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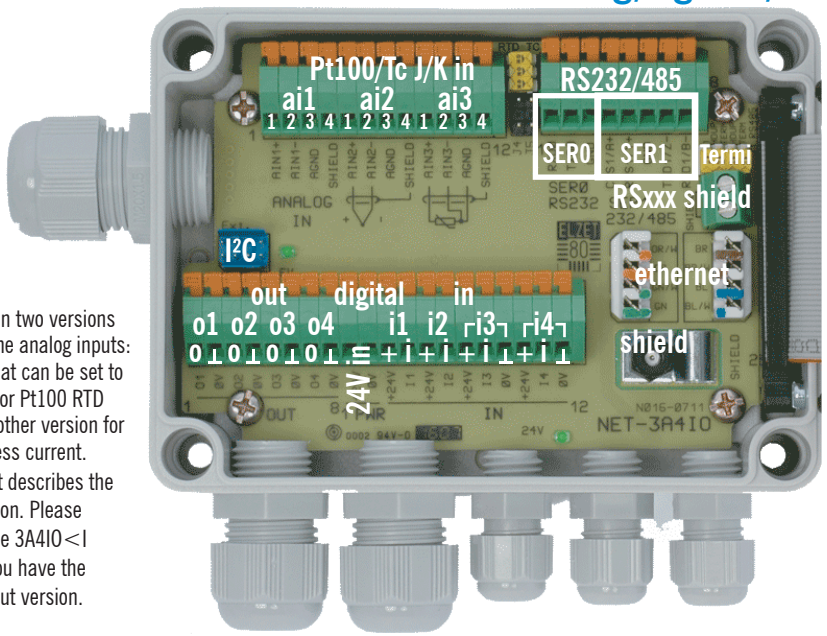
How to install the

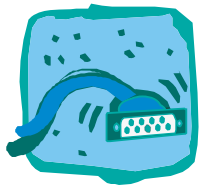
(Rev. 0711) Walter L. Giesler 3.3.2008

ETH-A7-3A4IO

ethernode® analog/digital i/o



3A4IO comes in two versions that differ in the analog inputs: One version that can be set to thermocouple or Pt100 RTD inputs and another version for 4..20mA process current.
This document describes the Pt100/Tc version. Please look/ask for the 3A4IO<I document if you have the 0/4..20mA input version.



Ethernet

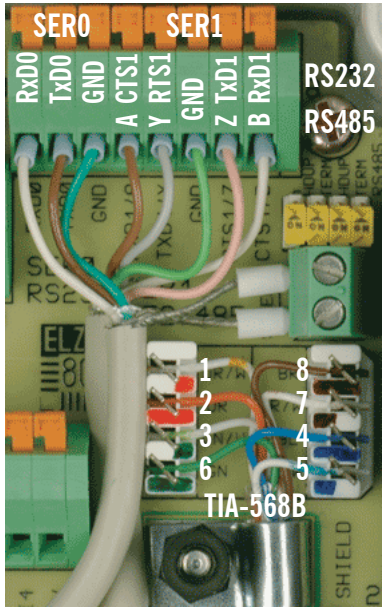
Use a common LSA punch tool to connect either patch cable or wiring cable to the two LSA terminal strips provided. Colour assignment is per TIA-568B, only the left strip connections (1/2+3/6) are used on ethernode for data. The right strip can be used for non-standard remote powering, applying 48V AC or DC to the brown and blue terminals (either polarity) for a PoE supply.

SER0: RS232, SER1: RS232 or RS422/485

SER0 is RS232 only with no handshake signals. By default (EEPROM option) it is the terminal connection to the SYSMON software tool.

SER1 can be set by software to be RS232 with a handshake pair or RS422/485 full duplex. In RS485 mode the two jumper switches marked "HDUP" can be set (please set both!) to ON to use the A/B or Y/Z pair for both transmit and reception (**half duplex** operation). Do **NOT** set to half duplex for RS232 (shorts lines)!

If you are at the physical end of a cable in RS485 mode, please set the "TERM" jumper switch(es) to ON to **terminate** the line properly: One switch for half duplex, both for full duplex.



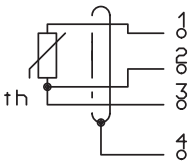
Power and digital i/o

All terminals named 24V are interconnected as all terminals named 0V are.

In the center of the lower terminal row there's a pair of terminals marked PWR and +24V/0V. This is the power input from an external 24V supply or, in the PoE ethernet powered version, the 24V power output of the PoE supply. Please note that only 150 to 200mA are available from PoE, depending on ambient temperature. Supply external relays, intelligent sensors or standard initiators. A foldback regulator limits the available current. If you need more power, then you might feed external power into the same pins. Please note that excessive voltages fed into this port (>28V) might destroy the PoE power supply.
To the left of the PWR are the four **outputs** that supply 24V from the 24V power "rail" into an external grounded load. Terminals (0V) are provided for the ground return. Outputs are short-circuit-proof FET switches BTS721L1 with auto current-limiting.
To the right are four digital **inputs**, all with an associated +24V-terminal to supply a mechanical switch, but two (I3, I4) only with a 0V (GND) terminal needed for electronic initiators (a space constraint).

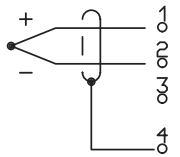
Analog inputs

Pt100 (RTD) input:



Apply the two sensor leads to either the leftmost terminals and the compensation lead to the third terminal. Shield goes to the fourth terminal.

Thermocouple input:



Apply the positive lead to the leftmost terminal and the negative to the second. Shield goes to the fourth terminal.

Jumpers J3..J5 are all open for Pt100/RTD, for thermocouples J3s are closed/on, J4 and J5 are open.

Technical data

Power input: 24V +/-15%@150mA, fused 10A max. Or PoE power supply option according to IEEE802.3af: 44..57V@240mA in turn supplying 24V at 150..200mA max. to external sensors.
Ambient temperature: -40..+50°C.
24V digital **outputs**: Opto-isolated BTS721L1 high side driver, 1A+ per channel, can be joined for higher current. Current and overtemperature limited. Max. switching time 400µs.
24V digital **inputs**: Opto-isolated inputs 18..30V DC. Input low-pass filter to catch spikes <100µs.

Analog inputs Pt100(RTD): 3-wire sensor input (2-wire needs jumper wire between pins 2 and 3). Standard range -200..+800°C (other ranges on request). Gain error <0.01% (~0.1°C). Gain drift typ. < 25ppm (0.025°C/K @ 800°C). ADC resolution ~0.05°C/bit.

Analog inputs thermocouple type J or K: 2-wire sensor input with cold junction compensation. Standard ranges -270..+1372°C (type K NiCr-Ni, -6.458mV..54.886mV), -50..+760°C (type J, Fe-CuNi, -8.095mV@-210°C..42.919mV). Gain error <0.01% (~0.1°C@1000°C type K). Gain drift typ. < 100ppm (0.1°C/K @ 1000°C type K). ADC resolution ~0.06°C/bit type K.

Software Setup

To get connected, attach a PC with a serial terminal program, "wLGO" by preference, to the SER0 port at 19200bd 8N1. Alternatively, use Telnet over Ethernet by opening the previously set IP address of the device (Enter "help ipset" at the Sysmon monitor prompt). The mCAT firmware on each device provides the 24V and analog i/o as logical devices in the "Express-I/O" hardware abstraction layer. See the mCAT documentation for details.
Express-I/O ports are also available for a quick test through SYSMON commands. Some examples:

xlist modules	Shows available hardware: BUS=CPU MODULE=01h TYPE=NETA7-DIN CHANNELS=04 etc.
xin cpu.1.0	Returns the value (0 or 1) of input 1 (channel 0) on module 1 (DIN) of the CPU-board
xout cpu.2.3 1	Switches on (=1) output 4 of the output "module" 2 of the board
xin cpu.3.1	Reads the analog value in microamps of input 2 (channel 1) of the cpu board