

INTECH Micro 2100-D. Installation Guide.

12 Channel, Isolated Digital Inputs.
12 Channel, Isolated Digital Outputs.

Features.

- 12 Digital, Isolated, Optocoupler Inputs.
- 12 Digital, Isolated, Relay Outputs.
- RS422/RS485 Upto 1200m.
- RS232 Cost Effective Radio Installation.
- RS232 Cost Effective PC IO Expansion.
- Selectable Baud Rates.
- Digital Inputs:
 - State or Count.
 - Speeds to 500Hz.
- Easy Programming Via Microscan Maps.
- Programmable Station Number.
- Scaled Rate Value Via Microscan Recorder.
- Scaled Totaliser Value Via Microscan Recorder.
- Programmable Relay States - NO or NC.
- Comms Failure Time-out Using Relay 12.
- Comms TXE and TX Delay Programming.
- Programming Information Retained on Power Down.
- Universal AC/DC Power Supply.
- Easy to Install.
- Compact DIN Rail Mount Enclosure.



Other 2100 models include:
 2100-A16 :16AI, 3DI, 2 Relay Out;
 2100-A4 :4AI, 4DI, 4 Relay Out;
 2100-A4e :4AI, 4DI, 8 Relay Out;
 2100-IS :Isolated RS232 to RS422/485;
 2100-ME :Memory Expansion for 2100-A;
 2100-M :16AI Multiplexer;
 2100-NS :Non-Isolated RS232 to RS422;
 2100-R :16 Relay Expansion for 2100-A.

Ordering Information.

2100-D-X

Standard Unit: RS422 COMMS, 80~265Vac/dc Power Supply.

2100-D - -
 C PS

Ranging Options for 2100-D			
COMMS	C	Power Supply	PS
RS232	232*	80~265Vac/dc	HV
RS422	422	23~90Vdc	LV
RS485	485		

*Note 1. The RS232 Comms. version comes complete with a RS232 kit, required for connecting the 2100-A16 to a PC, etc. The kit contains: 1 x 5m RS232 cable; (2,10 & 15m can be ordered) 1 x 9pin D type; 1 x 25pin D type.

Note 2: The 2100-D is factory set to RS232 or RS422/485. The 2100-D-X is field selectable for RS422 or RS485, and HV or LV power supply.

Ordering Examples.

1/ 2100-D-232-LV
 2/ 2100-D-422-HV

2100-D; RS232 COMMS; 23~90Vdc Power Supply.
 2100-D; RS422 COMMS; 80~265Vac/dc Power Supply.

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.

2100-D Installation Guide Index.

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2100-D Specifications.

Inputs:	12 Individually Isolated Inputs with LED Indication of Each Input.	
-Input Voltage	5~30Vdc.	
-Threshold	4.6V typical.	
-Load	@ 5V	1.1mA per Channel.
	@ 12Vdc	4.2mA per Channel.
	@ 24Vdc	9.6mA per Channel.
-Frequency	-Low	0~20Hz. Debounce - 50msec.
	-High	0~500Hz. Debounce - 2msec.
Outputs:	12 Individually Isolated Relays with LED Indication of Each Output.	
-Functions	12 Relay Contact - 10 Change Over; 2 Normally Open.	
-Contact Material	Silver Alloy	
-Relay Ratings	Rating	Approved to Standard
	250Vac, 2A	UL:E43028
	125Vac, 2A	CSA:LR26550
	110Vdc, 0.3A	
	30Vdc, 2A	
	1/6hp, 250Vac	
	1/10hp, 125Vac	
-Number of Operations	2 x 10 ⁵ Min, at 1A, 250Vac	
Comms:	RS422/RS485 or RS232	
-Baud Rate	Selectable 2400, 4800, 9600, 19200. (Default = 9600).	
-Format	8 bit, No Parity, 1 Stop.	
Power	-HV	80~265Vac/dc; 50/60Hz; 6VA.
	-LV	23~90Vdc; 6VA.
	-Fuse	1A 5 x 20mm Slow Blow.
	Refer to '2100-D H1 Power Supply Settings' for voltage selection instructions.	
Isolation	-Between Inputs	500Vac/dc peak for 1min.
	-Between Outputs	1000Vac/dc peak for 1min.
	-Comms to Inputs	1000Vac/dc peak for 1min.
	-Comms to Outputs	1500Vac/dc peak for 1min.
	-Inputs to Outputs	1500Vac/dc peak for 1min.
EMC Emissions Compliance	EN 55022-A	
EMC Immunity Compliance	EN 50082-1	
Safety Compliance.	EN 60950	
Operating Temperature	0~60C.	
Storage Temperature	-20~80C.	
Operating Humidity	85%RH Max. Non-Condensing.	
Housing	DIN & EN Rail Mount. L=184, W=127, H=100mm.	
Weight	900g, Including Packaging and RS232 kit.	

Note 1. Contact INTECH INSTRUMENTS for more detailed programming information.

Note 2. Specifications based on Standard Calibration Units, unless otherwise specified.

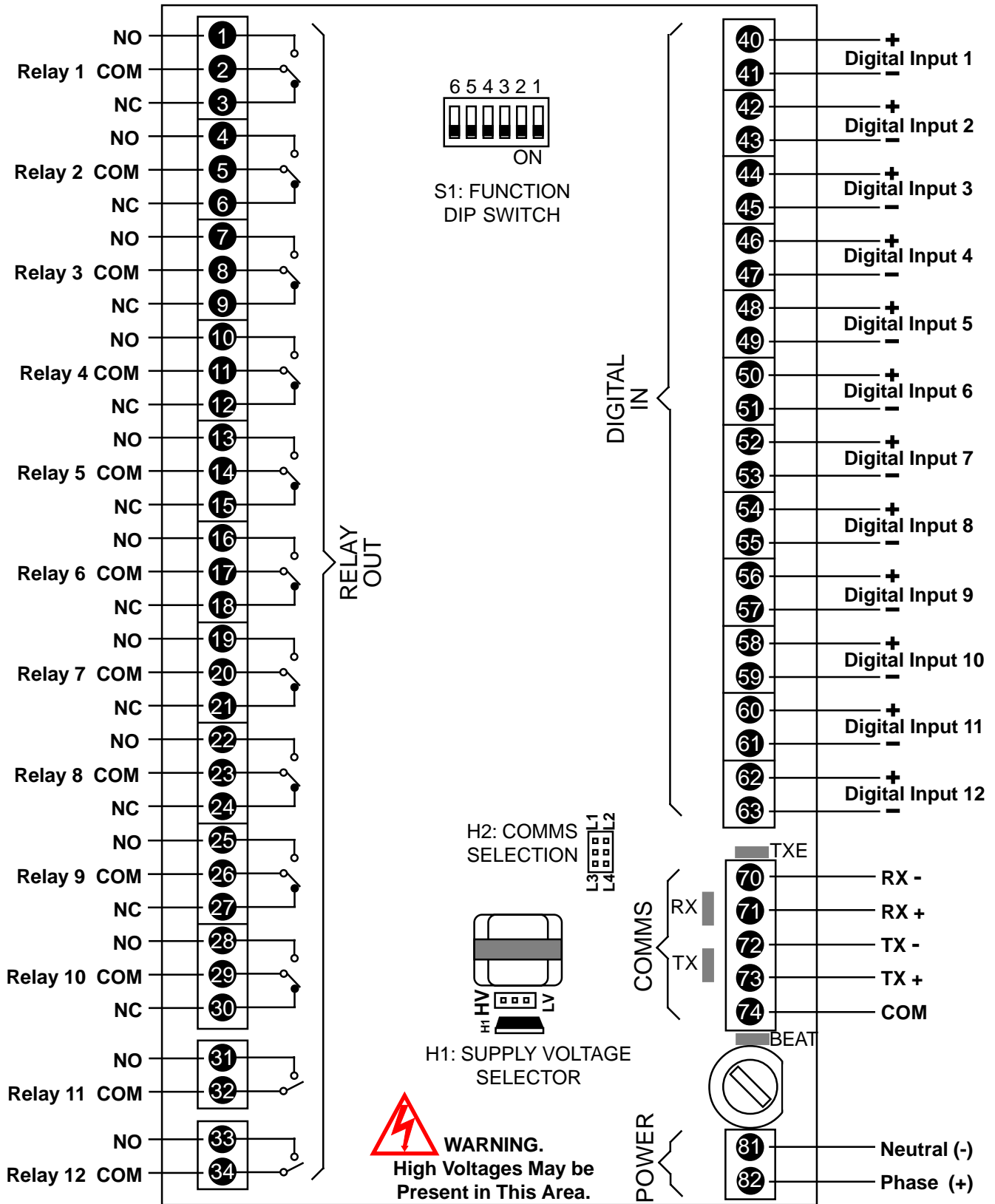
Note 3. Due to ongoing research and development, designs, specifications, and documentation are subject to change without notification.
No liability will be accepted for errors, omissions or amendments to this specification.



CAUTION: Dangerous voltages may be present. The 2100-D has no user serviceable parts. Protective enclosure only to be opened by qualified personnel. Remove ALL power sources before removing protective cover.

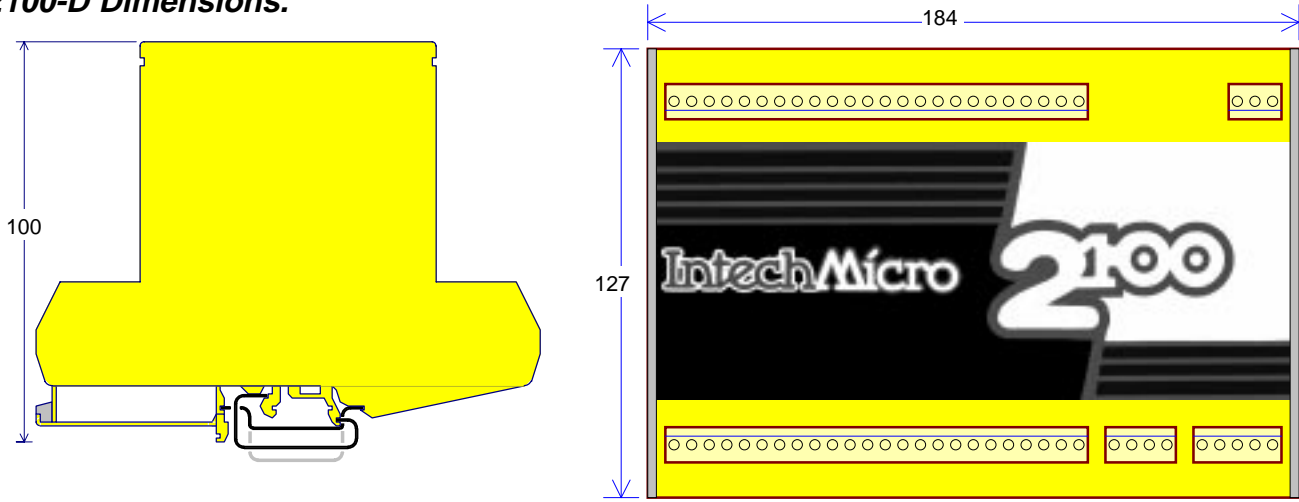


2100-D Terminals and Layout.



Only adjust jumpers with power OFF.

2100-D Dimensions.



2100-D Switches, Jumpers and LED Functions Tables.

CAUTION: Dangerous voltages may be present. The 2100-D has no user serviceable parts. Protective enclosure only to be opened by qualified personnel. Remove ALL power sources before removing protective cover.

- * For ALL programming tables. Switch Status: 0=OFF 1=ON X=Don't Care.
- * Refer to '2100-D Terminals and Layout' for the location of the following links and switches.

2100-D S1 Function Dip Switch Settings

Function Dip Switch Settings						
Function	S1-1	S1-2	S1-3	S1-4	S1-5	S1-6
9600baud <small>note1</small>	0	0	0	0	0	0
19200baud <small>note2</small>	1	0	0	0	0	0
4800baud	0	1	0	0	0	0
2400baud	1	1	0	0	0	0
Test Mode <small>note3</small>	0	0	1	0	0	0

- Note 1. Factory Default.
- Note 2. Use only with Pentium 166 or higher, or computers with 16550 Serial Ports.
- Note 3. Factory use ONLY.

2100-D H1 Power Supply Settings.

Power Supply Jumper Settings	
H1	Power Supply Voltage Range
H	Jumper for 80~265Vac/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.

2100-D H2 COMMS Settings.

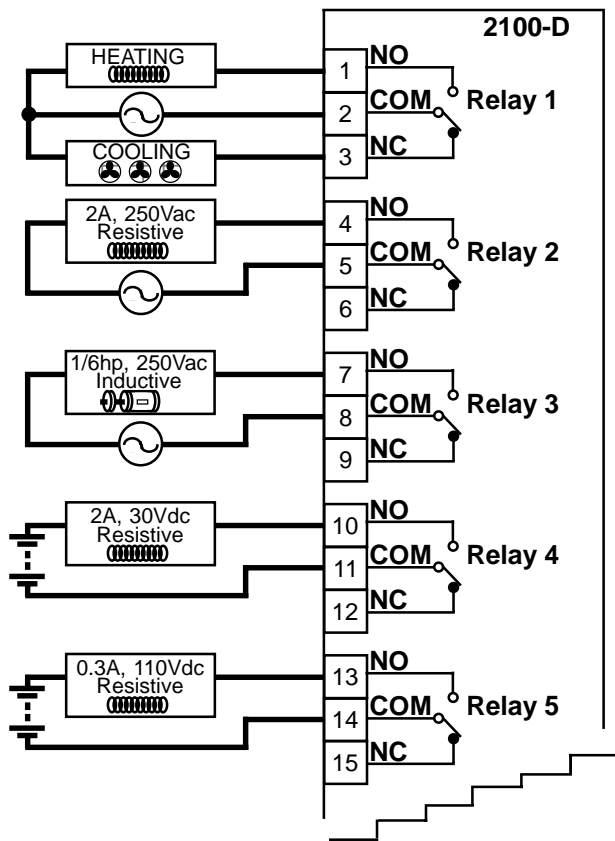
COMMS Jumper Settings				
Protocol	L1	L2	L3	L4
RS232 STD	0	0	1	0
RS232 RADIO	1	0	0	0
RS422	1	1	0	0
RS485	0	0	1	1

- Note 1. RS232 must be ordered separately to RS422/485.
- Note 2. RS422 can be jumper ed for RS485, and visa versa.

2100-D LED Descriptions Settings.

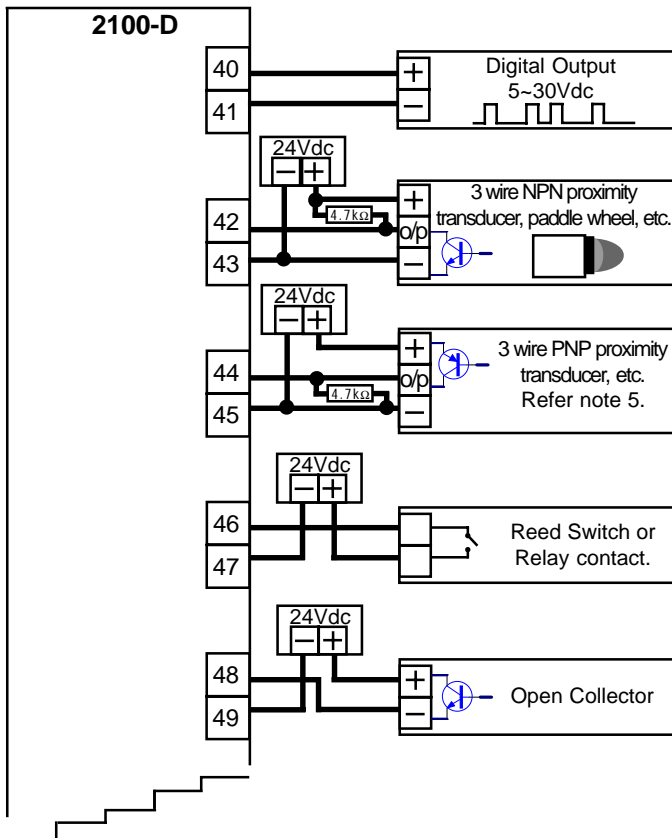
LED Descriptions	
LED Name	LED Function
RX	Active when Station is receiving serial data.
TX	Active only when Station is transmitting serial data.
TXE	Active only when Station is ready to transmit data.
BEAT	Heart beat. Continual flashing indicates Station healthy
Output 1~12	Indicates when their respective output relay is energized.
Input 1~12	Indicates when their respective input is energized, or counting

Connection Example Diagram for Digital Outputs.



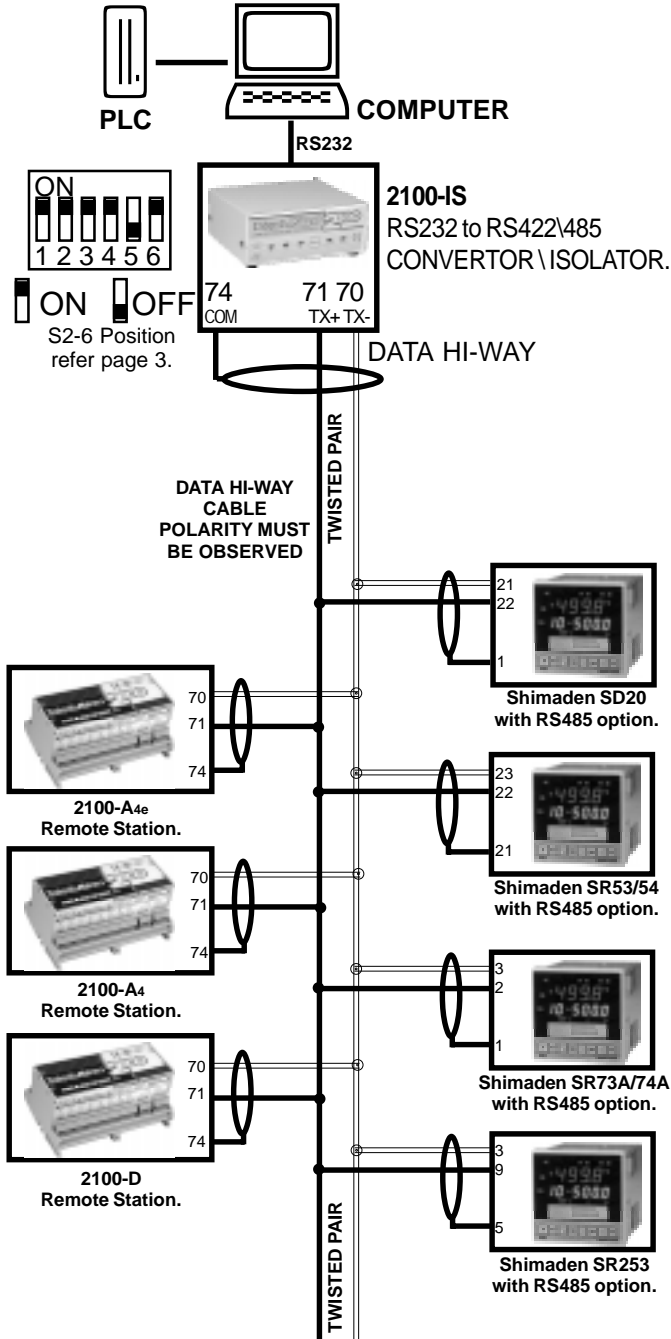
- Note 1. With relays NOT energized:
 NO = Normally Open.
 COM = Common.
 NC = Normally Closed.
- Note 2. The first ten relays are change-over. The last two (11 and 12) are Normally Open.
- Note 3. Each relay can be configured for a 'Normally ON' or 'Normally OFF' output state. (E.g. for fail safe operation.) The 'Normally ON/OFF' settings are retained in software on power down, but the relays are de-energized. Refer to MicroScan Configuration Manual.
- Note 4. Relay 12 can be selected as a Comms failure time-out alarm. Refer to the Microscan Configuration Manual.
- Note 5. LED indication on each output when each relay is energized.

Connection Example Diagram for Digital Inputs.

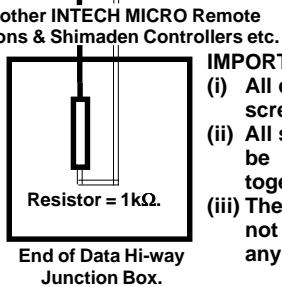


- Note 1. Inputs can be:
 State - i.e. ON or OFF
 Count - low speed: 0~20Hz; 50ms debounce
 Count - high speed: 0~500Hz; 2ms debounce
- Note 2. LED indication per input. LED intensity depends on voltage level at the input terminals. Refer to 'Specifications' for input loads.
- Note 3. For scaling of counter inputs, totalising and flow data conversion, refer to Microscan Configuration Manual, line setup/counter scaling.
- Note 4. All cables must be screened, with screen earthed at one end only. Refer 'The Proper Installation & Wiring of the 2100-D.'
- Note 5. 4K7 resistor not required for most types of 3 wire PNP transducers.

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.



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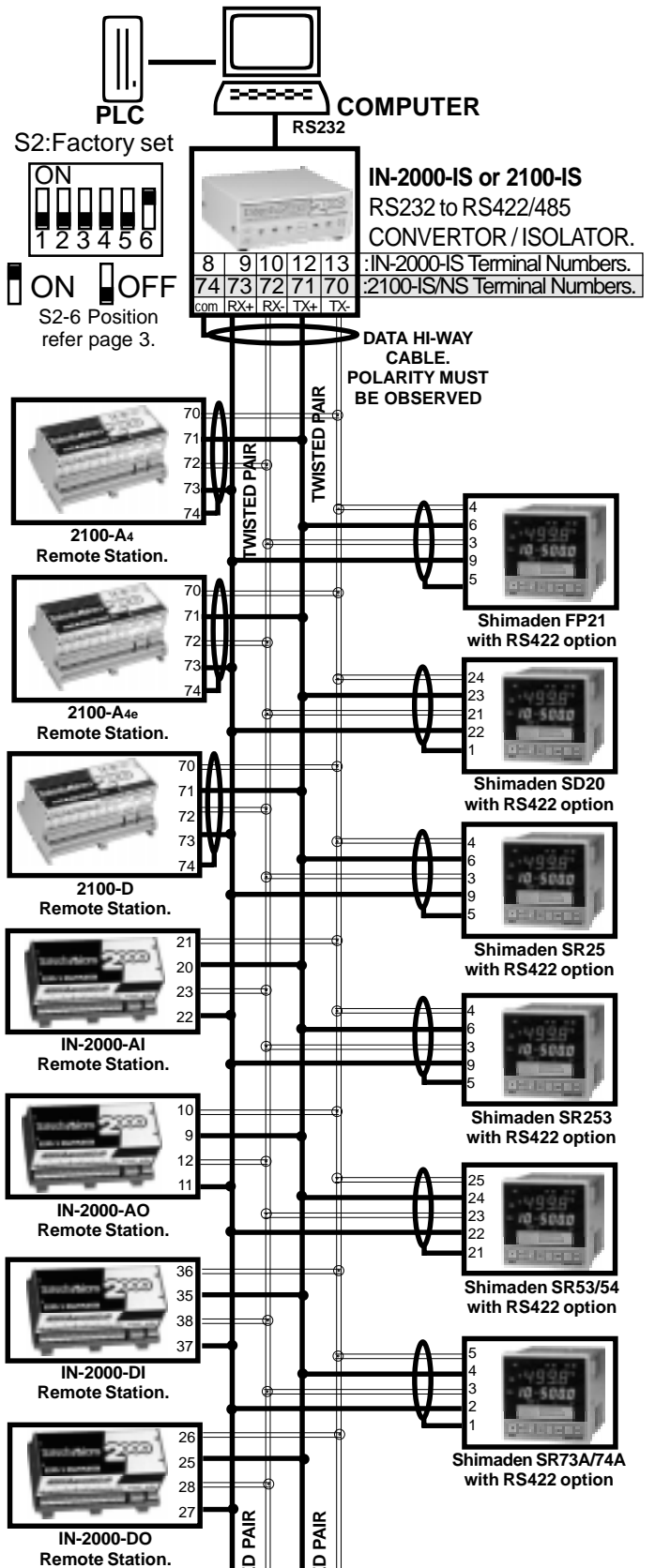
Notes:

- (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. The two Data Hi-ways must be run independent of each other, using two separate 2100-IS', that share the same RS232. Refer to parallel connection of RS232 into multiple 2100-IS', on page 7 of the 2100-IS Installation Manual.

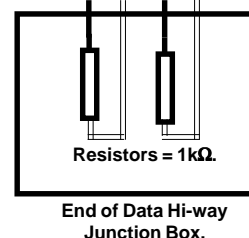
RS232: 2100-IS convertor is not required to connect the 2100-A4-232 directly to a PC. Use the RS232 kit to connect the 2100-A4-232 directly to a PC. The PC requires one RS232 port per 2100-A4.

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-A4 for RS485 operation.

OUTSTATION LAYOUT. 4-Wire RS422 Serial Connections.



To other INTECH MICRO Remote Stations & Shimaden Controllers etc.



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

2100-D Station Number Programming Sequence.

1. Once the 2100-D outstation is connected to the data hi-way, apply the power. Refer 'The Proper Installation & Wiring of the 2100-D.'
2. If the system is already running, close the Scada down. Start the 'Setup Manager'.
3. Select 'Recorder Setup', or 'Tag Setup'.
4. Select 'Program Address'. (Located in 'Station Programming Panel', at the bottom right of the window.
5. Enter the 2100-D serial number. (Written both on the 2100-D cover, and on the circuit board behind the power terminals.) Then enter the desired station number.
6. Select 'Program'. The station number will now be stored in 2100-D permanent memory.
7. A new station number will be created on the outstation map. This is ready for connection to tags or lines.

2100-D Station Software Programming.

Outstation setup.

1. If the system is already running, close the Scada down. Start the 'Setup Manager'.
2. Select 'Recorder Setup', or 'Tag Setup'.
3. Move to the required station number, using 'next' or 'prev' buttons.
4. Select 'Program Setup'. The serial number of the 2100-D will be recalled automatically. The software recalls the settings from the outstation, and displays them in the dialogue box.
5. Enter the required options and select 'Program' to write the data to the station.

Reading counter values.

1. On the station map connect the boxes marked 'count' to the line in the recorder.
2. Both totalising and rate are calculated using the MicroScan recorder. The totalise is based on the count value, and is not integrated using time.

Reading input states.

1. On the station map connect the boxes marked 'state' to the line in the recorder.

RS232 notes.

1. 2100-IS convertor is not required to connect the 2100-D-232 directly to a PC. Use the 2100-C kit to connect the 2100-D-232 directly to a PC. The PC requires one RS232 port per 2100-D outstation.

RS485 notes.

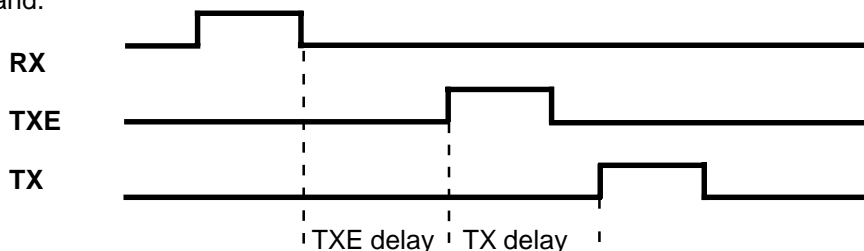
1. If the outstation is using RS485, it cannot be connected to the same data hi-way as an outstations using RS422.
2. In the 'programming' box, set the 'TX delay' box to 20. Set the Dip switches on the 2100-IS and the links on the 2100-D for RS485 operation.

2100-D TXE and TX Delay Settings.

The TXE and TX delays are software selectable in the MicroScan Outstation Programming Box. These delays are used for RS485/RS232 operation, to control the behaviour of the transmitter on the outstation, when it is ready to send data.

The TXE delay controls how long the transmitter waits before turning on. The TX delay controls how long the transmitter waits before sending data.

If the TXE delay is zero, the transmitter turns on immediately. If the TX delay is zero, the data is sent immediately, upon receiving a command.



The period is specified in units of 2.5ms. i.e. 10units = 25ms.

2100-D Delay Settings Table.

COMMS Delays Units (time)		
Protocol	TXE Delay	TX Delay
RS232 - to suit radio	10 (25ms)	20~200 (50~500ms)
RS422	0	0
RS485	0	20 (50ms)

The Proper Installation & Wiring of the 2100-D.

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) To maintain compliance with the EMC Directives the 2100-Ds are to be mounted in a fully enclosed steel fire cabinet. The cabinet must be properly earthed, with appropriate input / output entry points and cabling.
- (5) A readily accessible disconnect device and overcurrent device must be incorporated in the the power supply wiring.

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 analogue signals 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 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.		50pF/m
Capacitance between each wire to all others bunched together.		95pF/m
Cross-talk between pairs:	@ 1kHz @ 100kHz	>-90dB/100m >-50dB/100m
Characteristic Impedance .	@ 100kHz	135Ω
Attenuation of a pair:	@ 1kHz @ 10kHz @ 100kHz @ 150kHz @ 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.



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