INTECH Micro
2100-NET

Z985

Installation Guide.

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2100-NET Installation Guide Index.

Section A. Description, Ordering and Specifications.

Section B. LED and Switch Functions Tables.

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2100-NET 10/100 Ethernet to RS422/485/232 Converter.

Converts and Isolates 10/100 Ethernet to RS422/485/232 for communication to a field Datalogging, PLC, etc, system.

Features.

- **Easy to Install.**
- **LED Status Indications.**
- **Compact DIN Rail Mount Enclosure.**
- **Low Cost.**
- **Isolation Between Field Units & Computer.**
- **Universal AC/DC Power Supply.**

TECHNOLOGY & QUALITY AWARD

REGISTERED ISO9001 MANUFACTURER

Z985

2100 models include:
2100-4S : RS422 to RS485 Converter.
2100-A16 :16AI, 4DI, 2 Relay Out, 2 AO.
2100-A4 :4AI, 4DI, 4 Relay Out, 2 AO.
2100-A4e :4AI, 4DI, 8 Relay Out, 2 AO.
2100-AO :8 AO, 8 AI, 12 DI, 2 Relay Out.
2100-D :12DI, 12 Relay Out.
2100-IS :Isolated RS232 to RS422/485.
2100-M :16AI Multiplexer.
2100-ME :Memory Expansion for 2100-A.
2100-NET :Isolated Ethernet to RS232/422/485.
2100-NS :Non-Isolated RS232 to RS422/485.
2100-R :16 Relay Expansion for 2100-A.
2100-RL2 :2 Relay Expansion for 2100-A.

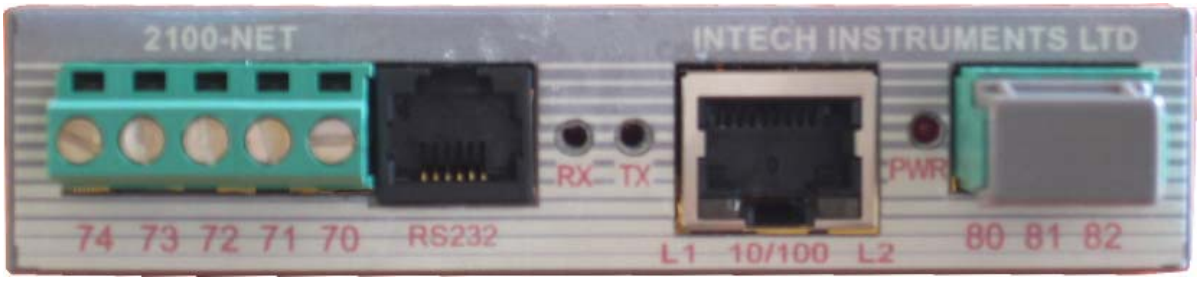
Ordering Information.

Standard Unit:

2100-NET	Isolated 10/100 Ethernet to RS422/485/232 Convertor.

Description.

The 2100-NET is a compact, DIN rail mount module that isolates and converts 10/100 Ethernet to RS422, RS485 or RS232 for communication to a field data logging or PLC system. Its RS422/485 driver and receiver meet EIA standards RS-422-A and CCITT recommendations V.11 and X.27, and are designed for multipoint transmission on long bus lines in noisy environments. It includes thermal shutdown and over current limiting. The XPort uses the Ethernet Protocol (IP) for network communications and the Transmission Control Protocol (TCP) to assure that no data is lost or duplicated, and that everything sent to the connection arrives at the correct target.



2100-NET Front View

Quality Assurance Programme.

The modern technology and strict procedures of the ISO9001 Quality Assurance Programme applied during design, development, production and final inspection grant long term reliability of the instrument. This instrument has been designed and built to comply with EMC and Safety Standards requirements.

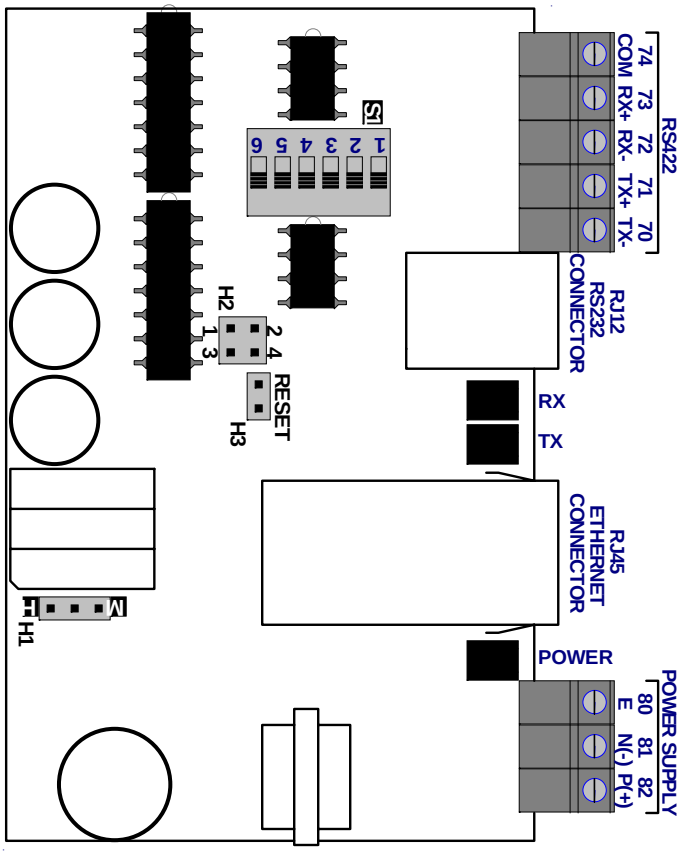
Specifications.

RS422/485/232	-Baud Rate	Software Selectable 4800, 9600, 19200 (Default = 9600).
	-Format	8 bit, No Parity, 1 Stop. (Not selectable.)
Ethernet	-Interface	RJ45 10Base-T & 100Base-TX Autosensing.
	-Compatibility	Version 2-0/IEEE802.3
	-LEDs	10Base-T & 100Base-TX Activity; Full/Half Duplex.
Power:	-H	85~264Vac/dc; 50/60Hz; 10VA.
	-M	23~90Vdc; 10VA.
	-L	10~28Vac/dc; 50/60Hz; 10VA.
		Refer to '*2100-NET H1 Power Supply Settings'* for voltage selection instructions.
EMC Emissions Compliance		EN 55022-A.
EMC Immunity Compliance		EN 50082-1.
Safety Compliance		EN 60950.
Mains Isolation		250Vac.
Mains Isolation Test Voltage		-To all Inputs & Outputs: 3000Vac, 50Hz for 1min.
.		-To Earth: 1500Vac, 50Hz for 1min.
Comms Isolation Test Voltage		-Input to Output: 1000Vdc, for 1min.
RF Immunity		<±1% Effect FSO Typical.
Operating Temperature		0~60C.
Storage Temperature		-20~80C.
Operating Humidity		5~85%RH Max. Non-Condensing.
Housing	-Dimensions	L=100, W=22.5, H=100mm.
	-Mounting	35mm Symmetrical Mounting Rail.
	-Weight	200g. Includes Packaging.

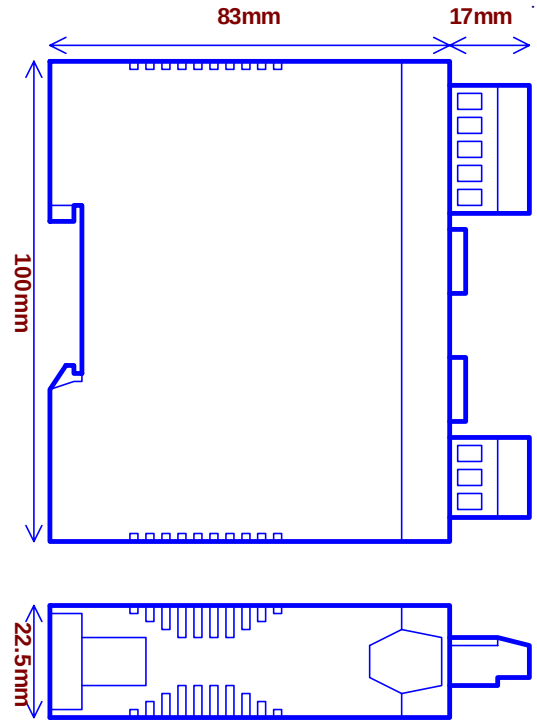
Product Liability. This information describes our products. It does not constitute guaranteed properties and is not intended to affirm the suitability of a product for a particular application. Due to ongoing research and development, designs, specifications, and documentation are subject to change without notification. Regrettably, omissions and exceptions cannot be completely ruled out. No liability will be accepted for errors, omissions or amendments to this specification. Technical data are always specified by their average values and are based on Standard Calibration Units at 25C, unless otherwise specified. Each product is subject to the 'Conditions of Sale'.

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

2100-NET Circuit Board Layout.



2100-NET Dimensions.



Section B. LED and Switch Functions Tables.

Description of RS422, RS485 & RS232 LED Functions.

R.X.	LED	ON	Unit Receiving Data From the Field.
T.X.	LED	ON	Unit Transmitting Data to the Field.
PWR	LED	ON	Unit has Power Connected.

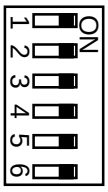
Description of Ethernet LED Functions.

Ethernet L1 & L2 LED Functions		
L1 LED	**Original Xport 01**	**New XPORT 03**
Off	No 100Base Tx Link	No Activity
Solid Amber	Half Duplex 100Base Tx Link	
Blinking Amber	Half Duplex 100Base Tx Activity	Half Duplex Activity
Solid Green	Full Duplex 100Base Tx Link	
Blinking Green	Full Duplex 100Base Tx Activity	Full Duplex Activity
L2 LED	**Original Xport 01**	**New XPORT 03**
Off	No 10Base T Link	No Link
Solid Amber	Half Duplex 10Base T Link	10Base T
Blinking Amber	Half Duplex 10Base T Activity	
Solid Green	Full Duplex 10Base T Link	100Base Tx
Blinking Green	Full Duplex 10Base T Activity	

L1 LED is the LED closest to terminal 70.
L2 LED is the LED closest to terminal 80.

S1 Description of Switch Settings.

6 Way DIP Switch

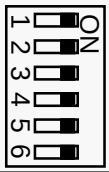


1 - ON = RS485 connects TX- to RX-.
2 - ON = RS485 connects TX+ to RX+.
3 - ON = RS485 Auto TX.
4 - ON = RS485 Auto RX.
5 - ON = Receive Data RS422/485.
6 - ON = Receive Data RS232.

} Note: Only 1 of DIP switches 5 or 6 should be on at any one time.

RS422/485/232 Mode Settings.

6 Way DIP Switch.

S1 RS422/485/232 Mode Settings.				
DIP Switch		**422-Microscan**	**485-Microscan**	**232**
	1	OFF	ON	OFF
	2	OFF	ON	OFF
	3	OFF	ON	OFF
	4	OFF	ON	OFF
	5	ON	ON	OFF
	6	OFF	OFF	ON

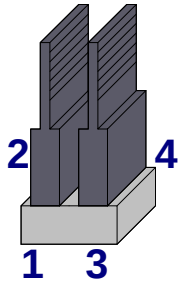
H1 Power Supply Settings.

Power Supply Jumper Settings	
H1	**Power Supply Voltage Range**
H	Jumper for 85~264Vac/dc
M	Jumper for 23~90Vdc

Note 1. Power must be OFF before changing H1's position.
Note 2. Exceeding these parameters may damage the unit.
Note 3. Ensure the enclosure label is correctly labelled for the jumper position.
Note 4. Low Voltage Power Supply version is fixed, and has no jumper. This must be ordered separately.

H2 Jumper Settings.

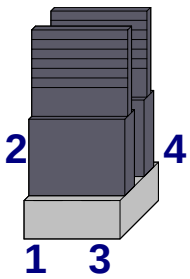
Connected to a Remote Station.



To connect the 2100-NET to a 2100 Remote Station (eg 2100-A16) jumper pins 1 & 2 and 3 & 4.

2100-NET = DTE.
Factory Standard Setting.

Connected to a PC.

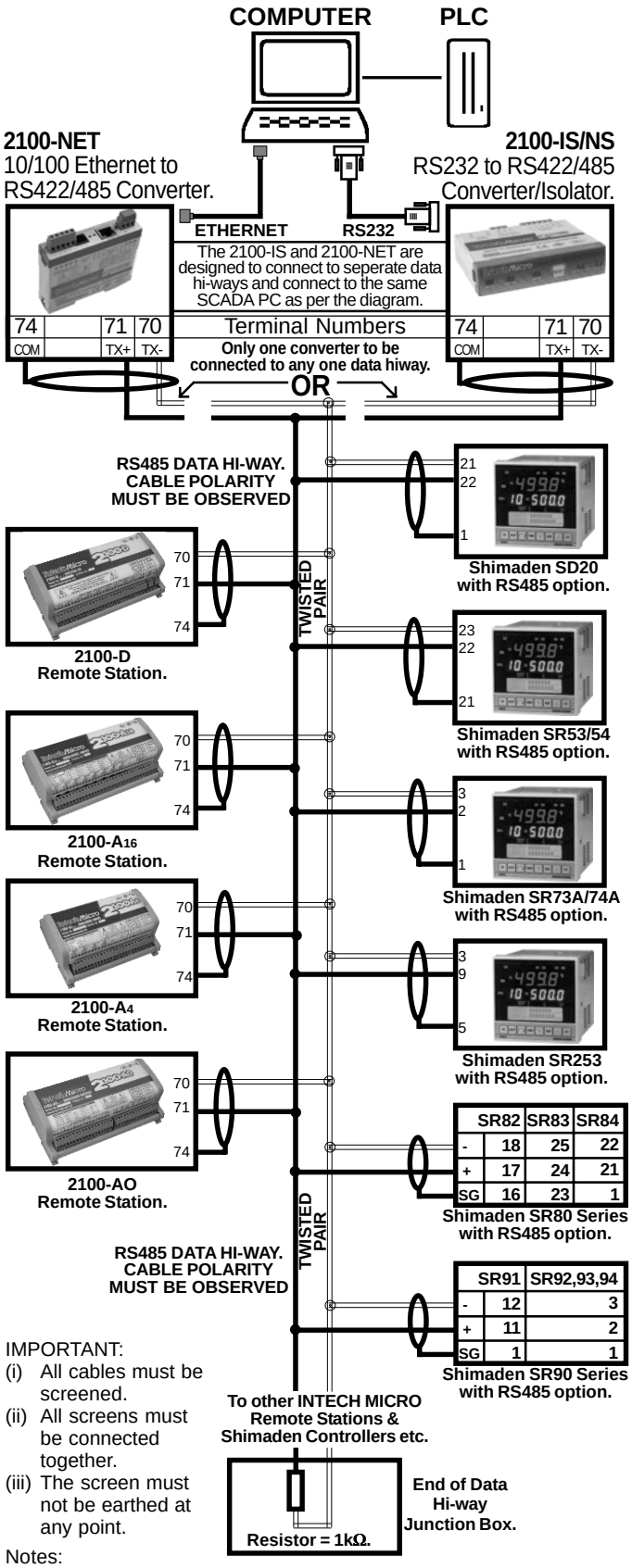


To connect the 2100-NET to a PC jumper pins 1 & 3 and 2 & 4.

2100-NET = DCE.

DO NOT GUESS TX OR RX CONNECTIONS. FOLLOW THE TERMINAL NUMBERS IN THE SERIAL CONNECTION DIAGRAMS EXACTLY.

OUTSTATION LAYOUT. 2-Wire RS485 Serial Connections.



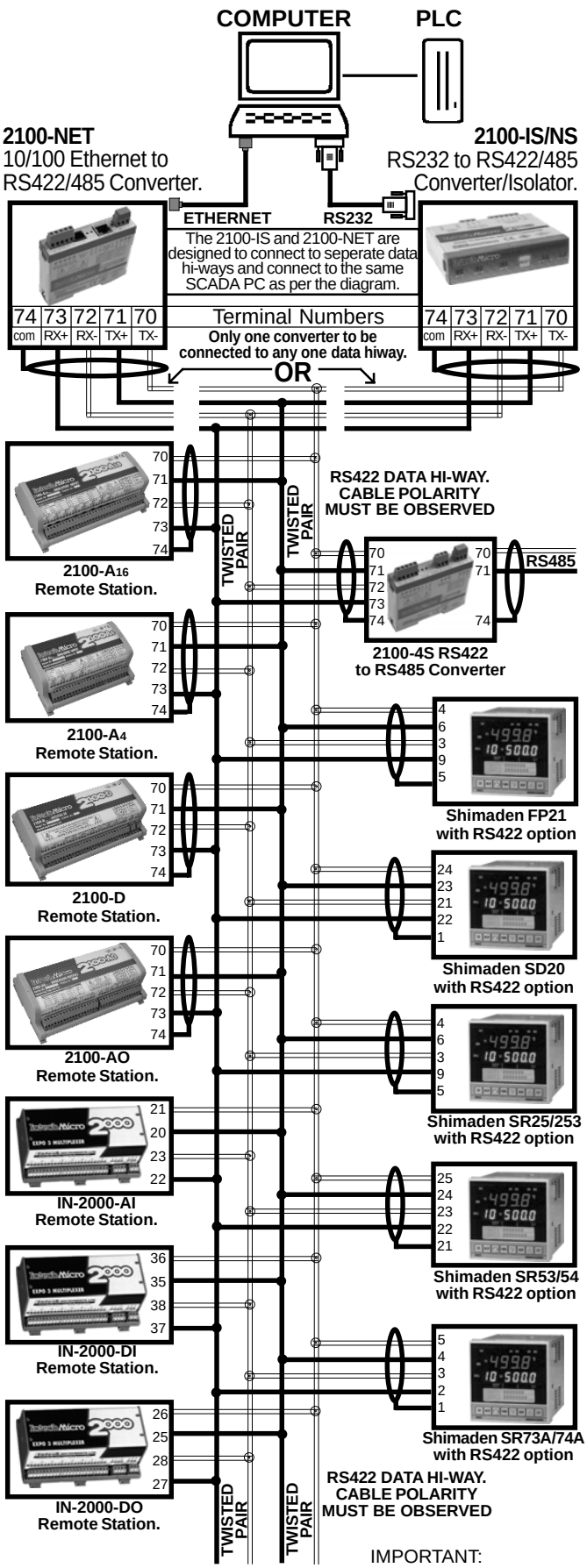
IMPORTANT:
(i) All cables must be screened.
(ii) All screens must be connected together.
(iii) The screen must not be earthed at any point.

Notes:
(i) RS485 can only be used with software release Ver. 4.02 onwards.
(ii) RS485 Data Hi-way is not compatible with RS422 Data Hi-way devices such as IN-2000-AI, IN-2000-AO, IN-2000-DI, IN-2000-DO, FP21, SR25, etc. Use a 2100-4S to interface an RS485 Data Hi-way to an existing RS422 Data Hi-way

RS232: 2100-IS convertor is not required to connect the 2100-232 directly to a PC. Use the RS232 kit to connect the 2100-232 directly to a PC. The PC requires one RS232 port per 2100.

RS485: If the outstation is using RS485, it cannot be connected to the same data hi-way as an outstations using RS422. In the 'programming' box, set the 'TX delay' box to 20. Set the Dip switches on the 2100-IS and the jumpers on the 2100 for RS485 operation.

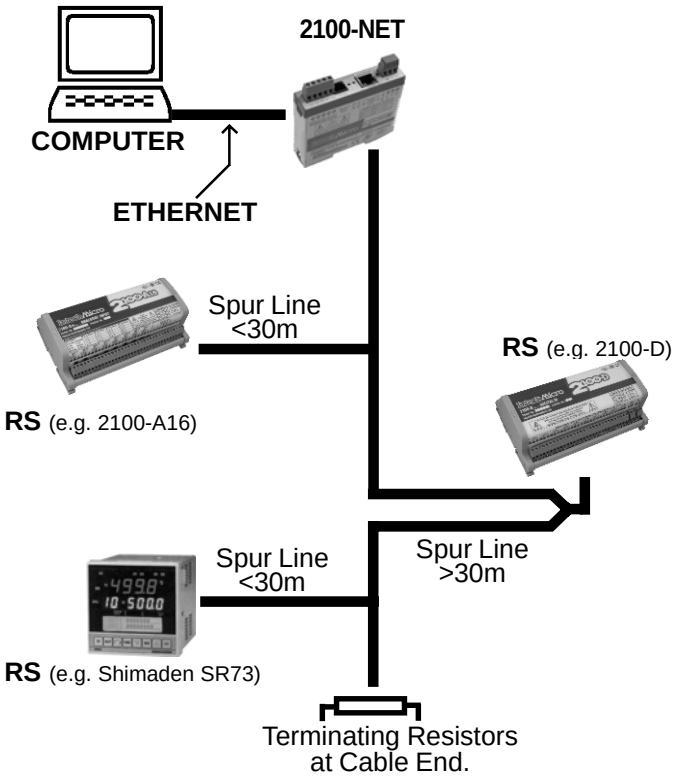
OUTSTATION LAYOUT. 4-Wire RS422 Serial Connections.



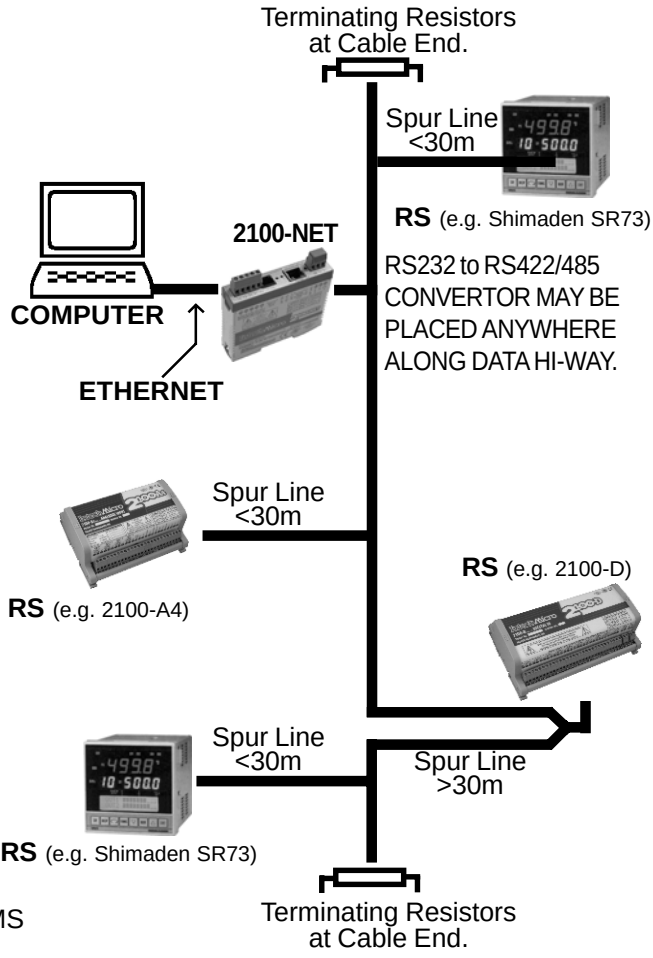
IMPORTANT:
(i) All cables must be screened.
(ii) All screens must be connected together.
(iii) The screen must not be earthed at any point.

Section C. Connection to a Microscan Scada System.
2100 SCADA.

RS422/485 Data Cabling Installation eg 1.

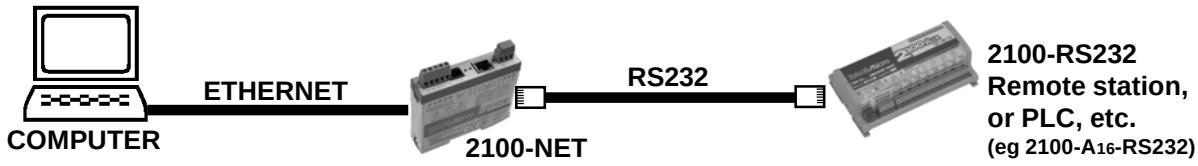


RS422/485 Data Cabling Installation eg 2.



Note 1**: RS** = MICRO 2000 or 2100 Remote Stations, or SHIMADEN CONTROLLERS.
Note 2: 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.
IMPORTANT: The accompanying Installation Instructions must be strictly adhered to.

RS232 Data Cabling Installation.



Note 1. The maximum cable length for RS232 is 15m.
Note 2. RS232 cables are available from Intech in 2, 5, 10 & 15m lengths.
Note 3. 9pin & 25pin D-type Connectors for connection to a PLC are available from Intech.
Note 4. RS232 1:1 link, 2100-NET to one RS232 station.

Terminations for 2100-NET.

Terminations		
Model	2100-NET	
	Term No	Connection
Mains Supply	82	Phase (+)
	81	Neutral (-)
	80	Earth
RS422 (RS485)	74	COM
	73	RX+
	72	RX-
	71	TX+ (RS485+)
	70	TX- (RS485-)

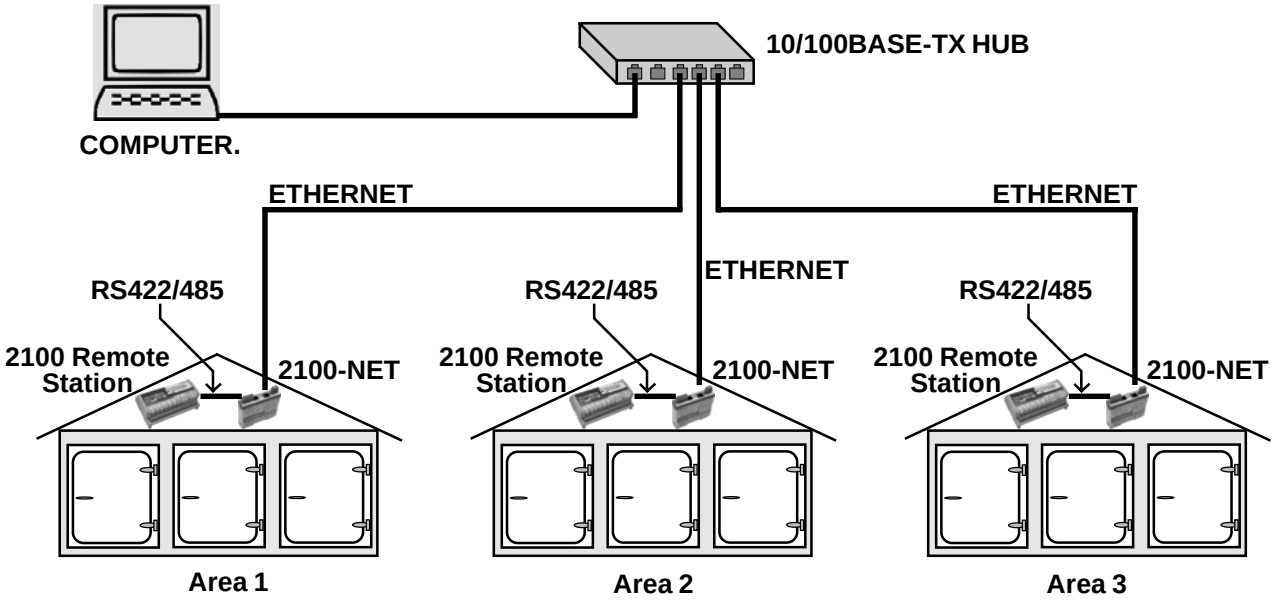
2100-NET RJ12 Pinout.

2100-NET RJ12 Pinout			
RJ11 Pin Number	Signal Name	DB9	DB25
1 (1 & 4 linked)	CTS	8	5
2	GND	5	7
3	RX	2	3
4 (1 & 4 linked)	RTS	7	4
5	N/C	1	1
6	TX	3	2

Note: Jumper H2 Reverses TX/RX Connections.
Refer to 'H2 Jumper Settings'

Connection Example of Multiple 2100-NETs.

Used in situations where the RS422/485 Data Hi-way is going in different directions in a plant.



2100-NET Software Installation.

Software for use with the 2100-NET is available off the Intech Website; www.intech.co.nz
The software on a separate CD can be supplied on request.
Factory Set IP Address is: 192.168.1.100
Factory Set Port is: 10001

1. Install the XPORT Installer. This is used to setup the XPORT, which is the Ethernet converter on the 2100-NET. This software does not need to be Installed on the end users PC, if the 2100-NET is setup before hand. If the 2100-NET is setup on site, the XPORT installer will need to be used onsite.

Note 1: This software is to be installed and/or setup by the Installer with Network IT persons. Intech will not be able to help with the setup and operation of a TCP/IP network and assigning of IP addresses. The hardware address that uniquely identifies each unit is printed on the side of the 2100-NET.

Note 2: Installed antivirus software may interfere with the sockets operations. You may need to open the IP address and port numbers for the commands to go through. We have found problems with Nortons system Works 2003, and found it necessary to disable email scanning of messages, as this was blocking the sockets requests. These problems may or may not exist on other antivirus programs.

Note 3: The Ethernet converter (XPORT) on the 2100-NET only allows one computer communications connection at one time. It is not possible to have multiple computers permanently communicating to the 2100-NET. The computers must share the 2100-NET by connecting and disconnecting as required.

2100-NET Troubleshooting.

Duplicate 0xFF Chatacters, port numbers 14001 -14009.
Do not use port numbers 14001-14009 with Modbus RTU/TCP protocol or other binary based protocols.
With these port numbers, the 0xFF characters get duplicated, and two 0xFF characters will appear for each 0xFF actually sent.

Section D. Wiring and Installation.
The Proper Installation & Wiring of the 2100-NET.

All power and signals must be de-energised before connecting any wiring, or altering any Jumpers or Dip Switches.

Mounting.

(1) Mount in a clean environment.
(2) Draft holes must have minimum free air space of 20mm. Foreign matter must not enter or block draft holes.
(3) Do not subject to vibration, excess temperature or humidity variations.
(4) Avoid mounting near power control equipment.
(5) Allow 10mm minimum clearance between the 2100-NET terminals and ANY conductive material.
(6) To maintain compliance with the EMC Directives the 2100-4S is to be mounted in a fully enclosed steel fire cabinet. The cabinet must be properly earthed, with appropriate input / output entry points and cabling.

Cover Removal and Fitting.

To remove the PCB to access jumpers and dip switches, push in the GREY BUTTONS at both ends of the enclosure TOP, and slide the PCB from the BASE of the enclosure. To reassemble slide the PCB back into the BASE until both GREY BUTTONS 'snap' into place. Ensure the TOP of the enclosure is flush with the BASE on all sides.

Power Supply Wiring.

(1) A readily accessible disconnect device and a 1A, 250Vac overcurrent device, must be in the power supply wiring.
(2) For power supply, connect Phase (or +Ve) to terminal 82, Neutral (or -Ve) to 81, and Earth to 80. To ensure compliance to CE Safety requirements, the grey terminal insulator must be fitted to ALL mains terminals after wiring is completed. (i.e. terminals 82, 81 and 80.) For Non Hazardous Voltage power supplies (not exceeding 42.4Vpeak or 60Vdc) terminals 81 and 80 may be linked together, instead of connecting an earth.

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 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.

RS422/485 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 @ 20C.		8.9Ω/100m
Max. Working Voltage.		300Vrms
Capacitance between wires of a pair.		50ρF/m
Capacitance between each wire to all others bunched together.		95ρF/m
Cross-talk between pairs:	@ 1kHz @ 100kHz	>-90dB/100m >-50dB/100m
Characteristic Impedance .	@ 100kHz	135Ω
Attenuation of a pair:	@ 1kHz @ 10kHz @ 100kHz @ 50kHz @ 1MHz @ 1.5MHz	0.15dB/100m 0.42dB/100m 0.8dB/100m 0.9dB/100m 1.9dB/100m 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: RS422 = 2. (Plus overall screen.) RS485 = 1. (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 1200m 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.

Section D. Wiring and Installation Cont.

Ethernet Cabling.

Category 5 (Cat 5) or better (eg Cat5e or Cat6) cable is required for 100Mbps fast Ethernet transmission. The 2100-NET uses a standard RJ45 Connector.

2100-NET Ethernet Port.

When powering up the 2100-NET, with the Ethernet plug connected, the GREEN LED or the ORANGE LED should light immediately, indicating a good network connection.

2100-NET Commissioning.

(1) The Dip switches inside must be set for RS422 or RS485 operation.
(2) The Micro Scan Data loop should be wired locally to the attached stations.
(3) The Ethernet cable should be connected to the unit.
(4) Power must be supplied to the unit.
(5) Check that all the above conditions have been met, and the wiring checked, before applying power to the 2100-NET.
(6) The POWER LED should be ON.
(7) The TX LED lights up when the 2100-NET is sending data to the attached stations.
(8) The RX LED lights up when the 2100-NET receives data from the attached stations.
(9) The GREEN and ORANGE LEDS of the Ethernet port light up according to the devices operation. Refer to “Description of Ethernet LED Functions.”

NOTES

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