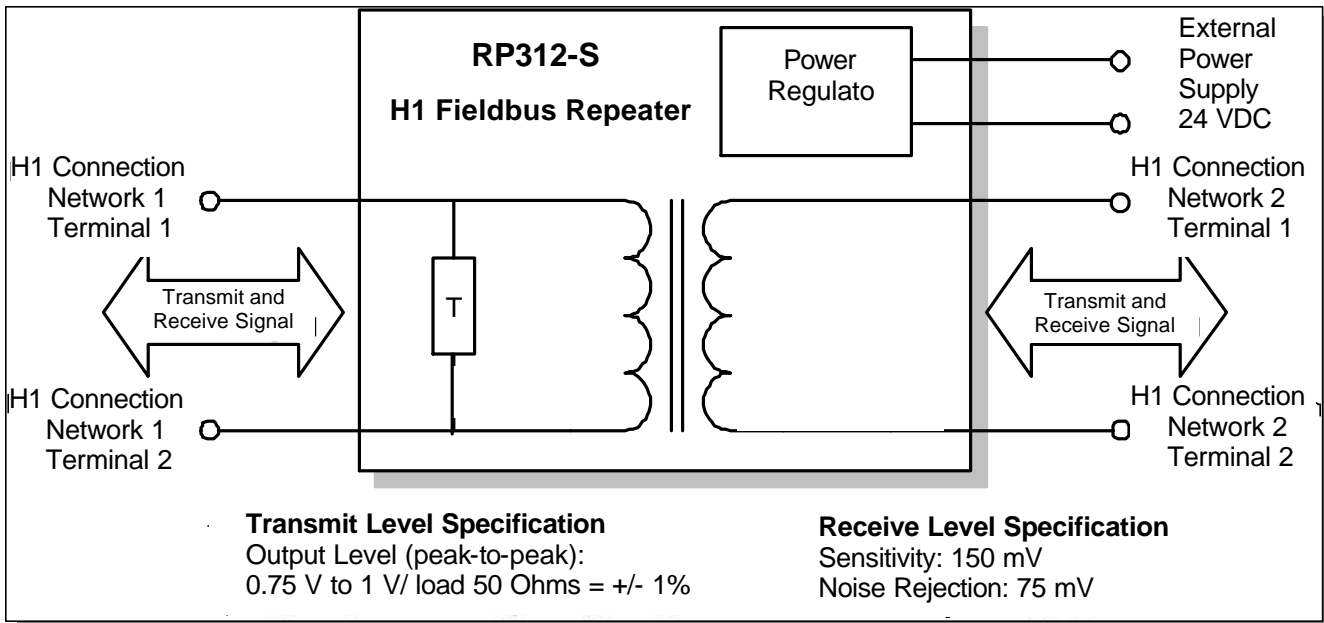
The device itself must be situated in a non-hazardous area where an explosive atmosphere will not exist at any time during repeater or network operation. If it is necessary to install in a hazardous area then it must be mounted

in a suitable approved explosion-proof enclosure with approved explosion-proof seals.

### Mounting

The RP312-S mounts easily by fast snap-on to a standard DIN mounting rail. It can also be panel mounted using provided corner mounting holes that accept two M4 or M5 (#6 or #10) screws. These mounting holes are molded into two corners of the housing shell base and do not increase the height or width of the enclosure, permitting multiple enclosures to be installed adjacent to each other with no clearance.

## Functional Diagram

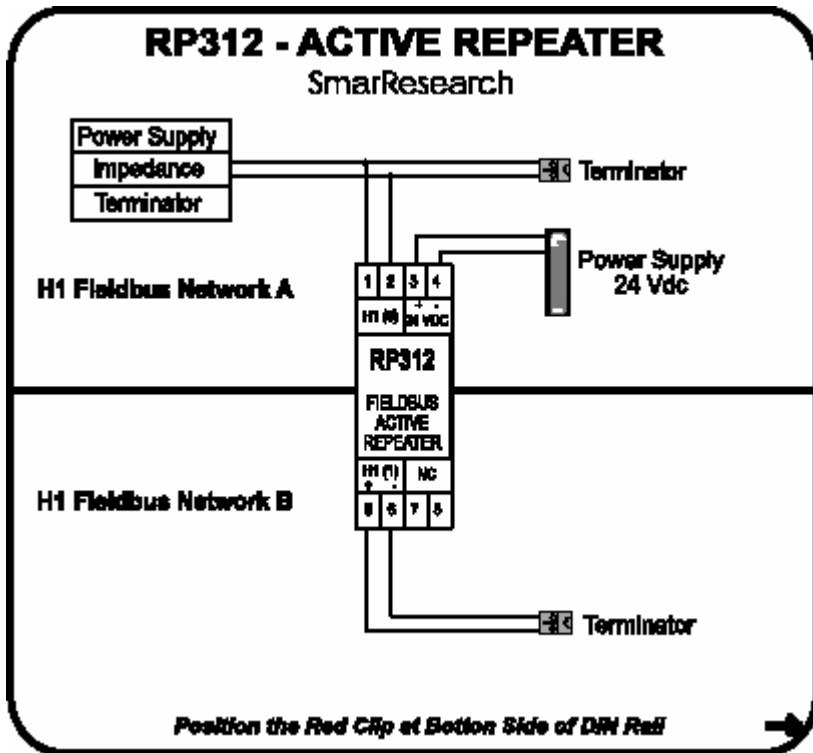


### Terminal Blocks

Connection	Description
1	Fieldbus I/O - Network 0
2	Fieldbus I/O - Network 0
3	24 VDC - Power Supply (+)
4	24 VDC - Power Supply (-)
5	Fieldbus I/O- Network 1
6	Fieldbus I/O- Network 1
7	Do Not Use
8	Do Not Use

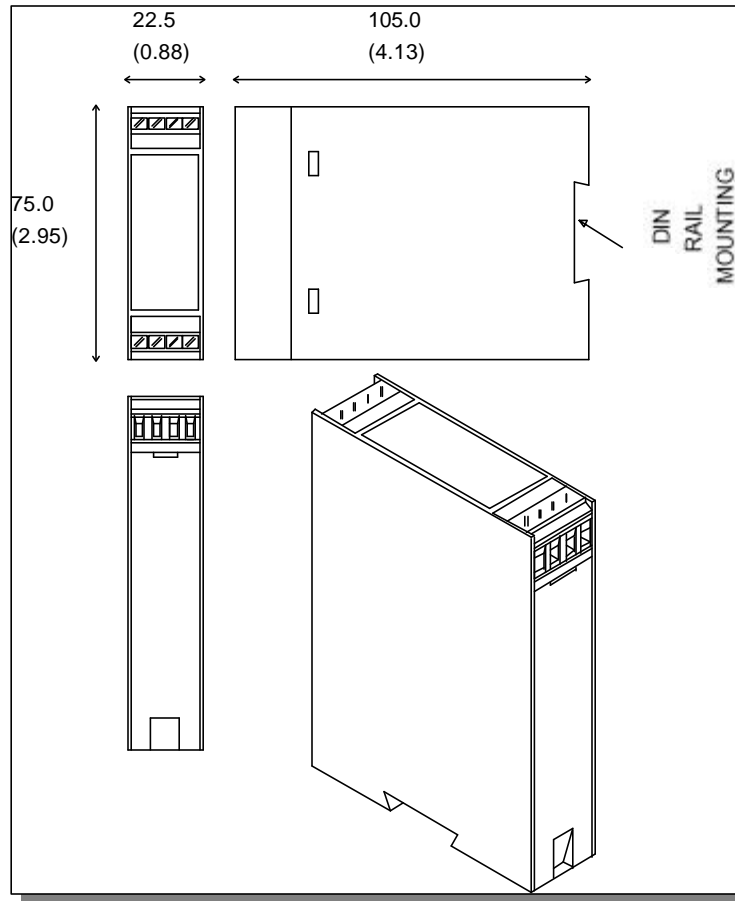


### Installation Guideline



**Note:** The head cover on the enclosure should be orientated so that the bottom of the text on the head cover coincides with the side of the enclosure with the red latch at the bottom.

## Mechanical Dimensions



RP312-S Physical Attributes



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