APPLICATION NOTE

AQ-2xx implementing ADAM units

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1 ADAM-4015 6CH RTD MODULE WITH MODBUS

1.1 BASIC TECHNICAL DATA

ADAM-4015 provides six RTD input channels for different types of RTD signal as an effective solution in industrial & building automation. Usually, broken external wiring will lead to inaccurate current value. The ADAM-4015 provides a broken wiring detecting function so users can easily troubleshoot broken wiring problems.
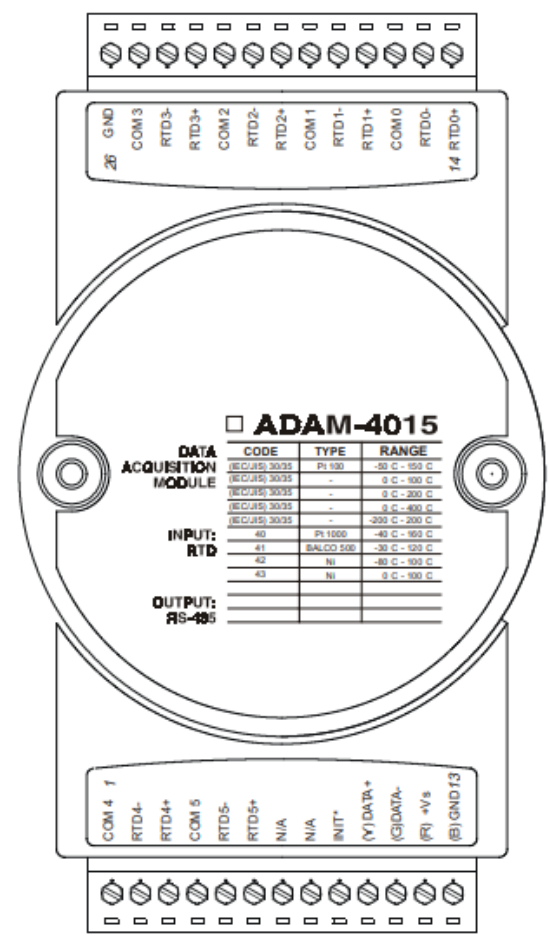

Picture 1: ADAM-4015 6-ch RTD input module

Channel Number	6 differential
Support Protocol	ADAM ASCII and MODBUS/RTU
Input Type	Pt100, Pt1000, BALCO500, Ni
Input Connections	2 or 3 wires
Wire Burnout Detection	Yes
Input Type and Temperature Range	Pt100: -50 to 150° C 　　　　 0 to 100° C 　　　　 0 to 200° C 　　　　 0 to 400° C 　　　　 -200 to 200° C Pt1000: -40 to 160° C Balco500: -30 to 120° C Ni 50 RTD: -80 to 100° C Ni 508 RTD: 0 to 100° C
Isolation Voltage	3000 V_{DC}
Sampling Rate	10 sample/second (total)
Input Impedance	10 MΩ
Resolution	16-bit
Accuracy	±0.1% (Typical)
CMR@50/60Hz	120 dB
NMR@50/60Hz	100 dB
Span Drift	± 25 ppm/°C
Zero Drift	± 3 µV/°C
Watchdog Timer	System (1.6 second) and Communication
Power Input	+10~+30 V_{DC} (non-regulated)
Power Consumption	1.2 W @ 24V_{DC}

ADAM-4015

RTD type	Temperature Range	Accuracy
Platinum 100 (IEC)	-50 ~ 150°C 0 ~ 100°C 0 ~ 200°C 0 ~ 400°C -200 ~ 200°C	0.10%
Platinum 100 (JIS)	-50 ~ 150°C 0 ~ 100°C 0 ~ 200°C 0 ~ 400°C -200 ~ 200°C	0.2% or better
Platinum 1000	-40 ~ 160°C	0.10%
BALCO 500	-30 ~ 120°C	0.50%
Ni 508	-50 ~ 200°C	0.10%
Ni 604	-80 ~ 100°C 0 ~ 100°C	0.10%

Picture 2: Technical specification of ADAM-4015 6-ch RTD input module

1.2 CONNECTIONS
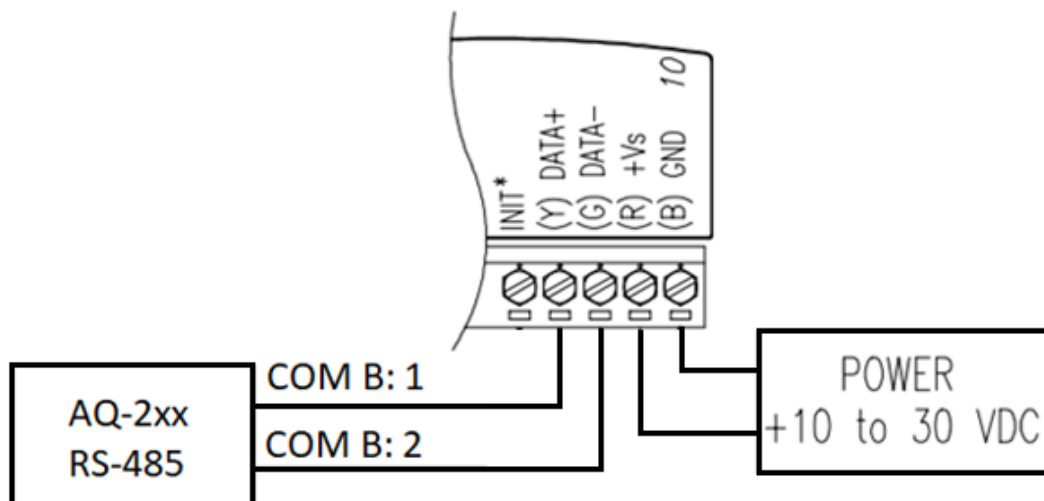
Picture 3: Connecting power supply and RS485 communication to ADAM-4015
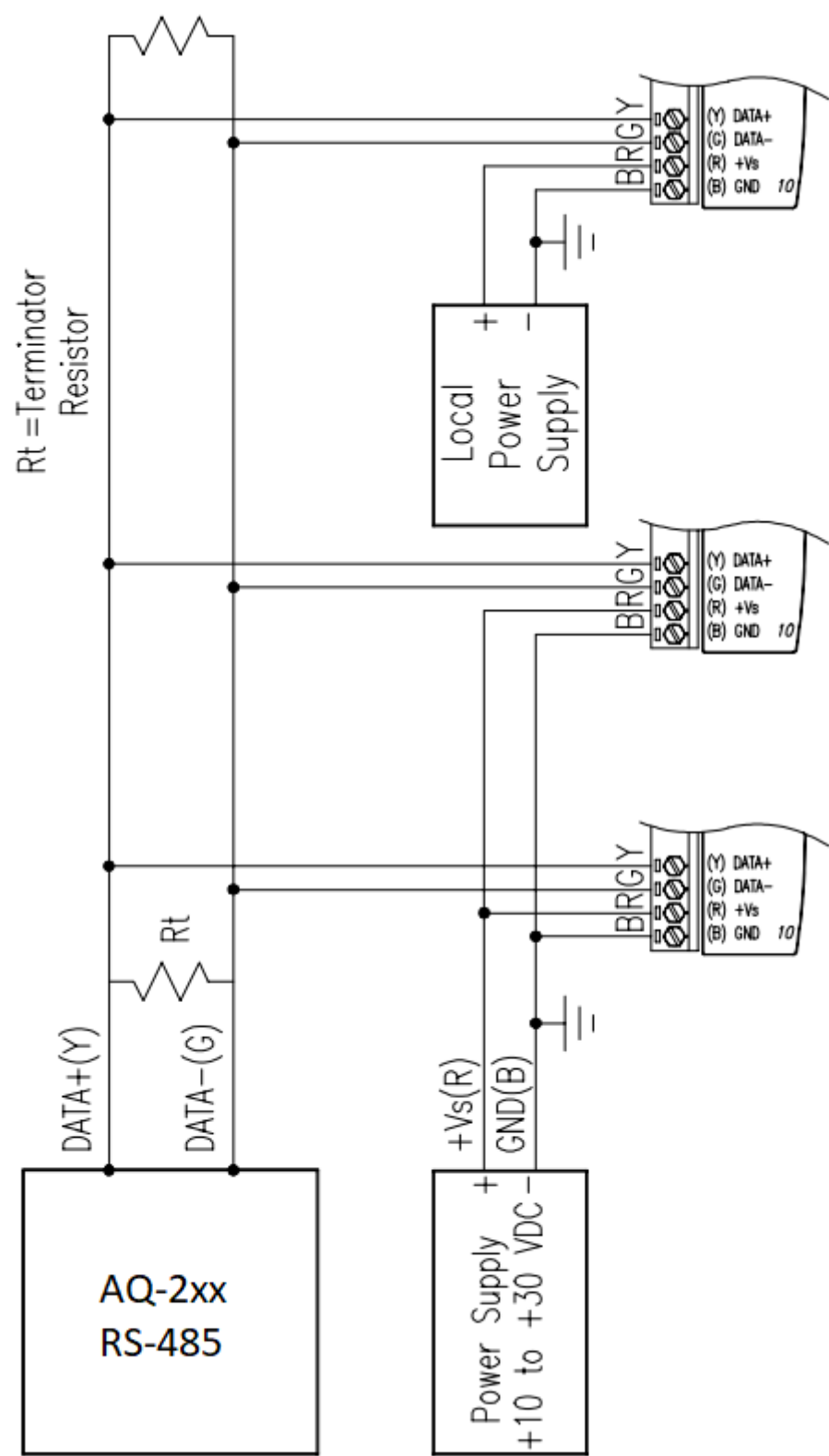
Picture 4: Connecting multiple ADAM-4015 units to AQ-2xx
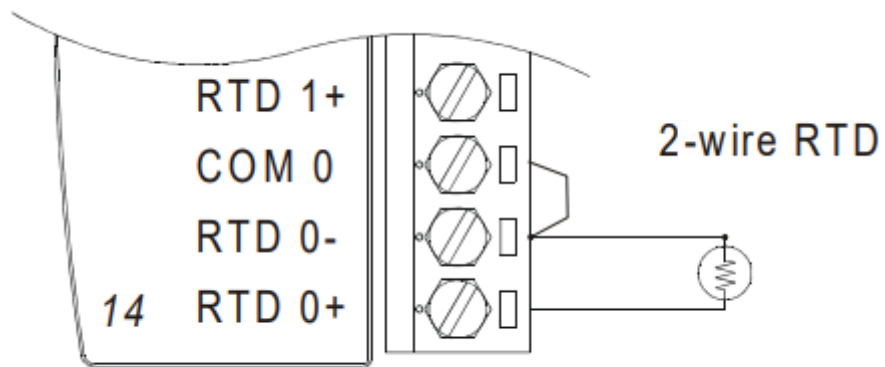
Picture 5: Connecting RTD measurement with 2-wire connection to ADAM-4015
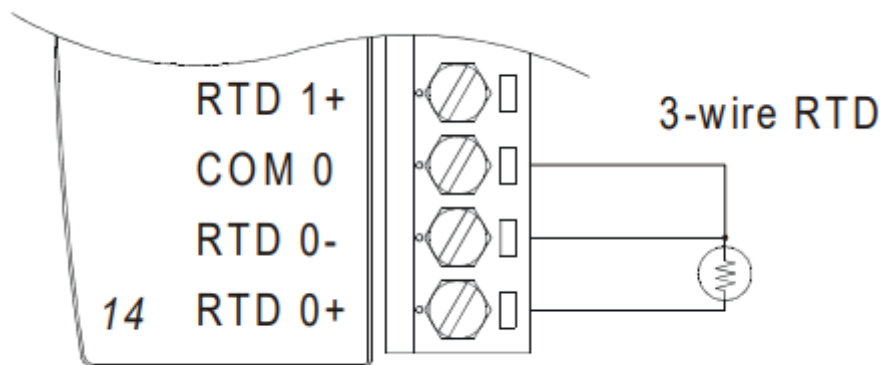
Picture 6: Connecting RTD measurement with 3-wire connection to ADAM-4015

2 ADAM-4018+ 8CH ANALOG MODULE WITH MODBUS

2.1 BASIC TECHNICAL DATA

ADAM-4018+ enables eight differential channels with multiple input types. This multi-ch/multi-type structure allows channels with different input types at the same time, say channel 1 with K input type meanwhile the others with R and S types. ADAM-4018+ is an 8-channel T/C input module. It is rather dedicated to T/C and 4 ~ 20 mA inputs for those with special request. Usually, broken external will lead to inaccurate current value. ADAM-4018+ provides burned-out detection so that users can easily troubleshoot broken wiring problems.
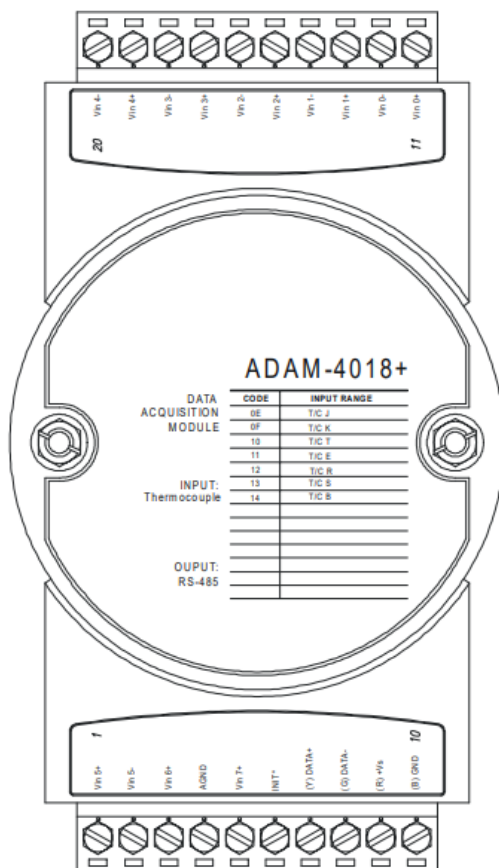
Picture 7: ADAM-4018+ 8-ch thermocouple input module

Channel	8
Input Type T	Thermocouple
Input range and T/C type	±20 mA, 4~20 mA J 0 ~ 760° C K 0 ~ 1370° C T -100 ~ 400° C E 0 ~ 1000° C R 500 ~ 1750° C S 500 ~ 1750° C B 500 ~ 1800° C
Isolation Voltage	3000 V_{DC}
Fault and over-voltage protection	Withstands over voltage up to ±35 V
Sampling Rate	10 sample/sec (total)
Input Impedance	Voltage: 20 MΩ, Current: 120Ω
Accuracy	±0.1% or better
Power Consumption	0.8 W @ 24V_{DC}
I/O Connector Type	10 pin plug-in terminal

Picture 8: Technical specification of ADAM-4018+ 8-ch thermocouple input module

2.2 CONNECTIONS
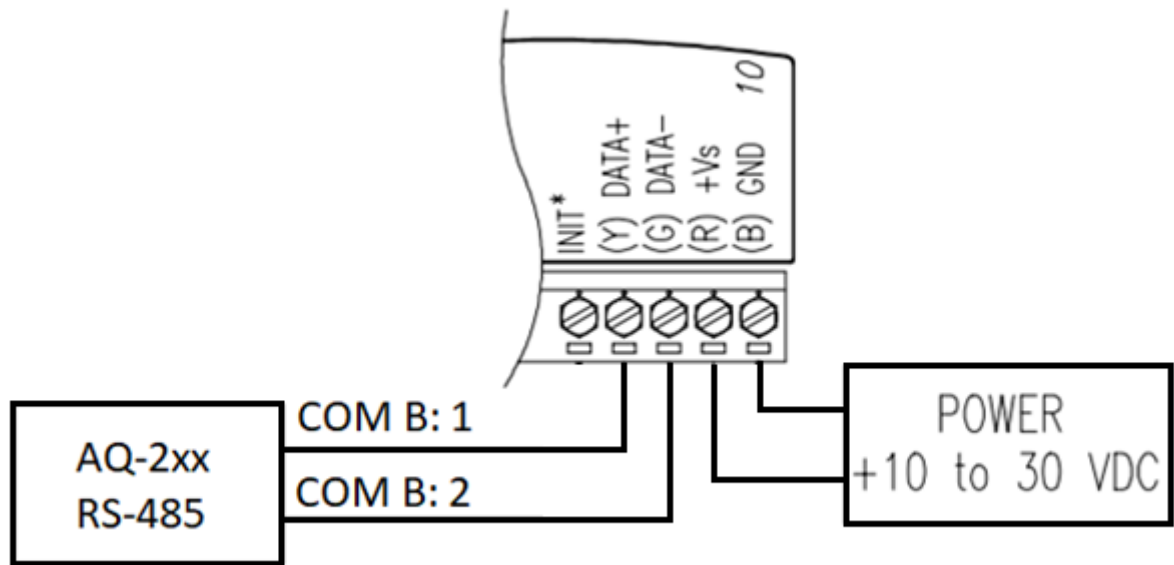
Picture 9: Connecting power supply and RS485 communication to ADAM-4018+
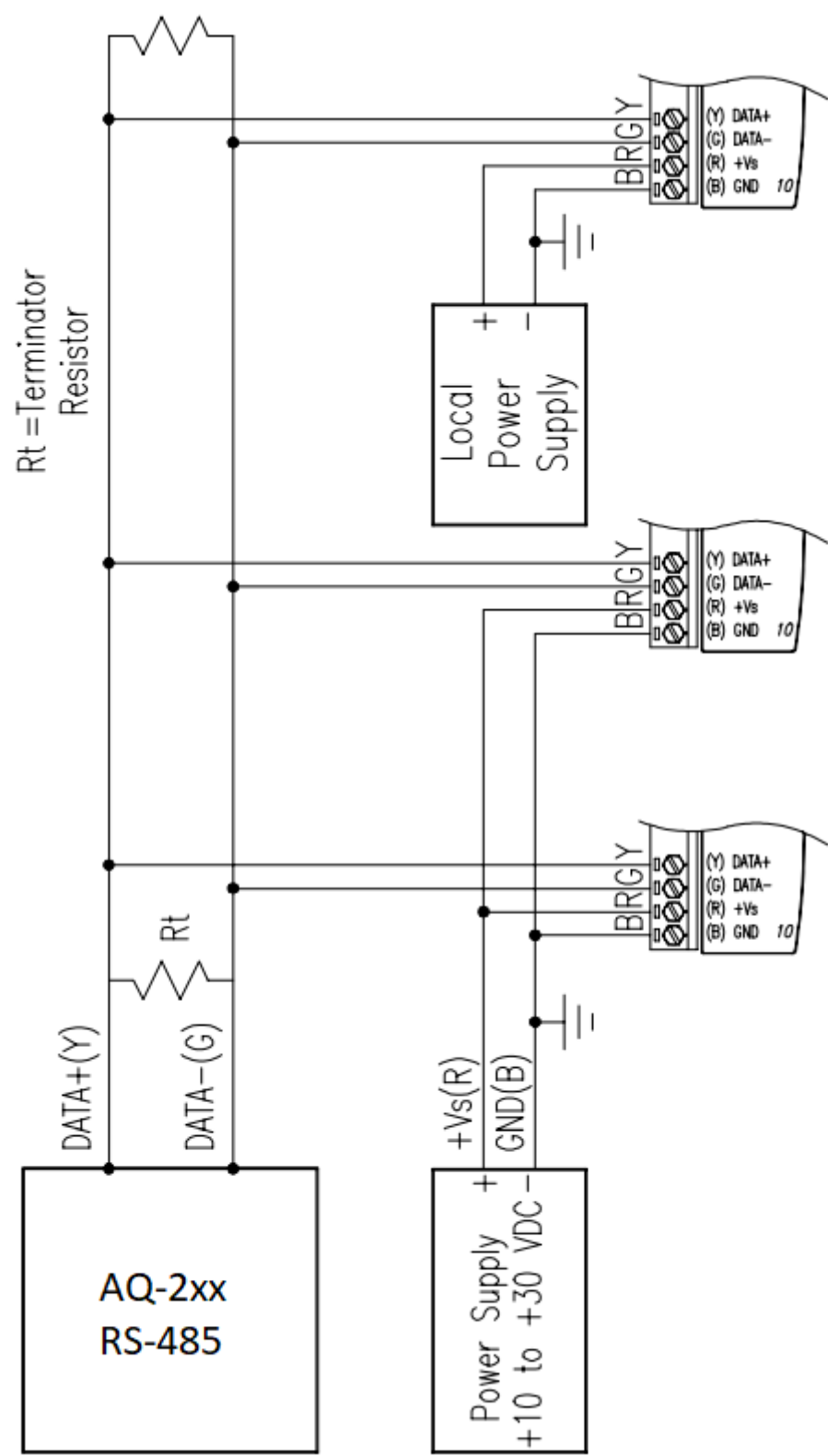
Picture 10: Connecting multiple ADAM-4018+ units to AQ-2xx
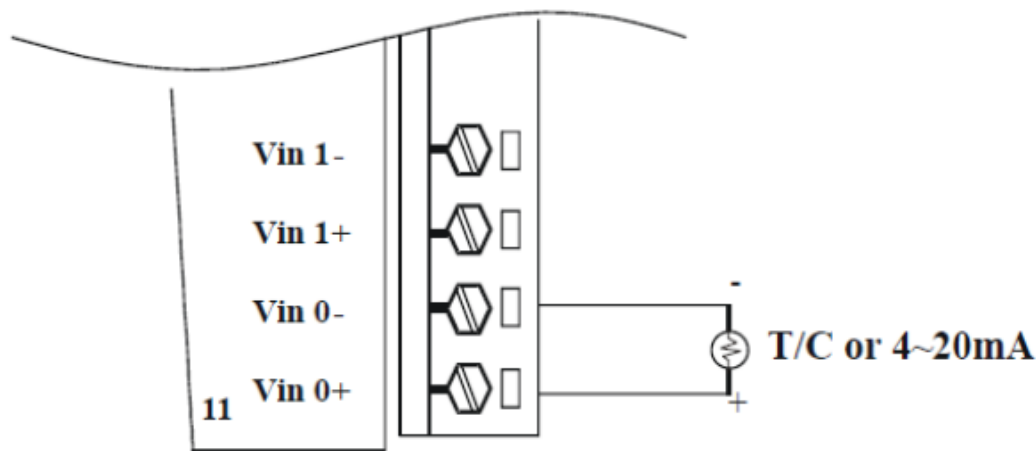
Picture 11: Connecting mA or thermocouple measurement to ADAM-4018+

JP0~ JP7	■ ■ □ ▽	4~20 mA Input Range							
	□ ■ ■ ▽	Voltage Input range							
Mapping to Channel		Ch.0	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7
		JP 0	JP 1	JP 2	JP 3	JP 4	JP 5	JP 6	JP 7
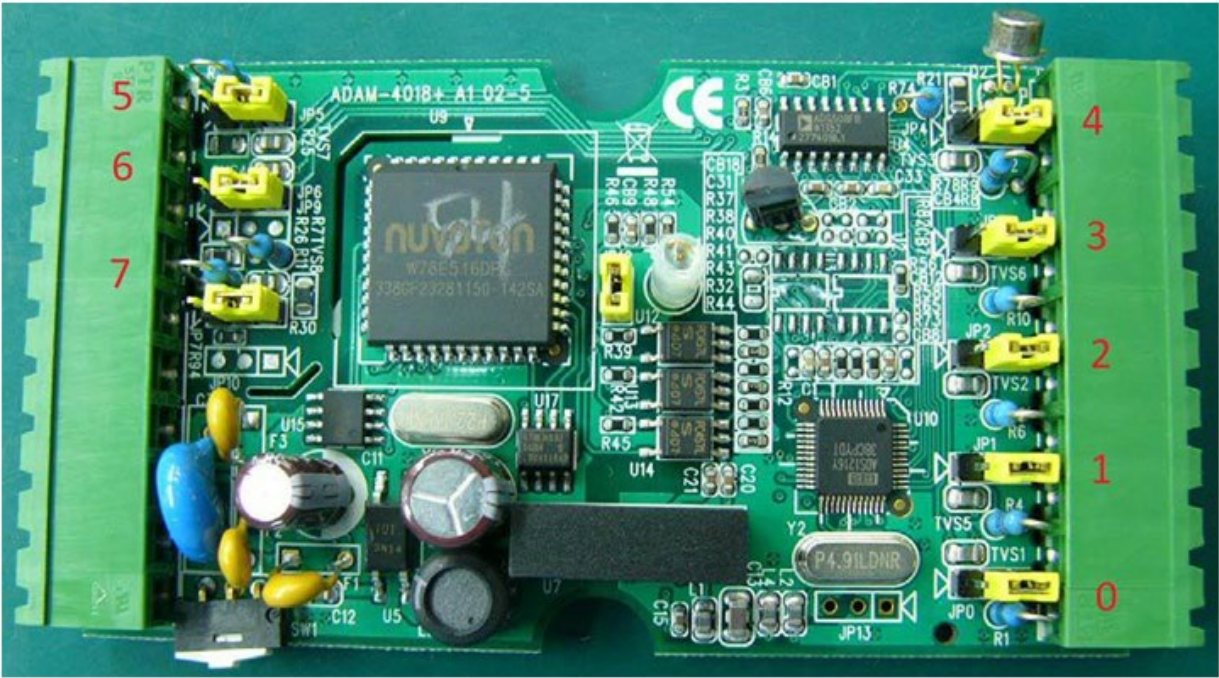
Picture 12: Selecting between thermocouple and mA measurement mode in ADAM-4018+

3 COMMISSIONING ADAM MODULE TO AQ2XX

3.1 AQ-2XX VERSION INFORMATION

Following versions are required in AQ-2xx relays to have this latest functionality with ADAM-4015 and ADAM-4018+ modules.

AQ-21x

F/V/S/P/E models: FVSPE_1.0.11-384 or newer

T model: T_1.0.11-313 or newer

G model: G_1.0.11-342 or newer

M model: M_1.0.11-370 or newer

AQ-25x

All models: v.2.5.6.1-1 or newer

3.2 FACTORY DEFAULT ADAM UNIT

First thing needed is RS485 to USB converter which can be used to configure ADAM unit. If ADAM unit is with Advantech factory settings then communication protocol and ModBus address must be set for the ADAM before it can be connected to AQ-2xx RS485 port. Arcteq uses Moxa Uport 1150 RS-232/422/485 USB-to-Serial converter. This can be purchased from Arcteq with code: SP-ADAM-KIT.
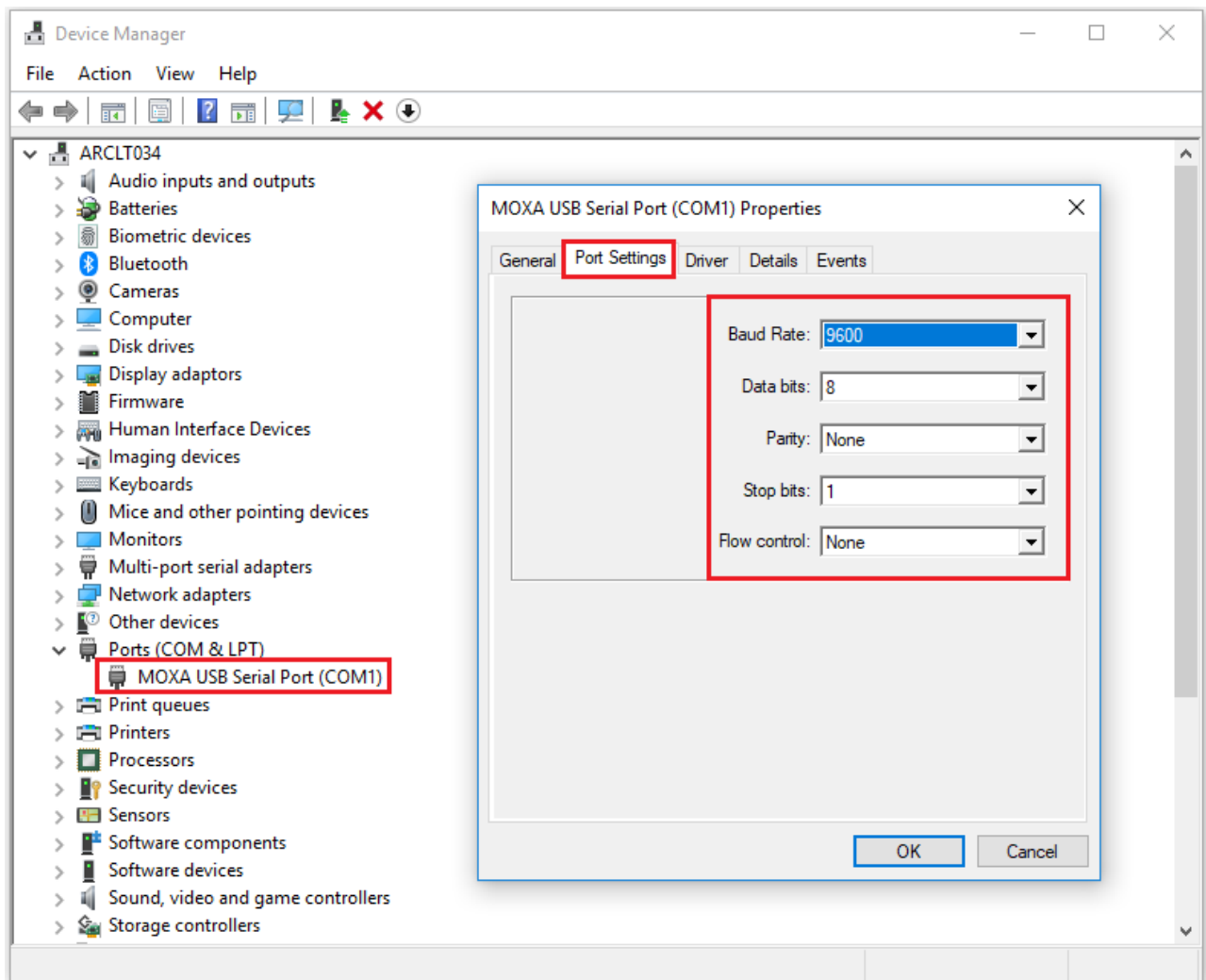
Picture 13: Settings for Moxa USB-to-Serial converter, general.
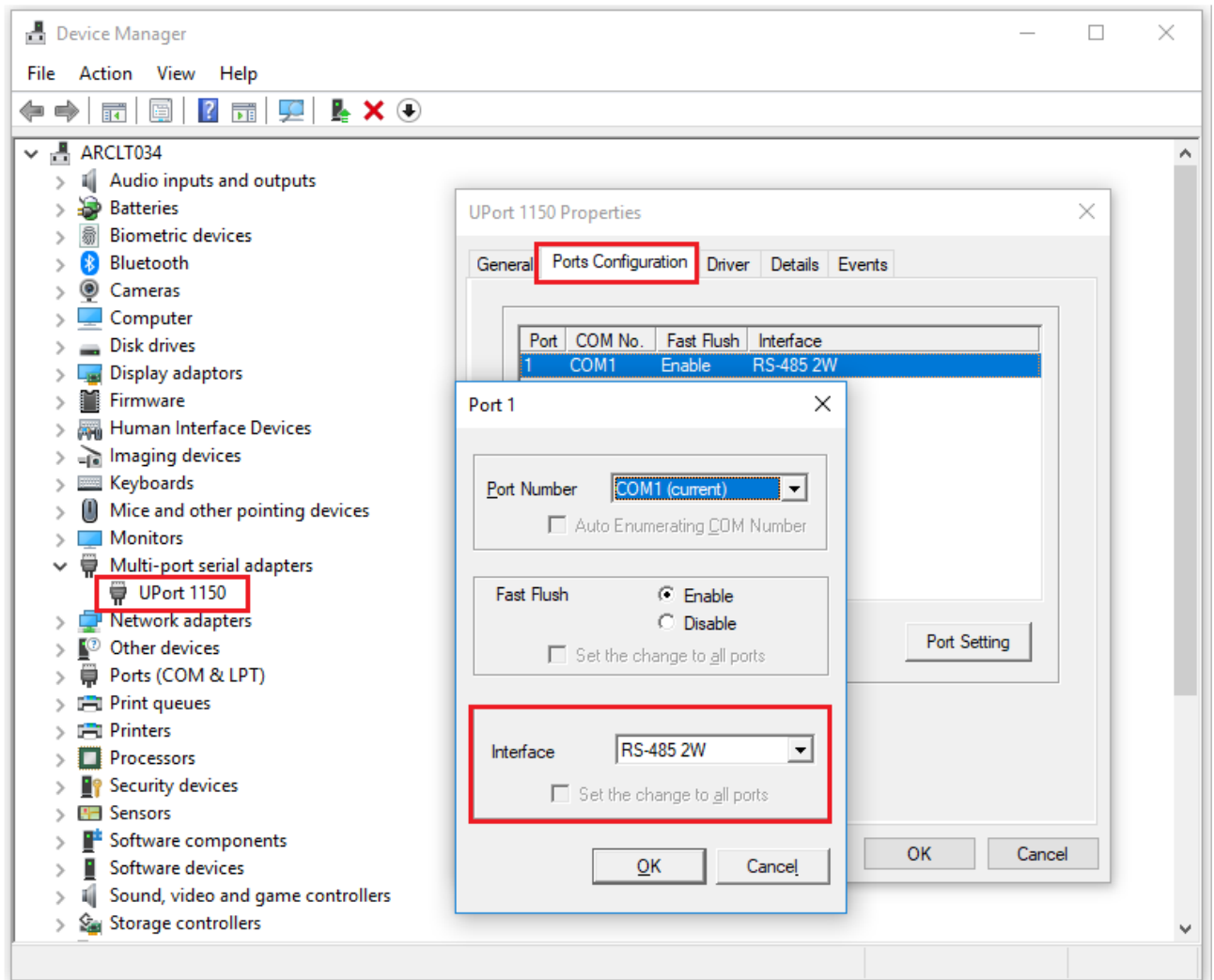
Picture 14: Settings for Moxa USB-to-Serial converter, Interface.
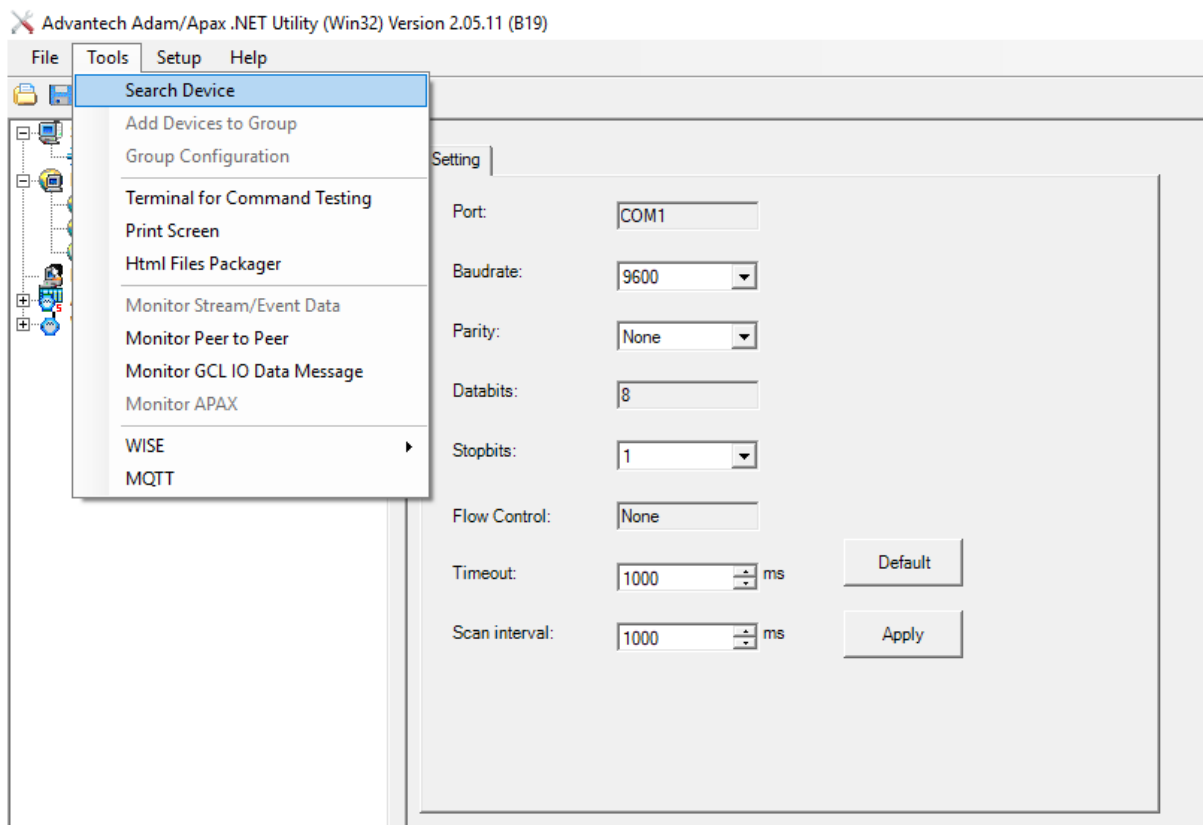
Picture 15: Open ADAM/Apax.NET Utility and Search devices.
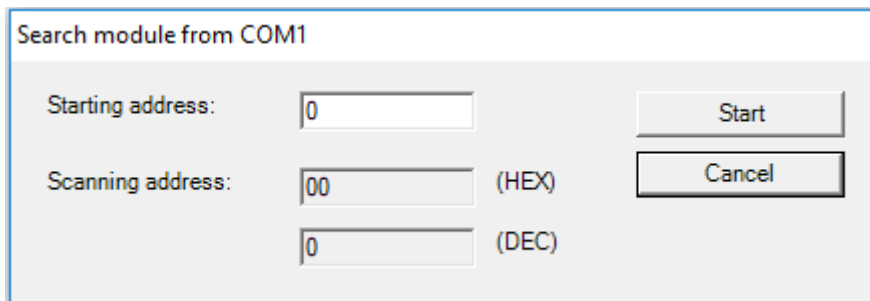
Picture 16: Start searching from address 0.
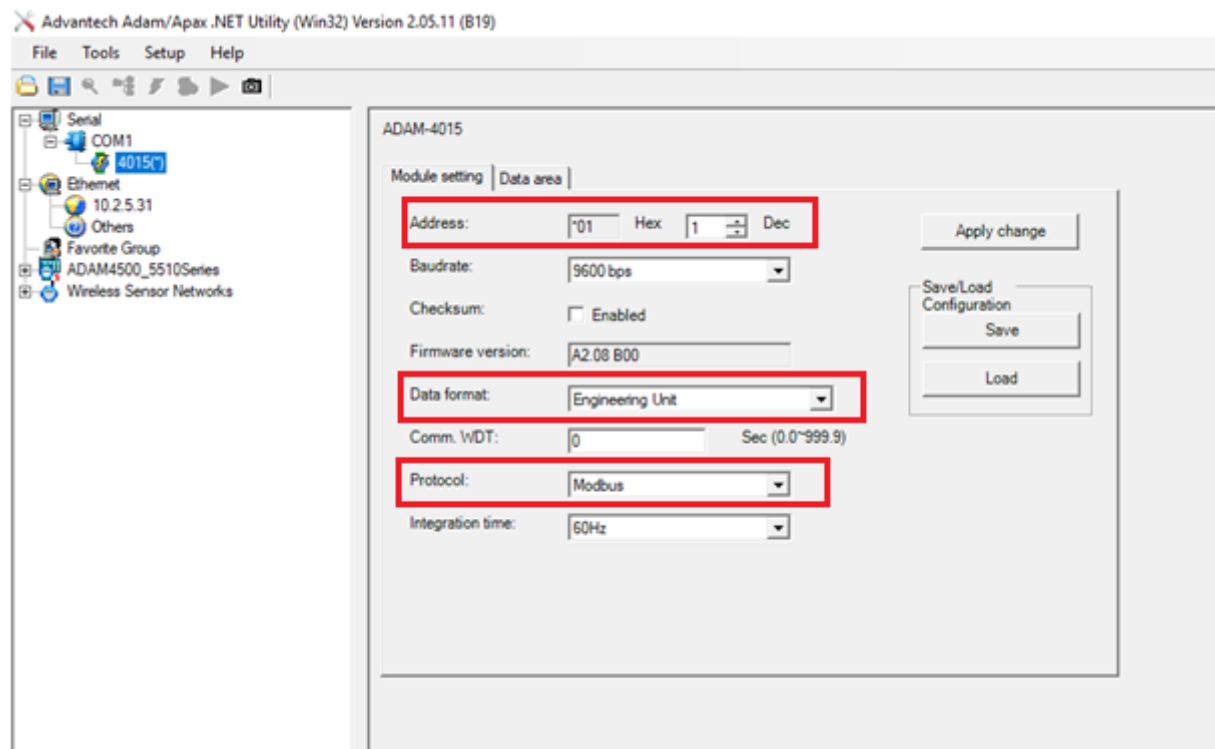
Picture 17: ADAM unit should appear under COMx and with clicking the ADAM unit it's automatically connected to your PC. Address should be unique for all ADAM units in same RS485 loop. Data format should be: "Engineering Unit" and Protocol: "Modbus". **These settings are visible only when INIT*-pin is connected to the ADAM GND-pin and unit is powered up with this connection done.**

After changing the settings "Apply change" must be pressed and after writing to ADAM is completed the ADAM unit must be rebooted (power off/ power on) to validate the changed parameters. **Only after rebooting the ADAM unit the changes take effect.**

3.3 PRE-CONFIGURED ADAM UNIT

If you have purchased ADAM-4015 or ADAM-4018+ from Arcteq directly then you can skip point 3.1 as units sold by Arcteq have pre-configuration inside the unit. Therefore, no need to set the address and protocol for ADAM-unit as they are already set. Address of the unit can be found from the sticker attached to the side of the ADAM.

3.4 SETTING UP RS485 COMMUNICATION FOR ADAM IN THE AQ2XX
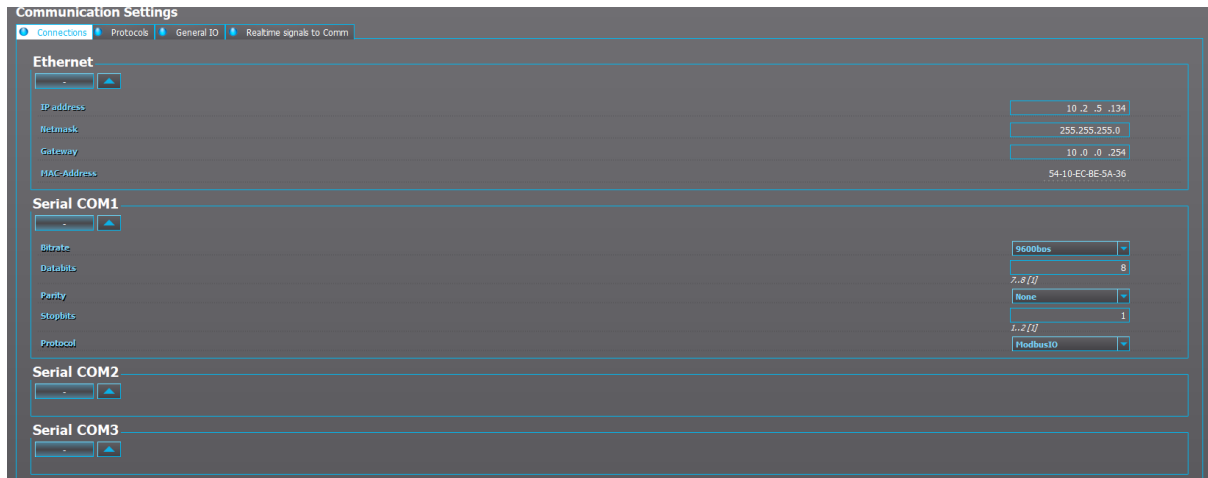
Picture 18: Set Serial COM1 to 9600bps, 8N1, ModbusIO
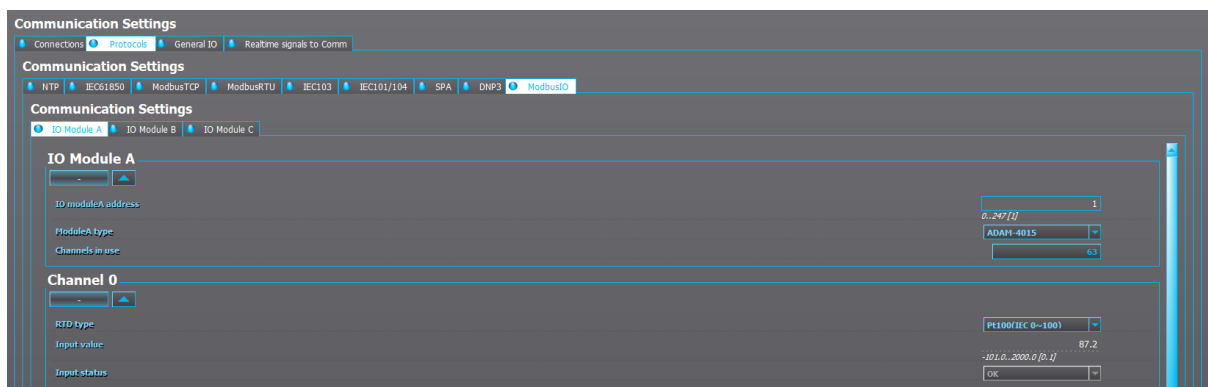
Picture 19: Set IO module A address to the same as set to the ADAM unit connected. Then set correct ADAM-module type: ADAM-4015 or ADAM-4018+.
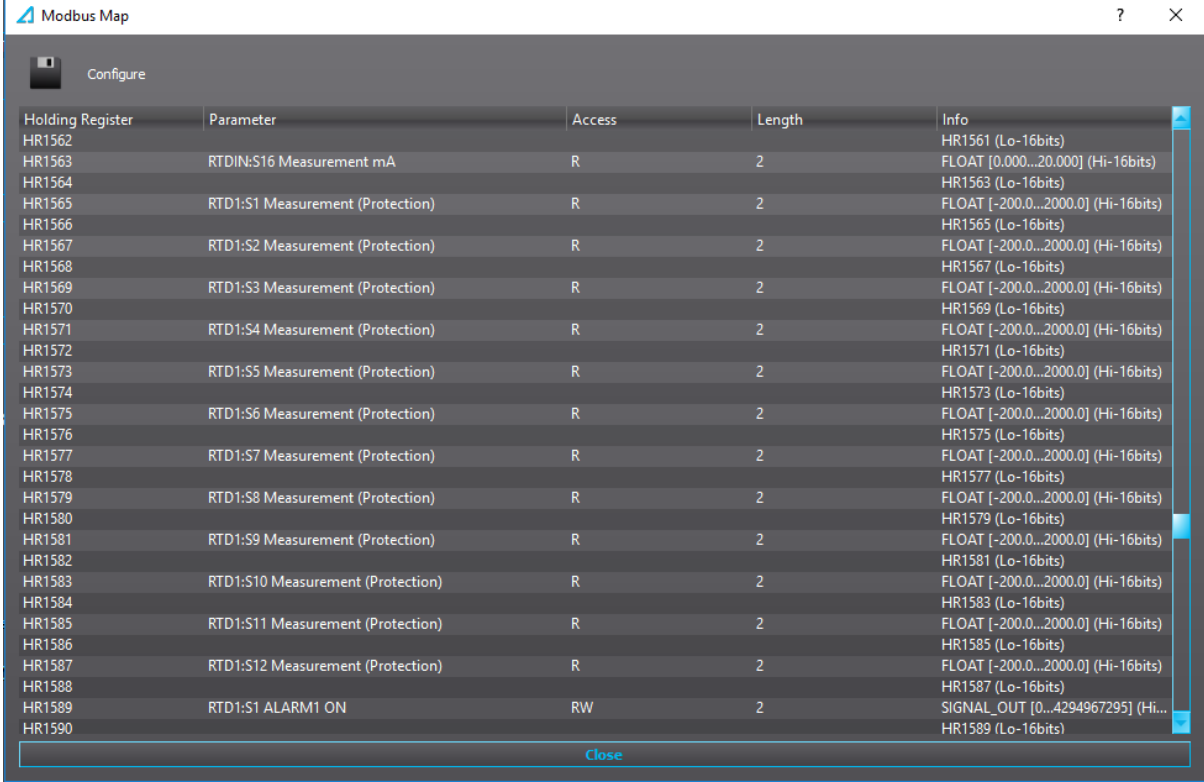
3.5 SETTING PROTECTION FUNCTION ACCORDING TO TEMPERATURE
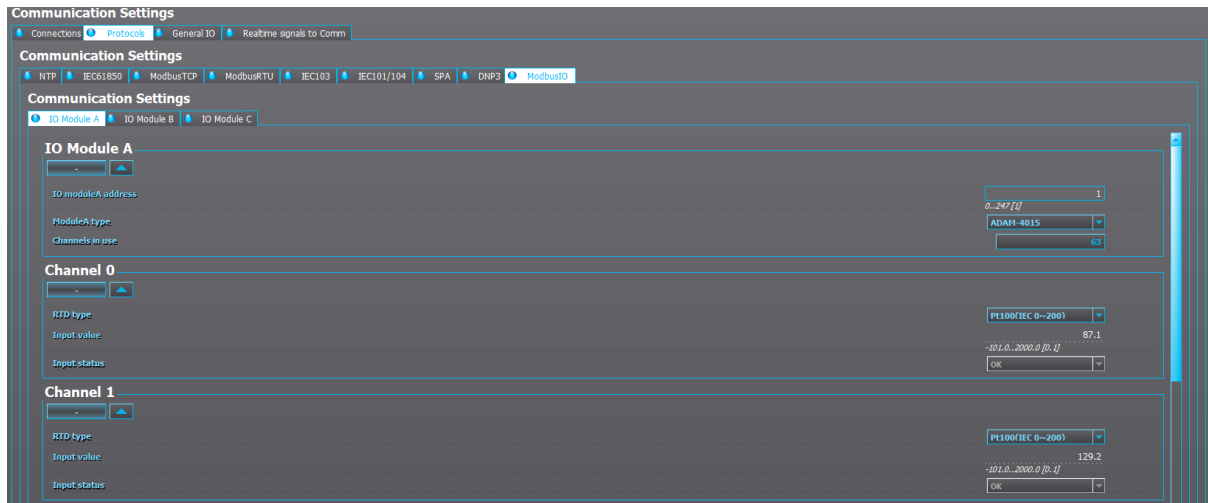
Picture 20: Set channels 0-5 according to the type of RTD sensor connected to the ADAM-4015. AQ-2xx writes this RTD sensor type directly to the ADAM-4015 with Modbus.
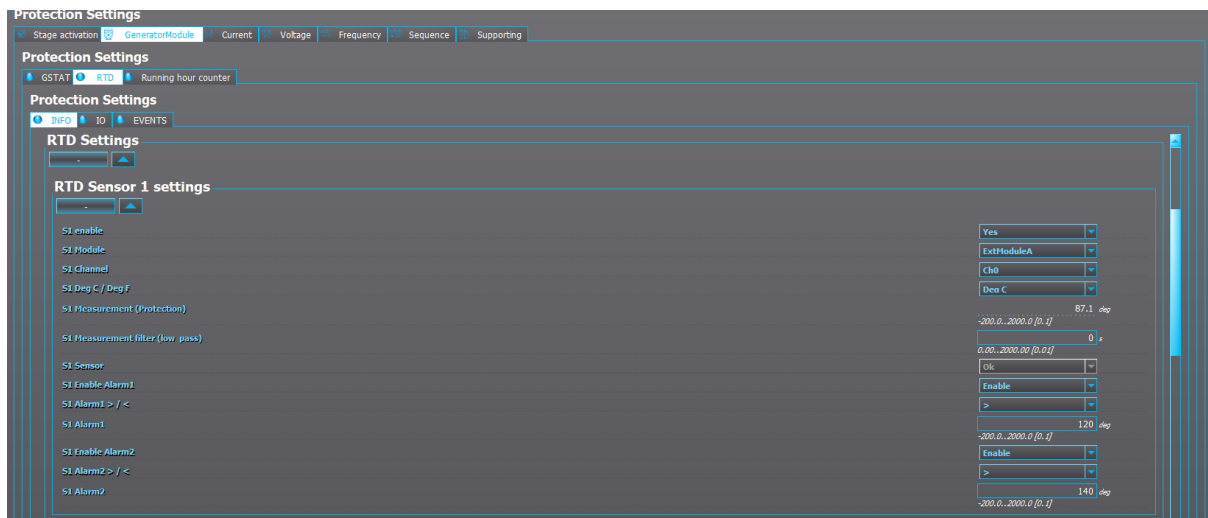
Picture 21: Set RTD protection module according to your application. **Note: S1 module: ExtModuleA (B,C)**
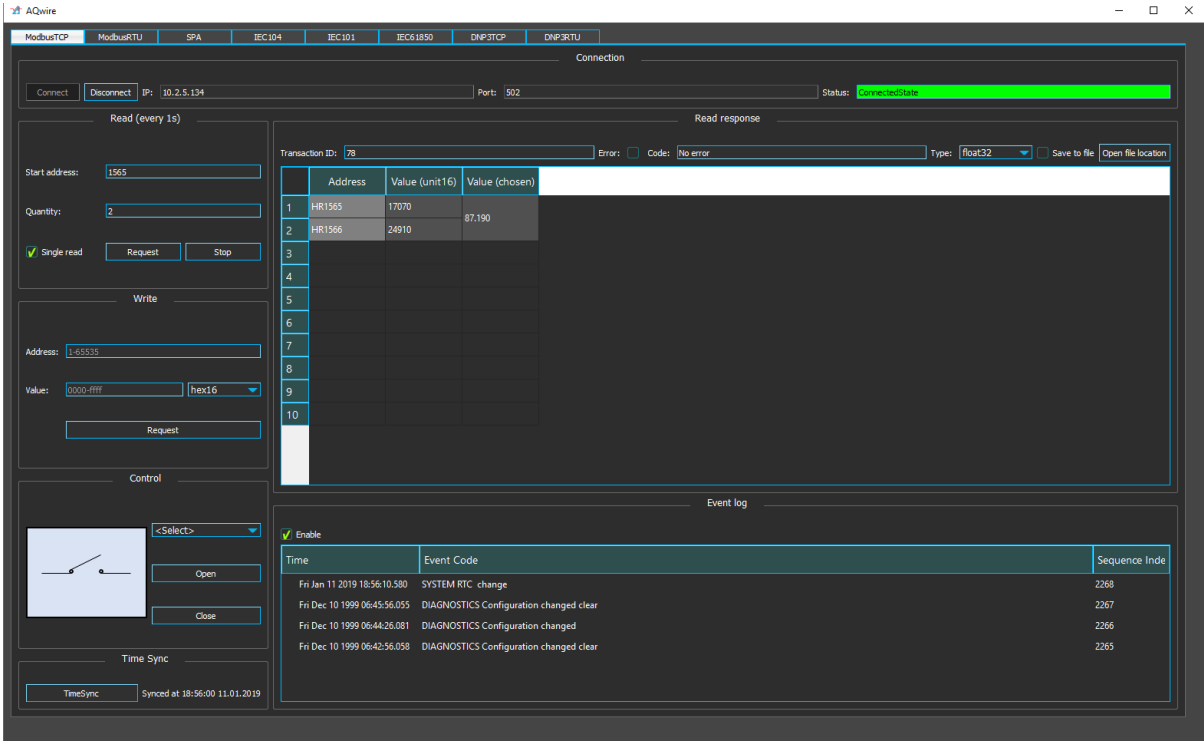
Picture 22: Reading measurements to Modbus TCP. RTD1:S1 Measurement (Protection) is the correct register for picture 21 configuration.

Picture 23: Modbus holding register 1565 read with AQWire protocol tester.

Picture 24: Measurement valid/invalid data can be found from these Modbus holding registers.

3.6 SETTING ON LOAD TAP CHANGER FUNCTION ACCORDING TO MA SIGNAL

Picture 25: Set channels 0-7 according to the sensor (or mA measurement) connected to the ADAM-4018+. AQ-2xx writes this sensor type directly to the ADAM-4018+ with Modbus.
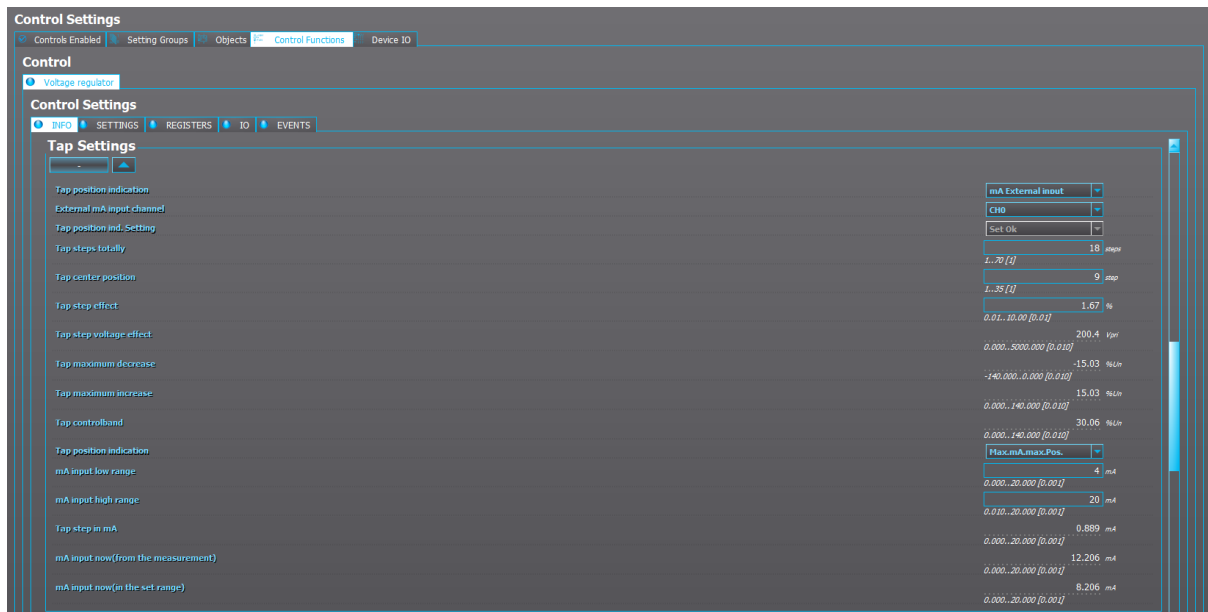
Picture 26: Set Tap position indication to "mA External input". Set "External mA input" channel to the channel where mA input is connected.

4 REFERENCE INFORMATION

Manufacturer information:
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