Extension modules for IL-NT, IC-NT, ID-Lite genset or engine controllers, IA-NT

Accessory Modules

April 2011

Reference Guide

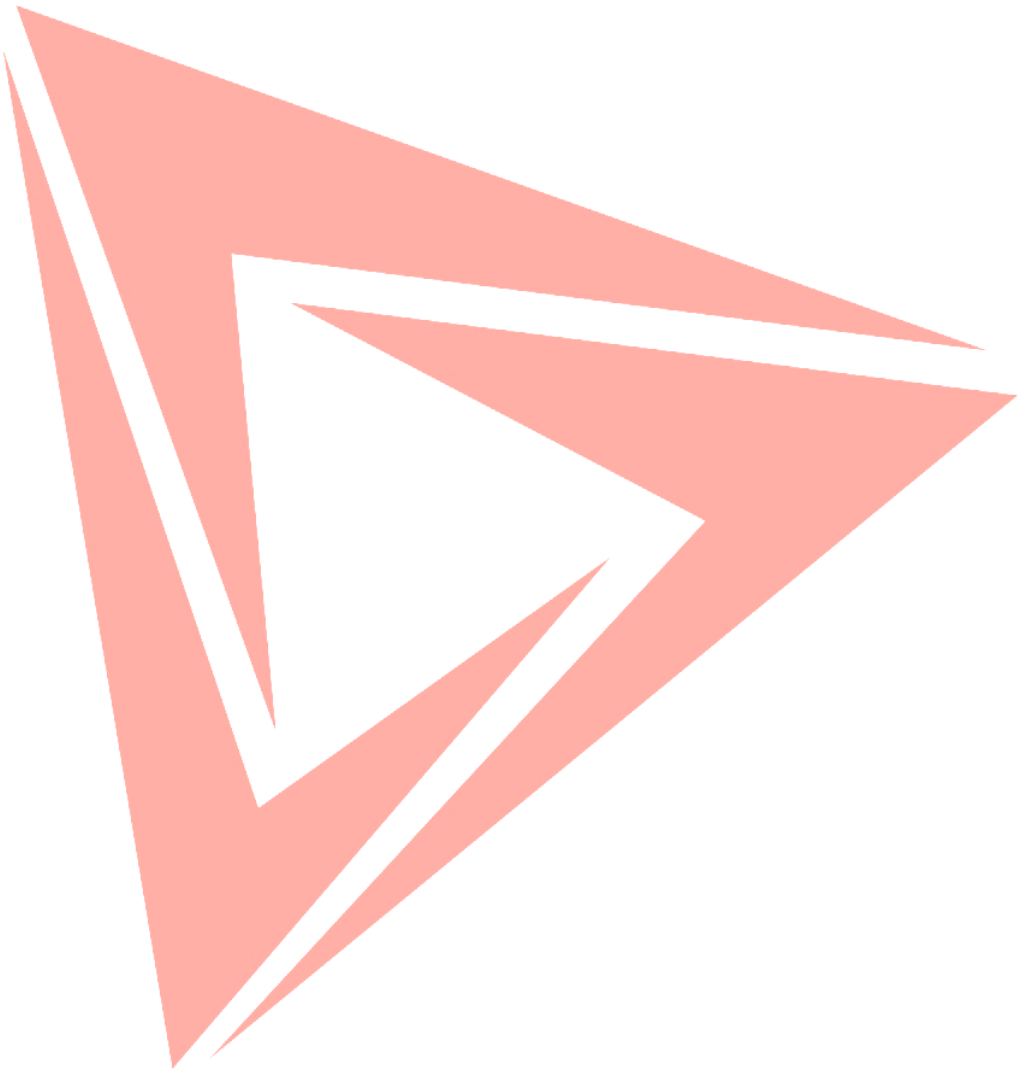

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Table of Contents

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

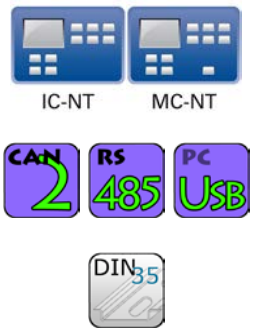
IL only MRS15, MRS16, AMF25
* only InteliLog

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

You can download these manuals from **http://www.comap.cz**

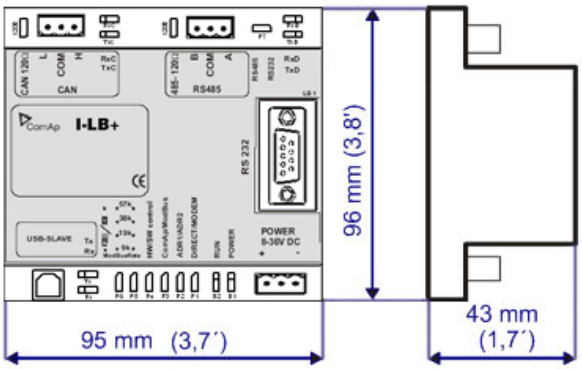
Modules

I-LB+



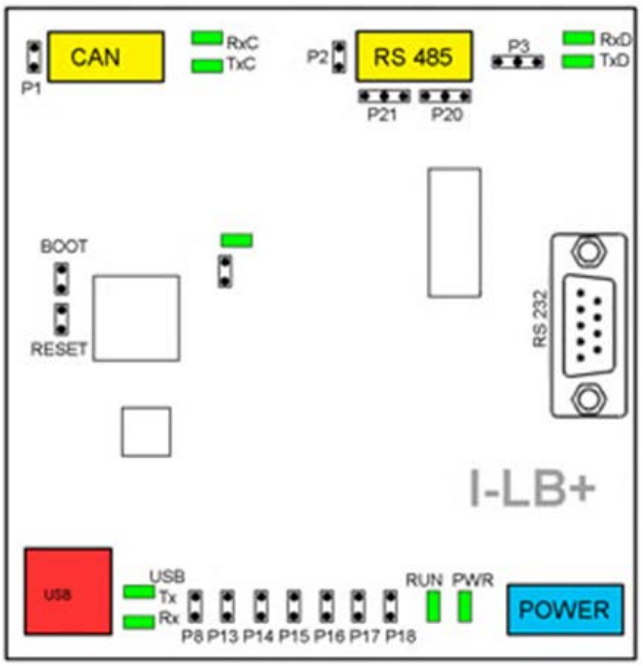
Description

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 ≈ 115200 bps).



Unit is 35 mm DIN rail mounted.

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*

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 actives.

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

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**!).

Default jumpers settings

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 protocol
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
  - **Modbus Rate** (9600 / 19200 / 38400 / 57600 bps) – selects the communication speed when Modbus protocol is selected, no matter if in Direct or Modem 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).

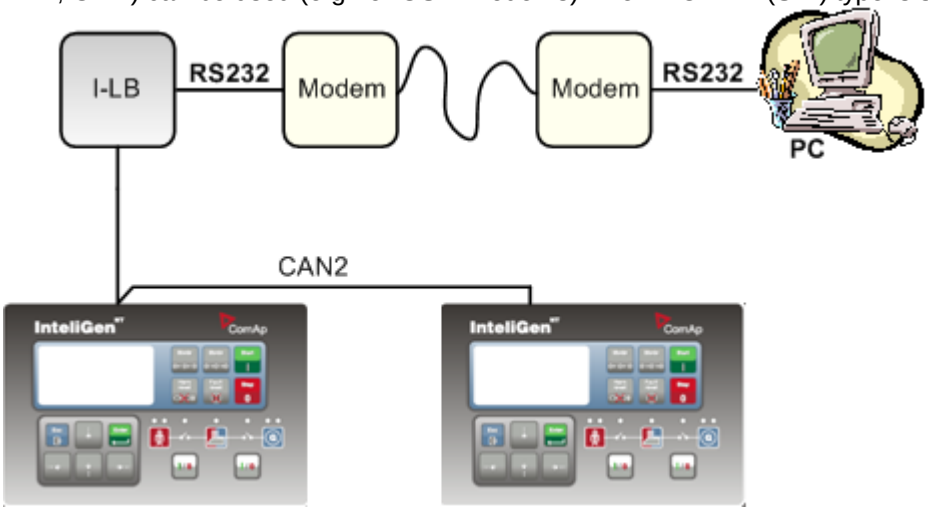
LEDs indication

LEDs indication

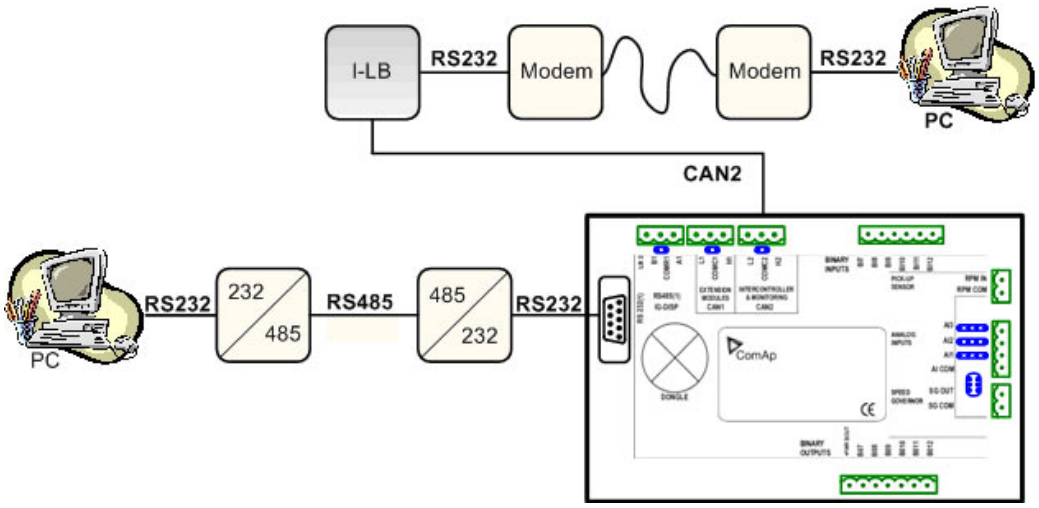
LED	Description	State
RxC	No data are received on the CAN line	Dark
	Data are received on the CAN line	Blink
TxC	No data are transmitted on the CAN line	Dark
	Data are transmitted on the CAN line	Blink
RxD	No data are received on the RS232 or RS485 line	Dark
	Data are received on the RS232 or RS485 line	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

Wiring

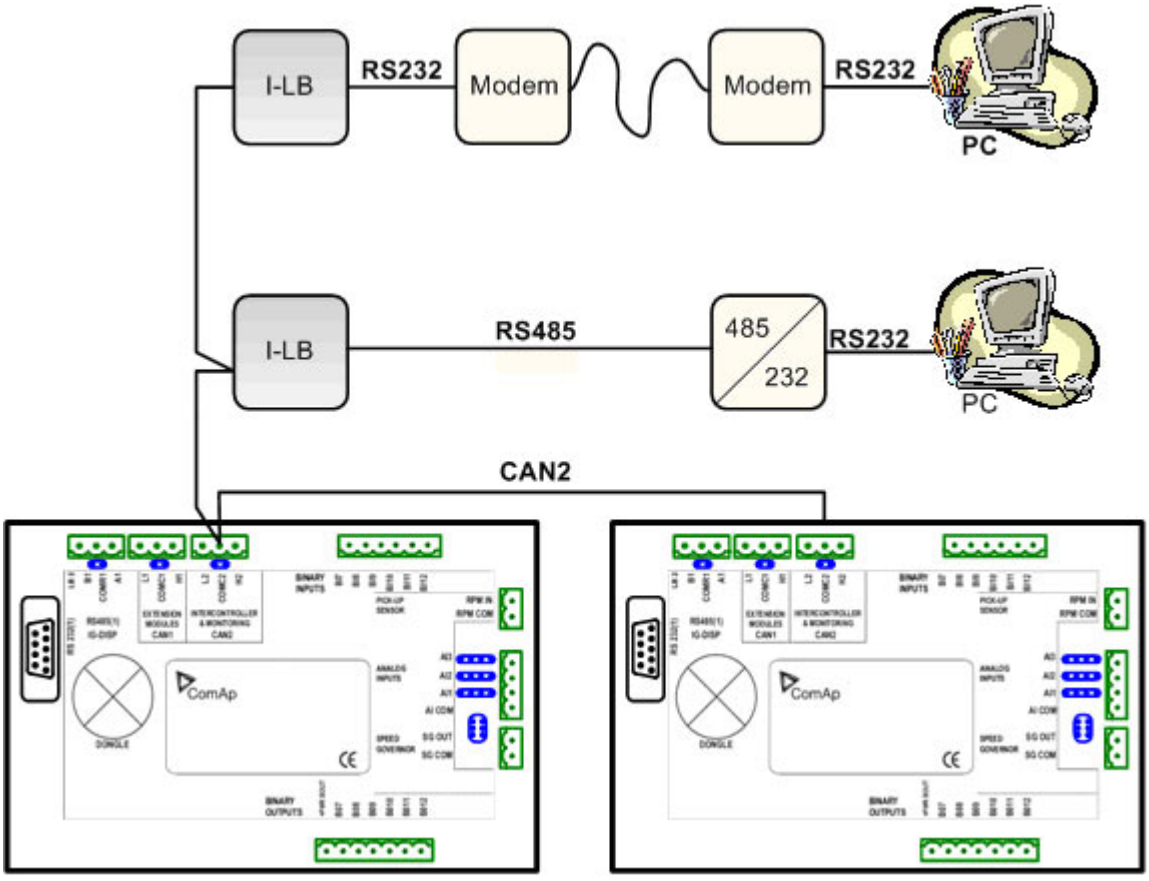
I-LB+ has to be connected to modem via standard modem cable (full RS232) where the DSR (Data Set Ready) signal detects modem presence (when MODEM (HW) type selected). Three-wire RS232 cable (TxD, RxD, GND) can be used (e.g. for GSM modems) when MODEM (SW) type is selected.



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. See the connection possibilities in the table on next side:

Table of I-LB+ connection

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)
Connection possibilities of only I-LB+ in following eight examples							
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
Connection possibilities of both I-LB+ (**) in following four examples							
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.

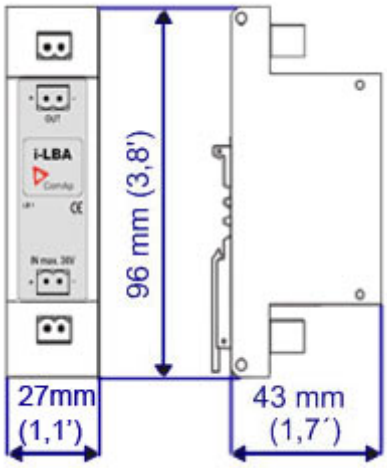
Technical data

Dimension (WxHxD)	**95x96x43 mm (3.7'x3.8'x1.7')**
Interface to controller	CAN
Interface to modem or PC	RS232, RS422, RS485, USB only I-LB+
Power supply	8 to 36 V DC
Analog outputs refreshment	Max. 300 ms
Current consumption	100mA at 24 V
Storage temperature	- 40C to + 80°C
Operating temperature	- 30°C to + 70°C

i-LBA

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.

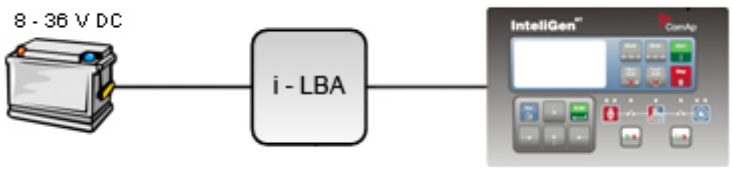


Unit is 35 mm DIN rail mounted.

Connectors

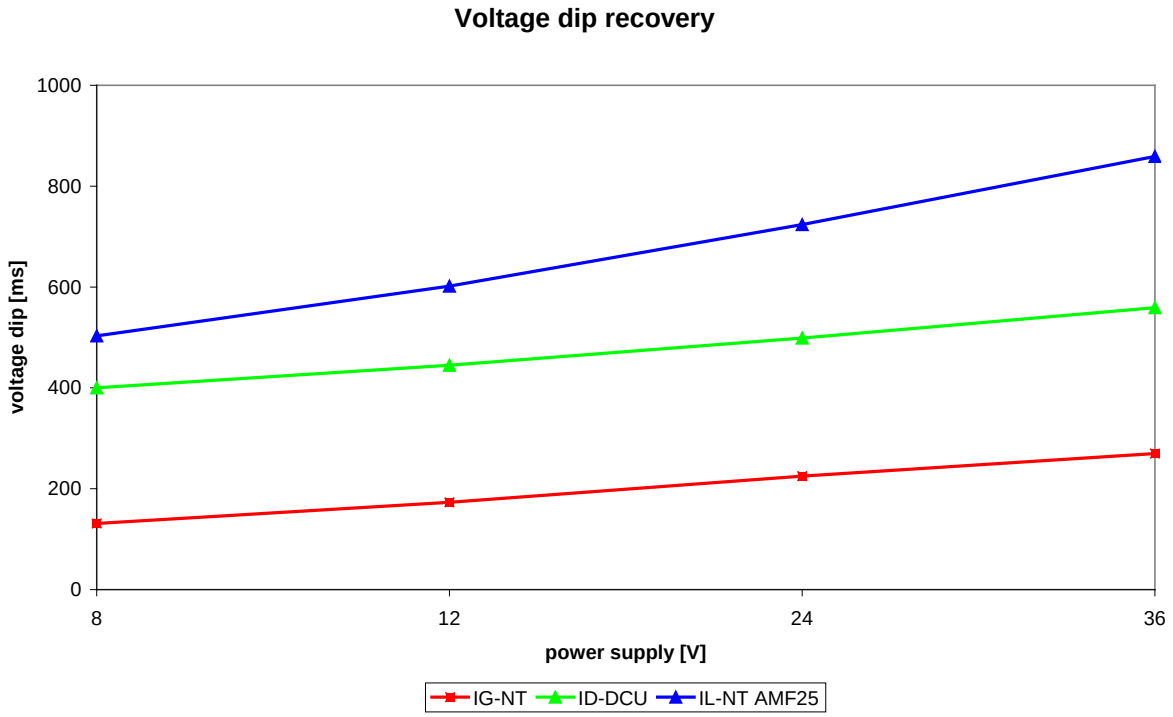
POWER in	*Power supply from battery*
POWER out	*Power supply to controller*

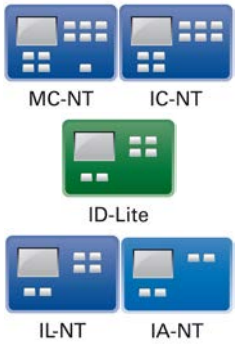
Wiring



Technical data

Dimension (WxHxD)	**27x96x43 mm (1.1'x3.8'x1.7')**
Outputs	8 to 36 V DC, no galvanic separation
Internal resistance	Under 0.2 ohm
Power supply	8 to 36 V DC
Storage temperature	- 40C to + 80°C
Operating temperature	- 30°C to + 70°C



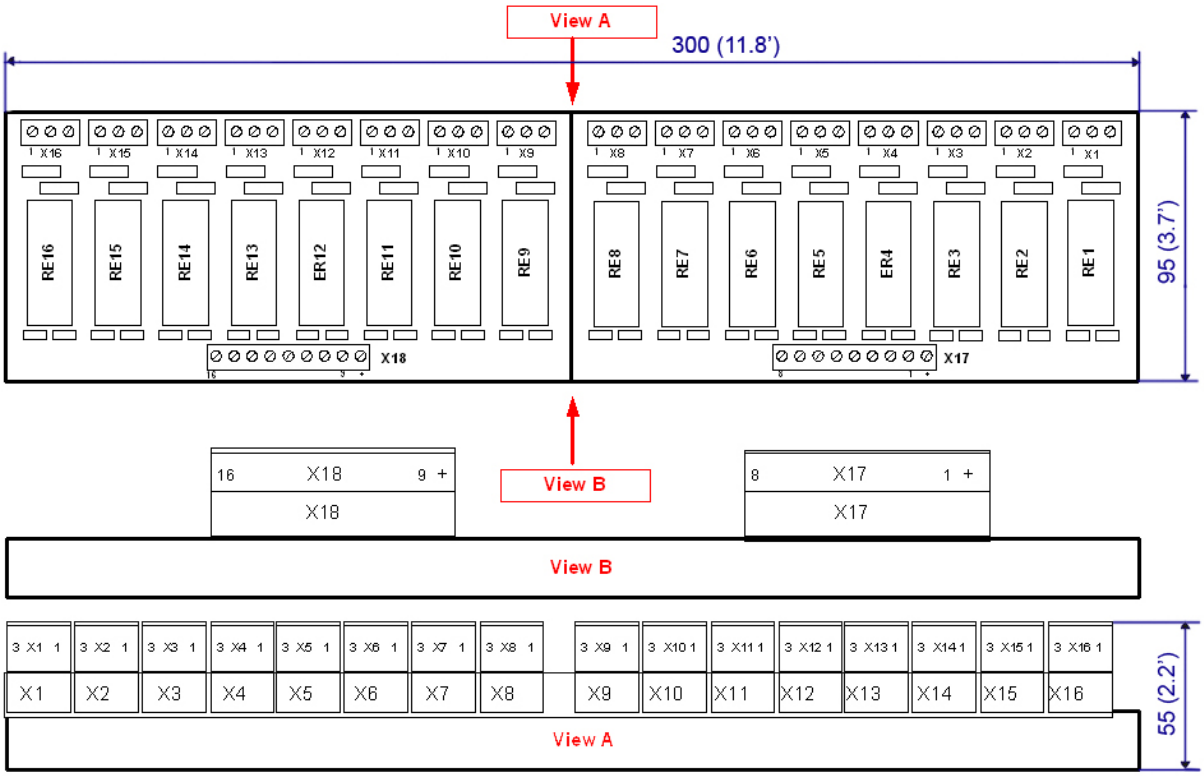


Description

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

Table of device difference

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



Unit is 35 mm DIN rail mounted.

Connectors

O1-O16	*Relay connector*
INPUT1, INPUT2	*Input signals*

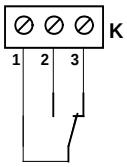
LEDs indication

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.

Wiring

Relay-connector connection

1 – 2 **n.o.**
1 – 3 **n.c.**

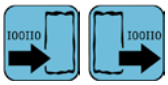


Technical data

Dimension (WxHxD)	**300x95x55 mm (11.8'x3.7'x2.2')**
Outputs	Max. switched current 16A DC, 4A AC Max. switched voltage 24V DC, 230V AC*
Voltage range	16.8 – 36V DC
Relay opens	At 10% of nominal voltage
Electric / mechanic cycles	100 000 (when switching 16A) / 10 000 000
Contacts protection	varistor 14DK390
Storage temperature	- 40C to + 80°C
Operating temperature	- 30°C to + 70°C

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

IG-IOM

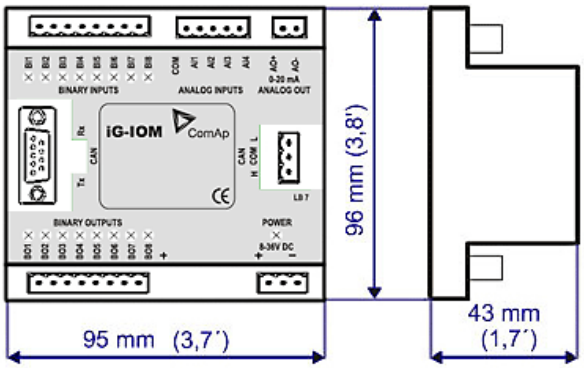


Description

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.

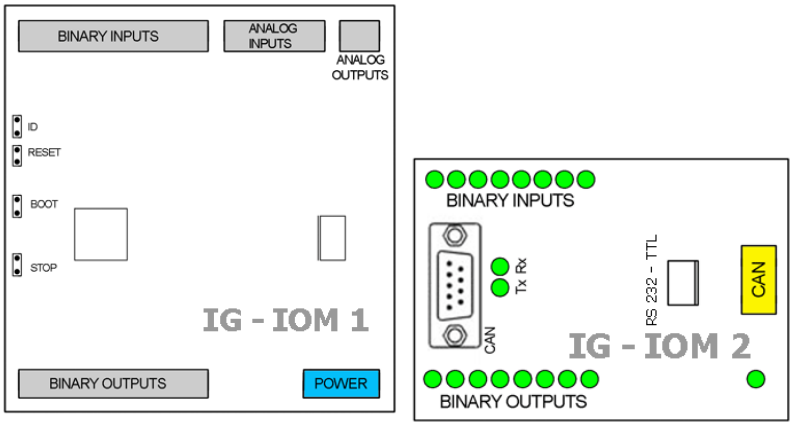
- Binary inputs and outputs are configurable the same way like inputs and outputs on controller.
- The protection of analog IOM inputs is activated by overcrossing the limits, active only when the engine is running.
- IG-IOM analog inputs are resistive (the same parameters like controller) 0 Ω-2,4 kΩ.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

Dimensions



Unit is 35 mm DIN rail mounted.

Terminals



BINARY INPUTS	*8 binary input*
ANALOG INPUTS	*4analog 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*

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.

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.

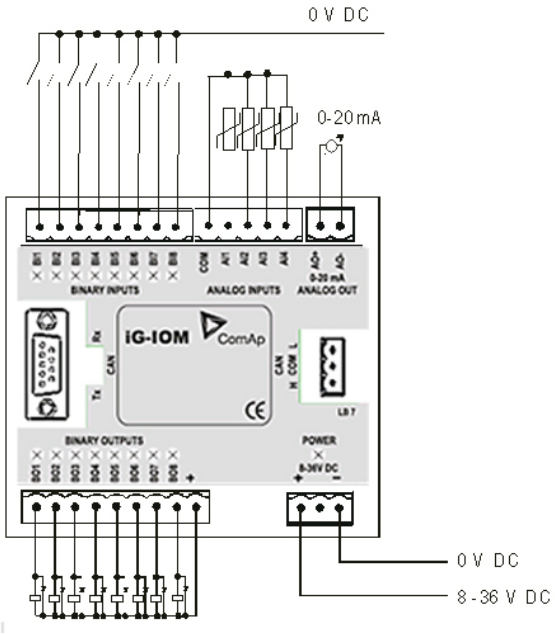
Binary outputs

Binary output LED shining when binary output is set.

Power

Power LED shining when power supply is connected.

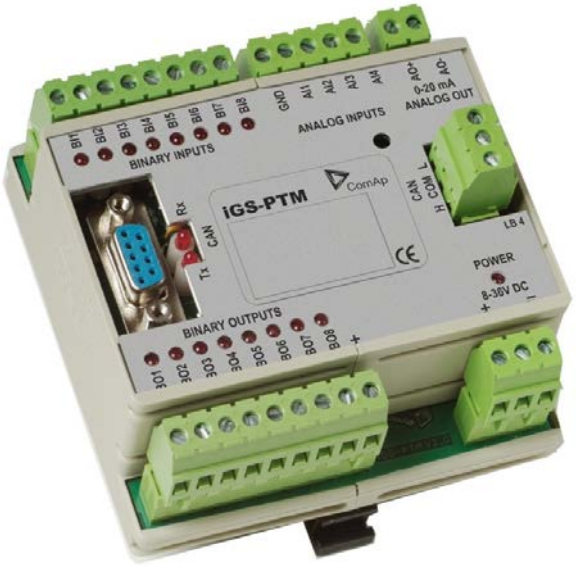
Wiring

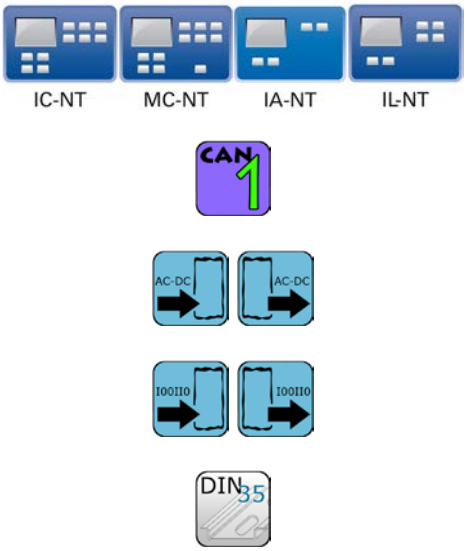


Technical data

Dimension (WxHxD)	**95x96x43 mm (3.7'x3.8'x1.7')**	
Interface to controller		
Binary inputs	*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*
Binary outputs (*Open collector outputs*)	*Max current*	*500mA*
	Max switching voltage	*36V DC*
Analog inputs *(Not electric separated)*	Resolution	10 bits
	Sensor resistance range	0 to 2400 ohm
	Resistance measurement tolerance	4 % ± 2 ohm out of measured value
Analog output *(not electric separated)*	Output current	0 to 20 mA
	resolution	10 bit
Power supply	8 to 36 V DC	
Current consumption	100 mA at 24V ÷ 500 mA	
Storage temperature	- 40C to + 80°C	
Operating temperature	- 30°C to + 70°C	

IGS-PTM



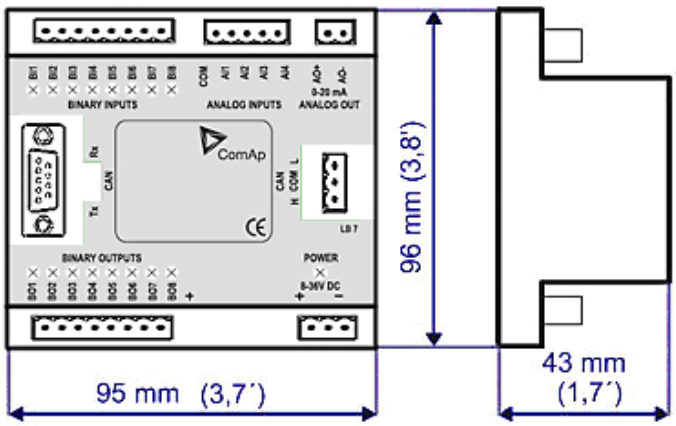


Description

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

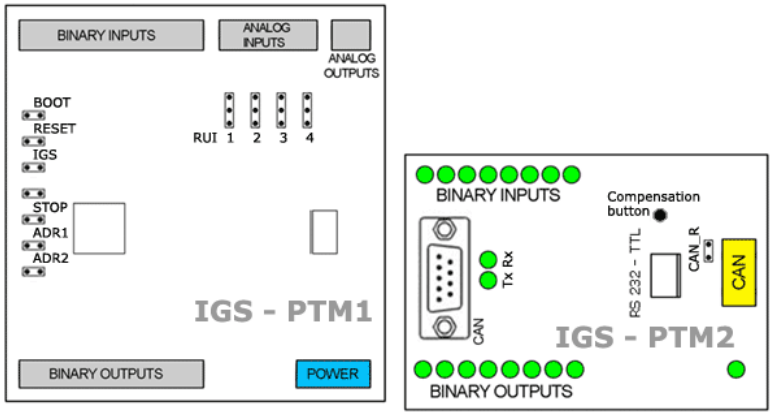
- 0 – 250 Ω (suitable for Pt100, Ni100),
- 0 – 100 mV,
- 0/4 – 20 mA.

Dimensions



Unit is 35 mm DIN rail mounted.

Terminals



BINARY INPUTS	*8 binary input*
ANALOG INPUTS	*4analog 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*

Hint:

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.

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 description

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

Address configuration

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

CAN address settings

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.

Analog input settings

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.

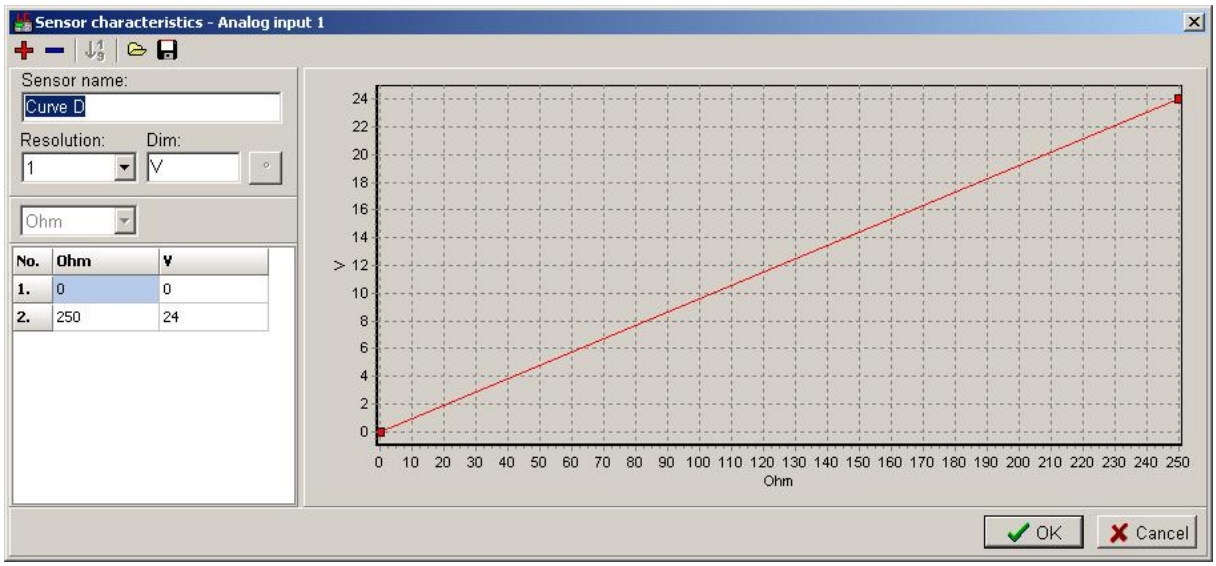
Hint:

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.

Table of conversion Pt100 or Ni100 resistance to temperature

Pt100 Resistance [Ω]	Temperature [°C]
92	-20,5
100	0,0
108	20,5
116	41,3
123	59,5
131	80,3
139	101,3
146	119,7
154	141.1
169	181,4

Ni100 Resistance [Ω]	Temperature [°C]
83	-20,6
90	-0,8
97	18,9
105	40,3
113	60,5
121	79,5
130	100,0
139	120,0
148	139,2
169	179,3



Tables of IGS-PTM analog inputs conversion

Current conversion table 20 mA / 20.0 mA	
Primary	**Converted]**
0	00
40	42
60	63
80	83
100	104
115	119
135	140
155	160
175	181
195	201

Voltage conversion table 100 mV / 100.0 mV	
Primary	**Converted]**
0	00
10	41
40	163
70	285
110	446
140	566
170	685
210	842
230	921
250	999

Current conversion table 20 mA / 100.0	
Primary	**Converted**
0	0
38	20
57	30
77	40
96	50
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	48
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

Hint:

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.

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.

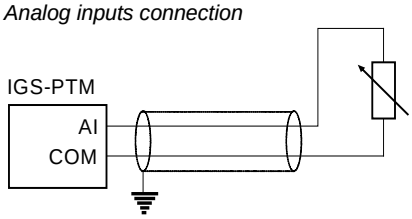
Power

Table of power LED description

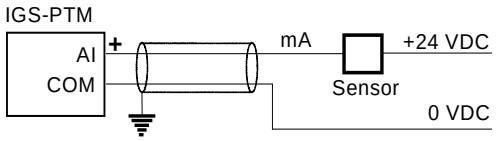
LED status	Description
Dark	No required power connected
Quick flashing	Program check failure
One flash and pause	Compensation fail
Three flashes and pause	Compensation successful
Flashes	there is no communication between IGS-PTM and the controller.
Lights	Power supply is in the range and communication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

Wiring

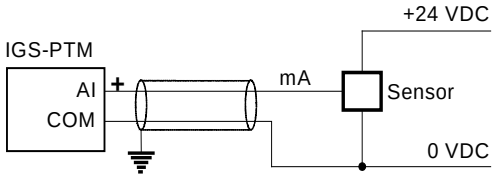
Analog inputs connection



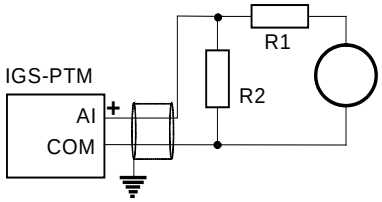
Two wire resistor sensor



Two wire current sensor.



Three wire current sensor.



Extension of voltage measuring range.

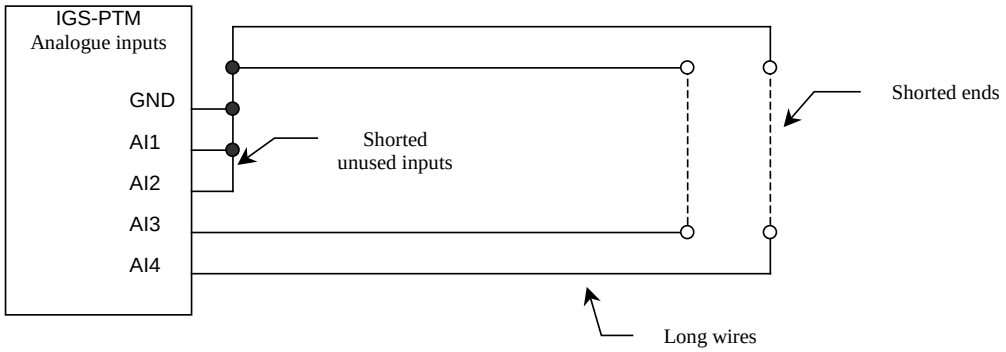
Hint:

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

Long wires resistance compensation

Process of compensation:

1. Short all wires to analog sensors at the end (replace sensors with shorting links).
2. Hold the compensation button on IGS-PTM through the hole in upper cover when switching IGS-PTM on.
3. 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.
4. Measured lead's resistance is stored in EEPROM memory (separate value for each input) and is subtracted from measured value when resistance measuring.



Hint:

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

Technical data

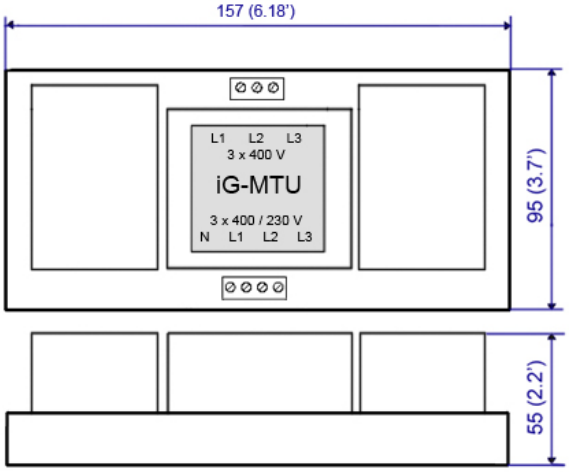
Dimension (WxHxD)	**95x96x43 mm (3.7'x3.8'x1.7')**	
Interface to controller		
Binary inputs	*Input resistance*	*4700 ohm*
	Input range	*0 to 36V DC*
	Switching voltage level for open contact indication	*0 to 2V*
	Max voltage level for open contact indication	*8 to 36V*
Binary outputs (*Open collector outputs*)	*Max current*	*500mA*
	Max switching voltage	*36V DC*
Analog inputs *(Not electric separated)*	Resolution	10 bits
	Sensor resistance range	0 to 250 ohm
	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
Analog output *(not electric separated)*	Output current	0 to 20 mA ± 0.33mA
	resolution	10 bit
Power supply	8 to 36 V DC	
Protection	IP20	
Current consumption	100 mA at 24V ÷ 500 mA	
Storage temperature	- 40C to + 80°C	
Operating temperature	- 30°C to + 70°C	

IG-MTU/IG-MTU-C/MTU-2-1

Description

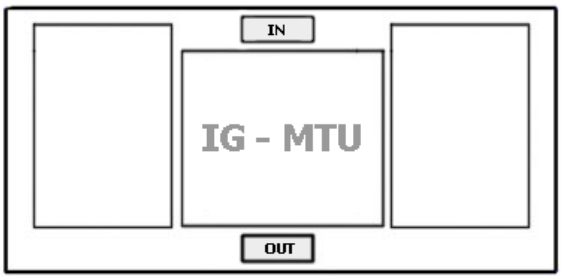
Voltage transformer unit, for three wire system, system with separated Neutral or when galvanic separation between generator or mains voltage and controller is required.

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



Unit is 35 mm DIN rail mounted.

Connectors

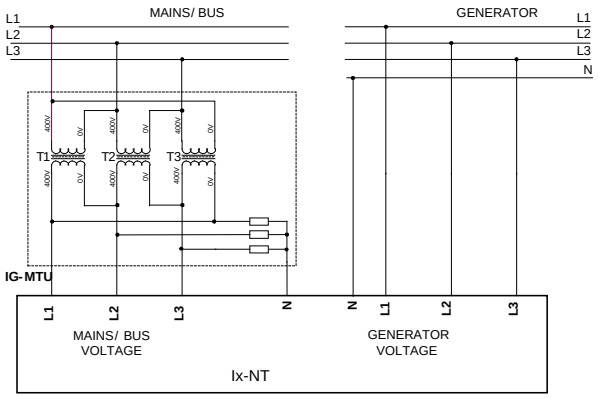


IN	*Input voltage*
OUT	*Output voltage*

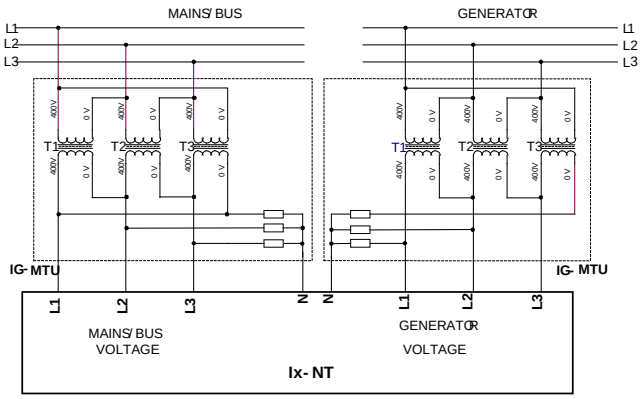
Wiring

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

Three wire mains



Three wire mains and three wire genset or electric separation



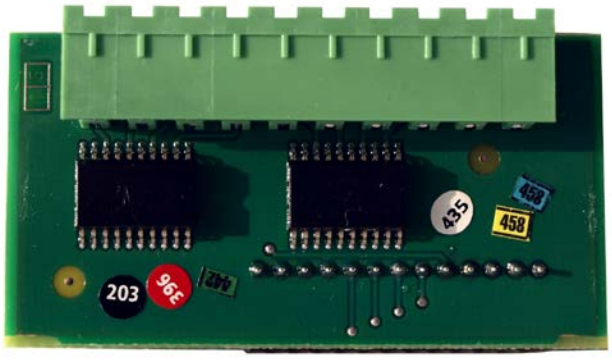
Hint:

IG-MTU-C can be connected **only with classical line controllers!**
We recommend connect IG-MTU and IG-MTU-2-1 only in marine applications or if is necessary galvanic separate mains/generator and controller.

Technical data

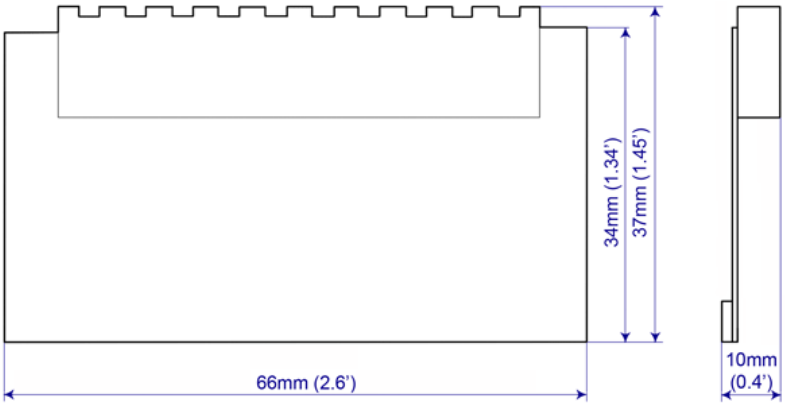
Dimension (WxHxD)	**157x55x95 mm (6.18'x2.2'x3.7')**
Interface to controller	Direct mounted (SUB25)
Primary voltage Ph-Ph	3x400 VAC / 50Hz (3x480 VAC / 60 Hz) *IG-MTU, IG-MTU-C*
	3x600 VAC / 50Hz (3x720 VAC / 60 Hz) *IG-MTU-2-1*
Secondary voltage Ph-N	3x 230 V AC (3x277 VAC / 60 Hz) , 5 VA *IG-MTU, IG-MTU-C*
	3x 173 V AC (3x208 VAC / 60 Hz) , 5 VA *IG-MTU-2-1*
Primary/secondary Phase shift	± 2° *IG-MTU, IG-MTU-2-1*
	± 3° *IG-MTU-C*
Conversion accuracy	± 1.5% at 50Hz *IG-MTU, IG-MTU-2-1*
	± 3.0% at 50Hz *IG-MTU-C*
Storage temperature	- 40C to + 80°C
Operating temperature	- 30°C to + 70°C

IL-NT-AOUT8

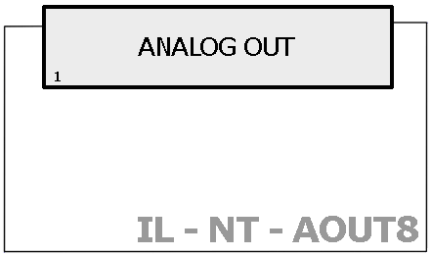


Description

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.



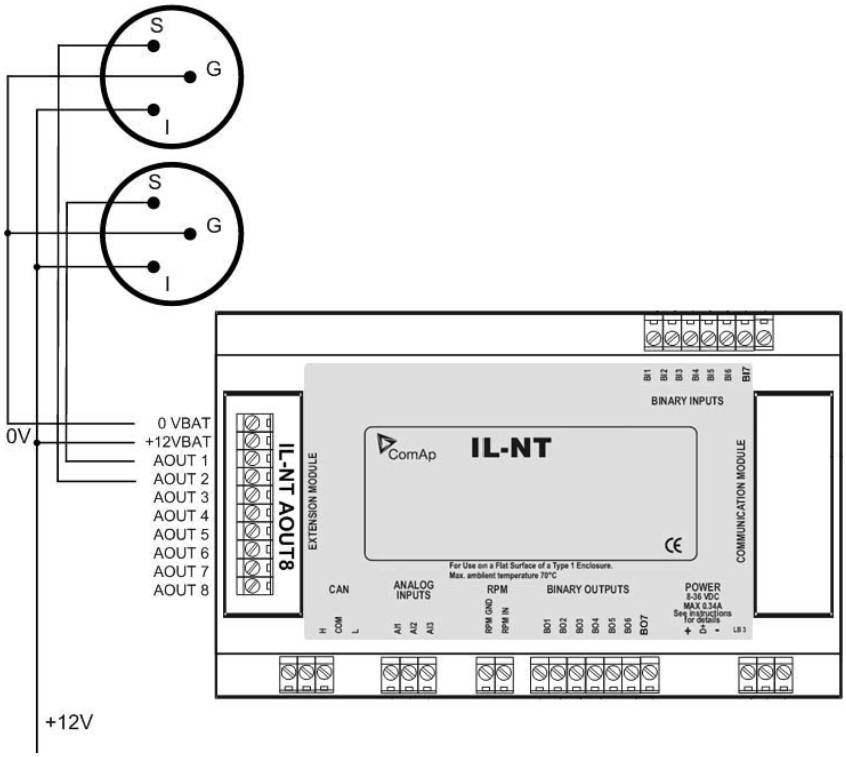
Connectors



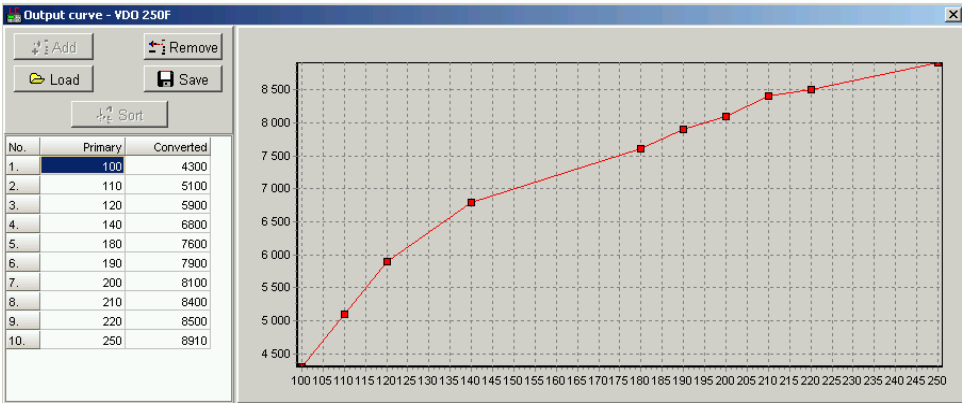
ANALOG OUT – port 2-10	*Analog out for gauges*
ANALOG – port OUT 1	*GND*
ANALOG – port OUT 2	*Power supply voltage*

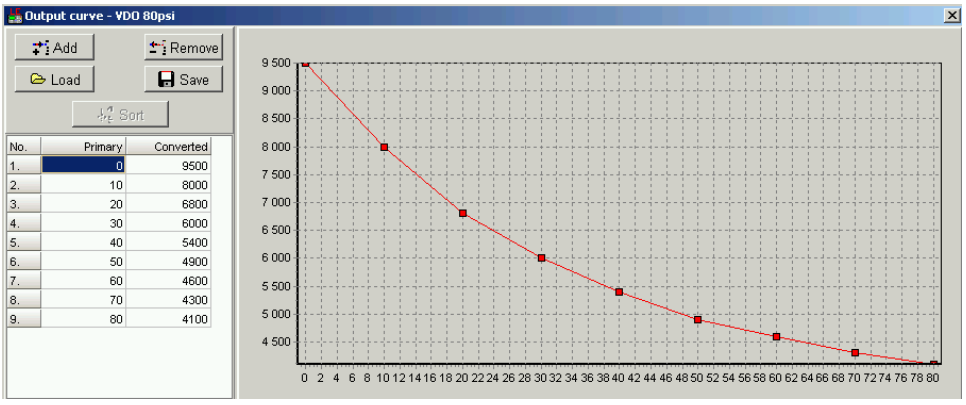
Wiring

IL-NT-AOUT8 wiring example for Dacon gauges



Example of default analog output curves

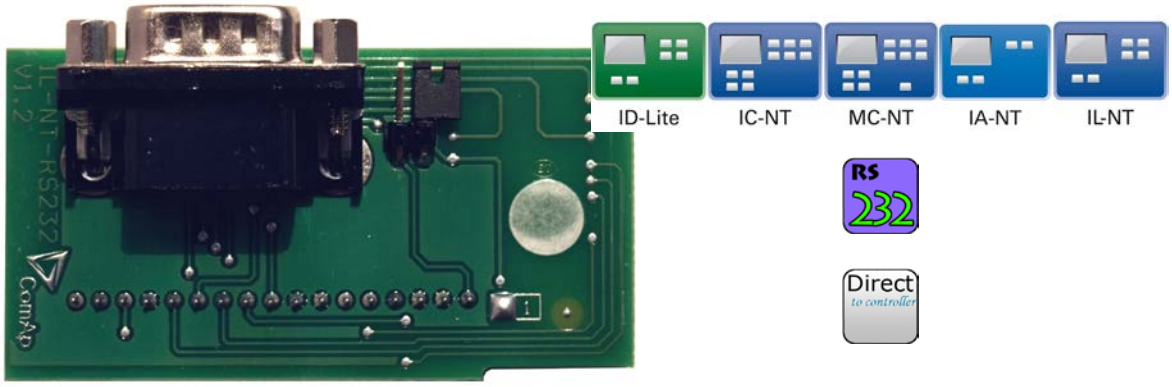




Technical data

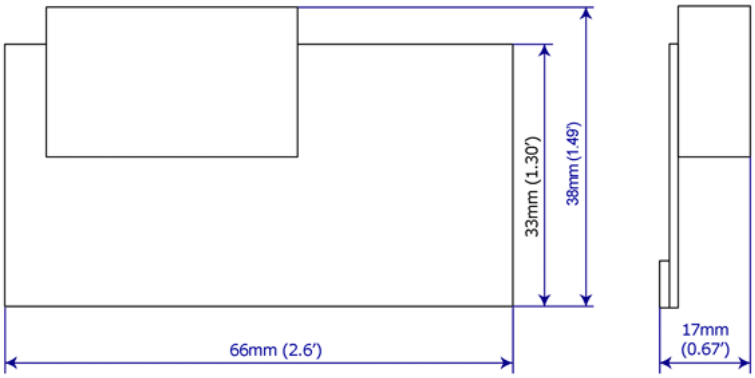
Dimension (WxHxD)	**66x37x10 mm (2.6'x1.45'x0.4')**
Interface to controller	Direct mounted
PWM output	Open collector, max. 0.5A
Power supply	12 to 24V DC
Storage temperature	- 40C to + 80°C
Operating temperature	- 30°C to + 70°C

IL-NT-RS232

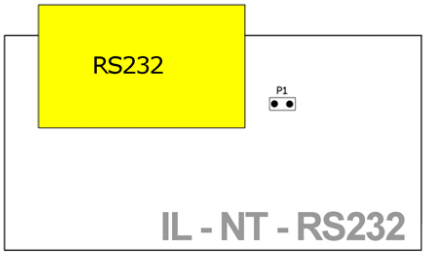


Description

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

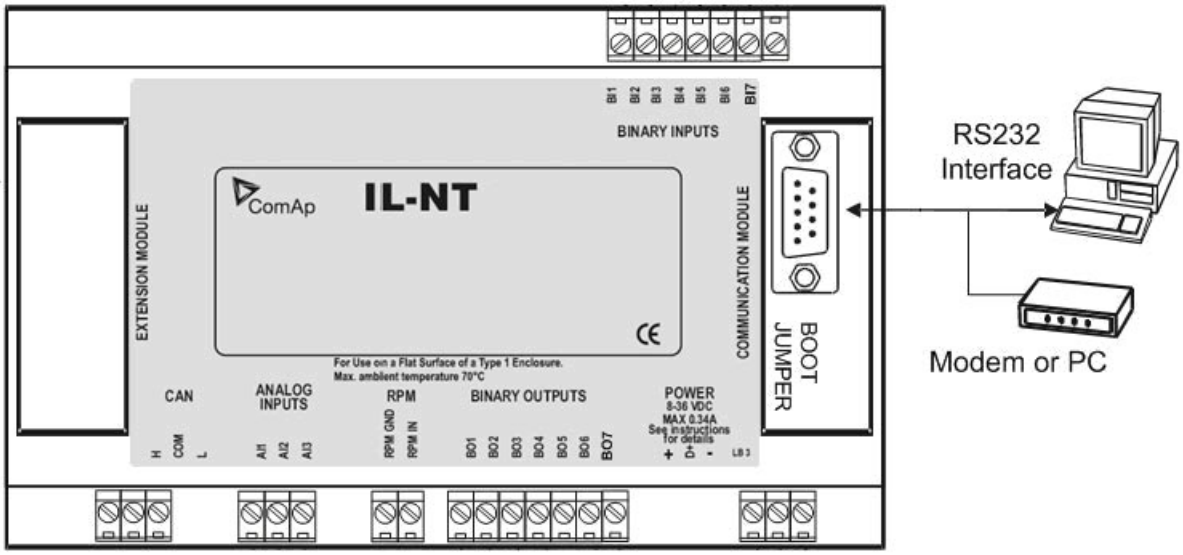


Connectors



RS 232	*RS232 line*
P1	*Programming*

Wiring

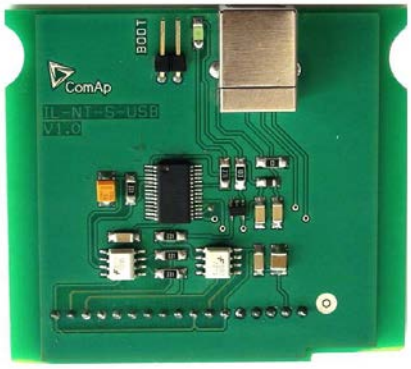


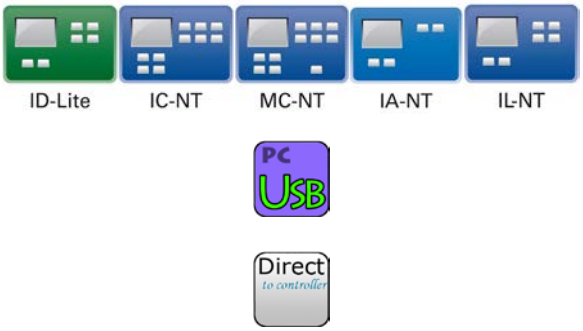
Technical data

Dimension (WxHxD)	**66x38x17 mm (2.6'x1.49'x0.67')**
Interface to controller	Direct mounted
RS232	Standard RS232 communication interface
Storage temperature	- 40C to + 80°C
Operating temperature	- 30°C to + 70°C

More about communication you can read in **Inteli communication guide.**

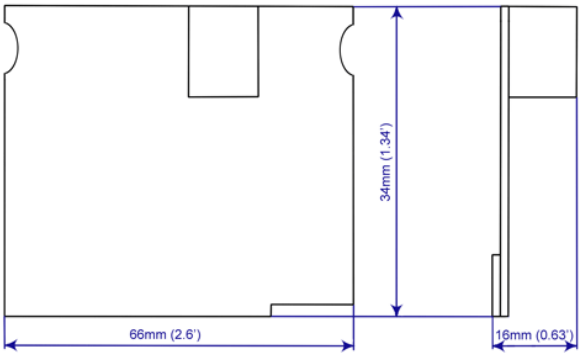
IL-NT-S-USB



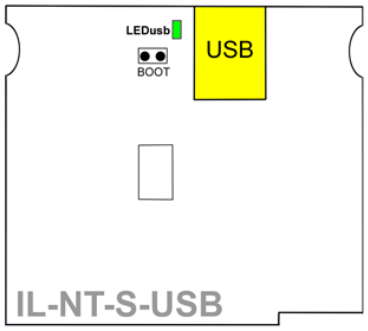


Description

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



Connectors

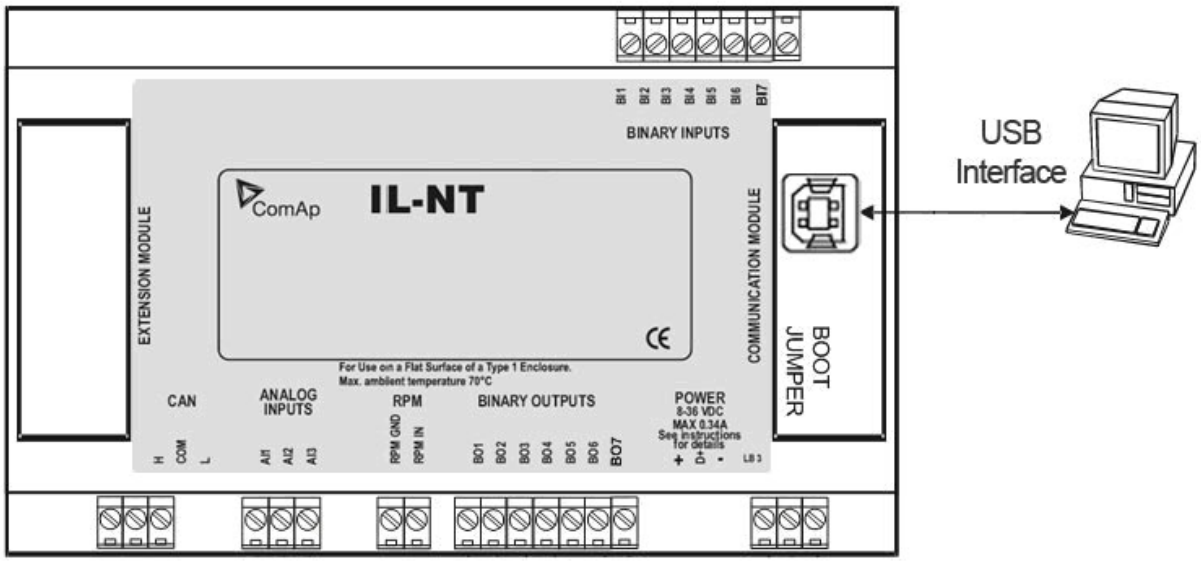


USB	*RS232 line*
LEDusb	*Data on USB line (Rx and Tx)*
BOOT	*Programming*

LED Indications

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

Wiring

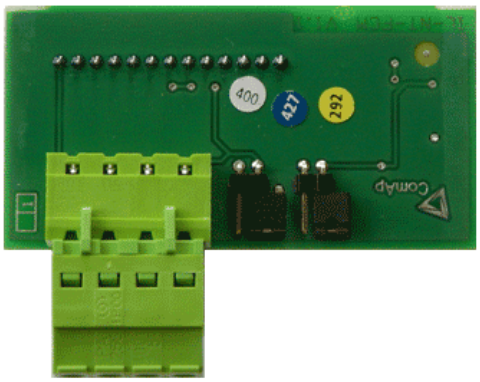


Technical data

Dimension (WxHxD)	**66x34x16 mm (2.6'x1.34'x0.63')**
Interface to controller	Direct mounted
USB	Standard USB communication interface
Storage temperature	- 40C to + 80°C
Operating temperature	- 30°C to + 70°C

More about communication you can read in **Inteli communication guide.**

IL-NT-FCM



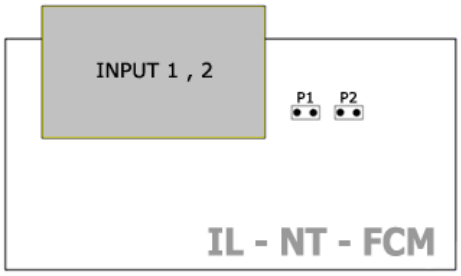
Description

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.**

Hint:

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

Connectors



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

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.

Others information

LiteEdit configuration

FuelManRefil **[l]**

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 immediatelly reset to 0.

Step: 1 l

Range: -32 000 – 32 000 l

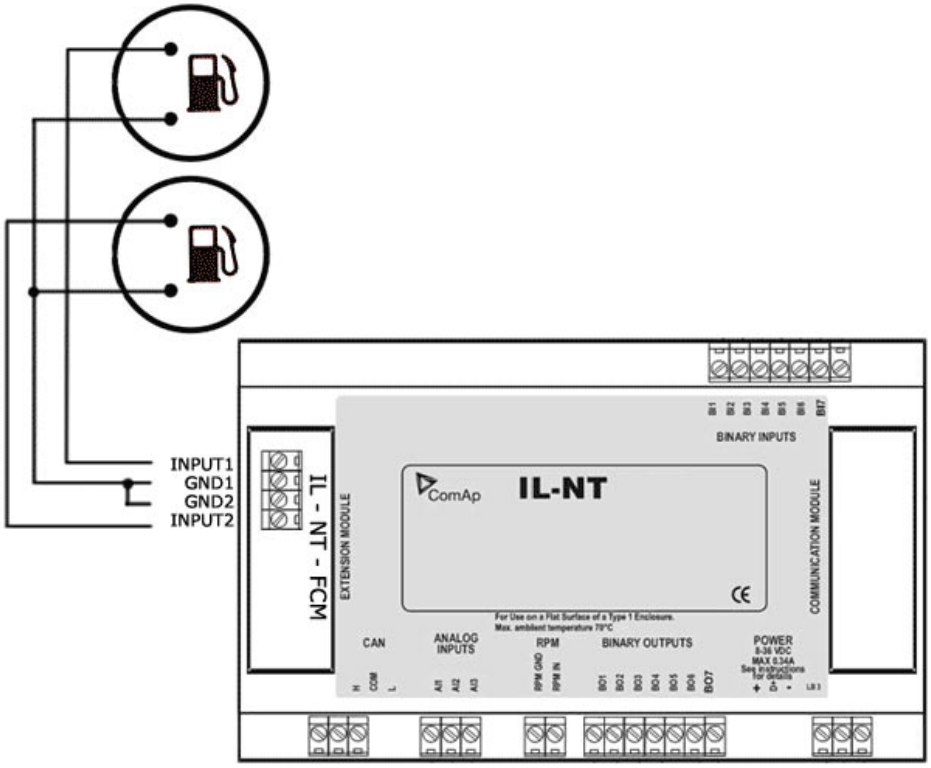
Hint:

Editation window of this setpoint is automatically entered after holding the button Refil on the unit panel for minimum 1 s.

ConPulseRate [ppl]
"Pulses per liter" constant of fuel flow sensor connected to the first pulse input of IL-NT-FCM module. By setting this constant, the propper counting of FuelConH value in values group **Fuel Mgmt** is provided, showing the hourly fuel consumption.
Step: 1 ppl
Range: 1 – 9999 ppl

AuRefPulseRate [ppl]
"Pulses per liter" constant of fuel flow sensor connected to the second pulse input of IL-NT-FCM module. By setting this constant, the propper counting of FuelAutrefTot value in values group **Fuel Mgmt** is provided, showing the total amount of fuel refilled through this sensor.
Step: 1 ppl
Range: 1 – 9999 ppl

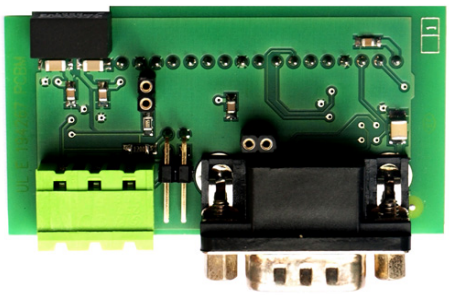
Wiring



Technical data

Dimension (WxHxD)	**66x34x16 mm (2.6'x1.34'x0.63')**
Interface to controller	Direct mounted
Pulse input	Max 2kHz, input voltage 9 to 27Vpp
Storage temperature	- 40C to + 80°C
Operating temperature	- 30°C to + 70°C

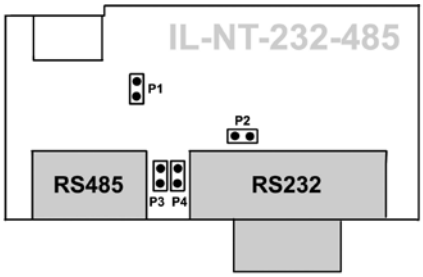
IL-NT-RS232-485



Description

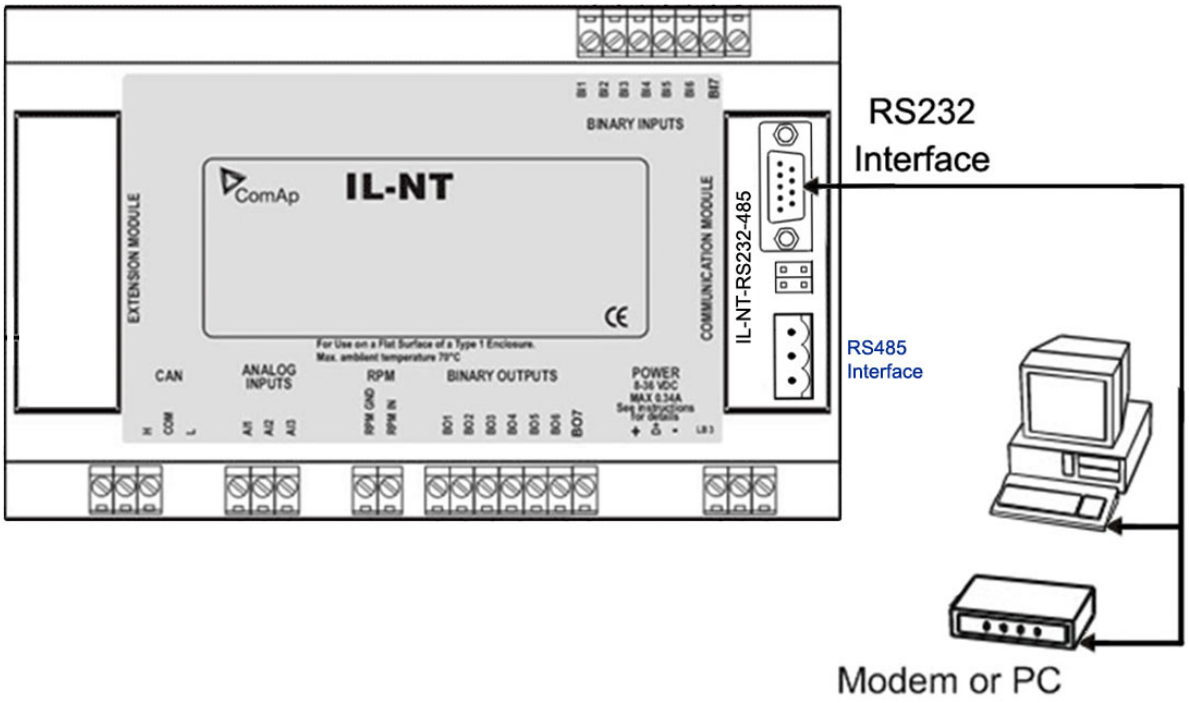
The IL-NT-RS–232-485 is a two port module with
RS232 and RS485 interfaces at independent COM channels. The RS232 is connected to COM1 and RS485 to COM2

Connectors



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

Wiring

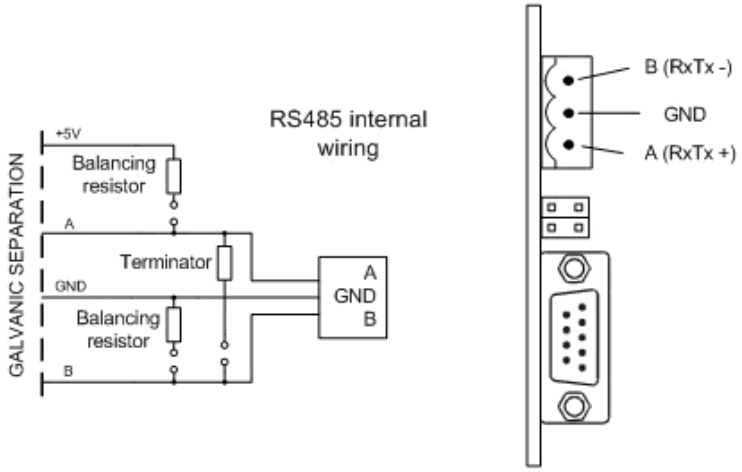


Technical data

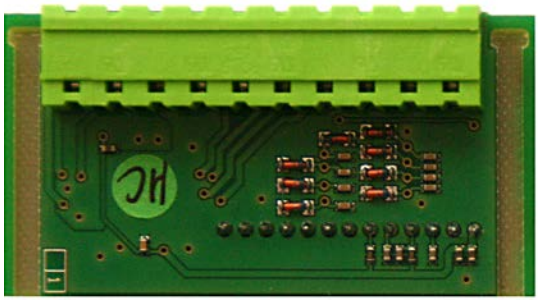
Dimension (WxHxD)	**66x38x17 mm (2.6'x1.49'x0.67')**
Interface to controller	Direct mounted
RS232 RS485	Standard communication interface
Storage temperature	- 40C to + 80°C
Operating temperature	- 30°C to + 70°C

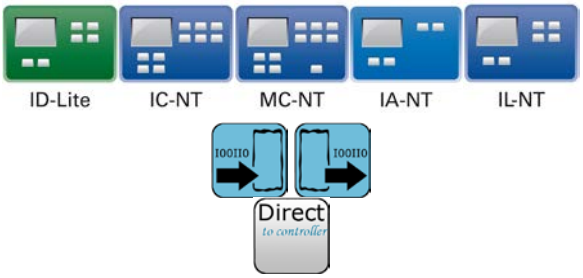
Hint:

Communication speed is depends on controller type and its settings.



IL-NT-BIO8

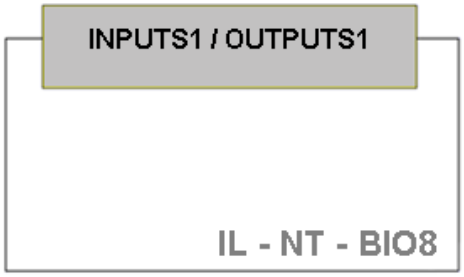




Description

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.

Connectors



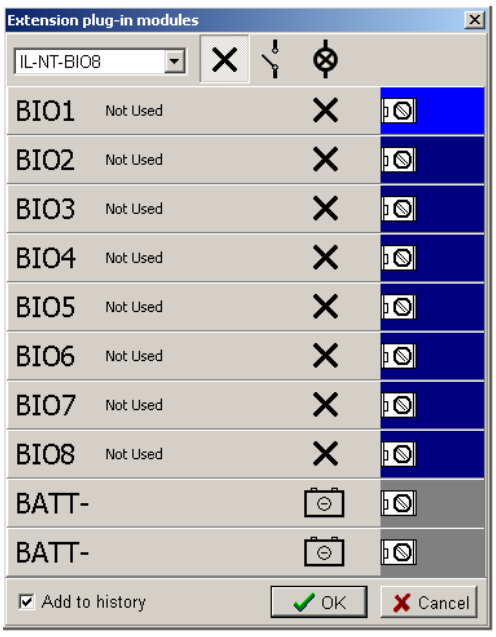
INPUTS1	*8 mixed binary inputs or outputs*
OUTPUTS1	

Address and jumper setting

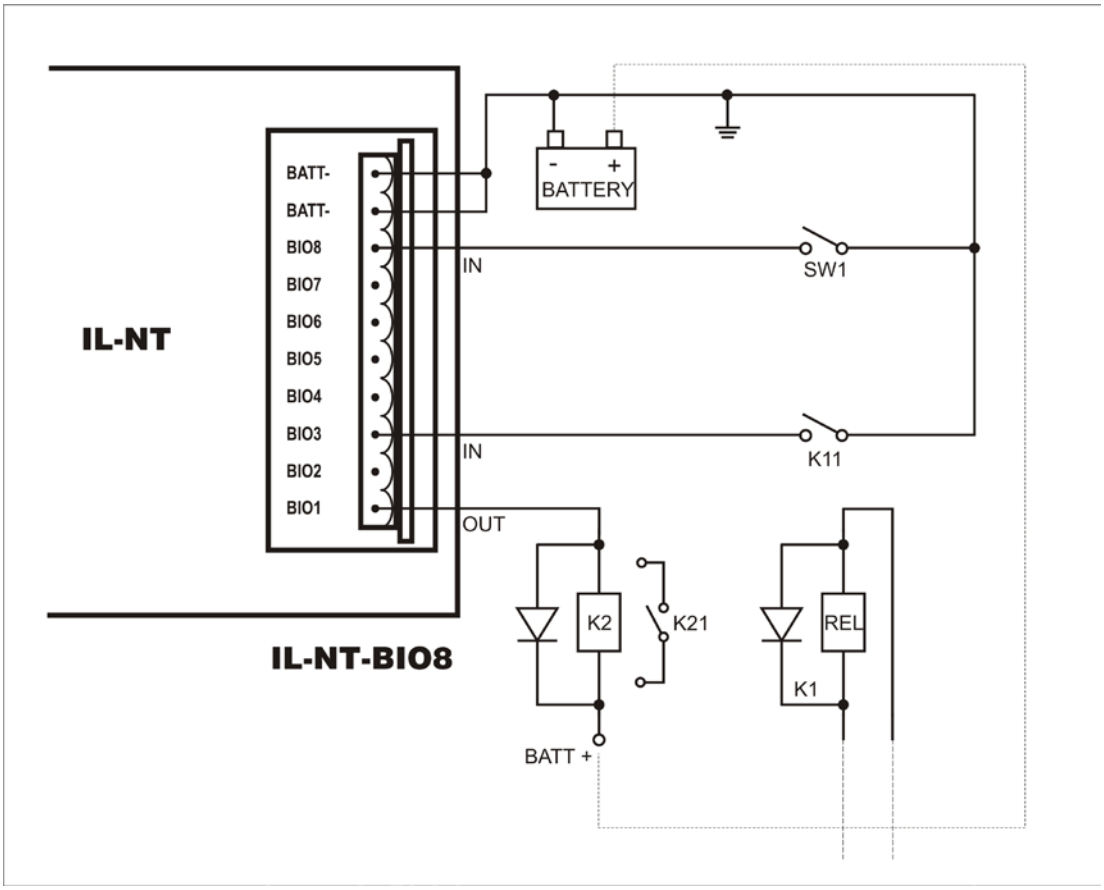
There is no possibility to set address of module.

Others information

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



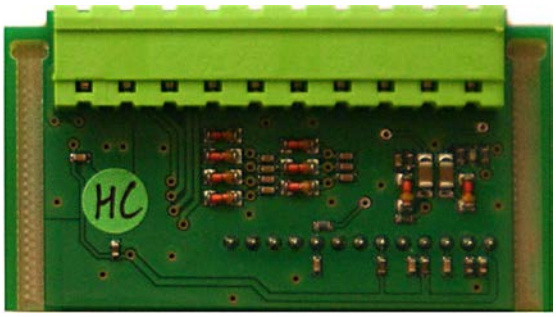
Wiring

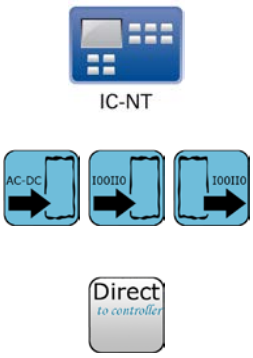


Technical data

Dimension (WxHxD)	**66x34x16 mm (2.6'x1.34'x0.63')**	
Interface to controller	Direct mounted	
Binary inputs	Input resistance	4700ohm
	Max. input signal	0 – 36VDC
	Logical H (1)	< 0,8 VDC
	Logical L (0)	> 2 VDC
Binary open collector outputs	Max current (per output)	0,5 A
	Max switching current (common)	2,0 A
	Max switching voltage	36 VDC
Storage temperature	- 40C to + 80°C	
Operating temperature	- 30°C to + 70°C	

IC-NT-CT-BIO7





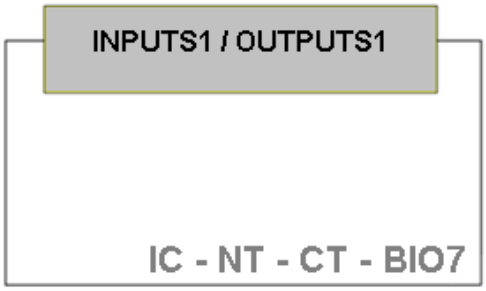
Description

IC-NT CT-BIO7 is equipped with one AC current (CT) measuring input and up to 7 binary inputs or 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.

Hint:

Current measuring input is intended to measure one phase (AC) current of mains and to limit Export/Import to/from mains to zero value during parallel to mains operation. This is case of SPtM application, so current input of IC-NT CT-BIO7 module is useful for SPtM controllers only.

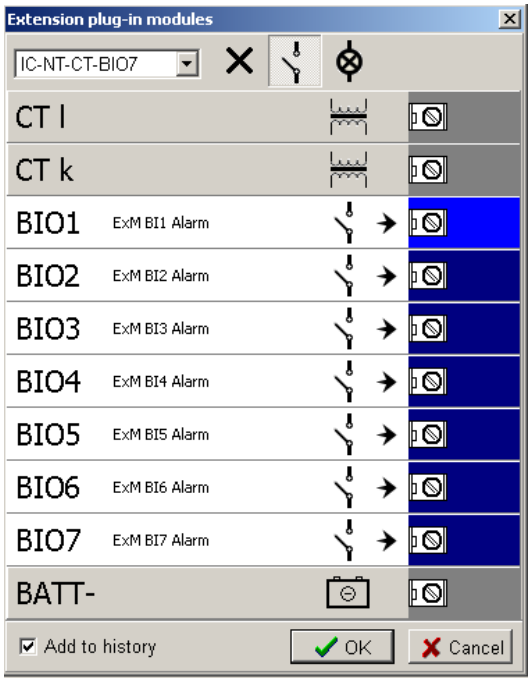
Connectors



INPUTS1 OUTPUTS1	*7 mixed binary inputs or outputs*

Address and jumper setting

There is no possibility to set address of module.



Others information

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

LiteEdit configuration

Im CT Ratiol **[A/5A]**
This setpoint defines mains current transformer ratio for current measuring input of IC-NT-CT-BIO7 module.
Step: 1
Range: 1 – 5000

PeakLevelStart **[kW]**
Load consumption level the gen-set has to start at. Function is inactive when *PeakAutS/Sdel* = OFF. Genset start is *PeakAutS/S Del* delayed after the consumption of the Load exceeds the *PeakLevelStar*t limit.
Step: 0,1 or 1
Range: PeakLevelStop – 3200

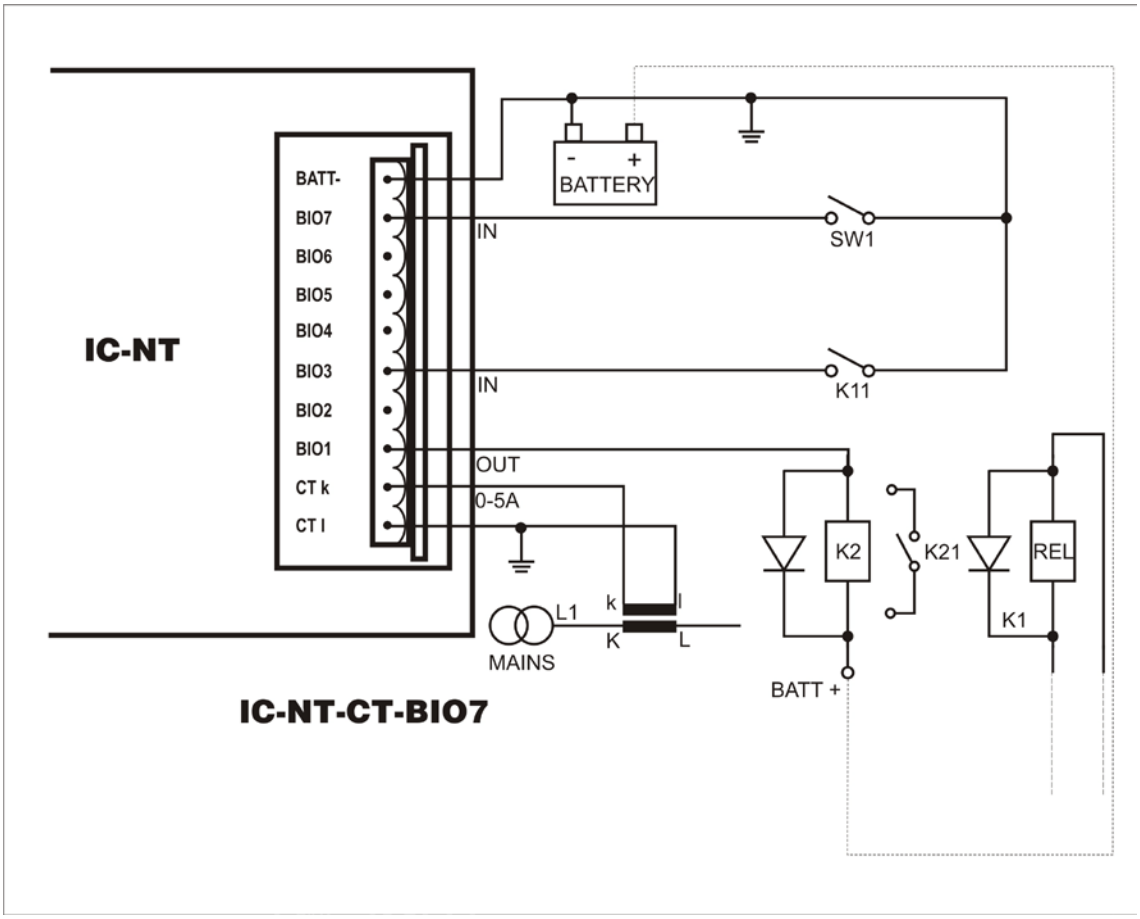
PeakLevelStart **[kW]**
Load consumption level the gen-set has to stop at. Genset stop is *PeakAutS/Sdel* delayed after *PeakLevelStop* limit is reached. Load consumption is calculated (not directly measured) as a sum of gen-set and mains active power.
Step: 0,1 or 1
Range: 0 - PeakLevelStart

PeakAutS/S Del **[s]**
The condition for the "peak" automatic start or stop must be valid for time period longer than value of this setpoint to execute the automatic start or stop. Adjusting 0 causes stop of the gen-set (if there is no other demand for running) and disable the automatic start.
Step: 1
Range: 0 (OFF) - 600

Export Limit **[-]**
Tells controller to activate protection against power export to the mains. The function limits gen-set requested power to hold import power higher or equal to the setpoint *Export kW.*
DISABLED / ENABLED

Export kW **[kW]**
Defines max limit for export / import in case Export Limit setpoint is set as ENABLED.
Negative value means import limit, positive value export limit zero means no export/import.
Step: 1
Range: -32000 - 32000

Wiring

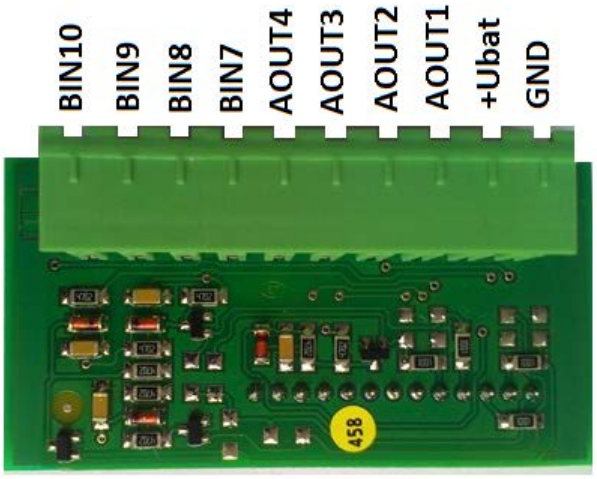


Technical data

Dimension (WxHxD)	**66x34x16 mm (2.6'x1.34'x0.63')**	
Interface to controller	Direct mounted	
Current measuring input	Nominal current	5 A
	Max. current	10 A
	Current accuracy	2% from nominal
	Max. peak current	150A / 1s
Binary inputs	Input resistance	4700ohm
	Max. input signal	0 – 36VDC
	Logical H (1)	< 0,8 VDC
	Logical L (0)	> 2 VDC
Binary open collector outputs	Max current (per output)	0,5 A
	Max switching current (common)	2,0 A
	Max switching voltage	36 VDC
Storage temperature	- 40C to + 80°C	
Operating temperature	- 30°C to + 70°C	

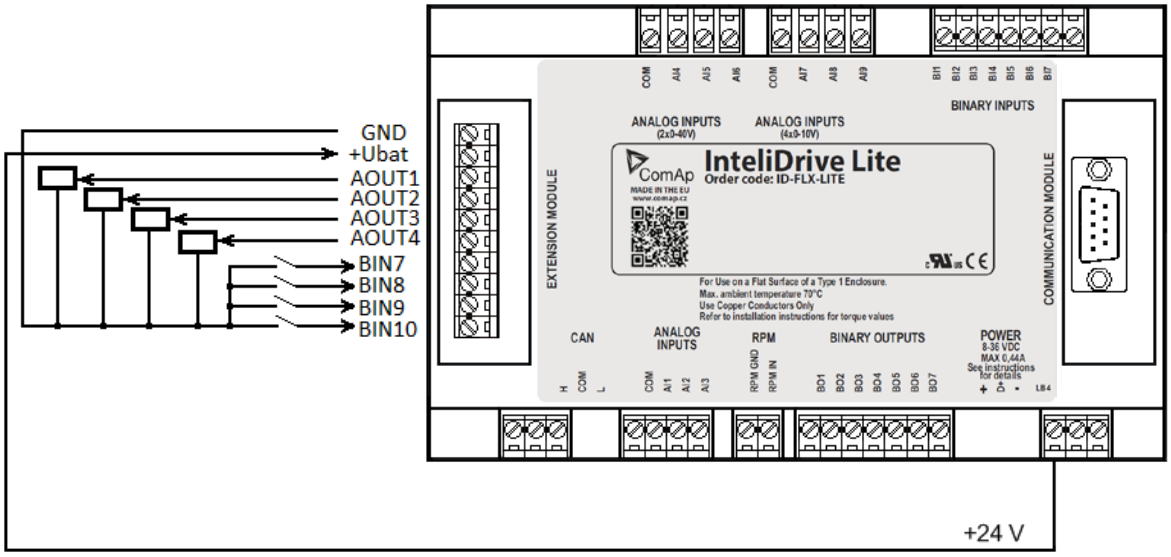
IL-NT-IO1

IL-NT IO1 is optional plug-in card. Through this card controller can drive up to 4 proportional valves and to use 4 additional binary inputs. The 0V (GND) terminal is internally wired with battery minus internally, the 12-24V (+Ubat) terminal is wired to battery plus power supply of InteliDrive Lite controller.



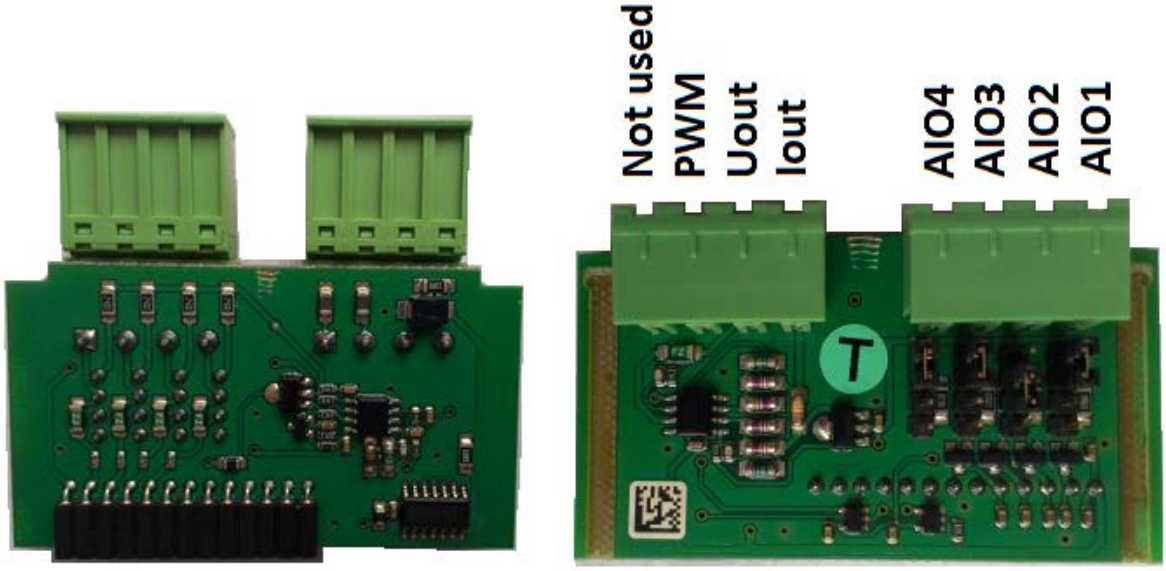
There should be, not more than 1V, lower voltage compare to adjusted % of +Ubat voltage.

NOTE:
Analog output shorted to ground more than one second can damage the output circuit.



IL-NT-AIO

IL-NT AIO is optional plug-in card. This card offers additional four analog inputs and one analog output. Analog inputs can be use for different types of sensor (resistive, current and voltage) and variable analog output, which can be used as PWM. Adjustment of extension plug-in modul is possible via LiteEdit too.



Type of analog input is selectable by jumper. Each analog input has own line of jumper position. The top position (closest to green conector on the pic above) is for resistive input, central position for voltage input and lowest position is for current input.

AI1 – AI4	2600 Ohm / 4V / 20 mA
Iout Uout PWM	0 – 20 mA (max 22mA) max 100 Ohm load 0 – 4,5V (max 10mA) PWM 5V / 15mA / 500 Hz
Not used	Do not connect!

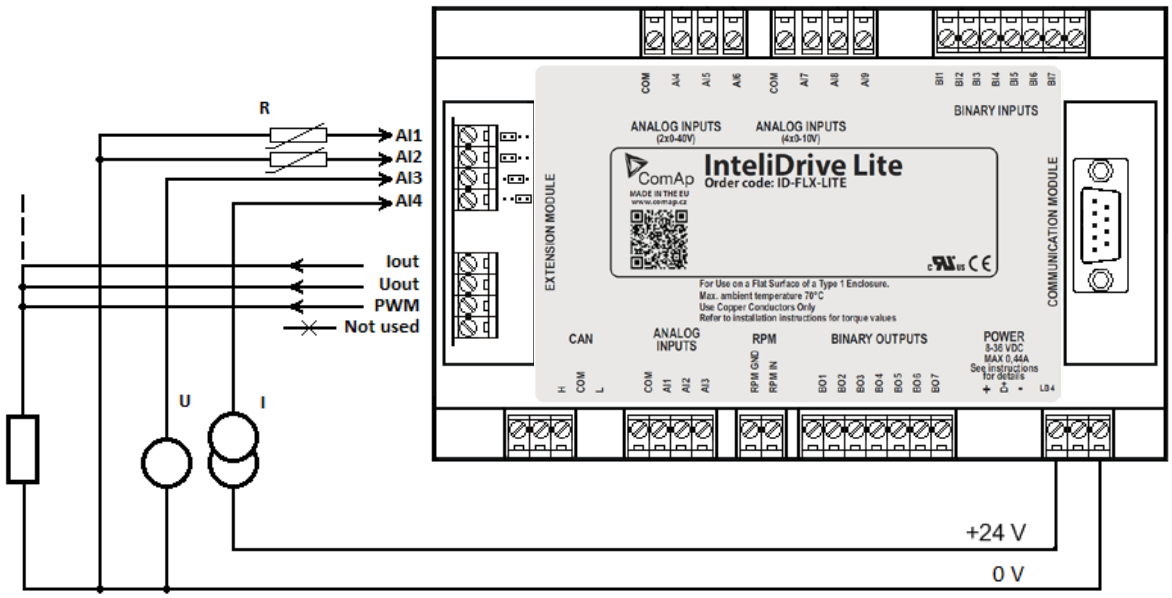


Table of symbols

	Supported for InteliDrive-Lite
	Supported for InteliCompact
	Supported for InteliATS
	Supported for InteliLite-NT
	Supported for MainsCompact-NT
	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 outputs
	Module has digital outputs
	Unit is 35 mm DIN rail mounted
	Unit is direct to controller mounted