EtherTRAK I/O		Flere varianter se oversigt
RemoteTRAK I/O		Flere varianter se oversigt

SIXNET EtherTRAK® Ethernet I/O Selection Guide

Part Number (Module w/ Base)	I/O Count				Description	Data Sheet No.
	DI	AI	DO	AO		
ET-MIX24880-D	24	8	8	-	Double density combination I/O module	1
ET-16DI2-H	16	-	-	-	10-30 VDC, high density configuration	2
ET-16DO2-H	-	-	16	-	10-30 VDC,1Amp / channel, high density	3
ET-16AI2-H	-	16	-	-	4-20 mA, high speed, 14-Bit	4
ET-8INS-U	-	8	-	-	Instrumentation (thermocouples,mV, etc.)	5
ET-8CNT-U	8	-	-	-	High speed counters(quad.,frequency,etc.)	6
ET-8DI2-8DO2-H	8	-	8	-	10-30 VDC, 1 Amp per output channel	7
ET-8DI2-8AI-H	8	8	-	-	10-30 VDC and 4-20 mA, 14-bit	8
ET-8AI2-4AO2-H	-	8	-	4	4-20mA (14-bit) ins and 4-20mA (16-bit) outs	9
ET4RTD-4DI-U	4	4	-	-	RTD (100 Ohm platinum) & 10-30 VDC inputs	10

Note: For larger Ethernet I/O stations, use an EtherTRAK I/O Concentrator (ET-GT-ST-2)or Redundant Ethernet I/O Gateway (ET-GT-ST-3) along with SIXTRAK I/O modules)

SIXNET RemoteTRAK® RS485 I/O Selection Guide

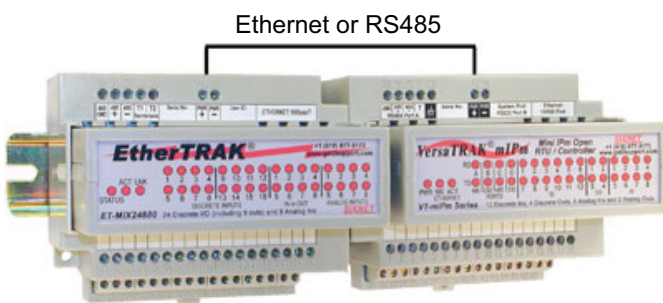| Part Number (Module w/ Base)	I/O Count				Description	Data Sheet No.
	DI	AI	DO	AO		
RM-8DI2-F	8	-	-	-	10-30 VDC, field wiring saves wiring and time	1
RM-8DI2-U	8	-	-	-	10-30 VDC, univ. base provides extra isolation	2
RM-8DI2-U	16	-	-	-	10-30 VDC, high density configuration	3
RM-8DO2-F	-	-	8	-	10-30 VDC, 3 Amps per channel	4
RM-16DO2-H	-	-	16	-	10-30 VDC, 1 Amp per channel, high density	5
RM-8AI2-F	-	8	-	-	4-20 mA, 16-bit	6
RM-16AI2-H	-	16	-	-	4-20 mA, high density configuration, 16-bit	7
RM-8INS-U	-	8	-	-	Instrumentation (thermocouples, mV, etc.)	8
RM-4AO2-F	-	-	-	4	4-20 mA, 13-bit	9
RM-8AO2-F	-	-	-	8	4-20 mA, 13-bit	10
RM-4DI2-4AI2-U	4	4	-	-	10-30 VDC and 4-20 mA, 16-bit	11
RM-4DI2-4DO2-U	4	-	4	-	10-30 VDC, 1 Amp per output channel	12
RM-RTU-8440-F	8	4	4	-	Low cost RTU / I/O module	13
RM-232-485-4U	-	-	-	-	RS232 to RS485 converter	14
RM-232-SETUP	-	-	-	-	Remote I/O setup module	15

These I/O modules seamlessly integrate into Scalable Control Systems (SCS)

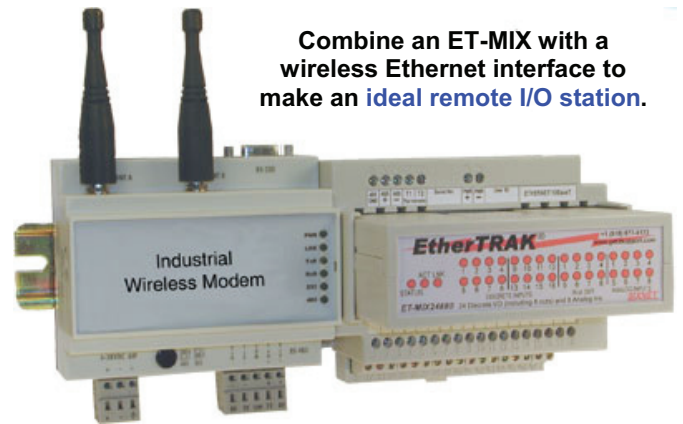# Double Density I/O for Direct Ethernet or RS485 Connections

Select an ET-MIX module when . . .

. . . you have a mix of I/O types or limited panel space
and a direct Ethernet or RS485 connection is required.

- **24 Discrete Inputs and/or 8 Discrete Outputs and 8 Analog Inputs in one compact module**
- **Ethernet or RS485 Modbus compatibility**
- **High density design saves space and cost**
- **16 bit A/D for precision measurements**
- **True hot swap of modules in live systems**

Ethernet or RS485

Combine an ET-MIX with a wireless Ethernet interface to make an ideal remote I/O station.

Use this EtherTRAK I/O module to expand a VT-MIPM RTU to 58 I/O points.
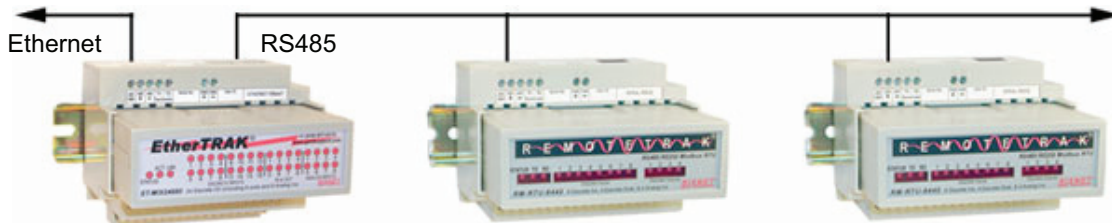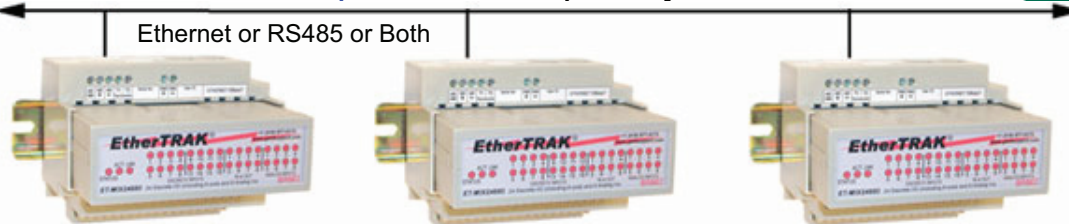
Ethernet   RS485

Connect to any Modbus I/O (ASCII or RTU).

The ET-MIX is expandable with RS485. Connect any RemoteTRAK or Modbus I/O to the single Ethernet link …

… or use the RS485 as a redundant backup communications path for your Ethernet I/O network.

Distribute ET-MIX modules with Ethernet or RS485 up to long distances.

Ethernet or RS485 or Both

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ET-MIX24880-D Performance Specifications

| Ethernet Port	10BaseT at 10 Mbps
Isolation	1200 Volts RMS 1 minute
Protocols	SIXNET and Modbus over TCP/IP or UDP
RS485 Port	**Up to 38,400 baud**
Operation	Master (passthru) or slave
Supported modes (see the Usage Tips in the catalog for details)	Expansion I/O (as a master), distributed I/O or backup communications path (as a slave)
Protocols	SIXNET, Modbus RTU / ASCII
Maximum distance	Up to 0.5 mile (0.8 km)
Environmental	**DIN rail or panel mount**
Required user supply	10-30 VDC
Power (typ.) @ 24 VDC	1 Watt, 42 mA (excluding I/O)
Operating temp. range	-40 to +70°C
Storage temp. range	-40 to +85°C
Humidity (non-conden.)	5 to 95% RH
Vibration	IEC68-2-6
Electrical safety	UL508, CSA C22.2/14; EN61010
EMI emissions	FCC part 15, ICES-003; EN55022
EMC immunity	EN50082-1, EN61326-1
Surge withstand	IEEE-472
Hazardous locations (Class 1, Div 2 / Zone 2)	UL1604, CSA C22.2/213, EN50021, EEx nA II T4 X
Marine/offshore locations	Det Norske Veritas (DNV) No. 2.4 (Class A & B)

24 Discrete inputs *	10-30 VDC
Channels 1 through 8	Sinking or sourcing (as a group)
Channels 9 through 24	Sourcing only
Guaranteed ON voltage	9 VDC
Guaranteed OFF voltage	5.0 VDC
Guaranteed OFF current	1.5 mA DC
Input resistance & current	10K Ohms & 2.4 mA @ 24VDC
Filtered ON/OFF delay	25 mS (10 Hz max. counting)
Fast ON/OFF delay	4 mS (100 Hz max. counting)
Counters on 1st 8 channels	50 KHz on channel 1 and 2
Counter modes	Count up, run time and pulse rate (with selectable time bases)
8 Discrete Outputs *	**10-30 VDC**
Max. output current	1A per channel, 8A per module
Max. OFF state leakage	0.05 mA
Min. load	1 mA
Inrush current	5 Amps (100 mS surge)
Typ. ON resistance / volt.	0.3 Ohms / 0.3 VDC (@1A)
8 Analog Inputs	**4-20 mA (other ranges available)**
A/D resolution	16 bits (0.003%)
Full scale accuracy	+/-0.1% (@20°C)
Span & offset temp. coeff.	+/-50 ppm per degree C
Input impedance	100 Ohm
Current protection	Self-resetting fuses
DMRR	66 dB at 50/60 Hz
Short circuit protection	Current limiting

* Note: Discrete I/O channels 16-24 can be configured individually to be discrete inputs or discrete outputs.
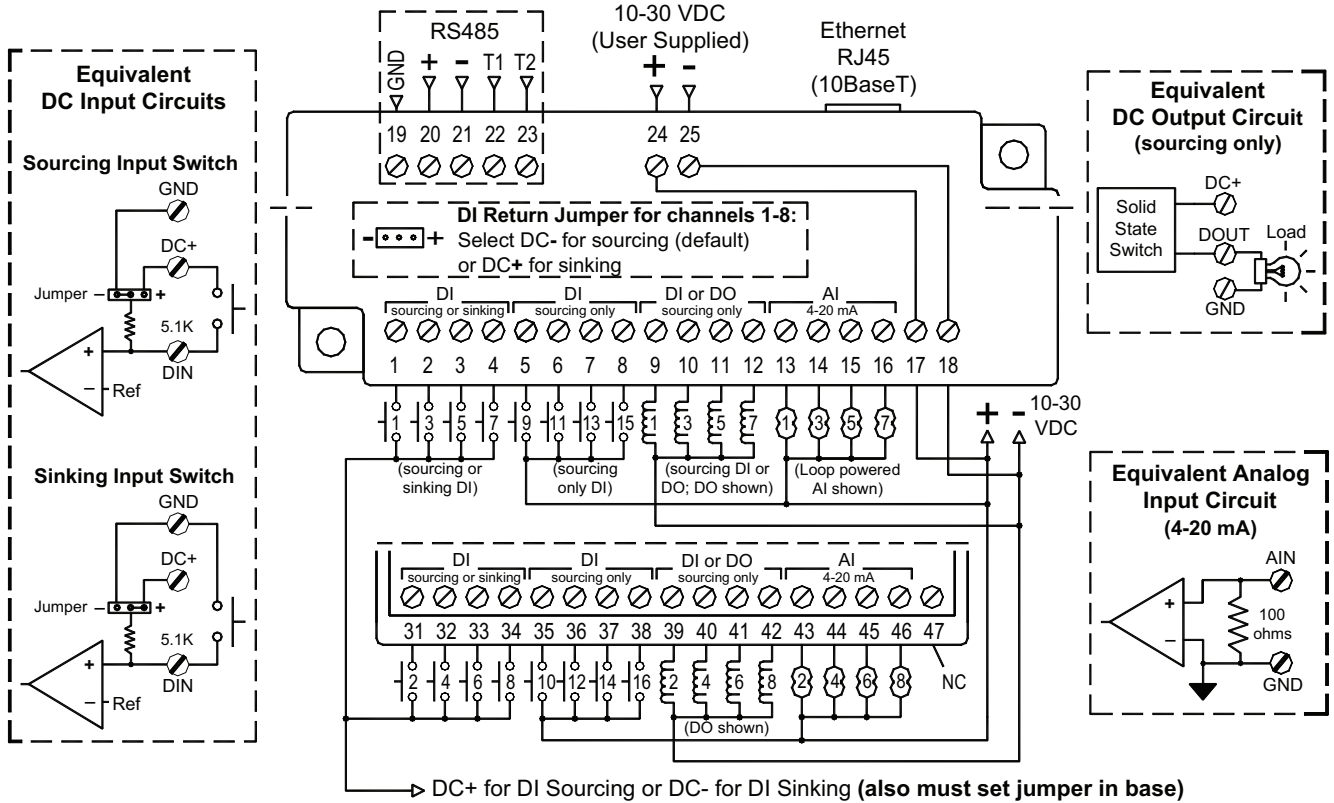There are a total of 24 discrete I/O channels.
Specifications are subject to change. Consult the factory for the latest information.

ET-MIX24880-D Mechanical Dimensions
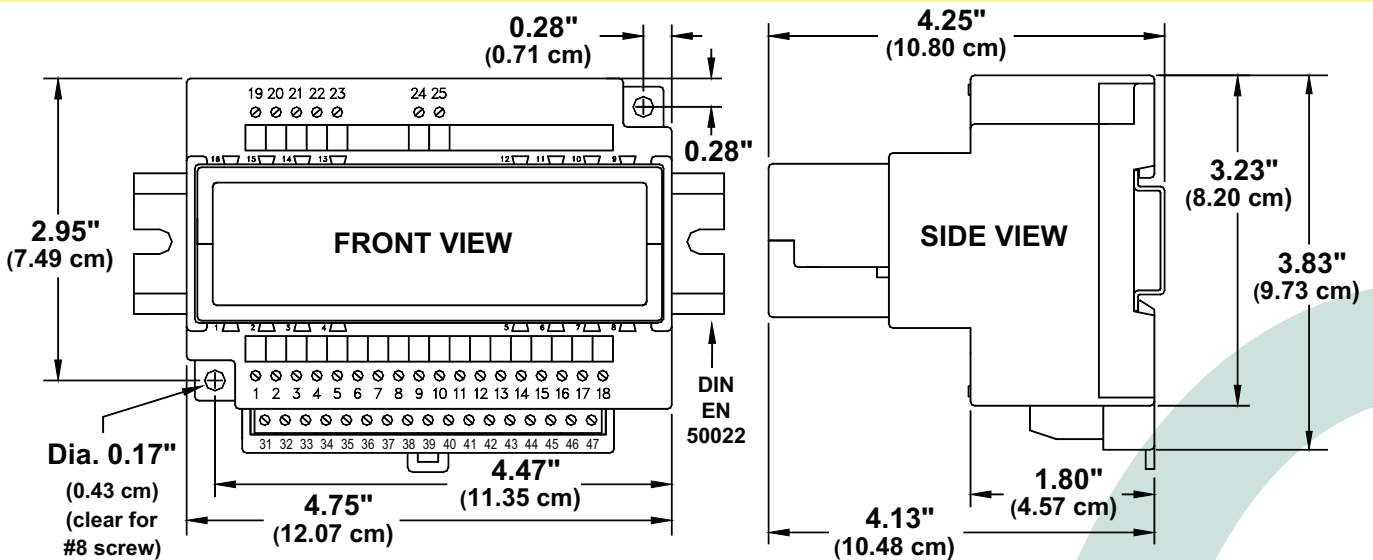
ET-MIX24880-D Power and I/O Wiring

I/O Group Descriptions:

1st Group of 8 DI	2nd Group of 8 DI	3rd Group of 8 DI/O	Analog Input Group
• Sinking or sourcing (select as group with jumper) • Can be counters up to 100Hz (50 KHz on channel 1 and 2) • Input threshold can be lowered to 4 Volts by modifying the base	• Sourcing 10-30 VDC only • No software counters	• Can be individually configured as sourcing discrete inputs or outputs • Input channels monitor state of outputs to detect shorts or open circuits	• Single-ended 4-20 mA inputs w/ common ground • Voltage ranges available with special wiring base (contact SIXNET)

ET-MIX24880-D Ordering Information

ET-MIX24880-D	Module and wiring base pair
ET-MIX24880-M	Replacement module only
ET-MIX24880-DB	Replacement wiring base only
RM-PS-024-01F	Optional AC to DC power supply, 1A

Certified to Perform:

ISO9001 Certified   **Class 1, Div II & Cenelec Zone 2**   **European Community**   **UL508 for Safety**   **Marine & Offshore**

Select an ET-16DI2 when…

…you need discrete (on/off) inputs reported over an Ethernet network.

- Supports DC sinking/sourcing or AC wiring
- User-configurable smart filtering
- Pulse counters with contact bounce filtering
- One high-speed counter channel to 2 KHz

Performance Specifications

|	
Number of input channels	16
Nominal input voltage	12/24 VDC/VAC
Guaranteed ON voltage (note 1)	9 VDC/VAC
Maximum input voltage	30 VDC/VAC
Guaranteed OFF voltage (note 2)	5.0 VDC
Guaranteed OFF current (note 2)	1.4 mA
Input resistance	3.6K Ohms
Nominal input current @ 24VDC	6.7 mA
Filtered Mode ON/OFF delay (note 3)	25mS
Filtered Mode count feature	10 Hz Maximum
Fast Mode count feature	100 Hz (2 KHz on channel 1)
Fastest scan rate (16 channels)	2 mS (see Note 4)
Required supply voltage	10-30 VDC (0.75 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

RS485 Port for I/O Expansion

|	
Max. RemoteTRAK modules	32 (up to 512 I/O)
Protocol	SIXNET "I/O for Windows" and Modbus ASCII and RTU
Baud rate	38,400 bps
Recommended distance	Up to 0.5 mile
Isolation (from Ethernet port)	1200 Volts RMS 1 minute

Notes: 1. Minimum voltage guaranteed to turn the module ON.
2. The maximum input current/voltage that will not switch the input from OFF to ON.
3. Smart logic ignores transients, power line dropouts and switch contact bounce.
4. I/O register update time does not include external communications.

Ordering Information

Description	Part Number
16 inputs with wiring base	ET-16DI2-H
Replacement module only	ET-16DI2-M
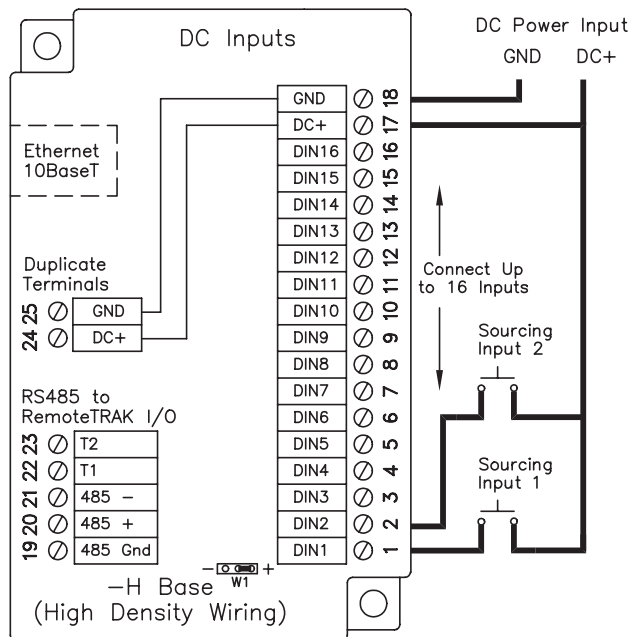
DC Inputs

Equivalent DC Input Circuits
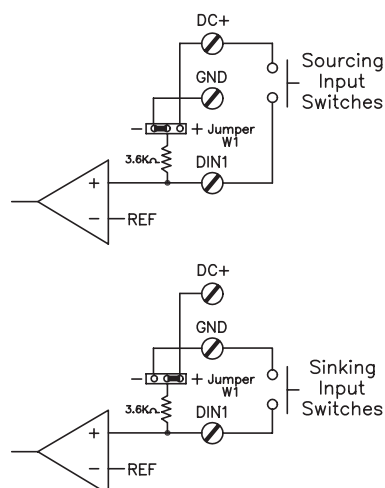
Select an ET-16DO2 when…

…you need to control relays, solenoids, valves and other outputs over an Ethernet network.

- High density outputs save space
- Isolation protects the Ethernet network
- Time Proportioned Outputs for variable control
- Surge suppressors safely clamp inductive loads

Performance Specifications

|	
Number of output channels	16
Output range	10 - 30 VDC
Max. output current per channel	1 Amp
Max. output current (entire module)	8 Amps
Max. OFF state leakage current	0.05 mA
Min. load current per channel	0.1 mA
Inrush current (100 mS surge)	5 Amps
Typical ON resistance	0.3 Ohms
Typical ON voltage (@ 1 Amp)	0.3 VDC
Time proportioned outputs (see note)	Configurable for each channel
Fastest scan rate (16 channels)	2 mS
Required supply voltage	10-30 VDC (0.75 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

RS485 Port for I/O Expansion

|	
Max. RemoteTRAK modules	32 (up to 512 I/O)
Protocol	SIXNET "I/O for Windows" and Modbus ASCII and RTU
Baud rate	38,400 bps
Recommended distance	Up to 0.5 mile
Isolation (from Ethernet port)	1200 Volts RMS 1 minute

Note: *Time Proportioned Outputs control the duty cycle of the output in proportion to an analog output register value. The cycle time and minimum pulse time are configurable.*

Ordering Information

Description	Part Number
16 outputs with wiring base	ET-16DO2-H
Replacement module only	ET-16DO2-M
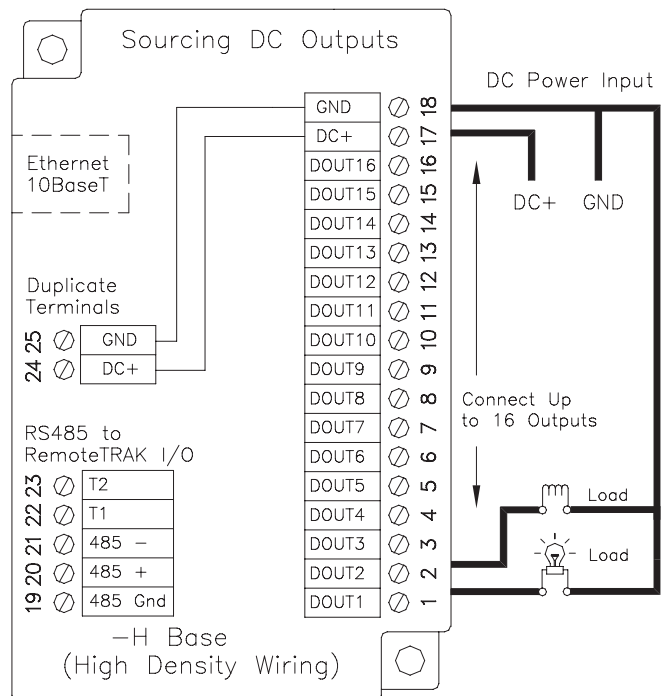
Sourcing DC Outputs

—H Base (High Density Wiring)

Equivalent DC Output Circuit (Sourcing only)

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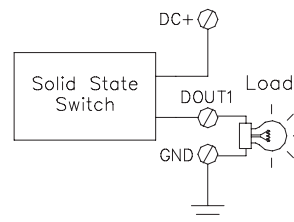
Select an ET-16AI2 when…

…you need to monitor 4-20 mA analog signals over an Ethernet network.

- 14 bit A/D for precision measurements
- Smart filtering rejects noise
- User choice of integration time – speed vs. filtering
- Field replaceable current shunts save maintenance time

Performance Specifications

Number of channels	16
Input range	4-20 mA
A/D resolution	14 bits (0.01%)
Full scale accuracy (@20°C)	+/- 0.05%
Span and offset temp. coefficient	+/- 50 ppm per °C typical
Input impedance	100 Ohms
Input current protection	Replaceable shunts
Fastest scan rate (16 channels)	5 mS
Required supply voltage	10-30 VDC (0.75 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

RS485 Port for I/O Expansion

Max. RemoteTRAK modules	32 (up to 512 I/O)
Protocol	SIXNET "I/O for Windows" and Modbus ASCII and RTU
Baud rate	38,400 bps
Recommended distance	Up to 0.5 mile
Isolation (from Ethernet port)	1200 Volts RMS 1 minute

Ordering Information

Description	Part Number
16 inputs with wiring base	ET-16AI2-H
Replacement module only	ET-16AI2-M

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Select an ET-8INS when…

…you need to read thermocouples, or you need isolated 16 bit inputs for high accuracy, or to connect to floating 4-20 mA inputs.

- Advanced 16 bit A/D for extreme accuracy
- Differential inputs minimize noise and ground loops
- Software selectable ranges - mix inputs on module
- Linearizes and compensates thermocouple readings
- Upscale/downscale thermocouple burnout detection

Performance Specifications

Number of channels	8
Lowest voltage range	+/- 0.062 Volts
Maximum voltage range	+/- 10 Volts
Auto-polarity current range	4-20 mA, 0-20 mA
Thermocouple types (see notes)	J,K,E,R,T,B,C,N,S *
A/D resolution	16 bits (0.003%)
Full scale accuracy (@20°C)	+/- 0.02%
Input span and offset adjustability	+/- 25%
Span and offset temp. coefficient	+/- 30 ppm per °C typical
Voltage range input impedance	200K Ohms
Current range input impedance	100 Ohms
CMRR (@ 50/60 Hz)	140 dB
DMRR (@ 50/60 Hz)	66 dB
Common mode input voltage:	
Between two input terminals	+/- 25VDC
Between inputs and ground	1200 Volts
No damage input voltage	+/- 50 VDC
Fastest scan rate (all 8 channels)	100 mS ** (see notes)
Required supply voltage	10-30 VDC (1.6 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

RS485 Port for I/O Expansion

Max. RemoteTRAK modules	32 (up to 512 I/O)
Protocol	SIXNET "I/O for Windows" and Modbus ASCII and RTU
Baud rate	38,400 bps
Recommended distance	Up to 0.5 mile
Isolation (from Ethernet port)	1200 Volts RMS 1 minute

Note: *Thermocouple inputs are cold-junction compensated and reported as °F, °C, 0.1°F or 0.1°C.*

Ordering Information

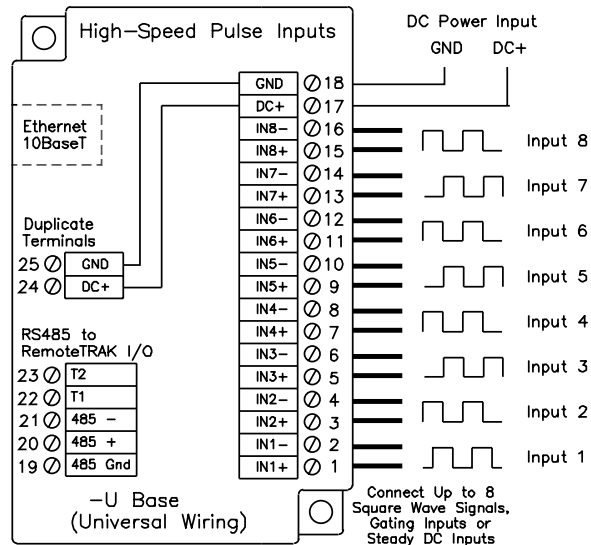| Description	Part Number
Instrumentation module with base	ET-8INS-U
Replacement module only	ET-8INS-M
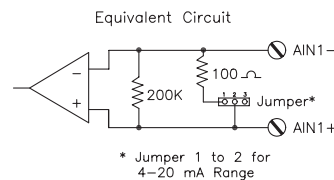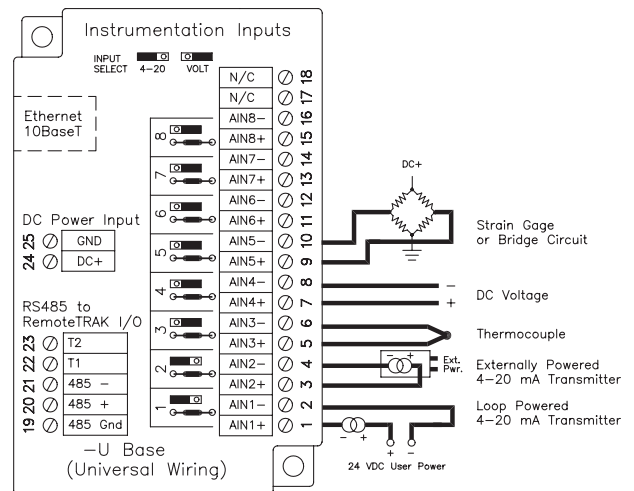
Select an ET-8CNT when…

…you need pulse accumulators, pulse rate, or position information over an Ethernet network.

- ■ Count rates to 50 KHz with 32-bit results
- ■ Measure pulses from milliseconds to a minute
- ■ Direct position detection from quadrature encoders
- ■ Individually isolated inputs for best noise immunity
- ■ Count inputs also report as discrete inputs
- ■ Support for hardware gating and software resets

Performance Specifications

Number of counters	8
Count mode performance:	
Guaranteed count rate	50 KHz
Count resolution	32 bits
Rate (frequency) mode performance:	
Maximum input rate	50,000 per sec
Shortest measurement period	10 mS
Longest measurement period	1 min
Position mode performance:	
Maximum position axes (2 channels/axis)	4
Maximum pulses per second	25,000
Maximum quadrature states per second	100,000
Position resolution	32 bits
Input performance:	
Guaranteed count input voltage	4 Volts
Maximum count input voltage	30 Volts
Guaranteed off input voltage	1.5 Volts
Nominal count input current	8 mA
Required supply voltage	10-30 VDC (1.4 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

RS485 Port for I/O Expansion

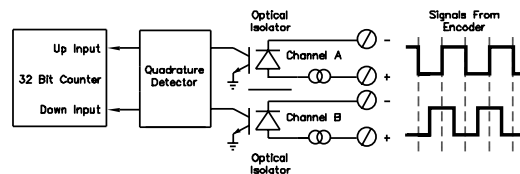|	
Max. RemoteTRAK modules	32 (up to 512 I/O)
Protocol	SIXNET "I/O for Windows" and Modbus ASCII and RTU
Baud rate	38,400 bps
Recommended distance	Up to 0.5 mile
Isolation (from Ethernet port)	1200 Volts RMS 1 minute

Note: *A pair of counter channels can be combined to make a 32-bit up/down counter or accumulator.*
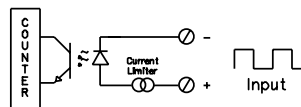
Ordering Information

Description	Part Number
8 High-Speed Counters w/base	ET-8CNT-U
Replacement module only	ET-8CNT-M

Select an ET-8DI2-8AI2 when…

…you need to monitor both discrete and analog inputs over an Ethernet network.

Select an ET-8DI2-8DO2 when…

…you need a mix of discrete inputs and outputs for control at a remote location.

- Single module compact solutions for small stations
- Lowest cost solution when mixed I/O is needed
- Can be expanded with RemoteTRAK® I/O
- Ideal "RTU" for networked systems

Performance Specifications

Number of discrete inputs	8
Nominal discrete input range	12/24 VDC/VAC
Discrete input characteristics	Same as ET-16DI2
Number of analog inputs	8 (-8AI2 module only)
Analog input range	4-20 mA
Analog input resolution	14 bits (0.01%)
Analog input characteristics	Same as ET-16AI2
Number of discrete outputs	8 (-8DO2 module only)
Max. output current per channel	1 Amp
Discrete output characteristics	Same as ET-16DO2
Filtered Mode ON/OFF delay	25 mS
Filtered Mode count feature	10 Hz Maximum
Fast Mode count feature	100 Hz Max (2 kHz on channel 1)
Required supply voltage	10-30 VDC (0.75 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

### RS485 Port for I/O Expansion

|	
Max. RemoteTRAK modules	32 (up to 512 I/O)
Protocol	SIXNET "I/O for Windows" and Modbus ASCII and RTU
Baud rate	38,400 bps
Recommended distance	Up to 0.5 mile
Isolation (from Ethernet port)	1200 Volts RMS 1 minute

Ordering Information

Description	Part Number
8DI and 8AI with wiring base	ET-8DI2-8AI2-H
8DI and 8DO with wiring base	ET-8DI2-8DO2-H
Replacement module only	ET-8DI2-8AI2-M
Replacement module only	ET-8DI2-8DO2-M

ET-8DI2-8AI2

ET-8DI2-8DO2

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Select an ET-8AI2-4AO2 when…
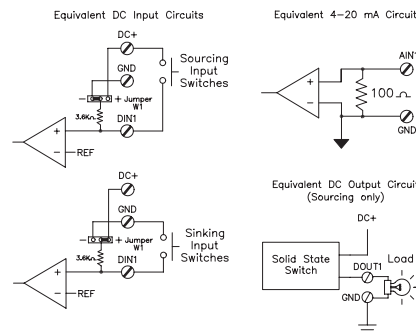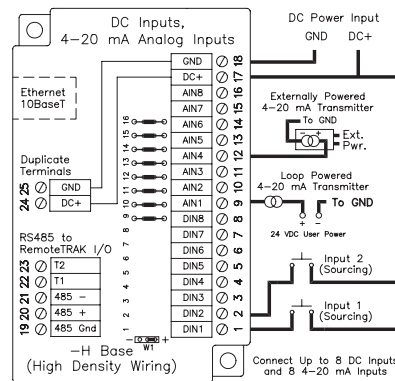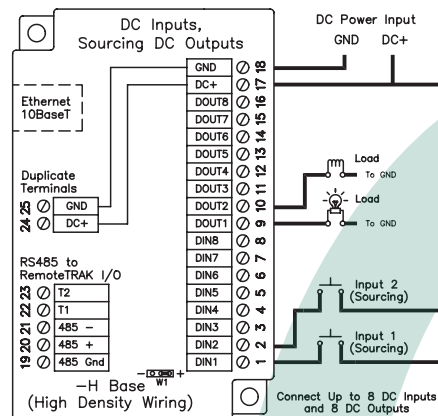
…you need a mix of 4-20 mA analog inputs and outputs at the same location.

- Single compact solution for small stations
- Lowest cost for small analog applications
- Input/output combination is ideal for control
- May be expanded with RemoteTRAK® I/O

Performance Specifications

Number of analog inputs	8
Analog input range	4-20 mA
Analog input resolution	14 bits (0.01%)
Analog input characteristics	Same as ET-16AI2
Number of analog outputs	4
Output range	4-20 mA
D/A resolution	16 bits (less than 1µA)
Full scale accuracy (@20°C)	+/- 0.02%
Span and offset temp. coefficient	+/- 50 ppm per °C typical
Max. output settling time (to 0.05%)	5 mS
Required user supplied voltage	10-30 VDC
Load resistance range (@ +24 VDC supply)	0-750 Ohms
Short circuit protection	Current limiting
Fastest scan rate (all channels)	5 mS
Required supply voltage	10-30 VDC (0.75 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

RS485 Port for I/O Expansion

Max. RemoteTRAK modules	32 (up to 512 I/O)
Protocol	SIXNET "I/O for Windows" and Modbus ASCII and RTU
Baud rate	38,400 bps
Recommended distance	Up to 0.5 mile
Isolation (from Ethernet port)	1200 Volts RMS 1 minute

Ordering Information

Description	Part Number
8AI and 4AO with wiring base	ET-8AI2-4AO2-H
Replacement module only	ET-8AI2-4AO2-M
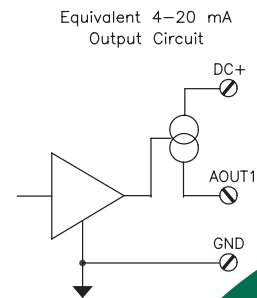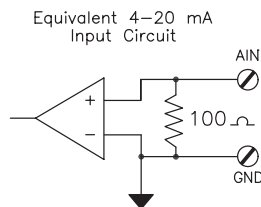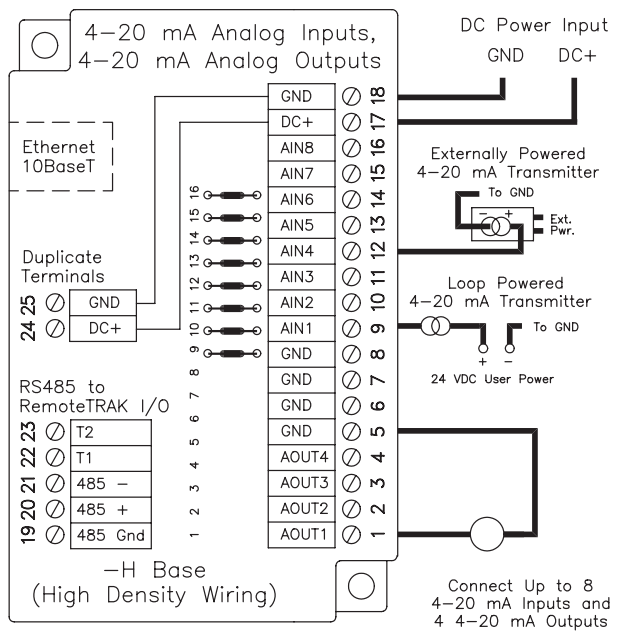
Select an ET-4RTD-4DI2 when…

…you need to monitor both 100 Ohm Platinum RTD and discrete inputs (alarm limits, switches, etc.) over an Ethernet network.

- 16 bit differential inputs reduce noise and ground loops
- RTDs are more accurate than thermocouples
- RTD linearization done in software for high accuracy
- Four discrete inputs for monitoring or counting


Performance Specifications

Number of RTD inputs	4
RTD type	100 ohm platinum, alpha = .00385 or .00392
Compatible lead configurations	2, 3, or 4 wire
Input range	-200 to 850°C
A/D resolution	16 bits
Scaled resolution	0.1°C
Full scale accuracy (@20C)	0.5°C
Span & offset temp. coefficient	+/- 25 ppm/°C
Excitation current (pulsed to reduce self-heating)	250 uA
Max. lead wire resistance	100 ohms per side, balanced
Input protection	+/- 25 VDC
Fastest scan rate (4 RTDs)	700 mS
Fastest scan rate (4DIs)	2 mS
Number of discrete inputs	4
Nominal discrete input range	12/24 VDC/VAC
Discrete input characteristics	Same as ET-16DI2
Filtered Mode ON/OFF delay	25 mS
Filtered Mode count feature	10 Hz Maximum
Fast Mode count feature	100 Hz Max (2 kHz on channel 1)
Required supply voltage	10-30 VDC (0.75 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

RS485 Port for I/O Expansion

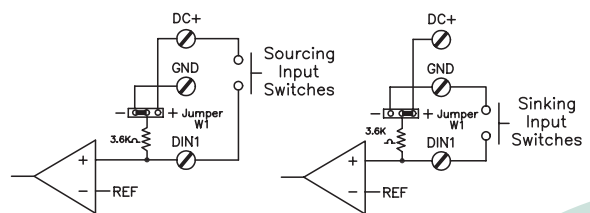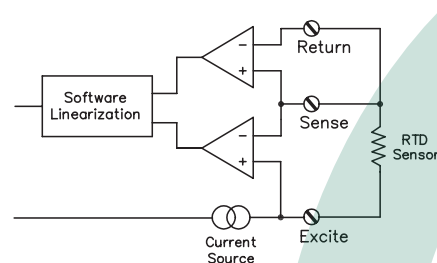|	
Max. RemoteTRAK modules	32 (up to 512 I/O)
Protocol	SIXNET "I/O for Windows" and Modbus ASCII and RTU
Baud rate	38,400 bps
Recommended distance	Up to 0.5 mile
Isolation (from Ethernet port)	1200 Volts RMS 1 minute

Ordering Information

Description	Part Number
4 RTD and 4DI with wiring base	ET-4RTD-4DI2-H
Replacement module only	ET-4RTD-4DI2-M
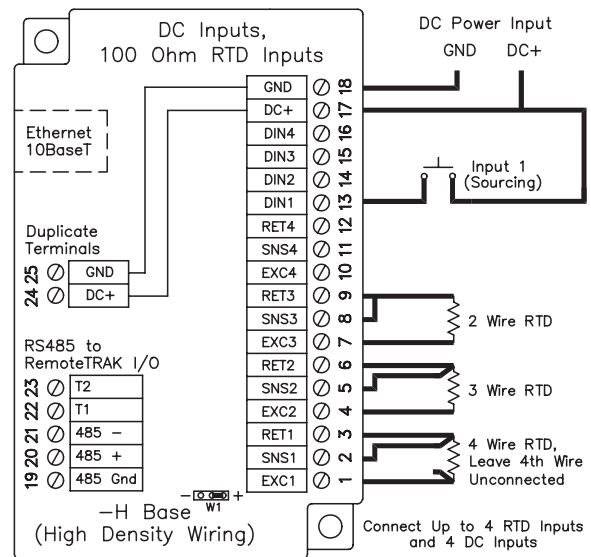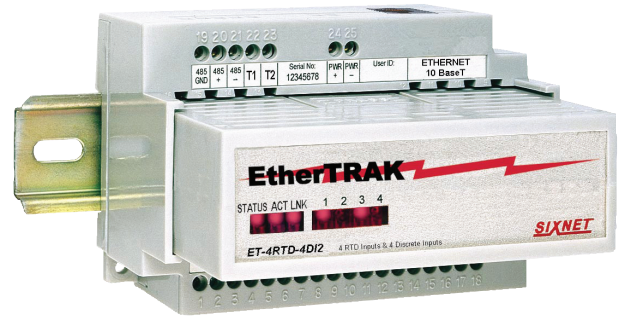
Select a RM-8DI2 when…

…you need a flexible choice of sinking, sourcing or individually isolated discrete inputs and/or pulse counters.

■ Optical isolation on each channel for best reliability
■ Autopolarity for DC sinking, sourcing or AC wiring
■ Pulse counters with contact debounce filtering
■ One high-speed counter channel to 2 KHz

RM-8DI2-F

Performance Specifications

Number of channels	8
Nominal input voltage	12/24 VDC/VAC
Guaranteed ON voltage (note 1)	9 VDC/VAC
Maximum input voltage	30 VDC/VAC
Guaranteed OFF current (note 2)	1.5 mA DC
Guaranteed OFF voltage (note 2)	5.0 VDC
Input resistance	2.4K Ohms
Nominal input current @ 24VDC	10 mA
Filtered ON/OFF delay (note 3)	25 mS (10 Hz counting)
Max. count frequency (fast mode)	100 Hz (2 KHz on channel 1)
Channel to channel isolation	500 Volts (w/-U base)
Isolation from internal circuitry	1200 Volts

Serial communication information	See page 19
RS485 isolation	1200 Volts RMS 1 minute
Required supply voltage	10-30 VDC (0.5 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

Notes: 1. *Minimum voltage guaranteed to turn the module ON.*
2. *The maximum input current/voltage that will not switch the input from OFF to ON.*
3. *Smart logic ignores transients, power line dropouts and switch contact bounce.*

Ordering Information

Description	Part Number
Module with field wiring base	RM-8DI2-F
Module with universal wiring base	RM-8DI2-U
Replacement module only	RM-8DI2-M
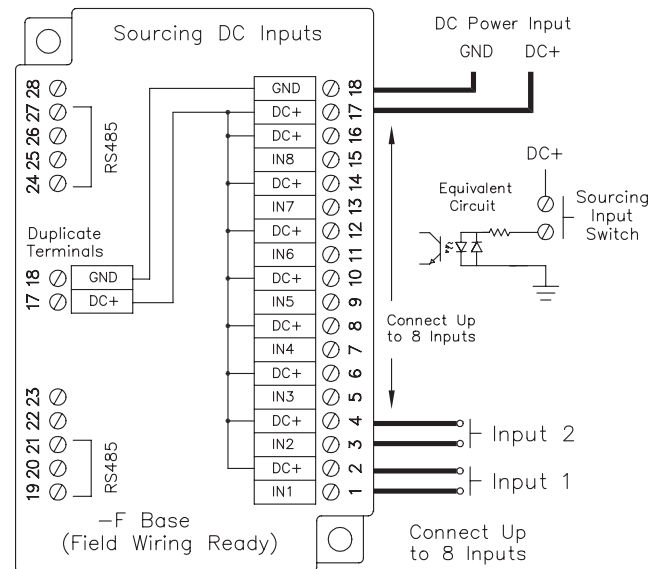
RM-8DI2-U
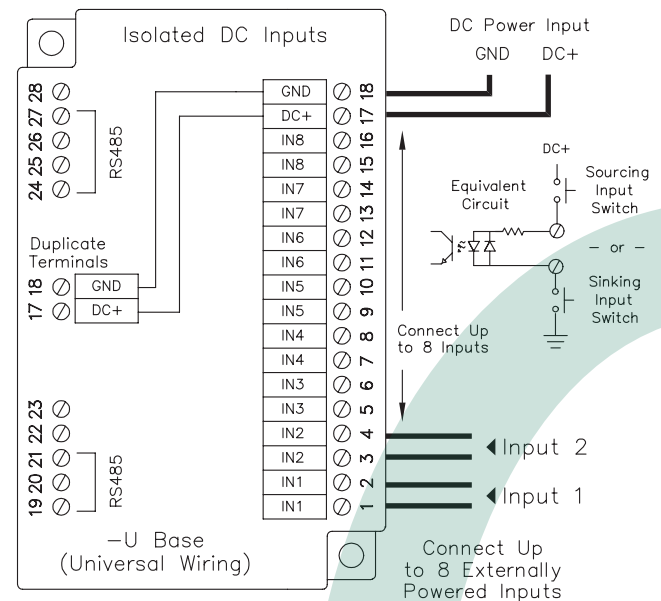
Select a RM-16DI2 when…

…you need the lowest cost per channel discrete inputs and channel-to-channel isolation is not required.

- ■ High density inputs save space and reduce cost
- ■ Module runs on existing I/O power supply (a special power source is not required)
- ■ All inputs return to a common ground

Performance Specifications

Number of channels	16
Nominal input voltage	12/24 VDC
Guaranteed ON voltage (note 1)	9 VDC
Maximum input voltage	30 VDC
Guaranteed OFF current (note 2)	1.5 mA DC
Guaranteed OFF voltage (note 2)	5.0 VDC
Input resistance	3.7K Ohms
Input current @ 12 VDC	3.5 mA
Input current @ 24 VDC	7 mA
Filtered Mode ON/OFF delay (note 3)	50 mS

|	
Serial communication information	See page 19
RS485 isolation	1200 Volts RMS 1 minute
Required supply voltage	10-30 VDC (0.5 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

Notes: 1. Minimum voltage guaranteed to turn the module ON.
2. The maximum input current/voltage that will not switch the input from OFF to ON.
3. Smart logic ignores transients, power line dropouts and switch contact bounce.
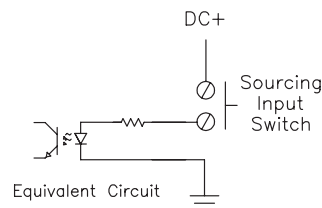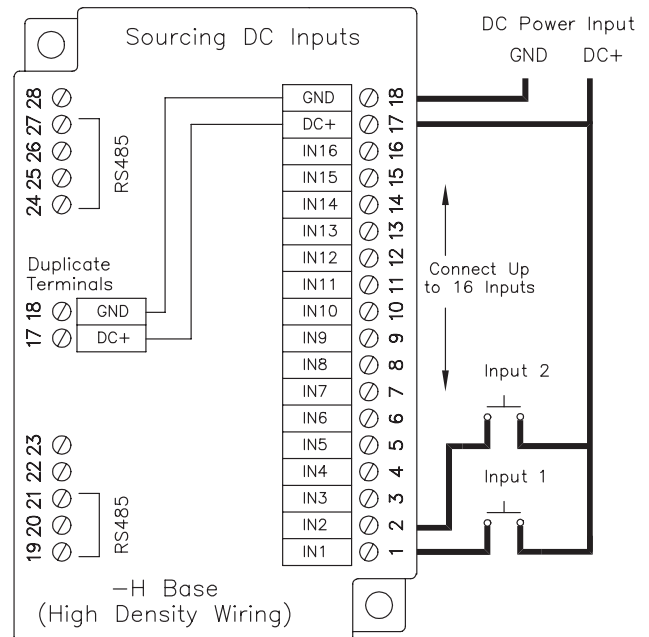

Ordering Information

Description	Part Number
Module with high density base	RM-16DI2-H
Replacement module only	RM-16DI2-M

Select a RM-8DO2 when…

…you need 8 discrete outputs that can drive up to 3 Amp loads with the benefits of short circuit protection.

- 3 Amp high-current outputs drive inductive loads
- Short circuit protection at full rated load
- Thermal overload protection and shutdown
- Time Proportioned Outputs for low cost control
- Direct field wiring with two terminals per output

Performance Specifications

Number of channels	8
Output range	10-30 VDC
Max. output current per channel	3 Amps (derate linearly to 2A from 50 to 70°C)
Max. output current (entire module)	10 Amps
Max. OFF state leakage current	0.05 mA
Min. load current per channel	0.1 mA
Inrush current (100 mS surge)	10 Amps
Maximum inductive load	0.2 H (3 Amp load at 24 VDC)
Typical ON resistance	0.1 Ohms
Typical ON voltage drop (@ 1 Amp)	0.1 VDC
Short circuit protection	At full rated load
Thermal shutdown protection	150° C

Serial communication information	See page 19
RS485 isolation	1200 Volts RMS 1 minute
Required supply voltage	10-30 VDC (0.5 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

Note: *Time Proportioned Outputs control the duty cycle of the output in proportion to an analog output register value. The cycle time and minimum pulse width are configurable.*
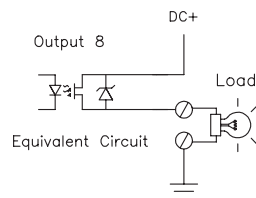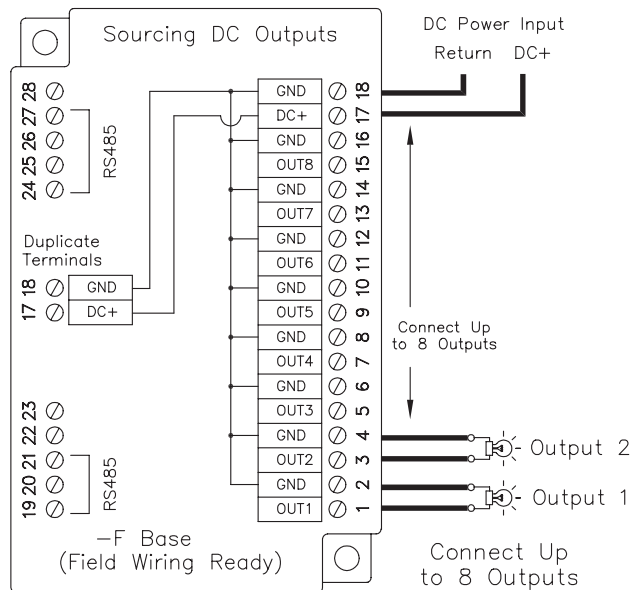
Ordering Information

Description	Part Number
Module with field wiring base	RM-8DO2-F
Replacement module only	RM-8DO2-M

0907

Select a RM-16DO2 when…

…you need the lowest cost per channel discrete outputs with load current requirements below 1 Amp per channel.

- High density outputs save space
- Lowest cost per channel discrete outputs
- Ideal for driving indicator lights and small relays
- Surge suppressors safely clamp inductive loads

Performance Specifications

Number of channels	16
Output range	10-30 VDC
Max. output current per channel	1 Amp
Max. output current (entire module)	10 Amps
Max. OFF state leakage current	0.05 mA
Min. load current per channel	0.1 mA
Inrush current (100 mS surge)	5 Amps
Typical ON resistance	0.3 Ohms
Typical ON voltage drop (@ 1 Amp)	0.3 VDC

Serial communication information	See page 19
RS485 isolation	1200 Volts RMS 1 minute
Required supply voltage	10-30 VDC (0.5 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

Ordering Information

Description	Part Number
Module with high density base	RM-16DO2-H
Replacement module only	RM-16DO2-M

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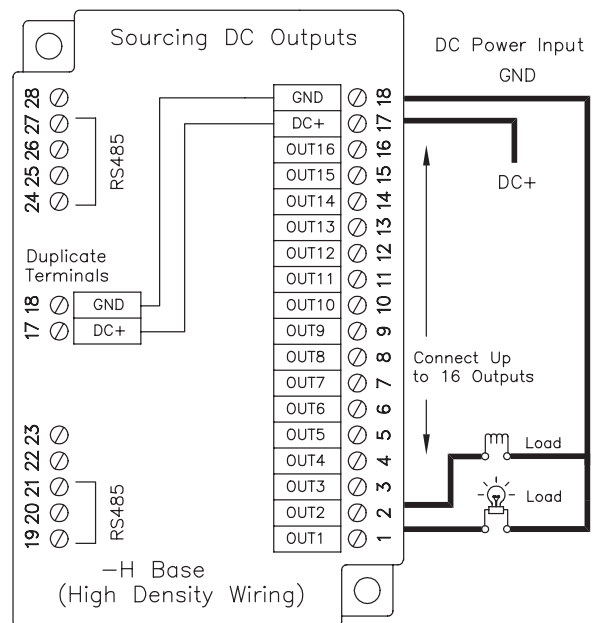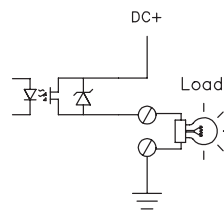
Select a RM-8AI2 when…

…the convenience of field ready wiring will save you time and you only need eight channels per module.

Select a RM-16AI2 when…

…you need the lowest cost per channel 4-20 mA analog inputs.

- 16 bit A/D converter for precision measurements
- Smart filtering provides excellent noise rejection
- Isolation on the RS485 lines eliminates ground loops
- Field replaceable current shunts save maintenance time
- Field configurable wiring choice for loop-powered transmitters or ground return instruments (RM-8AI2 only)

Performance Specifications

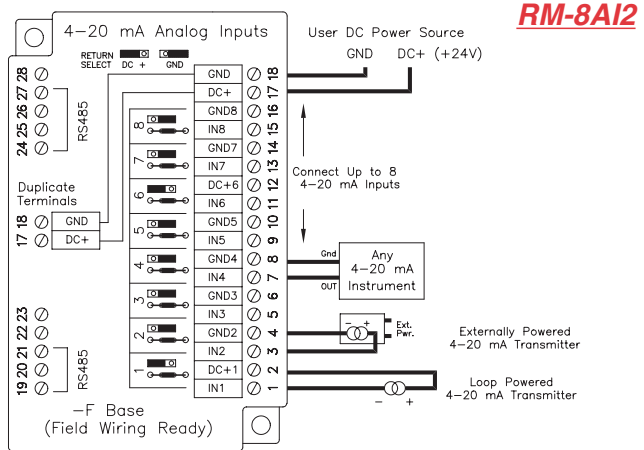|	
Number of channels	8 or 16
Input range	4-20 mA
A/D resolution	16 bits (0.003%)
Full scale accuracy (@ 20° C)	+/- 0.10%
Span and offset temp. coefficient	+/- 50 ppm per degree C
Input impedance	100 Ohms
DMRR (differential rejection at 50/60 Hz)	66 dB
Input current protection	Replaceable shunts
Max. scan rate (8 channels)	500 mS
Max. scan rate (16 channels)	1000 mS

Serial communication information	See page 19
RS485 isolation	1200 Volts RMS 1 minute
Required supply voltage	10-30 VDC (0.5 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

Ordering Information

Description	Part Number
8 channels with field wiring base	RM-8AI2-F
16 channels with high density base	RM-16AI2-H
Replacement module only	RM-8AI2-M
Replacement module only	RM-16AI2-M

RM-8AI2

4-20 mA Analog Inputs

User DC Power Source
GND   DC+ (+24V)

Connect Up to 8 4-20 mA Inputs

Any 4-20 mA Instrument

Externally Powered 4-20 mA Transmitter

Loop Powered 4-20 mA Transmitter

—F Base (Field Wiring Ready)

Externally powered transmitter, jumper in GND position

Loop powered transmitter, jumper in DC+ position

Equivalent Circuits

RM-16AI2

4-20 mA Analog Inputs

User DC Power Source
GND   DC+ (+24V)

Equivalent Circuit

Connect Up to 16 4-20 mA Inputs

Externally Powered 4-20 mA Transmitter or Instrument Output

Loop Powered 4-20 mA Transmitter

—H Base (High Density Wiring)

24 VDC User Power

Select a RM-8INS when…

…you need to read thermocouples, or you need isolated 16 bit inputs for high accuracy, or to connect to floating 4-20 mA inputs.

■ Advanced 16 bit A/D for extreme accuracy
■ Differential inputs minimize noise and ground loops
■ Software selectable ranges – mix inputs on module
■ Linearizes and compensates thermocouple readings
■ Upscale/downscale thermocouple burnout detection

Performance Specifications

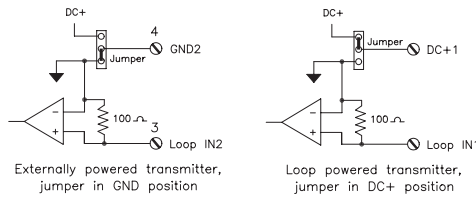|	
Number of channels	8
Lowest voltage range	+/- 0.062 Volts
Maximum voltage range	+/- 10 Volts
Auto-polarity current range	4-20 mA
Thermocouple types (see notes)	J,K,E,R,T,B,C,N,S *
A/D resolution	16 bits
Full scale accuracy (@20°C)	+/- 0.02%
Input span and offset adjustability	+/- 25%
Span and offset temp. coefficient	+/- 30 ppm per °C typ.
mV and voltage input impedance	200K Ohms
CMRR (at 50/60 Hz)	140 db
DMRR (at 50/60 Hz)	66 db
Common mode input voltage:	
Between two input terminals	+/- 25 VDC
Between inputs and ground	1200 Volts
No damage input voltage	+/- 50 VDC
Fastest scan rate (all 8 channels)	100 mS ** (see notes)

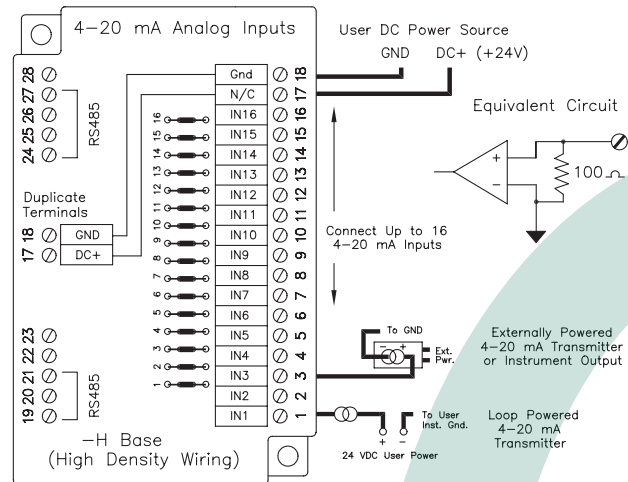|	
RS485 communication information	See page 19
RS485 isolation	1200 Volts RMS 1 minute
Required supply voltage	10-30 VDC (1.5 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

Note: *Thermocouple inputs are cold junction compensated and reported as °F, °C, 0.1°F or 0.1°C.*

Ordering Information

Description	Part Number
Instrumentation module with base	RM-8INS-U
Replacement module only	RM-8INS-M
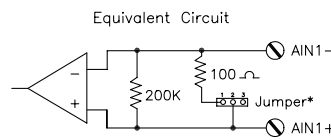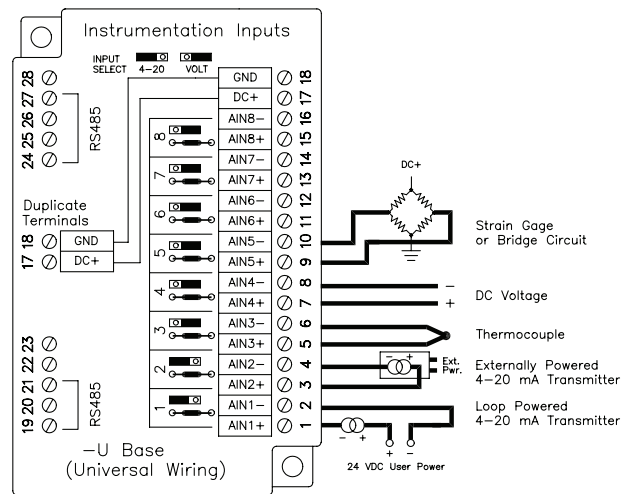
Select a RM-8AO2 when…

…your actuators or instruments require current loop (4-20 mA) analog signals.

Select a RM-4A02 when…

*…you only need four analog outputs at one location.*

- High precision ensures accurate analog signals
- High resolution (13 bits) removes output "steps"
- Isolation on the RS485 lines eliminates ground loops
- Operates from a wide range of loop power supplies

Performance Specifications

Number of channels	4 or 8
Output range	4-20 mA
D/A resolution	13 bits (0.03%)
Full scale accuracy (@ 20° C)	+/- 0.05%
Span and offset temp. coefficient	+/- 50 ppm per degree C
Max. output setting time (to 0.05%)	5 mS
Required user supplied loop voltage	10-30 VDC
Load resistance range (@ +24V supply)	0-750 Ohms
Short circuit protection	Current limiting

Serial communication information	See page 19
RS485 isolation	1200 Volts RMS 1 minute
Required supply voltage	10-30 VDC (0.5 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%
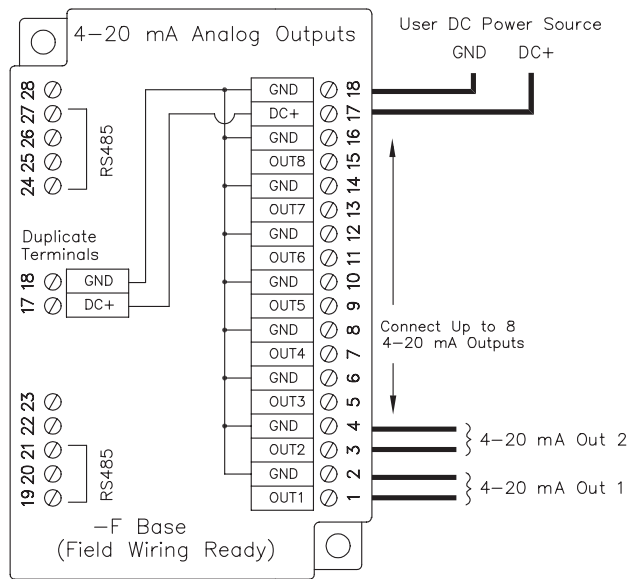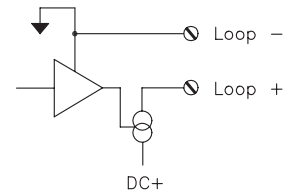
Ordering Information

Description	Part Number
4 channels with field wiring base	RM-4AO2-F
8 channels with field wiring base	RM-8AO2-F
Replacement module only	RM-4AO2-M
Replacement module only	RM-8AO2-M

…you need a few discrete and analog inputs for monitoring remote signals.

Select a RM-4DI2-4DO2 when…

…you need a few discrete inputs and outputs for control at a small, remote location.

- Single module compact solutions for small stations
- Lowest cost I/O solution for small remote stations
- Ideal solution for small "dumb" RTU applications
- Supports SIXNET radio packeting and phone links

Performance Specifications

Number of discrete inputs	4
Nominal discrete input range	12/24 VDC
Discrete input characteristics	Same as RM-8DI2
Number of analog inputs	4 (-4AI2 module only)
Analog input range	4-20 mA
Analog input resolution	16 bits
Analog input characteristics	Same as RM-8AI2
Number of discrete outputs	4 (-4DO2 module only)
Max. output current per channel	1 Amp
Discrete output characteristics	Same as RM-16DO2
Filtered Mode ON/OFF delay	25 mS
Filtered Mode count feature	10 Hz Maximum
Fast Mode count feature	100 Hz Max (2 kHz on channel 1)

Serial communication information	See page 19
RS485 isolation	1200 Volts RMS 1 minute
Required supply voltage	10-30 VDC (0.5 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

Ordering Information

Description	Part Number
4 DI and 4 AI with universal base	RM-4DI2-4AI2-U
4 DI and 4 DO with universal base	RM-4DI2-4DO2-U
Replacement module only	RM-4DI2-4AI2-M
Replacement module only	RM-4DI2-4DO2-M

RM-4DI2-4AI2

Connect Up to 4 DC Inputs and 4 4-20 mA Analog Inputs

Loop powered transmitter, jumper in DC+ position

Externally powered transmitter, jumper in GND position

RM-4DI2-4DO2

Connect up to 4 DC Outputs and 4 Externally Powered DC Inputs
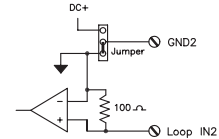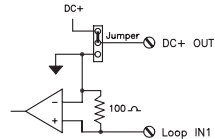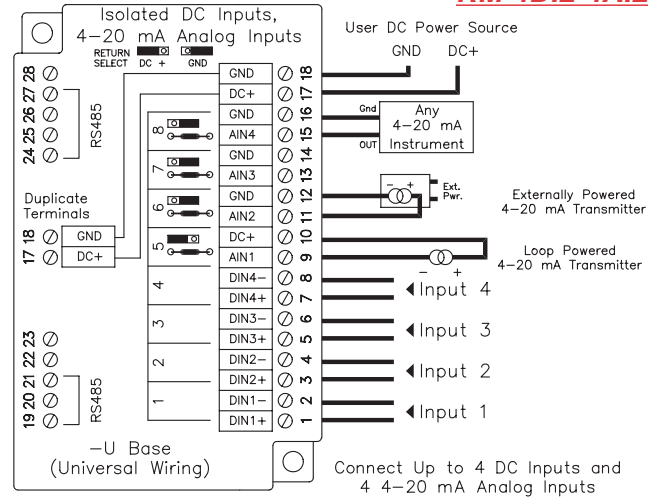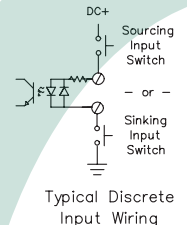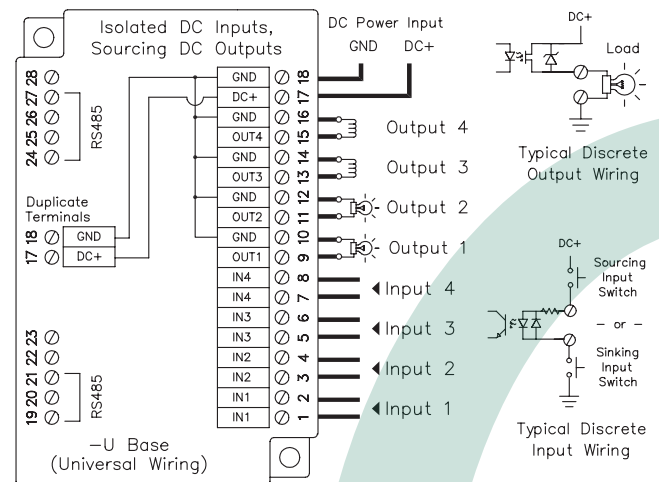
Combination I/O module with a RS232 / RS485 Interface

Select a RM-RTU-8440 when . . .

. . . you need I/O in any of the following situations

- **Low power RTU for small sites**
- **I/O with a RS232 connection**
- **Modbus RS485 combination I/O**
- **Expansion for EtherTRAK I/O**
- **Supports radio packeting and phone link**

All SIXNET I/O modules have these great features:

- **DIN rail or direct panel mounting**
- **Rugged Lexan™ packaging**
- **Hot swappable modules (auto-reconfigure)**
- **Certified to perform:**

Performance Specifications

Discrete inputs	8 channels
Voltage range	10-30 VDC
Guaranteed ON voltage	9 VDC
Maximum voltage	30 VDC
Guaranteed OFF voltage & current	5.0 VDC & 1.5 mA DC
Input resistance	10K Ohms
Input current @ 24 VDC	3 mA
Filtered ON/OFF delay	25 mS (20 Hz max. counting)
Fast ON/OFF delay	4 mS (100 Hz max. counting)
Counters functions (all 8 inputs)	Pulse accumulation (count up) Pulse rate (pulses per sec. or min.) Running time (in sec. or minutes)
Count Rate	100 Hz. (or 20 Hz. when filtered) 10 KHz on channels 1 and 2
Discrete Outputs	**4 channels**
Voltage range	10-30 VDC
Maximum output per channel	1 Amp
Maximum output per module	8 Amps
Max. OFF state leakage	0.05 mA
Minimum load	1 mA
Inrush current (100 mS surge)	5 Amps
Typical ON resistance	0.2 Ohms
Typical ON voltage (@1A)	0.2 VDC
Analog Inputs	**4 channels**
Standard range	4-20 mA
A/D resolution	16 bits (0.003%)
Full scale accuracy	+/-0.1% (@20°C)
Span and offset temp. coefficient	+/-50 ppm per degree C
Input impedance	100 Ohm
Current protection	Self-resetting fuses
DMRR (differential mode rejection)	66 dB at 50/60 Hz

Ordering Information

RM-RTU-8440-F	Module and wiring base pair
RM-RTU-8440-M	Replacement module only
RM-RTU-8440-FB	Replacement base only
VT-MODEM-1WW	Industrial modem

Specifications are subject to change. Consult factory for latest information.

Serial Communications	RS485 or RS232 (selectable)
Protocols supported	Modbus ASCII & RTU, SIXNET
RS485	2 wire with optional line termination
RS232	TD, RD, and RTS (key a modem to transmit)
Supported baud rates	2400, 9600, 19200, 38400, 57600
Factory default	9600 baud, no parity, 8 data bits, SIXNET protocol
Environmental	**DIN rail or panel mounting**
Input voltage	10-30 VDC
Input power	500 mW typical
Operating temp. range	-40 to +70°C
Storage temperature range	-40 to +85°C
Humidity (non-condensing)	5 to 95% RH
Vibration	IEC68-2-6
Electrical safety	UL508, CSA C22.2/14; EN61010
EMI emissions	FCC part 15, ICES-003, EN55022
EMC immunity	EN50082-1, EN61326-1
Surge withstand	IEEE-472
Hazardous locations (Class 1, Div 2 and Zone 2)	UL1604, CSA C22.2/213, EN50021, EEx nA II T4 X
Marine/offshore locations	Det Norske Veritas (DNV) No. 2.4 (Class A & B)

RM-RTU-8440-F Power, Com and I/O Wiring

RS485 Port

10-30 VDC
(User Supplied)

RS232
Port

RS232
Port
(RJ45)
Pinout
----
4 GND
5 RXD in
6 TXD out
8 RTS out

GND + − T1 T2   + −

19 20 21 22 23   24 25

Equivalent DC Input Circuits

GND(25)

DC+(24)

Jumper

5.1Kohms

DIN

Ref

Sourcing
Input
Switch

GND(25)

DC+(24)

Jumper

5.1Kohms

DIN

Ref

Sinking
Input
Switch

+ DI Return Jumper:
Select DC- for sourcing (default)
or DC+ for sinking
−

RS232
Com Jumper:
Select RS232 or RS485
RS485

Discrete Inputs ——— Discrete Outs ┌— Analog Ins —┐

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

1 2 3 4 5 6 7 8   1 2 3 4   1 2 3 4   NC

(sourcing or sinking DI)   (sourcing DO)   (Loop powered AI shown)

DC+ for
DI Sourcing
or
DC- for
DI Sinking
(must set
jumper
in base)

DO Return (DC-)

Analog GND (DC-)
Analog Power (DC+)
10-30 VDC
(User Supplied)

Equivalent DC Output Circuit
(sourcing only)

DC+(24)

Solid State
Switch

DOUT   Load

GND(25)

Equivalent Analog
(4-20 mA) Input Circuits
AIN

+

−

100
ohms

GND(18)

RM-RTU-8440-F Mechanical Dimensions

0.28"
(0.71 cm)

4.25"
(10.80 cm)

19 20 21 22 23   29 30   24 25 26 27 28

16 15 14 13   12 11 10 9

FRONT VIEW

0.28"

3.23"
(8.20 cm)

2.95"
(7.49 cm)

SIDE VIEW

1 2 3 4   5 6 7 8

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

DIN
EN
50022

Dia. 0.17"
(0.43 cm) (clear
for #8 screw)

4.47"
(11.35 cm)

4.75"
(12.07 cm)

4.13"
(10.48 cm)

1.80"
(4.57 cm)

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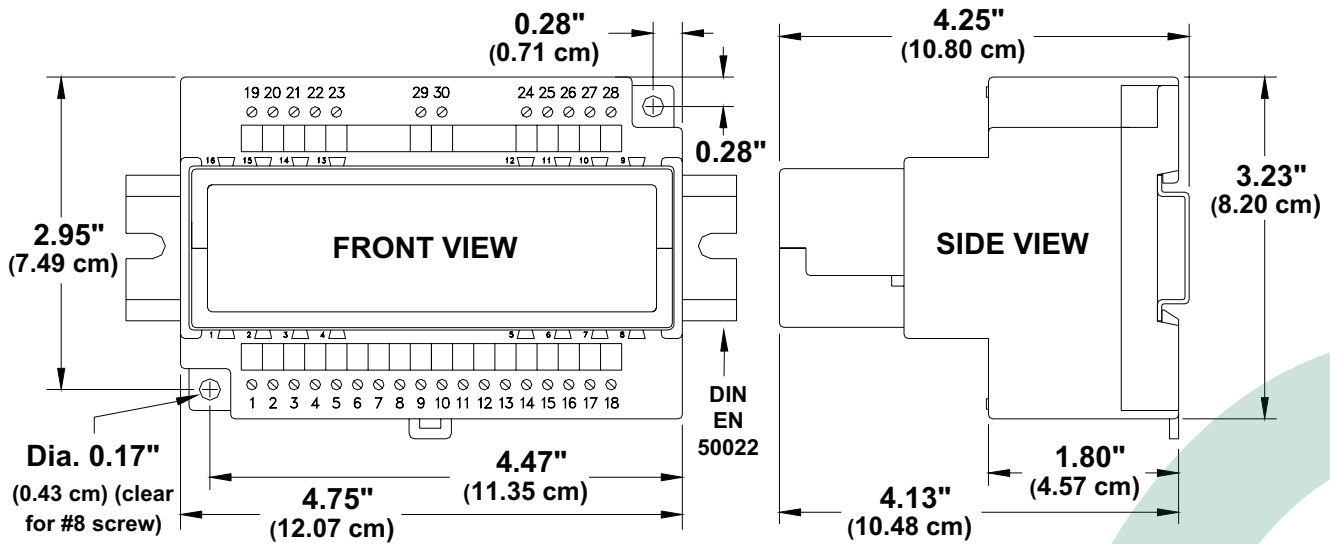
Select a RM-232-485-4 when…

…you need to connect RemoteTRAK I/O modules (RS485 based) to a master controller with a RS232 port. This module is also recommended any time more than 32 RemoteTRAK modules will be addressed.

- Pre-integrated simple connection to any RS232 port (Standard PC or VersaTRAK com port wiring)
- Address up to 128 modules with buffered RS485
- 4 RS485 ports simplify "star configurations"
- Isolated RS485 wiring greatly increases reliability
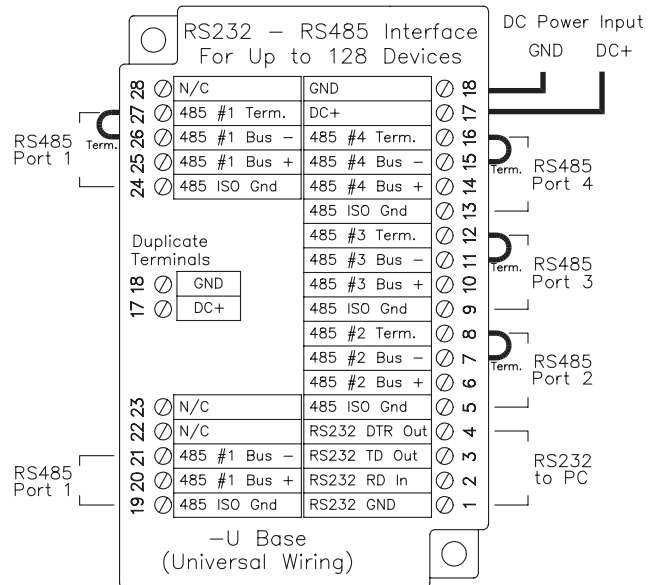- DIN rail, flat panel or tabletop mounting

Performance Specifications

Maximum baud rate	57,600 baud
Protocols supported	Modbus ASCII/RTU and SIXNET
Wiring configuration	RS485 two-wire isolated partyline
Isolation (RS485 to RS232 and power)	1200 Volts RMS 1 minute (See note 2)
RS485 RemoteTRAK ports	4 ports
Number of RemoteTRAK modules	32 modules per port, 128 modules total
Maximum RS485 cable distance	3 Km (See note 1 and page 14)

Serial communication information	See page 19
RS485 isolation	1200 Volts RMS 1 minute
Required supply voltage	10-30 VDC (0.5 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

Notes: 1. RS485 distance is limited by baud rate and cable quality. See page 19.

  2. RS485 ports are group isolated from incoming power and the RS232 port.

Notes: 3. Connect up to 32 RS485 devices to each port (1-4).

  4. RS485 Port 1 connections may be made at terminals 19-21 and/or terminals 24-26. Any of the ports may be an end station or middle station on its own RS485 network.

  5. To terminate any RS485 port, install the appropriate "Term" jumper as shown above.

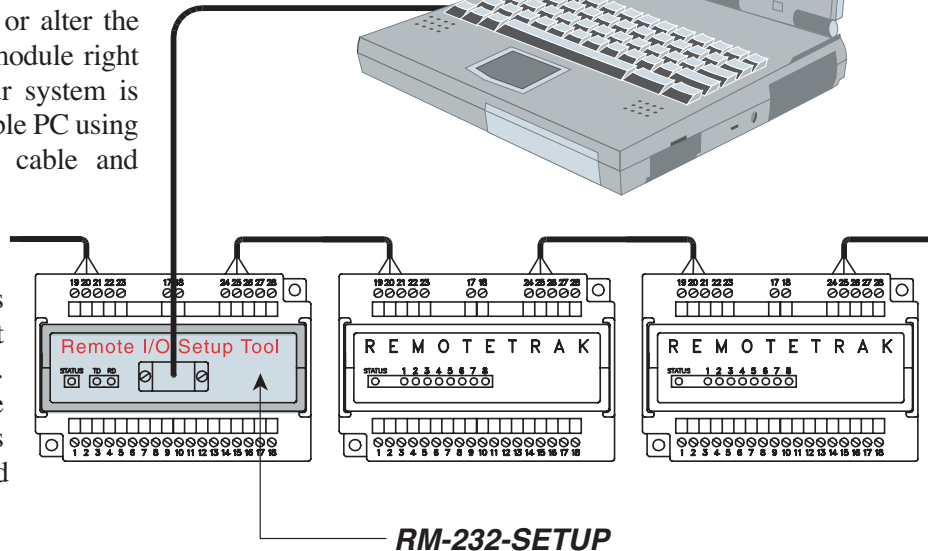 6. Connect your PC to the RS232 port on the face of this module, or connect to terminals 1-4.

Ordering Information

Description	Part Number
RS485 converter with base	RM-232-485-4U
Replacement module only	RM-232-485-4M
8-foot RS232 cable	ST-CABLE-PF

Select a RM-232-SETUP when…

…you need to configure RemoteTRAK modules in a live system or from a computer without an RS485 port or converter.

- Configure modules in live systems – the perfect "hot swap" tool
- Connects a portable laptop or any computer to the base of any RemoteTRAK module
- Lets you avoid RS485 conversion difficulties on your PC
- Automatically addresses the target module for quick and easy setup
- Use one RM-232-SETUP to configure all of your RemoteTRAK and EtherTRAK modules

This optional module is a convenience item. It enables you to enter or alter the setup of any RemoteTRAK module right on the plant floor while your system is running. It connects to a portable PC using a standard SIXNET RS232 cable and plugs into the base of the module being configured. (The user configuration for each RemoteTRAK module is stored in its wiring base so that modules may be hot swapped. Just plug a module into a live system and it self-configures from the "smart wiring" and instantly runs.)

RM-232-SETUP

Notes: 1. This module is a convenience item. RemoteTRAK modules can also be configured from any Windows-based computer with an RS485 port in an off-line mode.

2. This module plugs into the target module's existing base. A separate mounting base is not required for this module.

Performance Specifications

Modules supported	All EtherTRAK and RemoteTRAK I/O
Factory preset communication	9600 baud, no parity, 8 data bits

RS485 isolation	No connection
Required supply voltage	10-30 VDC (0.5 watt typical)
Operating temperature range	-30 to 70° C
Storage temperature range	-40 to 85° C
Humidity (non-condensing)	5 to 95%

Ordering Information

Description	Part Number
Configuration module only	RM-232-SETUP
8-foot RS232 cable	ST-CABLE-PF