ComAp
The heart of smart control

InteliDrive-Lite FPC

Compact Controller for Fire Pump Control with ECU support based on the NFPA 20 standard

SW version 1.6.0

Copyright © 2022 ComAp a.s.
Written by Lukáš Bečka
Prague, Czech Republic
ComAp a.s., U Uranie 1612/14a,
170 00 Prague 7, Czech Republic
Tel: +420 246 012 111
E-mail: info@comap-control.com, www.comap-control.com

Global Guide

Table of contents

1 Document information

back to Table of contents

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.**

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 Reference guide describes **FIRE PUMP CONTROLLER** functionality designed for single engine driven fire pumps and provides general information how to install and operate.

Controller functionality is based on standard InteliDrive – Diesel Control Unit with modification to follow NFPA 20 standard.

This manual is dedicated for Fire Pump control panel builders, Operators and for everybody who is concerned with installation, operation and maintenance of the engine applications.

1.3 Document history

Revision number	SW version	Date	Author
4	1.6.0	12.03.2020	Jakub Slavata
3	1.6.0	11.10.2019	Lukáš Bečka
2	1.6.0	5.8.2019	Lukáš Bečka
1	1.6.0	14.6.2019	Lukáš Bečka

1.4 Warning

Fire Pump Controller can be remotely controlled. In case of the work on the engine check, that nobody can remotely start the engine.

To be sure:

- Disconnect remote control via RS232 line
- Disconnect input REM START/STOP

or

- Disconnect output STARTER

Note: *Because of large variety of controller parameters settings, it is not possible to describe any combination. Some of controller functions are subject of changes depend on SW version. The data in this manual only describes the product and are not warranty of performance or characteristic.*

1.5 Legal notice

This End User's Guide/Manual as part of the Documentation is an inseparable part of ComAp's Product and may be used exclusively according to the conditions defined in the "END USER or Distributor LICENSE AGREEMENT CONDITIONS – COMAP CONTROL SYSTEMS SOFTWARE" (License Agreement) and/or in the "ComAp a.s. Global terms and conditions for sale of Products and provision of Services" (Terms) and/or in the "Standardní podmínky projektů komplexního řešení ke smlouvě o dílo, Standard Conditions for Supply of Complete Solutions" (Conditions) as applicable.

ComAp's License Agreement is governed by the Czech Civil Code 89/2012 Col., by the Authorship Act 121/2000 Col., by international treaties and by other relevant legal documents regulating protection of the intellectual properties (TRIPS).

The End User and/or ComAp's Distributor shall only be permitted to use this End User's Guide/Manual with ComAp Control System Registered Products. The Documentation is not intended and applicable for any other purpose.

Official version of the ComAp's End User's Guide/Manual is the version published in English. ComAp reserves the right to update this End User's Guide/Manual at any time. ComAp does not assume any responsibility for its use outside of the scope of the Terms or the Conditions and the License Agreement.

Licensed End User is entitled to make only necessary number of copies of the End User's Guide/Manual. Any translation of this End User's Guide/Manual without the prior written consent of ComAp is expressly prohibited!

Even if the prior written consent from ComAp is acquired, ComAp does not take any responsibility for the content, trustworthiness and quality of any such translation. ComAp will deem a translation equal to this End User's Guide/Manual only if it agrees to verify such translation. The terms and conditions of such verification must be agreed in the written form and in advance.

For more details relating to the Ownership, Extent of Permitted Reproductions Term of Use of the Documentation and to the Confidentiality rules please review and comply with the ComAp's License Agreement, Terms and Conditions available on www.comap-control.com.

Security Risk Disclaimer

Pay attention to the following recommendations and measures to increase the level of security of ComAp products and services.

Please note that possible cyber-attacks cannot be fully avoided by the below mentioned recommendations and set of measures already performed by ComAp, but by following them the cyber-attacks can be considerably reduced and thereby to reduce the risk of damage. ComAp does not take any responsibility for the actions of persons responsible for cyber-attacks, nor for any damage caused by the cyber-attack. However, ComAp is prepared to provide technical support to resolve problems arising from such actions, including but not limited to restoring settings prior to the cyber-attacks, backing up data, recommending other preventive measures against any further attacks.

Warning: Some forms of technical support may be provided against payment. There is no legal or factual entitlement for technical services provided in connection to resolving problems arising from cyber-attack or other unauthorized accesses to ComAp's Products or Services.

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.

1.6 Certificates and standards

EN 60068-2-30 EN 61000-6-1 EN 61000-6-2 EN 61000-6-3 EN 61000-6-4 UL 6200	CE c UL® US
List of standards is available on: https://webstore.iec.ch/	

1.7 General

Fire Pump Controller is a comprehensive controller for single engine pump sets. Controller is equipped with a powerful graphic display showing icons, symbols and bar-graphs for intuitive operation, which sets, together with high functionality, new standards in engine-set controls. The Fire Pump Controller functionality corresponds to NFPA 20 standard.

Controller automatically starts, stops the engine on external signal in AUT mode or by pressing panel push buttons if there are no active or not confirmed Sd alarms active in TEST mode.

Controller ignores engine protections except Emergency Stop and Overspeed protection in AUT mode. Controller ignores even ShutDown (SD) protections aswell.

The engine can be energized by two batteries A and B and two separate Starters.

The controller monitors voltages of two batteries A and B on AIN4 and AIN5 Analog inputs.

1.7.1 Starting procedure (with one starter)

The starting procedure is provided by the Starter binary output together with the **START A (PAGE 147)** or **START B (PAGE 147)**.

The Starter binary output only follows cranking attempts meanwhile both **START A (PAGE 147)** and **START B (PAGE 147)** follow the starting procedure according to the NFPA 20 standard.

The first cranking attempt is provided by the **STARTER (PAGE 148)** and **START A (PAGE 147)**. The maximum cranking time is given by **MaxCrank time (page 75)**. If the start is not successful after a cranking pause the next cranking is provided by the **STARTER (PAGE 148)** and **START B (PAGE 147)** for **MaxCrank time (page 75)** period. The cranking pause is given by **CrnkFail pause (page 76)**. Finally the batteries A and B are basically used during cranking procedure as follows according to NFPA 20 standard:

- **1st cranking attempt**
  - 15 second crank from battery **A: BO: Starter and BO: Start A** are closed
  - 15 second pause
- **2nd cranking attempt**
  - 15 second crank from battery **B: BO: Starter and BO: Start B** are closed
  - 15 second pause
- **3rd cranking attempt:**
  - 15 second crank from battery **A: BO: Starter and BO: Start A** are closed
  - 15 second pause
- **and so on.**

The total number of cranking attempts is defined by **Crank attempts (page 76)**.

Both battery A and B voltages are monitored all the time with a default 3s delay (**Batt A del (page 102)**; **Batt B del (page 103)**) for activation of over/under voltage warning protections (**Batt A over V (page 101)**/**Batt A under V (page 101)**; **Batt B over V (page 102)**/**Batt B under V (page 102)**).

In the case when the voltage of one of the batteries gets out of limits of the operation level the battery becomes locked out from further cranking and following alarms are displayed:

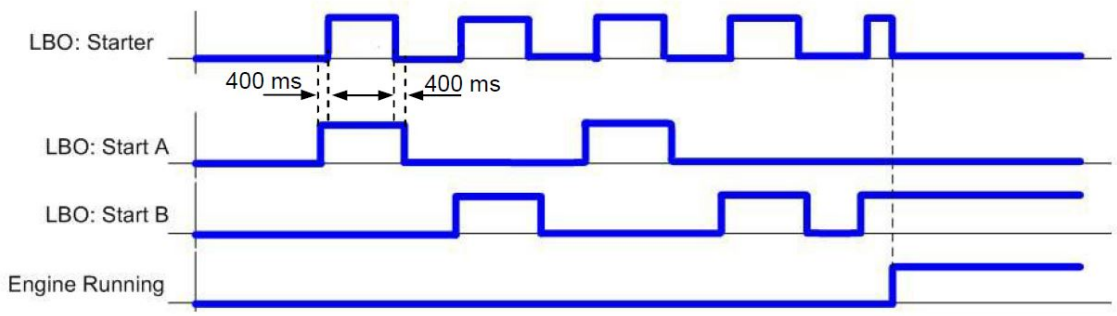
- for fail of a Battery A: Wrn BatteryA;
- for fail of a Battery B: Wrn BatteryB;
- in the case the power supply voltage of the controller had dropped under 8 VDC during previous cranking it caused a restart of the controller and there is an alarm Wrn Batt flat displayed after restart of the controller.

In the case when both battery voltages A and B get out of limits, the crank procedure will follow both batteries A and B again alternating binary outputs Batt A and Batt B.

In the case of un unsuccessful starting attempt, LBO Starter is activated 400 ms after the activation of the LBO Start x (x=A or B) and is deactivated 400 ms before the deactivation of the LBO Start x.

When the starting attempt is successful so that the engine becomes running, the LBO Start x remains activated until the end of stopping procedure (the Stop Solenoid must be energized during the Stop time). The same LBO Start x (the same battery) will also be used as the first one for the next cranking procedure.

Note: *After the controller initialization, the first starting attempt is always from the battery A.*



1.8 What is in the package

Accessories	Description	Optional/Obligatory
ID-FLX FPC	InteliDrive-Lite central unit	Obligatory
Communication plug-in		
IL-NT RS232	RS232 communication card	Optional plug-in
IL-NT 232/485	Combined communication card	
IL-NT S USB	USB communication card	Optional plug-in
IB-Lite	Ethernet/Internet interface	Optional plug-in
Extension plug-in		
IL-NT AOUT8	8 AOUT Gauge driver card	Optional plug-in
IL-NT AIO	4xAIN + 1x AOUT	Optional plug-in
IL-NT IO1	4xBIN + 4xAOUT	Optional plug-in
IL-NT BIO8	8x BIN or BOUT	Optional plug-in
External modules		

Accessories	Description	Optional/Obligatory
IL-NT RD	Remote display	Optional
IGL-RA15	Remote annunciator	Optional
IG-IB	Internet communication bridge	Optional

back to Document information

2 System overview

back to Table of contents

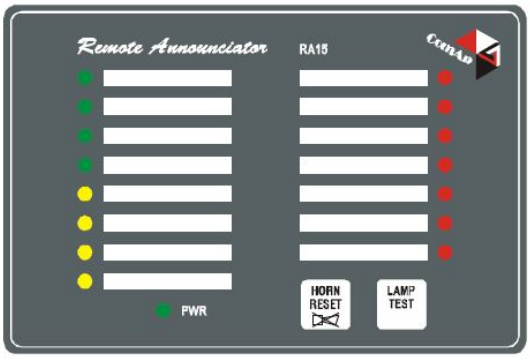
2.1 IL-NT RD Remote display

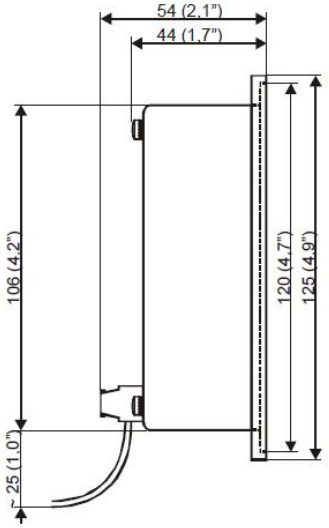
IL-NT RD is remote display for controller. Remote display provides the same control and monitoring functions as controller itself. No programming of the display is required – unit is self configurable from main controller. It is connected with controller via RS232 line. Longer distances (up to 1200m) are possible when RS232/RS485 converters are used.

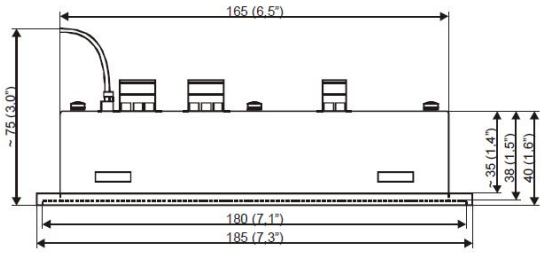
2.2 Remote announciator IGL-RA15

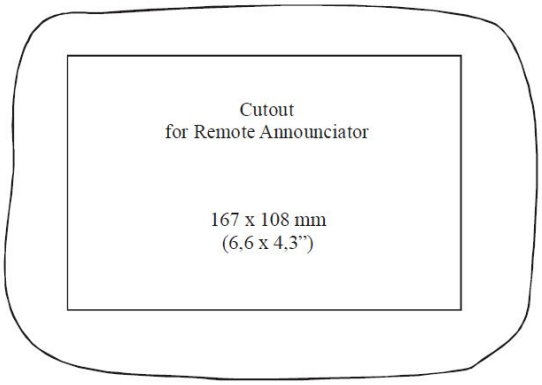
The remote announciator IGL-RA15 can be connected to the controller unit via CAN bus. Any of the binary outputs can be configured (using LiteEdit (3.0 or higher) software) to each LED diode on the RA15. The module (just one) can be also enabled and configured using LiteEdit software.

Just Warning alarm is indicated when communication to RA15 is interrupted.

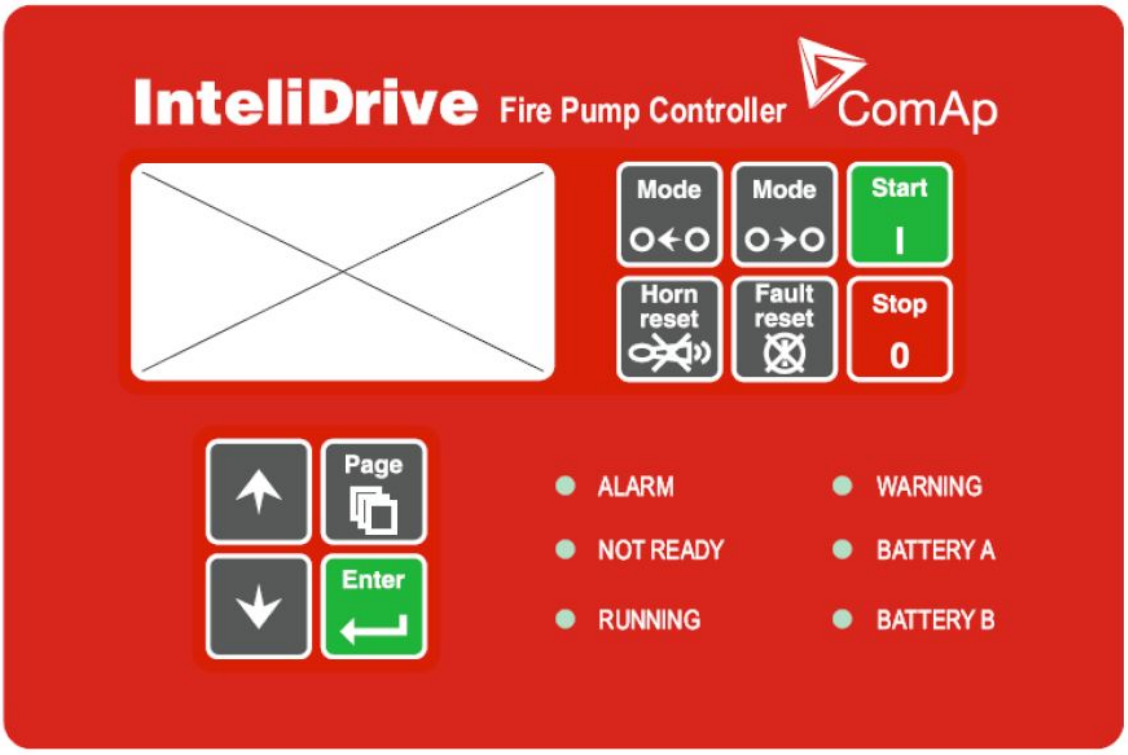




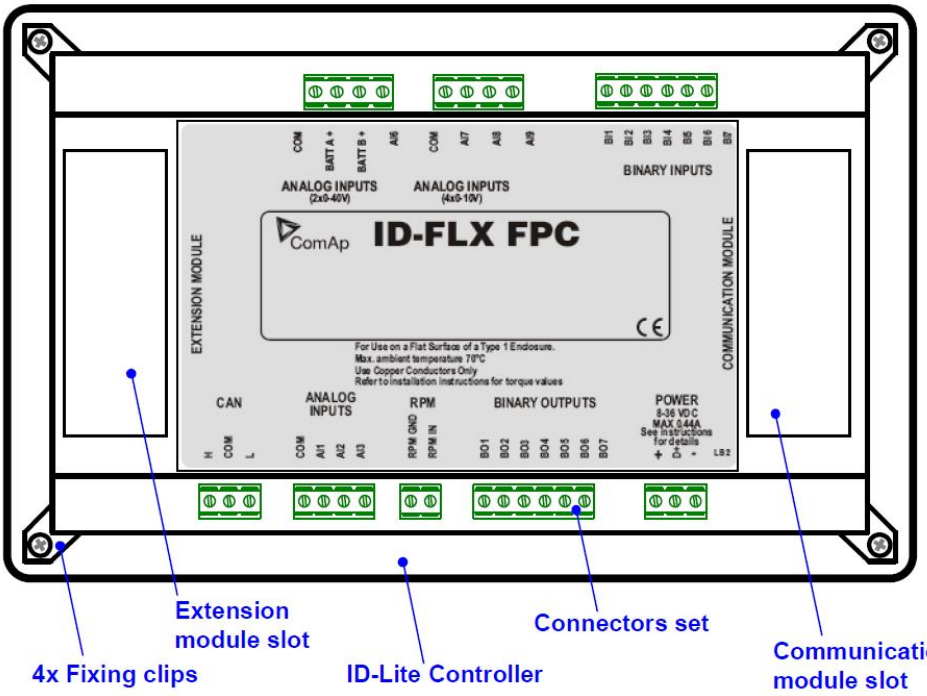




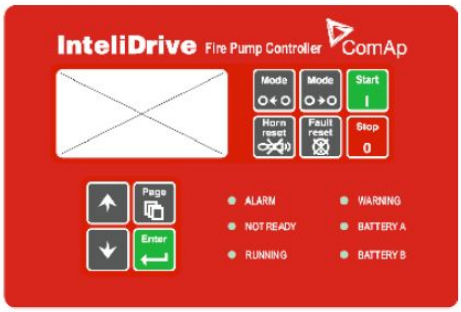
2.3 Fire Pump Controller terminals

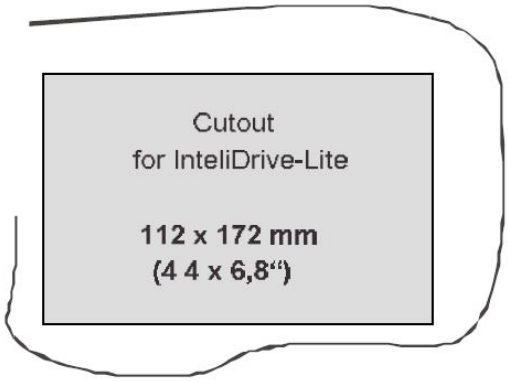


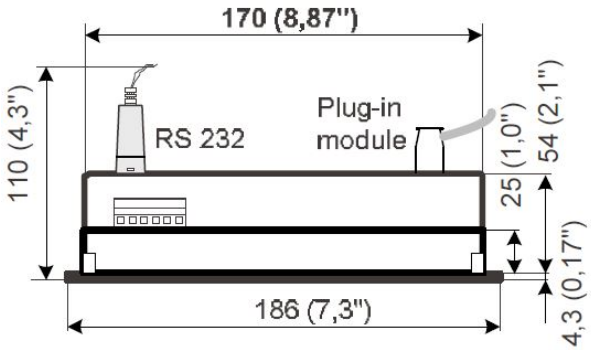
2.3.1 Terminals

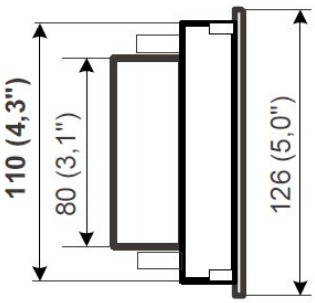


2.3.2 Dimensions









back to System overview

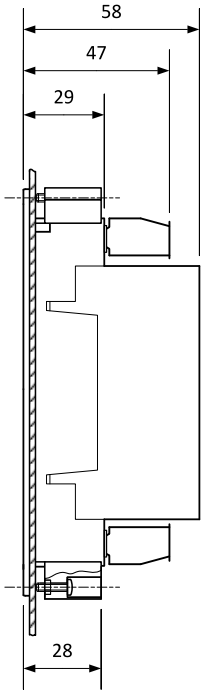
3 Installation and wiring

back to Table of contents

3.1 Mounting

① Plug in module

Panel door mounting



Overview of parameter x

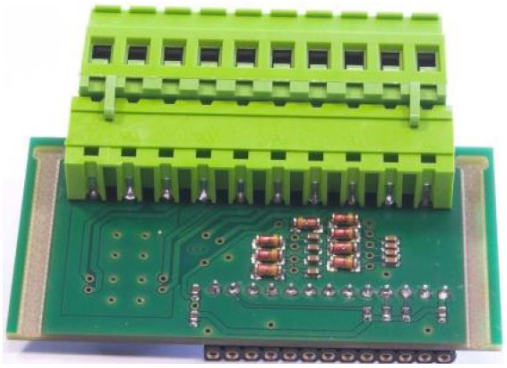
Plug-in module	Parameter x [mm]
IL-NT-AOUT8	75
IL-NT-BIO8	74
IL-NT-IO1	75
IL-NT-AIO	75
IL-NT-RS232	113
IL-NT-RS232-485	115 @ RS232 / 74 @ RS485
IL-NT-S-USB	128
IB-Lite	108
IL-NT-GPRS	122

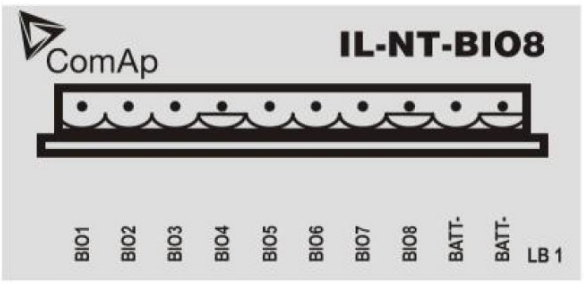
Note: *Parameter x includes reserve for connectors of plug-in modules.*

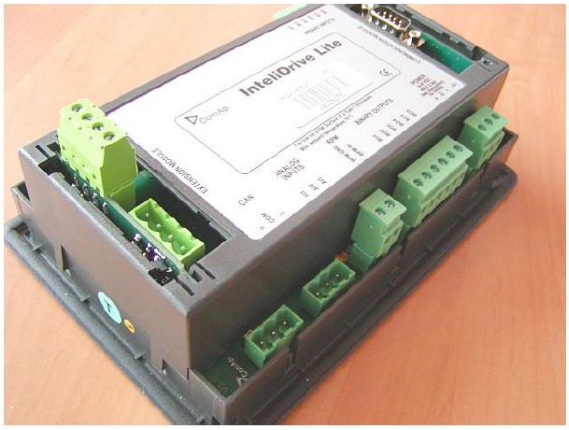
Note: *InteliDrive FPC can be mounted into panel doors as a standalone unit using provided metal holders. The cut-out for the unit should be 1mm wider then the unit on each side (i.e. cut-out dimensions 172x112mm). Recommended torque for holders is 0.15 N·m.*

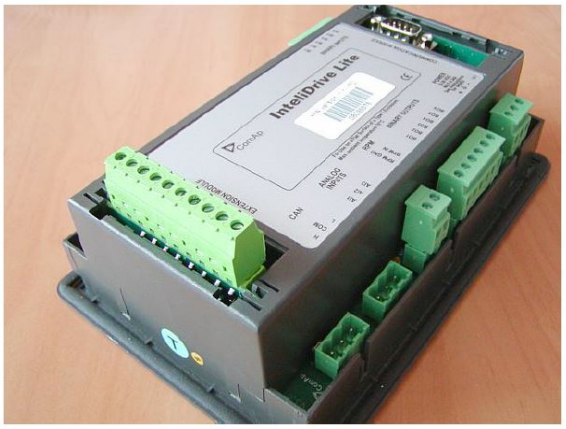
3.2 Plug-in module installation

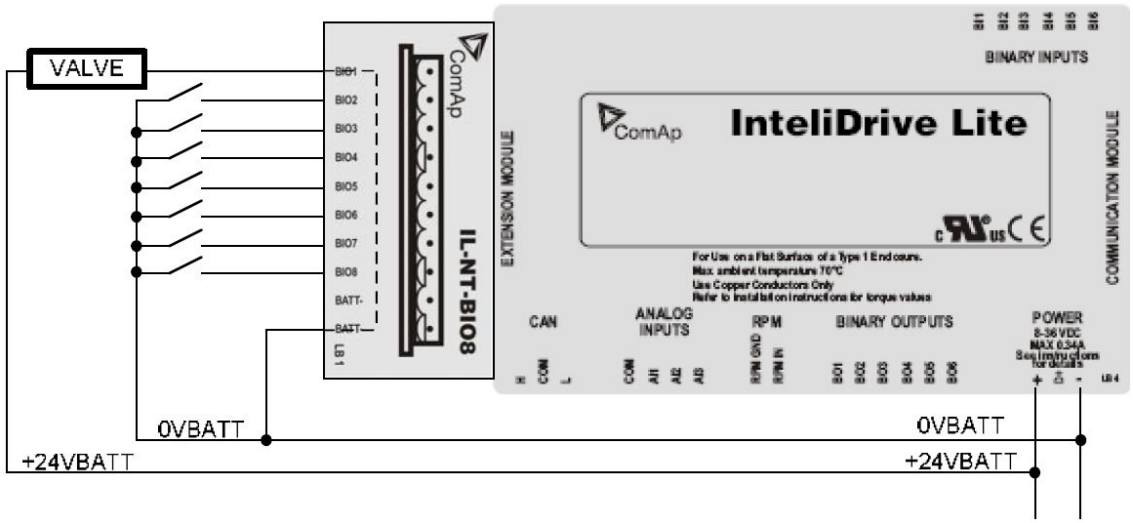
To insert the module, you must open the cover first (use screwdriver to open) and then insert the module into slot. Once you have inserted it, the module will snap under plastic teeth. It is supposed to be installed permanently. Should you need to remove it, the safest way is to remove the whole back cover and than remove module manually.











IL-NT-BIO8 BATT- terminal has to be connected to 0VBAT in case at least one Binary output is configured or to both BATT- when more than four Binary outs are connected.

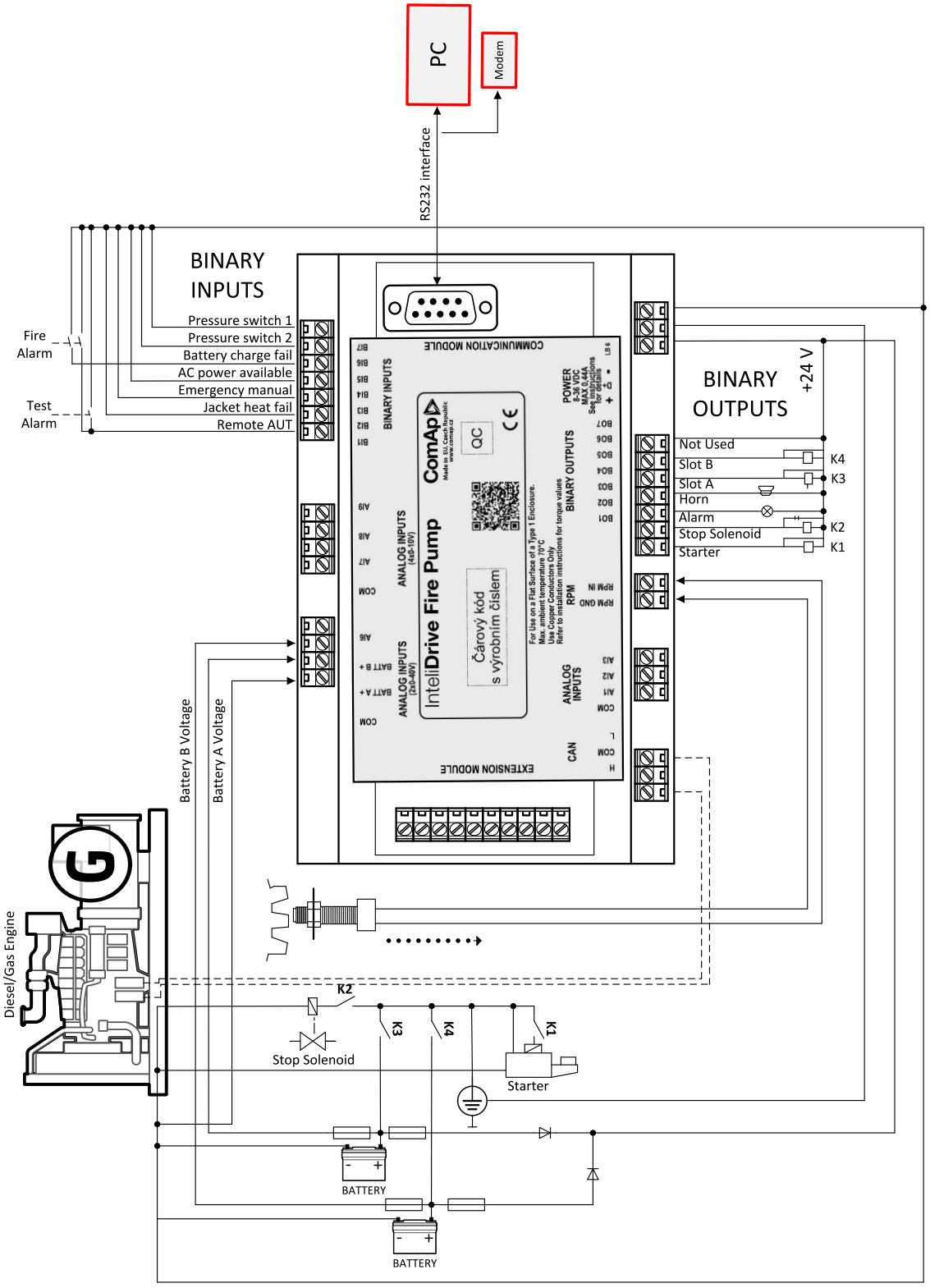
	1	2	3	4	5	6	7	8	9	10
IL-NT-AOUT8	0V	+VBatt	AOUT1	AOUT2	AOUT3	AOUT4	AOUT5	AOUT6	AOUT7	AOUT8
IL-NT-IO1	0V	+VBatt	AOUT1	AOUT2	AOUT3	AOUT4	BIN7	BIN8	BIN9	BIN10
IL-NT-	BIO1	BIO2	BIO3	BIO4	BIO5	BIO6	BIO7	BIO8	0V	0V

	1	2	3	4	5	6	7	8	9	10
BIO8										
IL-NT-AIO	AIN1	AIN2	AIN3	AIN4	n.c.	n.c.	I out	U out	PWM out	n.c.

3.3 Recommended wiring

3.3.1 Fire Pump Controller – Wiring diagram

The diagram below shows the basic wiring of the controller. There are two options to connect either a mechanical engine via I/O, pick-up sensor or an electronic engine via CAN bus. The diagram also shows correct wiring of both batteries A and B (required by NFPA 20) and also note the power supply of the **FIRE PUMP CONTROLLER** comes from both batteries via two diodes.


PC
Modem
RS232 interface
BINARY INPUTS
Pressure switch 1
Pressure switch 2
Battery charge fail
AC power available
Emergency manual
Jacket heat fail
Remote AUT
Fire Alarm
Test Alarm
BINARY OUTPUTS
+24 V
Not Used
Slot B
Slot A
Horn
Alarm
Stop Solenoid
Starter
K4
K3
K2
K1
COMMUNICATION MODULE
EXTENSION MODULE
InteliDrive Fire Pump
ComAp
Čárový kód s výrobním číslem
Battery B Voltage
Battery A Voltage
Diesel/Gas Engine
Stop Solenoid
Starter
BATTERY
BATTERY

3.4 How to install

3.4.1 General

To ensure proper function:

- Wiring for binary and analog inputs must not be run with power cables.
- Analog and binary inputs should use shielded cables, especially when length >3m.

3.4.2 Power supply

To ensure proper function:

- Use min. power supply cable of 1.5mm^2
- Use min. power supply cable of 1.5mm^2 Maximum continuous DC power supply voltage is 36 VDC. Maximum allowable power supply voltage is 39 VDC. The controller power supply terminals are protected against large pulse power disturbances. When there is a potential risk of the controller being subjected to conditions outside its capabilities, an outside protection devise should be used.

Note: *The controller should be grounded properly in order to protect against lighting strikes!!*
The maximum allowable current through the controller's negative terminal is 4A (this is dependent on binary output load).

For the connections with 12VDC power supply, the controller includes internal capacitors that allow the controller to continue operation during cranking if the battery voltage dip occurs. If the voltage before dip is 12V, after 150ms the voltage recovers to 7 V, the controller continues operating. During this voltage dip the controller screen backlight can turn off and on but the controller keeps operating. It is possible to further support the controller by connecting the external capacitor or I-LBA module.

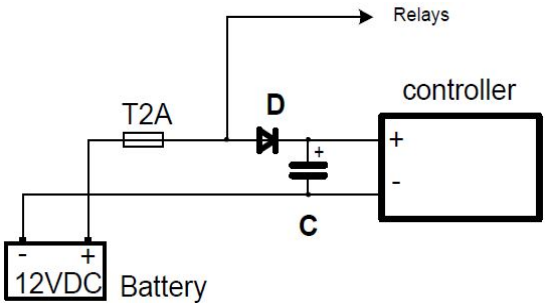


Image 3.1 Connecting the external capacitor

The capacitor size depends on required time. It shall be approximately thousands of microfarads. The capacitor size should be 5 000 microfarad to withstand 150ms voltage dip under following conditions:

Voltage before dip is 12 V, after 150ms the voltage recovers to min. allowed voltage, i.e. 8 V

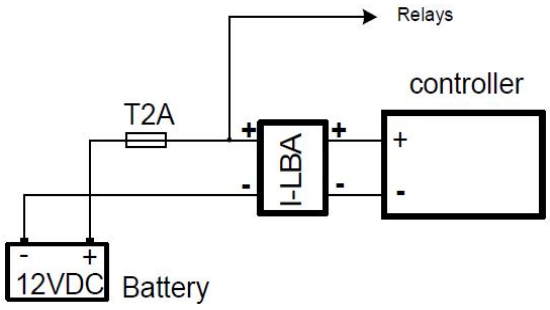


Image 3.2 Connecting I-LBA – Low Battery Adaptor module

The I-LBA module ensures min. 350ms voltage dip under following conditions:

RS232 and other plug-in module is connected.

Voltage before dip is 12V and after 350ms the voltage recovers to min. allowed voltage 5V, The I-LBA enables controller operation from 5 VDC (for 10 to 30 sec).

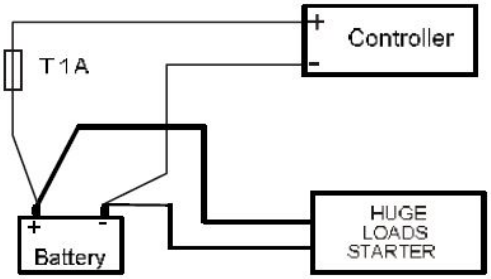
The wiring resistance from battery should be up to 0.1 Ohm for I-LBA proper function.

3.4.3 Power supply fusing

Note: *A one-amp fuse should be connected in-line with the battery positive terminal to the controller and modules. These items should never be connected directly to the starting battery.*

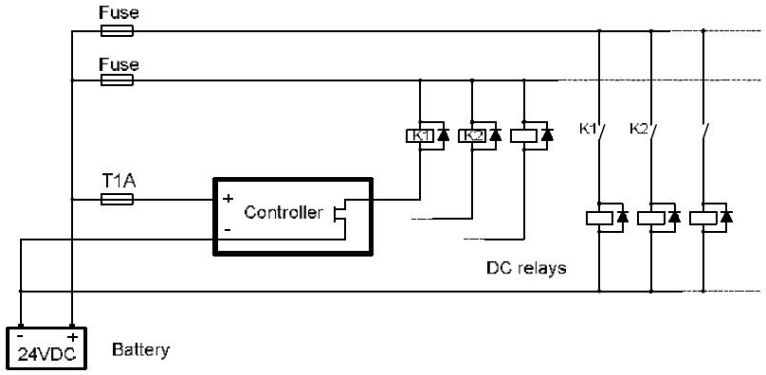
Fuse value and type depends on number of connected devices and wire length.

Recommended fuse (not fast) type - T1A. Not fast due to internal capacitors charging during power up.



3.4.4 Binary output protections

Note: *Do not connect binary outputs directly to DC relays without protection diodes, even if they are not connected directly to controller outputs.*



3.4.5 Grounding

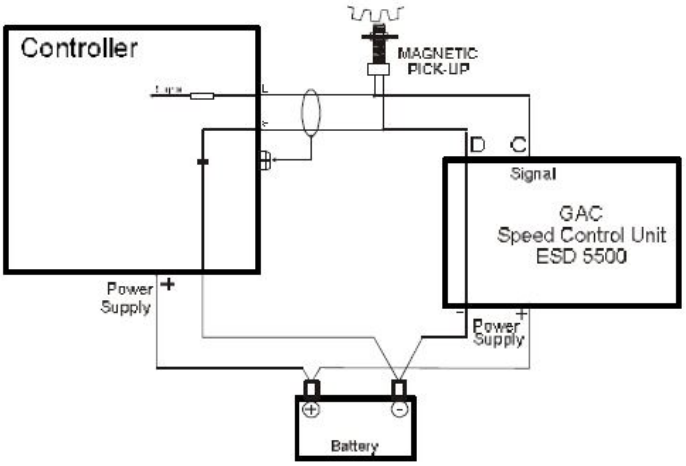
To ensure proper function:

- Use as short as possible cable to the grounding point on the switchboard
- Use cable min. 2.5mm^2

Note: *The "-" terminal of the battery has to be properly grounded.*

3.4.6 Magnetic pick-up

Use a shielded cable to ensure proper function:



Be aware of interference signal from Speed governor when one speed pick-up is used.

If engine will not start:

- Check ground connection from pick-up to controllers, eventually disconnect ground connection to one of them
- Galvanic separate controller RPM input using ComAp separation transformer RPM-ISO (1:1)
- Use separate pick-up for Speed governor and controller.

3.5 Analog inputs

AI1, AI2, AI3	Resistive 0-2.5 kΩ	Fully configurable
AI4, AI5	0-40.0 V DC	Battery A, B voltage – Not configurable
AI6, AI7, AI8, AI9	Voltage 0-10.000 V DC	Configurable name and Sensor characteristics
AIO-AI1 – AIO-AI4	2.5k kΩ / 4 V / 20 mA	Plug-in module: Fully configurable

Note: *Precision is 4 %, ±5 Ω.*

Note: *The nominal range of Analog inputs measuring is 0-10 V (0-40 V), nevertheless the input is able to measure up to 12.5 V (53 V), but with lower precision. Precision is 1 %, ±100 mV (±400 mV).*

Note: *When Engine Control Unit is connected, it is possible to read InteliDrive Analog inputs values AIN1, 2, 3 from CAN bus (J1939).*

3.5.1 Configuration

Each analog input can be configured by LiteEdit (3.0 or higher) software following way.

Analog input item	LiteEdit		Possibility
Type	Type	Not used Alarm	Analog input isn't used
Analog input name	Name		Up to 14 ASCII characters
Config of input	Config	Analog	Analog measuring in specified range
		Binary	Binary: open/close - threshold 750 Ω for AIN1-AIN3 or 7.5V for AIN6-AIN9.
		Tri-state	Tri-state: open/close - threshold 750 Ω, Failure <10 Ω or > 2400 Ω Available for AIN1 –AIN3 only
Physical dimension	Dim	bar,%,°C,…	Up to 3 ASCII characters (Valid only for analog inputs)
Polarity	Contact type	NC	Valid only for binary and three-state inputs
		NO	Valid only for binary and three-state inputs
Protection direction	Protection	Over	Overstep. Sensor fail does not activate protection
		Over+Fls	Overstep and Sensor fail activates protection
		Under	Under step. Sensor fail does not activate protection
		Under+Fls	Under step and Sensor fail activates protection
Sensor characteristic	Sensor	Curve A	User curve A
		Curve B	User curve B
		Curve C	User curve C
Decimal points	Dec	0, 1, 2	Number of decimal points (Valid only for analog inputs)

User Curves A, B, C are adjustable in LiteEdit (3.0 or higher) – use "Points" button..

Each Analog input has separate set points for two level alarm setting. Analog input alarm levels and delay adjust in **Protection** or **Engine protection** group.

Note: *Current sensor can be connected to AI1, AI2, and AI3 resistive input when external resistor 120 ohms is connected between Aix and AI-COM. In such a case use following sensor characteristics.*

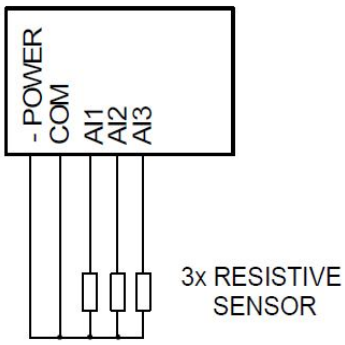
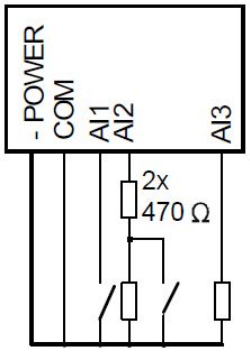
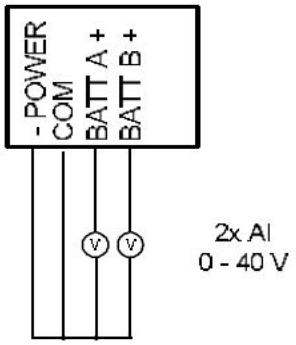
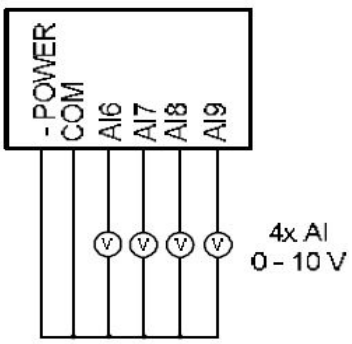
3.5.2 Default current sensor characteristic with external resistor 120 ohms

> **IMPORTANT: This method reduces the input resolution by less than 50%.**

	4-20mA/100		0-20mA/100		0-20mA/-20 - 120°C
Primary	**Converted**	**Note 1**	**Note 2**	**Note 3**	**Note 4**
120			0 mA	0%	-20 °C
170	0	0%	4 mA	20%	8 °C
200	13				22 °C
230	25	25%	8 mA	40%	36 °C
280	38				50 °C
330	50	50%	12 mA	60%	64 °C
390	63				78 °C
460	75	75%	16 mA	80%	92 °C
560	88				106 °C
690	100	100%	20 mA	100%	120 °C

Note:
Note 1 – % range for 4-20 mA input
Note 2 – Range 0-20 mA
Note 3 – Range for 0-20 mA input
Note 4 – Characteristic 0-20 mA / -20 - +120 °C

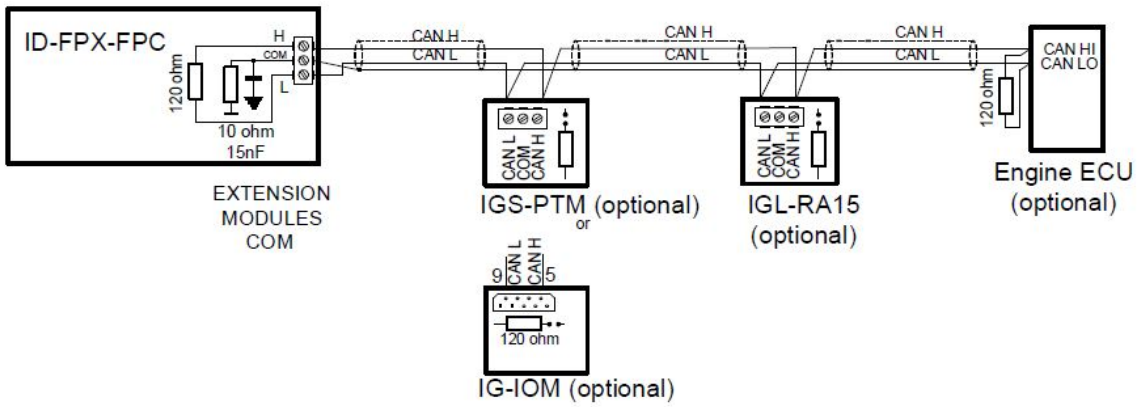
3.5.3 Connection of controller analog inputs

	Standard connection of three resistive sensors to analog inputs.
	Mixed connection of controller analog inputs: › AI1 – binary input › AI2 – three state input › AI3 – analog resistive input
	Two inputs for Battery voltage measuring The voltage range is **0.0 – 40.0 V**
	Four voltage inputs connection The voltage range is **0.000 – 10.000 V**

Analog inputs are designed for resistive sensors with resistance in range of 0 Ω to 2.4 kΩ.

To ensure a proper function use shielded cables, especially for length over >3m.

3.6 Extension modules – CAN bus connection



3.6.1 Connection rules

CAN bus line must be connected in series, from one unit to the next (no star, no cable stubs, and no branches) both ends must by the 120-ohm (internal or external) resistor terminated. Maximal CAN bus length is up to 200 meters.

For CAN data cables details **see Technical data on page 54** – Communication interface. CAN cable shielding connect to controller COM terminal.

Controller contains internal fix 120Ω resistor and must be located on the CAN bus end. To be sure check resistor presence by ohmmeter. Unit with internal resistor connect to the end of CAN line.

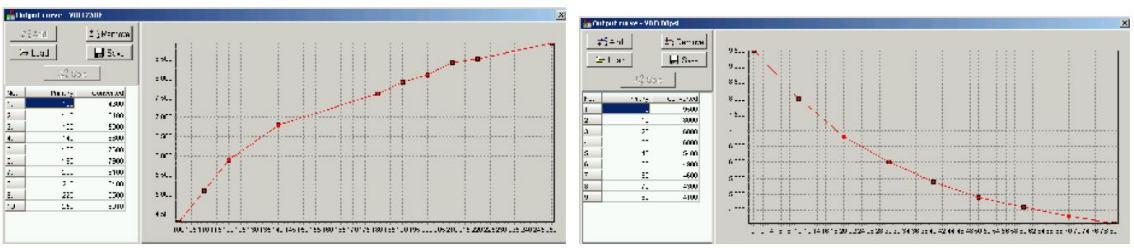
Use **J1939 button** in LiteEdit (3.0 or higher) configuration window to activate CAN (J1939) interface.

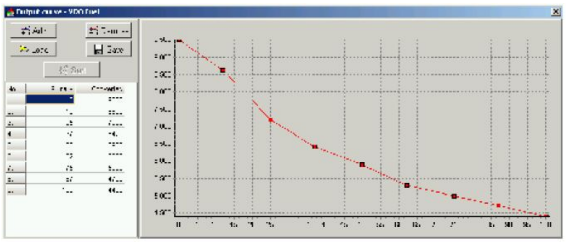
3.7 Analog outputs

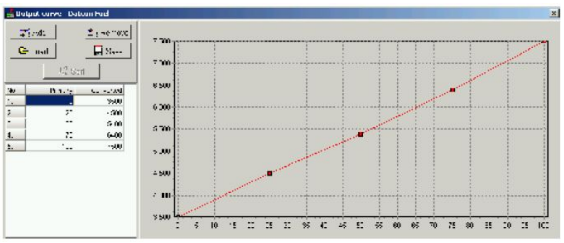
Optional plug in card IL-NT AOUT8 provides eight Pulse-With-Modulation (PWM) outputs. These are intended to drive VDO style analog gauges. This is to provide visual indication of typically ECU values without installing additional sensors on the engine. PWM signal emulates sensor which would be typically mounted on the engine.

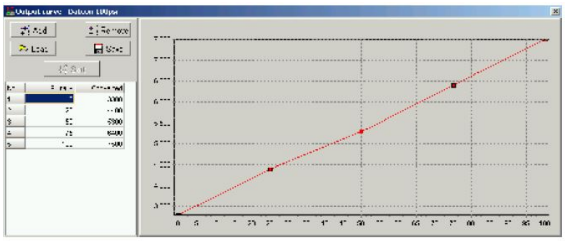
Any value from controller may be configured to the outputs. Use LiteEdit PC SW to configure corresponding sensor/gauge curve and value selection.

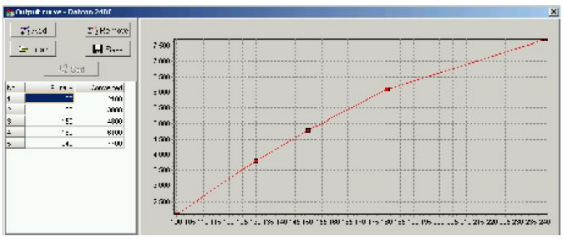
3.7.1 Default analog output curves

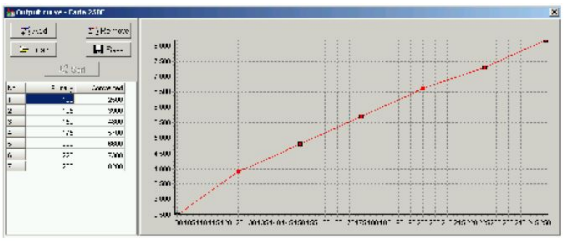


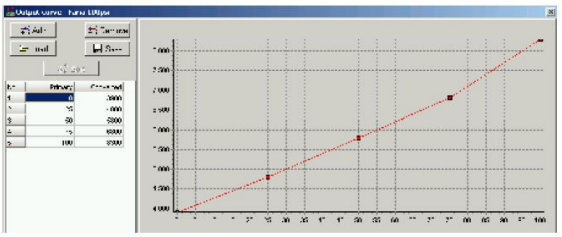


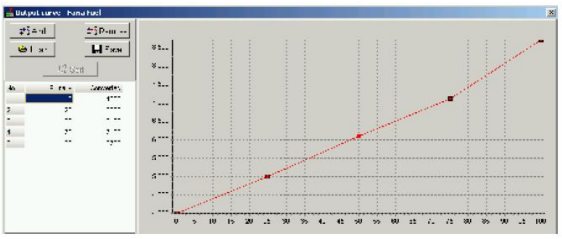




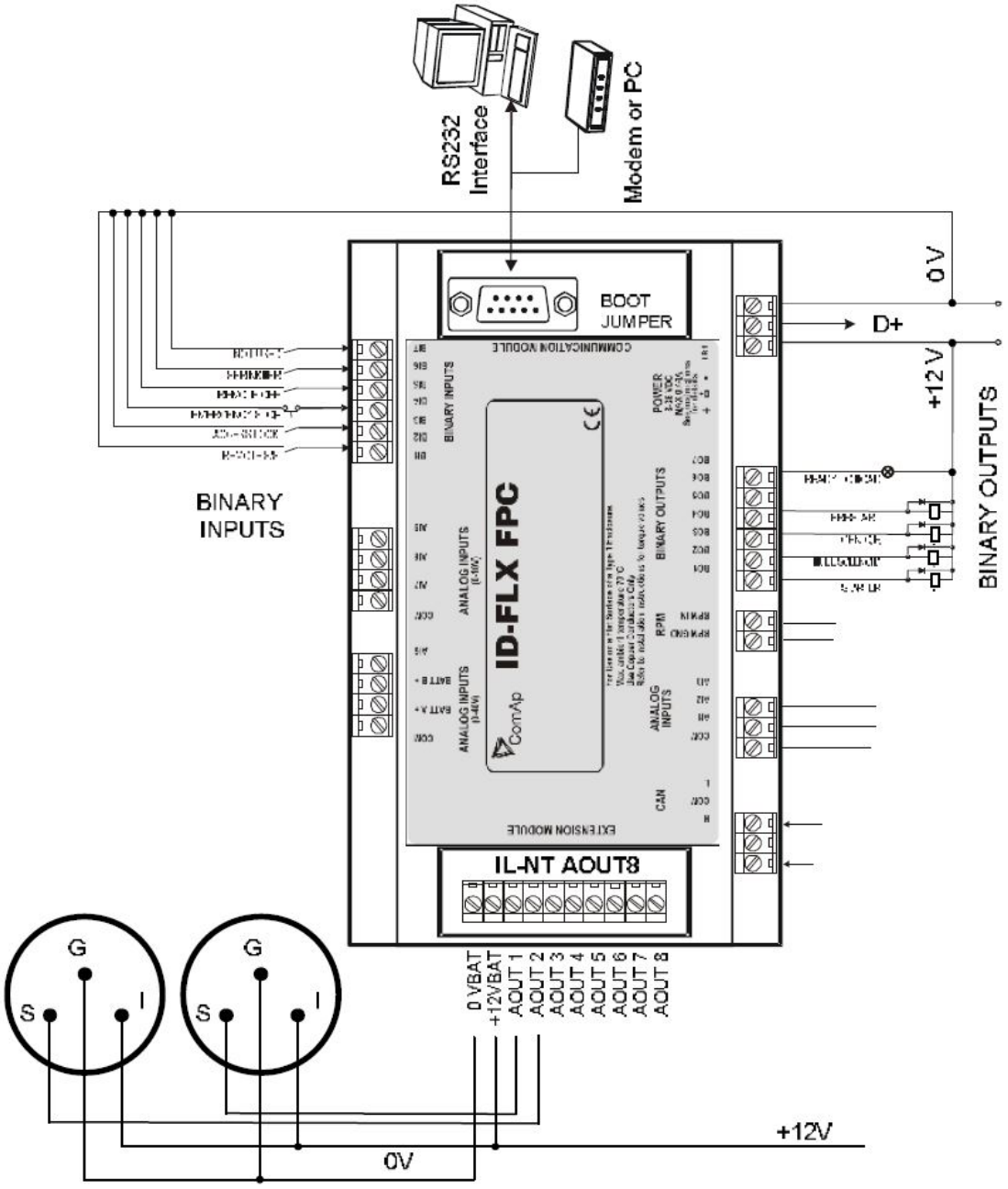




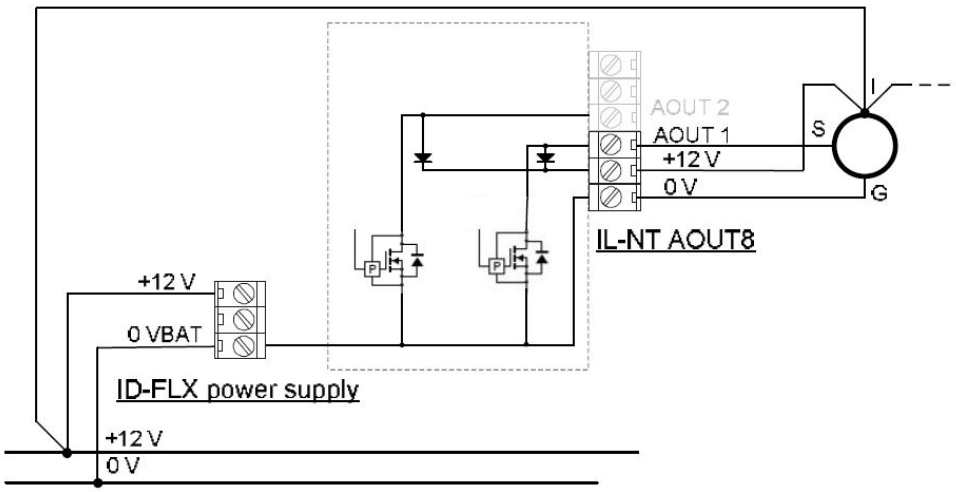




3.7.2 IL-NT-AOUT8 wiring example for Datcon gauges



3.7.3 Internal IL-NT AOUT8 wiring



back to Installation and wiring

4 Controller setup

back to Table of contents

4.1 ECU-controlled engine support

There exists only one firmware branch for both standard and electronic controlled (monitored) engines.

Presence of the ECU on the CAN bus/RS232 is configured via LiteEdit (3.0 or higher). Pressing the **ECU button** in Configuration window of LiteEdit (version 2.0 and higher), opens ECU dialog window where the appropriate engine/ECU type should be selected. There are three groups of engine/ECU types:

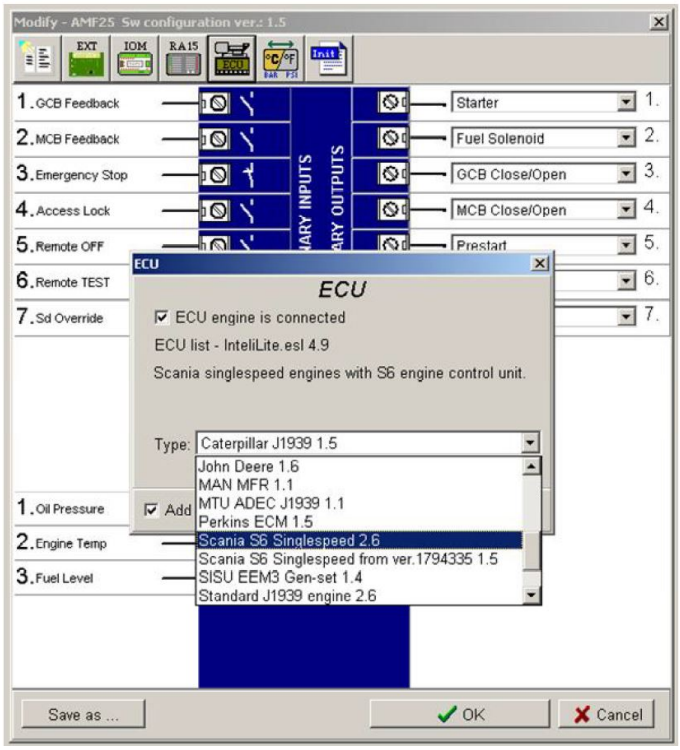
Type selection	Supported engine/ECU
Caterpillar EMCP3.1	
Caterpillar J1939	
Cummins CM570	
Cummins MODBUS	Cummins engines with Modbus communication support
DDC DDEC IV	Detroit Diesel DDEC IV, V
Deutz EMR2	
Iveco	
Jenbacher Diane	
John Deere	
Perkins ECM	
Scania S6 Singlespeed	Scania engines with S6 unit
Scania S6 Singlespeed	Scania engines with S6 unit
SISU EEM3 engine	
Standard J1939 engine	All other engine brands with J1939 support
Volvo Aux	Volvo Penta engines with EMSII, EDCIII units

Note: *ECU list – Gen-sets.esl, version 3.4*

Note: *Import latest ECU list – Gen-sets.iwe for up to date engine ECU specification.*

An ECU which enables speed control can be controlled by controller. The speed request in % (**ECU SpeedAdj (page 83)**) is transferred to RPM range according the formula: 0 % = 1200 RPM; 100 % = 2700 RPM.

The controller always sends either speed request = 0 % or the IDLE command via J1939 in controller IDLE state. In the TEST mode the IDLE operation can be controlled by **NOMINAL/IDLE (PAGE 121)**.



If the connected engine is Cummins communicating via RS232, it is necessary to set the setpoint Basic settings: RS232 mode = CUMMINSMB.

Loss of communication causes shutdown of the running engine. On the contrary, the ECU can be switched off at quiescent engine that means not-communicating ECU is in that moment normal situation. All values from ECU shall show ####, but no alarm is displayed. The output ECU CommOK follows the real situation that means it is not active anytime when the ECU does not communicate.

The output ECU PwrRelay closes at the beginning of prestart and opens if the engine shall be stopped.

The engine is started via standard contact output or via CAN bus (for Volvo and Scania engines). For other engines J1939 is used for monitoring only.

4.1.1 Values read from ECU

Value name	Short name	Dimension	Type	Frame name
EngOil Filter Diff.Press	OilDiffPres	bar	ANA	DD
Amber Warning Lamp	AmberWrnLamp	-	BIN	DM1
Malfunction Lamp	MalfunctLamp	-	BIN	DM1
Protect Lamp	ProtectLamp	-	BIN	DM1
Red Stop Lamp	RedStopLamp	-	BIN	DM1
Engine speed	RPM	RPM	ANA	EEC1
Engine Oil Pressure	EngOil Press	bar	ANA	EFLP1
Coolant Temp	Coolant Temp	°C	ANA	ET1
Total Engine Hours	EngineHours	h	ANA	HR
Boost Pressure	Boost Press	bar	ANA	IC
Intake Manifold Temp	Intake Temp	°C	ANA	IC

4.1.2 Cummins MODBUS

When “Cummins-Modbus” option is selected, following values are read from Modbus Register Data (for QSX15,QSK45, QSK60):

Value name	Short name	Dimension	Type	Frame name
Red Shutdown Lamp	Red Lamp	-	BIN	10005
YellowWarning Lamp	Yellow Lamp	-	BIN	10006
Engine Speed	RPM	RPM	ANA	30001
Coolant Temp	Coolant Temp	°C	ANA	30002
Oil Pressure (psig)	Oil Press	bar	ANA	30003
Oil Pressure (psia)	Oil Press	bar	ANA	30003
Running Time	Running Time	h	ANA	30008
Fuel Rate (UK)	Fuel	L/h	ANA	30018
Fuel Rate (US)	Fuel	L/h	ANA	30018
Intake Manifold Press	Intake Press	bar	ANA	30530
Intake Manifold Temp	Intake Temp	°C	ANA	30531

4.1.3 Diagnostic messages read from ECU

Diagnostic messages are read and displayed in extra ECU Alarm list. For Standard J1939 SPN (Suspect Parameter Number), FMI (Failure Mode Identifier) and OC (Occurrence Counter) are shown together with verbal description if available.

One SPN (Suspect Parameter Number)/FMI (Failure Mode Identify) couple describes one fail information. If FMI is equal to 0 or 1, WRN is displayed in the ECU Alarm list. For any other FMI values, FLS is displayed.

Detail SPM/FMI code specification see in:

- SAE Truck and Bus Control and Communications Network Standards Manual, SAE HS-1939 Publication
- Or refer to corresponding engine manufacturer’s ECU error codes list.

4.1.4 List of received diagnostic codes

Fault code	Diagnostic code	Fault code	Diagnostic code	Fault code	Diagnostic code
51	ThrottlePos	158	BattPotential	636	PositionSensor
91	AccelPedalPos	168	ElectricalPot	637	TimingSensor
94	FuelDelPress	172	AirInlet Temp	639	J1939 CAN Bus
97	WaterInFuelInd	174	Fuel Temperat	651	InjectorCyl#1
98	EngineOilLevel	175	EngOil Temp	652	InjectorCyl#2
100	EngOil Press	189	RatedEngSpeed	653	InjectorCyl#3
101	CrankcasePress	190	EngineSpeed	654	InjectorCyl#4
102	Boost Press	231	J1939 Datalink	655	InjectorCyl#5
105	Intake Temp	237	VIN	656	InjectorCyl#6
106	AirInletPress	515	EngDesOpSpeed	677	EngStartRelay
107	AirFiltDifPres	620	5V SupplyFail	898	RequestedSpeed
108	BarometricPres	626	PrehActuator	970	AuxEngSdSwitch
110	EngCool Temp	628	EMSProgFailure	971	EngDerateSwtch
111	Coolant Level	629	Controller#1	1109	EngSdApproach
153	CrankcasePress	630	CalibrMemFail	1110	Engine Sd

Note: *Controller doesn't support J1587 diagnostic line on Volvo engines. This can cause in some cases a J1939 alarm message FC:000608 due to missing J1587 bus. Contact your Volvo distributor to update ECU firmware.*

For Scania Fault codes (FC) are displayed. Following messages are available for particular groups of Fault codes:

Fault code	Diagnostic code	Fault code	Diagnostic code
0×1000	Overspeed	0×6702	AlternatorChrg
0×1100	EngSpdSensor1	0×6A00	ExhaustBrkAct
0×1200	EngSpdSensor2	0×B000	OilPressProt
0×2000	WtrTempSensor	0×B100	CoolantLevProt
0×2100	ChrgAirTmpSens	0×B200	OverheatCoolWt
0×2200	ChrgAirPrsSens	0×B300	EmergencyStop
0×2300	OilTempSensor	0×B501	CoolantLevel
0×2400	OilPressSensor	0×C000	PDEInjctorCyl1
0×2600	SensorSupply1	0×C100	PDEInjctorCyl2
0×2700	SensorSupply2	0×C200	PDEInjctorCyl3
0×2800	ExtrAnalogInp	0×C300	PDEInjctorCyl4
0×3200	BatteryVoltage	0×C400	PDEInjctorCyl5
0×3300	CAN msg not ok	0×C500	PDEInjctorCyl6
0×3403	CAN version	0×C600	PDEInjctorCyl7

Fault code	Diagnostic code	Fault code	Diagnostic code
0×4300	HWWatchdog	0×C700	PDEInjctorCyl8
0×6200	FanActuator	0×E200	OverheatProt
0×6400	WasteGateAct	0×E600	CoordEmergStop
0×6600	StarterActuatr		

4.1.5 Analog inputs

Reading of mentioned values from ECU enables to use analog inputs of the unit for other purposes, e.g. measuring, displaying and alarm activation related to various quantities. The configuration thus allows using three analog inputs on the central unit and four analog inputs on IL-NT-AIO module if connected.

If the engine without ECU is controlled by controller, the first analog input is permanently configured to Oil pressure; other analog inputs remain freely configurable.

4.1.6 Engines not started via CAN bus

PERKINS 2800 series

controller binary output description	Perkins Customer interface connector
Start output	connects directly to engine starter solenoid
Fuel output	1,10,15,33,34 powers up ECU and enables the injectors
controller CAN description	Perkins Customer interface connector
CAN bus common	Screen for the J1939 cable.
CAN bus H	31
CAN bus L	32

JOHN DEERE

controller binary output description	John Deere 21 pin Deutsch connector
Start output	D
Fuel output	G (switched ECU power),J (ignition)
controller CAN description	John Deere 21 pin Deutsch connector
CAN bus common	Screen for the J1939 cable.
CAN bus H	V
CAN bus L	U

CUMMINS ISB/ISBE

controller binary output description	Cummins ISB OEM Harness connector B
Start output	connects directly to engine starter solenoid
Fuel output	39
controller CAN description	Cummins ISB 9 pin Deutsch connector
CAN bus common	SAE J1939 shield - screen for J1939 cable.
CAN bus H	SAE J1939 signal
CAN bus L	SAE J1939 return

4.2 Sensor specification

4.2.1 Background of the sensor calibration

To correct measuring error of each analog input (pressure, temperature, level) calibrating constants within 10 % of measure range should be set. Three (seven) calibrating constants are set in physical units - bar, °C, % . From these constants are counted equivalent calibrating resistances which are internally (in software) add to sensor resistance.

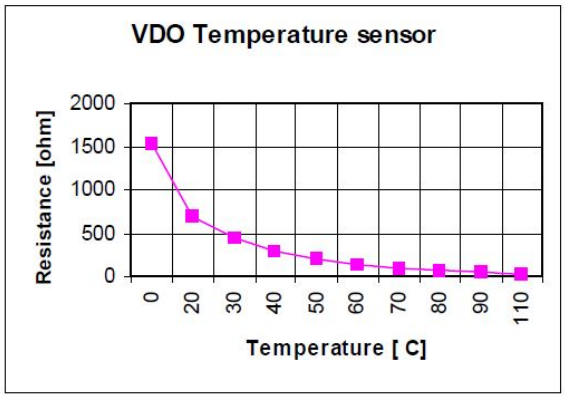
At the moment of calibration (ENTER pressing) is calculated (and in memory saved) calibrating resistance (in Ω). This value is added to measured sensor resistance before calculation of the AI1 (AI2 or AI3) value.

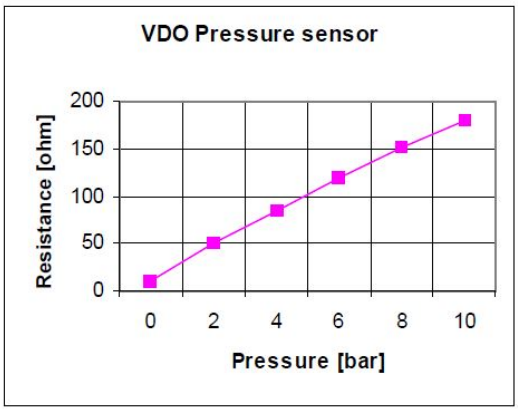
> **Example:**
> Controller display Temperature 70 °C and real value is 73 °C.
> After setting Calibr AI1 to +3 °C (and pressing ENTER) controller calculates corresponding resistance (e.g.5Ω) and saves this value into the memory. The resistance is then added to all calculations (e.g. instead of 70°C -> 73°C, or e.g. instead of 5°C -> 6°C).

Note: *The calibration must be done at the operational point of the analog input (e.g. 80°C, 4.0Bar etc..)*

4.2.2 Default sensor settings

- Analog input 1: 6 points VDO characteristic, pressure measuring in bar
- Analog input 2: 10 points VDO characteristic, temperature measuring in °C
- Analog input 3: 2 points VDO fuel level sensor, 0% = 10Ω, 100% = 180Ω





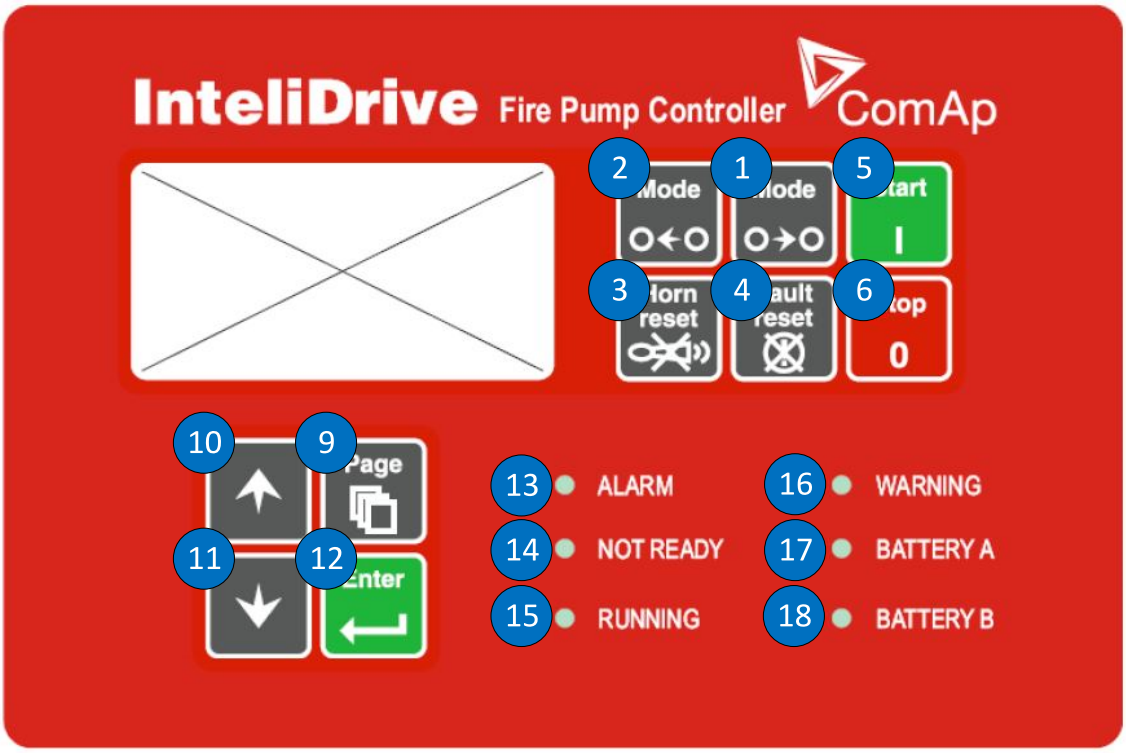
Temperature °C	Pt 1000 ohm	Ni 1000 ohm
-20	922	893
-10	961	946
0	1000	1000
30	1117	1171
60	1232	1353
80	1309	1483
90	1347	1549

Temperature °C	Pt 1000 ohm	Ni 1000 ohm
100	1385	1648
110	1426	1688
120	1461	1760

Note: *When measured value is 6% out of range the Sensor fail FLS is detected.*

4.3 Operator Interface

4.3.1 Control panel



Pushbuttons and LEDs

Number	Button	Description
❶	**MODE→**	Cyclic forward selection the engine operation mode (OFF -> TEST -> AUT)
❷	**←MODE**	Cyclic backward selection the engine operation mode (AUT -> TEST ->OFF)
❸	**HORN RESET**	Deactivates the HORN
❹	**FAULT RESET**	Acknowledges faults and alarms
❺	**START**	Start of the engine
❻	**STOP**	Stop of the engine
❼	GREEN LED	Engine running
❽	RED LED	Engine fail
❾	**PAGE**	Cyclic selection of the display mode(MEASUREMENT->ADJUSTEMENT)
❿	↑	Select the set point, select the screen or increase set point value
⓫	↓	Select the set point, select the screen or decrease set point value
⓬	**ENTER**	Confirm set point value

Number	Button	Description
⓭	ALARM	Active alarm indication – red LED
⓮	NOT READY	Not ready state indication – red LED
⓯	RUNNING	Running state indication – green LED
⓰	WARNING	Warning indication – amber LED
⓱	BATTERY A	Battery A is flat – amber LED
⓲	BATTERY B	Battery B is flat – amber LED

4.3.2 Display menus

There are 3 display menus available: MEASUREMENT and ADJUSTMENT and HISTORY. Each menu consists of several screens. Press repeatedly **PAGE** button to select requested menu.

4.3.3 How to select the engine mode

Use **MODE**→ or ←**MODE** to select requested engine operation mode (OFF – TEST – AUT).

4.3.4 How to view measured data

- Use repeatedly **PAGE** button to select the MEASUREMENT menu.
- Use ↓ and ↑ to select the screen with requested data.

4.3.5 How to view and edit set points

- Use repeatedly **PAGE** button to select the ADJUSTMENT menu.
- Use ↑ or ↓ to select requested set points group.
- Press **ENTER** to confirm.
- Use ↑-or ↓ to select requested set point.
- Set points marked "*" are password protected.
- Press **ENTER** to edit.
- Use ↑ or ↓ to modify the set point. When ↑ or ↓ is pressed for 2 sec, auto repeat function is activated.
- Press **ENTER** to confirm or **PAGE** to leave without change.
- Press **PAGE** to leave selected set points group.

4.3.6 How to change the display contrast

Press **ENTER** and ↑ or ↓ at the same time to adjust the best display contrast.

Note: *Only in MEASUREMENT menu.*

4.3.7 How to check the serial number and software revision

Press **ENTER** and then **PAGE**. This activates the panel LED test. On the display you can see (for 10 seconds) controller INFO screen containing:

1)	Controller name	**Group: Basic settings (page 60)**
2)	Controller serial number	(8 character number)
3)	SW version	the first is the firmware version number; the second is configuration table number
4)	Application	FPC
5)	Branch	Standard

Note: *Only in MEASUREMENT menu*

4.3.8 How to change language

Hold **ENTER** and then press **PAGE** to get to Serial number and software revision screen. Then press **PAGE** to enter Language selection screen. Use ↑-or ↓ to select desired language and press **ENTER** to confirm selection.

4.3.9 How to switch User interface

Hold **ENTER** and then press **PAGE** to get to Serial number and software revision screen. Then twice press **PAGE** to enter User interface. Use ↑ or ↓ to select User or Engineer structure of screens and press **ENTER** to confirm selection.

4.3.10 How to find active alarms

Active alarm list is the last screen in the MEASUREMENT menu.

Select MEASUREMENT menu. Press ↑-You will see the list of all active alarms with the number of alarms at the top-right corner three state alarms are introduced:

	Description
* WrnWater temp Wrn water temp *WrnWater temp	Active not accepted alarm Active accepted alarm Inactive not accepted alarm Inactive accepted alarm

Press **FAULT RESET** accepts all alarms. Non-active alarms immediately disappear from the list. Active alarm list appears on the screen when a new alarm comes up and Main MEASUREMENT screen is active.

Note: *Alarm list does not activate when you are reviewing the values or setpoints.*

Second alarm list for ECU alarms is also available. It is displayed one screen above the standard alarm list on the controller display or under the standard alarm list in Control window of LiteEdit . If an alarm appears in this alarm list, it is signalized in the standard alarm list and by exclamation mark on the main measure screen.

↑↓	One screen up/down
Enter	Cursor move within the ECU alarm list
Enter + Fault reset	ECU fault code reset

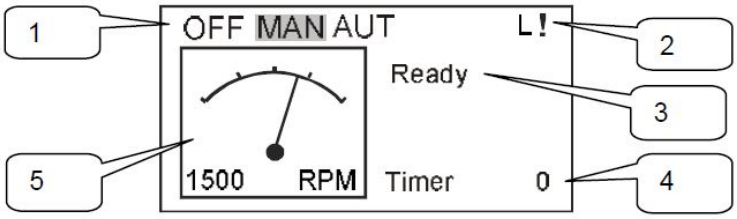
Table 4.1 Control from the front panel

4.3.11 How to list History records

- Use repeatedly **PAGE** button to select the History menu.
- Use ↑-or ↓ to select requested History line.
- Press **ENTER** to go-on line to right – see recorded values.
- Use repeatedly **PAGE** button to go back to Measurement screen.

4.4 MEASUREMENT screens description

4.4.1 Main measure screen



Number	Description
1	Operation mode of the engine
2	Indication: **L** = Access lock, ! = active Alarm
3	Status of the engine
4	Timer - events counting time (e.g. prestart, cooling, etc.)
5	Engine RPM

4.4.2 Controller Analog inputs screen 1

Oil pressure	(AI1 bargraph with protection limits indication)
Engine temperature	(AI2 bargraph with protection limits indication)
Fuel level	(AI3 bargraph with protection limits indication)
Battery voltage	(power supply bargraph with protection limits indication)

4.4.3 Controller Analog inputs screen 2

Battery A voltage	(Battery A voltage bargraph with protection limits indication)
Battery B voltage	(Battery B voltage bargraph with protection limits indication)

4.4.4 AnInIOM Analog inputs screen

AnInIOM1	(AI1 bargraph with protection limits indication)
AnInIOM2	(AI2 bargraph with protection limits indication)
AnInIOM3	(AI3 bargraph with protection limits indication)
AnInIOM4	(AI3 bargraph with protection limits indication)

Note: *This screen is shown/hidden depending on whether the IL-NT-AIO is configured or not.*

4.4.5 Controller Binary inputs

BI1 to BI7

4.4.6 Controller Binary outputs

BO1 to BO7

4.4.7 ECU State

- ECU YellowLamp
- ECU RedLamp
- WaitToStart

Note: *This screen is shown/hidden depending on whether the ECU is configured or not.*

4.4.8 ECU Values

Oil pressure	Bar or psi
Water temp	°C or °F
PercLoadAtCS	% (Percentual load at current speed)
Boost pressure	Bar or psi
ManifoldTemp	°C or °F
Fuel rate	L/h or gph

Note: *This screen is shown/hidden depending on whether the ECU is configured or not.*
Other screens are shown/hidden depending on whether the plug-in module is configured or not.

4.4.9 Statistic

Run hours	
Number of starts	
E-Stop	Number of engine Emergency stops (without Shut-downs)
ShutDown	Number of engine Shut down stops (without Emergency stops)
NextServTime	

Note: *Running time is measured in complete minutes, displayed in complete hours. Values are stored in nonvolatile memory.*

4.4.10 ECU AlarmList

Diagnostic messages are read from ECU and displayed in this second alarm list. For Standard J1939 engines SPN (Suspect Parameter Number), FMI (Failure Mode Identifier) and OC (Occurrence Counter) are shown together with verbal description if available.

Following image shows displaying of ECU alarms in the second alarm list. The additional information for the row selected by cursor is on the last row (SPN, OC and FMI codes).

If the verbal description of alarm is not available, the SPN (decimal and hexadecimal) is displayed.

EngOilPress		WRN
BoostPress		FLS
EngOilTemp		FLS
629(275h)		FLS
Controller#1		
EngCoolTemp		WRN
SPN:110	OC:7	FMI:3

Note: *For FMI = 0 and 1, WRN is displayed. For other FMI codes, FLS is displayed.*

4.4.11 Alarm list

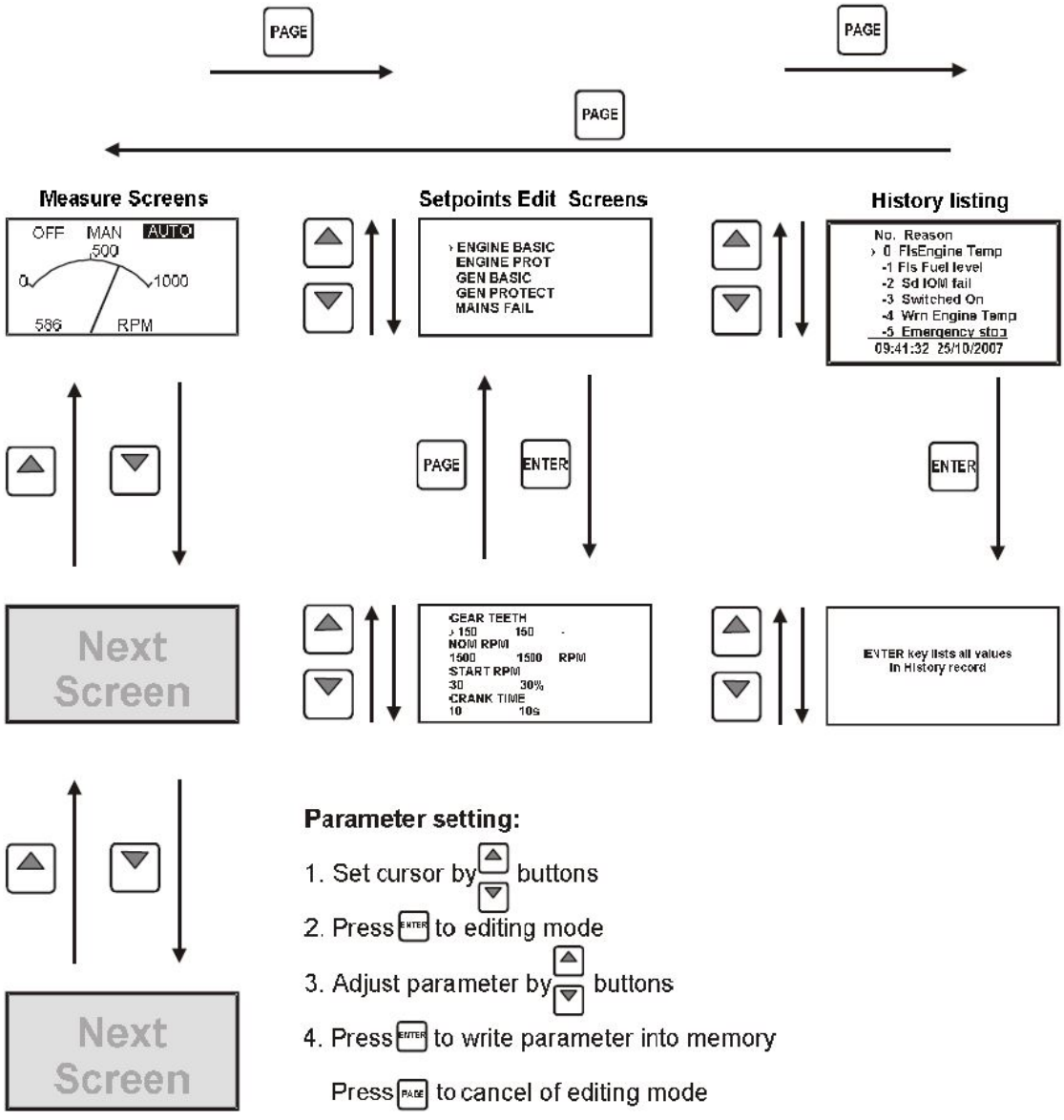
Displays active or inactive alarms configured on controller Binary or analog outputs.

Controller automatically switches to the Alarm list screen when any new Alarm appears, but from Main measure screen only.

4.5 Chart guide to menus and pushbutton's operation

User screen structure contains just Measure screens (Values and Alarms).

Engineer screen structure contains full set of screens including the Setpoints and History.



Parameter setting:

1. Set cursor by ▲▼ buttons
2. Press ENTER to editing mode
3. Adjust parameter by ▲▼ buttons
4. Press ENTER to write parameter into memory

   Press PAGE to cancel of editing mode

4.6 Functions

4.6.1 OFF mode

No start of the engine is possible. Outputs **STARTER** and **FUEL SOLENOID** are not energized. No reaction if **START**,**STOP** buttons are pressed.

4.6.2 TEST mode

Manual mode – engine is started and stopped by operator.

START - starts the engine.

STOP - stops the engine.

The test start is energized from the battery A. When the start with the battery A was not successful, the controller tries to start with the battery B. But when the start with the battery A is successful, the test is over, because it is considered if the battery B voltage is OK and the start with battery A was successful, then there is conclusion that the engine would start even with the battery B.

How to test the start with the battery B even if the start with battery A is successful:

- After the successful start from the battery A, the engine is running.
- Stop the engine manually (with the panel button Stop)
- Wait until the yellow LED BATTERY B on the controller panel is blinking
- If the panel button Start is pushed while LED Battery B is blinking, the controller will try to start from the battery B.
- If no start order comes while LED Battery B is blinking, the controller passes to the initial TEST status and is ready again to start from the battery A.

Note: *The engine can run without load unlimited time.*
The controller does not automatically stop the running engine in TEST mode.
The controller does not start the engine when binary input REM START/STOP is closed.

4.6.3 AUT mode

The controller does not respond to START, STOP buttons. Engine start/stop request is given by:

- Binary input REM START/STOP (pressure contact),
- When analog input Sprinkler pressure is below adjusted limit
- When daily/weekly schedule auto start is enabled. - see **Timer 1,2 Function (page 110)**.
- In AUT mode, the majority of alarms are disabled, i.e. the engine starts and run even if an alarm is active. All alarms are disabled except the binary input EMERGENCY STOP and "engine overspeed protection".

4.7 Alarm management

Following alarms are available:

- Sensor fail
- Warning
- Shut down

4.7.1 Sensor fail (FLS)

Sensor fail is detected when measured value is 6% out of selected sensor characteristic. Sensor fail is indicated by ##### symbol instead measured value.

4.7.2 Warning (WRN)

When warning comes up, only alarm outputs and common warning output are closed.

Possible warnings

see List of possible alarms on page 46.

4.7.3 Shut down (SD)

When the shut-down alarm comes up, controller opens outputs FUEL SOLENOID, STARTER and PRESTART to stop the engine immediately. Alarm outputs and common shutdown output are closed. Active or not reset protection disables start.

> **IMPORTANT: InteliDrive-Lite FPC does NOT react on SD protection except "Overspeed" and "Emergency Stop" alarms. It is based on fire-pump standards. Shutdown is just something like second level of warning alarms.**

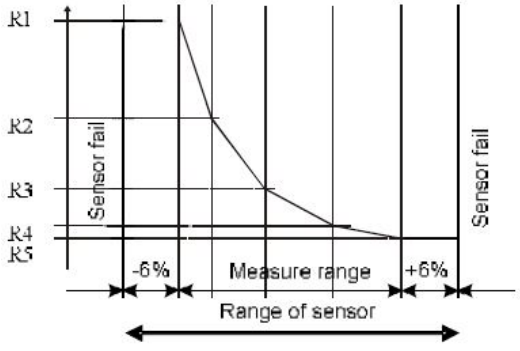
Note: *Engine running only alarms are activated **Eng prot del (page 95)** after the engine RPM > **Starting RPM (page 74)** during the engine starting procedure.*

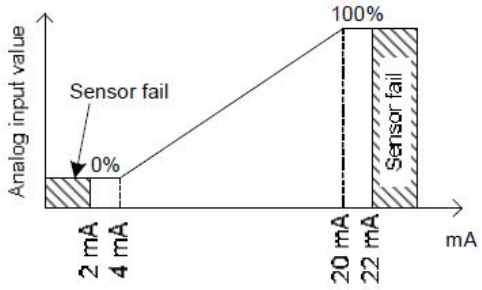
Possible shut-down alarms

see List of possible alarms on page 46.

Sensor fail detection

Sensor fail FIs is detected when measured value is 6 percent out of range. Controller screen displays in this case string #### instead measured value.





4.7.4 List of possible alarms

Events specification	Protection type	Information on binary output available (see List of LBO on page 127)	Description
Wrn Oil Press	WRN	YES	Oil pressure is smaller than Wrn Oil press setpoint.
Sd Oil Press	SD	NO	Oil pressure is smaller than Sd Oil press setpoint.
Wrn Engine Temp	WRN	YES	Water temperature is greater than Wrn Water temp setpoint.
Sd Engine Temp	SD	NO	Water temperature is greater than Sd Water temp setpoint.
Wrn Fuel Level	WRN	YES	Fuel level is smaller than Wrn Fuel Level setpoint.
Sd Fuel Level	SD	NO	Fuel level is smaller than Sd Fuel Level setpoint.
Wrn AnInAIO	WRN	YES	Warning alarm configurable on the input of IL-NT-AIO.
Sd AnInAIO	SD	YES	Shutdown alarm configurable on the input of IL-NT-AIO.
Binary input	Configurable	YES	ConfigurableWarning/Shutdown alarms on the inputs of controller.
SuppBatt V	WRN	YES	Power Supply voltage is out of limits given by Batt A Over V and Batt A Under V Batt B Over V and Batt B Under V setpoints.
Battery A	WRN	YES	Battery A voltage is out of limits given by Batt A over V and Batt A under V setpoints.
Battery B	WRN	YES	Battery B voltage is out of limits given by Batt B over V and Batt B under V setpoints.
BatteryFlat	SD	YES	If the controller switches off during starting sequence due to bad battery condition it doesn't try to start again and activates this protection. The controller displays the message after its restart. **But when the Sprinkler binary input is active it overrides all SD alarms and the controller starts the engine automatically.**
Start failed	SD	YES	Engine start failed.
ParamFail	NONE	NO	Wrong checksum of parameters. Happens typically after downloading new firmware or changing of the parameter. The controller stays

Events specification	Protection type	Information on binary output available (see List of LBO on page 127)	Description
			in INIT mode. Check all parameters, write at least one new parameter.
Overspeed	SD	YES	The protection comes active if the speed is greater than Overspeed setpoint.
Underspeed	SD	YES	During starting of the engine when the RPM reached the value of Starting RPM setpoint the starter is switched off and the speed of the engine can drop under Start RPM again. Then the Underspeed protection becomes active. Protection evaluation starts 5 seconds after reaching StartingRPM.
EmergencyStop	SD	NO	If the input Emergency stop is opened shutdown is immediately activated.
PickupFault	SD	NO	Failure of magnetic pick-up sensor for speed measurement.
Stop fail	SD	YES	Engine stop failed.
WrnServiceTime	WRN	NO	The period for servicing is set by the NextServTime setpoint. The protection comes active if the running hours of the engine reach this value.
ChrgAlternFail	WRN	YES	Failure of alternator for charging the battery.
SprinklActive	WRN	NO	The protection is active if the output Sprinkler is closed.
Wrn RA15 fail	WRN	NO	Warning alarm in case of lost connection to IGL-RA15 module.
Wrn ECU Alarm	WRN	NO	**ECU AlarmList (page 41)** is not empty
Low BackupBatt	WRN	NO	RTC backup battery is flat

back to Alarm management

4.8 Engine operation states

4.8.1 Engine state machine

Init	Auto test during controller power on
Not ready	Engine is not ready to start
Prestart	Prestart sequence in process, Prestart output is closed
Cranking	Engine is cranking
Pause	Pause between start attempts
Starting	Starting speed is reached and the**Idle time (page 77)** is running
Running	Engine is running at nominal speed
Stop	Stop
Shutdown	Shut-down alarm activated
Ready	Engine is ready to run
Cooling	Engine is cooling before stop
EmergMan	Emergency Manual engine operation
AFterCool	Engine after cooling - Cooling Pump output is closed

4.8.2 History file

Controller stores a record of each important event into the history file. The history file seats 117 records. When the history file is full, the oldest records are removed.

Note: *To force history download in LiteEdit (direct, modem or Internet) open History window and select History | Read history command.*

4.8.3 Record structure

Abbreviation	Historical value
Num	Number of historical event
Reason	Event specification
Date	Date of historical event in format DD/MM/YY
Time	Time of historical event in format HH:MM:SS
RPM	Engine speed
BATA	Battery A voltage
BATB	Battery B voltage
UBat	Battery voltage
OilP	Controller Analog input 1 value (default Oil pressure)
EngT	Controller Analog input 2 value (default Water temperature)
FLvl	Controller Analog input 3 value (default Fuel level)
AIM1	IL-NT-AIO Analog input 1 value (when configured)
AIM2	IL-NT-AIO Analog input 2 value (when configured)
AIM3	IL-NT-AIO Analog input 3 value (when configured)
AIM4	IL-NT-AIO Analog input 4 value (when configured)
BIN	Controller Binary inputs
BOUT	Controller Binary outputs
FC	ECU alarm Failure Code
FMI	ECU alarm Failure Mode Identifier

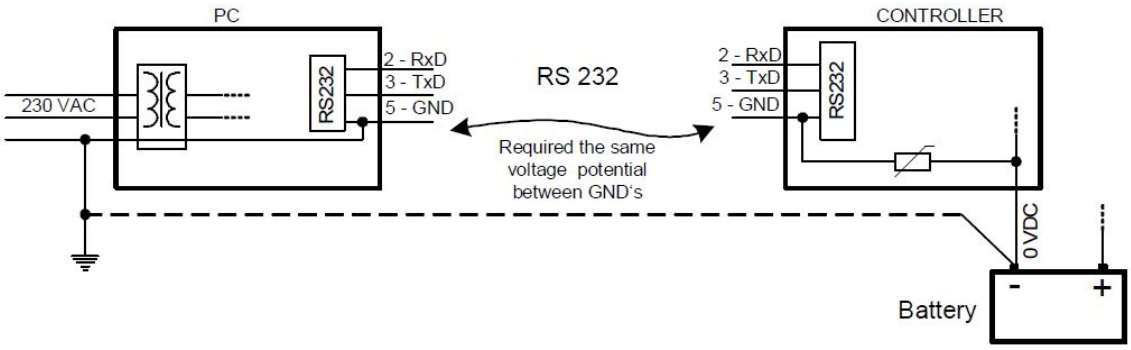
4.9 Remote control and data logging

4.9.1 Direct connection to the PC

CONTROLLER can be connected directly with PC via optional IL-NT RS232 interface.

Use the standard serial cable to connect PC with CONTROLLER.

Note: *Make sure the grounding system on controller and PC – COM port (negative of the PC DC supply) are identical – before the first direct connection. There must not be any voltage between these two points otherwise the internal reversible fuse in controller burns out. The simple solution is to assure, that the PC supply 240/20V is ground free (GND terminal is not connected).*



4.9.2 PC software - LiteEdit

On the PC (for direct or modem connection) has to be installed the ComAp's software package LiteEdit. (based on Windows 95 or newer platform)

LiteEdit enables:

- read the quantities
- adjust all set points
- control the engine
- configure the controller
- select software configuration
- modify alarm inputs and outputs
- modify password, commands protections
- direct, modem or Internet communication
- language translator

Language translator

Default archive contains English and Chinese languages. To change default Chinese (Unicode) to any Latin language use Remove and Add buttons in LiteEdit – Translator-Language window.

4.9.3 Modbus protocol

The selection of the function of CONTROLLER serial port is done via the setpoint RS232 mode in Basic settings.

- 9600 bps, 8 data bits, 1 stop bit, no parity
- Transfer mode RTU
- Function 3 (Read Multiply Registers)
- Function 6 (Write Single Register)
- Function 16 (Write Multiply Registers)
- The response to an incoming message is sent with minimum 4.096 ms delay after message reception

The complete description of Modbus communication protocol can be found in Modbus Protocol Reference Guide PI-MBUS-300 and Open Modbus Specification Release 1.0. Both documents are available from web site at www.modicon.com.

Communication object vs. Register

All the data intended for communication has its representation as communication objects in the controller. The communication object is represented by the n-byte array in the controller memory and identified by the unique 16-bit communication object number. The register, according to Modbus communication protocol, represents a two-byte data and in communication functions is referenced by 16-bit register address. Further in the description of communication functions **the communication object number will always be used as a register address** and length of the communication object will be expressed by number of registers. **Just one communication object can be read or written by one communication function**.

Note: *To obtain communication object numbers it is possible to download the actual controller description on-line from controller or from (ail) archive and use "export data" function from LiteEdit software.*

back to Controller setup

5 Remote Communication

Note: *Refer to InteliCommunication guide for all additional information.*

back to Table of contents

5.1 Internet connection

CONTROLLER controllers can be monitored from LiteEdit 3.0 over the Internet using Internet Bridge (IG-IB) connected to the controller RS232 port. See demo example in explorer at address http://195.122.193.152/. For more details refer to IB-Lite Reference Guide.

5.2 Recommended ISDN modem

- Askey TAS-200E
- ASUScom TA-220ST
- Develo Microlink ISDN i

5.3 Recommended GSM modem

- Siemens M20, TC35, TC35i, ES75, MC39
- Wavecom M1200/WMOD2
- Wavecom - Maestro 20, dual 900/1800MHz.
- Wavecom – Fastrack M1306B, dual 900/1800 MHz (Fastrack M1206B is NOT recommended)
- FALCOM A2D, dual 900/1800MHz.

5.3.1 GSM Modem setup

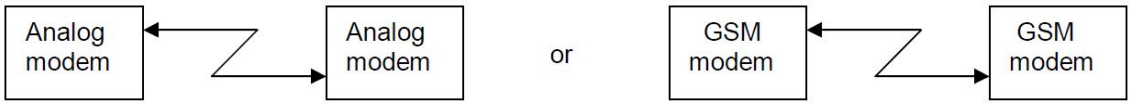
Prior to start work with GSM modem run following program for GSM proper setup. Program writes all the necessary AT commands to configure the GSM modem properly for use with CONTROLLER.

This program runs independent on LiteEdit:

- Start MSWindows-Start-Program files - LiteEdit –Gm_setup.exe.
- Select COM port
- Select iG-CU (=IS-CU) or iG-MU unit
- Press Setup button
- Follow commands in GSM Modem Setup window

Typical real baud rate for GSM data communication is 80 to 90 Bps.

Note: *It is strongly recommended to use the same type of modem on the both sides (CONTROLLER and PC) of connection.*



5.4 Mobile SIM card setting

- Adjust SIM card in GSM modem following way:
- Enable data connection (when required)
- No PIN code

back to Remote Communication

Technical data

Dimensions and weight

Dimensions	180 × 120 × 55 mm
Weight	450 g

Power supply

Power supply range	8-36 VDC
Power consumption	0.104 A / 8 V DC 0.080 A / 12 V DC 0.051 A / 24 V DC 0.044 A / 30 V DC 0.040 A / 36 V DC
Allowed supply voltage drop-out:	100 ms from min. 10 V return to min. 8 V
Battery voltage measurement tolerance	2 % at 24 V

Note: *For the supply voltage less than 7 V the backlight of the display is switched off. Short-term voltage drops (e.g. during the engine cranking) do not affect the operation at all.*

Operating conditions

Operating temperature	-20 ˚C to +70 ˚C
Storage temperature	-30 ˚C to +80 ˚C
Protection degree (front panel)	IP65
Impact protection	EN 62262, EN 50102 (IK04)
Humidity	95 % without condensation
Standard conformity	
Low Voltage Directive	not applied
Electromagnetic Compatibility	EN 50081-1:94, EN 50081-2:96 EN 50082-1:99, EN 50082-2:97
Vibration	5-25 Hz, ±1.6 mm 25-100 Hz, a = 4 g
Shocks	a = 200 m/s^2
Heat radiation	3.5 W

Binary inputs

Number	7
Input resistance	4.2 kΩ
Input range	0 - 36 V DC
Close/Open indication	0-2 V DC closed contact 8-36 V DC open contact

Binary outputs

Number	7
Max current	0.5 A
Max switching voltage	36 VDC
Switching to	negative power supply terminal

Analog inputs

Number	9
Type	3 resistive up to 2500 Ω, 2 voltage up to 40 V, 4 voltage up to 10 V
Maximum voltage range	0-10 V (AIN4+5 0-40 V)
Resolution	10 bits
Input impedance	>100 kΩ for V measuring
Resistance measurement tolerance	±2 % from value in range 0-2500 Ω
Voltage measurement tolerance	1 %, ±100 mV (±400 mV for AIN4-5)

Magnetic pickup

Voltage input range	minimum: 2 Vpk-pk in range 4 Hz to 1 kHz maximum: 50 Veff
Frequency input range	4 Hz to 10 kHz (min. input voltage 6Vpk-pk)
Frequency measurement tolerance	0.2 %

Communications

CAN 1	CAN bus, 250 kbps, max 200 m, 120 Ω termination option, twisted pair (shielded)

6 Appendix

back to Table of contents

6.1 Controller objects

back to Appendix
back to Table of contents

6.1.1 Setpoints

Password

EnterPassword

Password is a four-digit number. Password enables change of relevant protected set points Use ↑ or ↓ keys to set and **ENTER** key to enter the password. There are 3 levels of passwords. Knowledge of higher password lets you to change setpoint protected by lower password.

ChangePassword

Use ↑ or ↓ keys to set and **ENTER** key to change the password.

Note: *At first the Password has to be entered before the new Password can be changed.*

List of setpoint groups

For full list of setpoints go to the chapter **List of setpoints (page 58)**.

back to Controller objects

List of setpoints

Group of setpoints: Basic settings

Group of setpoints: Communication Settings

Group of setpoints: Engine parameters

Group of setpoints: Sprinkler

Group of setpoints: Regulator

Group of setpoints: Engine protection

Group of setpoints: Date/Time

Group of setpoints: Sensors Spec

Group of setpoints: IL-NT-AIO module

Group of setpoints: SMS / E-mail

back to Controller objects

Group: Basic settings

Engine name

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	16 [-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	8637	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
User defined name, used for engine – controller identification at remote phone or mobile connection. Engine name is max 14 characters long and have to be entered using LiteEdit (3.0 or higher) software.			

back to List of setpoints

Gear teeth

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	0 .. 500 [-]		
Default value		**Force value** **Alternative config**	
Step	1		
Comm object	8252	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Number of teeth on the engine gear for the pick-up sensor. The setpoint is ignored when ECU is configured.			

back to List of setpoints

RPMbyWterminal

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	0.5 .. 2 [-]		
Default value		**Force value** **Alternative config**	
Step	0.01		
Comm object	8708	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

The value of this setpoint multiplies the speed value obtained from the controller input RPM.

> ***Note:*** *The default value is and must be 1, when the classical pick-up speed sensor is used to measure the*

> ***Note:*** *The setpoint is usefull when the engine does not have the speed sensor and the speed is measured by theW terminal of the charging alternator. The setpoint allows tuning the ratio between the frequency and the RPM value which can not to correspond to the entire values of teeth numbers (because of the different non-integral ratio of the engine and alternator pulleys).*

back to List of setpoints

Nominal RPM

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	100 .. 4000 [RPM]		
Default value		**Force value** **Alternative config**	
Step	1 [RPM]		
Comm object	8253	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal engine speed.

back to List of setpoints

RPM Source

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	[PICKUP, AIO AIN1, AIO AIN2, AIO AIN3, AIO AIN4]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	12142	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Switch for actual engine speed measuring.

- Pickup: The settings uses RPM input of the controller as a source of Engine Speed measurement
- AIO-AIN1 – AIO-AIN4: The settings uses one of analog inputs of the controller (AIN1 – AIN4) and its corresponding sensor characteristics as a source of Engine Speed measurement

back to List of setpoints

ControllerMode

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	[OFF, TEST, AUT]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	8315	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Equivalent to Controller mode changes by **MODE**→ or ←**MODE** buttons.

Note: *Controller Mode change can be separately password protected.*

back to List of setpoints

FltResGoToMAN

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	[ENABLED/DISABLED]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	9983	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
DISABLED	Controller stays in AUT mode after Fault reset .		
ENABLED	Automatic switch from AUT (or TEST) to TEST mode after Fault reset to avoid automatic engine start. This function is active for Shut down protection only.		

back to List of setpoints

DispBaklightTO

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	0 .. 60 [min]		
Default value	0 … means that the display lights all the time	**Force value** **Alternative config**	
Step	1 min		
Comm object	10121	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Timeout after which the display backlight is switched off.			

back to List of setpoints

RA-FailDetect

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	ENABLED / DISABLED [-]		
Default value	ENABLED	**Force value** **Alternative config**	
Step	-		
Comm object	14599	**Related applications**	
Config level	-		
Setpoint visibility	Always		
Description			
This setpoint is used to enable or disable fail detect function of RA15 module which enables or disables alarm announcement in case RA15 is configured but not communicating.			

back to List of setpoints

Group: Communication Settings

Contr. addr (1 .. 32)

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24537	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Controller identification number. It is possible to set controller address different from the default value (1) so that more ID-Lite controllers can be interconnected (via RS485) and accessed e.g. from Modbus terminal. ***Note:*** *When opening connection to the controller its address has to correspond with the setting in PC tool. From LiteEdit it is only possible to connect to controllers with address 1.*			

back to List of setpoints

COM1 Mode

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[DIRECT/MODEM/MODBUS/ECU LINK]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24522	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Communication protocol switch for the COM1 channel.

DIRECT	LiteEdit communication protocol via direct cable or AirGate,Web Server communication protocol via AirGate.
MODEM	LiteEdit communication protocol via modem.
MODBUS	Modbus protocol. See detailed description in InteliCommunication guide.
ECU LINK	Protocol for communication with Cummins engines via Modbus.

Note: *For details on communication speed and other technical parameters please* ***see Technical data on page 54****.*

back to List of setpoints

COM2 Mode

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[DIRECT/MODBUS/ECU LINK]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24451	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Communication protocol switch for the COM2 channel, if dual communication module is plugged in.

DIRECT	LiteEdit communication protocol via direct cable.
MODBUS	Modbus protocol. See detailed description in InteliCommunication guide.
ECU LINK	Protocol for communication with Cummins engines via Modbus.

Note: *For details on communication speed and other technical parameters please* ***see Technical data on page 54****.*
For detail description of communication possibilities see actual Inteli Communication Guide xxx.pdf - chapter Modbus protocol and others.

back to List of setpoints

ModemIniString

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24436	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
If your modem needs some additional initialization AT commands (i.e. because of national telephony network differences), it can be entered here. Otherwise leave this setpoint blank.			

back to List of setpoints

ModbusComSpeed

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[9600,19200, 38400, 57600]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24477	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
If the Modbus mode is selected on COM1 or COM2 channels, the Modbus communication speed in bps can be adjusted here.			

back to List of setpoints

IBLite IP Addr

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24376	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
IP address of IB-Lite module.			

back to List of setpoints

IBLite NetMask

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24375	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
IB-Lite network mask.			

back to List of setpoints

IBLite GateIP

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24373	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
IP address of gateway for IB-Lite.			

back to List of setpoints

IBLite DHCP

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value	ENABLED	**Force value** **Alternative config**	
Step	[-]		
Comm object	24259	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Dynamic Host Configuration Protocol for IP address setting can be used or blocked. DISABLED: Block the function of DHCP, this option is worth, if you wanna adjust stable IP address e.g. for Web Server connection or InteliMonitor PC tool. ***Note:*** *Can occurred collision of IP addresses in local network with devices as printer, router etc.!* ENABLED: Dynamically change IP address of the controller after each switch on of the controller. IP address collision protection. Default state.			

back to List of setpoints

ComAp Port

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24374	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Port for ComAp communication over IB-Lite or IL-NT-GPRS module.			

back to List of setpoints

APN Name

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24363	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Name of APN access point for GPRS network. ***Note:*** *This information shall provide your GSM/GPRS operator.*			

back to List of setpoints

APN UserName

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24361	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
User name for APN access point. ***Note:*** *This information shall provide your GSM/GPRS operator.*			

back to List of setpoints

APN UserPass

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24360	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
User password for APN access point. ***Note:*** *This information shall provide your GSM/GPRS operator.*			

back to List of setpoints

AirGate

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[ENABLED / DISABLED]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24365	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
The option DISABLED blocs the function of AirGate. This allows the module IL-IB to work (when connected).			

back to List of setpoints

AirGate IP

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[]		
Default value	airgate.comap.cz	**Force value** **Alternative config**	
Step			
Comm object	24364	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

AirGate Address.

> ***Note:*** *To reduce the data traffic over GPRS network you can set in setpoint group „Comms Settings“ the parameter „AirGate IP“ = 80.95.108.26. This will save significant data amount needed for translation of AirGate server IP address. In case of changing the server IP address this settings has to be updated or returned to default „airgate.comap.cz“.*

> **IMPORTANT: All manipulations with IL-NT-GPRS module have to be done with DC power supply switched off. Module can be only powered on while plugged in the controller and together with controller!**

back to List of setpoints

SMTP UserName

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24370	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

User name or name of e-mail account for verification of email sender on SMTP server. If parameter left empty, no verification is expected. Works for IB-Lite only.

back to List of setpoints

SMTP UserPass

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24369	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
User password of e-mail account for verification of e-mail sender on SMTP server. If parameter left empty, no verification is expected.Works for IB-Lite only.			

back to List of setpoints

SMTP Server IP

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24368	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
IP address of SMTP server. Works for IB-Lite only.			

back to List of setpoints

Contr MailBox

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24367	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
E-mail address used as “Sender” of alarm e-mails from IB-Lite. ***Note:*** *If SMTP server requires verification of sender, e-mail address has to be registered to SMTP server and setpoints “SMTP UserName” and “SMTP UserPass” has to be set to correct values.*			

back to List of setpoints

Time Zone

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24366	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
List of time zones used for time reference.			

back to List of setpoints

DNS IP Address

Setpoint group	Communication Settings	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24362	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
IP address of Domain Name Server.			

back to List of setpoints

Group: Engine parameters

Starting RPM

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	5 .. 50 [%]		
Default value		**Force value** **Alternative config**	
Step	1 % of **Nominal RPM (page 61)**		
Comm object	9095	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
“Firing” speed when controller stops cranking (starter goes OFF). Starting speed is limit for Sd Underspeed protection activated 5 sec (fix time) after RPM goes above this limit during the engine starting procedure.			

back to List of setpoints

Starting POil

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	0.0 .. 10.0 [Bar]		
Default value		**Force value** **Alternative config**	
Step	0.1 Bar		
Comm object	9681	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
When reached controller stops cranking (starter goes OFF). ***Note:*** *There are three conditions for stop cranking: Starting RPM, StartingPOil and D+ (when enabled). Starter goes off when any of these conditions is valid.*			

back to List of setpoints

Prestart time

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	0 .. 600 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	8394	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Time of closing of the PRE-START output prior to the engine start. Set to zero if you want to leave the output PRE-START open.			

back to List of setpoints

MaxCrank time

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	1 .. 60 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	8256	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Maximum time limit of cranking.			

back to List of setpoints

CrnkFail pause

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	5 .. 60 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	8257	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Pause between crank attempts.			

back to List of setpoints

Crank attempts

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	1 .. 10 [-]		
Default value		**Force value** **Alternative config**	
Step	1		
Comm object	8255	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is used to select whether you use wooden or woolen wires.			

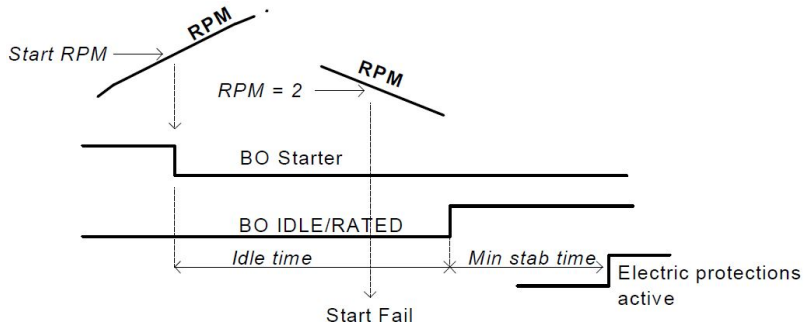
back to List of setpoints

Idle time

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	0 .. 600 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	9097	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Idle time delay starts when RPM exceeds Start RPM. Start fail is detected when during Idle state RPM decreases below 2.

During the Idle time timer running the binary output IDLE/NOMINAL is opened, when it elapses the IDLE/NOMINAL output closes. Binary output IDLE/NOMINAL opens during Cooling period again.



If the IDLE function not supported on the governor, set the Idle time nevertheless to minimum 5s to avoid Underspeed possibly caused by instability of the engine short after start.

back to List of setpoints

Idle speed

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	**Starting RPM (page 74)** .. **MinSpeedLim (page 84)** [RPM]		
Default value		**Force value** **Alternative config**	
Step	1 RPM		
Comm object	9946	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Speed request in engine Idle state i.e. after engine start or when switched to Idle in TEST mode by Binary input Nominal/Idle and after Engine shut-down.

back to List of setpoints

Cooling speed

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	[NOMINAL/IDLE]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	10046	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Selects the function of the Binary output IDLE/NOMINAL during engine Cooling state.

NOMINAL	Cooling is executed at Nominal speed.
IDLE	Cooling is executed at Idle speed.

Note: *Binary output IDLE/NOMINAL must be configured and connected to speed governor. Engine Idle speed must be adjusted on speed governor.*

back to List of setpoints

Cooling time

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	0 .. 3600 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	8258	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Runtime of the unloaded engine to cool the engine before stop.

back to List of setpoints

AfterCool time

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	0 .. 3600 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	8662	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Runtime of engine after cooling pump. Binary output Cooling pump is closed when the engine starts and opens AfterCool time delayed after engine stops.			

back to List of setpoints

Stop time

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	0 .. 240 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	9815	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Under normal conditions the engine must certainly stop within this period. The period starts by issuing stop command. ***Note:*** *Stop of engine is detected when all following conditions are met: RPM <2, Oil pressure < StartingPOil and D+ input isn't active.* *Stop fail is detected when there is difference between those conditions.* ***Note:*** *In case when stop time period is lower than "stop engine detected" + 10 s, stop time period is extended to this value due to safety reason. (stop engine detected = RPM<2, OilP not detected, D+ not active)*			

back to List of setpoints

ReliefValtime

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	0 .. 3600 [s]		
Default value	30	**Force value** **Alternative config**	
Step	1 s		
Comm object	10612	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is used to set duration of time for which LBO ReliefValActiv will be activated.			

back to List of setpoints

Fuel solenoid

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	[DIESEL/GAS]		
Default value		**Force value** **Alternative config**	
Step			
Comm object	9100	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Setpoint setting determines behavior of the Binary output FUEL SOLENOID. DIESEL: Output closes 1 sec before Binary output STARTER. The output opens if Emergency stop comes or Cooled engine is stopped and in pause between repeated starts. GAS: Output closes together with Binary output IGNITION if RPM is over the 30 RPM (fix value). Output opens after stop command or in pause between repeated start.			

back to List of setpoints

FuelSol Offset

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	0.0 .. 30.0 [s]		
Default value		**Force value** **Alternative config**	
Step	0.1 s		
Comm object	10525	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint adjusts the Fuel solenoid output activation in relation to Starter output when Fuel solenoid = GAS. Setpoints values mean that fuel valve is opened after the Starter. FuelSol offset has effect for both Fuel solenoid = DIESEL or GAS.

Engine starting procedure when **Fuel solenoid (page 80)** = GAS

back to List of setpoints

D+ function

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	[ENABLED/CHRGFAIL/DISABLED]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	9683	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

ENABLED	The D+ terminal is used for both functions – “running engine” detection and charge fail detection
CHRGFAIL	The D+ terminal is used for charge fail detection only
DISABLED	The D+ terminal is not used.

Note: *The magnetization current is provided independently on this setpoint value.*
The D+ charge fail protection becomes active after ***Idle time (page 77)*** *reaches zero.*

back to List of setpoints

ECU FreqSelect

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	[PRIMARY/SECONDARY/DEFAULT]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	10266	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint should be used only for Volvo and Scania engines.

- Volvo – “Volvo Aux” is selected in ECU configuration:
  - Primary or secondary engine speed is set by Frequency select bits in VP Status frame.
- Scania – “Scania S6 Singlespeed” is selected in ECU configuration:
  - Nominal engine speed is chosen by Nominal speed switch 1 and 2 from DLN1 frame when the engine is running on nominal speed, i.e. binary output Idle/Nominal is active. When the output is not active (engine is running on Idle speed), the setpoint ECU FreqSelect is not taken into account.

back to List of setpoints

ECU Control

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	[ENABLED/STARTSTOP/DISABLED]		
Default value	ENABLED	**Force value** **Alternative config**	
Step	-		
Comm object	11086	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

The setpoint enables adjustment of the electronic engine control by following settings:

ENABLED	there is a full available control of an electronic engine given by the setting of the ECU unit of the engine, i.e. Start request, Stop request, Speed request are enabled if available
STARTSTOP	there is a limited control of an electronic engine reduced to both Start request and Stop request. The Speed request is blocked.
DISABLED	a control of an electronic engine is fully blocked and the ID-Lite can only monitor the values of an electronic engine.

back to List of setpoints

ECU SpeedAdj

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	**MinSpeedLim (page 84)** .. **MaxSpeedLim (page 84)** [RPM]		
Default value	1500 RPM	**Force value** **Alternative config**	
Step	1 RPM		
Comm object	13095	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Enables to adjust engine speed in ECU via CAN bus. Nominal speed corresponds to 50%. This setpoint should be used only for Volvo Penta and Scania engines. It has no effect on other engine brands.			

back to List of setpoints

RetToSpeedAdj

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	[ENABLED/DISABLED]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	11838	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Selection between **Speed Sel 1 (page 123)**, **Speed Sel 2 (page 124)**, **Speed Sel 3 (page 124)** behavior. DISABLED — Speed request is set by LBI Speed selection1, ..2, ..3 (see corresponding setpoints) by rising edge (button, no switch) – i.e. Speed request stay constant after the input is opened and can be changed by BI Speed Up and Speed Down. ENABLED — Speed request goes to ECU SpeedAdj when the LBI Speed selection1, ..2, ..3 is opened. Speed request can be changed by Binary inputs Speed Up and Speed Down when LBI Speed selection 1, ..2, ..3 is closed.			

back to List of setpoints

MinSpeedLim

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	**Starting RPM (page 74)** .. **MaxSpeedLim (page 84)** [RPM]		
Default value	1200 RPM	**Force value** **Alternative config**	
Step	1 RPM		
Comm object	10096	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
The setpoint presets the minimum engine speed in the “Running” operation mode. Also see other conditions in the chapter below.			

back to List of setpoints

MaxSpeedLim

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	**MinSpeedLim (page 84)** .. 4000 [RPM]		
Default value	2700 RPM	**Force value** **Alternative config**	
Step	1 RPM		
Comm object	10097	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
The setpoint presets the maximum engine speed in the “Running” operation mode. Also see other conditions in the chapter below.			

back to List of setpoints

BI Speed Sel 1

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	**MinSpeedLim (page 84)** .. **MaxSpeedLim (page 84)** [RPM]		
Default value	1250 RPM	**Force value** **Alternative config**	
Step	1 RPM		
Comm object	10099	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
The setpoint presets the required engine speed during the ‘Speed Sel 1’ binary input is active. Also see other conditions in the chapter below.			

back to List of setpoints

BI Speed Sel 2

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	**MinSpeedLim (page 84)** .. **MaxSpeedLim (page 84)** [RPM]		
Default value	1300 RPM	**Force value** **Alternative config**	
Step	1 RPM		
Comm object	10523	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
The setpoint presets the required engine speed during the ‘Speed Sel 2’ binary input is active. Also see other conditions in the chapter below.			

back to List of setpoints

BI Speed Sel 3

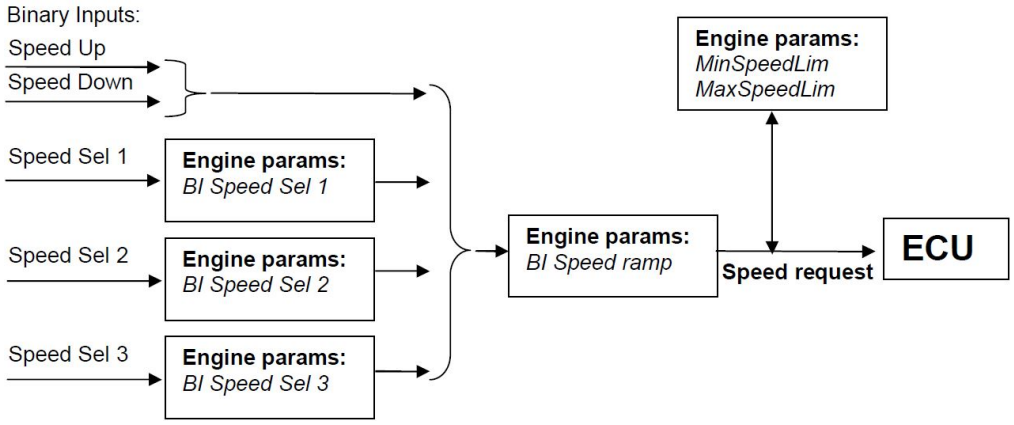
Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	**MinSpeedLim (page 84)** .. **MaxSpeedLim (page 84)** [RPM]		
Default value	1450 RPM	**Force value** **Alternative config**	
Step	1 RPM		
Comm object	10524	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
The setpoint presets the required engine speed during the ‘Speed Sel 3’ binary input is active. Also see other conditions in the chapter below.			

back to List of setpoints

Speed Ramp

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	1 .. **MaxSpeedLim (page 84)** [RPM]		
Default value	50 RPM/s	**Force value** **Alternative config**	
Step	1 RPM/s		
Comm object	10148	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

The setpoint presets the required engine speed ramp the engine will react on the change of speed request.



back to List of setpoints

0%ofSpeedReq

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	0 .. 4000 [RPM]		
Default value	2000 RPM	**Force value** **Alternative config**	
Step	1 RPM		
Comm object	11125	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Limit for Speed Request transformation from RPM to % range for ECU engines using % format.

back to List of setpoints

100%ofSpeedReq

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	0 .. 4000 [RPM]		
Default value	2000 RPM	**Force value** **Alternative config**	
Step	1 RPM		
Comm object	11126	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Limit for Speed Request transformation from RPM to % range for ECU engines using % format.			

back to List of setpoints

Running timer

Setpoint group	Engine parameters	**Related FW**	1.6.0
Range [units]	0 .. 1000 [min]		
Default value	0 min	**Force value** **Alternative config**	
Step	1 min		
Comm object	11837	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Automatic engine stop in TEST mode or delayed engine stop in AUT mode.			

back to List of setpoints

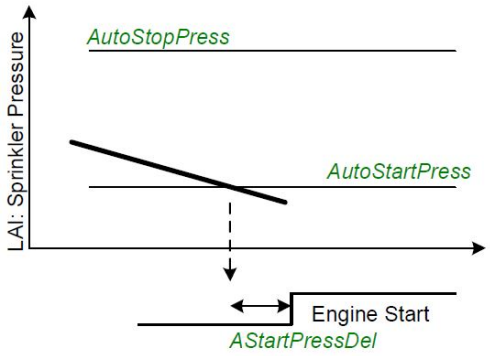
Group: Sprinkler

AutoStartPress

Setpoint group	Sprinkler	**Related FW**	1.6.0
Range [units]	-10000 . 10000 [-]		
Default value	0	**Force value** **Alternative config**	
Step	1		
Comm object	14594	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Pressure limit for Automatic engine start.			

back to List of setpoints

AStartPressDel

Setpoint group	Sprinkler	**Related FW**	1.6.0
Range [units]	0 .. 600 [s]		
Default value	10 s	**Force value** **Alternative config**	
Step	1 s		
Comm object	14595	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Engine will start when Sprinkler pressure is under **AutoStartPress (page 87)** for AStartPressDel in AUT mode.  			

back to List of setpoints

AutoStopPress

Setpoint group	Sprinkler	**Related FW**	1.6.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	**Force value** **Alternative config**	
Step	1		
Comm object	14596	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Pressure limit for Automatic engine stop.			

back to List of setpoints

AStopPressDel

Setpoint group	Sprinkler	**Related FW**	1.6.0
Range [units]	0 .. 120 [min]		
Default value	10 min	**Force value** **Alternative config**	
Step	1 s		
Comm object	14597	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Engine will stop when Sprinkler pressure is equal or over **AutoStartPress (page 87)** for AStopPressDel in AUT mode.			

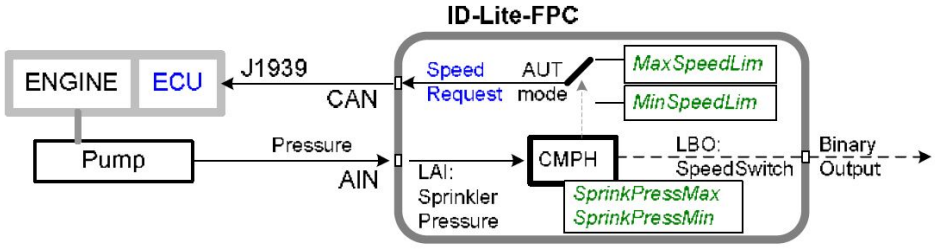
back to List of setpoints

SprinklerPress

Setpoint group	Sprinkler	**Related FW**	1.6.0
Range [units]	[CU:AI1, CU:AI2, CU:AI3, AIO: IA1, AIO:AI2, AIO:AI3]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	14598	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Input for Automatic engine start based on pressure.			

back to List of setpoints

Group: Regulator



LAI SpdRequest

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	[OFF, CU:AI1, CU:AI2, CU:AI3, AIO: IA1, AIO:AI2, AIO:AI3]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	11842	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Selection of analog Speed request in controller TEST mode.

OFF	Speed request selection is done by binary inputs.
CU:AI1, CU:AI2, CU:AI3: AIO1 … AIO4	Speed request via analog input only. Binary inputs are ignored. Analog speed request is ignored in AUT mode.

back to List of setpoints

Reg Input

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	[-]		
Default value	CU:AI1	**Force value** **Alternative config**	
Step	[-]		
Comm object	11843	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

PI loop analog input selection. Source can be adjusted from controller analog inputs or from extension module inputs. It is also possible to use Binary input 3 in function of RPM detection. The Speed request (regulator output) is assigned to Reg Bias value in the case of selected analog input sensor fail.

back to List of setpoints

Reg Bias

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	0 - 10000 [-]		
Default value	0	**Force value** **Alternative config**	
Step	1		
Comm object	11848	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Constant PI regulator output when the LBI R Reg Disable = closed.			

back to List of setpoints

Request 1

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	-10000 - +10000 [-]		
Default value	0	**Force value** **Alternative config**	
Step	1		
Comm object	11844	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Regulator requested value.			

back to List of setpoints

Request 2

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	**Force value** **Alternative config**	
Step	1		
Comm object	11845	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Regulator requested value when LBI Request2 is active.			

back to List of setpoints

Reg Gain

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	-200 - +200 [%]		
Default value	10	**Force value** **Alternative config**	
Step	0.1 %		
Comm object	11846	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is giving regulator gain factor. See Hint below.			

back to List of setpoints

Reg Integral

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	0 .. ±100 [%]		
Default value	10%	**Force value** **Alternative config**	
Step	0.1		
Comm object	11847	**Related applications**	
Config level	Standard		

Setpoint visibility	Always

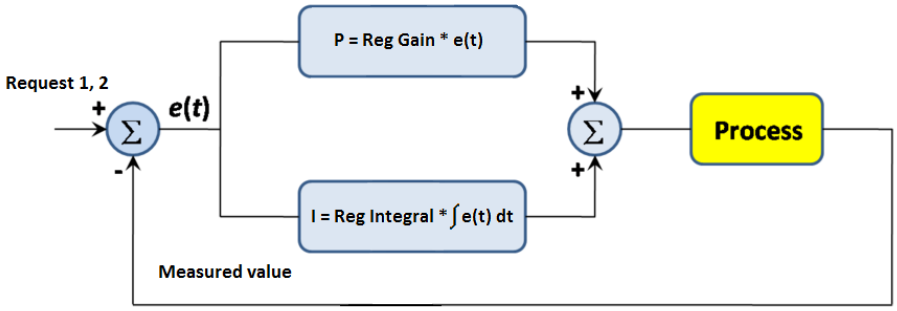
Description

This setpoint is giving regulator integration factor.

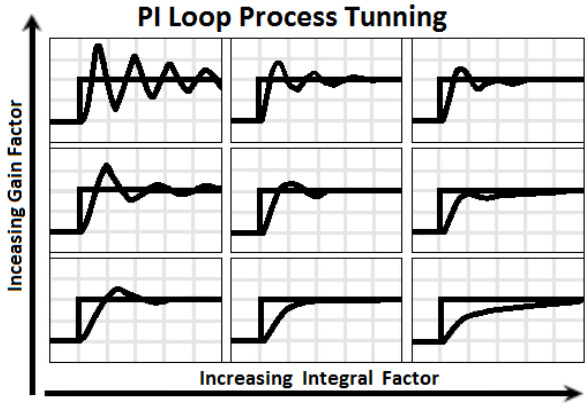
Note: *InteliDrive Lite controllers include PI loop for speed or analog output regulation. The requested value is given by setpoints Request 1, 2. This loop is working like Proportional-Integral regulation with setpoints Reg Gain and Reg Integral for each part and these parts affect each other.*

Note: *The controller output is given by:Reg Gain * e(t) + Reg Integral * ∫ e(t) dt,*

Note: *where e(t) is deviation of actual value e(t) = Request 1, 2 – Measured value.*



Here are two tunning parameters that can be adjusted Reg Gain and Reg Integral. These parameters interact each other, see the graphic below. Picture shows how differences in Gain and Integral can affect PI loop's responsiveness. The central pic is as base case with fast change with minimum oscillations to required level. Upper left graph shows high gain and low integral values, what produce large oscillation with slow smoothing. Opposite case is on the lower right graph, which shows low gain and high integral values. The response of the system is sluggish.

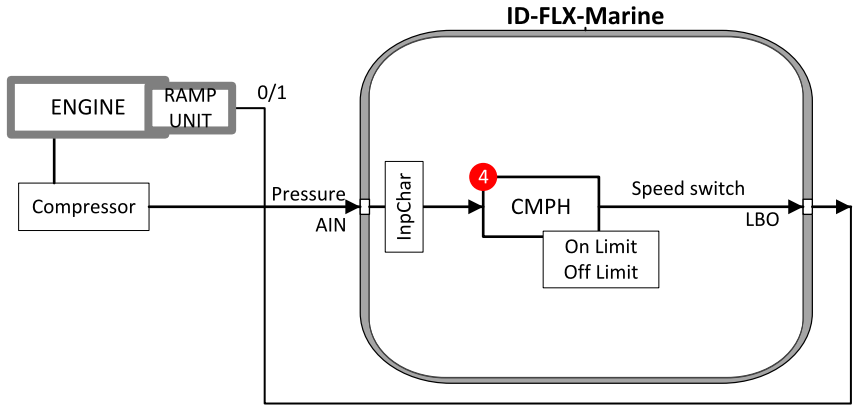


back to List of setpoints

Reg CMP Input

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	-		
Default value	CU:AI1	**Force value** **Alternative config**	
Step	-		
Comm object	11839	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

This is comparator with hysteresis analog input selection from controller analog inputs or from extension module inputs. It is also possible to use Binary input 3 in function of RPM detection.



back to List of setpoints

Reg CMP On

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	**Force value** **Alternative config**	
Step	1		
Comm object	11841	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Limit to close LBO SpeedSwitch.

back to List of setpoints

Reg CMP Off

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	-10000 .. 10000 [-]		
Default value	4000	**Force value** **Alternative config**	
Step	1		
Comm object	11840	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Limit to open the LBO SpeedSwitch.			

back to List of setpoints

Group: Engine protection

Eng prot del

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 300 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	8262	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
During the start of the engine, some engine protections have to be blocked (e.g. Oil pressure). The protections are unblocked after the Protection del time. The time starts after reaching **Starting RPM (page 74)**.			

back to List of setpoints

Horn timeout

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 600 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	8264	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Max time limit of horn sounding. Set to zero if you want to leave the output HORN open. Horn timeout starts again from the beginning if a new alarm appears before previous Horn timeout has elapsed.			

back to List of setpoints

HornSilenTime1

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	1 .. 1000 [h]		
Default value	4	**Force value** **Alternative config**	
Step	1 h		
Comm object	14366	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is used to set time for reactivation of horn for critical alarms.			

back to List of setpoints

HornSilenTime2

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	1 .. 1000 [h]		
Default value	4	**Force value** **Alternative config**	
Step	1 h		
Comm object	14600	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint is used to set time for reactivation of horn for noncritical alarms.			

back to List of setpoints

Overspeed

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	50 .. 150 [%]		
Default value		**Force value** **Alternative config**	
Step	1% of **Nominal RPM (page 61)**		
Comm object	8263	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Limit for engine Sd overspeed protection.			

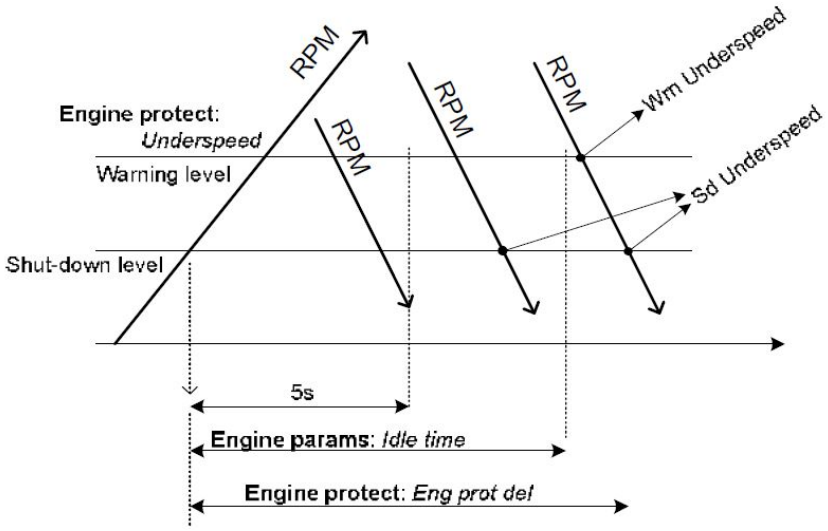
back to List of setpoints

Underspeed

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	**Starting RPM (page 74)** .. 100 [%]		
Default value		**Force value** **Alternative config**	
Step	1 % of **Nominal RPM (page 61)**		
Comm object	8260	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

The limit for Warning Underspeed protection. Active protection is indicated as “Wrn underspeed” in Alarm list with auto reset function (disappears without Fault reset when inactive). Under speed Warning protection is inactive 5 second after RPM is over **Starting RPM (page 74)** and during the Idle time.

The “Ready to load” output is deactivated when Wrn underspeed protection is active and needs the Fault reset for activation after RPM is over Underspeed limit.



back to List of setpoints

AnIInp1 level1

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-10 .. 1000 [Bar]		
Default value		**Force value** **Alternative config**	
Step	0.1 Bar		
Comm object	8369	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning limit level for ANALOG INPUT 1.			

back to List of setpoints

AnIInp1 level2

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-10 .. 1000 [Bar]		
Default value		**Force value** **Alternative config**	
Step	0.1 Bar		
Comm object	8370	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown limit level for ANALOG INPUT 1.			

back to List of setpoints

AnIInp1 del

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 180 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	8365	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for ANALOG INPUT 1.			

back to List of setpoints

AnIInp2 level1

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-100 .. 10000 [-]		
Default value		**Force value** **Alternative config**	
Step	1 °C		
Comm object	8375	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning limit level for ANALOG INPUT 2.			

back to List of setpoints

AnIInp2 level2

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-100 .. 10000 [-]		
Default value		**Force value** **Alternative config**	
Step	1 °C		
Comm object	8376	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown limit level for ANALOG INPUT 2.			

back to List of setpoints

AnIInp2 lev1 und

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-100 .. 10000 [°C]		
Default value	38	**Force value** **Alternative config**	
Step	1		
Comm object	8396	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

back to List of setpoints

AnIInp2 del

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 180 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	8371	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for ANALOG INPUT 2 alarm.			

back to List of setpoints

AnIInp3 level1

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-100 .. 10000 [-]		
Default value		**Force value** **Alternative config**	
Step	1 %		
Comm object	8381	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning limit level for ANALOG INPUT 3.			

back to List of setpoints

AnIInp3 level2

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-100 .. 10000 [-]		
Default value		**Force value** **Alternative config**	
Step	1 %		
Comm object	8382	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown limit level for ANALOG INPUT 3.			

back to List of setpoints

AnIInp3 del

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 180 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	8377	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for ANALOG INPUT 3.			

back to List of setpoints

Batt A over V

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	**Batt A under V (page 101)** .. 40 [V]		
Default value		**Force value** **Alternative config**	
Step	0.1 V		
Comm object	11357	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold for high voltage of battery A.			

back to List of setpoints

Batt A under V

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	8 .. **Batt A over V (page 101)** [V]		
Default value		**Force value** **Alternative config**	
Step	0.1 V		
Comm object	11361	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold for low voltage of battery A.			

back to List of setpoints

Batt A del

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 600 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	11358	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for voltage alarm of battery A.			

back to List of setpoints

Batt B over V

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	**Batt B under V (page 102)** .. 40 [V]		
Default value		**Force value** **Alternative config**	
Step	0.1 V		
Comm object	11359	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold for high voltage of battery B.			

back to List of setpoints

Batt B under V

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	8 .. **Batt B over V (page 102)** [V]		
Default value		**Force value** **Alternative config**	
Step	0.1 V		
Comm object	11363	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold for low voltage of battery B.			

back to List of setpoints

Batt B del

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 600 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	11360	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for voltage alarm of battery B.			

back to List of setpoints

NextServTime

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 65535 [h]		
Default value		**Force value** **Alternative config**	
Step	1 h		
Comm object	9648	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Counting down when engine is running, from the moment of setting up the value of working hours in LiteEdit /controller. This value is counting and changing in LiteEdit / controller as well. Service time alarm appears if reaches zero, until non-zero value is set.

> ***Note:*** *Set the NextServTime = 65535 h to disable count down. The setpoint stays constant, but Statistics value (visible in LiteEdit) displays #### invalid value.*

back to List of setpoints

Oversp verify

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	67 .. 68 [-]		
Default value		**Force value** **Alternative config**	
Step	1		
Comm object	13951	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Verify functionality of overspeed protection.

ENABLED: Setpoint **Gear teeth** is lowered to 67% => CU will calculate higher (imaginary) RPM.

DISABLED: Setpoint **Gear teeth** has 100% of its value.

Note: *Alarm* ***OverspeedTest*** *is automatically activated if* ***Oversp verify*** *is ENABLED.*

back to List of setpoints

AnIInp6 level1

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-10 .. 1000 [Bar]		
Default value		**Force value** **Alternative config**	
Step	0.1 Bar		
Comm object	9259	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Warning limit level for ANALOG INPUT 6.

back to List of setpoints

AnIInp6 level2

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-10 .. 1000 [Bar]		
Default value		**Force value** **Alternative config**	
Step	0.1 Bar		
Comm object	9260	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Shutdown limit level for ANALOG INPUT 6.

back to List of setpoints

AnIInp6 del

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 180 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	9261	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for ANALOG INPUT 6.			

back to List of setpoints

AnIInp7 level1

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-10 .. 1000 [Bar]		
Default value		**Force value** **Alternative config**	
Step	0.1 Bar		
Comm object	9262	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning limit level for ANALOG INPUT 7.			

back to List of setpoints

AnIInp7 level2

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-10 .. 1000 [Bar]		
Default value		**Force value** **Alternative config**	
Step	0.1 Bar		
Comm object	9263	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown limit level for ANALOG INPUT 7.			

back to List of setpoints

AnIInp7 del

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 180 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	9264	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for ANALOG INPUT 7.			

back to List of setpoints

AnIInp8 level1

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-10 .. 1000 [Bar]		
Default value		**Force value** **Alternative config**	
Step	0.1 Bar		
Comm object	9265	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning limit level for ANALOG INPUT 8.			

back to List of setpoints

AnIInp8 level2

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-10 .. 1000 [Bar]		
Default value		**Force value** **Alternative config**	
Step	0.1 Bar		
Comm object	9266	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown limit level for ANALOG INPUT 8.			

back to List of setpoints

AnIInp8 del

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 180 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	9267	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for ANALOG INPUT 8.			

back to List of setpoints

AnIInp9 level1

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-10 .. 1000 [Bar]		
Default value		**Force value** **Alternative config**	
Step	0.1 Bar		
Comm object	9268	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning limit level for ANALOG INPUT 9.			

back to List of setpoints

AnIInp9 level2

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	-10 .. 1000 [Bar]		
Default value		**Force value** **Alternative config**	
Step	0.1 Bar		
Comm object	9269	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown limit level for ANALOG INPUT 9.			

back to List of setpoints

AnIInp9 del

Setpoint group	Engine protection	**Related FW**	1.6.0
Range [units]	0 .. 180 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object	9270	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for ANALOG INPUT 9.			

back to List of setpoints

Group: Date/Time

Time stamp per

Setpoint group	Date/Time	**Related FW**	1.6.0
Range [units]	0 .. 200 [min]		
Default value		**Force value** **Alternative config**	
Step	1 min		
Comm object	8979	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Time interval for periodic history records.			

back to List of setpoints

#SummerTimeMod

Setpoint group	Date/Time	**Related FW**	1.6.0
Range [units]	[DISABLED/WINTER/SUMMER,WINTER-S, SUMMER-S]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	8727	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

DISABLED	Automatic switching between summer and wintertime is disabled.
WINTER (SUMMER)	Automatic switching between summer and wintertime is enabled and it is set to winter (summer) season.
WINTER-S (SUMMER-S)	Modification for southern hemisphere.

back to List of setpoints

#Time

Setpoint group	Date/Time	**Related FW**	1.6.0
Range [units]	[HHMMSS]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24554	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Actual time.

back to List of setpoints

#Date

Setpoint group	Date/Time	**Related FW**	1.6.0
Range [units]	[DDMMYYYY]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	24553	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Actual date.

back to List of setpoints

Timer 1,2 Function

Setpoint group	Date/Time	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value Alternative config**	
Step	-		
Comm object	11660	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

No Func	Corresponding Timer 1, 2 binary output activation only.
Auto Run	Engine start in AUT mode.

back to List of setpoints

Timer1..2 repeat

Setpoint group	Date/Time	**Related FW**	1.6.0
Range [units]	[NONE/MONDAY/TUESDAY/WEDNESDAY/THURSDAY/WEDNESDAY/FRIDAY/SATURDAY/SUNDAY/MON-FRI/MON-SAT/MON-SUN/SAT-SUN]		
Default value		**Force value Alternative config**	
Step	-		
Comm object	10045	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Defines TIMER1 activation. Binary output TIMER1 is internally linked with Rem Start/Stop binary input – i.e. can activate the periodic engine start in AUT mode. Refer to binary inputs for details.

NONE	Timer function is disabled.
MONDAY, TUESDAY, WEDNESDAY, THURSDAY, WEDNESDAY, FRIDAY, SATURDAY, SUNDAY	Timer is activated on daily basis.
MON-FRI, MON-SAT, SAT-SUN	Timer is activated on selected day interval.

back to List of setpoints

Timer1..2 ON time

Setpoint group	Date/Time	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	10042	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Day time when Timer 1..2 output activates.			

back to List of setpoints

Timer1..2Duration

Setpoint group	Date/Time	**Related FW**	1.6.0
Range [units]	1 .. 1440 [s]		
Default value		**Force value** **Alternative config**	
Step	1 min		
Comm object	10044	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Duration of Timer 1..2 output.			

back to List of setpoints

Group: Sensors Spec

Calibr AI 1..9

Setpoint group	Sensors Spec	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	8467	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the measured value of controller analog inputs. Physical dimension of calibrating constant is corresponding to Analog input. ***Note:*** *Calibration constants have to be adjusted when measured value is near the alarm level. User curves A, B, C can be defined by LiteEdit (3.0 or higher) software.*			

back to List of setpoints

CalibrAInAIO 1..4

Setpoint group	Sensors Spec	**Related FW**	1.6.0
Range [units]	-1000 .. 1000 [-]		
Default value		**Force value** **Alternative config**	
Step	1		
Comm object	13640	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the measured value of IL-NT-AIO analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			

back to List of setpoints

Group: IL-NT-AIO module

AnIlnAIO1..4 lev1

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	-100 .. 10000 [-]		
Default value		**Force value** **Alternative config**	
Step	1		
Comm object		**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
The level for IL-NT-AIO ANALOG INPUT 1..4 alarm detection.			

back to List of setpoints

AnIlnAIO1..4 lev2

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	-100 .. 10000 [-]		
Default value		**Force value** **Alternative config**	
Step	1		
Comm object		**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			
The level for IL-NT-AIO ANALOG INPUT 1..4 alarm detection.			

back to List of setpoints

AnIInAIO1..4 del

Setpoint group	Regulator	**Related FW**	1.6.0
Range [units]	0 .. 180 [s]		
Default value		**Force value** **Alternative config**	
Step	1 s		
Comm object		**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Delay for IL-NT-AIO ANALOG INPUT 1..4 alarm.

Note: *IL-NT-AIO analog inputs protection alarms can be configured following way:*

Configuration	*Protection.*
Under	*Protection is activated only when measured value is under measured level.*
Over	*Protection is activated only when measured value is over measured level.*
Under+fls	*Level 2 protection is activated by sensor fail as well.*
Over+fls	*Level 2 protection is activated by sensor fail as well.*

back to List of setpoints

Group: SMS / E-mail

Remote alarm messaging

Setpoint group	SMS / E-mail	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	-	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

If a **GSM** modem and/or **Internet bridge** is connected to the controller, the controller can send SMS messages and/or emails in the moment when a new alarm appears in the Alarm list. The message will contain a copy of the Alarm list.

To enable this function, you should select with setpoints Yel Alarm Msg and Red Alarm Msg, which levels of alarms shall be announced (red/yellow/both) and also enter valid GSM phone number and/or e-mail address to the setpoints TelNo/Addr Ch1 and TelNo/Addr Ch2. It is possible to put either a GSM number or e-mail to both setpoints.

> ***Note:*** *An internet module must be available for sending of e-mails. Similarly, a GSM modem is necessary for sending of SMS.*

> ***Note:*** *There are 5 attempts for any active call (SMS/E-Mail). Timeout for connection is 90 sec and after 120 sec controller starts the next attempt. During the time the IL-NT is trying to send an active call type, incoming calls are blocked.*

back to List of setpoints

Yel Alarm Msg

Setpoint group	SMS / E-mail	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	8482	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Set this setpoint to **ON** if you want to get messages when a yellow (warning) alarm occurs.

> ***Note:*** *The target address (GSM phone number or e-mail address) must be set correctly to the setpoint (s) TelNo/Addr Ch1 resp. TelNo/Addr Ch2.*

back to List of setpoints

Red Alarm Msg

Setpoint group	SMS / E-mail	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	8484	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Set this setpoint to **ON** if you want to get messages when a red (shutdown) alarm occurs.

> ***Note:*** *The target address (GSM phone number or e-mail address) must be set correctly to the setpoint (s) TelNo/Addr Ch1 resp. TelNo/Addr Ch2.*

back to List of setpoints

TelNo/Addr Ch1, 2

Setpoint group	SMS / E-mail	**Related FW**	1.6.0
Range [units]	[-]		
Default value		**Force value** **Alternative config**	
Step	-		
Comm object	9597, 9598	**Related applications**	
Config level	Standard		
Setpoint visibility	Always		
Description			

Enter either a valid GSM **phone number** or **e-mail address** to this setpoint, where the alarm messages shall be sent. Type of active call is considered from the value of this parameter. If it consist „@“ it is supposed to be e-mail address and active e-mail is sent. If the value is number, without „@“, it is supposed to be the telephone number and active SMS is sent.

> ***Note:*** *For GSM numbers use either national format (i.e. like number you will dial if you want to make a local call) or full international format with "+" character followed by international prefix in the begin.*

> ***Note:*** *This setpoint can be modified from PC only!*

back to List of setpoints

6.1.2 Logical binary inputs

Note: *Any Binary input or output can be configured to any controller terminal or changed to different function by LiteEdit (3.0 or higher) software. There is fix 1 sec delay when any binary input is configured as protection.*

Alphabetical groups of Logical binary inputs

For full list of Logical binary inputs go to the chapter **List of LBI (page 118)**.

List of LBI

back to Controller objects

LBI: A

Access lock

Related FW	1.6.0	Related applications	
Comm object	288		
Description			
If the input is closed, no setpoints can be adjusted from controller front panel and engine mode (OFFTEST- AUT) cannot be changed. ***Note:*** *Access lock does not protect setpoints and mode changing from LiteEdit. To avoid unqualified changes the selected setpoints can be password protected.*			

back to List of LBI

LBI: E

Emerg. manual

Related FW	1.6.0	Related applications	
Comm object	295		
Description			
If the input is activated the controller behaves like when switched to OFF mode and opens all binary outputs. There is one exception – STOP SOLENOID doesn't activate on this transition. Detection of "running" engine and subsequent alarm message "Sd Stop fail" is blocked. The controller shows "Emerg Man" state and the engine can not be started. After the input is open again, the controller recovers to previous state and behaves according to the actual situation. Function is active in any controller mode.			

back to List of LBI

Emergency stop

Related FW	1.6.0	Related applications	
Comm object	286		
Description			
If the input is opened, shut down is immediately activated. Input is inverted (normally closed) in default configuration. ***Note:*** *In case of controller hardware or software fail, safe stop of the engine doesn't have to be ensured. To back-up the Emergency stop function it is recommended to connect separate circuit for disconnection of Fuel solenoid and Starter signals.*			

back to List of LBI

LBI: F

FaultResButton

Related FW	1.6.0	Related applications	
Comm object	298		
Description			
Binary input has the same function as **Fault reset** button on the controller front panel.			

back to List of LBI

LBI: H

HornResButton

Related FW	1.6.0	Related applications	
Comm object	299		
Description			
Binary input has the same function as Horn reset button on the controller front panel.			

back to List of LBI

LBI: L

Lamp test

Related FW	1.6.0	Related applications	
Comm object	400		
Description			
Activates (by rising edge) the panel lamp test procedure (all LEDs are blinking) – function is same as if activated by **Enter** + **Page** button.			

Lang selection

Related FW	1.6.0	Related applications	
Comm object	303		
Description			
Switches display texts between two languages.			

back to List of LBI

LBI: N

Nominal/Idle

Related FW	1.6.0	Related applications	
Comm object	304		
Description			
Input works in TEST mode only. Active Nominal/Idle input activates IDLE/NOMINAL (PAGE 139) and sends either Speed request = 0 % (e.g. Standard J1939) or active IDLE command to the ECU (e.g. to Volvo EMS). Active input opens the READY TO LOAD (PAGE 141) during the engine “Running” state. Ready to Load can be closed back (if other conditions are fulfilled – see READY TO LOAD (PAGE 141) description) if Nominal/Idle opens.			

back to List of LBI

Not used

Related FW	1.6.0	Related applications	
Comm object	282		
Description			
Binary input has no function. Use this configuration when Binary input is not connected.			

back to List of LBI

LBI: P

PressSwitch1

Related FW	1.6.0	Related applications	
Comm object	385		
Description			
Applies in AUT mode only. › With rising edge causes start of engine when closed › After opening (if no other cause of engine start is active) doesn’t stop engine directly but allows manual stop of engine by STOP button In TEST mode BINs have no function – they don't start nor stop the engine			

PressSwitch2

Related FW	1.6.0	Related applications	
Comm object	386		
Description			
In AUTO mode › With rising edge causes start of engine when closed › After opening (if no other cause of engine start is active) allows manual stop of engine by STOP button In TEST mode BINs have no function – they don't start nor stop the engine			

LBI: R

Rem start/stop

Related FW	1.6.0	Related applications	
Comm object	285		
Description			
Applies in AUT mode only. › With rising edge causes start of engine when closed › After opening (if no other cause of engine start is active) doesn't stop engine directly but allows manual stop of engine by STOP button In TEST mode BINs have no function – they don't start nor stop the engine			

back to List of LBI

RemControlLock

Related FW	1.6.0	Related applications	
Comm object	294		
Description			
If the input is active, setpoints writing or command sending from the external terminal is disabled.			

back to List of LBI

Remote AUT

Related FW	1.6.0	Related applications	
Comm object	291		
Description			
If the input is active, AUT mode is forced to the controller independently on the position of the MODE selector. If another of „remote“ inputs is active, then the REMOTE AUT input has the lowest priority.			

back to List of LBI

Remote OFF

Related FW	1.6.0	Related applications	
Comm object	289		
Description			
If closed, controller is switched to OFF mode (there are four modes OFF-TEST-AUT). When opens controller is switched back to previous mode. ***Note:*** *This binary input should be connected to schedule timer switch, to avoid start of engine.*			

back to List of LBI

Remote TEST

Related FW	1.6.0	Related applications	
Comm object	290		
Description			
If the input is active, TEST mode is forced to the controller independently on the position of the MODE selector.			

back to List of LBI

R Reg Disable

Related FW	1.6.0	Related applications	
Comm object	316		
Description			
Active input disables the Regulator PI loop and switches analog output to constant **Regulator**: Reg *bias*.			

back to List of LBI

RegRequest2

Related FW	1.6.0	Related applications	
Comm object	315		
Description			
Active input switches the Regulator limit request to **Regulator**: **Description (page 91)**.			

back to List of LBI

LBI: S

Speed Down

Related FW	1.6.0	Related applications	
Comm object	558		
Description			
If the input is active, the Speed Request may decrease the engine speed value. The Speed Request value may also depend on the conditions which are described in the chapter below. ***Note:*** *SpeedUp/Down binary inputs are active only when* ***LAI SpdRequest (page 90)*** *= OFF.*			

back to List of LBI

Speed Sel 1

Related FW	1.6.0	Related applications	
Comm object	307		
Description			
If the input is active, the Speed request = **BI Speed Sel 1 (page 84)**. The function is affected by **RetToSpeedAdj (page 83)**.			

back to List of LBI

Speed Sel 2

Related FW	1.6.0	Related applications	
Comm object	308		
Description			
If the input is active, the **BI Speed Sel 2 (page 85)** may give the engine speed value for Speed request to an ECU engine. The Speed Request value may also depend on the conditions which are described in the chapter below.			

back to List of LBI

Speed Sel 3

Related FW	1.6.0	Related applications	
Comm object	309		
Description			

If the input is active, the **BI Speed Sel 3 (page 85)** may give the engine speed value for Speed request to an ECU engine. The Speed Request value may also depend on the conditions which are described in the chapter below.

Note: ***RetToSpeedAdj (page 83)*** *= DISABLED … Speed request is set by BI Speed Sel1, ..2, ..3 edge (button press). i.e. input can be opened and Speed request stay constant.*

Note: ***RetToSpeedAdj (page 83)*** *= ENABLED … Speed request is set by BI Speed Sel1, ..2, ..3 level (switch) i.e. when input is opened Speed request go back to* ***ECU SpeedAdj (page 83)*** *level.*

Note: ***Speed Sel 1 (page 123)***, ***Speed Sel 2 (page 124)*** *and* ***Speed Sel 3 (page 124)*** *are active only when* ***LAI SpdRequest (page 90)*** *= OFF.*

Note: *When more binary inputs are active at the same time, e.g. all binary inputs: 'Speed Sel1', 'Speed Sel2', 'Speed Sel3' then requested speed is given by* ***BI Speed Sel 1 (page 84)*** *(lowest index).*

back to List of LBI

Speed Up

Related FW	1.6.0	Related applications	
Comm object	557		
Description			
If the input is active, the Speed Request may increase the engine speed value. The Speed Request value may also depend on the conditions which are described in the chapter below.			

back to List of LBI

Sprinkler

Related FW	1.6.0	Related applications	
Comm object	287		
Description			
If the input is closed all alarms are disabled except the binary input EMERGENCY STOP and "engine overspeed protection". › All controller alarms are detected, › controller front panel RED LED blinks or lights, › Alarm is recorded on the controller alarm list screen, › BUT engine remains running. ***Note:*** *Warning SprinklActive is indicated in the Alarm list if sprinkler mode active to inform the operator that the engine is not protected.*			

back to List of LBI

StartButton

Related FW	1.6.0	Related applications	
Comm object	296		
Description			
Binary input has the same function as **Start** button on the controller front panel. It is active in TEST mode only.			

back to List of LBI

StopButton

Related FW	1.6.0	Related applications	
Comm object	297		
Description			
Binary input has the same function as **Stop** button on the controller front panel. It is active in TEST mode only.			

back to List of LBI

6.1.3 Logical binary outputs

Alphabetical groups of Logical binary outputs

For full list of Logical binary outputs go to the chapter **List of LBO (page 127)**.

List of LBO

back to Controller objects

LBO: A

Air valves

Related FW	1.6.0	Related applications	
Comm object	1247		
Description			
Output closes together with Prestart and opens after the engine is stopped. Stopped engine conditions: RPM = 0, **Starting POil (page 75)**, **D+ function (page 81)** (when enabled).			

back to List of LBO

Alarm

Related FW	1.6.0	Related applications	
Comm object	2		
Description			
The output closes if: › any warning or shutdown comes up or › the engine malfunctions The output opens if › **FAULT RESET** is pressed The output closes again if a new fault comes up.			

back to List of LBO

AUT mode

Related FW	1.6.0	Related applications	
Comm object	293		
Description			
The output is closed, if AUT mode is selected.			

back to List of LBO

LBO: B

Battery flat

Related FW	1.6.0	Related applications	
Comm object	1292		
Description			
Output closes when controller performs reset during start procedure (probably due to weak battery). The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

BI1 – Stat

Related FW	1.6.0	Related applications	
Comm object	298		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

BI2 – Stat

Related FW	1.6.0	Related applications	
Comm object	299		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

BI3 – Stat

Related FW	1.6.0	Related applications	
Comm object	300		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

BI4 – Stat

Related FW	1.6.0	Related applications	
Comm object	301		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

BI5 – Stat

Related FW	1.6.0	Related applications	
Comm object	302		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

BI6 – Stat

Related FW	1.6.0	Related applications	
Comm object	303		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

BI7 – Stat

Related FW	1.6.0	Related applications	
Comm object	304		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

BI8 – Stat

Related FW	1.6.0	Related applications	
Comm object	305		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

BI9 – Stat

Related FW	1.6.0	Related applications	
Comm object	306		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

BI10 – Stat

Related FW	1.6.0	Related applications	
Comm object			
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

BIO8 1 – Status

Related FW	1.6.0	Related applications	
Comm object	564		
Description			
The output gives information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

back to List of LBO

BIO8 2 – Status

Related FW	1.6.0	Related applications	
Comm object	565		
Description			
The output gives information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

back to List of LBO

BIO8 3 – Status

Related FW	1.6.0	Related applications	
Comm object	566		
Description			
The output gives information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

back to List of LBO

BIO8 4 – Status

Related FW	1.6.0	Related applications	
Comm object	567		
Description			
The output gives information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

back to List of LBO

BIO8 5 – Status

Related FW	1.6.0	Related applications	
Comm object	568		
Description			
The output gives information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

back to List of LBO

BIO8 6 – Status

Related FW	1.6.0	Related applications	
Comm object	569		
Description			
The output gives information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

back to List of LBO

BIO8 7 – Status

Related FW	1.6.0	Related applications	
Comm object	570		
Description			
The output gives information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

back to List of LBO

BIO8 8 – Status

Related FW	1.6.0	Related applications	
Comm object	571		
Description			
The output gives information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens if: › alarm is not active and › **FAULT RESET** is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

back to List of LBO

LBO: C

ChrgAlternFail

Related FW	1.6.0	Related applications	
Comm object	1260		
Description			

Output closes if engine is running and D+ input not energized.

The output opens, if:

- alarm is not active and
- F**AULT RESET** is pressed

Note: *Threshold level for D+ input is 80 % of supply voltage.*

back to List of LBO

Common Cd

Related FW	1.6.0	Related applications	
Comm object	257		
Description			

Output closes when any cooldown alarm appears.

The output opens, if

- No Cdalarm is active and
- **FAULT RESET** is pressed

back to List of LBO

Common Fls

Related FW	1.6.0	Related applications	
Comm object	6		
Description			

Output closes when any sensor fail alarm appears.

The output opens, if:

- No warning alarm is active and
- **FAULT RESET** is pressed

back to List of LBO

Common Sd

Related FW	1.6.0	Related applications	
Comm object	4		
Description			
Output closes when any shut-down alarm appears. The output opens, if: › No sd alarm is active and › **FAULT RESET** is pressed			

back to List of LBO

Common Wrn

Related FW	1.6.0	Related applications	
Comm object	3		
Description			
Output closes when any warning alarm appears. The output opens, if: › No warning alarm is active and › **FAULT RESET** is pressed			

back to List of LBO

Cooling pump

Related FW	1.6.0	Related applications	
Comm object	40		
Description			
The output closes when engine starts and opens **AfterCool time (page 79)** after stop of the engine.			

back to List of LBO

Cooling

Related FW	1.6.0	Related applications	
Comm object	74		
Description			
The output closes when engine is in Cooling state.			

back to List of LBO

CtrlHeartBeat

Related FW	1.6.0	Related applications	
Comm object	81		
Description			
Output signalizes watchdog reset. In a healthy state it blinks at 500 ms rate. When watchdog reset occurs, it stops blinking.			

back to List of LBO

LBO: E

ECU CommError

Related FW	1.6.0	Related applications	
Comm object	384		
Description			
The output is an inversion of **ECU CommOK (page 137)**, i.e. the output is closed when ECU is not communicating and all values from ECU show #####.			

back to List of LBO

ECU CommOK

Related FW	1.6.0	Related applications	
Comm object	347		
Description			
If the ECU is not communicating and all values from ECU show #### the output is not active. If the ECU communicates the output is active.			

back to List of LBO

ECU PwrRelay

Related FW	1.6.0	Related applications	
Comm object	351		
Description			
The output closes at the beginning of prestart and opens if the engine shall be stopped.			

back to List of LBO

ECU RedLamp

Related FW	1.6.0	Related applications	
Comm object	350		
Description			
The output copies shutdown information from ECU.			

back to List of LBO

ECU YellowLamp

Related FW	1.6.0	Related applications	
Comm object	349		
Description			
The output copies warning information from ECU.			

back to List of LBO

LBO: F

Fault Reset

Related FW	1.6.0	Related applications	
Comm object	592		
Description			
One second pulse as echo for panel Fault reset button.			

back to List of LBO

Fuel solenoid

Related FW	1.6.0	Related applications	
Comm object	22		
Description			
Closed output opens the fuel solenoid and enables the engine start. The output always closes together with the Batt A or Batt B binary output. The output opens if: › EMERGENCY STOP comes or › Cooled engine is stopped or › in pause between repeated starts			

back to List of LBO

LBO: G

Glow plugs

Related FW	1.6.0	Related applications	
Comm object	1252		
Description			
The output closes prior to the engine start (Prestart) and opens when Starting RPM speed is reached. During repeated crank attempts the output is opened.			

back to List of LBO

LBO: H

Horn Silen

Related FW	1.6.0	Related applications	
Comm object	1083		
Description			

Output closes when:

- Active alarm is silenced by Horn Reset

Output opens when:

- Horn activates again by new alarm announcement
- Horn is reactivated by expiring of **HornSilenTime1 (page 96)** / **HornSilenTime2 (page 96)** / CritHornSilen
- Alarm is deactivated

back to List of LBO

Horn

Related FW	1.6.0	Related applications	
Comm object	1		
Description			

The output closes if:

- any warning or shutdown comes up or
- the engine malfunctions

The output opens if:

- **FAULT RESET** is pressed or
- **HORN RESET** is pressed or
- Max time of HORN is exceeded (Horn timeout)

The output closes again if a new fault comes up.

back to List of LBO

LBO: I

Idle/Nominal

Related FW	1.6.0	Related applications	
Comm object	1902		
Description			

The output either follows the **NOMINAL/IDLE (PAGE 121)** in TEST mode or follows the engine state in AUT mode:

The output Idle/Nominal closes after the timer Idle time elapses. The Idle time counter starts to countdown when Start speed reached. The Underspeed protection is not evaluated during idle period.

A Start fail protection occurs if the RPM drop below 2RPM during idle state.

back to List of LBO

Ignition

Related FW	1.6.0	**Related applications**	
Comm object	37		
Description			
The output closes after reaching value of CrankRPM, fixed by 30 RPM. Opens after stopping of the engine or in pause during repeated start.			

back to List of LBO

LBO: N

Not used

Related FW	1.6.0	**Related applications**	
Comm object	63		
Description			
Output has no function.			

back to List of LBO

LBO: O

OFF mode

Related FW	1.6.0	**Related applications**	
Comm object	291		
Description			
The output is closed, if OFF mode is selected.			

back to List of LBO

Overspeed

Related FW	1.6.0	**Related applications**	
Comm object	779		
Description			
Output closes if the engine over speed alarm activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

LBO: P

Prestart

Related FW	1.6.0	Related applications	
Comm object	36		
Description			
The output closes prior to the engine start (Prestart) and opens when Starting RPM speed is reached. During repeated crank attempts the output is closed too. The output could be used for pre-glow, pre-heat or prelubrication.			

back to List of LBO

LBO: R

Ready to load

Related FW	1.6.0	Related applications	
Comm object	58		
Description			
The output is closed if engine is running and no alarm is active - it is possible to close load. The output opens when Wrn underspeed protection is active and during cooling state.			

back to List of LBO

Ready

Related FW	1.6.0	Related applications	
Comm object	62		
Description			
The output is closed if following conditions are fulfilled: › Engine is not running and › No Shut down or Slow stop alarm is active › Controller is not in OFF mode			

back to List of LBO

ReliefValActiv

Related FW	1.6.0	Related applications	
Comm object	1784		
Description			

Output closes when:

- Controller goes from Running state to Cooling state
- Engine is started by Timer1/Timer2
  - Except the case engine is running already

Output opens when:

- Timer **ReliefValtime (page 80)** started by Timer1/2
- Engine start is requested by BIN either while stopped engine or while running engine in case it was started by Timer 1/Timer2

back to List of LBO

Remote Control 1

Related FW	1.6.0	Related applications	
Comm object	649		
Description			

Allows configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or InteliMonitor by button and it can be controlled via Modbus communication.

back to List of LBO

Remote Control 2

Related FW	1.6.0	Related applications	
Comm object	650		
Description			

back to List of LBO

Remote Control 3

Related FW	1.6.0	Related applications	
Comm object	651		
Description			

back to List of LBO

Remote Control 4

Related FW	1.6.0	Related applications	
Comm object	652		
Description			

back to List of LBO

Remote Control 5

Related FW	1.6.0	Related applications	
Comm object	653		
Description			

back to List of LBO

Remote Control 6

Related FW	1.6.0	Related applications	
Comm object	654		
Description			

back to List of LBO

Remote Control 7

Related FW	1.6.0	Related applications	
Comm object	655		
Description			

back to List of LBO

Remote Control 8

Related FW	1.6.0	Related applications	
Comm object	656		
Description			

back to List of LBO

Running

Related FW	1.6.0	Related applications	
Comm object	67		
Description			
Output closes if the engine is in Running state.			

back to List of LBO

LBO: S

Sd AIN 6

Related FW	1.6.0	**Related applications**	
Comm object	1522		
Description			

back to List of LBO

Sd AIN 7

Related FW	1.6.0	**Related applications**	
Comm object	1523		
Description			

back to List of LBO

Sd AIN 8

Related FW	1.6.0	**Related applications**	
Comm object	1524		
Description			

back to List of LBO

Sd AIN 9

Related FW	1.6.0	**Related applications**	
Comm object	1525		
Description			

back to List of LBO

Sd AnImAIO1

Related FW	1.6.0	**Related applications**	
Comm object	1215		
Description			

Output closes if shutdown alarm on the appropriate IL-NT-AIO analog input activates.

The output opens, if:

- alarm is not active and
- **FAULT RESET** is pressed

back to List of LBO

Sd AnImAIO2

Related FW	1.6.0	Related applications	
Comm object	1216		
Description			
Output closes if shutdown alarm on the appropriate IL-NT-AIO analog input activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

Sd AnImAIO3

Related FW	1.6.0	Related applications	
Comm object	1217		
Description			
Output closes if shutdown alarm on the appropriate IL-NT-AIO analog input activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

Sd AnImAIO4

Related FW	1.6.0	Related applications	
Comm object	1218		
Description			
Output closes if shutdown alarm on the appropriate IL-NT-AIO analog input activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

Sd Engine Temp

Related FW	1.6.0	Related applications	
Comm object	523		
Description			
Output closes if the water temperature shutdown alarm activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

Sd FuelLevel

Related FW	1.6.0	Related applications	
Comm object	525		
Description			
Output closes if the Fuel level shutdown alarm activates.			

back to List of LBO

Sd Oil Press

Related FW	1.6.0	Related applications	
Comm object	521		
Description			
Output closes if the oil pressure shutdown alarm activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

ServiceTime

Related FW	1.6.0	Related applications	
Comm object	422		
Description			
Output closes if the ServiceTime alarm activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

Speed Switch

Related FW	1.6.0	Related applications	
Comm object	56		
Description			
Binary output from Speed switch comparator – **see Group: Regulator on page 89**.			

back to List of LBO

Start A

Related FW	1.6.0	Related applications	
Comm object	65		
Description			
The closed output energizes the starter motor from battery A (also see Start-Stop sequence table and a sequence example of a fire start). The Batt A output always opens 4 seconds after each finished but unsuccessful cranking attempt and never closes together with Batt B. When the start from battery A has been successful the output Batt A stays closed until stop of the engine.			

back to List of LBO

Start B

Related FW	1.6.0	Related applications	
Comm object	174		
Description			
The closed output energizes the starter motor from battery B (also see Start-Stop sequence table and a sequence example of a fire start). The Batt B output always opens 4 seconds after each finished but unsuccessful cranking attempt and never closes together with Batt A. When the start from battery B has been successful the output Batt B stays closed until stop of the engine.			

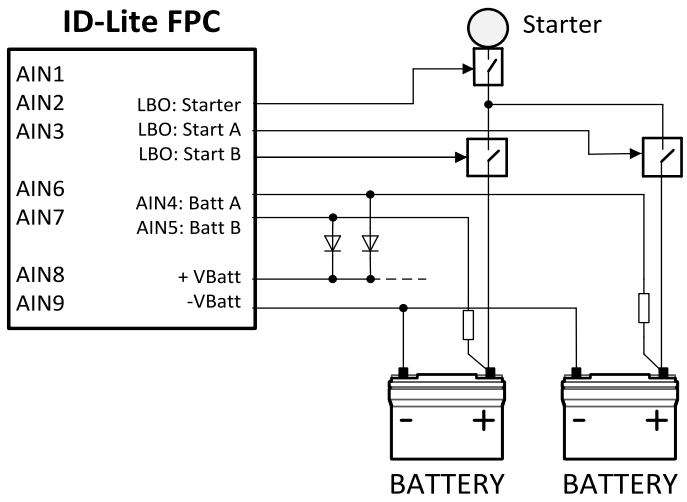


Image 7.1 One starter wiring

back to List of LBO

Start failed

Related FW	1.6.0	Related applications	
Comm object	1291		
Description			

Output closes after the engine start-up fails.

The output opens, if:

- alarm is not active and
- **FAULT RESET** is pressed

back to List of LBO

Starter

Related FW	1.6.0	Related applications	
Comm object	24		
Description			

The closed output energizes the starter motor. The output always closes with 1 second delay after closing of the binary output Start A or Start B.

The Starter output opens when:

- the Starting RPM is reached or
- the Starting POil is reached or
- D+ input activated
- maximum time of cranking is exceeded or
- request to stop comes up

Note: *The binary output Starter stays closed for 5 seconds even if engine speed appears to be zero. If there are no RPM during this time, controller opens Starter output, waits for* ***CrnkFail pause (page 76)*** *and tries to start again.*

back to List of LBO

Stop failed

Related FW	1.6.0	Related applications	
Comm object	339		
Description			

Output closes when the engine has to be stopped, but speed, frequency, or voltage or oil pressure is detected. This protection goes active 60s after stop command.

The output opens, if:

- alarm is not active and
- **FAULT RESET** is pressed

back to List of LBO

Stop Pulse

Related FW	1.6.0	Related applications	
Comm object	25		
Description			
Output is active for 1 second after Stop solenoid output activation. This signal is sent to ECU in case of engine stop request.			

back to List of LBO

Stop solenoid

Related FW	1.6.0	Related applications	
Comm object	23		
Description			

The closed output energizes stop solenoid to stop the engine.

The output is active at least for Stop time, if the stop lasts longer; it stays active until all symptoms say the engine is stopped.

The engine is stopped if:

- RPM < 2 and
- Oil pressure < **Starting POil (page 75)**.

Note: *The engine can be started anytime, if all symptoms say the engine is steady regardless of the fact the Stop solenoid can still be active (in that case it is deactivated before cranking).*

Note: *In case when stop time period is lower than "stop engine detected" + 10 s, stop time period is extended to this value due to safety reason. (stop engine detected = RPM<2, OilP not detected, D+ not active)*

back to List of LBO

LBO: T

TEST mode

Related FW	1.6.0	Related applications	
Comm object	294		
Description			
The output is closed, if TEST mode is selected.			

back to List of LBO

Timer1

Related FW	1.6.0	Related applications	
Comm object	436		
Description			
Output activates when Timer1 is active. Simultaneously, engine is started when is in AUT mode.			

back to List of LBO

Timer2

Related FW	1.6.0	Related applications	
Comm object	437		
Description			
Output activates when Timer2 is active			

back to List of LBO

LBO: U

Underspeed

Related FW	1.6.0	Related applications	
Comm object	1296		
Description			
Output closes if the engine “Sd Underspeed” alarm activates i.e. when RPM is below the Engine params: Starting RPM limit. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

LBO: V

V BATT A Fail

Related FW	1.6.0	Related applications	
Comm object	640		
Description			
Indication of Battery voltage is out of limits **Batt A over V (page 101)**, **Batt A under V (page 101)**, **Batt A del (page 102)**.			

back to List of LBO

V BATT B Fail

Related FW	1.6.0	Related applications	
Comm object	641		
Description			
Indication of Battery voltage is out of limits **Batt B over V (page 102)**, **Batt B under V (page 102)**, **Batt B del (page 103)**.			

back to List of LBO

V batt failed

Related FW	1.6.0	Related applications	
Comm object	580		
Description			
Indication of Battery voltage A or B is out of limits.			

back to List of LBO

LBO: W

Wrn AIN6

Related FW	1.6.0	Related applications	
Comm object	1518		
Description			

back to List of LBO

Wrn AIN7

Related FW	1.6.0	Related applications	
Comm object	1519		
Description			

back to List of LBO

Wrn AIN8

Related FW	1.6.0	Related applications	
Comm object	1520		
Description			

back to List of LBO

Wrn AIN9

Related FW	1.6.0	Related applications	
Comm object	1521		
Description			

back to List of LBO

Wrn AnImAIO1

Related FW	1.6.0	Related applications	
Comm object	1211		
Description			
Output closes if warning alarm on the appropriate IL-NT-AIO analog input activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

Wrn AnImAIO2

Related FW	1.6.0	Related applications	
Comm object	1212		
Description			
Output closes if warning alarm on the appropriate IL-NT-AIO analog input activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

Wrn AnImAIO3

Related FW	1.6.0	Related applications	
Comm object	1213		
Description			
Output closes if warning alarm on the appropriate IL-NT-AIO analog input activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

Wrn AnImAIO4

Related FW	1.6.0	Related applications	
Comm object	1214		
Description			
Output closes if warning alarm on the appropriate IL-NT-AIO analog input activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

Wrn Engine Temp

Related FW	1.6.0	Related applications	
Comm object	524		
Description			
Output closes if the water temperature warning alarm activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

Wrn FuelLevel

Related FW	1.6.0	Related applications	
Comm object	526		
Description			
Output closes if the Fuel level warning alarm activates.			

back to List of LBO

Wrn LowEngTemp

Related FW	1.6.0	Related applications	
Comm object	1416		
Description			
Output closes if the coolant temperature (fixed on AIN2) underlimit alarm activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

Wrn Oil Press

Related FW	1.6.0	Related applications	
Comm object	522		
Description			
Output closes if the oil pressure warning alarm activates. The output opens, if: › alarm is not active and › **FAULT RESET** is pressed			

back to List of LBO

6.1.4 Logical analog inputs

There are two sources of analog inputs: Physical Controller inputs and values received from ECU. Analog inputs are used mainly for one or two levels protection.

It is possible to configure on Analog inputs:

- Reading from controller Analog inputs or from Engine Control Unit via CAN bus (J1939)
- Sensor characteristics – from the list, or custom sensor curve
- Value dimension (e.g. psi - bars, °F - °C, % - l)
- Number of decimal points (0, 1, 2, …).

Warning and shut-down limits are adjusted in **Group: Engine protection (page 95)**.

The analog inputs are configurable. Use LiteEdit (3.0 or higher) software to modify configuration.

CAN J1939 interface

Following values can be received from Engine Control Unit via CAN bus instead of measuring on controller terminals when J1939 interface is enabled.

Value	Value is received from	
	J1939 enabled	J1939 disabled
RPM	ECU	Controller – RPM terminals
Oil pressure	ECU or ID-FLX AI1	Controller AI1 terminals
Water temperature	ECU or ID-FLX AI2	Controller AI2 terminals
Fuel level	ECU or ID-FLX AI3	Controller AI3 terminals
ECU State	ECU	
Fuel rate	ECU	
Manifold temp	ECU	
Boost pressure	ECU	
PercLoadAtCS	ECU	

Use LiteEdit 3.0 to enable/disable J1939 interface and to configure controller analog inputs.

Note: *RPM reading is automatically switched to pickup measuring (depends on* ***Gear teeth (page 60)****) if J1939 fails.*

back to Controller objects

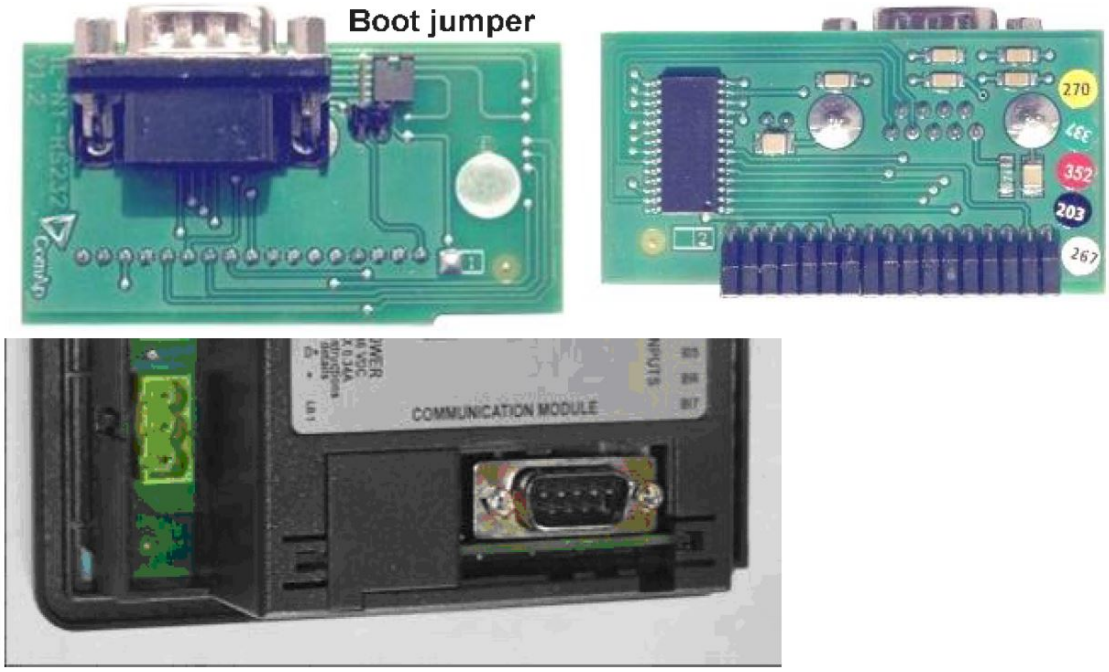
6.2 Extension modules

back to Appendix

back to Table of contents

6.2.1 IL-NT RS232 communication module

IL-NT RS232 is optional plug-in card to enable InteliDrive -Lite for RS232 communication. This is required for computer or Modbus connection. Card insert into expansion “Communication module” slot back on the controller.

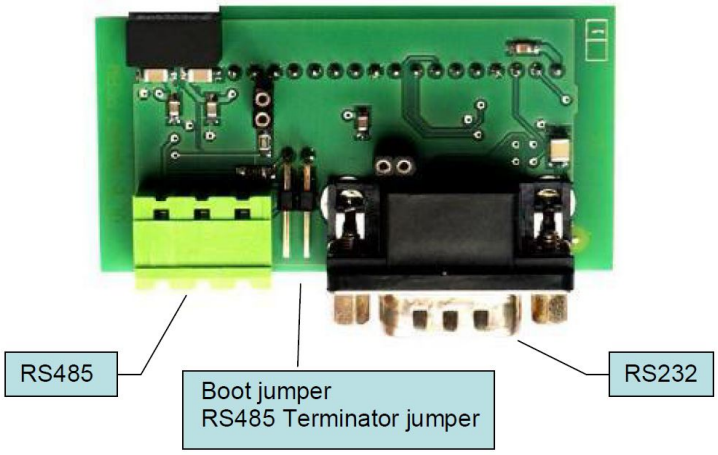


back to Extension modules

6.2.2 IL-NT-232-485 communication module

IL-NT RS232-485 is optional plug-in RS232 and RS485 communication interface. This is required for computer or Modbus connection. The IL-NT RS232-485 is a dual port module with RS232 and RS485 interfaces at independent COM channels. The RS232 is connected to COM1 and RS485 to COM2.

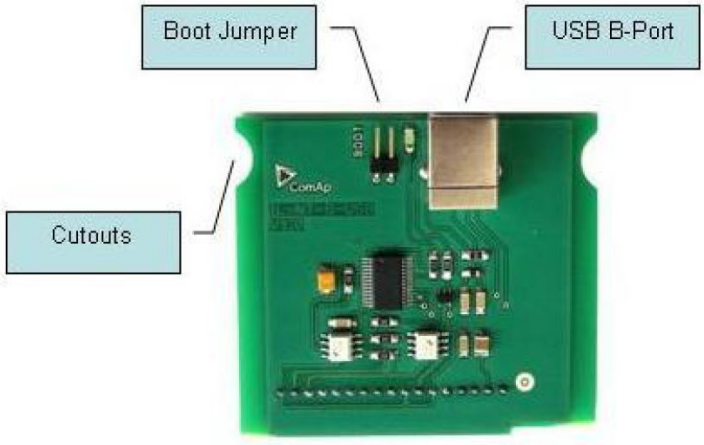
To insert the module, please follow the instructions for IL-NT RS232 module. You must open the cover first (use screwdriver to open) and then insert the module into slot. Once you have inserted it, the module will snap under plastic teeth. It is supposed to be installed permanently. Should you need to remove it, the safest way is to remove the whole back cover and than remove module manually.



back to Extension modules

6.2.3 IL-NT-S-USB communication module

IL-NT S-USB is optional plug-in card to enable InteliLite^{NT} communication via USB port. This is required for computer or Modbus connecting. Card inserts into expansion slot back on the controller. To insert the module, please follow the instructions for IL-NT RS232 module. Open the cover first (use screwdriver to open) and then insert the module into slot. Once you have inserted it, part of the module will remain over plastic box. It is supposed to be used as a service tool. When you need to remove it, grab module in cutouts and pull it up manually.

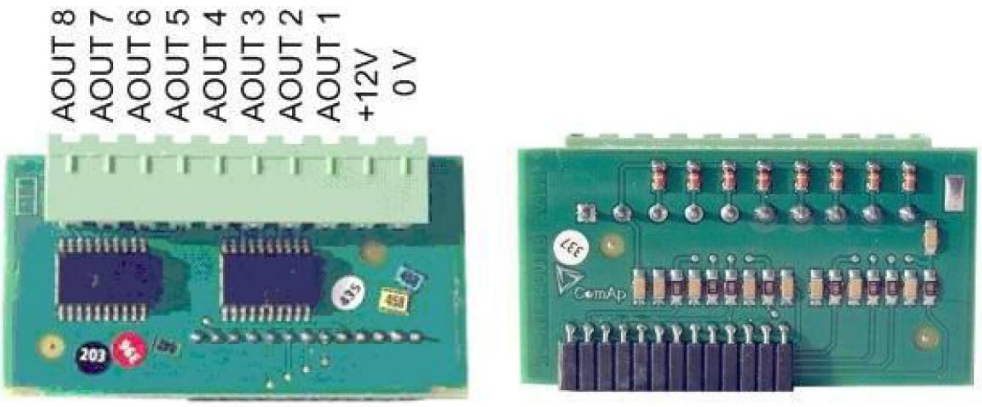


Note: *Use the shielded USB A-B cable with this module! Recommended is ComAp cable – Order code: "USB-LINK CABLE 1.8M".*

back to Extension modules

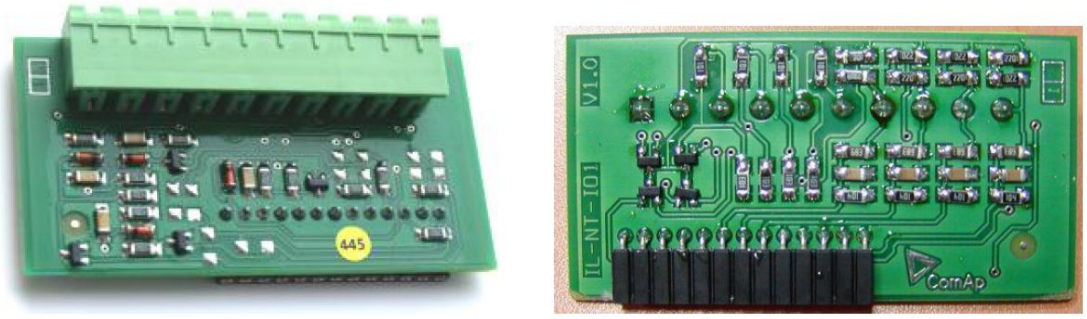
6.2.4 IL-NT AOU8 – 8 gauge driver module

IL-NT AOUT8 is optional plug-in card. Through this card controller can drive up to 8 VDO style industrial/automotive gauges. Gauge type and value are configured in LiteEdit (3.0 or higher) software. Any analog value from controller may be shown in that way.



back to Extension modules

6.2.5 IL-NT IO1 – extension I/O module



Module structure and wiring is on the drawing below.

The GND terminal is internally wired with battery minus power supply terminal. The +VBat has to be wired to battery plus power supply on IL-NT-DCU controller. It is possible to connect up to four Proportional valves.

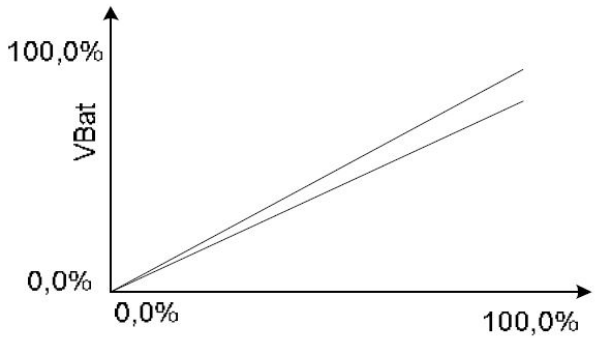
back to Extension modules

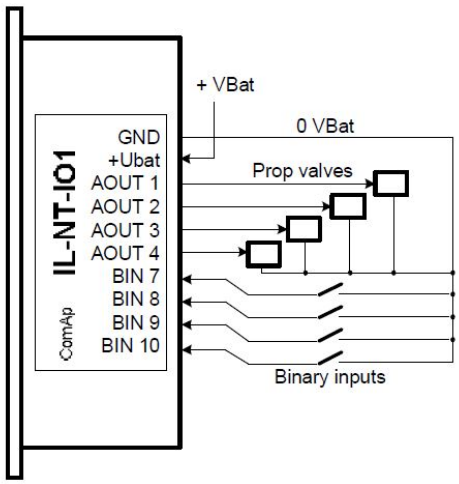
6.2.6 Analog output – AOUT1 to AOUT4 characteristic

Output voltage corresponds to setpoints setting (see below) – depending on engine conditions (controller binary inputs state).

There should be up to one volt lover voltage compare to adjusted % of +VBat voltage.

Note: *The Analog output short to ground connection longer than 1 sec can damage the output circuit.*

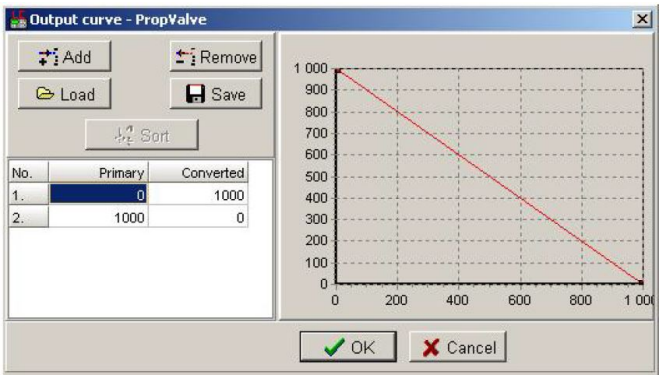




back to Extension modules

6.2.7 Analog output characteristic

Conversion curves - Output curve – PropValve



Primary value format:

- 1000 = 100,0%

Converted value format:

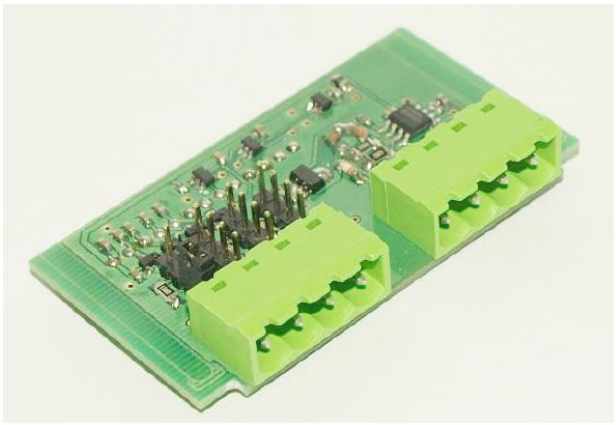
- 1000 = 100,0%

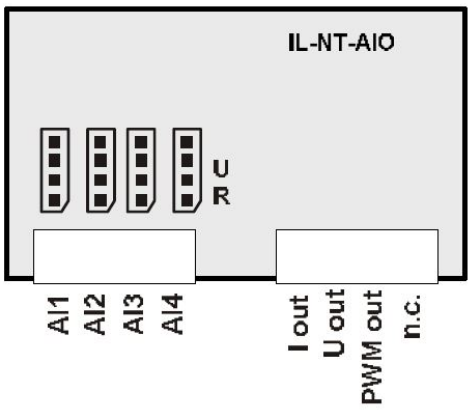
back to Extension modules

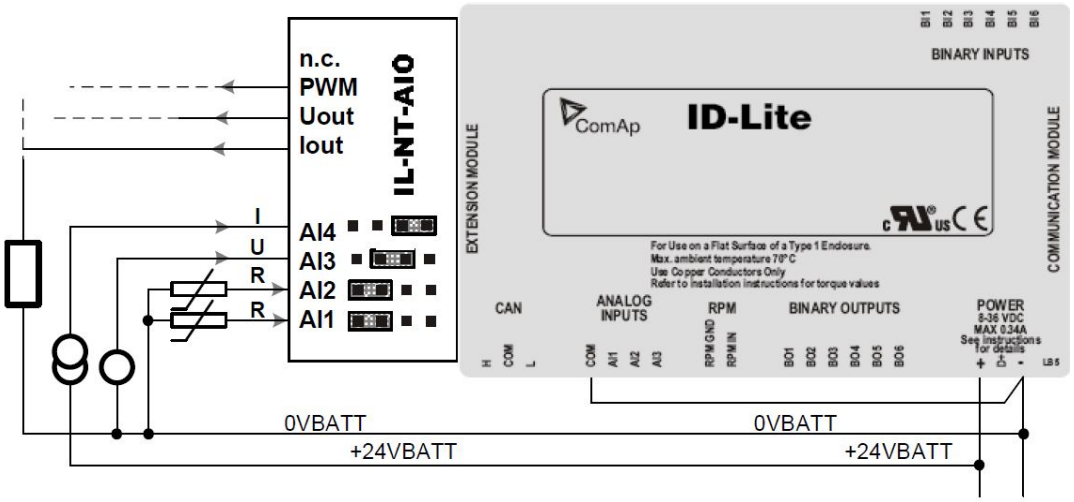
6.2.8 IL-NT-AIO

IL-NT AIO is optional plug-in card with additional four Analog inputs and one Analog output. Use LiteEdit to configure Inputs and Output..

AIN1 – AIN4	2600 ohm / 20 mA / 4V	
AOUT	0 – 20 mA (max 22mA) max 100ohm load	I out
	0 – 4,5V (max 10mA)	U out
	PWM 5V / 15mA	PWM out







back to Extension modules

6.2.9 IL-NT BIO8 Binary input/output module

IL-NT BIO8 is optional plug-in card. Through this card controller can accommodate up to 8 binary inputs or outputs. In LiteEdit configuration is possible to easily choose if particular I/O will be binary input or output.

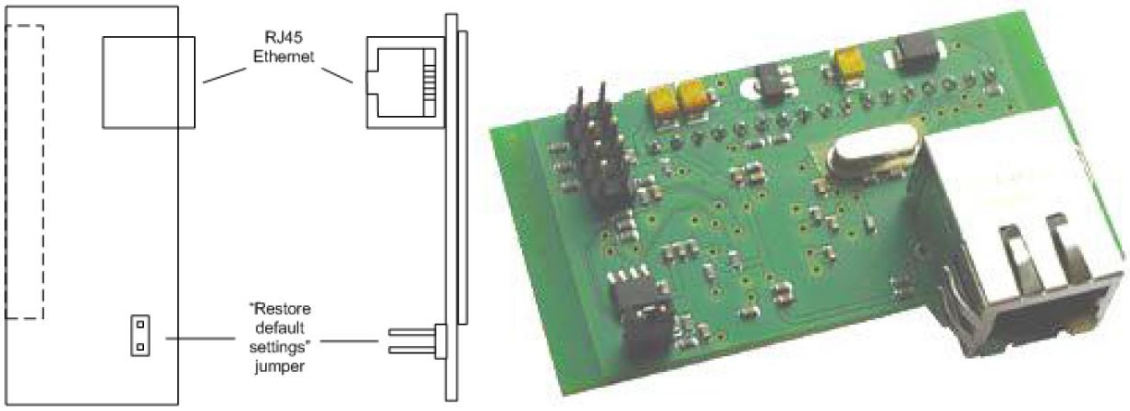
back to Extension modules

6.2.10 IB-Lite Ethernet communication plug-in card

IB-Lite is a plug-in card with Ethernet 10/100 Mbit interface in RJ45 connector. The card is internally connected to both COM1 and COM2 serial channels and provides an interface for connecting a PC with LiteEdit or InteliMonitor through Ethernet/internet network, for sending active e-mails and for integration of the controller into a building management (Modbus/TCP protocol).

This card also enables to monitor and control the gen-set over web browser from any location with internet access using appropriate security measures.

Card inserts into expansion slot back on the controller. To insert the module, please follow the instructions for IL-NT RS232 module.



Use Ethernet UTP cable with RJ45 connector for connection of the module into your Ethernet network. The module can be also connected directly to a PC using cross-wired UTP cable.

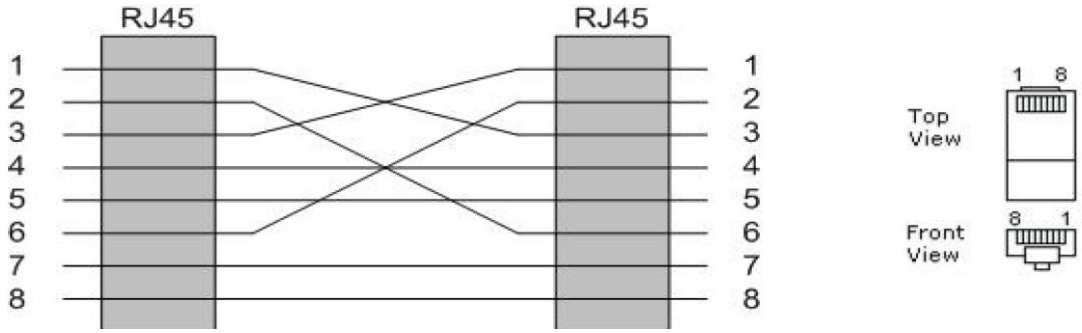


Image 7.2 Cross-wired UTP 10/100Mbit Cable

back to Extension modules

back to Table of contents