User Manual

ASeries A430

Interface Converter

RS-422 ⇔ 20mA Current Loop

The interfacing specialists

ALFATRON

A430 User Manual

Version 1.10

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1.0 PRODUCT DESCRIPTION

The ASeries A430 is an RS422 to 20mA Current Loop level converter. This product has been engineered to be used in both industrial and office environments.

The physical layout of the product is shown in the following diagram:

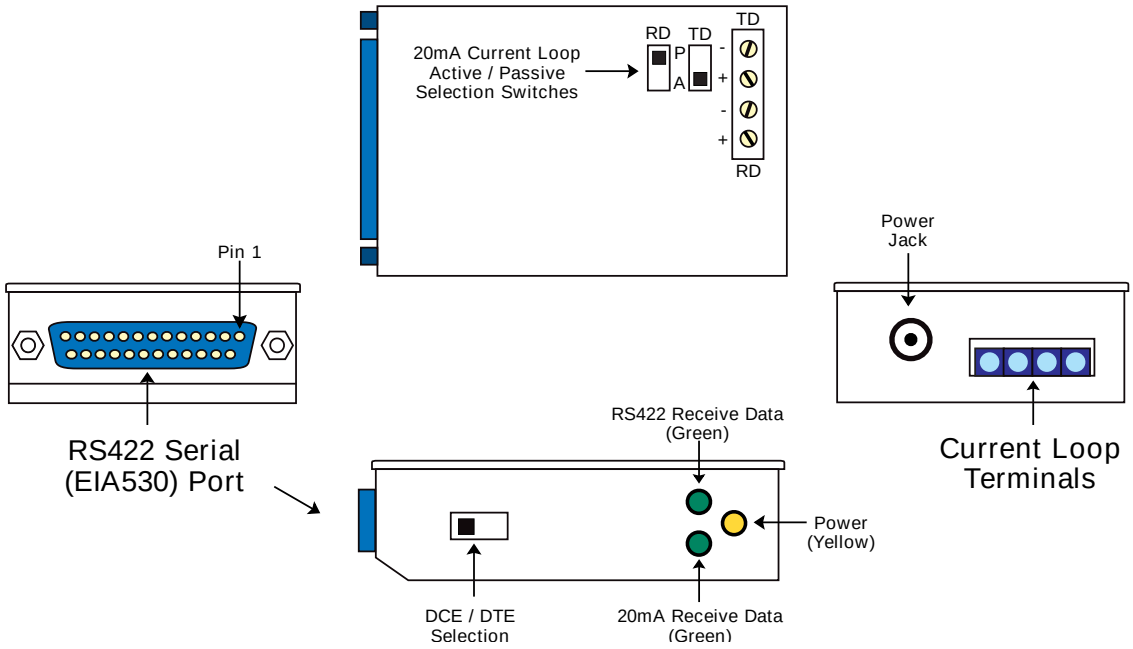


Figure 1.1 - A430 viewed from each angle

1.1 Overview of Features

The A430 has a number of features which make it particularly useful in industrial environments and inter-building connections:

- The RS422 port is set up according to the EIA530 Standard and therefore uses a DB25 connector.
- The Current Loop interface is particularly suited to environments with poor grounding or grounding problems.
- High data transfer rates are possible over long distances, e.g. 19,200bps at a 400 metre length.
- Optically isolated data lines provide immunity to ground imbalance, for example between buildings.
- Units may be ordered as a pre-set, fully isolated pair (2500Vac for 1 minute).
- Full duplex point-to-point communication uses only 4 wires, one pair each for receive and transmit data.
- Fully configurable Transmitter and Receiver sections - each unit may be either Active or Passive, so the unit may be used in any installation.

1.2 Isolation Details

The electrical isolation provided by the A430 is in three sections as follows:

(a) Power Supply Isolation

The A430 is supplied with authority approved power adapters which provide the initial mains supply to data link isolation.

(b) Isolation by Configuration

In a 20mA Current Loop installation, typically, one side is configured as an isolated unit while the other is a non-isolated unit. The isolated unit has full breakdown isolation and is typically installed on the sensitive side.

(c) Data Link Isolation

The line drivers and receivers used in the A430 are specified to withstand 2500Vac for one minute. The design of the A430 allows this specification to be realised on the isolated unit.

1.3 Maximum Loop Lengths and Data Rates

In the A430 converter the maximum loop length is limited by the current loop cable resistance and the maximum data rate by the RS232 driver. Typical data rate performance versus distance is shown in the following graph.

Please note that the maximum data rate of the A430 is 64kbps and that all loop lengths are measured in one direction only.

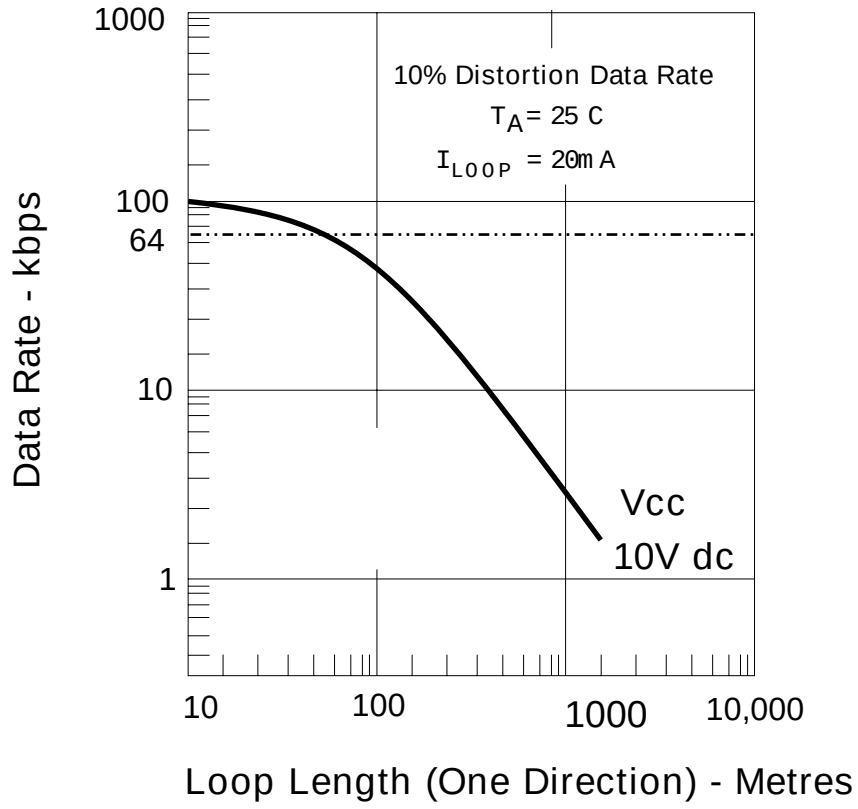


Figure 1.2 - Typical Data Rate versus Distance

2.0 INSTALLATION

- All configuration and cabling to the A430 must be done while NO power is connected to the unit.
- No configuration required on the RS422(EIA530) port, except for DCE/DTE selection, as the data rate is controlled by the driving device.
- On the 20mA Current Loop side the A430 is configured via two slide switches. These switches are located on top of the A430 as shown in Figure 1. For details of the switch configuration please refer to Section 6.
- Connect and secure the appropriate cables to the A430. Sections 4 and 5 contain details on cables along with various cable examples.
- After all cables have been connected and secured, insert the power plug into the jack socket and turn the power ON. The A430 is now ready for use.

2.1 LED indicators

The Current Loop - Receive Data (RD) LED indicator will flash each time data is being received by the 20mA Current Loop Port.

The RS422 Serial - Receive Data (RD) LED indicator will flash each time data is being received by the RS422 Serial Port.

These LEDs will not operate at any other time.

Note: The 20mA Current Loop Standard specifies that 20mA in the loop represents the 'no data idle state' while 0mA represents the 'data state'. If nothing is connected to the 20mA Receive Data then the loop effectively carries no current, i.e. 'data state', and the Current Loop RD LED will remain ON.

3.0 INTERFACE PORT PIN ASSIGNMENTS

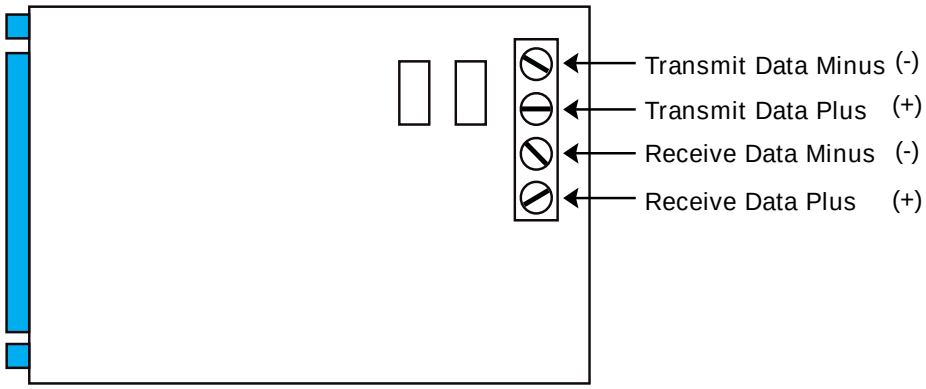
3.1 RS-422 (EIA530) Serial Port

The RS-422 (EIA530) Serial Port of the A430 may be configuired as DCE or DTE via a slide switch on the side of the unit as shown in Figure 1.

Pin	***Status***	***Set for DCE***	***Set for DTE***
1	Used	Frame Ground	Frame Ground
2	Input / Output	RD+	TD+
3	Output / Input	TD+	RD+
7	Used	Signal Ground	Signal Ground
14	Input / Output	RD-	TD-
16	Input / Output	TD-	RD-

The Factory Default RS-422 Serial switch setting is DCE as follows:

3.2 20mA Current Loop Port Pinout



4.0 CABLE REQUIREMENTS

Alfatron Pty Ltd recommends the use of shielded cable with all of its products. Shielding reduces Electro Magnetic Radiation and improves noise immunity. This helps minimise interference to other equipment and will improve the communications reliability.

4.1 Cable Construction

The recommended cable construction is as follows:

- Take the shield (surrounding cable wires) and solder it to the Frame Ground (FG) pin. If FG is not available, use Signal Ground (SG) but in this case always use a separate wire for ground which is connected at both ends.
- The shield must only be connected at both ends of the cable.

4.2 Cable Diagrams

The cable diagrams in this manual represent the cable shield in the following manner:

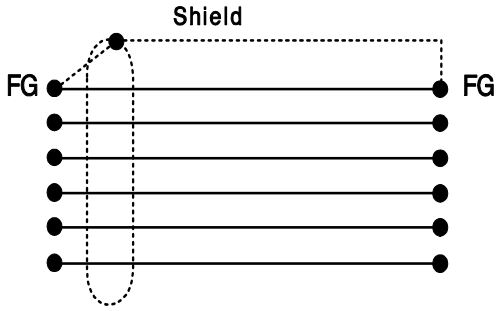


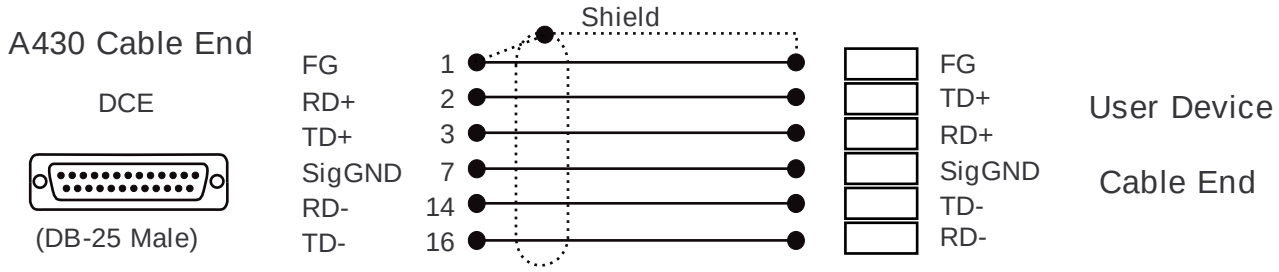
Figure 3 - Example of Shield representation in Cable Diagrams

This shows the shield soldered to FG at both ends of the cable and shows the shield running the full length of the cable. Please note that the shield is treated as a totally separate wire.

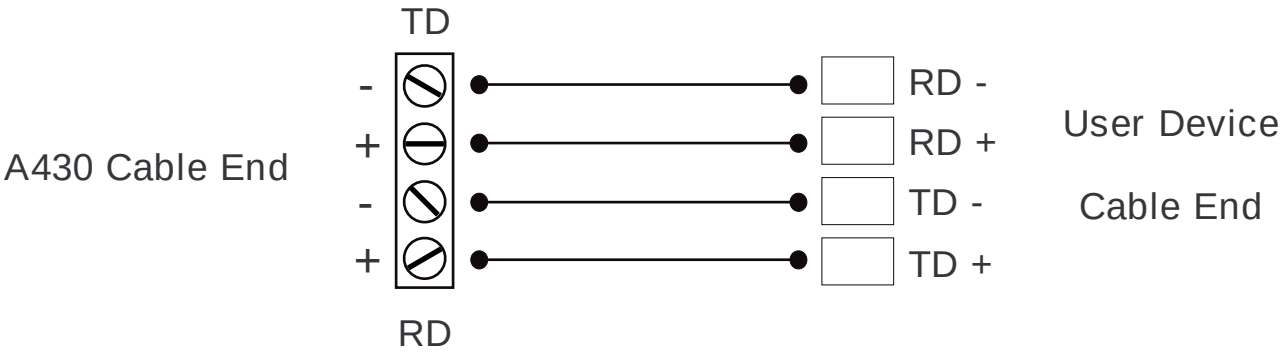
Note: The Current Loop cable should not be shielded because connecting it to Ground at either side would render the optical isolation redundant.

5.0 CABLE EXAMPLES

5.1 RS-422 Connection to Other RS-422 Devices



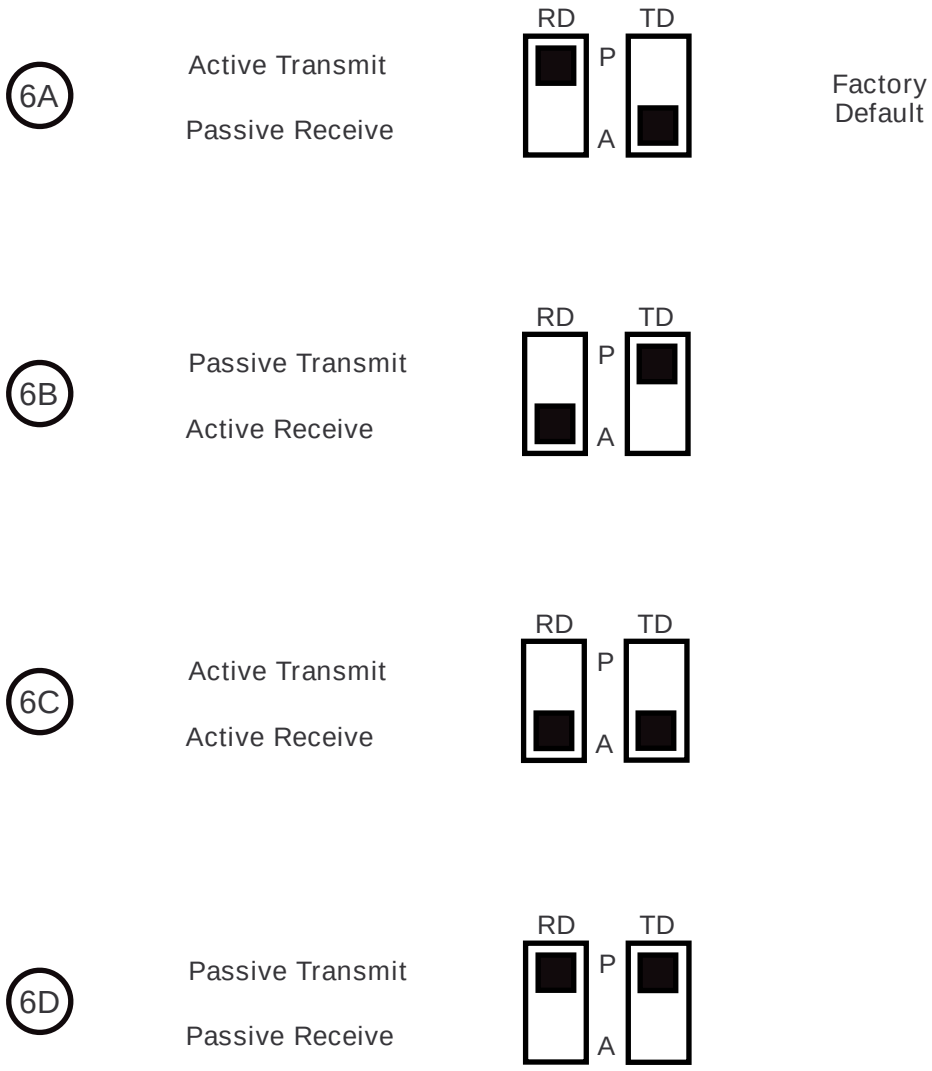
5.2 Connecting 20mA Current Loop



Note: Sheilding and grounding wires are not recommended for Current Loop cables.

6.0 CURRENT LOOP CONFIGURATION

Please refer to Figure 1.1 for the location of the 20mA Current Loop slide switches. The switch marked TD is for Transmit and the switch marked RD is for Receive.



6.1 Applications requiring Isolation

For applications requiring isolation, it is recommended that the A430 be configured with 'Passive Transmit' and 'Passive Receive'.

6.2 Factory Default

The A430 is shipped from the factory with the links set to 'Active Transmit' and 'Passive Receive' as per item (A) above.

7.0 SPECIFICATIONS

Serial Port:	Asynchronous RS-422 Standard Select as DCE or DTE DB-25 female connector Speed is dependant on cable length Maximum speed is 64kbps
Current Loop Port:	20mA Current Loop Screw Terminal Block x 4 (2.5mm diameter) Receive Data and Transmit Data loops each configurable as either ACTIVE or PASSIVE. Optically isolated for 20mA signal Isolation in PASSIVE mode only
Handshaking:	Software Handshaking (Xon/Xoff)
LED Indicators:	Receive Data - RS422 (Green) Receive Data - Current Loop (Green) Power (Yellow)
Power Supply:	9V (200mA) DC Power Adapter Reverse polarity protection Plug jack - 5.5mm outer/2.5mm inner Outer Negative:
Dimensions:	84mm x 58mm x 23mm
Weight:	160 grams
Operating Temperature:	10° to 35° C
Stroage Temperature:	0° to 45° C

All specifications subject to change without notice

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according to the European Commissions EMC Directive 89/336/EEC

We,	Name of Manufacturer:	ALFATRON PTY. LTD
of,	Address of Manufacturer:	UNIT 9, 36 NEW ST. RINGWOOD VIC 3134 AUSTRALIA
	Australian Company Number:	ACN: 005 410 819

declare under sole responsibility that the product:

Product Name:	ASeries RS-422 to 20mA Current Loop Interface Converter
Model Number:	A430

to which this declaration relates is in conformity with the following standards:

CISPR-22 / EN 55022 class B	EMI from Information Technology Equipment (ITE)
IEC 801-2 / prEN55024-2	Electro Static Discharge Immunity
IEC 801-3 / prEN55024-3	Radiated RF Immunity
IEC 801-4 / prEN55024-4	Electrical Fast Transients Immunity