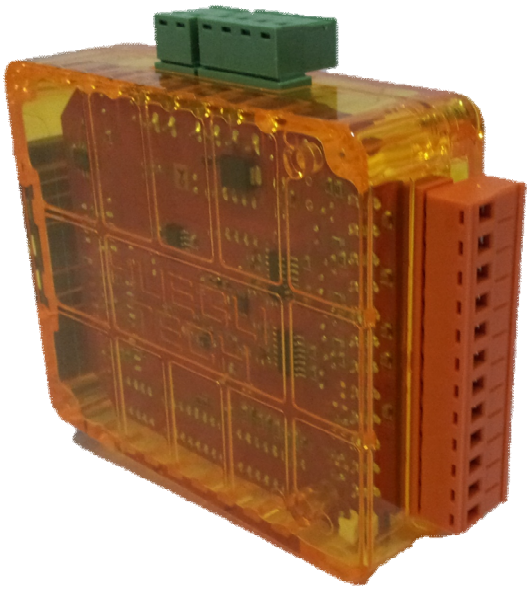
CuteLine

AIN8 Temperature

Manual



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1 Mounting

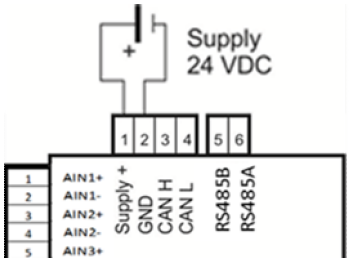
The CuteLine modules are designed to be mounted on a 35 mm DIN Rail and can be easily attached and detached from the DIN rail.

To mount the module on the DIN rail, attached the upper portion of the module onto the DIN rail and press down the module until the hook clicks itself.

To remove the module from the DIN rail, simply unhook the lower part using a screwdriver and lift the enclosure from the DIN rail.

2 Electrical Connection

All connectors can be pulled out from the board for easier wiring.

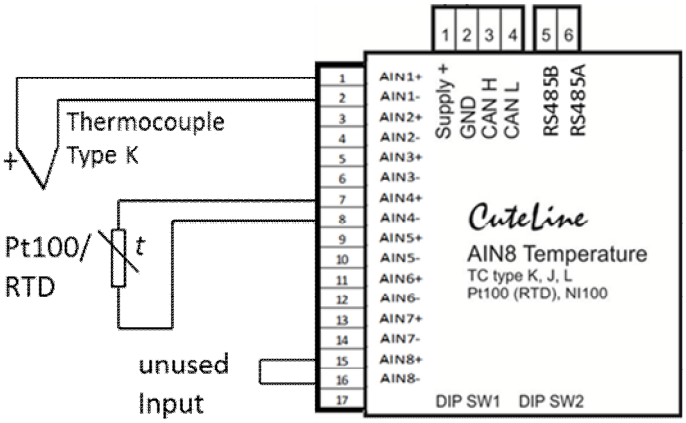


2.1 Power Supply

The nominal supply input for CuteLine AIN8 Temperature Module is 24 VDC power supply but it can also work from a voltage range of 7-30VDC. The green LED on the front is turned on when the device is connected to the power supply. The supply input is reverse polarity protected.

2.2 Sensor Connection

For each of the 8 analogue inputs, Thermocouple type K/J/L, Pt1000 (RTD) or Pt100 (RTD)/NI100 can be connected.



If a thermocouple is used the + of it must be connected to AINx+ (for example AIN1+) and the – must be connected to the corresponding AINx- (for example AIN1-).

Using a 2 wire Pt1000 (RTD) or Pt100 (RTD)/NI100 one wire must be connected to AINx+ (for example AIN4+) and the other wire must be connected to the corresponding AINx- (for example AIN4-).

With DIP Switch 1 the type of input is selected. Each of the 8 switches is assigned to the corresponding input.

Note: Pt1000 (RTD) sensor type is available on HT-CL-AIN8PT1000 Module
Pt100 (RTD) and NI100 sensor types are only available on HT-CL-AIN8T Module

If the sensors are connected as in the drawing above, DIP Switch 1 must be configured as follows :

SW1:1 OFF
SW1:4 ON

Input Selection DIP Switch 1

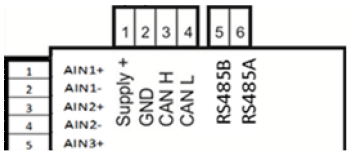
	Thermocouple K, J, L	Pt100(RTD) / NI100
Input AIN 1	SW1:1 OFF	SW1:1 ON
Input AIN 2	SW1:2 OFF	SW1:2 ON
Input AIN 3	SW1:3 OFF	SW1:3 ON
Input AIN 4	SW1:4 OFF	SW1:4 ON
Input AIN 5	SW1:5 OFF	SW1:5 ON
Input AIN 6	SW1:6 OFF	SW1:6 ON
Input AIN 7	SW1:7 OFF	SW1:7 ON
Input AIN 8	SW1:8 OFF	SW1:8 ON

Note: Unused inputs (AINx+) should be connected to their corresponding pair inputs (AINx-), the corresponding DIP switch must be OFF.

3 Serial Connection

The CuteLine AIN8 Temperature Module provides two kinds of serial connection:

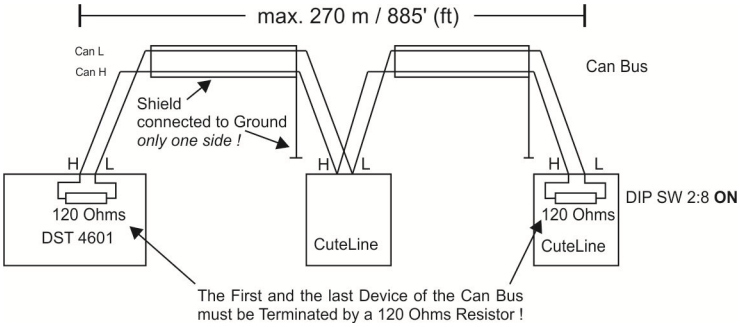
Can Bus ***Various Protocols***
RS485 ***Mod Bus RTU***



3.1 Can Bus Connection

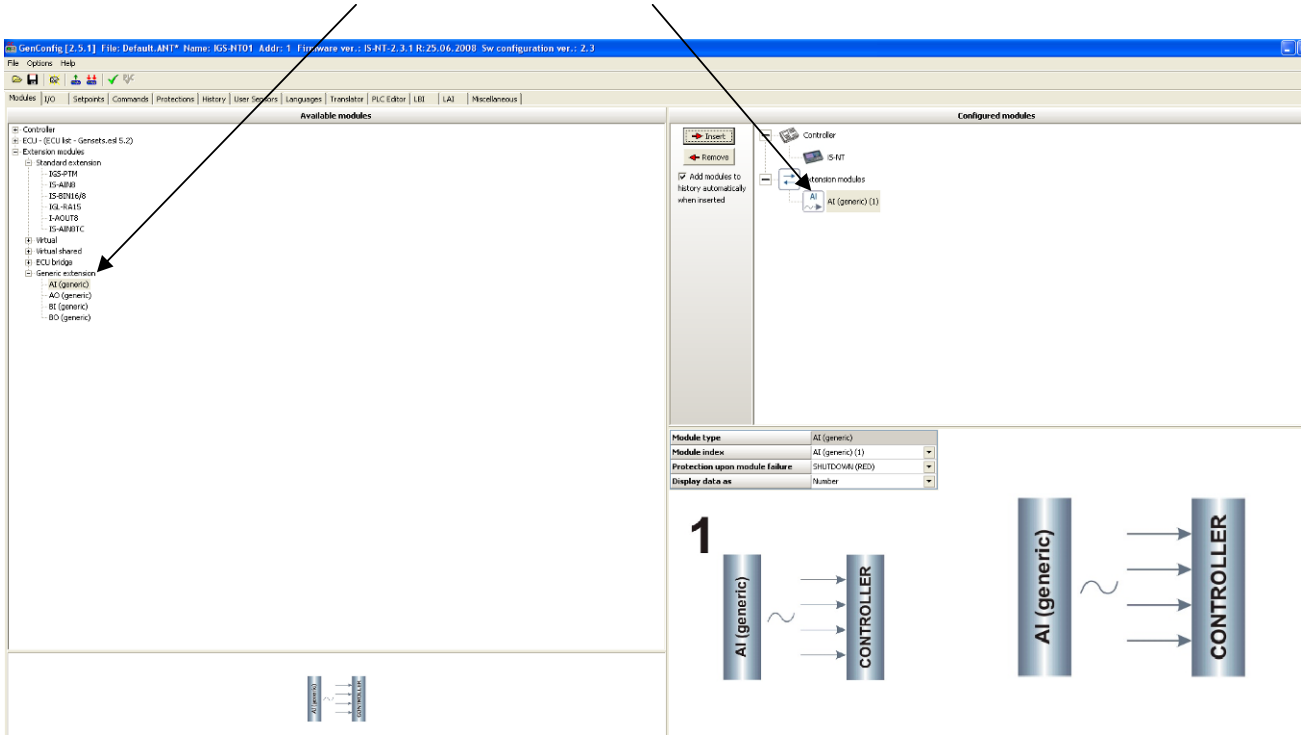
Using the Can Bus connection, the bus cable must be connected to the terminals Can H(igh) and Can L(ow). If the module is the first or the last device in the bus, a termination resistor is required. There is a build in resistor (120 Ohms) which can be activated by switching SW2:8 to ON position.
Shielded cable (for example HELUKABEL CAN BUS 2x0.22) must be used for the CAN Bus connection.

Recommended Wiring



3.2 Can Bus Connection to IG-NT / IS-NT

If the device is connected to IG-NT / IS-NT, the address setting (DIP SW2) in the CuteLine module must be configured to match the setting in the Controller. In the GenConfig, the CuteLine devices should be selected as a Generic Extension -> AI (generic).

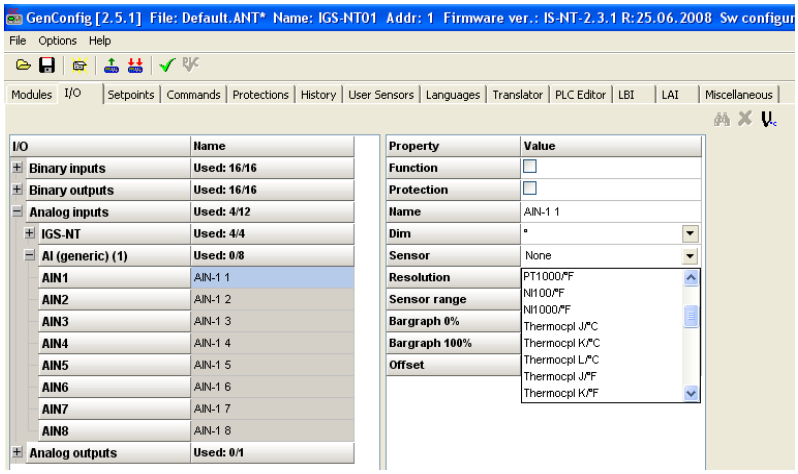


Address Settings for IG-NT / IS-NT Mode
DIP Switch 2

Address	SW2:1	SW2:2	SW2:3	SW2:4	SW2:5	SW2:6	SW2:7
1	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	ON	OFF	OFF	OFF	OFF	OFF	OFF
3	OFF	ON	OFF	OFF	OFF	OFF	OFF
4	ON	ON	OFF	OFF	OFF	OFF	OFF
5	OFF	OFF	ON	OFF	OFF	OFF	OFF
6	ON	OFF	ON	OFF	OFF	OFF	OFF
7	OFF	ON	ON	OFF	OFF	OFF	OFF
8	ON	ON	ON	OFF	OFF	OFF	OFF
9	OFF	OFF	OFF	ON	OFF	OFF	OFF
10	ON	OFF	OFF	ON	OFF	OFF	OFF
11	OFF	ON	OFF	ON	OFF	OFF	OFF
12	ON	ON	OFF	ON	OFF	OFF	OFF
13	OFF	OFF	ON	ON	OFF	OFF	OFF
14	ON	OFF	ON	ON	OFF	OFF	OFF
15	OFF	ON	ON	ON	OFF	OFF	OFF
16	ON	ON	ON	ON	OFF	OFF	OFF

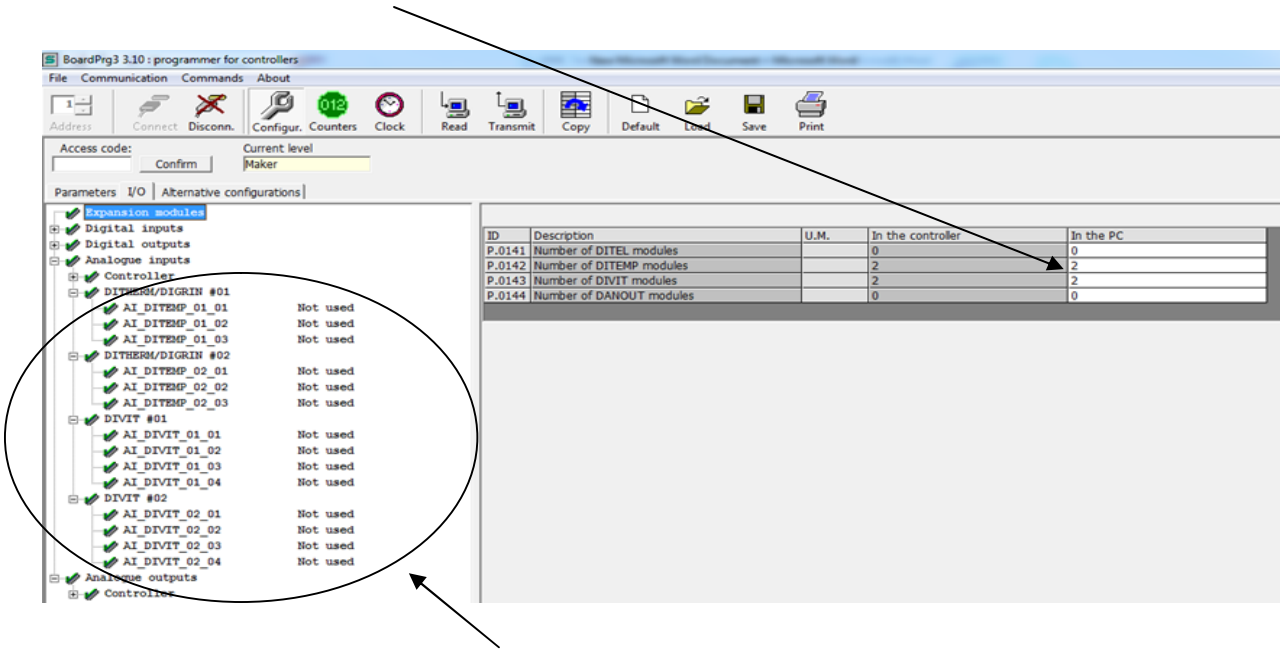
HINT
Any changes on the address settings (switches SW2:1 to SW2:7) are valid only after a Power Down Reset

Sensors that can be configured in GenConfig that supports this module include Thermocouple (K, J, L) (°C/°F) and Pt1000 (RTD) or Pt100 (RTD)/NI100 (°C/°F).



3.3 Can Bus Connection to HT Controller (DST Mode)

If the device is connected to HT Controller, the address setting (DIP SW2) in the CuteLine module must be configured to match the setting in the Controller. In the BoardPrg, the CuteLine devices must be selected as DITHERM or DIVIT.



The module covers automatic two DITHERM / DIVIT addresses because on one DITHERM / DIVIT address as there are only 3 (DITHERM) or 4 (DIVIT) input channels that are configurable.

Note: In DST Model, Yellow LED on the front is blinking when data are sent out.

In default mode, the unit for temperature reading of thermocouples type K and Pt100 or Pt1000 (RTD) is in °C.

Using other sensors see chapter 3.6

Address Settings for DST Mode
DIP Switch 2

Address	SW2:1	SW2:2	SW2:3	SW2:4	SW2:5	SW2:6	SW2:7
DITHERM #01 + #02	OFF	OFF	OFF	OFF	ON	OFF	OFF
DITHERM #03 + #04	ON	OFF	OFF	OFF	ON	OFF	OFF
DITHERM #05 + #06	OFF	ON	OFF	OFF	ON	OFF	OFF
DITHERM #07 + #08	ON	ON	OFF	OFF	ON	OFF	OFF
DITHERM #09 + #10	OFF	OFF	ON	OFF	ON	OFF	OFF
DITHERM #11 + #12	ON	OFF	ON	OFF	ON	OFF	OFF
DITHERM #13 + #14	OFF	ON	ON	OFF	ON	OFF	OFF
DITHERM #15 + #16	ON	ON	ON	OFF	ON	OFF	OFF
DIVIT #01 + #02	OFF	OFF	OFF	ON	ON	OFF	OFF
DIVIT #03 + #04	ON	OFF	OFF	ON	ON	OFF	OFF
DIVIT #05 + #06	OFF	ON	OFF	ON	ON	OFF	OFF
DIVIT #07 + #08	ON	ON	OFF	ON	ON	OFF	OFF
DIVIT #09 + #10	OFF	OFF	ON	ON	ON	OFF	OFF
DIVIT #11 + #12	ON	OFF	ON	ON	ON	OFF	OFF
DIVIT #13 + #14	OFF	ON	ON	ON	ON	OFF	OFF
DIVIT #15 + #16	ON	ON	ON	ON	ON	OFF	OFF

HINT
Any changes on the address settings (switches SW2:1 to SW2:7) are valid only after a Power Down Reset

HINT
Selecting DITHERM Address reads on Inputs 1-3 and 5-7 from the AIN8 Temp

3.4 Can Bus Connection in J1939 Mode

In this mode the CuteLine AIN8 Temperature Module provides the possibility to connect it to any controllers which can read the SPN's for single exhaust gas temperatures. In the J1939 protocol for single exhaust gas temperature measurement, each PGN contains the measurement of 4 Cylinders (Cyl. 1 – 4, Cyl. 5 – 8 etc.). Since the module has 8 inputs it will transmit the measurements of two PGN's. The only exception is for cylinders 17 – 20 where only the measurements of AIN 1 to AIN 4 are transmitted. Measurements of AIN 5 to AIN 8 are ignored.

Note: In J1939 Mode, Yellow LED on the front is blinking when data are sent out.

In default mode, the unit for temperature reading of thermocouples type K and Pt100 or Pt1000 (RTD) is in °C.

Using other sensors see chapter 3.6

Address Settings for J1939 Mode
DIP Switch 2

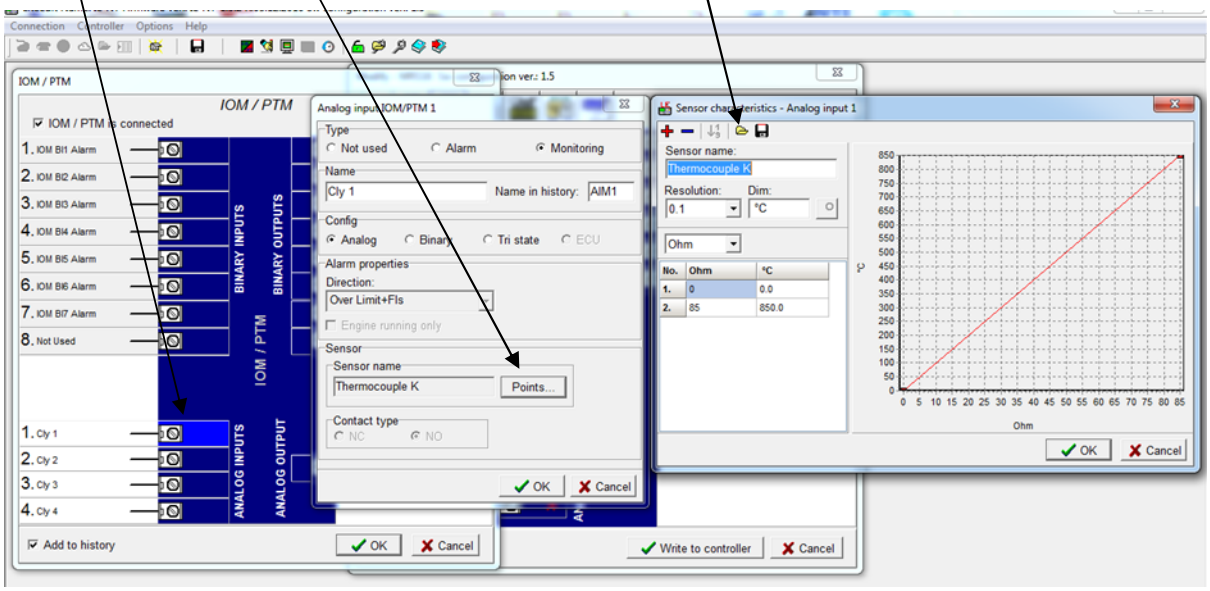
Address	SW2:1	SW2:2	SW2:3	SW2:4	SW2:5	SW2:6	SW2:7
Cylinder #1 to #8 SPN 1137 -1144 PGN 65187 (FEA3) + PGN 65186 (FEA2)	OFF	OFF	OFF	OFF	OFF	OFF	ON
Cylinder #9 to #16 SPN 1145 -1152 PGN 65185 (FEA1) + PGN 65184 (FEA0)	ON	OFF	OFF	OFF	OFF	OFF	ON
Cylinder #17 to #20 SPN 1153 -1156 PGN 65183 (FE9F)	OFF	ON	OFF	OFF	OFF	OFF	ON

HINT
Any changes on the address settings (switches SW2:1 to SW2:7) are valid only after a Power Down Reset

3.5 Can Bus Connection to IL-NT / IC-NT

If the device is connected to IL-NT / IC-NT, the address setting (DIP SW2) in the CuteLine module must be configured to match the setting in the Controller. The four analogue inputs under IOM can be configured as the desired sensor type by loading the corresponding sensor characteristics curve (CRV file).

Analogue Input ➔ Sensor ➔ loading the desired CRV by browsing the destined folder



To be configured as Thermocouple K (°C) and Pt100 or Pt1000 (RTD) (°C), the ready sensor characteristics curve (CRV file) for these sensors can be downloaded from http://www.huegli-tech.com/.
For other type of sensors, the respective sensor characteristics curve must be created by the user accordingly.

Note: In this Mode, Yellow LED on the front is blinking when data are sent out.
In default mode, the unit for temperature reading of thermocouples type K and Pt100 or Pt1000 (RTD) is in °C.

Address Setting for IL-NT / LC-NT Mode
DIP Switch 2

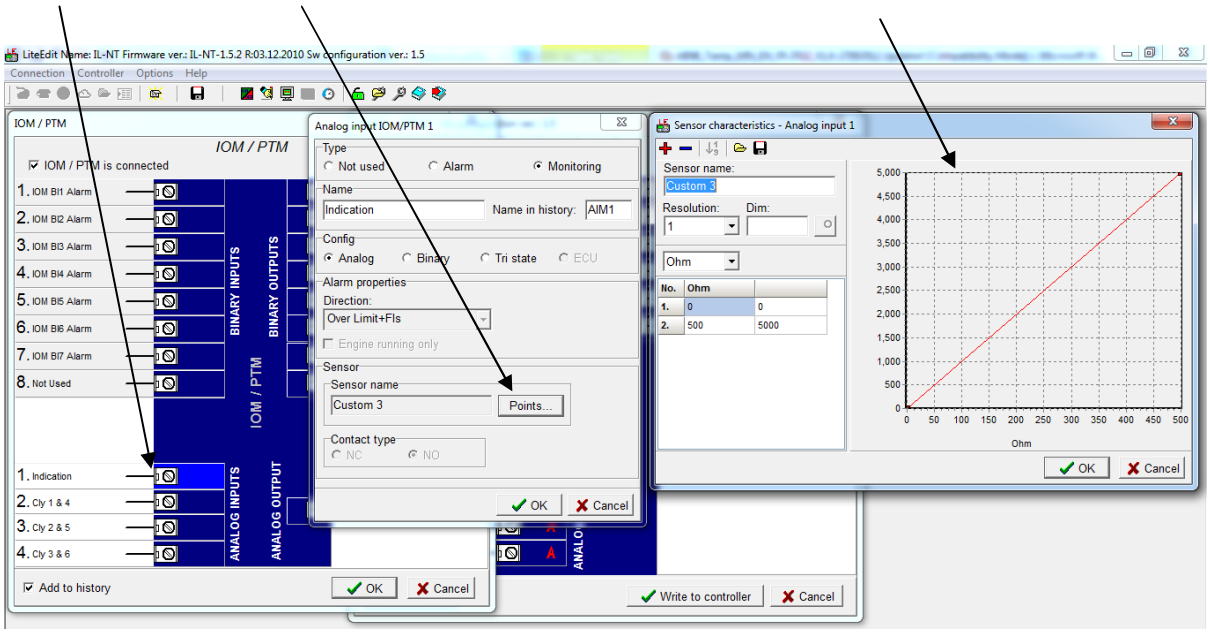
SW2:1	SW2:2	SW2:3	SW2:4	SW2:5	SW2:6	SW2:7
ON	ON	ON	ON	OFF	OFF	OFF

HINT
Any changes on the address settings (switches SW2:1 to SW2:7) are valid only after a Power Down Reset
When the module is in IL-NT / IC-NT Mode, only inputs 1-4 from the AIN8 Temp can be read in.

3.6 Can Bus Connection to IL-NT / IC-NT (Special)

If the device is connected to IL-NT / IC-NT using the special mode, the address setting (DIP SW2) in the CuteLine module must be configured to match the setting in the Controller.Under this mode, it is capable of monitoring the temperature sensor up to 6 from CuteLine device though the controller supports only four configurable analog inputs.
Among the four analogue inputs under IOM, the first one must be configured as the indication of the display which are currently monitoring since the display is changing between two sets of reading. It can be configured by loading the characteristics curve (CRV file) named **AIN8 Temp Indication** which can be downloaded from http://www.huegli-tech.com/

Analogue Input ➔ Sensor ➔ loading AIN8 Temp Indication characteristics curve (CRV file)

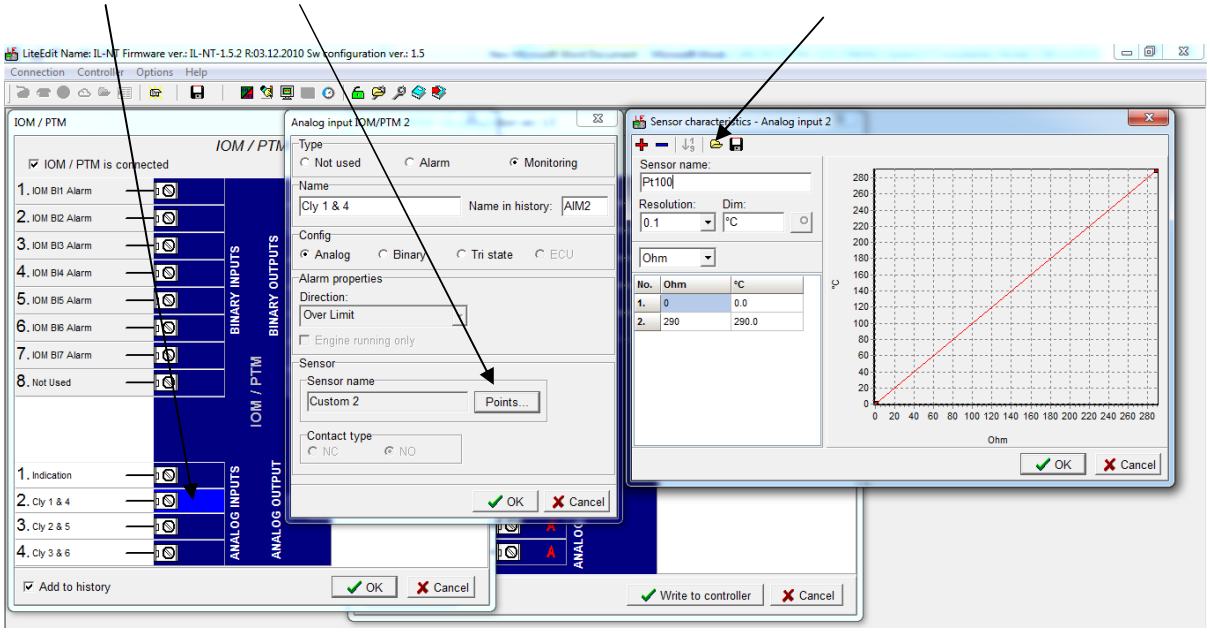


The other three analogue inputs can be configured as the desired sensor type inputs by loading the corresponding sensor characteristics curve (CRV file).

To be configured as Thermocouple K (°C) and Pt100 or Pt1000 (RTD) (°C), the ready sensor characteristics curve (CRV file) for these sensors can be downloaded from http://www.huegli-tech.com/.
For other type of sensors, the respective sensor characteristics curve must be created by the user accordingly.

Note: In this Mode, Yellow LED on the front is blinking when data are sent out.
In default mode, the unit for temperature reading of thermocouples type K and Pt100 or Pt1000 (RTD) is in °C.

Analogue Input ➔ Sensor ➔ loading the desired CRV by browsing the destined folder



Address Setting for IL-NT / LC-NT Mode (Special)
DIP Switch 2

SW2:1	SW2:2	SW2:3	SW2:4	SW2:5	SW2:6	SW2:7
OFF	ON	ON	ON	OFF	OFF	OFF

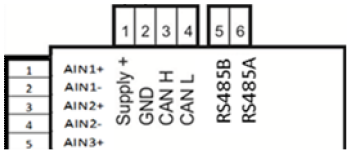
HINT
Any changes on the address settings (switches SW2:1 to SW2:7) are valid only after a Power Down Reset

When the module is in IL-NT / IC-NT (Special) Mode, only inputs 2-4 and 6-8 from the AIN8 Temp can be read in.

Display
As the display can show only three readings at one time, the reading shown at display is moving to and fro between 1st set of reading (123) and 2nd set of reading (456).

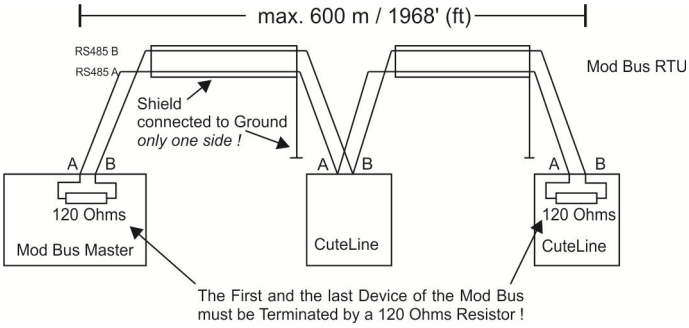
1st set of Reading		2nd set of Reading	
Indication	123	Indication	456
1	Input AIN2	4	Input AIN6
2	Input AIN3	5	Input AIN7
3	Input AIN4	6	Input AIN8

3.7 Mod Bus RTU Connection



When working in this mode, the CuteLine AIN8 Temperature Module works as a Mod Bus Slave so the Master has to request data from it. The connection must be on the terminals RS485A and RS485B. If the module is the last device in the bus, an external 120 Ohms termination resistor must be added.

Recommended Wiring



There are fixed object numbers for the 8 analogue inputs :

30001 AIN 1	***30002 AIN 2***	***30003 AIN 3***	***30004 AIN 4***
30005 AIN 5	***30006 AIN 6***	***30007 AIN 7***	***30008 AIN 8***

The Master can read a single or several objects by using the command 04.
In standard the scaling for the temperature is in °C and only for thermocouples type K and Pt100 or Pt1000 (RTD).

Using other sensors see chapter 3.6

The communication settings are 9600 / 19200 Baud (depending on DIP SW2:5), 8 Bit, 1 Stop Bit, No Parity.
The yellow LED on the front is blinking when data are sent out after a request from the Master.

Address Settings for Mod Bus RTU Mode
DIP Switch 2

Address	SW2:1	SW2:2	SW2:3	SW2:4	SW2:5	SW2:6	SW2:7
1	OFF	OFF	OFF	OFF	*	ON	OFF
2	ON	OFF	OFF	OFF	*	ON	OFF
3	OFF	ON	OFF	OFF	*	ON	OFF
4	ON	ON	OFF	OFF	*	ON	OFF
5	OFF	OFF	ON	OFF	*	ON	OFF
6	ON	OFF	ON	OFF	*	ON	OFF
7	OFF	ON	ON	OFF	*	ON	OFF
8	ON	ON	ON	OFF	*	ON	OFF
9	OFF	OFF	OFF	ON	*	ON	OFF
10	ON	OFF	OFF	ON	*	ON	OFF
11	OFF	ON	OFF	ON	*	ON	OFF
12	ON	ON	OFF	ON	*	ON	OFF
13	OFF	OFF	ON	ON	*	ON	OFF
14	ON	OFF	ON	ON	*	ON	OFF
15	OFF	ON	ON	ON	*	ON	OFF
16	ON	ON	ON	ON	*	ON	OFF

*** = Baud Rate Selector**
OFF = 9600 Baud
ON = 19200 Baud

HINT
Any changes on the address settings (switches SW2:1 to SW2:7) are valid only after a Power Down Reset

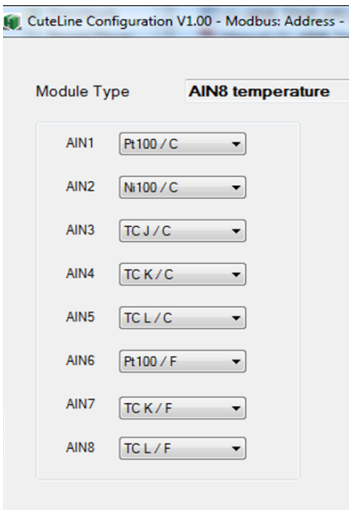
3.8 Using other Sensors

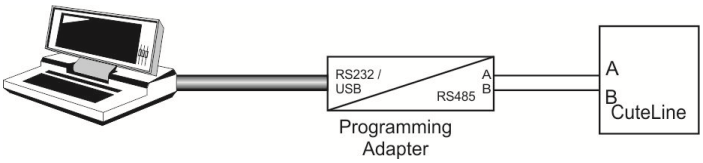
When using a connection to a HT Controller, J1939 protocol or Mod Bus RTU in standard setup, only thermocouples type K and Pt100 or Pt1000 can be connected to the device. With the software ***Cute-Line Configuration,*** the module can be configured to use different sensors like thermocouples type J or NI100. Latest version of the software can be downloaded from http://www.huegli-tech.com/

To start the configuration, switch off the module and set the DIP SW2 to these positions:

SW2:1	SW2:2	SW2:3	SW2:4	SW2:5	SW2:6	SW2:7
OFF	OFF	OFF	OFF	ON	ON	OFF

Connect the PC / Laptop to the module:





Launch the software and click on “Connect”. Select the type of sensor which is connected to the individual inputs and click on “OK”. If the configuration is successful, you will receive a pop box message to notify you about it. After this is completed, click on “Disconnect” and turn off the power supply to the module. This completes the sensor type configuration process.

To resume the use of the module, put back DIP SW2 to the position of the configuration as needed and follow the instruction to the relevant chapters.

4 Technical Data

Power Supply ..... 7-30VDC, Reverse Polarity Protected

Current Consumption ..... 35 mA with 24VDC Input @ 25°C

Number of Inputs ..... 8, Differential

Sensor Types/Range
- Thermocouple Type K ..... 0 ~ 850°C (32 ~ 1562°F)
- Thermocouple Type J ..... 0 ~ 620°C (32 ~ 1148°F)
- Thermocouple Type L ..... 0 ~ 610°C (32 ~ 1130°F)
- Pt100 (RTD) # ..... -100 ~ 300°C (-148 ~ 572°F)
- NI100 # ..... -60 ~ 160°C (-76 ~ 320°F)
- Pt1000 (RTD) * ..... -100 ~ 300°C (-148 ~ 572°F)

Resolution ..... 1°

Accuracy
- Thermocouple Type K ..... 0.7% of Full Scale @ 25°C
- RTD ..... 1.2% of Full Scale @ 25°C

Calibration ..... Factory Calibrated

Communication Supported Protocols
- Can Bus IS/IG
- Can Bus HT Controller
- J1939
- Can Bus IC/IL
- Can Bus IC/IL (Special)
- Mod Bus RTU

Operational Temperature ..... -40 to +85°C (-40 to +185°F)

Storage Temperature ..... -40 to +85°C (-40 to +185°F)

Relative Humidity ..... 5 to 95%, Non-condensing

Dimension ..... 30 x 110 x 94 mm

Weight 190g

Wire Size ..... 22 to 12 AWG

Mounting ..... DIN Rail 35 mm

*** Pt1000 (RTD) sensor type is available on HT-CL-AIN8PT1000 Module.**
 # Pt100 (RTD)/NI100 sensor types are only available on HT-CL-AIN8T Module.