

Intech 2400-IS Isolating Converter USB/RS232 to RS485/422/232



Installation Guide.

2400-IS Isolating Converter Installation Guide:

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Warning: These products are not designed for use in, and should not be used for patient connected applications. In any critical installation an independent fail-safe back-up system must always be implemented.

2400-IS

Isolating Converter
USB/RS232 to RS485/422/232.

Description:

The 2400-IS is a compact desktop module that isolates and converts USB or RS232 from a computer to RS485, RS422 or RS232 for communication to a field data logging system. It's driver and receiver meet EIA standards RS-422-A and CCITT recommendations V.11 and X.27 and is designed for multipoint transmission on long bus lines in noisy environments. The module can be powered from the computers USB port, or from an external 5Vdc power adapter (not supplied).



Ordering Information:

2400-IS Isolated USB/RS232 to RS485/RS422/RS232 Converter.

Complete with:

- USB cable (length = 1m).
- RS232 cable (length = 2m) - for PC connection.

Features:

- Isolation Between Computer and Field.
- Powered Via Computer USB Port, (or 5Vdc external power adapter not included).
- Fully Compatible with USB 2.0.
- Supports RS485 Field Stations / Controllers on an Existing RS422 Data Hi-way.
- Supports Multiple Baud Rates.
- Stylish Compact Desk Top Case.
- Easy to Install.

Specifications:

Power Supply	5Vdc.
Max Current	130mA.
Operating Temperature	-40° ~ +85°C.
Computer Input Types:	
USB	USB-B type (Fully compatible with USB 2.0 connections).
RS232	DB9-Female.
Field Outputs:	
RS485/422	5-pin screw terminal.
RS232	RJ-11.
Comms Baud Rates:	
USB	300~256000 Baud.
RS485/422/232	300~128000 Baud.
Dimensions	L=119mm, W=72mm, D=26mm.
Weight	0.1Kg.

Note: USB cable cannot exceed 5m.

RS232 cable cannot exceed 15m.

2400-IS Physical Layout:



LED indicators:

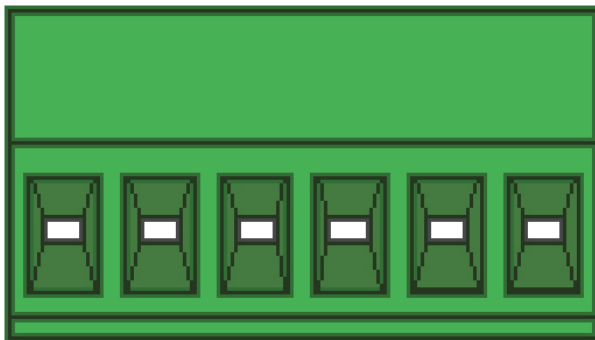
- PWR** Power status - Lights up when power is supplied to the *USB 5VDC* input.
- USB** USB status - Lights up when a USB or power adapter is connected to the *USB 5VDC* input, and there is no RS232 cable connected to the *RS232 DB9* Input. This indicates that the module will convert the USB interface from the computer to the RS485/422/232 interface of the field devices.
- RS232** RS232 status - Lights up when a RS232 cable is connected to the *RS232 DB9* input. This indicates that the module will convert the RS232 interface from the computer to the RS485/422 interface of the field devices. Please note that the *USB 5VDC* input still requires a power supply either from a USB port on your computer or an external power adapter.
- Rx** Field receiving status - Lights up when the converter is receiving data from the field devices.
- Tx** Field transmitting status - Lights up when the converter is transmitting data to the field devices.

2400-IS Connections:



RS232 DB9 Input:

- Pin 1:** No Connection
- Pin 2:** Tx
- Pin 3:** Rx
- Pin 4:** No Connection
- Pin 5:** GND
- Pin 6:** No Connection
- Pin 7:** No Connection
- Pin 8:** No Connection
- Pin 9:** No Connection



5-Pin Screw Terminal Output:

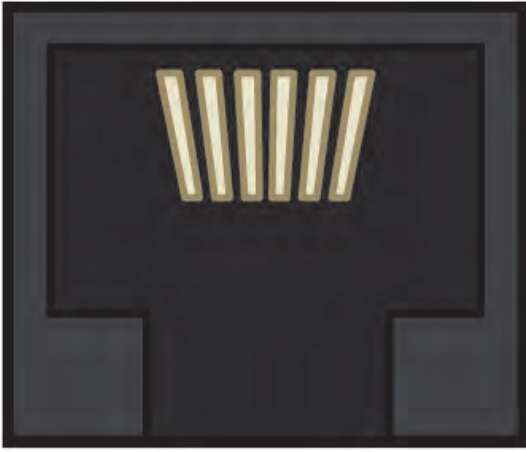
RS485:

- Pin 70:** Tx-/Rx-
- Pin 71:** Tx+/Rx+
- Pin 72:** No Connection
- Pin 73:** No Connection
- Pin 74:** COM
- Pin 75:** No Connection

RS422:

- Pin 70:** Tx-
- Pin 71:** Tx+
- Pin 72:** Rx-
- Pin 73:** Rx+
- Pin 74:** COM
- Pin 75:** No Connection

75	74	73	72	71	70
NC	COM	Rx+	Rx-	Tx+	Tx-



1 6

RS232 RJ11 Output:

- Pin 1: No Connection
- Pin 2: Tx
- Pin 3: Rx
- Pin 4: No Connection
- Pin 5: GND
- Pin 6: No Connection



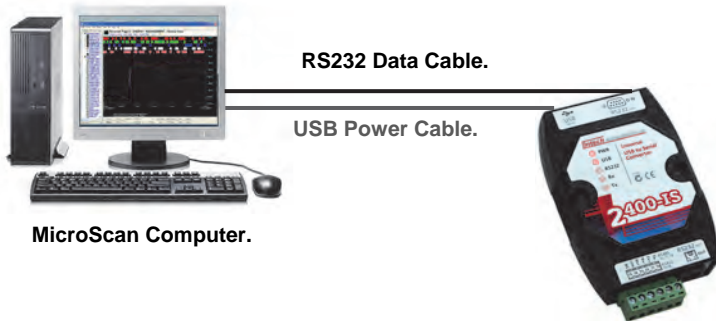
USB Output:

The USB output of the 2400-IS requires a driver before installation. If you already have MicroScan V5 installed on your PC (Build: 5.0.3050.17 or later), then the driver will already be installed. However if you need to install the driver manually, then you can download the driver from the following location:

www.intech.co.nz/2400isdriver

Typical Input Examples:

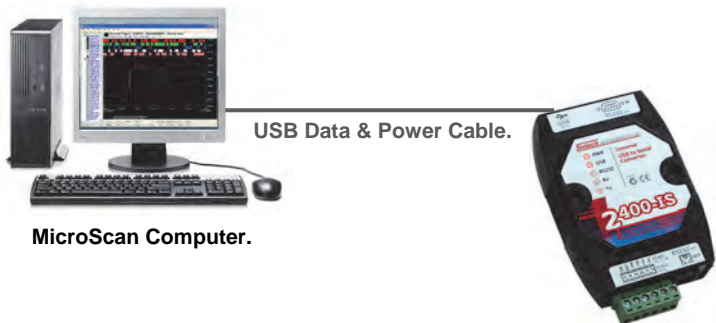
Data via RS232, Power via USB:



2400-IS Converter.

2400-IS Converter automatically defaults to RS232 COMMS when an RS232 cable is detected. USB must also be connected for power.

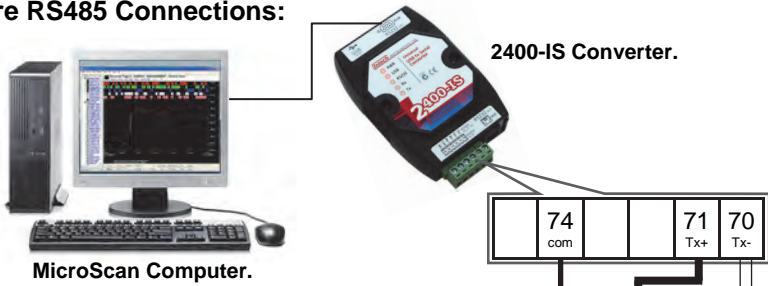
Data and Power via USB:



2400-IS Converter.

Outstation Layout - RS485:

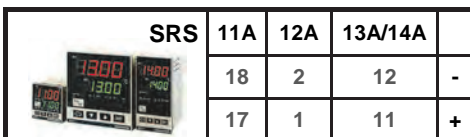
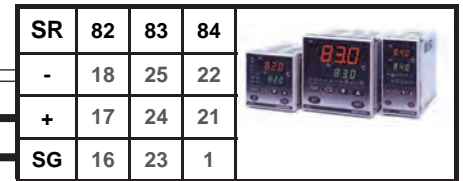
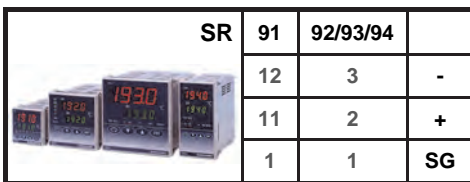
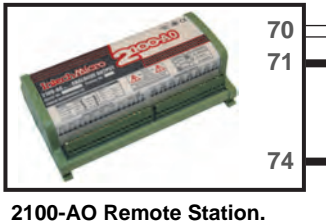
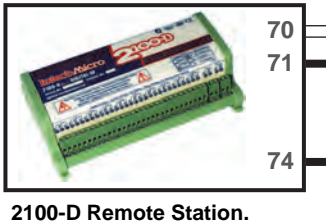
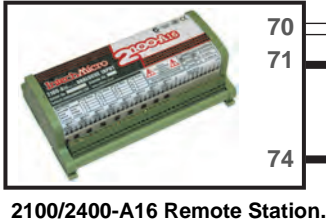
2 Wire RS485 Connections:



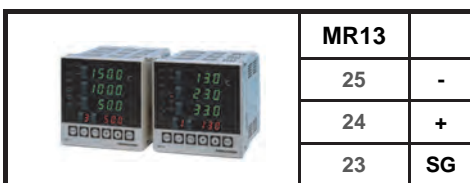
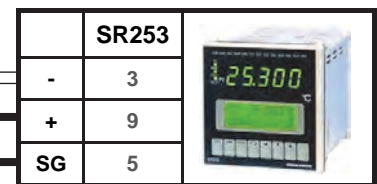
Never guess Tx or Rx connections. Follow the terminal numbers in the serial connections diagrams exactly.

Important:

1. All cables must be screened.
2. All screens must be connected together.
3. The screen must not be earthed at any point.



RS485 DATA HI-WAY. CABLE POLARITY MUST BE OBSERVED.

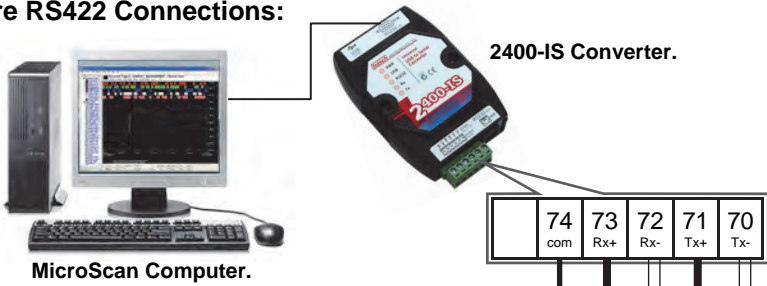


1KΩ End of Data Highway Junction Box; Resistor = 1KΩ.

TWISTED PAIR

Outstation Layout - RS422:

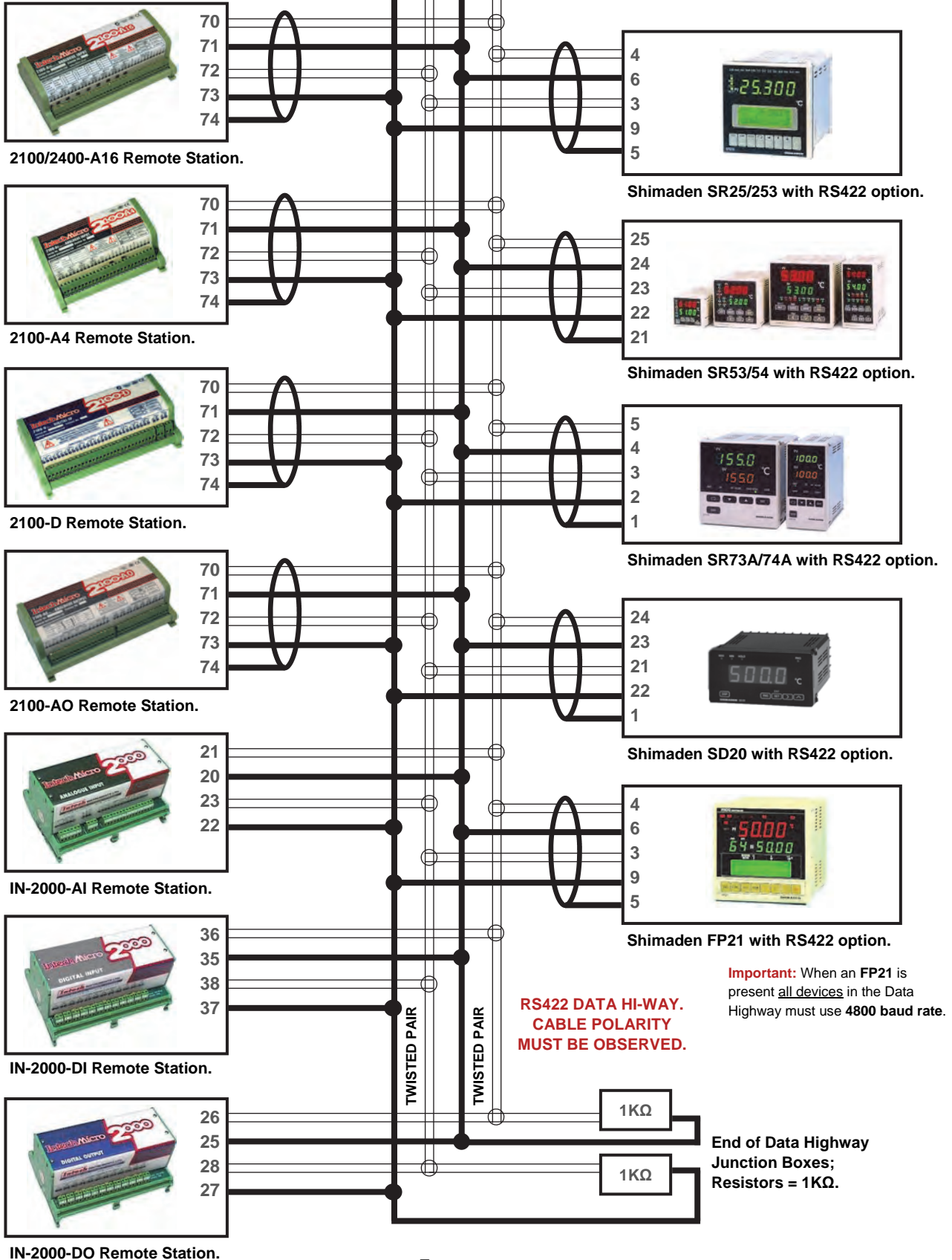
4 Wire RS422 Connections:



Never guess Tx or Rx connections. Follow the terminal numbers in the serial connections diagrams exactly.

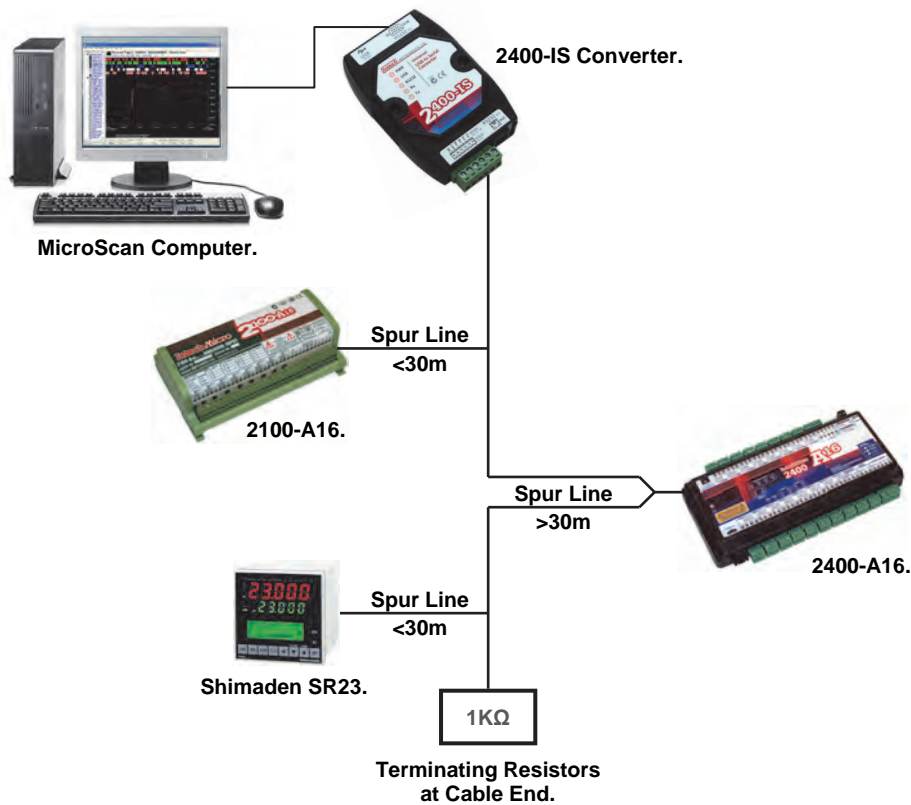
Important:

1. All cables must be screened.
2. All screens must be connected together.
3. The screen must not be earthed at any point.



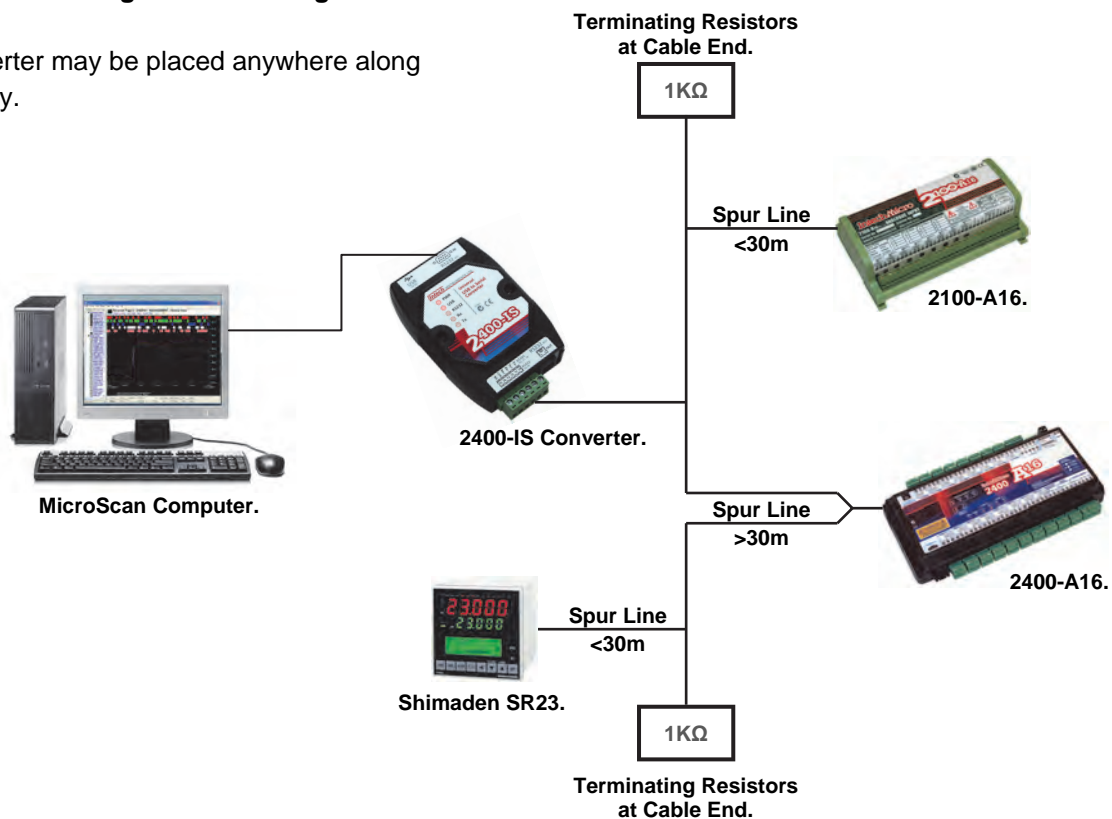
Connection to a MicroScan SCADA System:

RS485/422 Data Cabling Installation e.g. 1:



RS485/422 Data Cabling Installation e.g. 2:

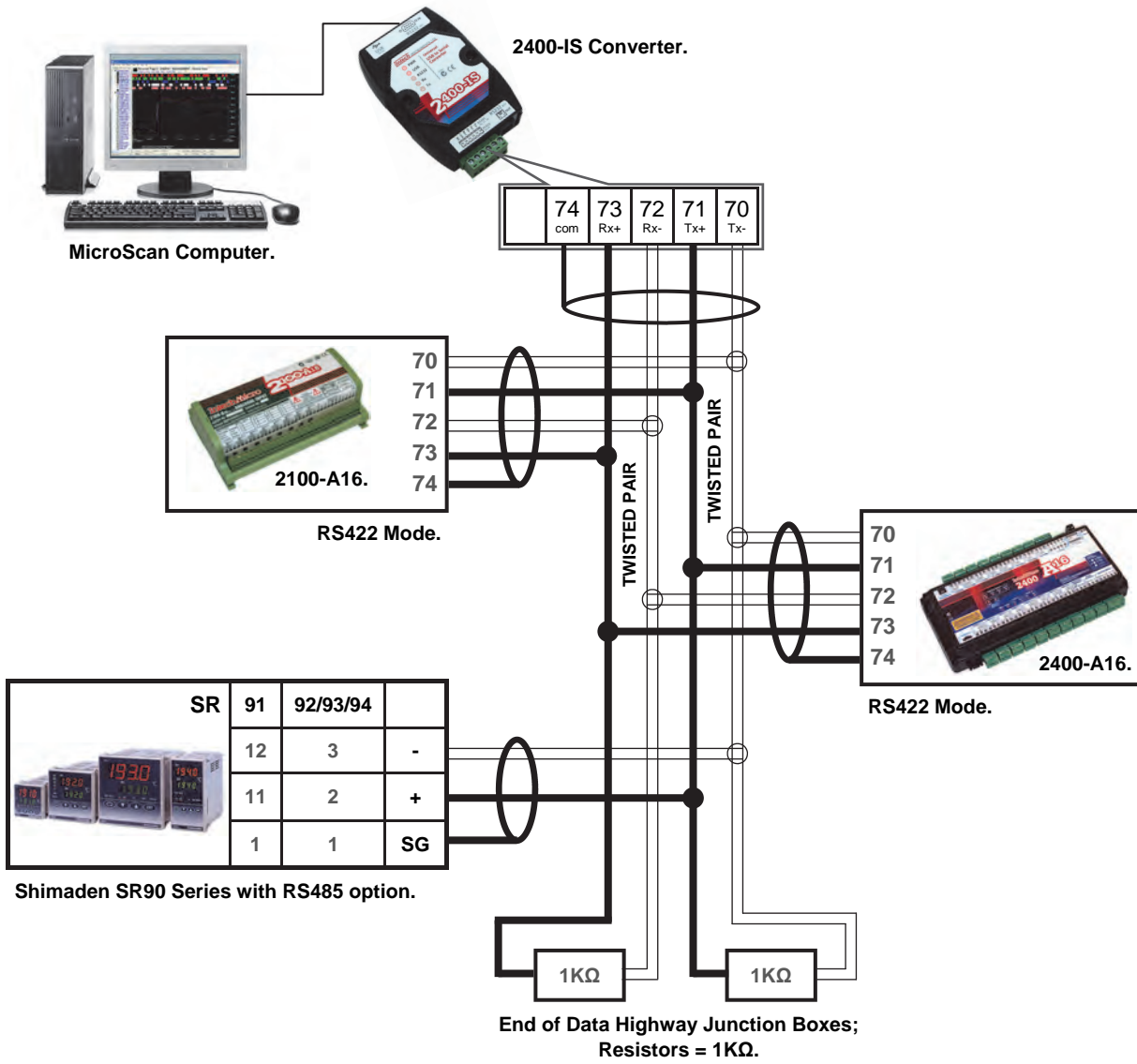
2400-IS converter may be placed anywhere along the data hi-way.



- Note:** Shimaden Controllers must have a unique serial number preprogrammed before connecting to the COMMS data hi-way. All signals and power must be de-energised before connecting to any wiring.
- Note:** Total length of trunk line, including spurs, is not to exceed, typically 500m using RS485 or typically 1200m using RS422.

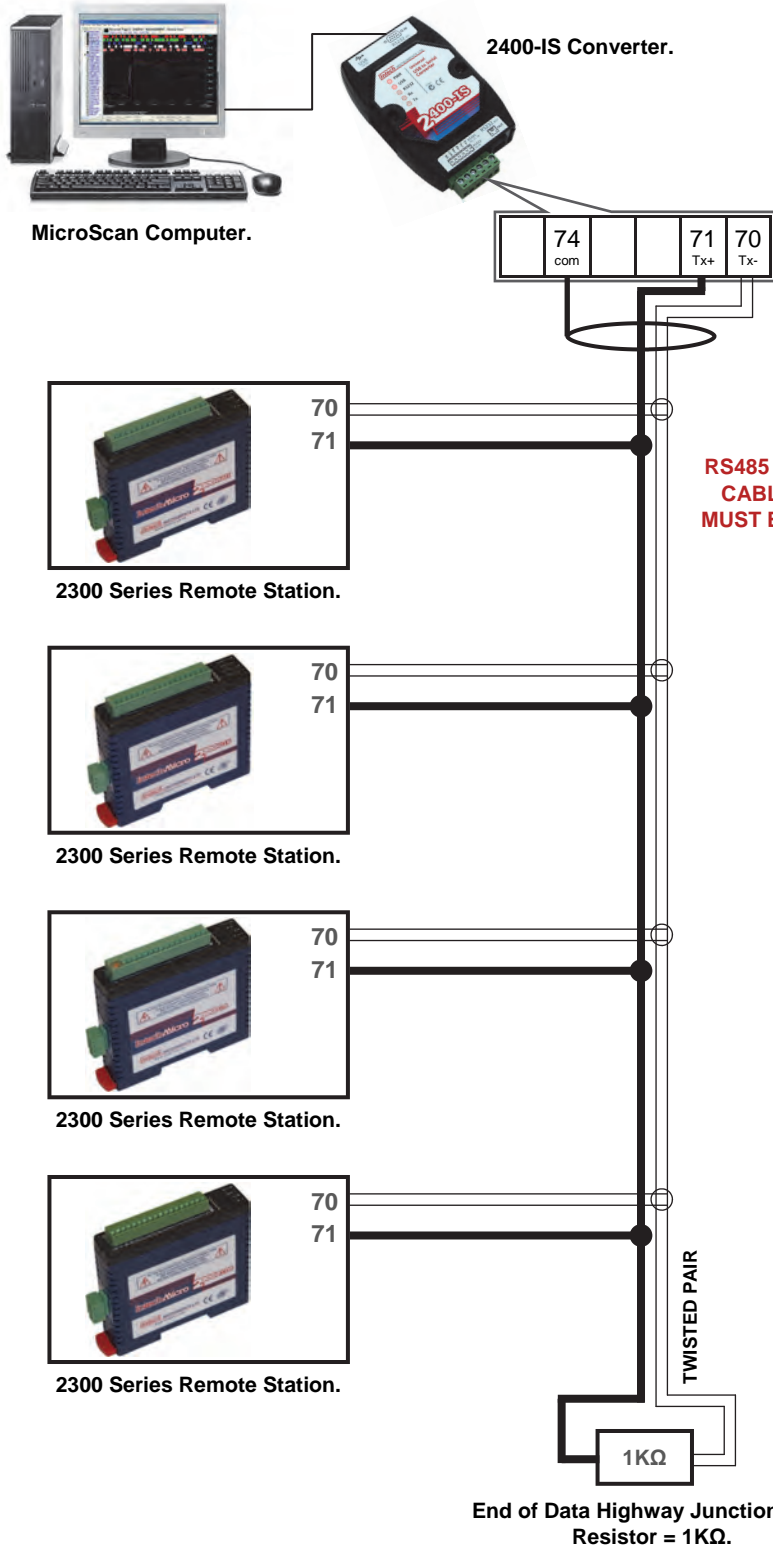
IMPORTANT: The Accompanying Installation Instructions must be strictly adhered to.

Connecting a RS485 Field Station / Controller to an Existing RS422 Data Hi-way:



Note: This type of connection is only supported by the **2400-IS** converter.

2300 Series Connections:



Never guess Tx or Rx connections. Follow the terminal numbers in the serial connections diagrams exactly.

Important:

1. All cables must be screened.
2. All screens must be connected together.
3. The screen must not be earthed at any point.

RS485 DATA HI-WAY.
CABLE POLARITY
MUST BE OBSERVED.

Important: The 2300-XX stations cannot share a data hi-way with the 2100-XX / 2400-XX stations and/or Shimaden Controllers.

Wiring and Installation:

The Prober Installation and Wiring of the 2400-IS:

All power and signals must be de-energised before connecting any wiring, or altering any jumpers of dip switches.

Mounting:

1. Mount in a clean environment.
2. Do not subject to vibration, excess temperature or humidity variations.
3. Avoid mounting near power control equipment.
4. Allow 10mm minimum clearance between the 2400-IS terminals and ANY conductive materials.

Cover Removal:

Removing the cover of the 2400-IS will void the warranty.

Analogue Signal Cabling:

1. All analogue cables should be good quality, overall screened, INSTRUMENTATION CABLE, with the screen earthed at one end only. (e.g. Austral Standard Cables B5102ES.)
2. Analogue signal cables should be laid at a minimum distance of 300mm from power and data cables.
3. It is recommended that you do not ground current loops or use power supplies with ungrounded outputs.
4. Lightning arresters should be used on inputs and outputs when there is a danger from this source.
5. Refer to diagrams for connection details.

RS485-422 Comms Signal Cabling:

1. Use only low capacitance, twisted pair, overall screened data cable. The cable must equal or better the following specifications.

Cable Specifications.		
Conductor Size.		7/0.20mm, 24AWG
Conductor Resistance @ 20°C.		8.9Ω/100m
Max. Working Voltage.		300Vrms
Capacitance Between Wires of a Pair.		50pF/m
Capacitance Between Each Wire to All Others Bunched Together.		95pF/m
Cross-Talk Between Pairs.	@ 1KHz	>-90dB/100m
	@ 100KHz	>-50dB/100m
Characteristic Impedance.	@ 100KHz	135Ω
Attenuation of a Pair.	@ 1KHz	.15dB/100m
	@ 10KHz	.42dB/100m
	@ 50KHz	.80dB/100m
	@ 100KHz	.90dB/100m
	@ 1MHz	1.9dB/100m
	@ 1.5MHz	2.4dB/100m

Note: All cables are to be subject during manufacture to in-process spark testing @ 4kVrms.
All cables are to be tested between conductors and conductors to screen for 1min @ 1500Vrms.

2. Minimum cable pairs: RS485 = 1 (*Plus overall screen*), RS422 = 2 (*Plus overall screen*).
3. Take care not to stress or damage cables during installation.
4. Total length of trunk line, including spurs, is not to exceed, typically 500m using RS485 or typically 1200m using RS422, without isolating boosters.
5. Terminating resistors - 1kΩ.
6. Cabling paths should avoid sources of radio frequency interferences such as fluorescent lights, variable speed motor drives, welding equipment, radio transmitters, etc.
7. There should be a minimum of 200mm physical separation between power cables and data cables.
8. Data cables should not be exposed to excessive heat or moisture, and should not be buried directly in the ground without protection.
9. Avoid powering a remote station or controller from the same power supply as a variable speed drive.
10. All unused twisted pairs should be terminated at both ends with 1kΩ resistors. DO NOT ground unused pairs.

Commissioning:

1. Check that all the above conditions have been met, and that the wiring is checked, before applying power to the 2400-IS.
2. Check each relay output functions correctly, and the relay specifications are not being exceeded.

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