

# Accessory modules

## Extension modules for IL-NT, IC-NT, IA-NT and ID-Lite

1 Document information .....	5
2 Table of modules .....	7
3 Table of symbols .....	8
4 Modules .....	9

# Table of contents

<b>1 Document information</b>	<b>5</b>
1.1 Clarification of Notation	5
1.2 About this guide	5
1.3 Legal notice	5
<b>2 Table of modules</b>	<b>7</b>
<b>3 Table of symbols</b>	<b>8</b>
<b>4 Modules</b>	<b>9</b>
4.1 I-LB+	10
4.1.1 Description	10
4.1.2 Connectors	11
4.1.3 Address and jumpers settings	11
4.1.4 LEDs indication	14
4.1.5 Wiring	14
4.1.6 Technical data	16
4.2 i-LBA	17
4.2.1 Description	17
4.2.2 Connectors	17
4.2.3 Wiring	18
4.2.4 Technical data	18
4.3 I-RB8/I-RB16/I-RB8-231/I-RB16-231	19
4.3.1 Description	19
4.3.2 Connectors	20
4.3.3 LEDs indication	20
4.3.4 Wiring	20
4.3.5 Technical data	21
4.4 IG-IOM	22
4.4.1 Description	22
4.4.2 Dimensions	22
4.4.3 Terminals	23
4.4.4 Address and jumpers setting	23
4.4.5 LED indication	23
4.4.6 Wiring	24
4.4.7 Technical data	24
4.5 IGS-PTM	26
4.5.1 Description	26

4.5.2 Dimensions .....	26
4.5.3 Terminals .....	27
4.5.4 Address and jumpers setting .....	28
4.5.5 LED indication .....	30
4.5.6 Wiring .....	31
4.5.7 Technical data .....	32
4.6 IG-MTU/IG-MTU-C/MTU-2-1 .....	33
4.6.1 Description .....	33
4.6.2 Connectors .....	33
4.6.3 Wiring .....	33
4.6.4 Dimensions .....	35
4.6.5 Technical data .....	35
4.7 IL-NT-AOUT8 .....	36
4.7.1 Description .....	36
4.7.2 Connectors .....	36
4.7.3 Wiring .....	37
4.7.4 Technical data .....	38
4.8 IL-NT-RS232 .....	39
4.8.1 Description .....	39
4.8.2 Connectors .....	39
4.8.3 Wiring .....	40
4.8.4 Technical data .....	40
4.9 IL-NT-S-USB .....	41
4.9.1 Description .....	41
4.9.2 Connectors .....	41
4.9.3 LED Indications .....	42
4.9.4 Wiring .....	42
4.9.5 Technical data .....	42
4.10 IL-NT-FCM .....	43
4.10.1 Description .....	43
4.10.2 Connectors .....	43
4.10.3 Address and jumper setting .....	43
4.10.4 Others information .....	44
4.10.5 Wiring .....	45
4.10.6 Technical data .....	45
4.11 IL-NT-RS232-485 .....	46
4.11.1 Description .....	46
4.11.2 Connectors .....	46
4.11.3 Wiring .....	47

4.11.4 Technical data .....	47
4.12 IL-NT-BIO8 .....	48
4.12.1 Description .....	48
4.12.2 Connectors .....	48
4.12.3 Address and jumper setting .....	48
4.12.4 Others information .....	49
4.12.5 Wiring .....	49
4.12.6 Technical data .....	50
4.13 IC-NT-CT-BIO7 .....	51
4.13.1 Description .....	51
4.13.2 Connectors .....	51
4.13.3 Address and jumper setting .....	51
4.13.4 Others information .....	51
4.13.5 Wiring .....	54
4.13.6 Technical data .....	55
4.14 IL-NT-IO1 .....	56
4.15 IL-NT-AIO .....	57
4.16 Inteli RPU .....	58
4.16.1 Installation and wiring .....	59
4.16.2 Features .....	62
4.16.3 Overspeed RPM configuration .....	63

# 1 Document information

1.1 Clarification of Notation .....	5
1.2 About this guide .....	5
1.3 Legal notice .....	5

## 1.1 Clarification of Notation

**Note:** This type of paragraph calls the reader's attention to a notice or related theme.

**IMPORTANT:** This type of paragraph highlights a procedure, adjustment etc., which can cause a damage or improper function of the equipment if not performed correctly and may not be clear at first sight.

**WARNING:** This type of paragraph highlights a procedure, adjustment etc., which can cause a damage or improper function of the equipment if not performed correctly and may not be clear at first sight.

**Example:** This type of paragraph contains information that is used to illustrate how a specific function works.

## 1.2 About this guide

This guide contains information about extension modules for IL-NT, IC-NT, IA-NT and ID-Lite.

## 1.3 Legal notice

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General security recommendations and set of measures

#### 1. AccessCode

- Change the AccessCode BEFORE the device is connected to a network.
- Use a secure AccessCode – ideally a random string of 8 characters containing lowercase, uppercase letters and digits.
- For each device use a different AccessCode.

#### 2. Password

- Change the password BEFORE the device enters a regular operation.
- Do not leave displays or PC tools unattended if an user, especially administrator, is logged in.

#### 3. Controller Web interface

- The controller web interface at port TCP/80 is based on http, not https, and thus it is intended to be used only in closed private network infrastructures.
- Avoid exposing the port TCP/80 to the public Internet.

#### 4. MODBUS/TCP

- The MODBUS/TCP protocol (port TCP/502) is an instrumentation protocol designed to exchange data between locally connected devices like sensors, I/O modules, controllers etc. From it's nature it does not contain any kind of security – neither encryption nor authentication. Thus it is intended to be used only in closed private network infrastructures.
- Avoid exposing the port TCP/502 to the public Internet.

#### 5. SNMP

- The SNMP protocol (port UDP/161) version 1,2 is not encrypted. Thus it is intended to be used only in closed private network infrastructures.
- Avoid exposing the port UDP/161 to the public Internet.

## 2 Table of modules

Module	Controller type				Related documentation
	IL-NT	IC-NT	ID-Lite	IA-NT	
I-LB/I-LB+	✗	✓	✗	✗	
I-LBA	✓	✓	✓	✓	
I-RB8	✓	✓	✓	✗	
I-RB8-231	✓	✓	✓	✗	
IG-IB	✓	✓	✓	✗	IG-6.1-IS-3.1-CommunicationGuide
IG-IOM	✓ #	✓	✗	✗	
IGL-RA15	✓ #	✓	✓	✗	IGL-RA15-1.2
IG-MTU/IG-MTU-C/MTU-2-1	✓	✓	✓	✗	
IGS-PTM	✓ #	✓	✗	✗	
IL-NT AOUT8	✓	✓	✓	✗	
IL-NT RS232	✓	✓	✓	✓	
IL-NT S-USB	✓	✓	✓	✓	
IL-NT BIO8	✓	✓	✓	✓	
IC-NT-CT-BIO7	✗	✓	✗	✗	
IL-NT IO1	✗	✗	✓	✗	
IL-NT AIO	✗	✗	✓	✗	
IL-NT FCM	✓ *	✗	✗	✗	
IL-NT RS232-485	✓	✓	✓	✓	
IC-NT RD	✗	✓	✗	✗	IC-NT-RD-1.0-New Features















**Note:**





# IL only MRS15, MRS16, AMF25

\* only IntelLog

**Note:** For connecting with controller and unit reprogramming, see **Proprietary controller guide**.

# 3 Table of symbols

Icon	Description
	Supported IntelliDrive controller
	Supported IntelliSys-NT controller
	Supported IntelliGen-NT controller
	Supported IntelliGen-NT controller
	Supported IntelliGen-NT and IntelliSys-NT controller
	Supported CAN1 line
	Supported CAN2 line
	Supported CAN1 and CAN2 line
	Supported USB
	Supported Ethernet
	Supported RS232 line
	Supported RS485 line
	Module has analog inputs
	Module has digital inputs

	Module has analog output
	Module has digital output
	Unit is 35 mm DIN rail mounted
	Unit is direct to controller mounted

[⬅ back to Table of contents](#)



# 4 Modules

4.1 I-LB+ .....	10
4.2 i-LBA .....	17
4.3 I-RB8/I-RB16/I-RB8-231/I-RB16-231 .....	19
4.4 IG-IOM .....	22
4.5 IGS-PTM .....	26
4.6 IG-MTU/IG-MTU-C/MTU-2-1 .....	33
4.7 IL-NT-AOUT8 .....	36
4.8 IL-NT-RS232 .....	39
4.9 IL-NT-S-USB .....	41
4.10 IL-NT-FCM .....	43
4.11 IL-NT-RS232-485 .....	46
4.12 IL-NT-BIO8 .....	48
4.13 IC-NT-CT-BIO7 .....	51
4.14 IL-NT-IO1 .....	56
4.15 IL-NT-AIO .....	57
4.16 Intel RPU .....	58

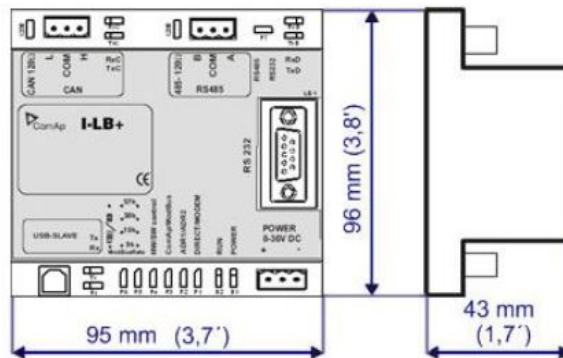
 [back to Table of contents](#)

## 4.1 I-LB+



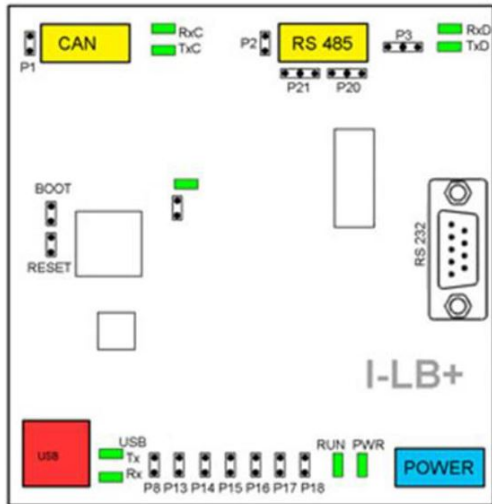
### 4.1.1 Description

I-LB+ is communication modules for communication with all devices connected to CAN2 bus. I-LB+ is successors of the IG-MU unit designed to be used with classic controllers. It therefore provides additional communication port and higher communication speed. Speed for direct/modem connection can be up to 57600 bps (IG-MU only 19200 bps). I-LB/I-LB+ can be connected with PC via USB, RS232 or RS485. I-LB is without USB port, I-LB+ is with USB port (speed  $\approx$  115200 bps).



Unit is 35 mm DIN rail mounted.

## 4.1.2 Connectors



POWER	Power supply
CAN	CAN 1 line
USB	USB line
RS232	RS485 line
J13 - J18	SW/HW control
BOOT	Programming
RESET	Programming/Reset
P1	Terminating resistor
P2	Terminating resistor
P3	RS232 or RS485
P8	USB enable/disable
P13	Communication speed
P14	Communication speed
P15	Modem control (HW/SW)
P16	Protocol (Modbus/ComAp)
P17	CAN address
P18	Connection (direct/modem)
P20	Bias -A
P21	Bias -B
RxC, TxC	CAN data
RxD, TxD	RSxxx data
Tx, Rx USB	USB data
RUN	Power
PWR	Module state

## 4.1.3 Address and jumpers settings

### CAN1 termination (P1)

I-LB+ has included CAN terminating resistor (120 ohm). Close jumper P1 to connect terminating resistor to CAN bus, open jumper P1 to disconnect terminating resistor.

### RS232 or RS485 termination (P2)

I-LB+ has included RS232/RS485 terminating resistor (120 ohm). Close jumper P2 to connect terminating resistor to RS485 bus, open jumper P2 to disconnect terminating resistor.

### Select RS mode (P3)

Jumper P3 selecting RS mode. When jumper P3 is connected to 1-2, RS232 mode is activated. When jumper P3 is connected to 2-3, RS485 mode is active.

## ComAp / Modbus (P16)

Jumper P16 selects between ComAp PC tools (InteliMonitor, WinScope, et al.) and third party PC SW for monitoring with Modbus interface. ComAp PC tools are selected when P16 is opened; Modbus is selected when P16 is closed.

## Modbus rate (P13 and P14)

Modbus rate is set by jumpers P13 and P14; description is in the table bellow.

Modbus rate	P13	P14
9600 bps	Open	Open
19200 bps	Close	Open
38400 bps	Open	Close
57600 bps	Close	Close

## Direct/Modem (P18)

Select between direct connection via RS232 or RS 485 and modem connection type. For modem connection is jumper P18 closed, for direct connection is jumper P18 opened.

## ADR1 / ADR2 (P17)

Select device address. ADR1 is selected if P17 is opened and ADR2 is selected if P17 is closed.

## SW/HW control (P15)

Select SW or HW modem control. Jumper P15 is opened for HW modem control and closed for SW modem control.

## RS485 bias resistor (P20 and P21)

Jumpers P20 and P21 are opened if the bias resistors (560R) are not requested. Closed jumper connects bias resistor to the line A (P20) or B (P21).

## USB interface enable/disable (P8) (missing on HW 1.0)

Jumper P8 has to be set to enable USB interface. Opened jumper disables USB interface (disabled USB doesn't occupies a communication channel on the CAN bus i.e. there are still 3 free communications channels on the CAN bus).

USB interface allows only local communication (modbus is not implemented in this interface!).

Jumper	Description	State
P1	CAN terminating resistor	Opened – not connect
P2	RS485 terminating resistor	Opened – not connect
P3	RS232 or RS485	1–2 – active RS232
P8	USB enable/disable	Opened – disabled
P13	Modbus rate	Opened
P14	Modbus rate	Opened – 9600 bps
P15	HW or SW modem control	Opened – HW control
P16	ComAp or Modbus	Opened – ComAp protoco
P17	ADR1 or ADR2	Opened – ADR1
P18	Direct or Modem	Opened – Direct

## Jumper tree

- ComAp
  - DIRECT
    - RS232/RS485 – selection of serial communication type
    - ADR1/ADR2 – selection between two available local communication channels
  - MODEM
    - HW/SW control – selection between modems with full interface
    - ADR1/ADR2 – selection between two available modem communication channels; IG/IS-NT controllers only
    - Setting RS232/RS485 jumper to RS232 position is obligatory
- Modbus (not available at USB port of I-LB+, USB port always works in ComAp mode)
  - DIRECT
    - RS232/RS485 – selection of serial communication type
    - ADR1/ADR2 – selection between two available local communication channels
  - MODEM
    - ADR1/ADR2 – selection between two available modem communication channels; IG/IS-NT controllers only,
    - Setting HW/SW control has no influence; a modem with HW control is always expected in this mode

## Programming

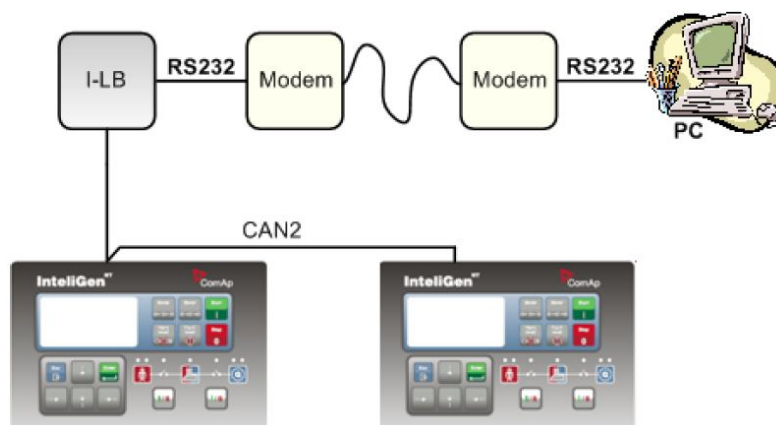
For programming is necessary to close BOOT jumper. RESET jumper is used to reset the device. Close jumper to reset the device. For programming is used FlashProg PC tool. Check if jumper P3 is set according to your communication interface (mostly RS232 – position 1-2).

## 4.1.4 LEDs indication

LED	Description	State
RxC	No data are received on the CAN line	Dark
	Data are received on the CAN line	Blink
TxC	No data are transmitted on the CAN line	Dark
	Data are transmitted on the CAN line	Blink
RxD	No data are received on the RS232 or RS485 line	Dark
	Data are received on the RS232 or RS485 line	Blink
TxD	No data are transmitted on the RS232 or RS485 line	Dark
	Data are transmitted on the RS232 or RS485 line	Blink
TxUSB	No data are received on USB	Dark
	Data are received on USB	Blink
RxUSB	No data are transmitted on USB	Dark
	Data are transmitted on USB	Blink
RUN	No power supply	Dark
	Power supply OK	Continuous light
PWR	When at least one controller is active on the CAN bus	Continuous light
	After connection power supply - no controller detected on the CAN bus (during communication speed detection).	Blink

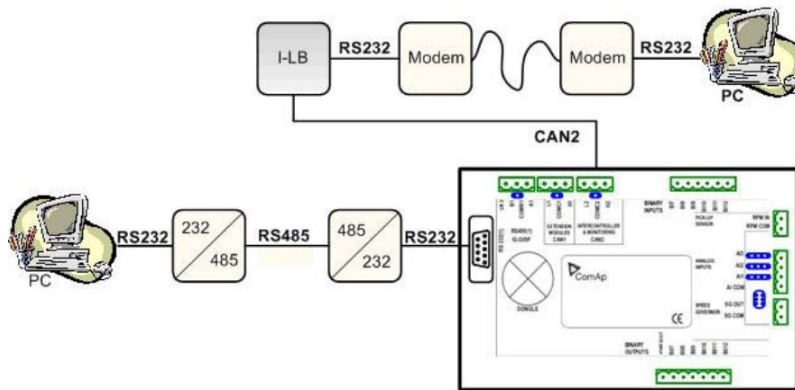
## 4.1.5 Wiring

I-LB+ has to be connected to modem via standard modem cable (full RS232) where the DSR (Data Set Ready) signal detects modem presence (when MODEM (HW) type selected). Three-wire RS232 cable (TxD, RxD, GND) can be used (e.g. for GSM modems) when MODEM (SW) type is selected.

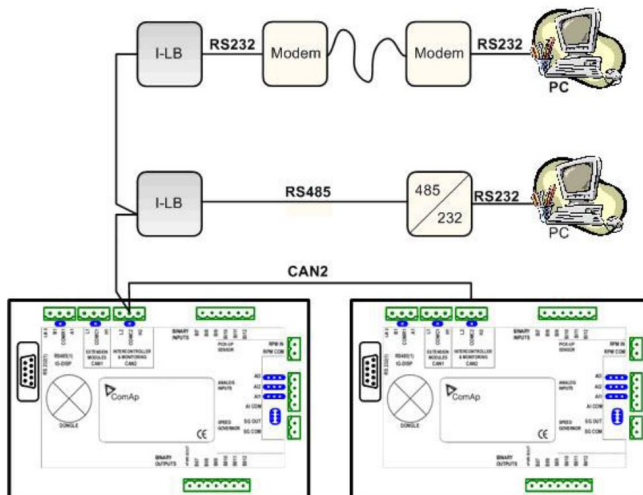


## Combined communication – remote and modem

> Option 1:



> Option 2:



## Combined communication I-LB+ with maximum configuration

There are more separate internal channels for NT controller connection which can operate at once (all via CAN2):

- > Local connection 1 (I-LB+ local address 1)
- > Local connection 2 (I-LB+ local address 2)
- > Modem connection 1 (I-LB+ modem address 1)
- > Modem connection 2 (I-LB+ modem address 2)

It is necessary to select which connection type(s) particular I-LB+ is using.

## Available combinations of I-LB+ modules

There are four of communication channels available on the CAN2 link at the same time.

I-LB+ module	DIRECT/ MODEM jumper	ADR1/ ADR2 jumper	channel 1 (local con. 1)	channel 2 (local con. 2)	channel 3 (modem con. 1)	channel 4 (***) (modem con. 2)
<i>Connection possibilities of only I-LB+ in following eight examples</i>						
1.	I-LB+ (*)	DIRECT	ADR1	RS232/485	-	-
2.	I-LB+ (*)	DIRECT	ADR2	-	RS232/485	-
3.	I-LB+ (*)	MODEM	ADR1	-	-	RS232-modem
4.	I-LB+ (*)	MODEM	ADR2	-	-	RS232-modem
5.	I-LB+	DIRECT	ADR1	RS232/485	USB	-
6.	I-LB+	DIRECT	ADR2	USB	RS232/485	-
7.	I-LB+	MODEM	ADR1	-	USB	RS232-modem
8.	I-LB+	MODEM	ADR2	USB	-	RS232-modem
<i>Connection possibilities of both I-LB+ (**) in following four examples</i>						
9.	I-LB+ (*)	DIRECT	ADR1	RS232/485	-	-
	I-LB+	MODEM	ADR1	-	USB	RS232-modem
10.	I-LB+ (*)	MODEM	ADR1	-	-	RS232-modem
	I-LB+	DIRECT	ADR1	RS232/485	USB	-
11.	I-LB+ (*)	MODEM	ADR1	-	-	RS232-modem
	I-LB+	MODEM	ADR2	USB	-	RS232-modem
12.	I-LB+	MODEM	ADR1	-	USB	RS232-modem
	I-LB+	MODEM	ADR2	USB	-	RS232-modem

(\*) – USB interface is disabled

(\*\*) – there can be max. two of I-LB+ on the CAN2 link.

(\*\*\*) – available for IG-NT, IS-NT controllers only, not for ID, IG, IS, IL-NT

## Modbus communication via I-LB+

To use I-LB+ modbus communication connect Modbus jumper in I-LB+ unit. Additionally, you can choose the communication speed using the speed selection jumpers. Their combination allows the speed selection of 9600/19200/38400/57600 bps. Modbus is not supported via USB interface.

### 4.1.6 Technical data

<b>Dimension (W×H×D)</b>	95×96×43 mm (3.7'×3.8'×1.7')
<b>Interface to controller</b>	CAN
<b>Interface to modem or PC</b>	RS232, RS422, RS485, USB only I-LB+
<b>Power supply</b>	8 to 36 V DC
<b>Analog outputs refreshment</b>	Max. 300 ms
<b>Current consumption</b>	100mA at 24 V
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C

🔍 back to I-LB+

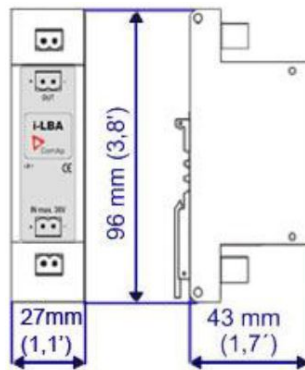


## 4.2 i-LBA



### 4.2.1 Description

For the connections with 12VDC power supply an i-LBA module can be connected to controller power terminals in order to allow the controller to continue operation during cranking if the battery voltage dip occurs.



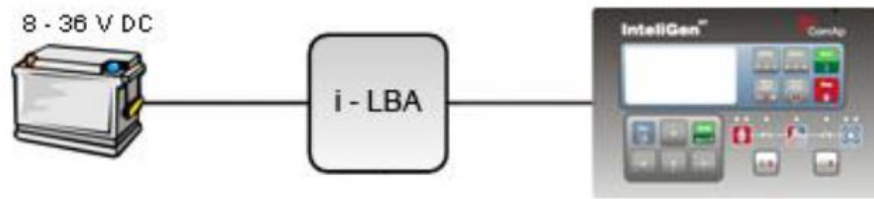
**Note:** Unit is 35 mm DIN rail mounted.

### 4.2.2 Connectors



POWER in	Power supply from battery
POWER out	Power supply to controller

## 4.2.3 Wiring



## 4.2.4 Technical data

<b>Dimension (W×H×D)</b>	27×96×43 mm (1.1'×3.8'×1.7')
<b>Outputs</b>	8 to 36 V DC, no galvanic separation
<b>Internal resistance</b>	Under 0.2 ohm
<b>Power supply</b>	8 to 36 V DC
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C

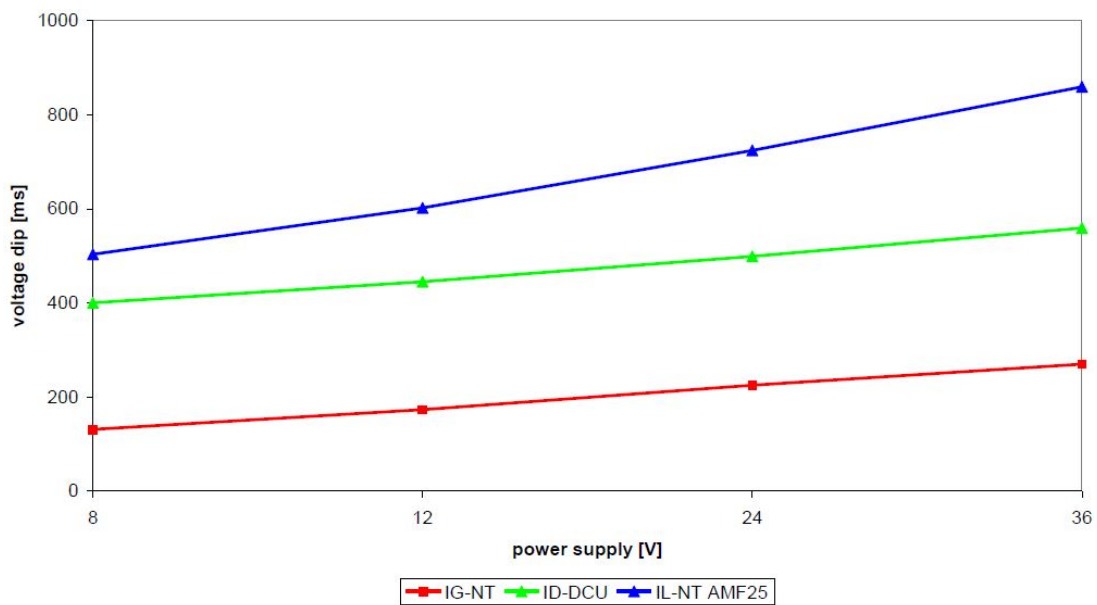


Image 4.1 Voltage dip recovery

[back to i-LBA](#)

## 4.3 I-RB8/I-RB16/I-RB8-231/I-RB16-231



### 4.3.1 Description

Relay board contains 8 or 16 relays for binary (open collector) output separation. All relays are placed in sockets.

	I-RB8	I-RB16	I-RB8-231	I-RB16-231
<b>Number of relays</b>	8	16	8	16
<b>Nominal voltage [V] DC</b>	24	24	230	230
<b>Maximal load</b>	16A resistive load, 4A inductive load			

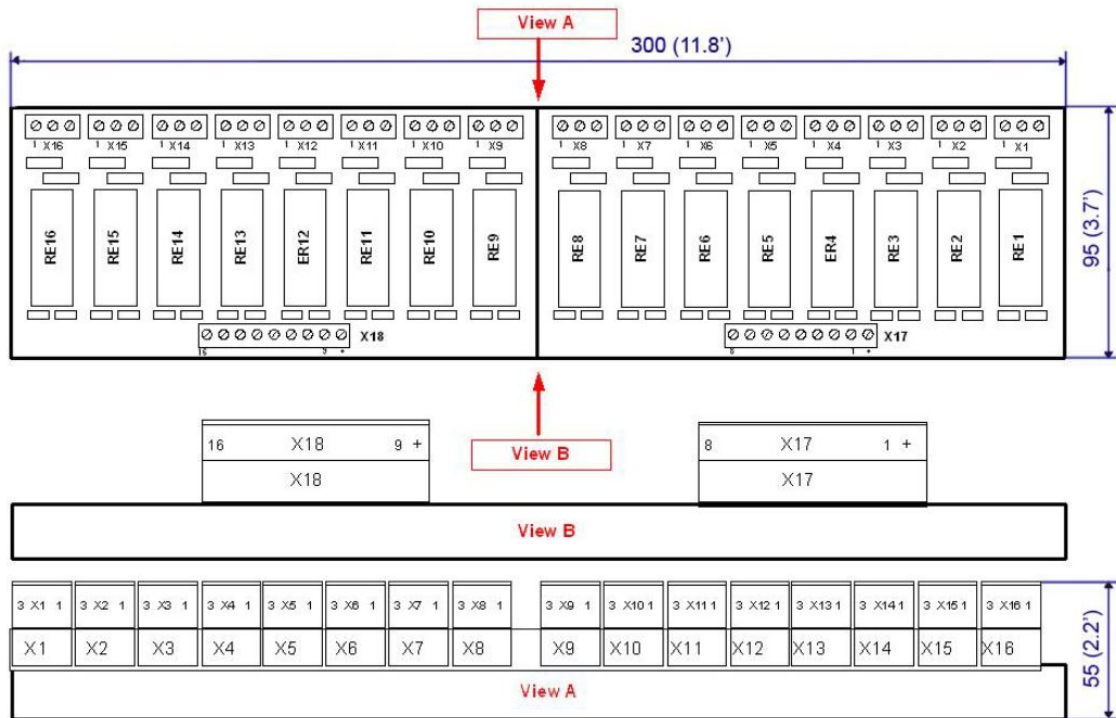


Image 4.2 Unit is 35 mm DIN rail mounted.

### 4.3.2 Connectors



O1-O16	Relay connector
INPUT1 INPUT2	Input signals

### 4.3.3 LEDs indication

Each relay has LED which lights when n.o. relay's connector is closed. This LED is dark when n.o. relay's connector is open. I-RB8, I-RB8-231 has 8 LEDs and I-RB16, I-RB16-231 has 16 LEDs.

### 4.3.4 Wiring

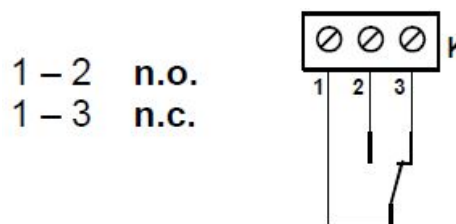



Image 4.3 Relay-connector connection

### 4.3.5 Technical data

<b>Dimension (W×H×D)</b>	300×95×55 mm (11.8'×7.7'×2.2')
<b>Outputs</b>	Max. switched current 16A DC, 4A AC Max. switched voltage 24V DC, 230V AC*
<b>Voltage range</b>	16.8 – 36V DC
<b>Relay opens</b>	At 10% of nominal voltage
<b>Electric/mechanic cycles</b>	100 000 (when switching 16A) / 10 000 000
<b>Contacts protection</b>	varistor 14DK390
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	30 °C to + 70 °C

**Note:**

\* - only I-RB8-231, IRB-16-231

 [back to I-RB8/I-RB16/I-RB8-231/I-RB16-231](#)

## 4.4 IG-IOM

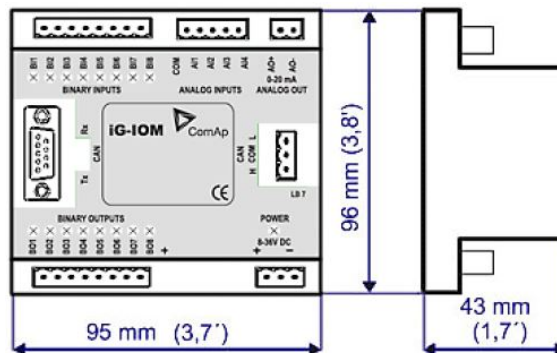


### 4.4.1 Description

IG-IOM modules are I/O extension modules equipped with 8 binary inputs, 8 binary outputs, 4 analog inputs and one analog output. The module can be used for only MRS15/16 and AMF 25 from IL-NT family.

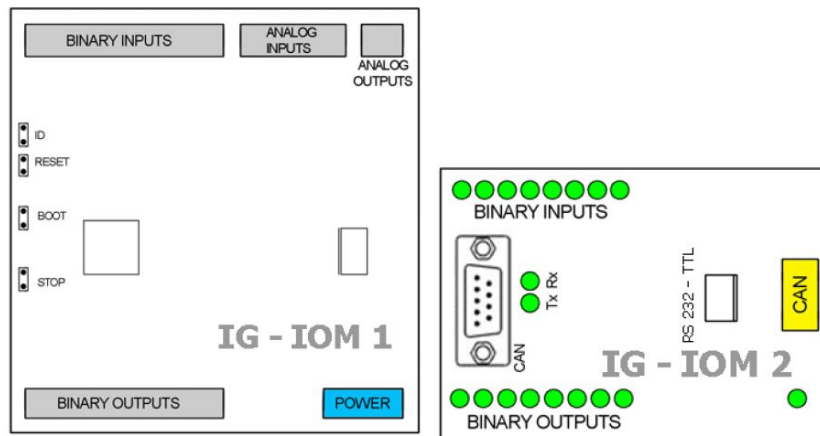
- Binary inputs and outputs are configurable the same way like inputs and outputs on controller.
- The protection of analog IOM inputs is activated by overcrossing the limits, active only when the engine is running.
- IG-IOM analog inputs are resistive (the same parameters like controller) 0 Ω-2,4 kΩ. The module IOM is designed for especially VDO resistive sensors.

### 4.4.2 Dimensions



**Note:** Unit is 35 mm DIN rail mounted.

## 4.4.3 Terminals



BINARY INPUTS	8 binary input
ANALOG INPUTS	4 analog input
ANALOG OUTPUTS	1 analog output
BINARY OUTPUTS	8 binary output
CAN	CAN1 line
RS232-TTL	Interface for programming
POWER	Power supply
BINARY INPUTS	8 LEDs for binary input indication
BINARY OUTPUTS	8 LEDs for binary output indication
Tx, Rx	Indication transmitted or received data
POWER	Power supply LED indication
STOP	Service jumper
BOOT	Programming
RESET	Programming/Reset
ID	Service jumper

## 4.4.4 Address and jumpers setting

### Programming Firmware

Firmware upgrade is via AT-link (TTL). For programming is necessary to close jumper BOOT. RESET jumper is used to reset the device. Close jumper to reset the device. For programming is used FlashProg PC tool.

## 4.4.5 LED indication

### Binary inputs

Each binary input has LED which indicates input signal. LED is shining when input signal is set, and LED is dark while input signal has other state.

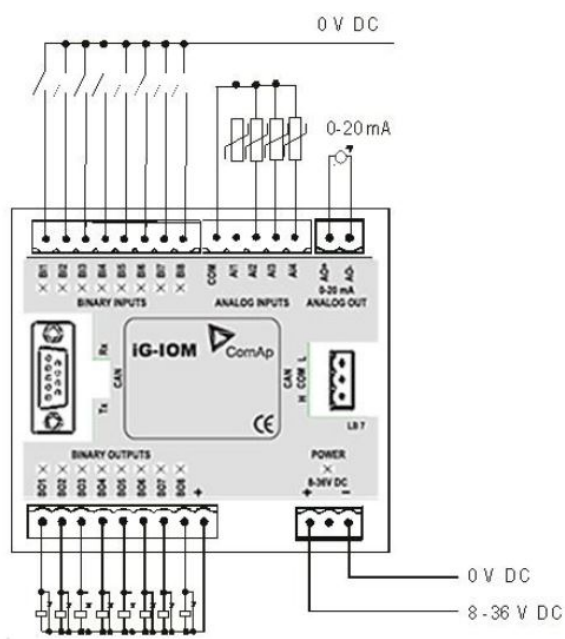
## Binary outputs

Binary output LED shining when binary output is set.

## Power

Power LED shining when power supply is connected.

### 4.4.6 Wiring



### 4.4.7 Technical data

<b>Dimension (W×H×D)</b>	95×96×43 mm (3.7'×3.8'×1.7')	
<b>Binary inputs</b>	Input resistance	4700 ohm
	Input range	0 to 36V DC
	Switching voltage level for open contact indication	0 to 2V
	Max voltage level for open contact indication	8 to 36V
<b>Binary outputs (Open collector outputs)</b>	Max current	500mA
	Max switching voltage	36V DC
<b>Analog inputs (Not electric separated)</b>	Resolution	10 bits
	Sensor resistance range	0 to 2400 ohm
	Resistance measurement tolerance	4 % ± 2 ohm out of measured value
<b>Analog output (Not electric separated)</b>	Output current	0 to 20 mA
	resolution	10 bit
<b>Power supply</b>	8 to 36 V DC	



<b>Current cons</b>	100 mA at 24V ÷ 500 mA
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C

[▲ back to IG-IOM](#)

## 4.5 IGS-PTM

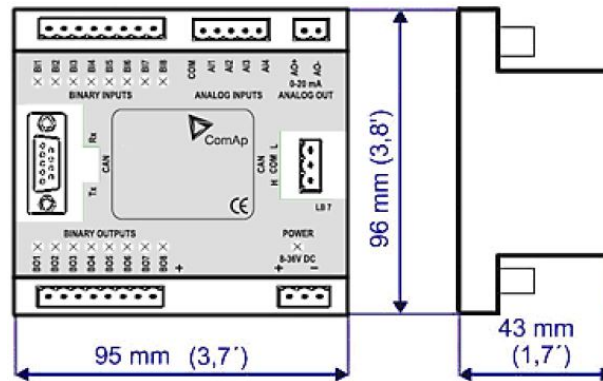


### 4.5.1 Description

IGS-PTM is modification of standard IG-IOM module with four analog inputs, which can be configured for range:

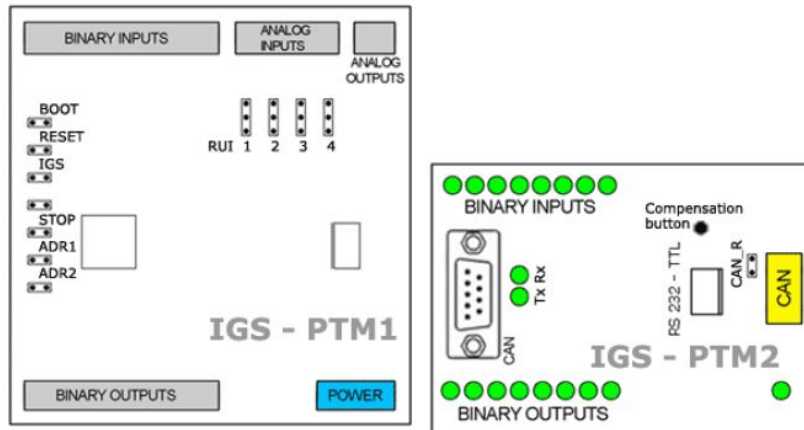
- > 0 – 250  $\Omega$  (suitable for Pt100, Ni100)
- > 0 – 100 mV
- > 0/4 – 20 mA

### 4.5.2 Dimensions



**Note:** Unit is 35 mm DIN rail mounted.

## 4.5.3 Terminals



BINARY INPUTS	8 binary input
ANALOG INPUTS	4 analog input
ANALOG OUTPUTS	1 analog output
BINARY OUTPUTS	8 binary output
CAN	CAN1 line
RS232-TTL	Interface for programming
POWER	Power supply
BINARY INPUTS	8 LEDs for binary input indication
BINARY OUTPUTS	8 LEDs for binary output indication
Tx, Rx	Indication transmitted or received data
POWER	Power supply LED indication
CAN_R	Terminating CAN resistor
RUI	Analog inputs configuration
RESET	Programming/reset
BOOT	Programming
IGS	Controller type selection
STOP	Service jumper
ADR1	Module's address offset 1,2
ADR2	
Compensation button	Long wires resistance compensation

**Note:** Configuration jumpers IGS, ADR1, ADR2 are OPEN by default.  
 CAN\_R jumper is CLOSE by default (IG-IOM mode).  
 Analog inputs are configured for resistance measurement by default.

## 4.5.4 Address and jumpers setting

### Controller type selection

The type of controller to be used with IGS-PTM must be selected via jumper labeled IGS accessible at the lower PCB.

IGS jumper	Controller type
OPEN	IL-NT, IC-NT
CLOSE	IG-NT, IS-NT, IM-NT, ID

### Address configur

If IS-NT controller type is selected (by IGS jumper), address of IGS-PTM could be modified via jumpers labeled ADR1 and ADR2.

ADR1	ADR2	ADR offset	BIN module	BOUT module	AIN module
Open	Open	0 (default)	1	1	1
Close	Open	1	2	2	2
Open	Close	2	3	3	3
Close	Close	3	4	4	4

### Analog inputs hardware configuration

Analog inputs can be configured for:

- > Resistance measurement
- > Current measurement
- > Voltage measurement

The type of analog inputs is configured via jumpers RUI located on lower PCB.

RUI	Analog input configuration
1 – 2	Resistance measuring
2 – 3	Current measuring
no jumper	Voltage measuring

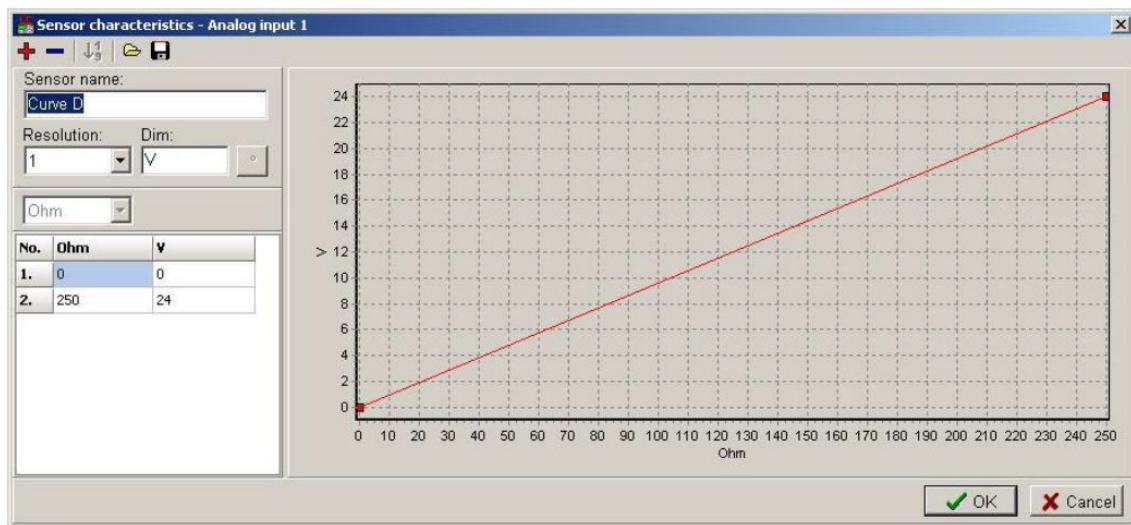
### Sensor characteristic

The controller provides the same user curves for analog inputs on both Inteli-NT controller and PTM. However, the physical measuring range of PTM is different from the one of the controller - the voltage range used on controller is 2.5 V, but on PTM, it is 100 mV. The curves are optimized for resistive sensors with maximum range 250 Ohm. When the same curves are used for voltage sensor, the maximum range must be entered as 250 Ohm, what in fact corresponds to the 100 mV real measurement range. See example in the picture for converting 100 mV measured voltage to 24 V converted value, displayed on controller screen.

**Note:** It is not possible to use default sensor characteristics (Pt1000, Ni1000 and VDO Temp) because of IGS-PTM measuring range is up to 250 ohms. Sensor characteristics A,B,C can be modified for measuring in range 0-20mA/100, 0-20mA/60, 4-20mA/100, 4-20mA/60 (or different) – see tables below:

<b>Pt100 Resistance [Ω]</b>	<b>Temperature [°C]</b>	<b>Ni100 Resistance [Ω]</b>	<b>Temperature [°C]</b>
92	-20.5	83	-20.6
100	0.0	90	-0.8
108	20.5	97	18.9
116	41.3	105	40.3
123	59.5	113	60.5
131	80.3	121	79.5
139	101.3	130	100.0
146	119.7	139	120.0
154	141.1	148	139.2
169	181.4	169	179.3

Table 4.1 Table of conversion Pt100 or Ni100 resistance to temperature



<b>Current conversion table 20 mA/20.0 mA</b>	
<b>Primary</b>	<b>Converted</b>
0	00
40	42
60	63
80	83
100	104

<b>Voltage conversion table 100 mV/100.0 mV</b>	
<b>Primary</b>	<b>Converted</b>
0	00
10	41
40	163
70	285
110	446

<b>Current conversion table 20 mA/100.0</b>	
<b>Primary</b>	<b>Converted</b>
0	0
38	20
57	30
77	40
96	50

Current conversion table 20 mA/20.0 mA	
Primary	Converted
115	119
135	140
155	160
175	181
195	201

Voltage conversion table 100 mV/100.0 mV	
Primary	Converted
140	566
170	685
210	842
230	921
250	999

Current conversion table 20 mA/100.0	
Primary	Converted
116	60
135	70
155	80
174	90
194	100

Current conversion table 20 mA/60.0	
Primary	Converted
0	0
38	12
57	18
77	24
96	30
116	36
135	42
155	28
174	54
194	60

Current conversion table 4-20 mA/100.0	
Primary	Converted
38	0
54	10
77	25
100	40
116	50
139	65
155	75
178	90
194	100

Voltage conversion table 4-20 mV/60.0	
Primary	Converted
38	0
54	6
77	15
100	24
116	30
139	39
155	45
178	54
194	60

**Note:**

1. If other sensor not included from this list is configured, the unit returns sensor fail.
2. PC software tool configuration must correspond to jumpers setting.
3. Do not configure inputs 5 – 8 of analog inputs module in PC software tool - Analog inputs.
4. Do not configure outputs 2-8 of analog outputs module in PC software tool - Analog outputs.

## Programming Firmware

Firmware upgrade is via AT-link (TTL). For programming is necessary to close jumper BOOT. RESET jumper is used to reset the device. Close jumper to reset the device. For programming is used FlashProg PC tool.

### 4.5.5 LED indication

#### Binary inputs

Each binary input has LED which indicates input signal. LED is shining when input signal is set, and LED is dark while input signal has other state.

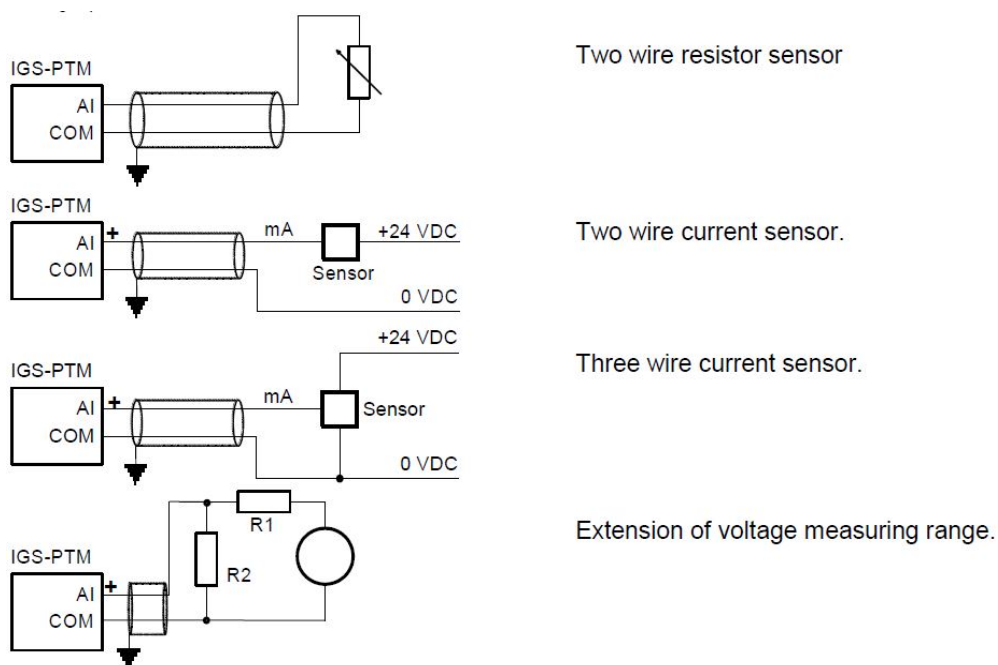
#### Binary outputs

Binary output LED shining when binary output is set.

## Power

LED status	Description
Dark	No required power connected
Quick flashing	Program check failure
One flash and pause	Compensation fail
Three flashes and pause	Compensation successful
Flashes	There is no communication between IGS-PTM and the controller.
Lights	Power supply is in the range and communication between IGS-PTM and controller properly works.

### 4.5.6 Wiring

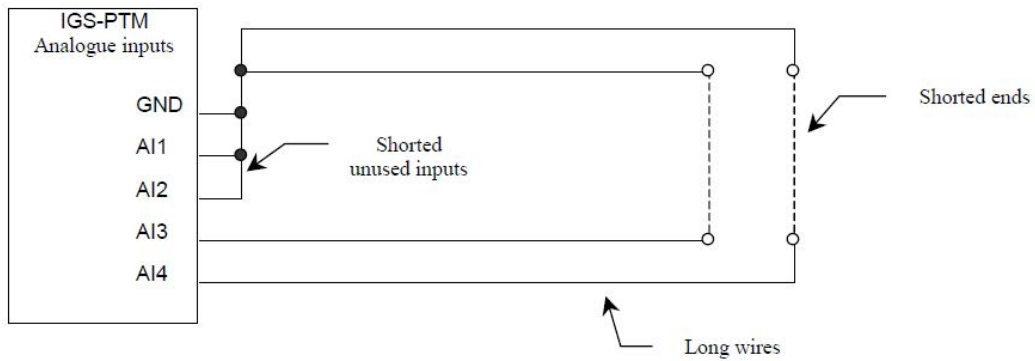


**Note:** It is not necessary to connect analog inputs COM terminal to negative power supply.

### Long wires resistance compensation

Process of compensation:

- > Short all wires to analog sensors at the end (replace sensors with shorting links).
- > Hold the compensation button on IGS-PTM through the hole in upper cover when switching IGS-PTM on.
- > Result of compensation will be shown in 2 seconds by flashing of POWER LED.
  - >> One flash and pause – compensation fail.
  - >> Three flashes and pause – compensation success.
- > Measured lead's resistance is stored in EEPROM memory (separate value for each input) and is subtracted from measured value when resistance measuring.



**Note:** Maximum resistance of two leads (from IGS-PTM to sensor and back) can be 20  $\Omega$ . Otherwise the compensation fails. Unused analog inputs must be shorted at the IGS-PTM.

## 4.5.7 Technical data

<b>Dimension (W×H×D)</b>	95×96×43 mm (3.7'×3.8'×1.7')	
<b>Binary inputs</b>	Input resistance	4700 ohm
	Input range	0 to 36V DC
	Switching voltage level for open contact indication	0 to 2V
	Max voltage level for open contact indication	8 to 36V
<b>Binary outputs (Open collector outputs)</b>	Max current	500mA
	Max switching voltage	36V DC
	Resolution	10 bits
	Sensor resistance range	0 to 250 ohm
<b>Analog inputs (Not electric separated)</b>	Maximal voltage range	0 to 100 mV
	Maximal current range	0 to 20 mA
	Resistance measurement tolerance	1 % ± 2 ohm out of measured value
	Voltage measurement tolerance	1.5 % ± 1 mV out of measured value
	Current measurement tolerance	2.5 % ± 0.5 ohm out of measured value
<b>Analog output (not electric separated)</b>	Output current	0 to 20 mA ± 0.33mA
	resolution	10 bit
<b>Power supply</b>	8 to 36 V DC	
<b>Protection</b>	IP20	
<b>Current consumption</b>	100 mA at 24V ÷ 500 mA	
<b>Storage temperature</b>	-40 °C to + 80 °C	
<b>Operating temperature</b>	- 30 °C to + 70 °C	

🔍 back to IGS-PTM



## 4.6 IG-MTU/IG-MTU-C/MTU-2-1

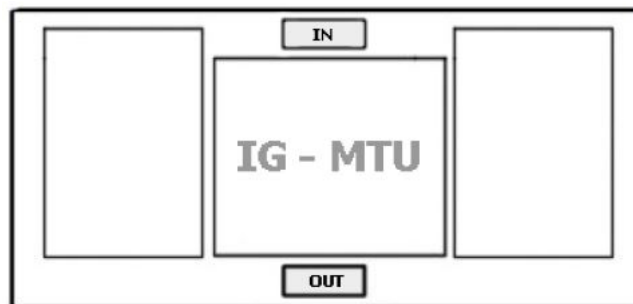


### 4.6.1 Description

Voltage transformer unit, for three wire system, system with separated Neutral or when galvanic separation between generator or mains voltage and controller is required.

- > IG-MTU with voltage ratio 1 : 1, conversion accuracy  $\pm 1.5\%$ , phase shift  $\pm 2^\circ$
- > IG-MTU-2-1 with voltage ratio 2 : 1, conversion accuracy  $\pm 1.5\%$ , phase shift  $\pm 2^\circ$
- > IG-MTU-C with voltage ratio 1 : 1, conversion accuracy  $\pm 3\%$ , phase shift  $\pm 3^\circ$ . Additional filter for the cases of extreme distortion of generator voltage by higher harmonics due to inverters etc.

### 4.6.2 Connectors



<b>IN</b>	Input voltage
<b>OUT</b>	Output voltage

### 4.6.3 Wiring

Connect one or two IG-MTU units to separate generator and Mains/bus voltage from controller.

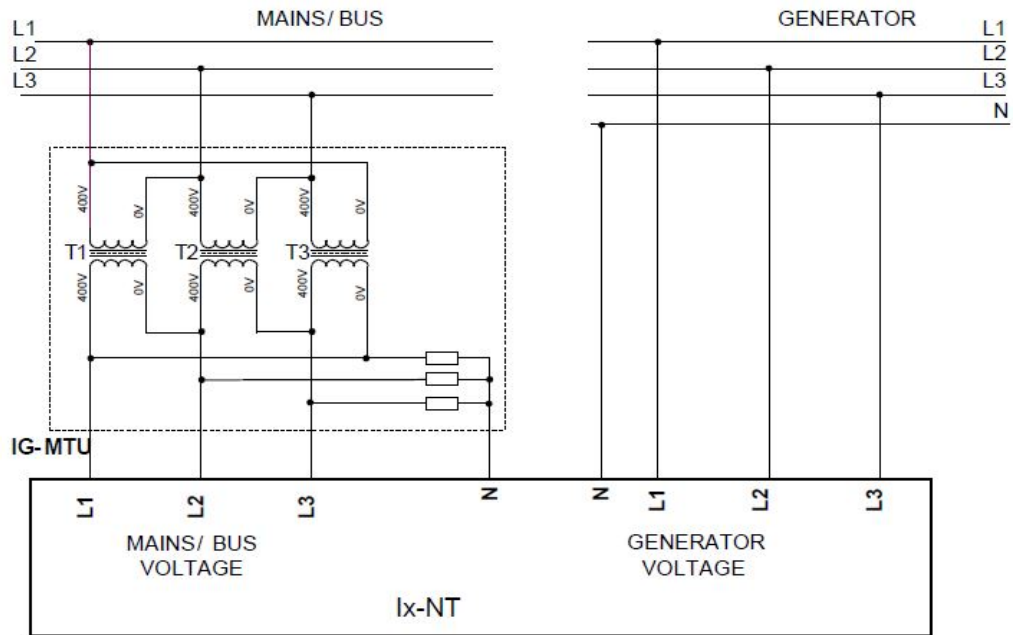


Image 4.4 Three wire mains

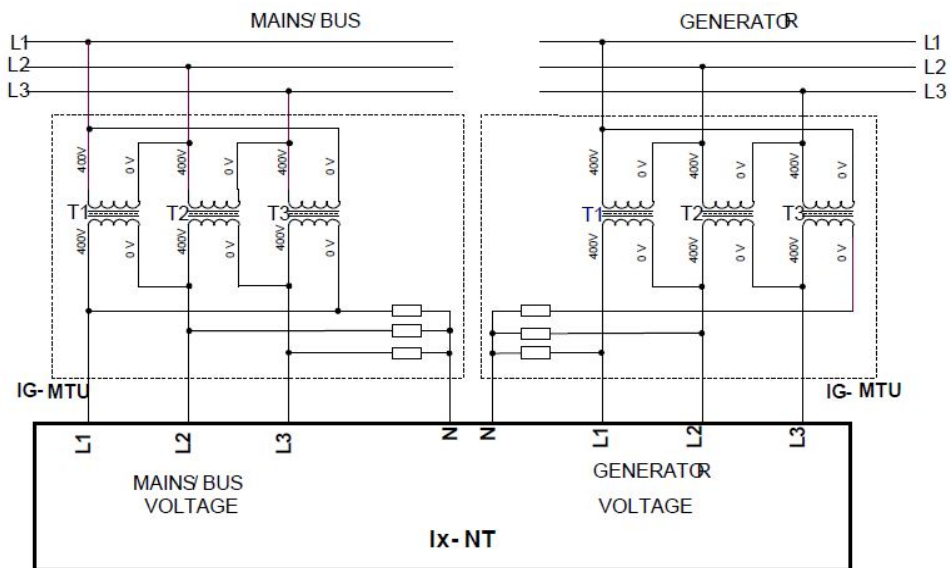
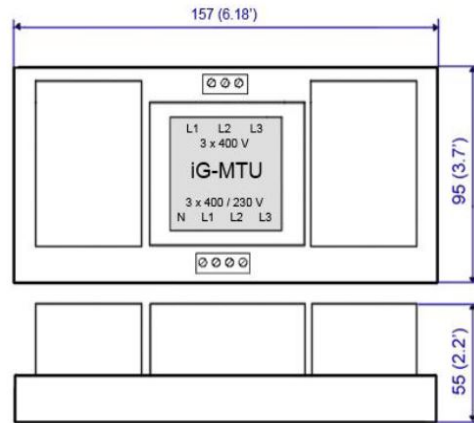


Image 4.5 Three wire mains and three wire gen-set or electric separation

**Note:** IG-MTU-C can be connected **only with classical line controllers!** We recommend connect IG-MTU and IG-MTU-2-1 only when is needed separated neutral or when is necessary galvanic separate mains/generator and controller.

🔍 back to Table of modules

## 4.6.4 Dimensions



Unit is 35 mm DIN rail mounted.

## 4.6.5 Technical data

<b>Dimension (W×H×D)</b>	157×55×95 mm (6.18'×2.2'×3.7')
<b>Interface to controller</b>	Direct mounted (SUB25)
<b>Primary voltage Ph-Ph</b>	3×400 VAC/50Hz (3×480 VAC/60 Hz) 3×600 VAC/50Hz (3×720 VAC/60 Hz)
<b>Secondary voltage Ph-N</b>	3× 230 V AC ( 3×277 VAC/60 Hz), 5 VA 3× 173 V AC ( 3×208 VAC/60 Hz), 5 VA
<b>Primary/secondary Phase shift</b>	± 2° ± 3°
<b>Conversion accuracy</b>	± 1.5% at 50Hz ± 3.0% at 50Hz
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C

🔍 back to [IG-MTU/IG-MTU-C/MTU-2-1](#)

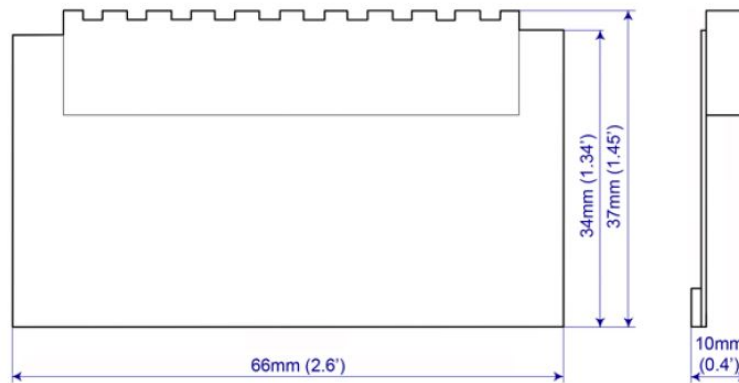
## 4.7 IL-NT-AOUT8



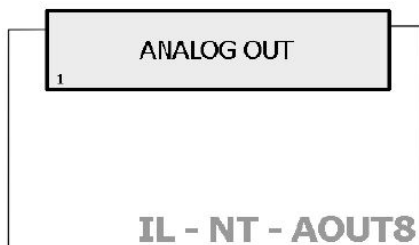
### 4.7.1 Description

Analog output module, optional plug in card IL-NT AOU8 provides eight Pulse-With-Modulation (PWM) outputs. These are intended to drive VDO style analog gauges. This is to provide visual indication of typically ECU values without installing additional sensors on the engine. PWM signal emulates sensor which would be typically mounted on the engine.

Any value from controller may be configured to the outputs. Use LiteEdit PC SW to configure corresponding sensor/gauge curve and value selection.



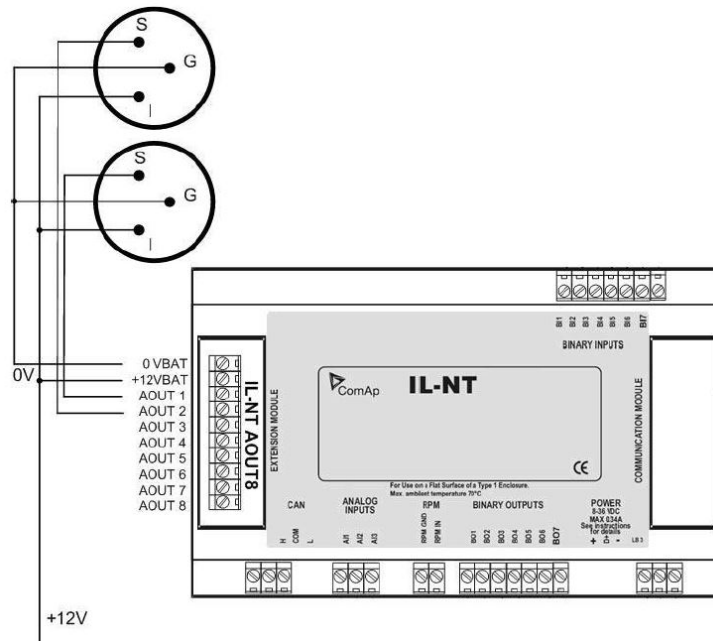
### 4.7.2 Connectors



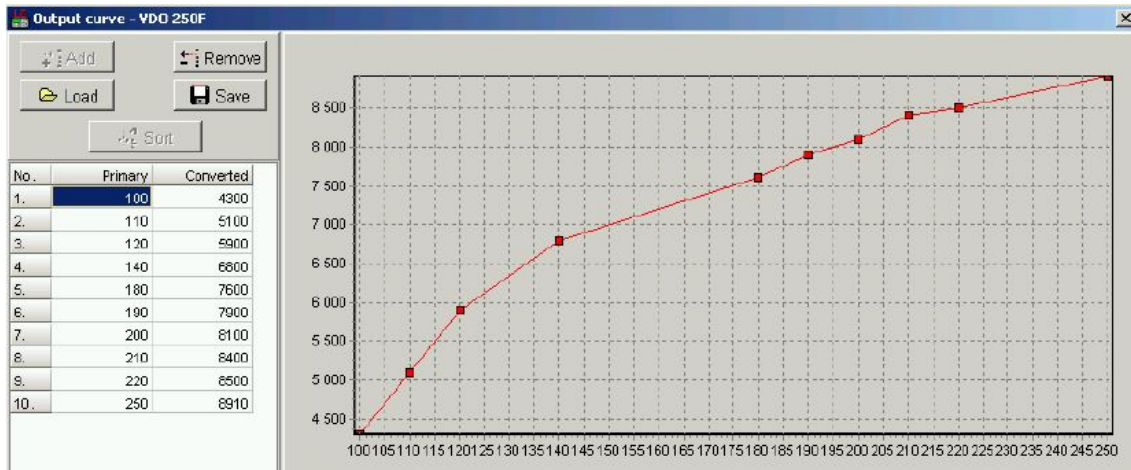
ANALOG OUT – port 2-10	Analog out for gauges
ANALOG – port OUT 1	GND
ANALOG – port OUT 2	Power supply voltage

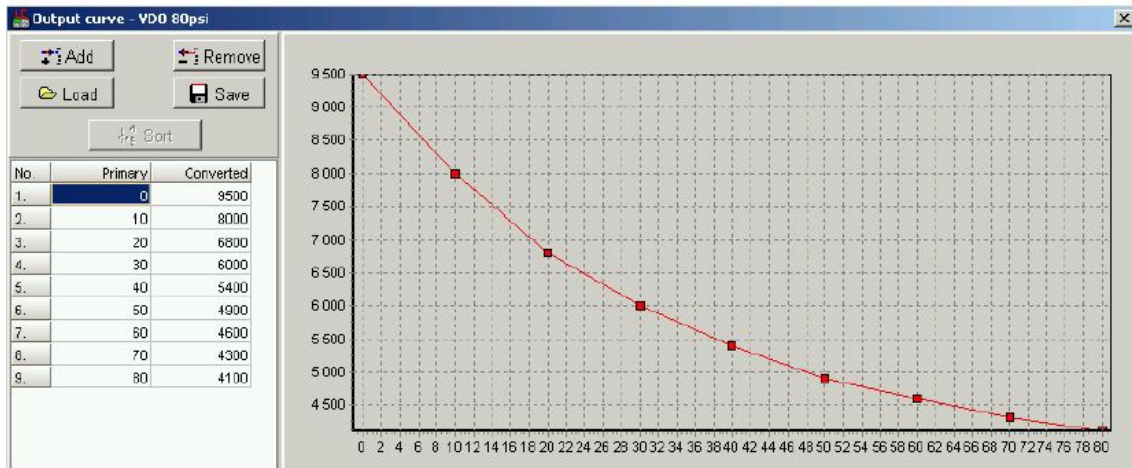
## 4.7.3 Wiring

### IL-NT-AOUT8 wiring example for Dacon gauges



### Example of default analog output curves



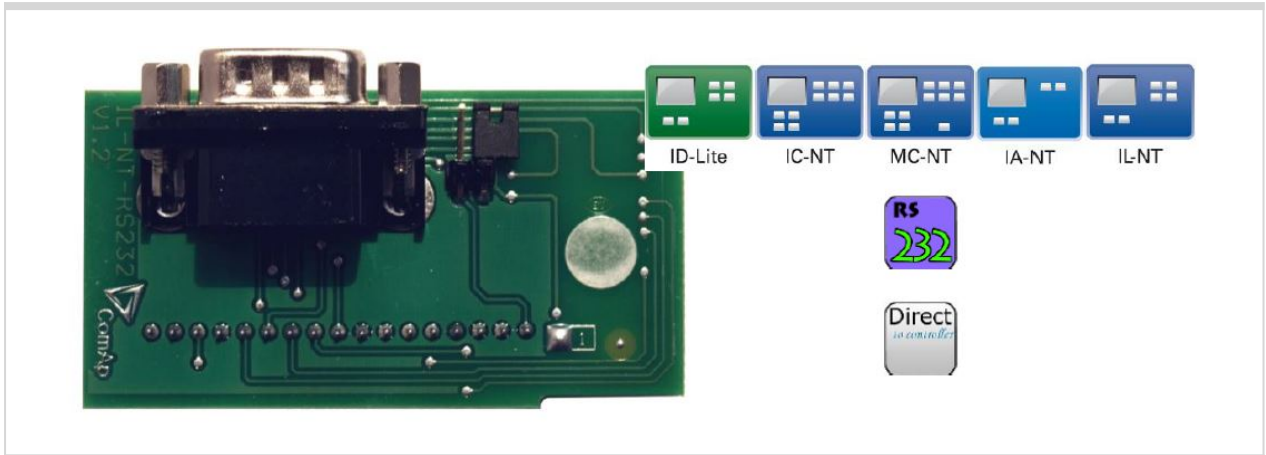


## 4.7.4 Technical data

<b>Dimension (W×H×D)</b>	66×37×10 mm (2.6'×1.45'×0.4')
<b>Interface to controller</b>	Direct mounted
<b>PWM output</b>	Open collector, max. 0.5A
<b>Power supply</b>	12 to 24V DC
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C

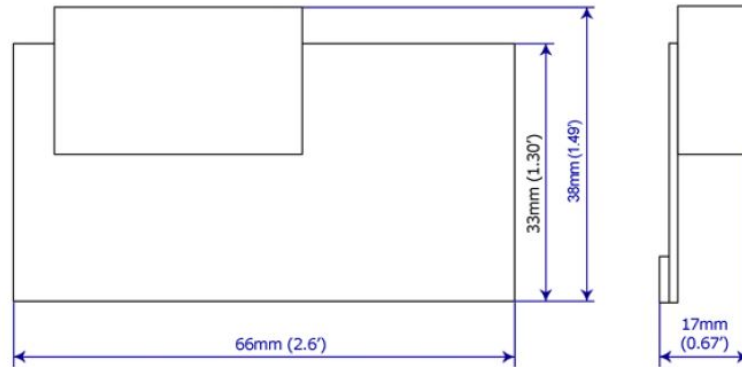
🔍 back to IL-NT-AOUT8

## 4.8 IL-NT-RS232

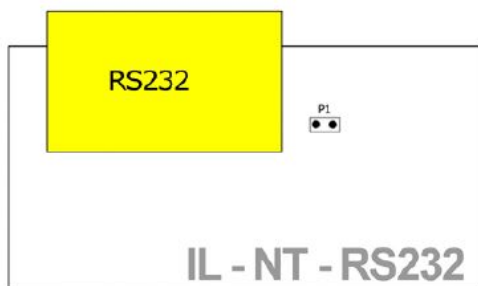


### 4.8.1 Description

Communication module, optional plug in card IL-NT RS232 provides additional serial interface for controller.

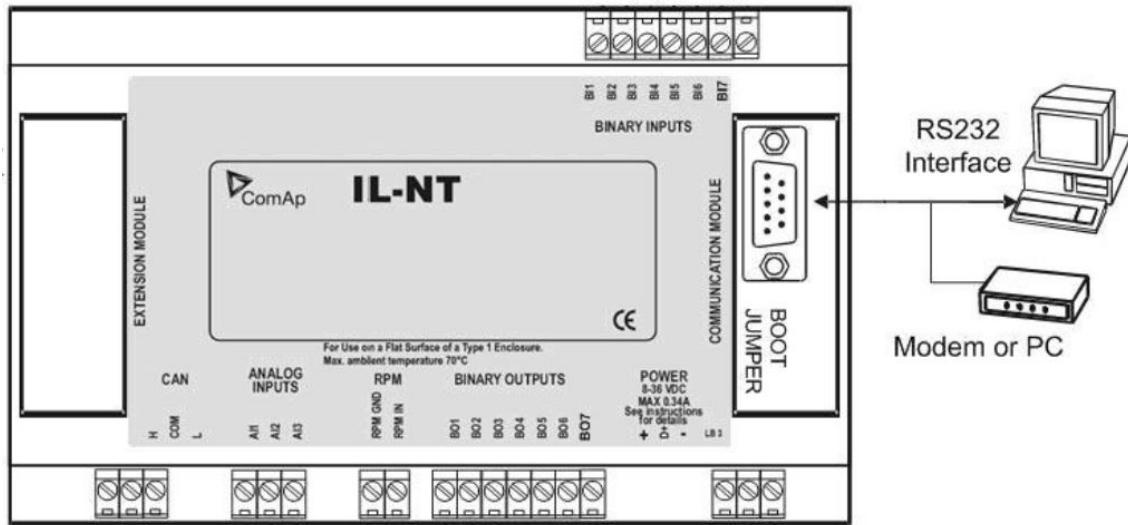


### 4.8.2 Connectors



RS232	RS232 line
P1	Programming

## 4.8.3 Wiring



## 4.8.4 Technical data

<b>Dimension (W×H×D)</b>	66×38×17 mm (2.6'×1.49'×0.67')
<b>Interface to controller</b>	Direct mounted
<b>RS232</b>	Standard RS232 communication interface
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C

🔍 [back to IL-NT-RS232](#)

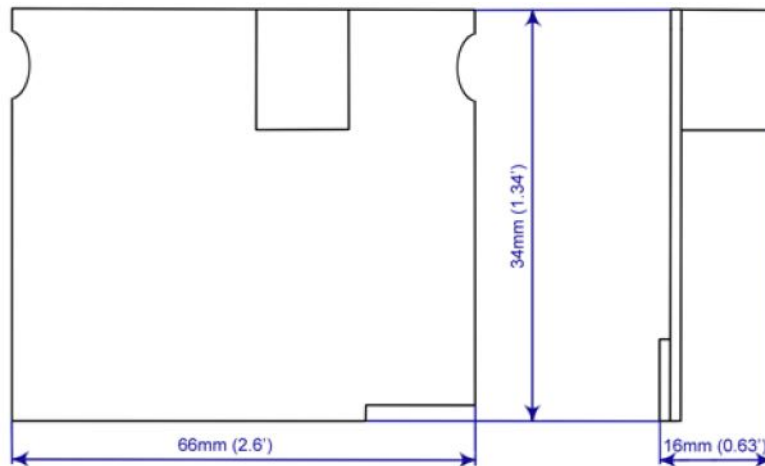


## 4.9 IL-NT-S-USB

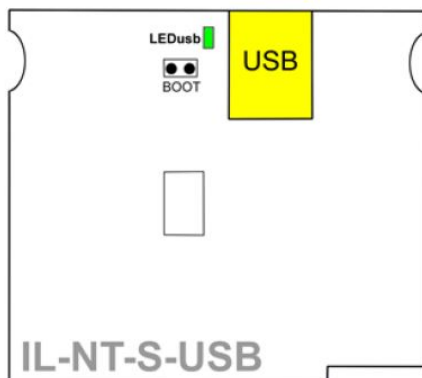


### 4.9.1 Description

Communication module, optional plug in card IL-NT USB provides additional USB interface for controller.



### 4.9.2 Connectors

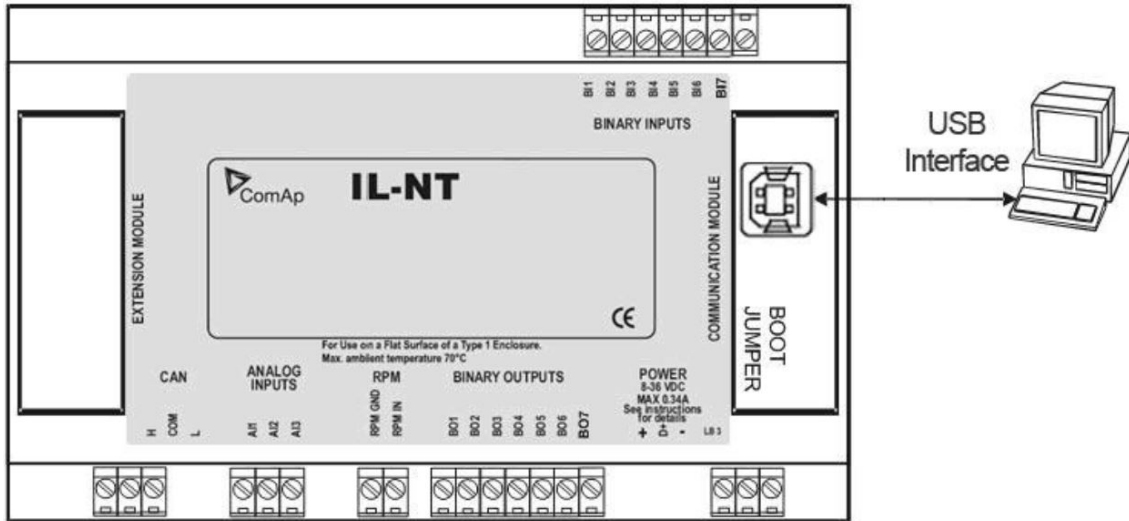


USB	RS232 line
LEDusb	Data on USB line (Rx and Tx)
BOOT	Programming

### 4.9.3 LED Indications

LEDusb indicates active communications on USB line. When LEDusb blink data are receiving or transmitting on USB line.

### 4.9.4 Wiring



### 4.9.5 Technical data

<b>Dimension (W×H×D)</b>	66×34×16 mm (2.6'×1.34'×0.63')
<b>Interface to controller</b>	Direct mounted
<b>USB</b>	Standard USB communication interface
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C

🔍 back to IL-NT-S-USB

## 4.10 IL-NT-FCM



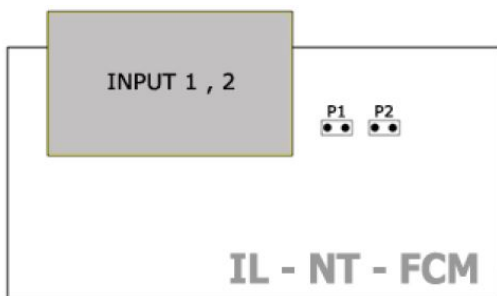
**Note:**

\* This module can be use only with InteliLog controller.

### 4.10.1 Description

InteliLog fuel counter module is optional plug-in card. Through this card controller can read rectangular signal on 2 inputs. The module has to be configured in LiteEdit software. The impulse inputs are used for evaluation of incrementing values FuelConH and FuelAutRefTot in group Fuel mgmt.

### 4.10.2 Connectors



INPUT1	Fuel consumption per hour
INPUT2	Absolute fuel inflow into tank
P1,P2	Input settings

### 4.10.3 Address and jumper setting

Module inputs can be set for voltage or open collector input signal. When jumper P1 is open, module input is sets to voltage input, jumper P2 is closed for open collector input. Jumper P1 configures input 1 and jumper P2 input 2.

## 4.10.4 Others information

### FuelManRefil [l]

<b>Setpoint group</b>	LiteEdit configuration		
<b>Range [units]</b>	-32 000 – 32 000 l		
<b>Default value</b>	0	<b>Force value Alternative config</b>	YES
<b>Step</b>	1 l		
<b>Comm object</b>		<b>Related applications</b>	AMF, MRS
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Actually refilled amount of fuel in liters. After editing this setpoint, its value is added to the actual value of counter FuelManRefTot in values group Fuel Mgmt and immediately reset to 0.			
<i>Note: Editation window of this setpoint is automatically entered after holding the button <b>Refil</b> on the unit panel for minimum 1 s.</i>			

### ConPulseRate [ppl]

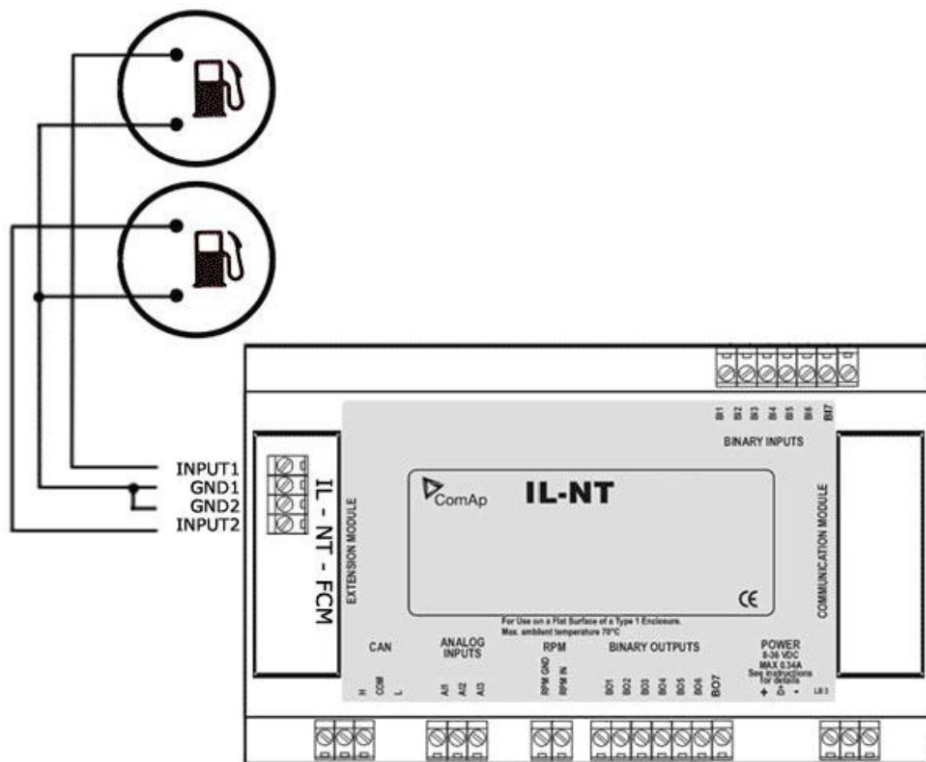
<b>Setpoint group</b>	LiteEdit configuration		
<b>Range [units]</b>	1 – 9999 ppl		
<b>Default value</b>	1	<b>Force value Alternative config</b>	YES
<b>Step</b>	1 ppl		
<b>Comm object</b>		<b>Related applications</b>	AMF, MRS
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
“Pulses per liter” constant of fuel flow sensor connected to the first pulse input of IL-NT-FCM module. By setting this constant, the proper counting of FuelConH value in values group Fuel Mgmt is provided, showing the hourly fuel consumption.			

### AuRefPulseRate [ppl]

<b>Setpoint group</b>	LiteEdit configuration		
<b>Range [units]</b>	1 – 9999 ppl		
<b>Default value</b>	1	<b>Force value Alternative config</b>	YES
<b>Step</b>	1 ppl		
<b>Comm object</b>		<b>Related applications</b>	AMF, MRS
<b>Config level</b>	Standard		

<b>Setpoint visibility</b>	Always
<b>Description</b>	<p>“Pulses per liter” constant of fuel flow sensor connected to the second pulse input of IL-NT-FCM module.</p> <p>By setting this constant, the proper counting of FuelAutrefTot value in values group Fuel Mgmt is provided, showing the total amount of fuel refilled through this sensor.</p>

### 4.10.5 Wiring

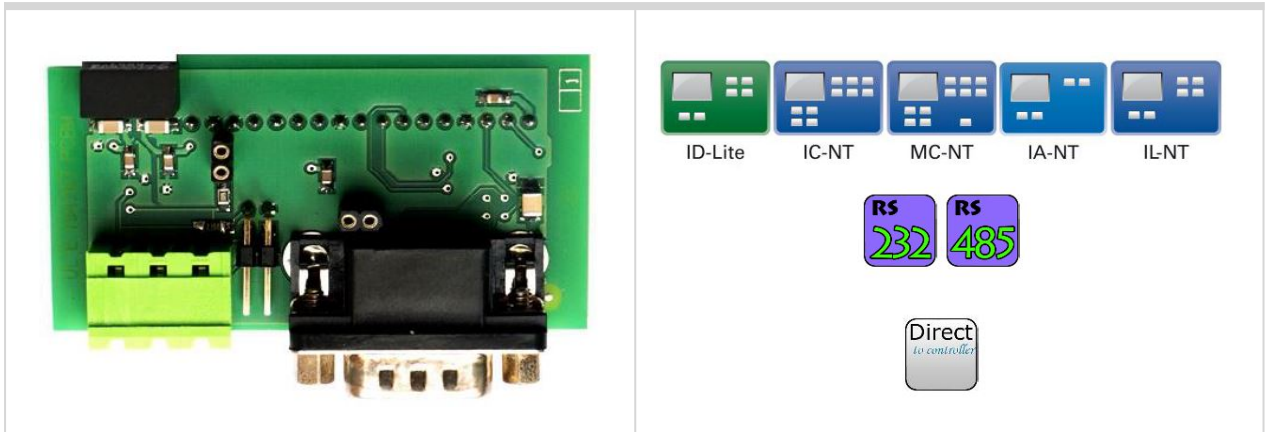


### 4.10.6 Technical data

<b>Dimension (W×H×D)</b>	66×34×16 mm (2.6'×1.34'×0.63')
<b>Interface to controller</b>	Direct mounted
<b>Pulse input</b>	Max 2kHz, input voltage 9 to 27Vpp
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C

[⬅ back to IL-NT-FCM](#)

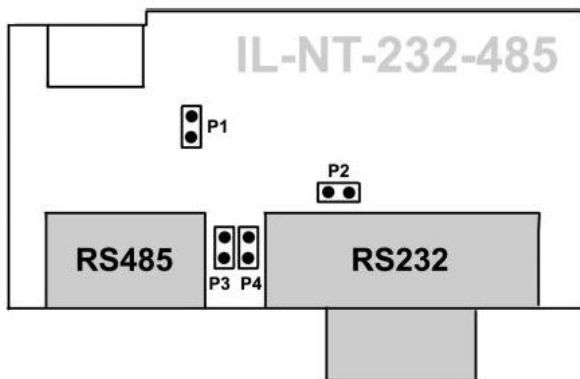
## 4.11 IL-NT-RS232-485



### 4.11.1 Description

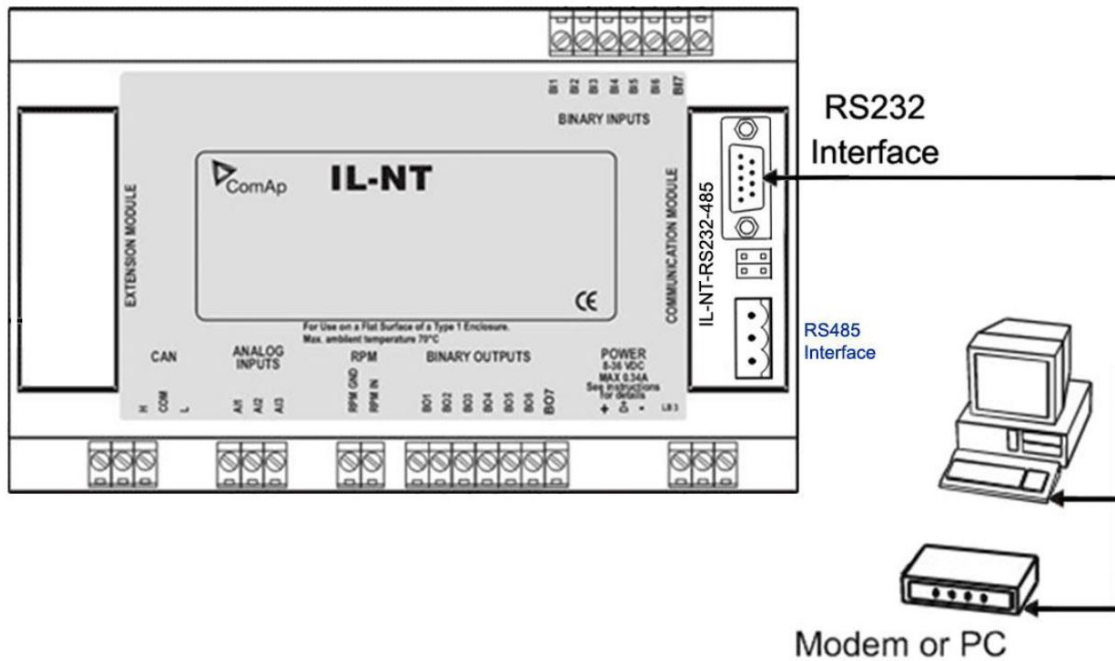
The IL-NT-RS-232-485 is a two port module with RS232 and RS485 interfaces at independent COM channels. The RS232 is connected to COM1 and RS485 to COM2.

### 4.11.2 Connectors



COM1	RS232 line
COM2	RS485 line
P1,P2	Balancing resistor
P3	Terminator jumper
P4	Boot jumper

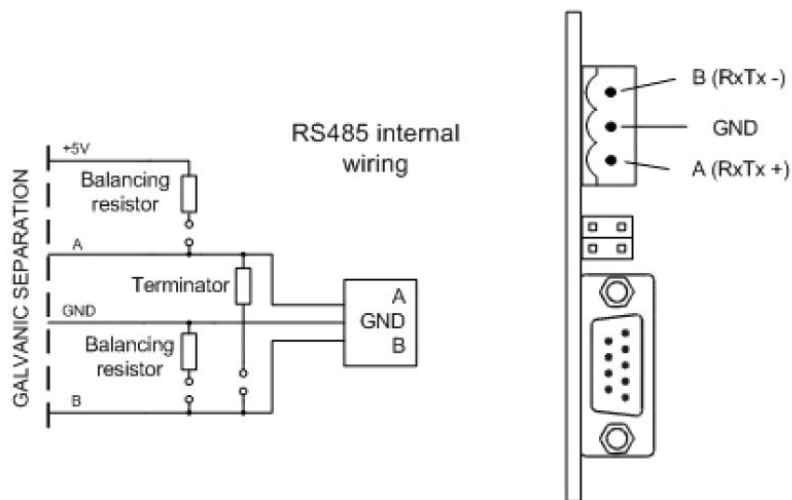
### 4.11.3 Wiring



### 4.11.4 Technical data

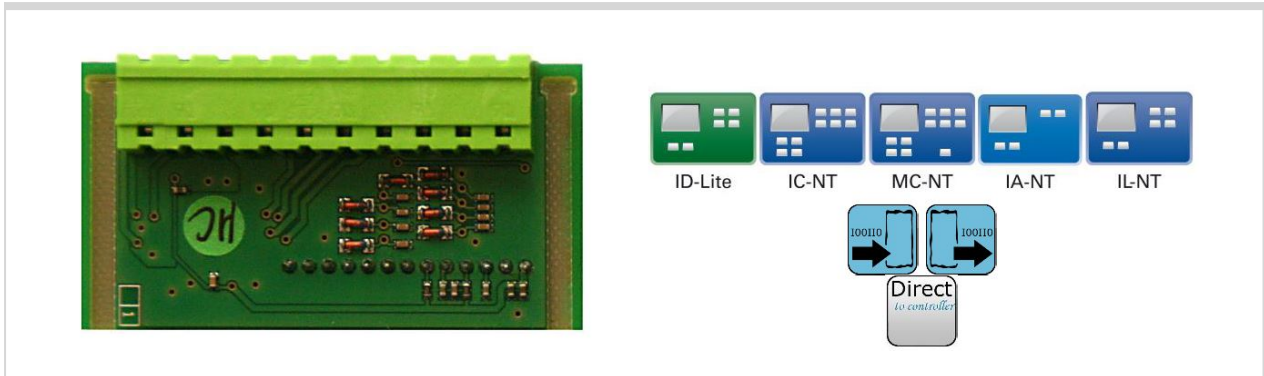
<b>Dimension (W×H×D)</b>	66×38×17 mm (2.6'×1.49'×0.67')
<b>Interface to controller</b>	Direct mounted
<b>RS232</b>	Standard communication interface
<b>RS485</b>	Standard communication interface
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C

**Note:** Communication speed is depends on controller type and its settings.



⬅ back to IL-NT-RS232-485

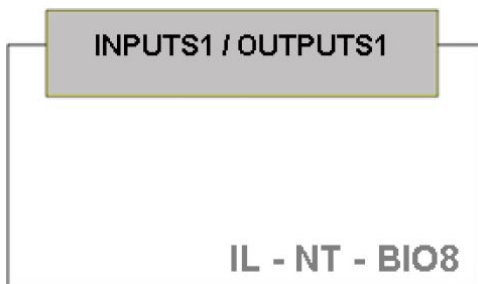
## 4.12 IL-NT-BIO8



### 4.12.1 Description

IL-NT BIO8 is optional plug-in module with 8 binary inputs or 8 binary open collector outputs. In LiteEdit PC tool (version 4.4 and higher) it is possible to easily choose and configure particular I/O will be binary input or output.

### 4.12.2 Connectors



INPUTS1	8 mixed binary inputs or
OUTPUTS1	outputs

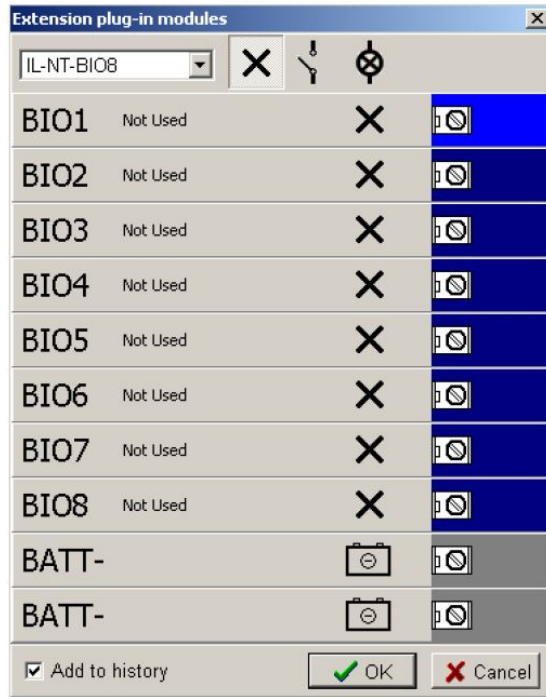
### 4.12.3 Address and jumper setting

There is no possibility to set address of module.



## 4.12.4 Others information

This module is configurable in LiteEdit – Modify configuration – Extension plug-in modules – IL-NT-BIO8.



## 4.12.5 Wiring

