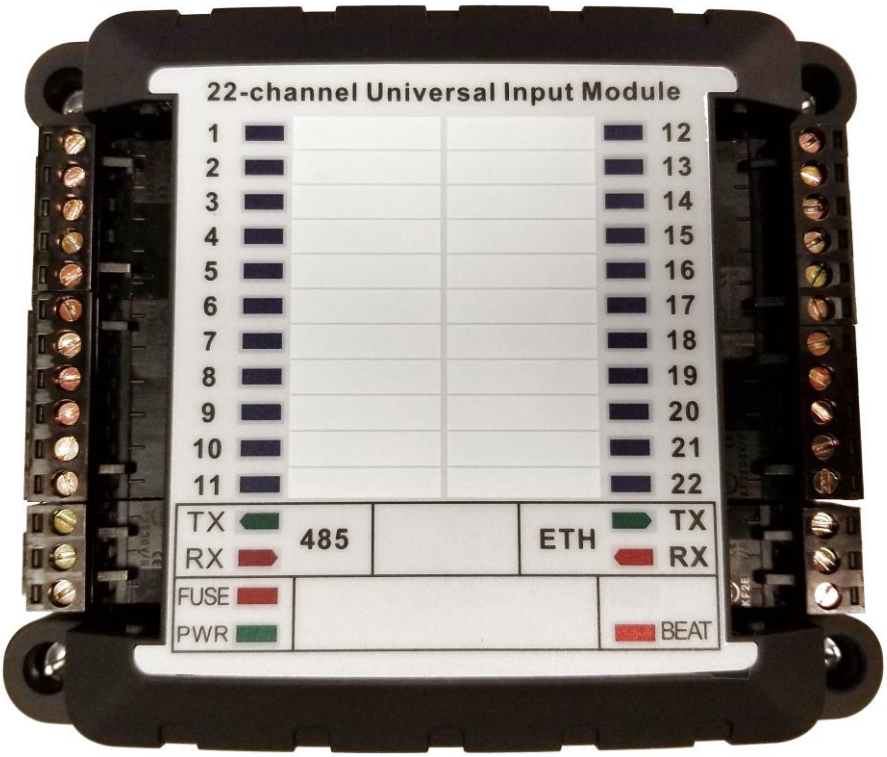
MBus_Ai22_Eth: 22-channel Universal Input Module with Ethernet & RS485



Features

- 22 surge-protected universal inputs with 12-bit resolution
- Ethernet interface for communication via Modbus-TCP
- RS485 interface for communication via Modbus-RTU
- Inputs are software configurable. No hardware input jumpers necessary.
- Inputs can be software configured for 0-5VDC, 0-10VDC, 4-20mA, Thermistor/Dry Contact
- Inputs 12-22 can be configured as slow-speed counters (up to 1Hz).
- Din-Rail Mountable. Also has 4 screw holes for mounting without Din-Rail.

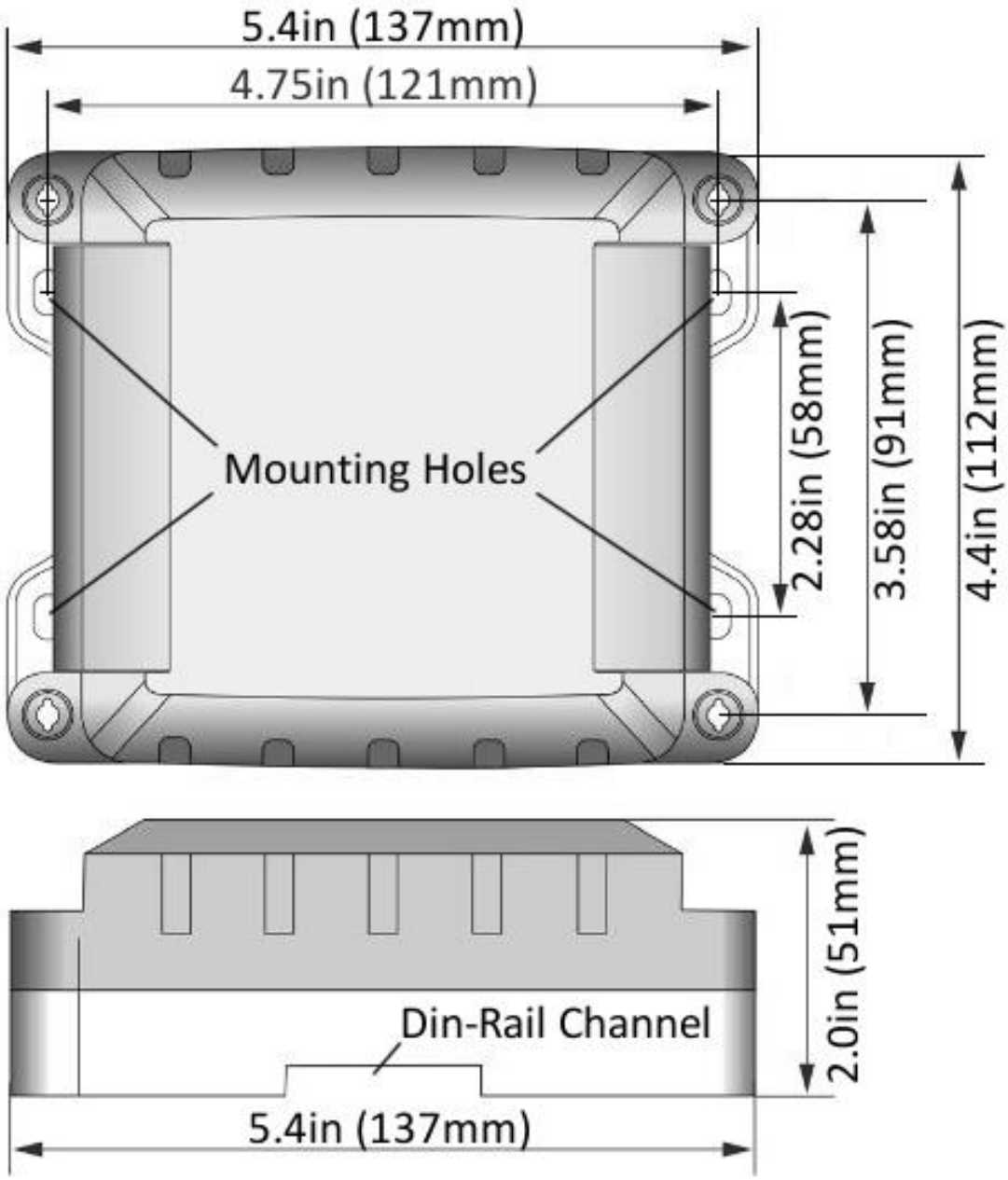
Specs

- Supply Voltage: 12-24VAC/DC (50-60Hz)
- Power Consumption: max of 1.5W or 125mA @ 12-24VAC/DC
- Operating Temp: -30C to 50C. Operating Humidity: 0-85%RH, Non-Condensing

Finding the IP Address

- The Ai22 is shipped with the IP Address set to DHCP mode & it will automatically be assigned an IP by your router, assuming that DHCP is enabled on the router. To find the assigned IP Address:
  - Log into your router & check the “Attached Devices” list. The device should be shown in the “Wired Devices” section: The name will be blank or listed as “unknown” or “Asix Electronics”.
  - Or you use Modbus-RTU over RS485 & read the assigned IP from Modbus registers 47-50.
- If there is no DHCP router available or enabled on the network, then the 1st time the Ai22 is powered up it will use an address of 192.168.0.3. However, once the Ai22 has been placed on a network with a DHCP server and assigned an address, it will hold that assigned address through a power cycle, even if the DHCP server is no longer available after it reboots.

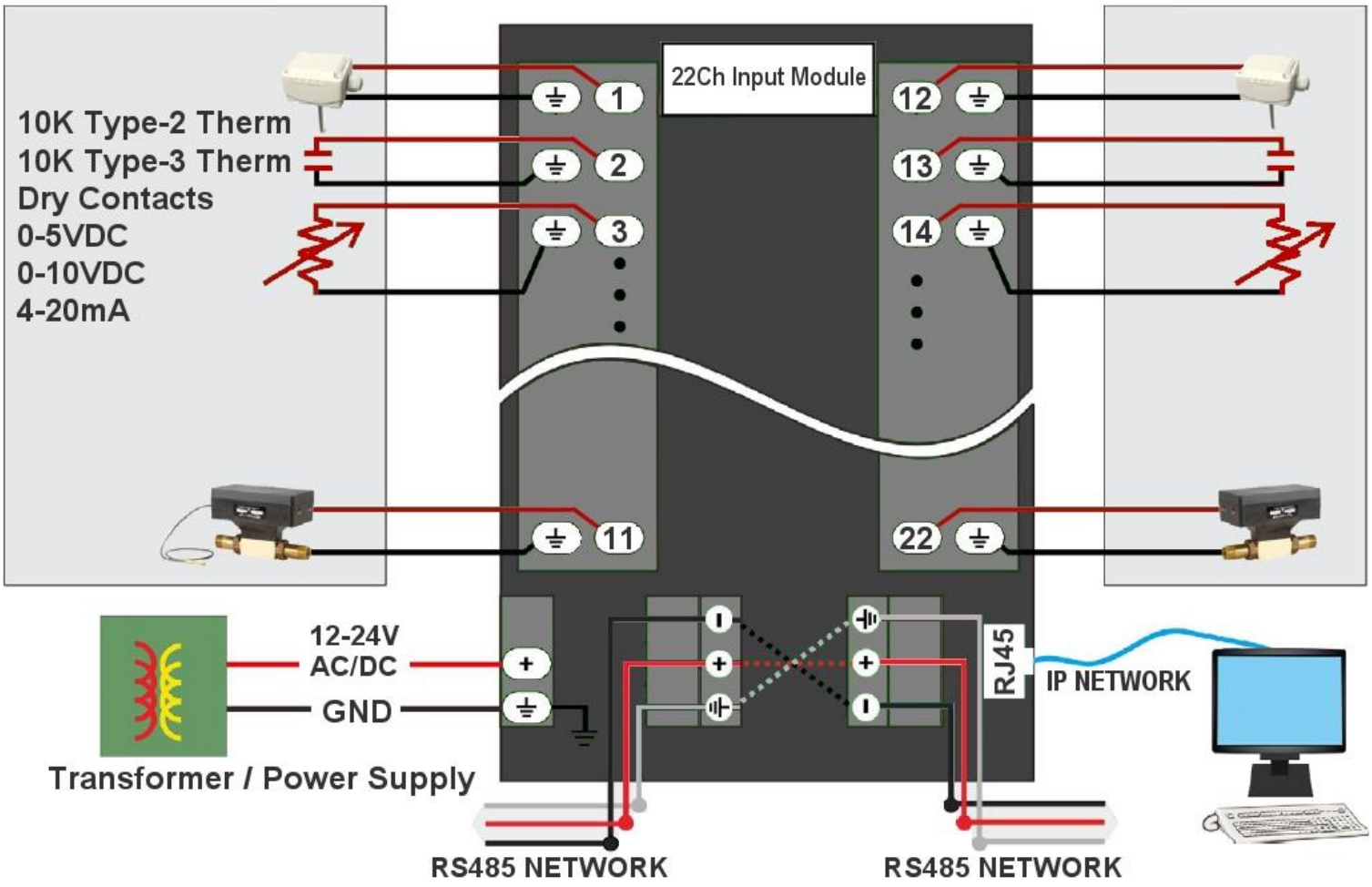
Dimensional Drawing



Close-up view of Left-side Connectors

Close-up view of Right-side Connectors

Wiring Diagram



RS485 Communication Parameters:

Baudrate: The default RS485 baudrate is 19200. The RS485 baudrate can be changed by writing to Modbus register 15.
Default ID: The default Modbus ID is 33, or just use 255 because it will respond to 255 regardless of the actual ID.
Comm Parameters: The default comm parameters are: 19200 baud, 8 Data Bits, No Parity, 1 Stop Bit.
Register Type: All Ai22 registers are HOLDING Registers. Use function code 3 – read holding registers to read them.

Modbus Map for the MBus_Ai22_Eth (applies to both ModbusTCP and ModbusRTU registers)

Address	R or R/W	# Bytes	Default	Register and Description
0-3	R	4	-	Serial Number
4	R	1	-	Current Firmware Version
6	R/W	1	33	Modbus Slave ID: **If unknown use 255 because the Ai22 will respond to ID 255 regardless of the actual ID.**
7	R	1	43	Product Model: (43)
8	R	1	-	Hardware Version
15	R/W	1	1	RS485 Baudrate: 0=9600bps, 1=19200bps, 2=38400, 3=57600, 4=115200
40-45	R	6	-	MAC Address: READ ONLY
46	R	1	1	IP Mode (0=Static, 1=DHCP): READ ONLY
47-50	R	4	-	Active IP Address Bytes 0-3: READ ONLY **If no DHCP server, the default IP on the first power-up will be 192.168.0.3. If the Ai22 had previously been assigned an IP by a DHCP server and is then re-powered with no DCHP available, the previously assigned IP will be maintained even though DHCP server is no longer online.**
51-54	R	4	-	Subnet Mask Bytes 0-3: READ ONLY
55-58	R	4	-	Gateway Bytes 0-3: READ ONLY
60	R	1	502	Modbus TCP Port (Default 502): READ ONLY
61	R/W	1	1	IP Mode (0=Static, 1=DHCP): Writable
62-65	R/W	4	-	Static IP Address Bytes 0-3: Writable (only used if IP Mode is set to Static)
66-69	R/W	4	-	Subnet Mask Bytes 0-3: Writable
70-73	R/W	4	-	Gateway Bytes 0-3: Writable
75	R/W	1	502	Modbus TCP Port (Default 502): Writable
76	R/W	1	0	Write a 1 to update IP Settings & Reboot
100-101	R	2	-	Input 1 Value: 100=highWord, 101=lowWord. Only low word is used unless input configured as 32bit counter.
…	…	…	…	…
142-143	R	2	-	Input 22 Value: 142=highWord, 143=lowWord. Only low word is used unless input configured as 32bit counter.
200-221	R/W	22	1	Input Filter Values. Reg200=In1, Reg201=In2, etc.. (Range is 0-255)
225-246	R/W	22	0	Input Scaling Registers: These registers are used to define how each input is scaled. Whenever an Input Scaling Register for an input is changed, the Input Type Register for that input defaults back to 0 (digital). So if you set one of these registers to an Analog Scaling Type, then make sure to set the corresponding Input Type Register to 1 (analog) immediately afterwards. **DIGITAL SCALING TYPES**: Input Type (Reg 269-290) must be set to 0 (digital) for these values to work. **0**: unused (default). (Input LED Off) **11**: Shorted to ground=0/LED-OFF, Open=1/LED-ON. **12**: Shorted to ground=1/LED-ON, Open=0/LED-OFF. **ANALOG SCALING TYPES**: Input Type (Reg 269-290) must be set to 1 (analog) for these values to work. **3**: 10K Type-2 NTC Thermistor in DegC x 100. **4**: 10K Type-2 NTC Thermistor in DegF x 100. **7**: 10K Type-3 NTC Thermistor in DegC x 100. **8**: 10K Type-3 NTC Thermistor in DegF x 100. **11**: 0-5VDCx100 (Input LED Off below 2.5V and On at 2.5V or above). **17**: 0-5VDC (scaled to 0-100% x 10). **13**: 4-20mAx100 (Input LED Off below 10mA and On at 10mA or above). **18**: 4-20mA (scaled to 0-100% x 10). **19**: 0-10VDCx100 (Input LED Off below 5V and On at 5V or above). **16**: 0-10VDC (scaled to 0-100% x 10). **15**: Slow speed Counters on inputs 12-22 only. (max of 1Hz only)
269-290	R/W	22	0	Input Type Registers: **0**=Digital, **1**=Analog. Set Input Scaling Register (Reg225-246) first, & then set this register.
291-312	R	22	0	Input Config Setting: **0**=Therm/Dry Contact, **1**=4-20mA, **2**=0-5V. **3**=0-10V. READ ONLY. Set automatically based on the Input Scaling Registers (Reg225-246) and the Input Type Registers (Reg269-290)