

InteliLite Telecom DC

Controller for DC Telecom application

SW version 1.2.0

1 Document information	5
2 System overview	10
3 Applications overview	18
4 Installation and wiring	19
5 Controller setup	45
6 Communication	69
7 Technical data	71
8 Appendix	73

Table of contents

1 Document information	5
1.1 Clarification of notation	5
1.2 About this guide	5
1.3 Legal notice	5
1.4 General warnings	7
1.4.1 Remote control and programing	7
1.4.2 SW and HW versions compatibility	7
1.4.3 Dangerous voltage	7
1.4.4 Adjust the setpoints	7
1.5 Certifications and standards	8
1.6 Document history	8
1.7 Symbols in this manual	9
2 System overview	10
2.1 General description	10
2.1.1 The key features of IntelliLite Telecom DC	10
2.2 Configuration and monitoring	10
2.2.1 Supported configuration and monitoring tools	10
2.2.2 Configuration parts	11
2.3 PC Tools	12
2.3.1 LiteEdit	12
2.3.2 WebSupervisor	12
2.3.3 WinScope	13
2.3.4 IntelliMonitor	13
2.4 Modules	14
2.4.1 AIO9/1	14
2.4.2 IB-Lite	14
2.4.3 IGL-RA15	15
2.4.4 IL-NT AIO	15
2.4.5 IL-NT AOUT8	15
2.4.6 IL-NT BIO8	16
2.4.7 IL-NT GPRS	16
2.4.8 IL-NT IO1	16
2.4.9 IL-NT RS232	17
2.4.10 IL-NT RS232-485	17
2.4.11 IL-NT S-USB	17

3 Applications overview	18
3.1 Telecom DC	18
4 Installation and wiring	19
4.1 Package content	19
4.1.1 Software package	19
4.1.2 Components	19
4.2 Controller installation	20
4.2.1 Dimensions	20
4.2.2 Mounting	21
4.3 Terminals diagram and front face	22
4.4 Recommended wiring	23
4.4.1 General	24
4.4.2 Grounding	25
4.4.3 Power supply	26
4.4.4 Measurement	28
4.4.5 RPM measurement	37
4.4.6 Binary inputs	38
4.4.7 Binary outputs	39
4.4.8 Analog inputs	39
4.4.9 CAN bus and RS-485 wiring	41
4.4.10 Modules wiring	44
5 Controller setup	45
5.1 Operator Guide	45
5.1.1 Front panel elements	45
5.1.2 Display screens and pages structure	47
5.1.3 Browsing alarms	50
5.1.4 Password	51
5.1.5 Information screen	51
5.1.6 Display contrast adjustment	52
5.2 Function description	52
5.2.1 Operating states	52
5.2.2 Charging cycle	53
5.2.3 How to set up charging parameters in IntelliLite Telecom DC	56
5.2.4 Compensations	59
5.2.5 ECU engine support	61
5.2.6 Alarm management	61
5.2.7 Operating modes	65
5.2.8 Breaker control	66

6 Communication	69
6.1 Direct cable connection	69
6.2 Remote connection	70
6.2.1 Internet connection	70
6.2.2 AirGate connection	70
6.2.3 Modbus connection	70
7 Technical data	71
8 Appendix	73
8.1 Controller objects	74
8.1.1 List of controller objects types	74
8.1.2 Setpoints	75
8.1.3 Values	142
8.1.4 Logical binary inputs	156
8.1.5 Logical binary outputs	165
8.2 Alarms	185
8.2.1 Alarm levels in the controller	185
8.2.2 Alarms level 1	186
8.2.3 Alarms level 2	193
8.3 Modules	199
8.3.1 List of supported modules	199
8.3.2 Peripheral modules	199
8.3.3 Plug-in modules	201

1 Document information

1.1 Clarification of notation	5
1.2 About this guide	5
1.3 Legal notice	5
1.4 General warnings	7
1.5 Certifications and standards	8
1.6 Document history	8
1.7 Symbols in this manual	9

 [back to Table of contents](#)

1.1 Clarification of notation

Note: This type of paragraph calls readers 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.

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

1.2 About this guide

This manual contains important instructions for IntelliLite Telecom DC controllers family that shall be followed during installation and maintenance of the IntelliLite Telecom DC controllers.

This manual provides general information how to install and operate IntelliLite Telecom DC controllers.

This manual is dedicated for:

- ▶ Operators of gen-sets
- ▶ Gen-set control panel builders
- ▶ For everybody who is concerned with installation, operation and maintenance of the gen-set

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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 its 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.

1.4 General warnings

1.4.1 Remote control and programming

Controller can be remotely controlled. In the event that maintenance of gen-set has to be done, or controller has to be programmed, check the following points to ensure that the engine cannot be started or any other parts of the system cannot be effected.

To be sure:

- ▶ Disconnect remote control
- ▶ Disconnected binary outputs

1.4.2 SW and HW versions compatibility

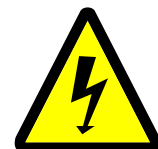
Be aware to use proper combination of SW and HW versions.

1.4.3 Dangerous voltage

In no case touch the terminals for voltage and current measurement!

Always connect grounding terminals!

In any case do not disconnect controller CT terminals!



1.4.4 Adjust the setpoints

All parameters are adjusted to their typical values. However the setpoints has to be checked and adjusted to their real values before the first starting of the gen-set.

IMPORTANT: Wrong adjustment of setpoints can destroy the gen-set.

***Note:** The controller contains a large number of configurable setpoints, because of this it is impossible to describe all of its functions. Some functions can be changed or have different behavior in different SW versions. Always check the Global guide and New feature list for SW version which is used in controller. This manual only describes the product and is not guaranteed to be set for your application.*

IMPORTANT: Be aware that the binary outputs can change state during and after software reprogramming (before the controller is used again ensure that the proper configuration and setpoint settings are set in the controller).

The following instructions are for qualified personnel only. To avoid personal injury do not perform any action not specified in related guides for product.

1.5 Certifications and standards

- ▶ EN 61010-1:2010+Cor.1:2011-05
- ▶ EN 61000-6-1:2007
- ▶ EN 61000-6-2 ed.3:2006
- ▶ EN 61000-6-3:2007/A1:2011/AC:2012-08
- ▶ EN 61000-6-4:2007/A1:2011
- ▶ EN 60068-2-1 ed.2:2008 (-20°C / 16 h for STD, -40°C / 16 h for LT)
- ▶ EN 60068-2-2:2008 (+70°C / 16 h)
- ▶ EN 60068-2-6 ed.2:2008 (2 ÷ 25 Hz / ±1,6 mm; 25 ÷ 100 Hz / 4,0 g)
- ▶ EN 60068-2-27 ed.2:2010 (a = 500 m/s²)
- ▶ EN 60068-2-30:2005 (25 / 55 / 25°C; humidity at 97% ; 2 cycles)
- ▶ EN 60529:1989 (front panel IP65, back side IP20)
- ▶ IEC 61010-2-030:2010 / Measurement category II



1.6 Document history

Revision number	Related sw. version	Date	Author
4	1.2.0	19.9.2019	Martin Klíma
3	1.2.0	25.12.2018	Michal Slavata
2	1.1.0	30.12.2015	Petr Šťastný
1	1.0.0	19.5.2015	Petr Šťastný

1.7 Symbols in this manual

	3 x Phases		Contact		GSM modem		Starter
	Active current sensor		Contactor		Jumper		Switch - manually operated
	AirGate		Controller simplified		Load		Transformer
	Alternating current		Current measuring		Mains		Transformer with 2 windings
	Analog modem		Current measuring		Mains		USB type B male
	Battery		Diode		Mobile provider		USB type B female
	Battery storage		Ethernet male		Passive current sensor		Voltage measuring
	Bo		Ethernet female		Pick - up		
	Break contact		Fuel solenoid		Relay coil		
	Break contact		Fuse		Relay coil of slow-operating		
	Breaker		Fuse switch		Resistor		
	Breaker		Generator		Resistor adjustable		
	Breaker		Generator schematic		Resistive sensor RPTC		
	Capacitor		Grounding		RS-232 male		
			GSM		RS-232 female		

2 System overview

2.1 General description	10
2.2 Configuration and monitoring	10
2.3 PC Tools	12
2.4 Modules	14

 [back to Table of contents](#)

2.1 General description

InteliLite Telecom DC is an electronic programmable unit which drives PMG (Permanent Magnet Generator), variable speed generator with rectifier or controls the excitation of AVR (Automatic Voltage Regulator) at single speed DC generator.

The DC voltage is used to charge batteries or to energize the load. In order to ensure the longest possible life cycle of the battery InteliLite Telecom DC can regulate (speed, excitation) to the constant current or voltage according to the measured values (current, voltage) in the connected system.

2.1.1 The key features of InteliLite Telecom DC

- ▶ Predefined algorithm for hybrid and battery cycling application, which saves operation and maintenance costs and ensures correct battery charging
- ▶ Various conditions for starting / stopping of the gen-set as Battery Voltage, Charging Current, Charged and Discharged Ah, Timers or External signal.
- ▶ Temperature depending Voltage and Current compensation.
- ▶ Speed or Excitation regulation for providing of the right charging voltage and current.
- ▶ Important statistic overview for maintenance.
- ▶ Communication - via communication modules e.g. IL-NT GPRS, IB-Lite, IL-NT S-USB and PC tools WebServer, InteliMonitor, LiteEdit etc.
- ▶ Process logic - active control of engine, generator, history log, configuration-no programming

2.2 Configuration and monitoring

One of the key features of the controller is the system's high level of adaptability to the needs of each individual application and wide possibilities for monitoring. This can be achieved by configuring and using the powerful ComAp PC/mobile tools.

2.2.1 Supported configuration and monitoring tools

- ▶ LiteEdit - complete configuration and single gen-set monitoring
- ▶ WebSupervisor - web-based system for monitoring and controlling of the whole gens-set fleet
- ▶ WebSupervisor mobile - smart phone application for monitoring of whole gen-set fleet
- ▶ WinScope - special graphical monitoring software used mainly during commissioning
- ▶ InteliMonitor - simple configuration, monitoring and controlling tool for the whole site

Note: It is recommended to use LiteEdit version 5.1.2 and/or newer.

The firmware of controller contains a large number of predefined logical binary inputs and outputs. Configuration means to map all required "logical" firmware inputs and outputs to the "physical" hardware inputs and outputs.

2.2.2 Configuration parts

- ▶ Mapping of logical binary inputs (functions) or assigning alarms to physical binary input terminals
- ▶ Mapping of logical binary outputs (functions) to physical binary output terminals
- ▶ Definition of sensor characteristics and alarms to analog inputs
- ▶ Selection of peripheral modules, which are connected to the controller, and full configuration of their inputs and outputs
- ▶ Selection of ECU type, if an ECU is connected
- ▶ Changing the language of the controller interface

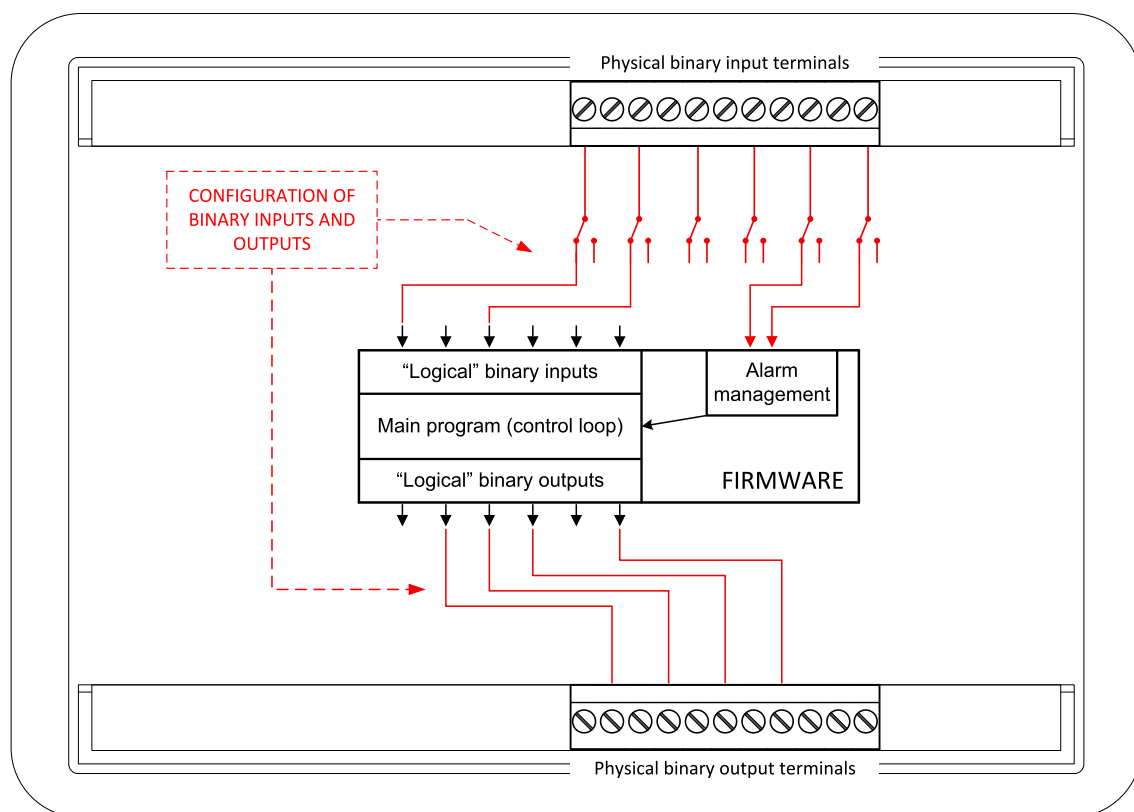


Image 2.1 Principle of binary inputs and outputs configuration

The controller is shipped with a default configuration, which should be suitable for most standard applications. This default configuration can be changed only by using a PC with the LiteEdit software. See LiteEdit documentation for details.

Once the configuration is modified, it can be saved to a file for later usage with another controller or for backup purposes. The file is called archive and has the file extension **.ail**. An archive contains a full image of the controller at the time of saving (if the controller is online for the PC) except the firmware. Besides configuration it also contains current adjustment of all setpoints, all measured values, a copy of the history log and a copy of the alarm list.

The archive can be simply used for cloning controllers, i.e. preparing controllers with identical configuration and settings.

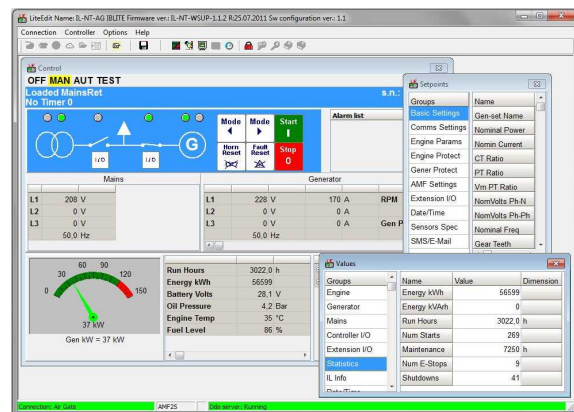
2.3 PC Tools

2.3.1 LiteEdit

LiteEdit is a software for configuration and monitoring of ComAp controllers. See more at the [LiteEdit webpage](#).

This tool provides the following functions:

- ▶ Remote control and monitoring, parameters adjustment
- ▶ Controller configuration and programming, controller firmware upgrade, cloning of configuration
- ▶ Selection of electronic engines
- ▶ Controller language translation
- ▶ Connection via USB, serial link, modem, internet or AirGate



2.3.2 WebSupervisor

Web-based system for monitoring and controlling of ComAp controllers. See more at the [WebSupervisor webpage](#).

This tool provides the following functions:

- ▶ Site and fleet monitoring
- ▶ Reading of measured values
- ▶ Browsing of controller history records
- ▶ On-line notification of alarms
- ▶ Email notification
- ▶ Also available as a smart-phone application



WebSupervisor available at: <http://websupervisor.comap.cz/>

Demo account:

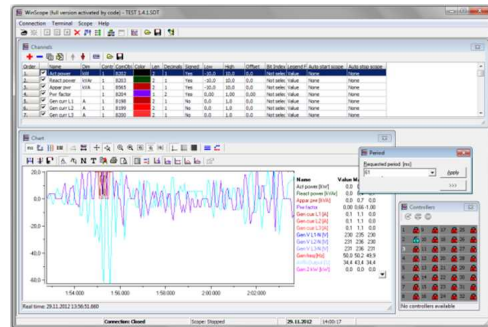
- ▶ Login: comaptest
- ▶ Password: comaptest

2.3.3 WinScope

Special graphical controller monitoring software used mainly for commissioning and gen-set troubleshooting. See more in the WinScope Reference guide.

This tool provides the following functions:

- ▶ Monitoring and archiving of ComAp controller's parameters and values
- ▶ View of actual / historical trends in controller
- ▶ On-line change of controllers' parameters for easy regulator setup



2.3.4 IntelliMonitor

PC Monitoring tool for Intelli controllers. See more in the IntelliMonitor Reference Guide.

This tool provides the following functions:

- ▶ Online monitoring of a controller or whole site
- ▶ Fully customizable SCADA diagram
- ▶ Reading / writing / adjustment of setpoints
- ▶ Reading of measured values
- ▶ Browsing of controller history records



2.4 Modules

2.4.1 AIO9/1

The AIO9/1 is an external module suitable for measurement and control of analog inputs and output through CAN interface. The module enables tracking of voltage and current in 4 nodes in telecommunication application. It typically measures Battery, DC Generator, Load and Auxiliary (Photovoltaic or Wind) source.

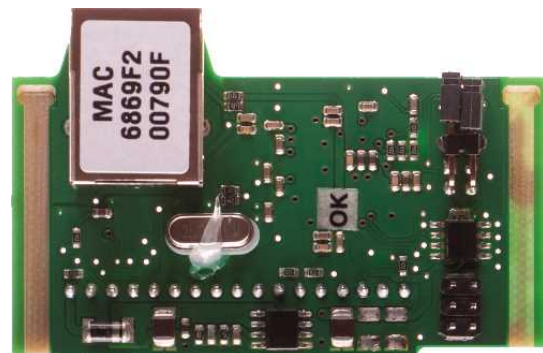
- ▶ 4x differential voltage inputs for measurement in range of 0 - 65 V or -65 – 0 V (positive grounded solution supported)
- ▶ 4x shielded, galvanic separated ± 75 mV inputs for DC current measurement via resistor shunts
- ▶ One Speed Governor or Generator Voltage Regulator output: galvanic separated analog outputs with 0 – 20 mA, 0 – 10 V DC or PWM option
- ▶ Resistance analog input 0 – 2500 Ω for battery temperature measuring and consequent charging characteristics compensation



2.4.2 IB-Lite

Plug-in Internet / Ethernet communication module which includes in-built WebServer.

- ▶ 10/100 Mbit ethernet interface in RJ45 socket
- ▶ Web interface for basic monitoring and adjustment of the controller
- ▶ ComAp/TCP protocol for remote access from LiteEdit or IntelliMonitor
- ▶ Modbus/TCP protocol for integration of the controller into building management systems or other remote monitoring purposes
- ▶ SNMP v1 agent
- ▶ SMTP protocol with authentication for sending of active e-mails
- ▶ Web-based configuration and firmware upgrade of the module
- ▶ Simple connection using the AirGate technology for the easy access even with non-static and non-public IP address



2.4.3 IGL-RA15

Remote annunciator.

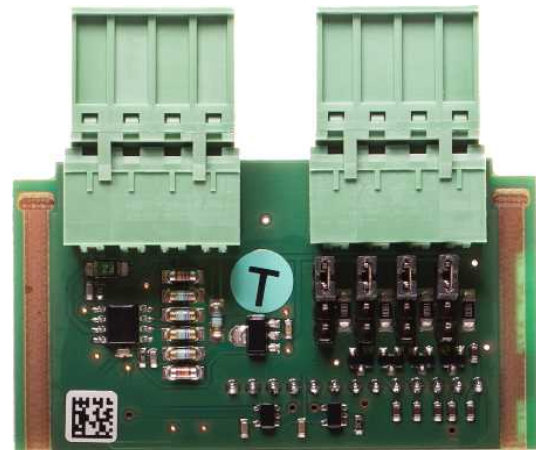
- ▶ 15 programmable LEDs with configurable colors red-green-yellow
- ▶ Customizable labels
- ▶ Local Horn output
- ▶ Lamp test function
- ▶ Maximal distance 200 m from the controller
- ▶ UL certified



2.4.4 IL-NT AIO

Plug-in analog input / output module.

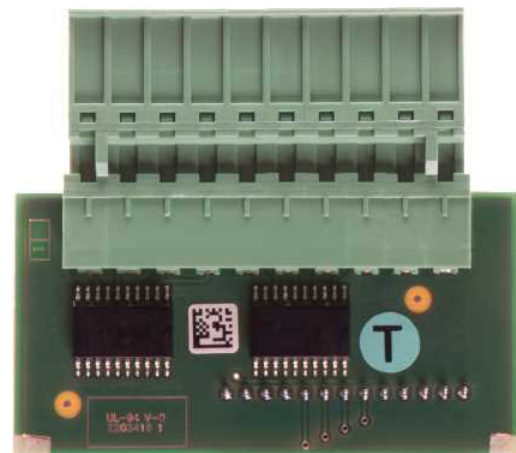
- ▶ Extension plug-in module increasing the number of analog inputs and output of selected engine controllers
- ▶ 4 configurable analog inputs for the sensors in range 0 - 2400 Ω , 0/4 - 20 mA or 0 - 4 V DC
- ▶ 1 configurable analog output for the sensor in range 0/4 - 20 mA, 0 - 5 V DC or PWM 5 V / 500Hz



2.4.5 IL-NT AOUT8

Plug-in module with analog outputs for PWM gauges module.

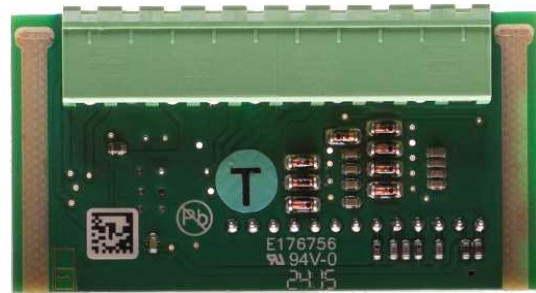
- ▶ Gauge driver plug-in interface
- ▶ Up to 8 gauges (such as VDO, Datcon) can be driven by one controller



2.4.6 IL-NT BIO8

Plug-in binary input / output module.

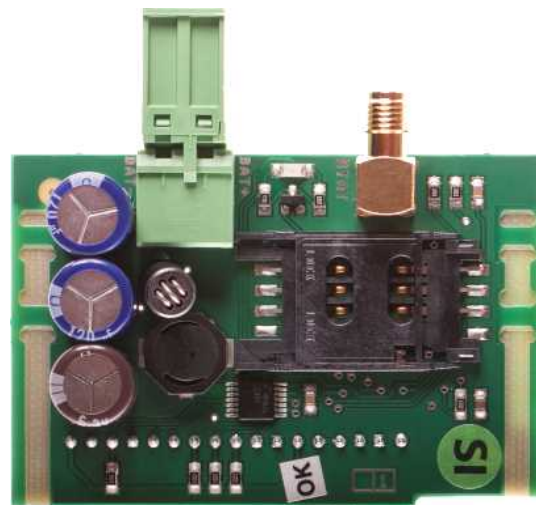
- ▶ Hybrid binary input / output module
- ▶ Up to 8 additional configurable binary inputs or outputs



2.4.7 IL-NT GPRS

Plug-in GSM / GPRS modem communication module.

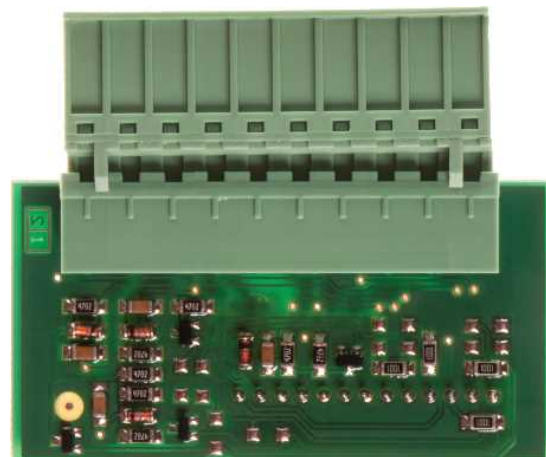
- ▶ GSM Modem function for dial-up connection
- ▶ GPRS support for wireless internet connection
- ▶ WebSupervisor system support. WebSupervisor is a web based system for monitoring and control of one or multiple controllers at the same time
- ▶ AirGate technology support for easy connection over GPRS, overcomes many of the issues traditionally experienced with internet connection to embedded systems
- ▶ Locate support - gen-set / engine locating in WebSupervisor and tracking of movement
- ▶ Remote access from LiteEdit or InteliMonitor
- ▶ Mobile and wireless solution
- ▶ Automatic SMS messages for alarms or events
- ▶ SMS control of gen-set / engine



2.4.8 IL-NT IO1

Plug-in analog output and binary input module.

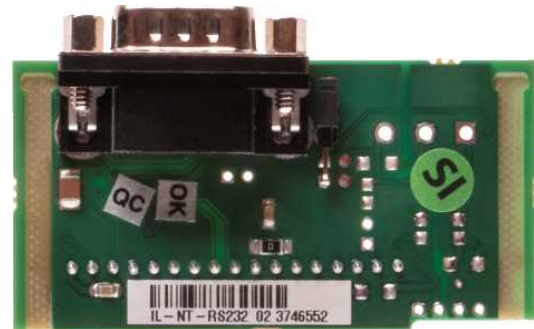
- ▶ Extension plug-in module increasing the number of analog outputs and binary inputs of selected engine controllers
- ▶ 4 configurable analog outputs in range: 0 to +VBatt ± 1 V
- ▶ 4 configurable binary inputs



2.4.9 IL-NT RS232

Plug-in communication module.

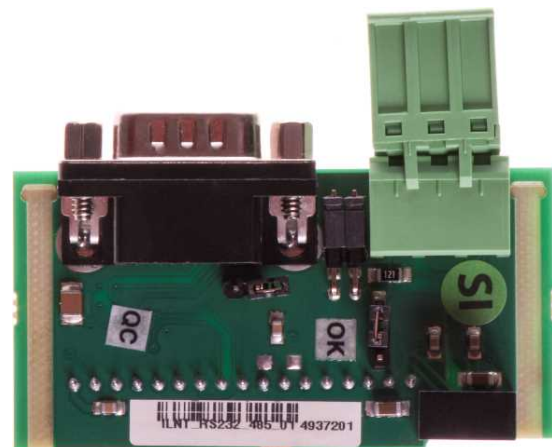
- ▶ Extension plug-in module containing the serial RS-232 port



2.4.10 IL-NT RS232-485

Plug-in dual port extension communication module.

- ▶ Dual port module with RS-232 and RS-485 interfaces at independent COM channels.
- ▶ The RS-232 is connected to COM1 and RS-485 to COM2.



2.4.11 IL-NT S-USB

Plug-in service USB communication module.

- ▶ Easily removable plug-in communication module with USB device interface



3 Applications overview

3.1 Telecom DC

See the basic wiring scheme for a single DC generator, which is supplying battery and BTS load, with IntelliLite Telecom DC controller and AIO9/1 external module in default configuration.

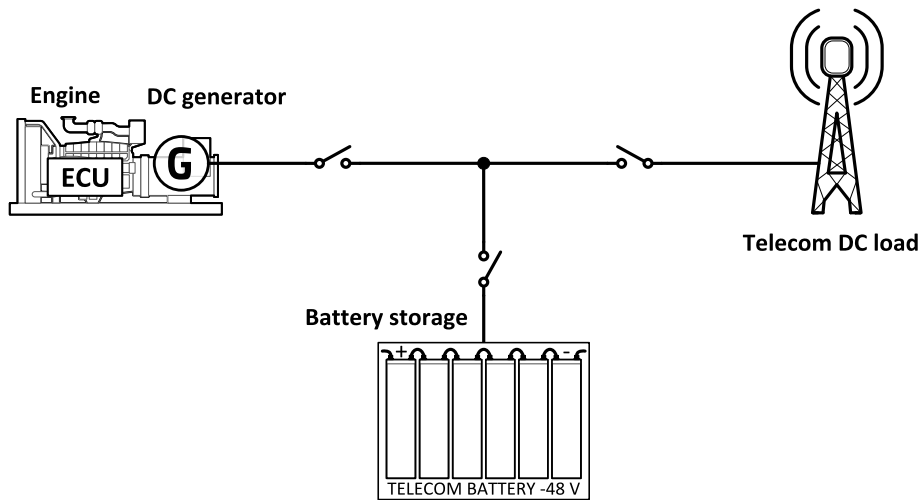


Image 3.1 Basic Telecom application

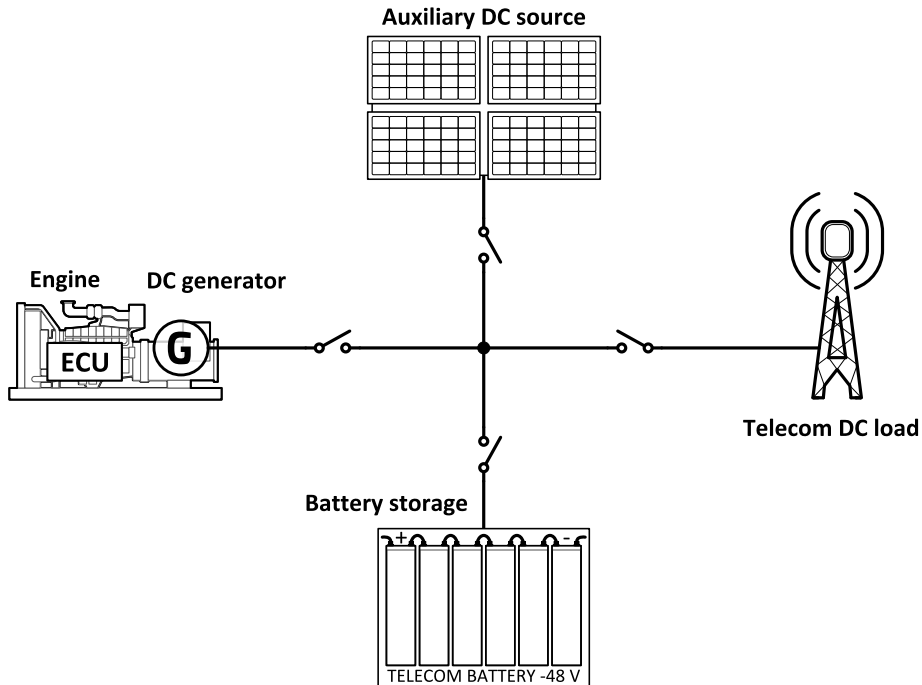


Image 3.2 Telecom application using Auxiliary DC source

Note: For AIO9/1 module terminal connection see AIO9/1 on page 199

[back to Table of contents](#)

4 Installation and wiring

4.1 Package content	19
4.2 Controller installation	20
4.3 Terminals diagram and front face	22
4.4 Recommended wiring	23

 [back to Table of contents](#)

4.1 Package content

InteliLite Telecom DC controller is delivered in the box as one set containing the

- ▶ InteliLite Telecom DC controller programmed with default configuration
- ▶ 4x Fixing clips
- ▶ Complete connectors (female) set for controller wiring

AIO9/1 - The AIO9/1 is external module that is not part of the package. See ComAp website for purchasing information.

The module measures battery, load, generator and auxiliary source voltage and current through CAN interface. It provides galvanic separation of the current sensing resistor shunts and analog output for Sped or Excitation control. It should be used together with InteliLite Telecom DC controller in telecom application.

4.1.1 Software package

InteliLite Telecom DC is distributed as IL-NT-TLC-DC-x.y.iwe package and it is compatible with the PC tool LiteEdit x.y.z and ECU list-x.y, where x, y, z are numbers of software version. Find installation files on ComAp web. Version of published files on the webpage are compatible each other.

4.1.2 Components

Accessories	Description	Optional / Obligatory
IL-NT-TLC-DC	InteliLite Telecom DC control unit	Obligatory
External modules		
AIO9/1	Analog Input/Output module with galvanic separation	Optional external
IL-NT AIO	Analog Input/Output plug-in module	Optional plug-in
Communication plug-in		
IL-NT RS232	Communication card	Optional plug-in
IL-NT RS232-485	Combined communication card	Optional plug-in
IL-NT S-USB	Service USB communication card	Optional plug-in
IB-Lite	Ethernet/Internet communication card	Optional plug-in
IL-NT GPRS	GSM/GPRS communication card	Optional plug-in

4.2 Controller installation

4.2.1 Dimensions

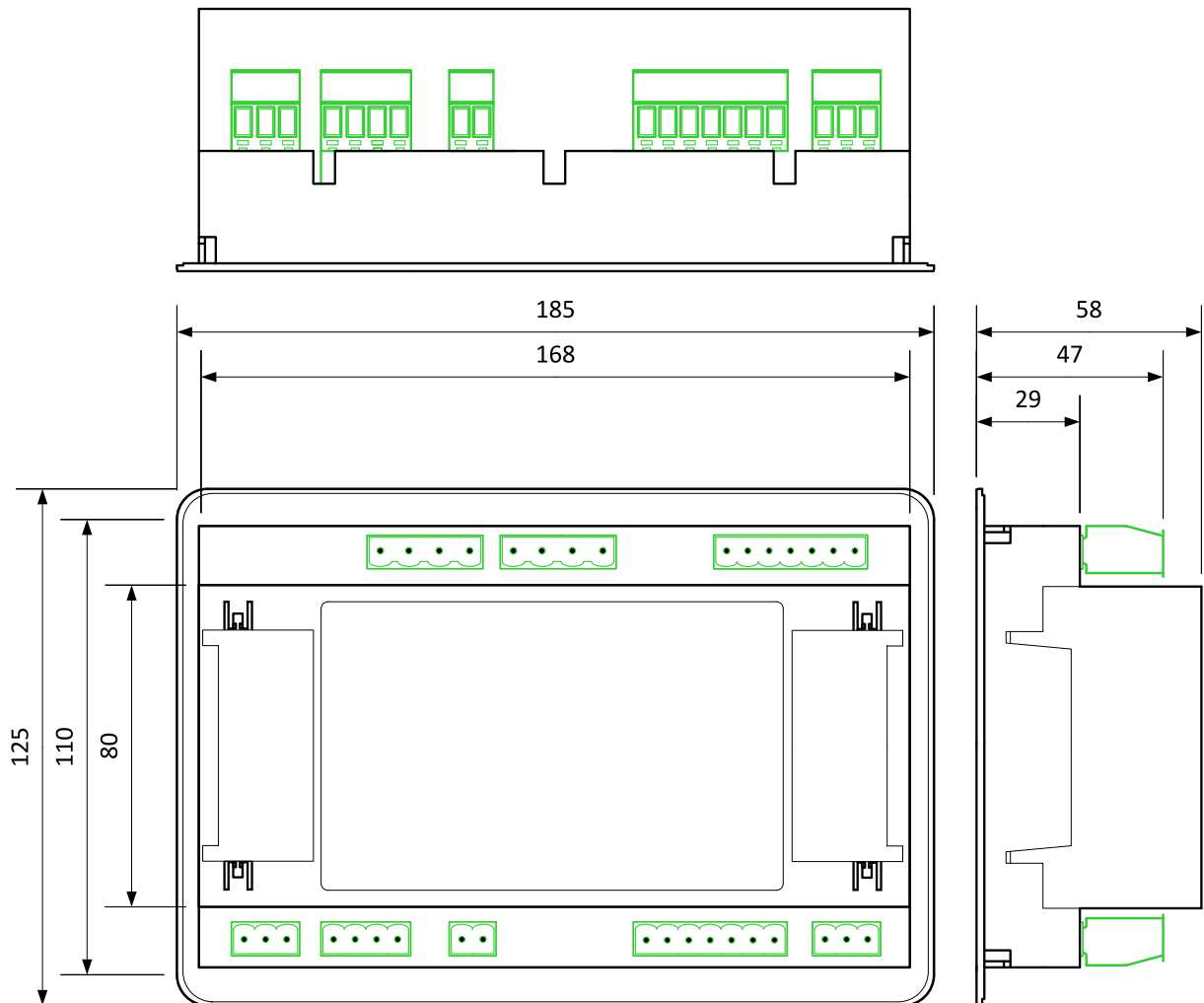
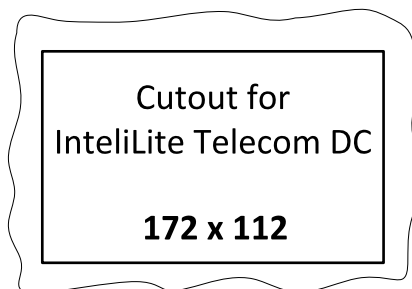


Image 4.1 Dimensions

Note: Dimensions are in millimeters.



Note: Cutout is in millimeters.

4.2.2 Mounting

The controller is used to be mounted onto the switchboard door. Requested cutout size is 172 x 112 mm. Use the screw holders delivered with the controller to fix the controller into the door as described on pictures below.

Recommended torque for holders is 0,15 - 0,2 Nm.



Image 4.2 Connecting the screw holders to the controller and mounted controller on panel door

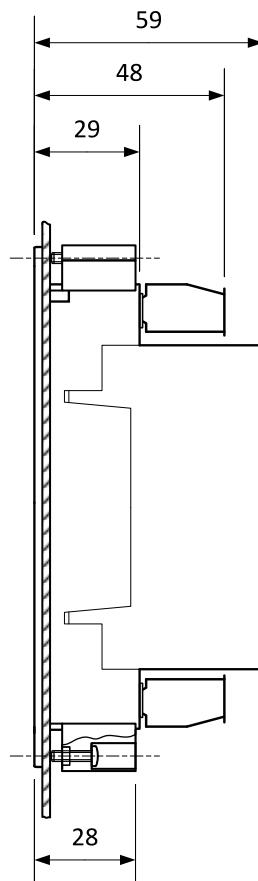


Image 4.3 Dimensions of mounted controller

Note: all dimensions are in mm

4.3 Terminals diagram and front face

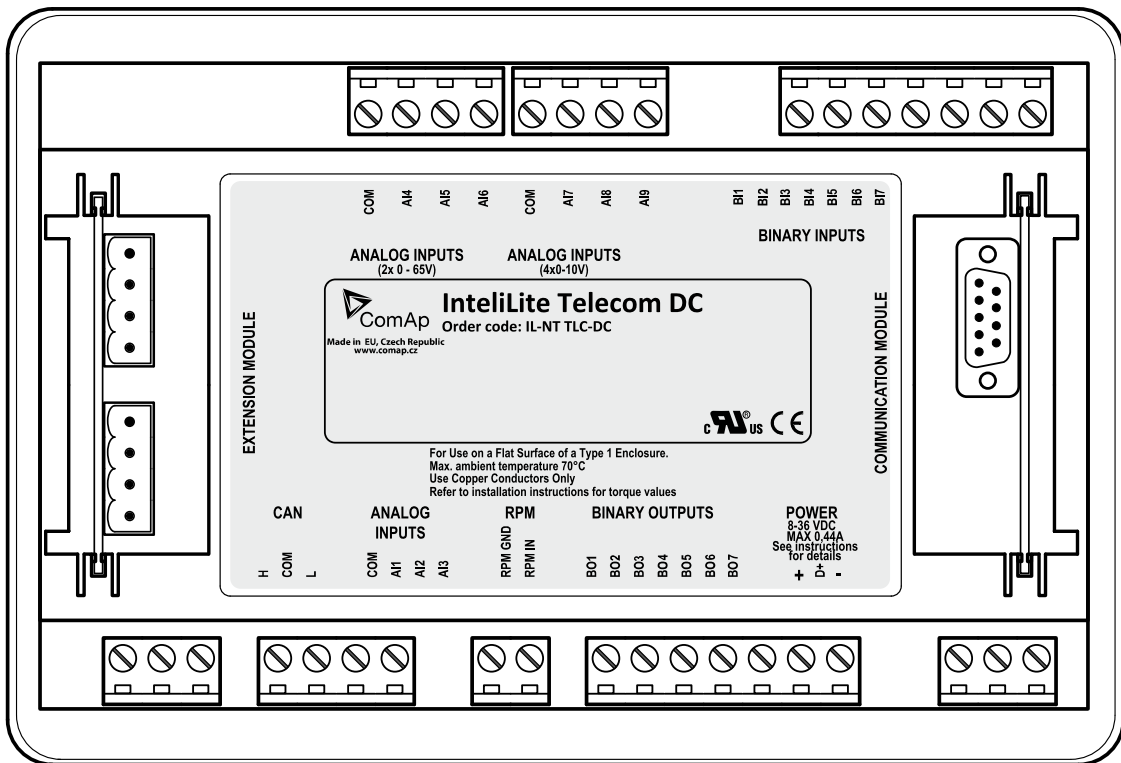


Image 4.4 Terminals diagram

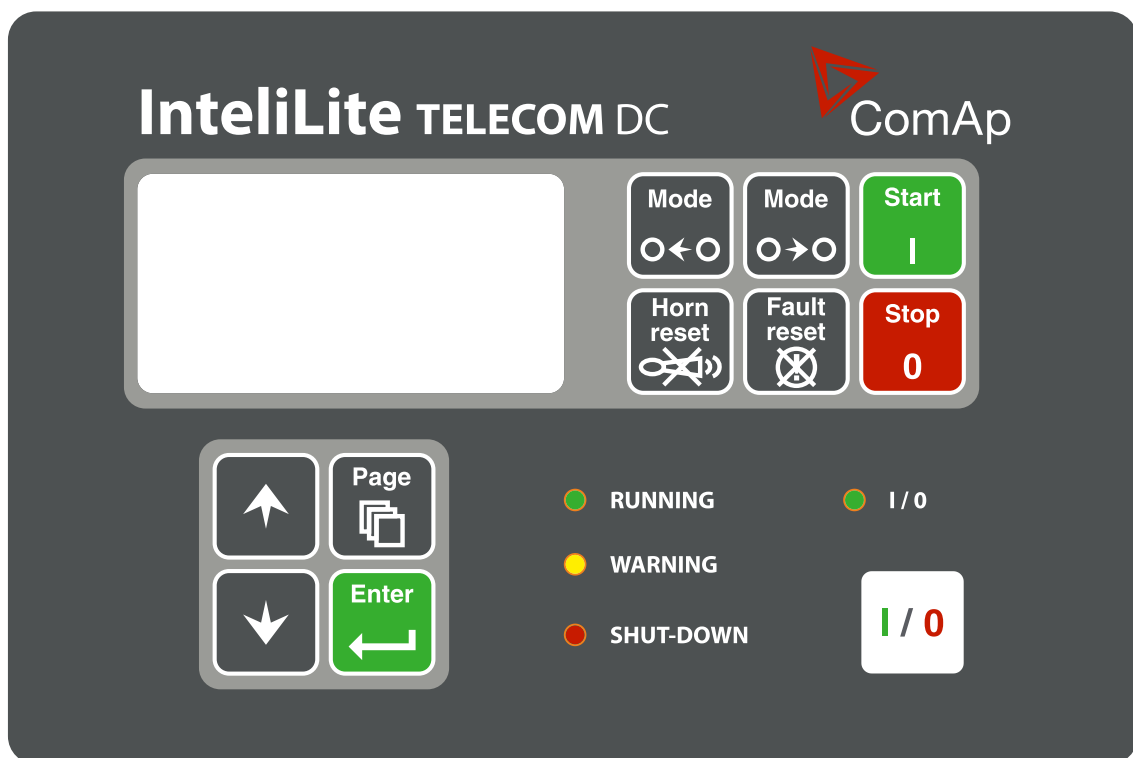
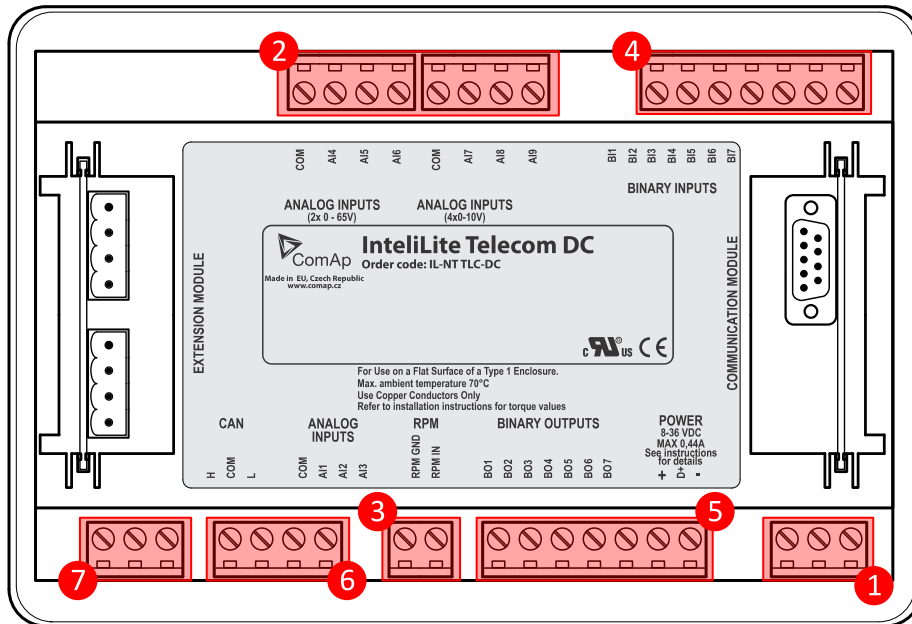


Image 4.5 Front face

4.4 Recommended wiring



1	Power supply wiring	"+", D+, "-"	Power supply (page 26)
2	Measurement wiring	COM, COM AI4, AI7 AI5, AI8 AI6, AI*	Measurement (page 28)
3	Magnetic pick-up wiring	RPM GND, RPM IN	Magnetic pick-up (page 38)
4	Binary inputs wiring	BI1 - BI7	Binary inputs (page 38)
5	Binary outputs wiring	BO1 - BO7	Binary outputs (page 39)
6	Analog inputs wiring	COM, AI1 AI2 AI3	Analog inputs (page 39)
7	CAN wiring	H, COM, L	CAN bus and RS-485 wiring (page 41)

[back to Installation and wiring](#)

4.4.1 General

To ensure proper function:

- ▶ Use grounding terminals.
- ▶ Wiring for binary inputs and analog inputs must not be run with power cables.
- ▶ Analog and binary inputs should use shielded cables, especially when the length is more than 3 m.

Tightening torque, allowable wire size and type, for the Field-Wiring Terminals:	
For Mains(Bus) Voltage, Generator Voltage and Current terminals	
	<p>Specified tightening torque is 0,56 Nm (5,0 In-lb)</p>
	<p>use only diameter 2,0 - 0,5 mm (12 - 26 AWG) conductor, rated for 90°C minimum.</p>
For other controller field wiring terminals	
	<p>Specified tightening torque 0,79 nm (7,0 In-lb)</p>
	<p>Use only diameter 2,0 - 0,5 mm (12 - 26 AWWG) conductor, rated for 75°C minimum.</p>
	<p>use copper conductors only</p>

4.4.2 Grounding

To ensure proper function:

- ▶ Use cable min. 2,5 mm².
- ▶ Brass M4x10 screw with star washer securing ring type grounding terminal shall be used.
- ▶ The negative “-“ terminal of the battery has to be properly grounded.
- ▶ Switchboard and engine has to be grounded in common spot.
- ▶ Use cable as short as possible to the grounding point.

IMPORTANT: Grounding must be connected to a common point to ensure a zero electric potential difference. Improper grounding can cause electric discharges that can be harmful to equipment and personnel and is in the violation of warranty agreement. Please follow the instructions for grounding thoroughly.

IMPORTANT: In telecommunication application there can be a standard to use POSITIVE grounding, to PLUS pole (terminal). ComAp controllers are using NEGATIVE grounding, to MINUS pole (terminal), which is considered as a standard for genset applications.

It is necessary to ensure proper grounding wiring for telecom load and for other parts of the system.

In case you export DC solution out of your country make sure that your customer know about this potential issue and is able to do necessary changes in wiring of the DC system!

Example: Wiring for MINUS pole grounding IntelliLite Telecom DC and AIO9/1 module:

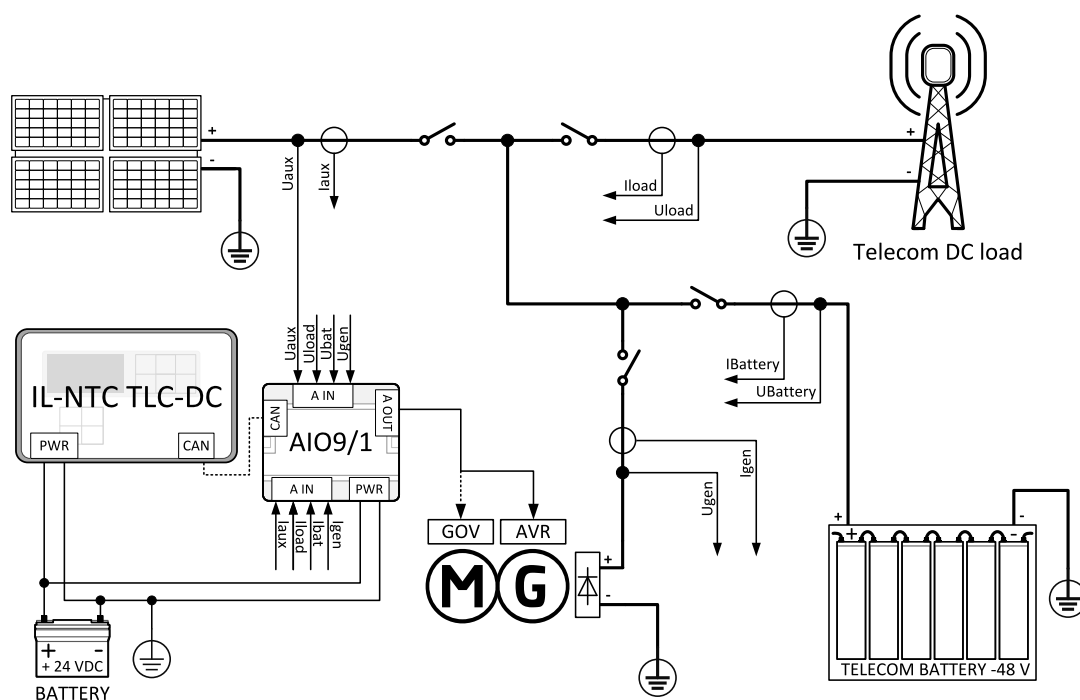


Image 4.6 Example of wiring for MINUS pole grounding

Example: Wiring for PLUS pole grounding IntelliLite Telecom DC and AIO9/1 module:

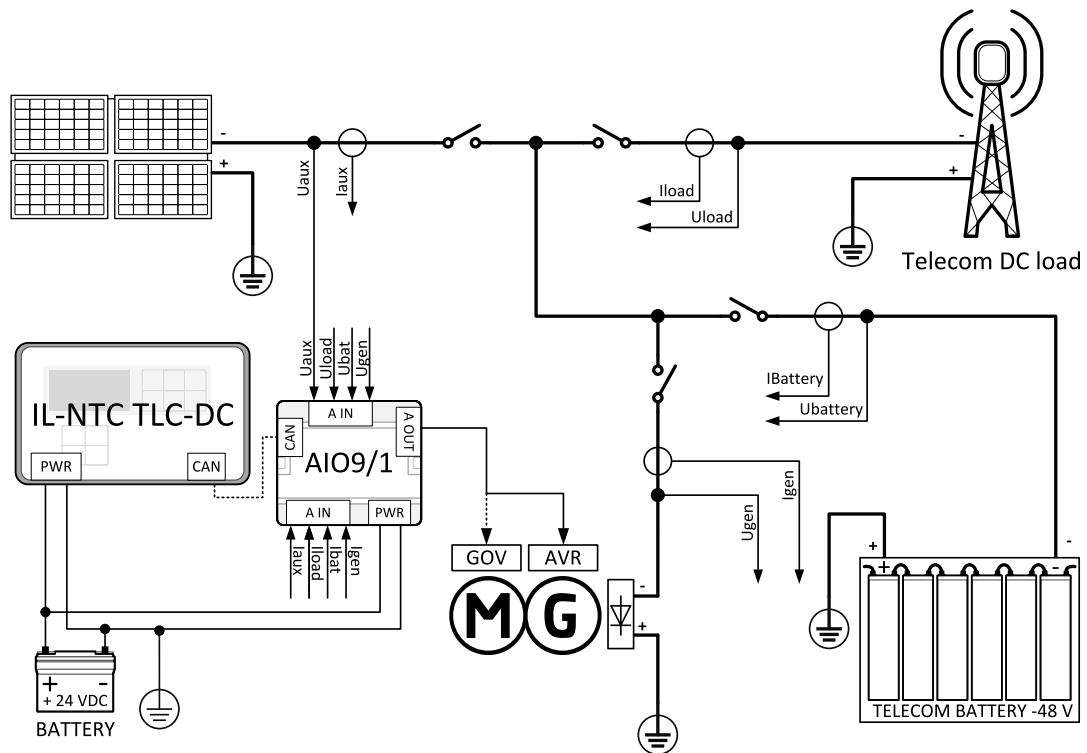


Image 4.7 Example of wiring for PLUS pole grounding

4.4.3 Power supply

Maximum continuous controller power supply voltage is 36 V DC. Maximum allowable controller power supply voltage is 39 V DC. Use minimally power supply cable of 1.5 mm².

The IntelliLite Telecom DC power supply terminals are protected against large pulse power disturbances. When there is a potential risk the controller being subjected to conditions outside its capabilities, an outside protection device should be used.

IMPORTANT: The IntelliLite Telecom DC controller should be grounded properly in order to protect against lightning strikes. The maximum allowable current through the controller's negative terminal is 4 A (it depends on binary output load).

For the connections with 12 V DC power supply, the IntelliLite Telecom DC includes internal capacitors that allow the controller to continue in operation during cranking when the battery voltage drop occurs. If the voltage before the drop is 12 V after 150 ms the voltage recovers to 7 V, the controller continues in and operation. During this voltage drop the controller screen back light 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.

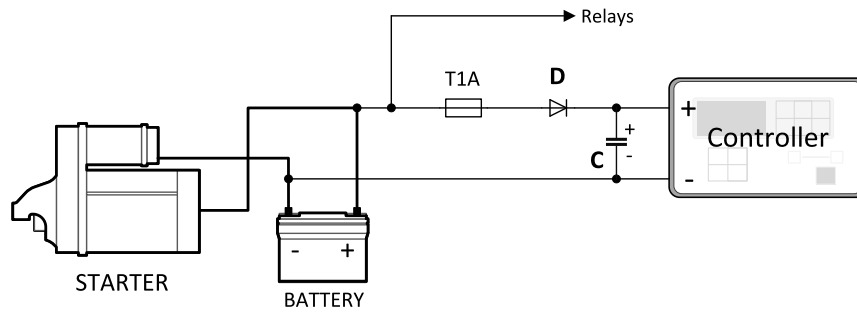


Image 4.8 Connecting to external capacitor

Connecting the external capacitor. The capacitor size depends on required time. It shall be approximately thousands of μF . The capacitor size should be 5000 μF to withstand 150 ms voltage drop under following conditions: Voltage before the drop is 12 V, after 150 ms the voltage recovers to minimum allowed voltage i.e. 8 V.

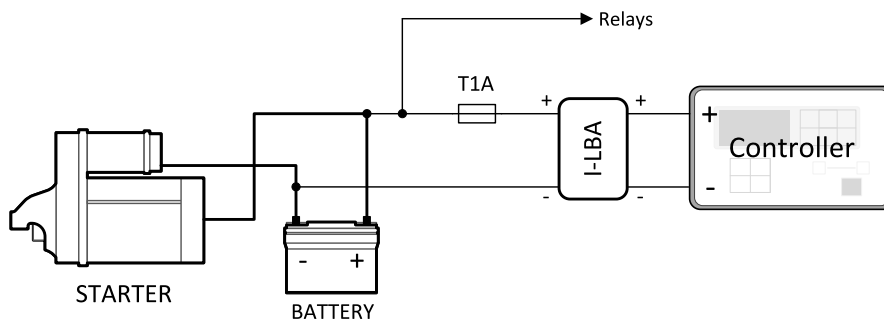


Image 4.9 Connecting I-LBA - Low battery adapter module

Connecting I-LBA. The I-LBA module ensures minimally 350 ms voltage dip under following conditions: RS232 and other plug-in module is connected. Voltage before dip is 12 V and after 350 ms the voltage recovers to minimum allowed voltage 5 V. The I-LBA enables controller operation from 5 V (for 10 to 30 s). The wiring resistance from battery should be up to 0.1 Ω for I-LBA proper function.

Power supply fusing

A 1 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.

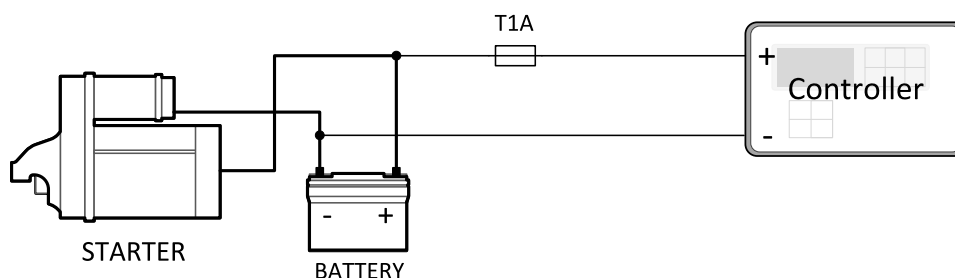


Image 4.10 Power supply fusing

4.4.4 Measurement

Use 1.5 mm² cables for voltage connection and 2.5 mm² for current transformers connection.

IMPORTANT: Risk of personal injury due to electric shock when manipulating voltage terminals under voltage. Be sure the terminals are not under voltage before touching them. Do not open the secondary circuit of current transformers when the primary circuit is closed. Open the primary circuit first.

Current measurement

Current measurement can be provided by the IntelliLite Telecom DC controller unit only or by AIO9/1 extensional module. Below you can see base scheme of current measurement. Current measurement behavior depends on adjusting of setpoint **CurrSelection** (page 78).

Current measurement using ammeter shunt or transducer, for more information see **Shunt and transducer set-up on page 33**.

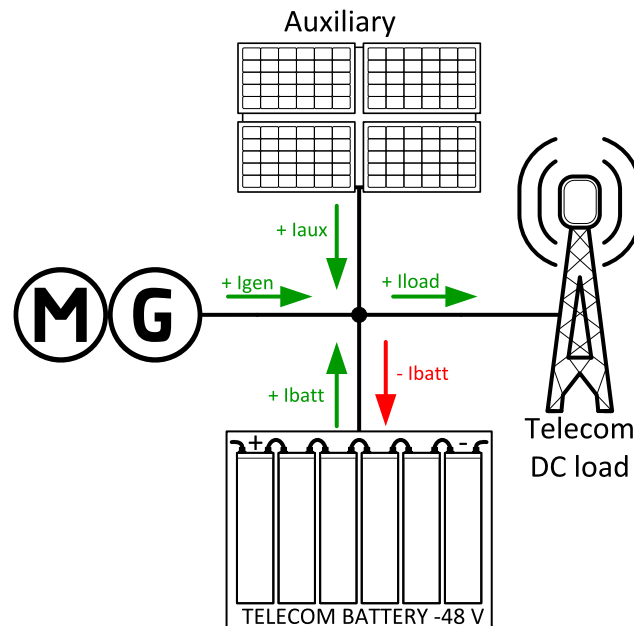


Image 4.11 Current measurement - full configuration

Related value	Dimension	Location
Analog input values from CU or AIO9/1		
Igen	[A]	Generator current
Iload		Load current
Ibatt		Charging – negative value (current into the battery) Discharging – positive value (current from the battery)
Iaux		Auxiliary current

Note: For the proper function of the system is absolute minimum to measure battery and generator voltage and current.

Current measurement wiring using IntelliLite Telecom DC terminals

Controller "current" inputs, current measured by current transducers

Analog input	Signal	Max.Range
AIN7	IGen	0 - 10 V
AIN8	ILoad / IAux	0 - 10 V
AIN9	IBatt	0 - 10 V

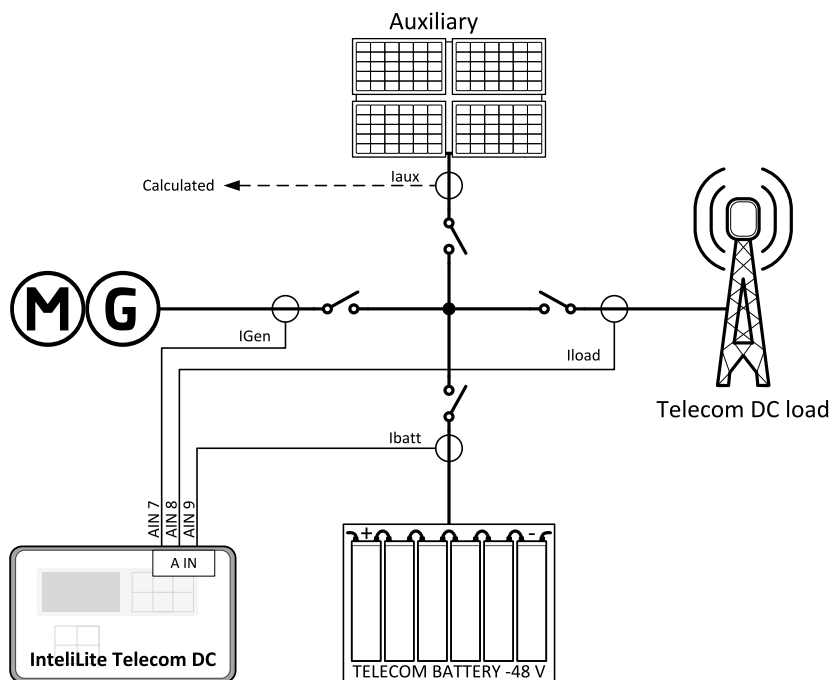
IMPORTANT: The required measurement is selected within controller using the setpoint CurrSelection (page 78) Dedicated setpoint options are described on following pictures.

IMPORTANT: Current is measured only when breaker is closed (for each current there is specific breaker). With open breaker there is always 0.

Note: In case that AIO9/1 module is not used and CurrSelection (page 78) setpoint is adjusted to Ge+Ba+Ld+Ax or Ge+Ba+Ld-Ax, currents are measured even if breaker is open. This option is for testing purpose only.

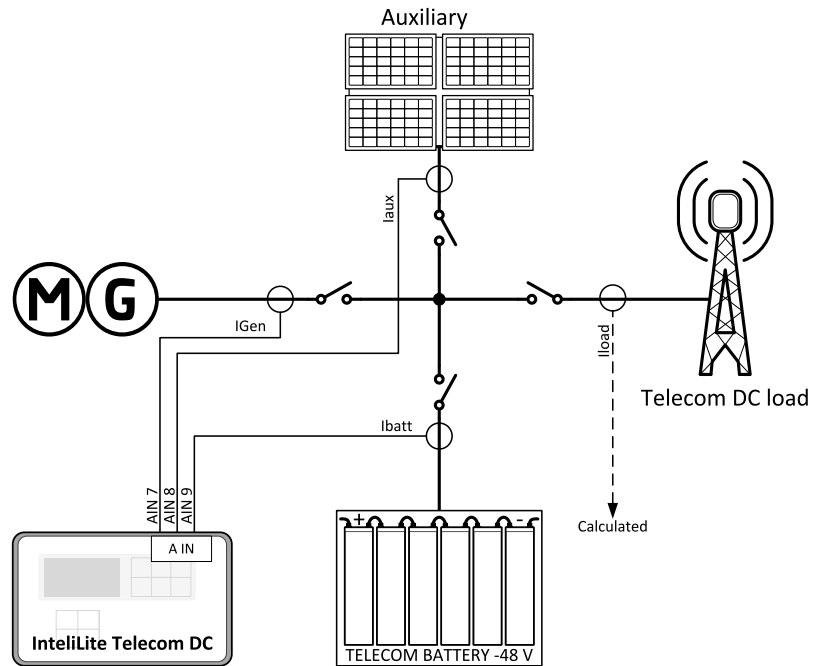
CurrSelection: Ge+Bat+Ld

- ▶ Current measured: Generator, Battery, Load
- ▶ Current calculated: Auxiliary



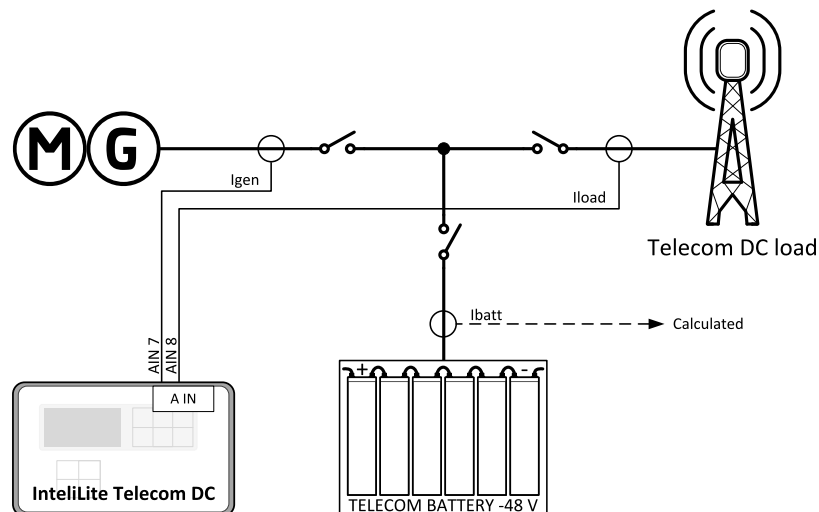
CurrSelection: Ge+Ba+Ax

- ▶ Current measured: Generator, Battery, Auxiliary
- ▶ Current calculated: Load



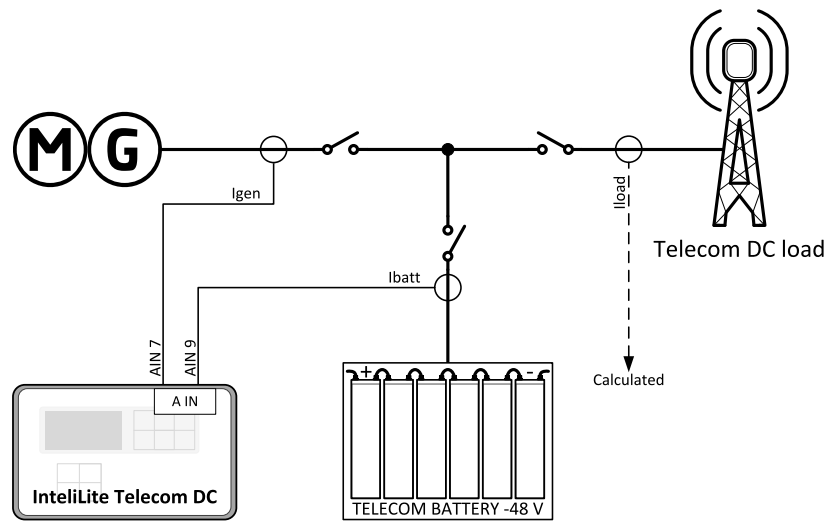
CurrSelection: Gen+Load

- ▶ Current measured: Generator, Load
- ▶ Current calculated: Battery



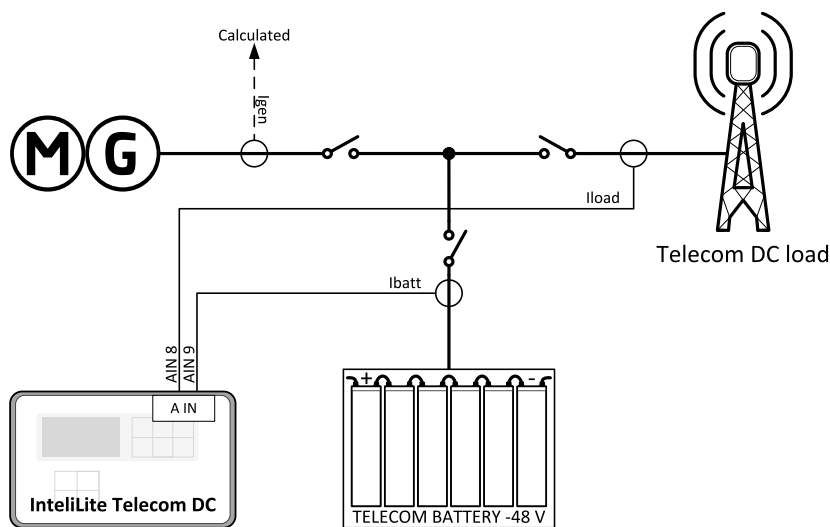
CurrSelection: Gen+Batt

- ▶ Current measured: Generator, Battery
- ▶ Current calculated: Load



CurrSelection: Batt+Load

- ▶ Current measured: Battery, Load
- ▶ Current calculated: Generator



Current measurement wiring via AIO9/1 extension module

If AIO9/1 is used, the IntelLite Telecom DC controller analog inputs AIN4, AIN5 and AIN6 to AIN9 are dedicated for custom use and not for current measurement.

AIO9/1 extension module "current" inputs, current measured by shunts					
Analog input	Signal	positive (+)	Negative (-)	Shielded	Max.Range
AI5	Igen	A	B	C	$0 \pm 75 \text{ mV}^1$
AI6	Ibat	A	B	C	$0 \pm 75 \text{ mV}^1$

¹Modify default current characteristics in LiteEdit according the shunts.

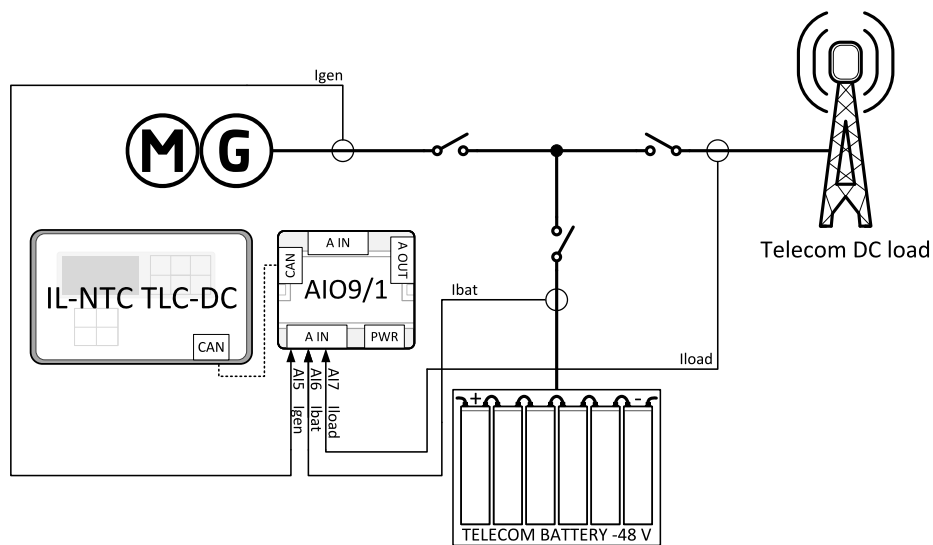
AI7	Iload	A	B	C	$0 \pm 75 \text{ mV}^1$
AI8	Iaux	A	B	C	$0 \pm 75 \text{ mV}^1$
AI9	resistive	A	B	C	$0 - 2400 \Omega$

IMPORTANT: Selection of various current measurement depends on the setpoint CurrSelection (page 78). Options dedicated for AIO9/1 are on pictures below.

IMPORTANT: Current is measured only when breaker is closed (for each current there is specific breaker). With open breaker there is always 0.

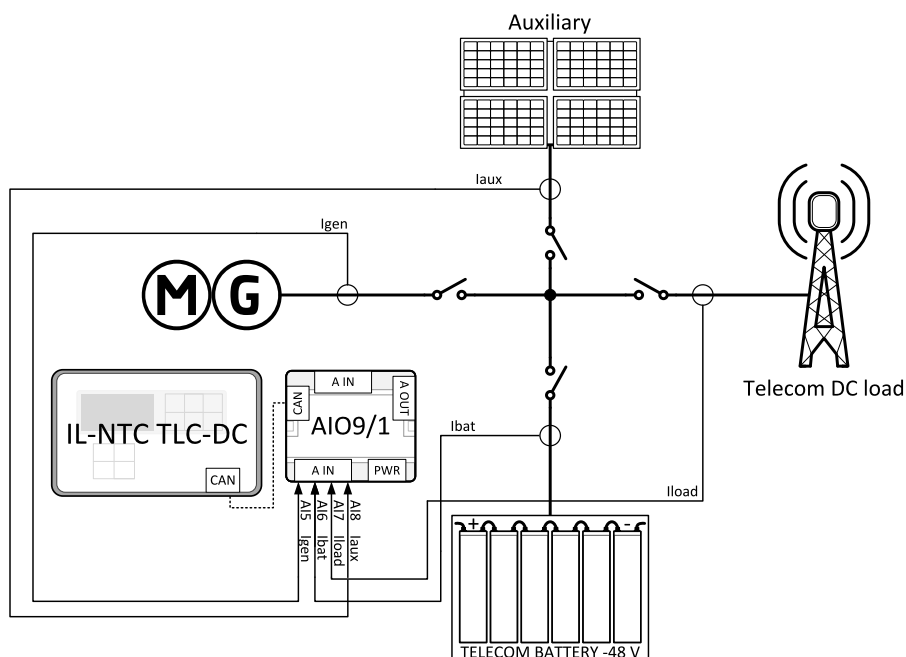
CurrSelection: Ge+Ba+Ld-Ax

- ▶ Current measured: Generator, Battery, Load



CurrSelection: Ge+Ba+Ld+Ax

- ▶ Current measured: Generator, Battery, Load, Auxiliary



Shunt and transducer set-up

In case of current measurement via terminals at the control unit, use the bi-polar current transducer with 0 - 10 V output.

- ▶ I_n (Nominal current) / 0 - 10 V DC

In case of current measurement via extension AI09/1 module, use the resistive shunts with ± 75 mV output.

- ▶ I_n (Nominal current) / ± 75 mV DC

For shunts and transducer use one of these recommended curves.

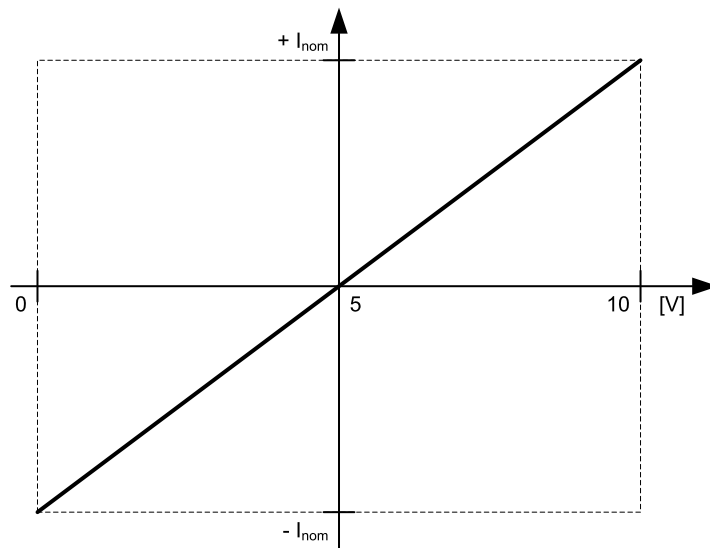


Image 4.12 Curve for 0 .. 10 V output

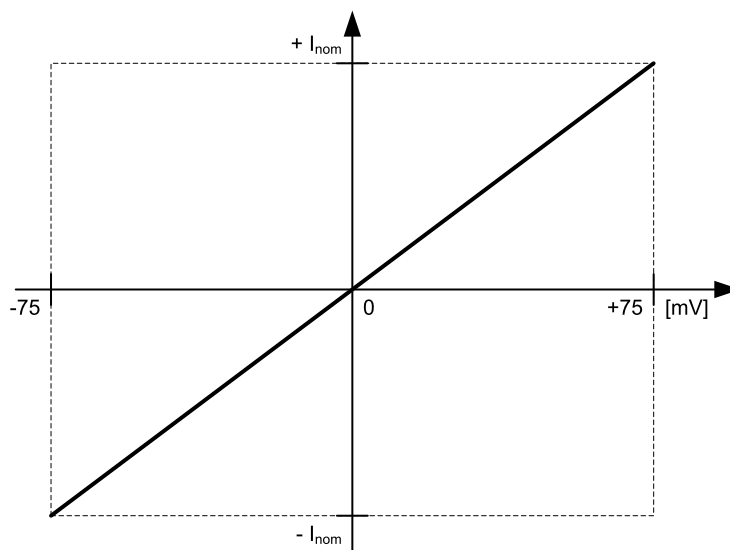


Image 4.13 Curve for -75 .. 75 mV output

Voltage measurement

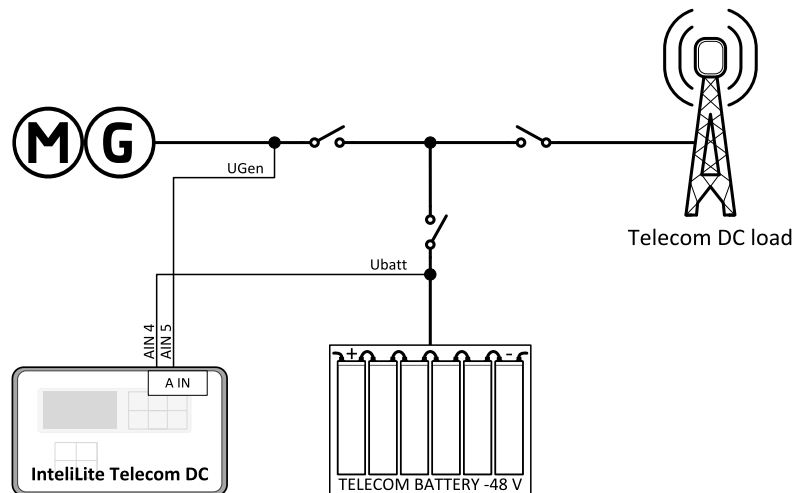
Voltage measurement wiring via IntelliLite Telecom DC terminals

Controller "voltage" inputs		
Analog Input	Signal	Max.Range
AIN4	UBatt	0 to +65 V or -65 to 0 V
AIN5	UGen	0 to +65 V or -65 to 0 V
AIN6	UAux	0 - 10 V

IMPORTANT: The required measurement is selected within controller using the setpoint CurrSelection (page 78)

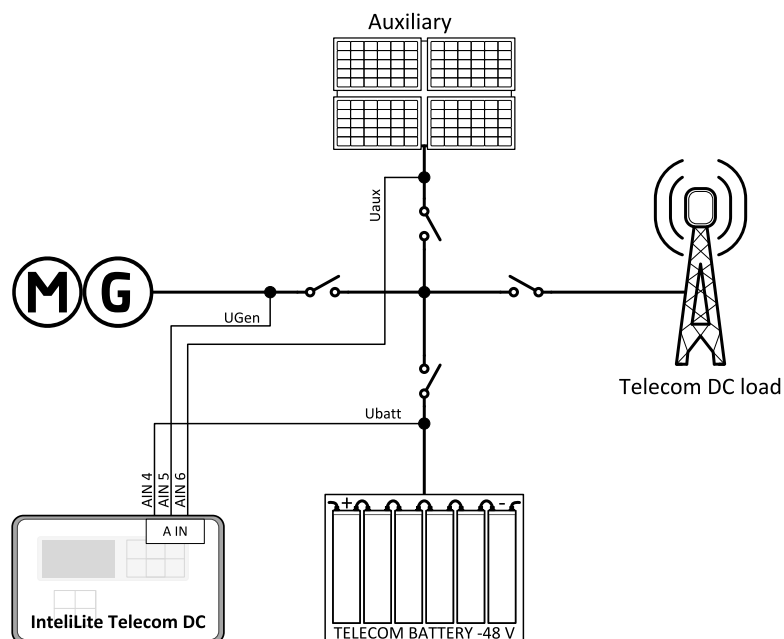
CurrSelection: Ge+Bat+Ld

- ▶ Voltage measured: Generator, Battery



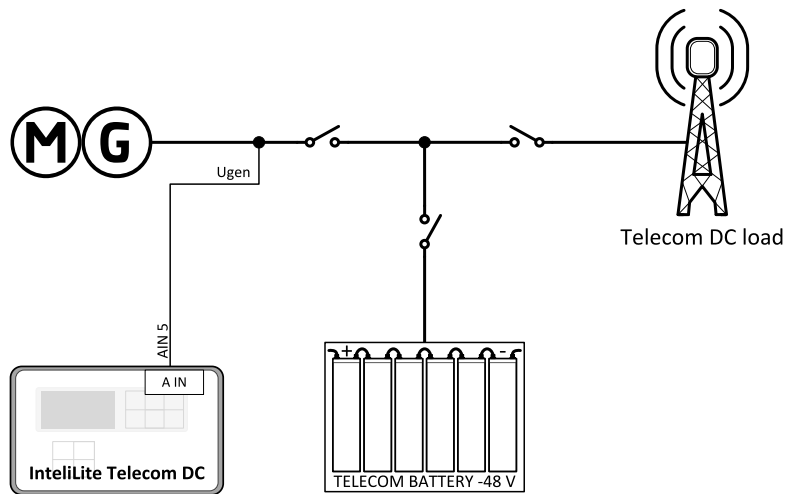
CurrSelection: Ge+Ba+Ax

- ▶ Voltage measured: Generator, Battery, Auxiliary



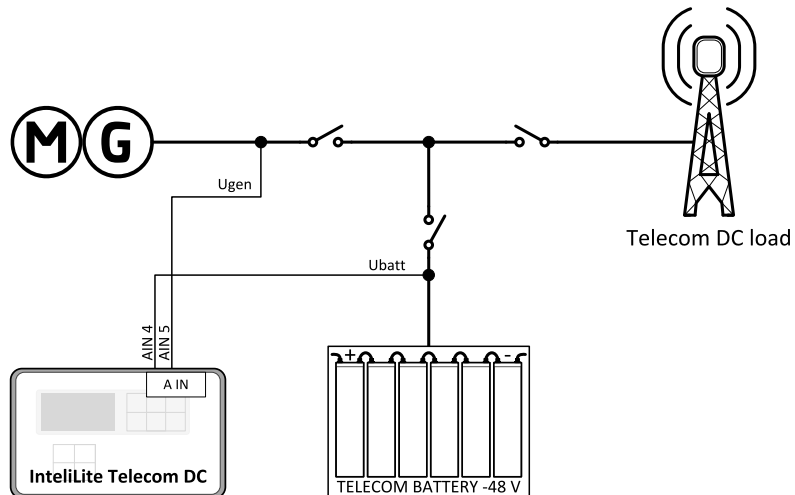
CurrSelection: Gen+Load

► Voltage measured: Generator



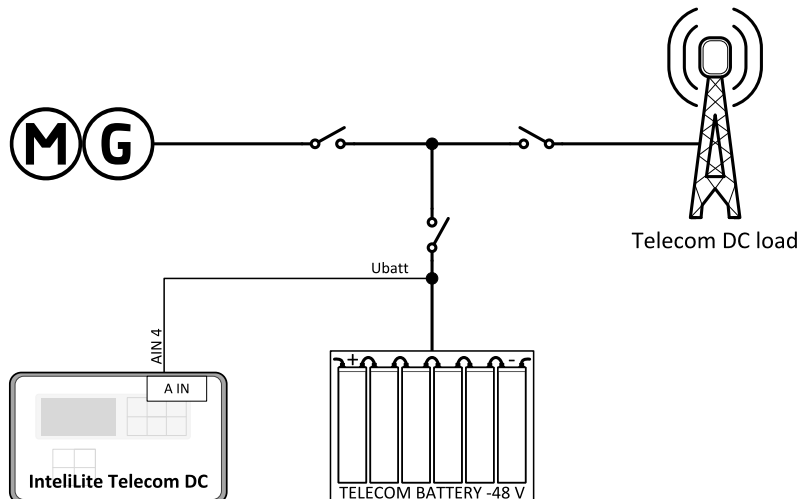
CurrSelection: Gen+Batt

► Voltage measured: Generator, Battery



CurrSelection: Batt+Load

► Voltage measured: Battery



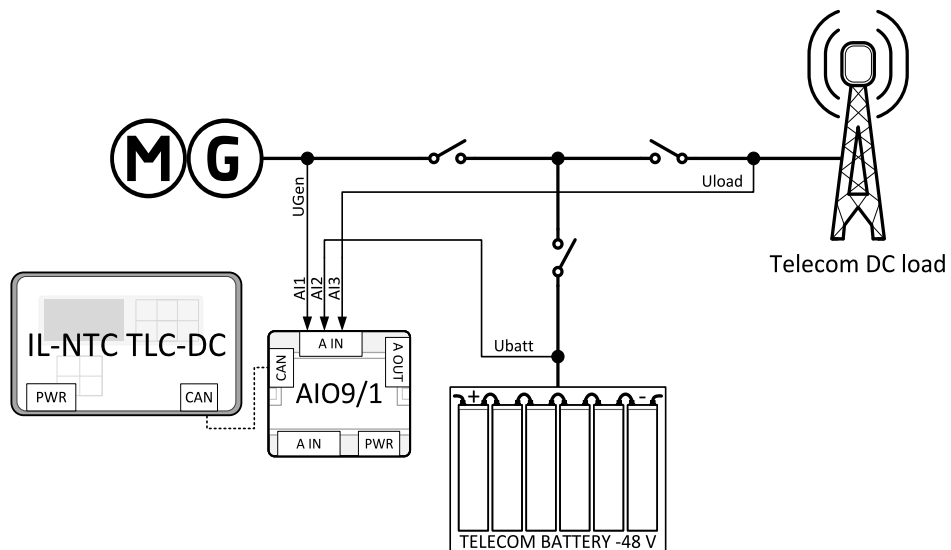
Voltage measurement wiring using AIO9/1

Voltage inputs of extension module AIO9/1				
Analog input	Signal	Positive (+)	Negative (-)	Max.Range
AI1	Ugen	A	B	± 65 V DC to 0 V
AI2	Ubat	A	B	± 65 V DC to 0 V
AI3	Uload	A	B	± 65 V DC to 0 V
AI4	Uaux	A	B	± 65 V DC to 0 V

IMPORTANT: Voltage measurement via extensional module AIO9/1 is optional. Selection of various voltage measurement depends on the setpoint CurrSelection (page 78). Both options are on pictures below.

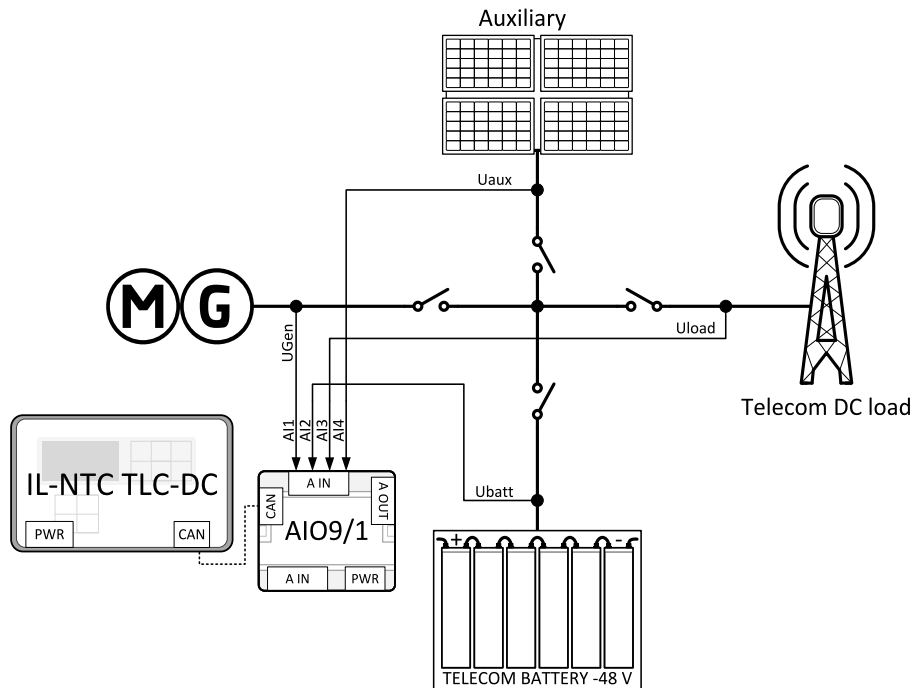
CurrSelection: Ge+Ba+Ld-Ax

- ▶ Voltage measured: Generator, Battery, Load



CurrSelection: Ge+Ba+Ld+Ax

- ▶ Voltage measured: Generator, Battery, Load, Auxiliary



4.4.5 RPM measurement

ECU

RPM can be read from ECU. In this case ECU has to be connected via CAN terminal and also configured via LiteEdit.

W terminal

W terminal of alternator can be used for measuring of RPM. Adjust the setpoint **RPMbyWterminal** (page 79) to correct value which is specific for each alternator.

Magnetic pick-up

To ensure proper function:

- ▶ Use a shielded cable.
- ▶ Be aware of interference signal from Speed governor, if one speed pick up is used.

If the engine will not start:

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

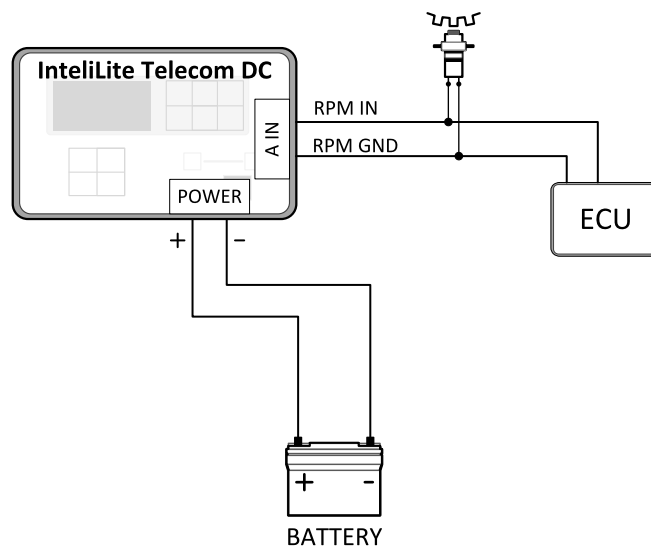
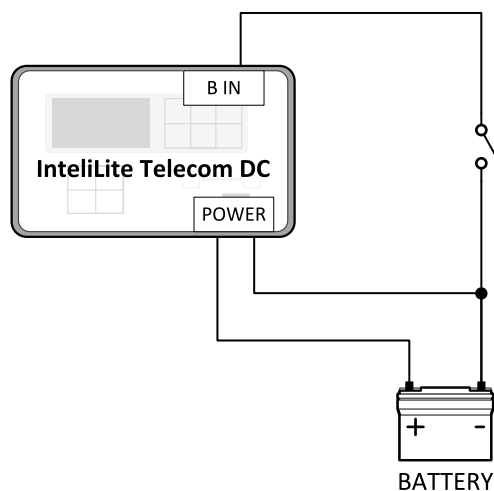


Image 4.14 Magnetic pick-up wiring

4.4.6 Binary inputs

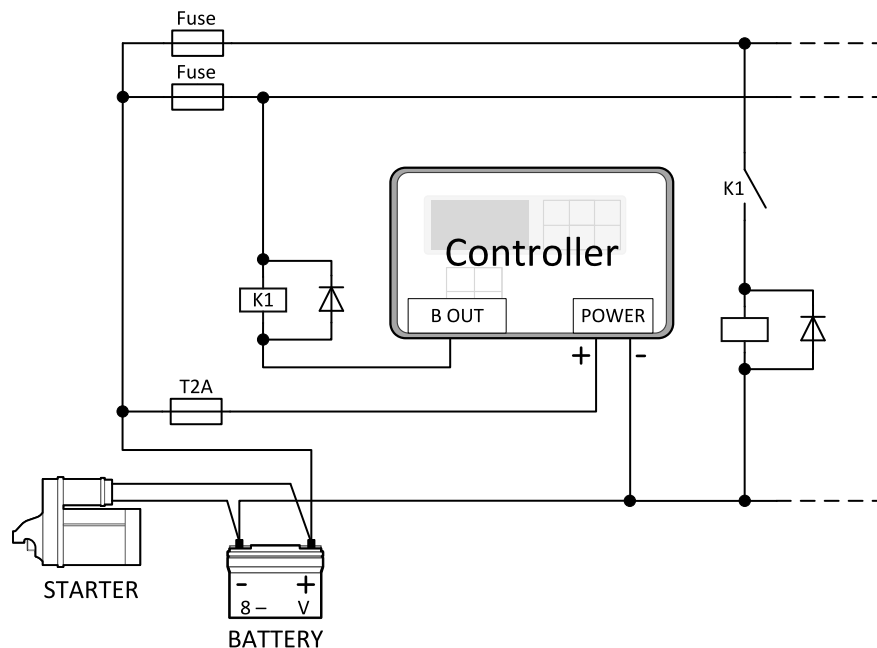
Use minimally 1 mm² cables for wiring of Binary inputs.



Note: The name and function or alarm type for each binary input have to be assigned during the configuration.

4.4.7 Binary outputs

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



4.4.8 Analog inputs

On the IntelliLite Telecom DC controller there are nine analog inputs are available. See the table below with specific characteristics.

All here mentioned properties can be modified by LiteEdit PC tool only, in the Modify configuration window.

Available analog inputs

Input	Range	Use	Custom use	Option Setpoint
AI1	0 - 2,5 kΩ	Oil Pressure	NO	
AI2	0 - 2,5 kΩ	Cooling Temp / Custom	YES	
AI3	0 - 2,4 kΩ	Batt Temp / Custom	YES ¹	BatteryTempSel (page 93)
AI4	0 - 65 VDC	Ubatt	YES ¹	Fixed for DC application
AI5	0 - 65 VDC	Ugen	YES ¹	
AI6	0 - 10 VDC	Uaux	YES ¹	
AI7	0 - 10 VDC	Igen	YES ¹	CurrSelection (page 78)
AI8	0 - 10 VDC	Iload, Iaux	YES ¹	
AI9	0 - 10 VDC	Ibatt	YES ¹	


Note: AI4 - AI9 are firmly assigned to current and voltage measurement if AIO9/1 extension module is not configured.

¹YES, if AIO9/1 is used for voltage and current measurement.

For more information see **Current measurement wiring using IntelliLite Telecom DC terminals on page 29** and see **Voltage measurement wiring via IntelliLite Telecom DC terminals on page 34**.

The nominal range of Analog inputs measuring resistivity is 0- 2,4 k Ω , nevertheless the input is able to measure up to 15 k Ω , but with lower precision.

When the ECU (Engine Control Unit) is connected, it is possible to read IntelliLite Telecom DC Analog inputs values AIN1, 2, 3 from CAN bus (J1939).

LiteEdit	Modify	Possibility
Type	Not used	Analog input isn't used
	Alarm	Analog input is used for monitoring and protection
	Monitoring	Analog input is used only for monitoring
Name	... text	Up to 14 ASCII characters
	Name in history	Up to 4 ASCII characters for the name used in history records
Config	Analog	Analog measuring in specified range.
	Binary	Binary: open/close - threshold 750 Ω or 7 V DC
	Tri state	Three (Triple)-state: open/close - threshold 750 Ω (only AIN1-AIN3), failure <10 Ω or > 2400 Ω
Alarm properties	Direction	Under limit Under step. Sensor fail does not activate protection.
		Over limit Overstep. Sensor fail does not activate protection.
		UnderLimit+FIs Under step and Sensor fail activates protection. OverLimit+FIs Overstep and Sensor fail activates protection.
Sensor	Type	Sensor fail Warning Wrn+Sd CoolDown
	Engine running only	Check box: Alarms are valid only for running engines, if box is checked
	Sensor name 	... text Resolution: number of decimal points Dimension: bar, %, $^{\circ}$ C, etc. Table and graph: customize curves
Contact type	NC	Valid only for binary and three-state inputs
	NO	Valid only for binary and three-state inputs

Analog inputs wiring

Connection of IntelliLite Telecom DC analog inputs

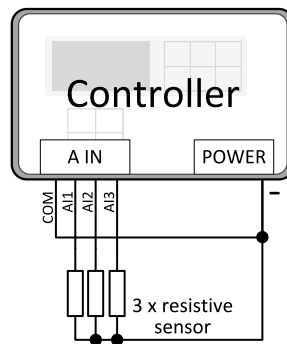


Image 4.15 Standard connection of three resistive sensors to analog inputs.

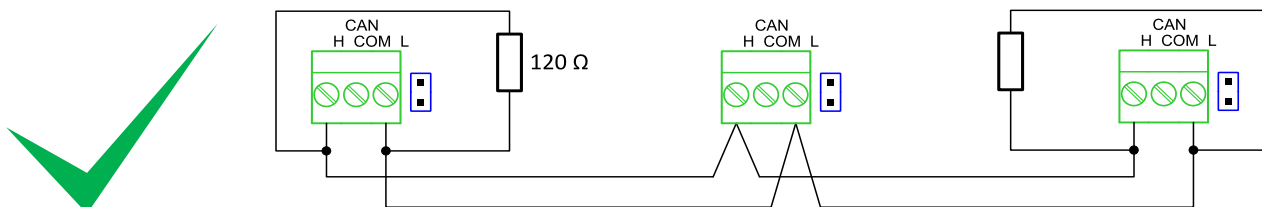
4.4.9 CAN bus and RS-485 wiring

CAN bus wiring

The wiring of the CAN bus communication should be provided in such a way that the following rules are observed:

- ▶ The maximum length of the CAN bus is 200 m.
- ▶ The bus must be wired in linear form with termination resistors at both ends. No nodes are allowed except on the controller terminals.
- ▶ Shielded cable¹ has to be used, shielding has to be connected to the terminal T01 (BATT -).
- ▶ External units can be connected on the CAN bus line in any order, but keeping line arrangement (no tails, no star) is necessary.
- ▶ The CAN bus has to be terminated by 120 Ω resistors at both ends use a cable with following parameters:

Cable type	Shielded twisted pair
Impedance	120 Ω
Propagation velocity	≥ 75% (delay ≤ 4,4 ns/m)
Wire crosscut	≥ 0,25 mm ²
Attenuation (@1MHz)	≤ 2 dB/100 m



¹Recommended data cables: BELDEN (<http://www.belden.com>) - for shorter distances: 3105A Paired - EIA Industrial RS-485 PLTC/CM (1x2 conductors); for longer distances: 3106A Paired - EIA Industrial RS-485 PLTC/CM (1x2+1 conductors)

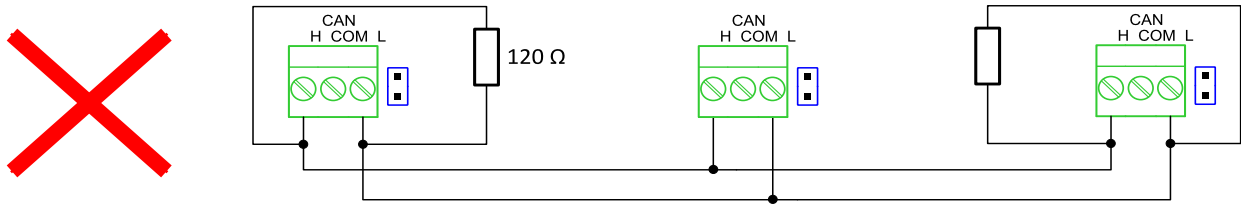


Image 4.16 CAN bus topology

Note: A termination resistor at the CAN is already implemented on the PCB. For connecting, close the jumper near the appropriate CAN terminal.

- ▶ For shorter distances (connection within one building)

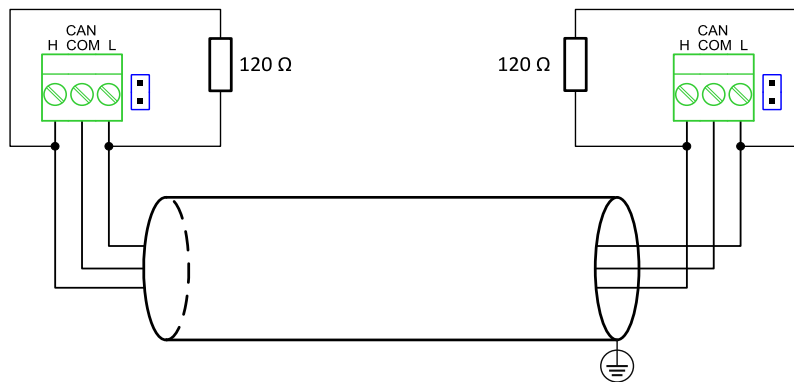


Image 4.17 CAN bus wiring for shorter distances

- ▶ For longer distances or in case of surge hazard (connection out of building, in case of storm etc.)

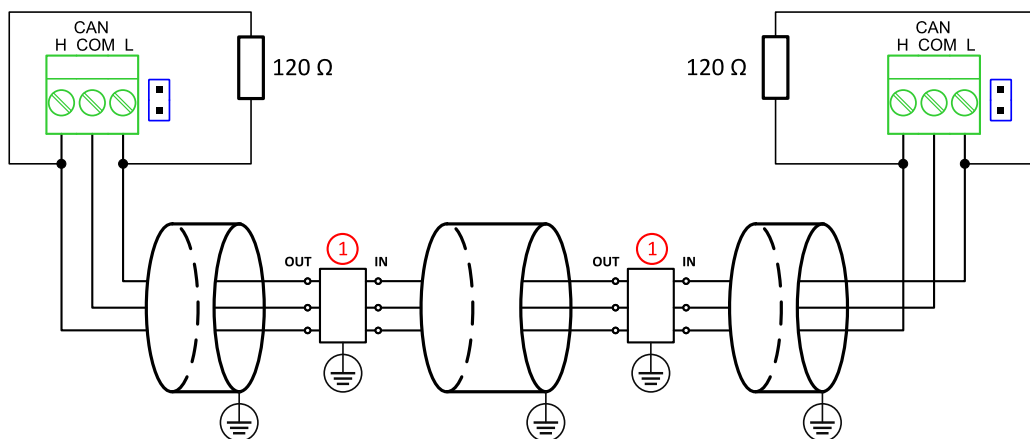


Image 4.18 CAN bus wiring for longer distances

① Recommended PT5-HF-12DC-ST¹

¹Protections recommended: Phoenix Contact (<http://www.phoenixcontact.com>): PT 5-HF-12DC-ST with PT2x2-BE (base element) or Saltek (<http://www.saltek.cz>): DM-012/2 R DJ

RS-485 wiring

The wiring of the RS-485 communication should be provided in such a way that the following rules are observed:

- ▶ Standard maximum link length is 1000 m.
- ▶ Shielded cable¹ has to be used, shielding has to be connected to the terminal T01 (BATT -).
- ▶ External units can be connected on the RS-485 line in any order, but keeping line arrangement (no tails, no star) is necessary.
- ▶ The line has to be terminated by 120 Ω resistors at both ends.
- ▶ For shorter distances (connection within one building)

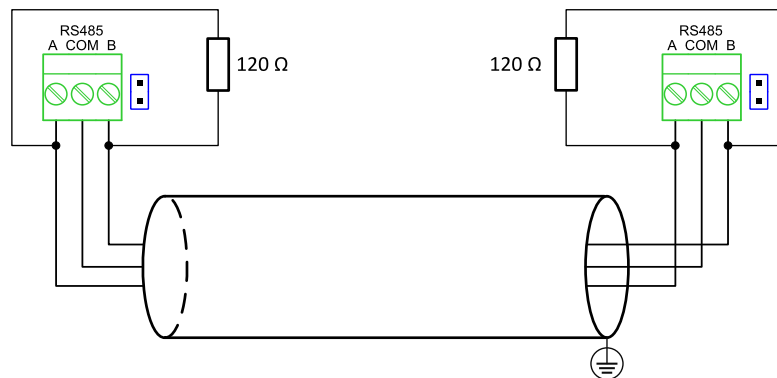


Image 4.19 RS-485 wiring for shorter distances

- ▶ For longer distances or in case of surge hazard (connection out of building, in case of storm etc.)

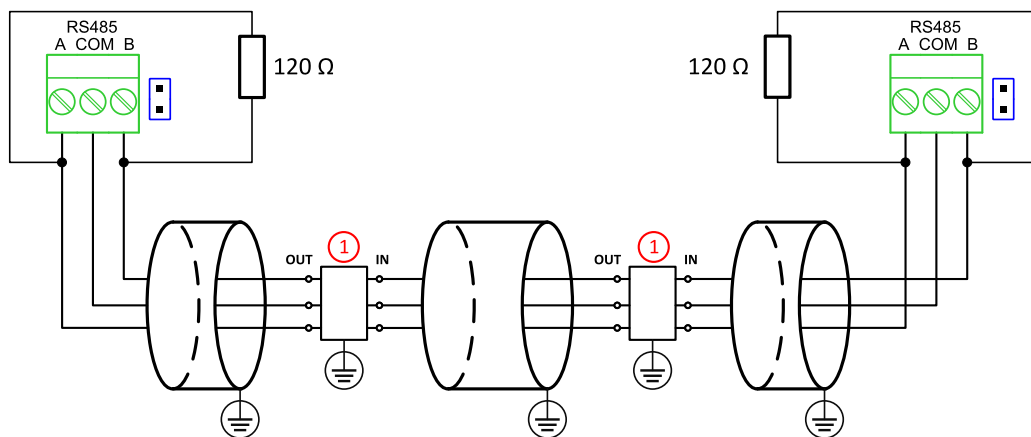


Image 4.20 RS-485 wiring for longer distances

① Recommended PT5HF-5DC-ST²

¹Recommended data cables: BELDEN (<http://www.belden.com>) - for shorter distances: 3105A Paired - EIA Industrial RS-485 PLTC/CM (1x2 conductors); for longer distances: 3106A Paired - EIA Industrial RS-485 PLTC/CM (1x2+1 conductors)

²Recommended protections: Phoenix Contact (<http://www.phoenixcontact.com>): PT 5-HF-5DC-ST with PT2x2-BE (base element)(or MT-RS485-TTL) or Saltek (<http://www.saltek.cz>): DM-006/2 R DJ

4.4.10 Modules wiring

Wiring of extension or plug-in module are described in appendix. For more information please see **Modules** on **page 199**.

5 Controller setup

5.1 Operator Guide 45
 5.2 Function description 52

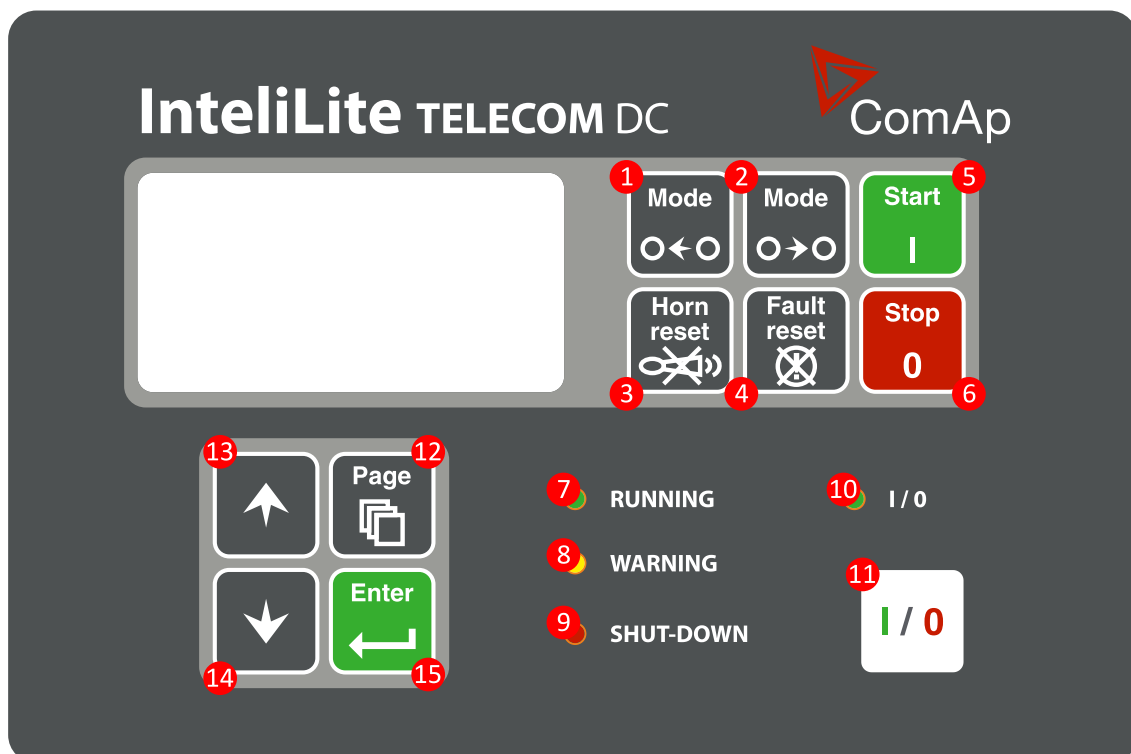
 back to Table of contents

5.1 Operator Guide

5.1.1 Front panel elements 45
 5.1.2 Display screens and pages structure 47
 5.1.3 Browsing alarms 50
 5.1.4 Password 51
 5.1.5 Information screen 51
 5.1.6 Display contrast adjustment 52

 back to Table of contents

5.1.1 Front panel elements



Control buttons		
Position	Button	Description
1		<p>MODE LEFT button. Use this button to change the mode. The button works only if the main screen with the indicator of currently selected mode is displayed.</p> <p>Note: This button will not work if the controller mode is forced by one of binary inputs Remote OFF, Remote MAN, Remote AUT, Remote TEST.</p>
2		<p>MODE RIGHT button. Use this button to change the mode. The button works only if the main screen with the indicator of currently selected mode is displayed.</p> <p>Note: This button will not work if the controller mode is forced by one of binary inputs Remote OFF, Remote MAN, Remote AUT, Remote TEST.</p>
3		<p>HORN RESET button. Use this button to deactivate the horn output without confirmation of the alarms.</p>
4		<p>FAULT RESET button. Use this button to acknowledge alarms and deactivate the horn output. Inactive alarms will disappear immediately and status of active alarms will be changed to "confirmed" so they will disappear as soon as their reasons dismiss.</p>
5		<p>START button. Works in MAN mode only. Press this button to initiate the start sequence of the engine.</p>
6		<p>STOP button. Works in MAN mode only. Press this button to initiate the stop sequence of the engine.</p>
11		<p>ON/OFF button: according to the user setup, the button switches the corresponding Logical binary output according the Basic settings: Panel Button setpoint (Toggle, Nominal/Idle, Close load etc.)</p>
12		<p>PAGE button. Use this button to switch over display pages. See Display Screens and Pages Structure chapter below this table for more details.</p>
13		<p>UP button. Use this button to select the set point, select the screen or increase set point value</p>
14		<p>DOWN button. Use this button to select the set point, select the screen or decrease set point value</p>

15		ENTER button. Use this button to finish editing a setpoint or moving right in the history page.
Indicators and others		
Position	Button	Description
7	 RUNNING LED	Engine running
8	 WARNING LED	A failure but engine keeps running
9	 SHUT- DOWN LED	Engine is stopped because of red alarm.
10	 I/O LED	Status of I/O button:

5.1.2 Display screens and pages structure

There are 3 display menus available: MEASUREMENT, ADJUSTMENT and HISTORY in Engineer interface and MEASUREMENT only in User interface.

Each menu consists of several screens. Press repeatedly button to select requested menu.

Measurement screens

Main measure screen

Charging procedure overview is located on the first screen.



InteliLite Telecom DC Analog inputs screen 1

Oil pressure	Analog Input 1: bar-graph with protection limits indication, usually Oil pressure dedicated
Engine temp	Analog Input 2: bar-graph with protection limits indication, usually engine temperature dedicated
Fuel Level	Analog Input 3: bar-graph with protection limits indication, usually fuel level dedicated
Battery Volts	Power supply bar-graph with protection limits indication

Note: This configuration is recommended to use for DC application. In case of use external AIO9/1 module additional screens are going to be displayed and the controller's analog inputs can be used for different purposes.

InteliLite Telecom DC Analog inputs screen 2

Ubatt	Analog Input 4: Battery bank voltage
Ugen	Analog Input 5: Generator output voltage
Uload	Analog Input 6: Load input voltage
Uaux	Analog Input 7: Auxiliary source voltage

InteliLite Telecom DC Analog inputs screen 3

IbattAbs	Analog Input 9: Absolute value of the battery current
Igen	Analog Input 8: Output generator current
Iload	Analog Input 7: Measured current into the load
Iaux	Calculated current from auxiliary source

InteliLite Telecom DC Binary inputs screen

This screen shows binary inputs BI1 to BI7 states and their names.

IL-NT BIO8 Binary inputs screen

IN: BIO8 BI1 Alarm	
IN: BIO8 BI2 Alarm	
IN: BIO8 BI3 Alarm	
IN: BIO8 BI4 Alarm	
IN: BIO8 BI5 Alarm	
IN: BIO8 BI6 Alarm	
IN: BIO8 BI7 Alarm	
IN: BIO8 BI8 Alarm	this line is displayed on the following screen

Note: These screens are shown/hidden depending on whether the IL-NT BIO8 is configured or not.

IL-NT IO1 Binary inputs screen

IN: BIO8 BI1 Alarm	
IN: BIO8 BI2 Alarm	
IN: BIO8 BI3 Alarm	
IN: BIO8 BI4 Alarm	

Note: This screen is shown/hidden depending on whether the IL-NT IO1 is configured or not.
Analog outputs are not displayed on any screen

IL-NT AIO Analog inputs screen

AIO AI1	A11 barograph with protection limits indication, displayed only if is configured
AIO AI2	A12 barograph with protection limits indication, displayed only if is configured
AIO AI3	A13 barograph with protection limits indication, displayed only if is configured
AIO AI4	A14 barograph with protection limits indication, displayed only if is configured

Note: This screen is shown/hidden depending on whether the IL-NT AIO is configured or not.
Analog output AO1 is not displayed on any screen! It is visible among values in LiteEdit.

ECU state screen

ECU State	
ECU YellowLamp	
ECU RedLamp	
WaitToStart	
SpeedReq Abs	Required RPM of the engine
SpeedReq Rel	%

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

ECU values screen

It depends on the ESF file which is configured. See practical example of the screen below for Caterpillar J1939 2.1.

Example:

Fuel rate	L/h or gph
CoolantTemp	°C or °F
IntakeTemp	°C or °F
Oil pressure	Bar or psi
Boost pressure	Bar or psi
Load	% (Percentual load at current speed)

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

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.

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






Alarm list

Alarm list displays active or inactive alarms occurred in IntelliLite Telecom DC unit. IntelliLite controller automatically switches to the Alarm list screen when any new alarm appears, but from Main measure screen only, see **Alarm management on page 61**.

Setpoint Screens


1. Use repeatedly  button to select the ADJUSTMENT menu.
2. Use  or  to select requested set points group.
3. Press  to confirm.
4. Use  or  to select requested set point.
5. Set points marked “*” are password protected.
6. Press  to edit.
7. Use  or  to modify the set point. When  or  is pressed for 2 sec, auto repeat function is activated.
8. Press  to confirm or  to leave without change.
9. Press  to leave selected set points group.

History Log


1. Use repeatedly  button to select the History menu.
2. Use  or  to select requested History line – see Reason, Date and Time.
3. Press  to go-on line to right – see recorded values.
4. Use repeatedly  button to go back to Measurement screen.

5.1.3 Browsing alarms

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

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






Example	Description
*Wrm Water temp	Active not accepted alarm
Wrm water temp	Active accepted alarm
*Wrm Water temp	Inactive not accepted alarm
	Inactive accepted alarm

Press  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.

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 signaled in the standard alarm list and by exclamation mark on the main measure screen.

Control from the front panel	
 or 	One screen up/down
	Cursor move within the ECU alarm list
 + 	ECU fault code reset




5.1.4 Password

Press  button while being at the Main screen. This will get you to the list of Setpoint groups where the first group is named as Password. By clicking at  button you can get inside of this group. Your following options are either:

- ▶ Enter the Password
- ▶ Change the Password

For confirmation of chosen option use , for returning use  and for changes of the password number use arrows  and .

5.1.5 Information screen

Following screens are displayed after powering on the controller or you can be displayed from main metering screen after holding  and pressing  button. Pressing  button again will switch to another following screen.

Init screen

This is a first screen after controller's start which is dedicated for information provided by customers such as contact numbers, service technician contact and customer message for end users of engine. Configuration of this screen is only done by LiteEdit PC tool.

Firmware screen

This screen contains information about controller's type, controller manufacturer ComAp, uploaded firmware, version of firmware, used application and branch. There is also information about currently configured electronic engine unit, respectively about ESF file. Details for recognition of configured electronic engine are in chapter ECU controlled engine support.

Languages screen

InteliLite Telecom DC controller offers configurable language support. On this screen is possible to switch between languages configured in controller. Second way, how to change language, is by binary input Lang Selection.

5.1.6 Display contrast adjustment

While staying at MEASUREMENT screen press  and  or  at the same time to adjust the best display contrast

5.2 Function description

5.2.1 Operating states	52
5.2.2 Charging cycle	53
5.2.3 How to set up charging parameters in InteliLite Telecom DC	56
5.2.4 Compensations	59
5.2.5 ECU engine support	61
5.2.6 Alarm management	61
5.2.7 Operating modes	65
5.2.8 Breaker control	66

 [back to Table of contents](#)

5.2.1 Operating states

Engine State	Meaning
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 101) 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

Charging State	Meaning
Bulk	Maximum constant current charging battery bank
Absorption	Constants voltage charging algorithm with regulated drop of current
AUXCharge	Auxiliary source charging battery bank
Discharge	Battery bank supply load

5.2.2 Charging cycle

InteliLite Telecom DC bringing, except standard starting procedure and protection, advantage of smart charging algorithm. In general in DC application we are expecting battery bank which needs to be charged and by ComAp solution we can reach significant fuel saving.

Battery bank is taken as primary source of energy for DC load. DC generator is working only as charging device and system backup.

Charging cycle initiates by four basic conditions:

1. Battery voltage start,
2. Remote or External START/STOP signal,
3. Discharged ampere hour
4. Timer start based on **NextStartDelay (page 92)** and **ChrgTimeout (page 93)** setpoints.

Note: Each starting condition has certain stopping condition, e.g. if once charging cycle start on the battery voltage condition **U Start (page 89)**, generator stop only on the **I Absorb Stop (page 91)** condition and do not stop on **ChargeLimit (page 94)** condition.

Battery voltage start

Performed charging characteristic by InteliLite Telecom DC you can see below with description of important points. This characteristic is given by producer of batteries to extend life cycle of battery cells. Setpoints for proper adjustment should be recommended by battery producer, usually it is possible to find them in the battery datasheet.

Example: If you have battery with the capacity of 1600 Ah, then usual recommended charging current is 0.1-0.3C, setpoint **I Max Charge (page 90)** then can be adjust as 160-480 Amps, depends on the recommendation of battery manufacturer and available DC generator output power.

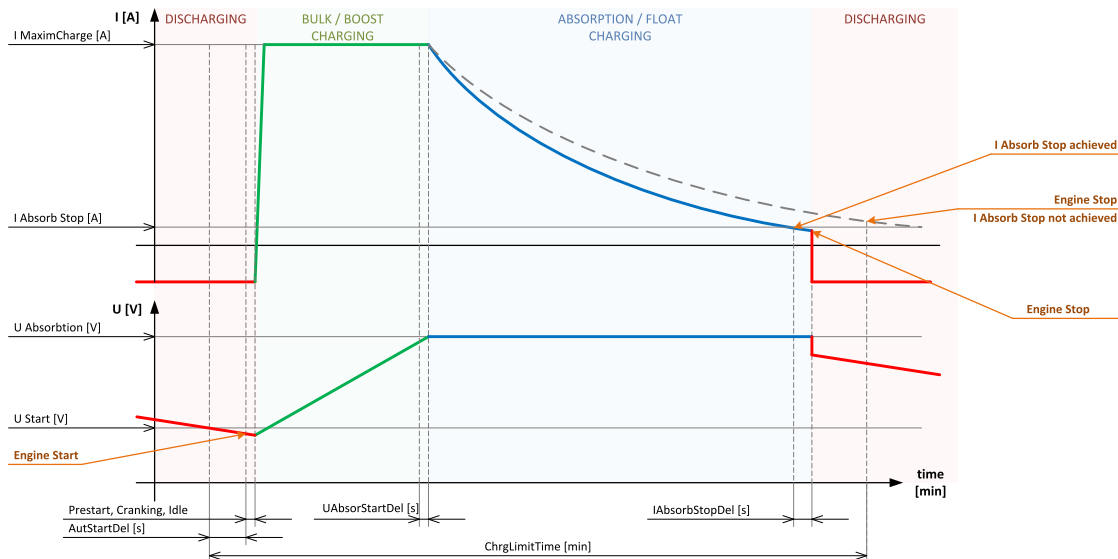
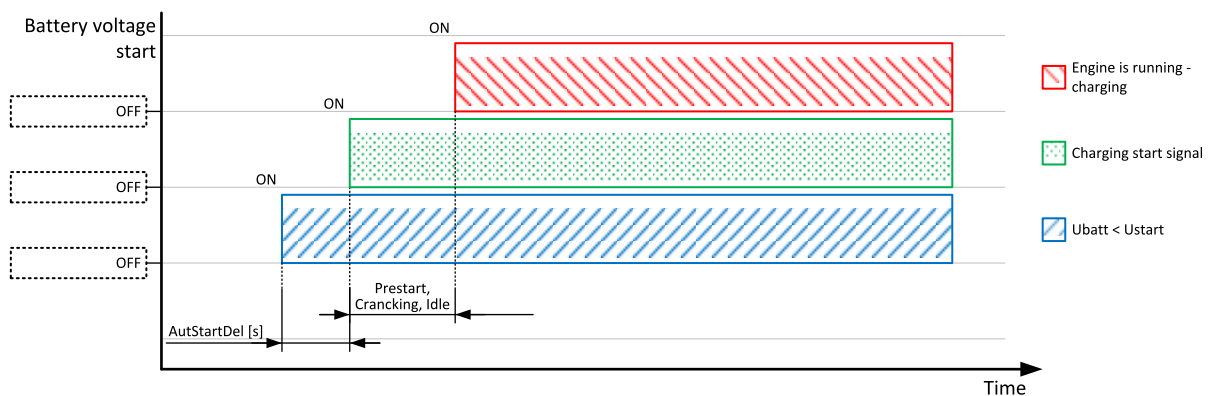


Image 5.1 Charging characteristic

The generator starts cranking in AUT mode if battery voltage level drops under adjusted limit. For controller it means if value **U_{battComp}** (page 144) has lower value than **U Start** (page 89) and stays under this limit longer than adjusted delay **AutStartDel** (page 89).

Note: Related setpoints, that affect start delay, are **AutStartDel** (page 89), **Prestart Time** (page 100), **Preglow Time** (page 100), **MaxCrank Time** (page 100), **Idle Time** (page 101) etc.



Bulk Cycle

Bulk cycle is intended to charge the battery with nominal (maximum possible) charging current **I Max Charge** (page 90). Bulk cycle is finished when battery voltage **U_{battComp}** (page 144) ($U_{battComp} = U_{batt} + Batt\ Temp\ Comp$) reaches the nominal voltage of the battery **U Absorb Start** (page 91).

Absorption cycle

Absorption cycle maintains the battery voltage **U_{batt}** (page 144) at constant voltage level **U Absorb Start** (page 91) as long as the battery charging current **I_{batt}** (page 145) drops below **I Absorb Stop** (page 91) limit (this limit stops the charging process)

Note: In case the **I Absorb Stop** (page 91) limit is not achieved, the charging process will stop once **ChargeLimit** (page 94) period is elapsed.

Stopping

As soon as all condition for stopping are achieved the generator is stopped with **I Absorb Stop** (page 91).

Remote External START/STOP signal

Binary input **EXT START/STOP** (PAGE 160) can be use to initialize start and stop of the DC generator.

If the binary input **EXT START/STOP** (PAGE 160) is activated, the charging is regulated only on constant current level, given by setpoint **I Max Charge** (page 90). The controller cannot go into the Absorption part of cycle.

This feature can be used to run permanently DC generator to supply directly the load or more often is used for charging special types of batteries (e.g. Li-Ion), that has own charging management system (BMS).

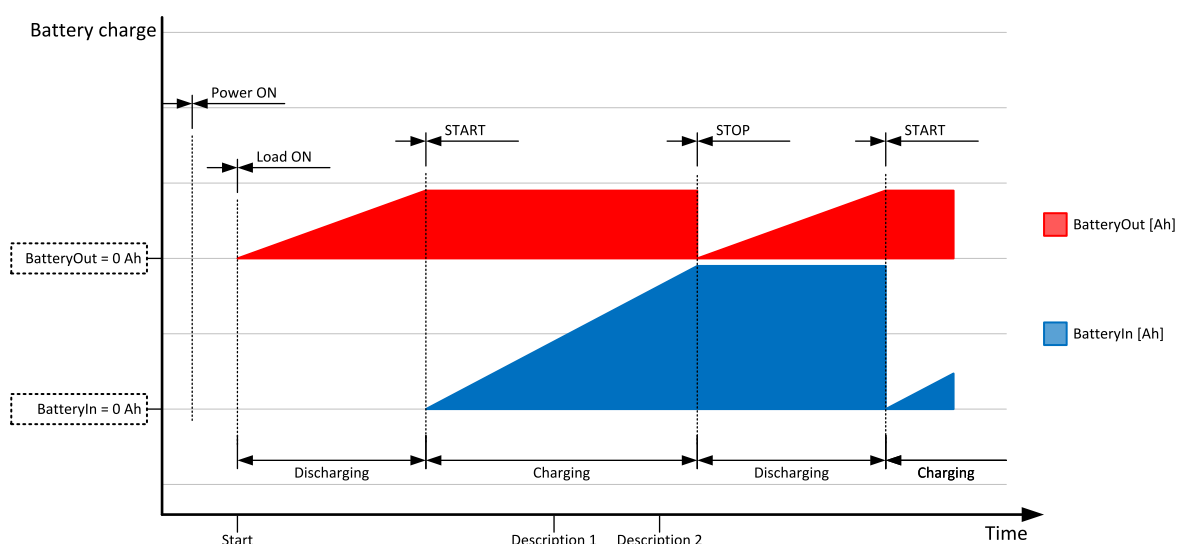
Discharge ampere hours

DC generator and charging procedure start automatically in AUT mode. Start is activated by reaching discharge current limit.

The controller is measuring current and voltage during charging and discharging the battery and recounts it into the Ampere hours. Values are displayed as **BatteryIn** (page 146) and **BatteryOut** (page 146) in one cycle.

These actual values **BatteryIn** (page 146) and **BatteryOut** (page 146) are compared with two setpoints **Battery Charge: ChargeLimit** (page 94) and **DischargeLimit** (page 95). When the **DischargeLimit** (page 95) is reached the engine is started and when the **ChargeLimit** (page 94) is reached engine is stopped.

The controller at the same time is counting number of cycles and saving into the value statistic **NumOfCycles** (page 148). Over all cycles are also counted **TotBattChrg** (page 148) and **TotBattDischrg** (page 148) Ampere hours.



Values related to charging cycle

Related Values	Dimension	Details
Ubatt (page 144)	[V]	Battery voltage – measured
Ugen (page 144)	[V]	Generator voltage - measured
BatteryIn (page 146)	[Ah]	Charging battery current in Ampere hours – counted
BatteryOut (page 146)	[Ah]	Discharging battery current in Ampere hours – counted
UbattComp (page 144)	[V]	Compensated battery voltage – calculated, see Temperature compensation on page 59
Uaux (page 145)	[V]	Auxiliary – external power source voltage - measured
ExcitRequest (page 146)	[-]	Output signal of controller for excitation or speed control
Igen (page 145)	[A]	Generator current – measured / calculated, see Current measurement on page 28
Iload (page 145)	[A]	Load current – measured / calculated , see Current measurement on page 28
Ibatt (page 145)	[A]	Battery current – measured / calculated, see Current measurement on page 28
Ibatt Abs	[A]	Battery current value for displaying on the screen of the controller, absolute value of Ibatt (page 145)
Iaux (page 145)	[A]	Auxiliary current – measured / calculated, see Current measurement on page 28
BatteryTemp (page 145)	[-]	Available for temperature measurement, see BatteryTempSel on page 93

Full charge cycle

In real applications the telecom battery is typically charged to its ca 90% of capacity only because of the requirement to lower the fuel consumption. It is then recommended to make the full charge each n-th cycle, **FullChrgCycle (page 96)**, to ensure the long life for the battery.

This means that each **FullChrgCycle (page 96)** the charging is not performed according to Standard setpoint but according to "Full Charging" setpoints.

Original setpoints

ChargeLimit (page 94)
 ChrgTimeout (page 93)
 I Absorb Stop (page 91)

Full charge setpoints

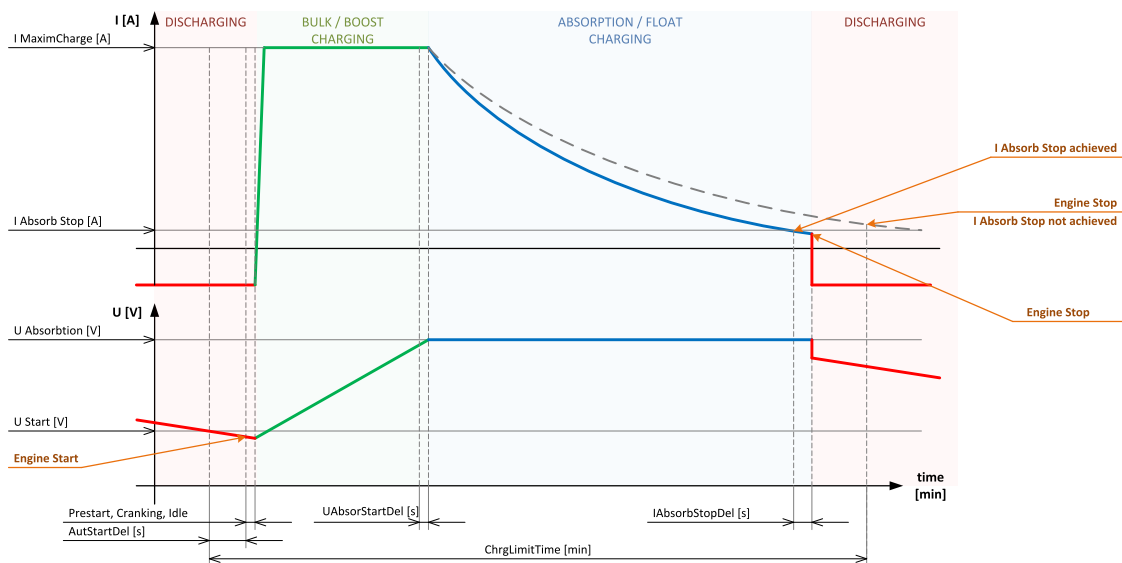
FullChrgLimit (page 95)
 FullChrgTimeout (page 95)
 I FullChrgStop (page 95)

Note: Number of Full charge cycles is counted in **NumOfFullCycls (page 148)** value.

5.2.3 How to set up charging parameters in InteliLite Telecom DC

IMPORTANT: All parameters set in group of setpoints Battery Charging depend on the application and type of battery which is used.

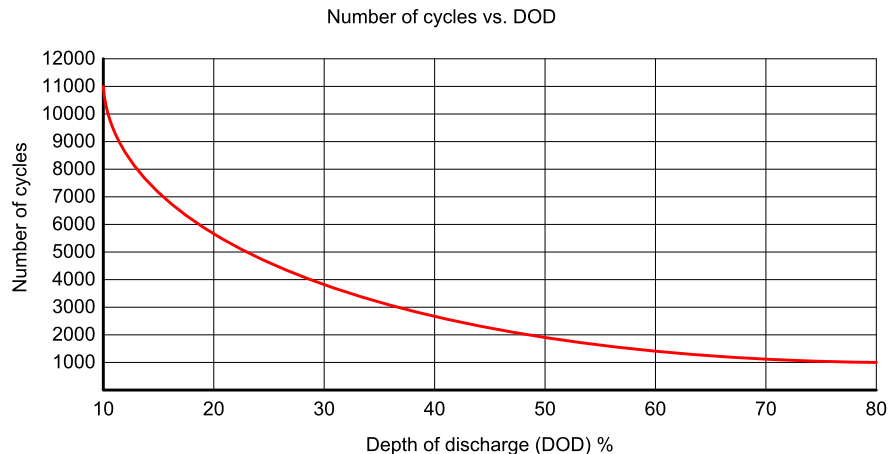
DC power source in stand-by telecom applications typically use **IU₀U** charging characteristics. **I** for constant current (Bulk) phase, **U₀** for constant high voltage (Absorption) phase and **U** for lower voltage (Float) phase. In hybrid and cycling applications it is common to use IU0 charging characteristic only. Final Float stage is not used in this case.



Here according to the picture above it is necessary to set properly all following parameters:

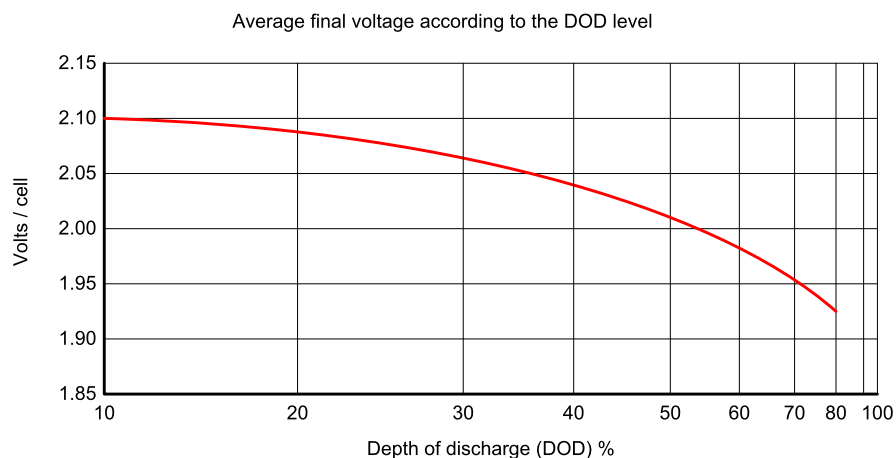
- ▶ **U Start (page 89)** – Describes when the battery is considered as discharged and the DC genset should start.
- ▶ **I Max Charge (page 90)** – Sets what is the maximal/recommended charging current of your battery. This value is also used for first “bulk” stage – constant current charging.
- ▶ **U Absorb Start (page 91)** – Sets what is the maximal/recommended charging voltage of your battery. When this value is reached, controller switch to second “absorption” phase – constant voltage charging.
- ▶ **I Absorb Stop (page 91)** – Sets the limit current when the battery is considered as charged and the genset can stop.

Example: There is used 540 Ah battery comprising of 24 pcs of 2 V Gel VRLA cells (e.g. 7 OPzV 490). VRLA Gel battery together with much (at least twice) higher capacity is used in this case because of the requirement of high number of cycle.



Note: Graph is only an example. Look for the datasheet of your battery to have the real data.

- ▶ **U Start** - According to discharging information from the battery manual set the parameter **U Start** as a final voltage for discharging and starting of the DC genset in the same time. In cycling applications, the battery should be designed for lower % of DOD (Depth of discharge), e.g. max 50%. Check the final voltage for 50% of DOD in the battery manual. In our case it is ca 2,01 V/cell according to the discharging curve, which means 48.24 V for the whole battery. Set the parameter of **U Start** to 48.2 V.



Note: Fully charged cell in this case has 2.13 V according to the manual. This is equal to 51.1 V for the whole battery.

- ▶ **I Max Charge** - Battery manual contains typically the maximal charging current, recommended value by the producers can typically vary between 0.1 and 1.0 of C_{10} Amps. Which means between 55 and 540 Amps. Set this number into **I Max Charge** setpoint. Lower number means of course longer charging time.

Note: The **I Max Charge** parameter depends on the nominal power of the DC genset and the typical load of the BTS site also. Remember that the DC genset needs to provide enough power for both loads – BTS and battery at the same time.

- ▶ *U Absorption* - Charging voltage should be set according to the battery manual. In our case to 2.4 V/cell which means for 48 V battery (containing 24 cells) $2.4 \times 24 = 57.6$ V. The parameter *U Absorb Start* will be then set to 57.6 V.
- ▶ *I Absorb Stop* - This value should be typically between 0.01 and 0.1 C₁₀ Amps. In our case we have set 0.1 C₁₀ which means 54 A.
- ▶ It is also recommended to set other limitation parameters for charging and discharging:
 - *DischargeLimit* in Ah should be set to the maximal capacity we want to use regarding to the % of DOD. We have set the *DischargeLimit* to 270 Ah, as 50% of DOD to ensure enough high number of cycles.
 - *ChargeLimit* in Ah should be set to maximal amount of power we want to charge into the battery. Typically, it should be $1.3 \times \text{Discharge Limit}$. The battery needs more power to charge than it was discharged, plus mind the power loss. In our case we have set 340 Ah.
 - Parameters *NextStartDelay* and *ChrgTimeout* should be set according to the required running time of the genset or the battery. Respect the similar relation between the time allowed for discharging (*NextStartDelay*) and time used for charging (*ChrgTimeout*) as in the case of *DischargeLimit* and *ChargeLimit*.

IMPORTANT: Read carefully the battery manual. Lead acid batteries should not be typically charged by the maximal voltage (*U Absorption*) longer than for 24 hours.

- ▶ If the battery is not fully charged in the standard charging cycle, e.g. due to required fuel savings, it is highly recommended to do each n-th (5th – 15th) cycle the full charging to avoid the battery lifetime decreasing. In our case the battery producer recommends to do the Full charging each 10th cycle as the latest.
 - For this Full charging cycle use decreased value of *I Absorb Stop*, e.g. to 0.01 C₁₀ Amps, and set it in the parameter of *I FullChrgStop*.
 - Prolong the charging time (*ChrgTimeout*) and set it in *FullChrgTimeout* setpoint and increase also the value of *FullChrgLimit* in comparison with *ChargeLimit* setpoint.

5.2.4 Compensations

Controller supports two different compensations for battery voltage. First compensation is based on measured temperature, second compensation is based on load current from battery.

Note: Both compensation can be active at one moment.

Temperature compensation

The battery bank is through the year and region used in different temperature condition. This negatively affect life cycle of battery bank. To prolong the life cycle of the battery bank and better follow charging characteristic under different temperature conditions, the controller is calculating compensation of voltage and current depending on the measured battery bank temperature.

Note: Battery temperature compensation of battery voltage and battery current is possible to disabled by adjustment of setpoint *BatteryTempSel* (page 93) to OFF.

Temperature compensation of battery voltage

The compensated voltage *UbattComp* (page 144) is calculated based on measured battery *Ubatt* (page 144) and compensation constant *Batt Temp Comp* (page 94).

Voltage is compensated by mV for each °C. Reference temperature is given $\Delta t_{20} = 20^{\circ}\text{C} - \text{BatteryTemp}$ (page 145).

$$U_{\text{battComp}} \text{ (page 144)} = U_{\text{batt}} \text{ (page 144)} - \text{Batt Temp Comp} \text{ (page 94)} * \Delta t_{20}$$

Note: Temperature compensation of battery voltage is possible to disable by adjustment of setpoint **Batt Temp Comp** (page 94) to 0 mV/°C.

IMPORTANT: Setpoint **BatteryTempSel** (page 93) has to be adjusted to analog input with temperature sensor to enable this function.

Temperature compensation of battery current

The compensated current is calculated based on measured battery temperature, **Ibatt** (page 145) and compensation constant **Curr Temp Comp** (page 94). This compensation is affecting limit for charging current **I Max Charge** (page 90).

Current limit is compensated by A for each °C. Reference temperature is given $\Delta t_{50} = 50^{\circ}\text{C} - \text{BatteryTemp}$ (page 145).

$$I \text{ Max Charge} \text{ (page 90)} = I_{\text{batt}} \text{ (page 145)} - \text{Curr Temp Comp} \text{ (page 94)} * \Delta t_{50}$$

Note: Temperature compensation of battery current is possible to disable by adjustment of setpoint **Curr Temp Comp** (page 94) to 0,0 A/°C.

IMPORTANT: Setpoint **BatteryTempSel** (page 93) has to be adjusted to analog input with temperature sensor to enable this function.

Current compensation

This compensation is based on battery current. According to discharging average battery current, the **Ubatt** (page 144) voltage is compensated to **UbattComp** (page 144). The range of compensation is defined by setpoint **U LoadComp Rng** (page 96). Average current is calculated from measured **Ibatt** (page 145). Fluctuation character of the current is adjusted via setpoint **I LoadComp Chr** (page 98). Minimal and maximal current for compensation is adjusted via setpoints **I LoadComp Min** (page 97) and **I LoadComp Max** (page 98).

$$U_{\text{battComp}} \text{ (page 144)} = U_{\text{batt}} \text{ (page 144)} - U_{\text{battCompLoad}} \text{ (page 144)}$$

Note: Current compensation of battery voltage is possible to disable by adjustment of setpoint **U LoadComp Rng** (page 96) to 0 V.

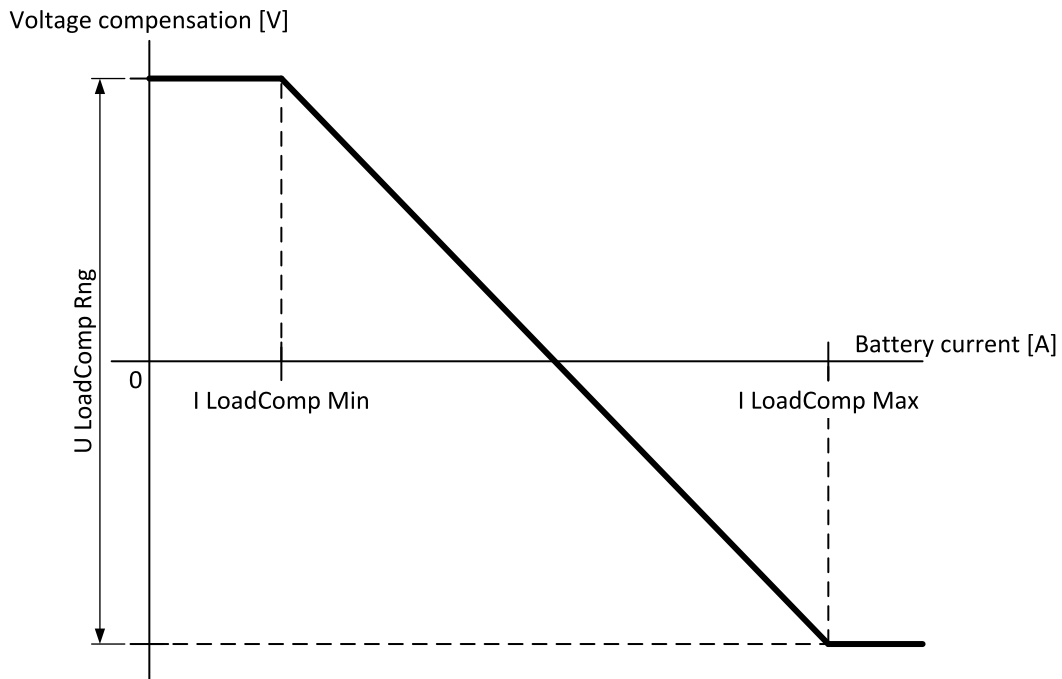



Image 5.2 Current compensation

5.2.5 ECU engine support

InteliLite Telecom DC firmware branch covers both standard and electronic controlled (monitored) engines. The appropriate engine/ECU type is selected in PC tool LiteEdit like other peripherals. Press the button  in Modify configuration window.

Import latest ECU list – ECU list-x.x.iwe for update engine ECU specification.

Select the proper ESL file in LiteEdit → Options → ESL files - typically Allspeed.esl.

IMPORTANT: More information about ECU list packages, values, configuration and wiring recommendations can be found in Comap [Electronic Engines Support manual](#).

The InteliLite Telecom DC controller always sends either speed request = 0% or the IDLE command via J1939 in controller Idle state. In the MAN mode the Idle operation can be controlled by **NOMINAL/IDLE (PAGE 162)** binary input.

If the connected engine is Cummins communicating via RS-232, it is necessary to set the setpoint **Comms Settings (page 83): COM1 Mode (page 83)** (or **COM2 Mode (page 83)** if IL-NT RS232-485 module is used) = ECULINK.

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 COMM OK (PAGE 175)** follows the real situation that means it is not active anytime when the ECU does not communicate.

The output **ECU POWERRELAY (PAGE 175)** closes at the beginning of prestart and opens if the engine shall be stopped.

5.2.6 Alarm management

Note: The max. number of records in history is 100

The controller evaluates two levels of alarms:

- ▶ Level 1 – Yellow alarm – is a pre-critical alarm that is only informative and does not take any action regarding gen-set control.
- ▶ Level 2 – Red alarm – represents a critical situation, where an action must be taken to prevent damage of the gen-set or technology.

Alarm rules:

- ▶ One alarm of any type can be assigned to each binary input
- ▶ Two alarms (one yellow and one red type) can be assigned to each analog input
- ▶ There are also Built-in alarms with fixed alarm types.
- ▶ Each alarm is written to the Alarm List
- ▶ Each alarm causes a record to be written into the history log.
- ▶ Each alarm activates the Alarm and Horn output.
- ▶ Each alarm can cause sending of a SMS message or an email.

Binary inputs

Alarms on binary inputs have following parameters for set-up: Contact type and Alarm type.

Following contact types are available for binary inputs:

- ▶ NC - normally closed - alarm is active in binary zero
- ▶ NO - normally opened - alarm is active in binary one

Following alarm types are available for binary inputs:

- ▶ Warning
- ▶ A+H indication
- ▶ Shutdown
- ▶ BOC (Breaker open and Cool down)

Note: Type and contact type of protection for binary inputs is adjustable in PC tool LiteEdit.

Analog inputs

Alarms on analog inputs have following parameters for set-up: Direction and Alarm type.

Following directions are available for analog inputs:

- ▶ Under limit - Alarm is activated when value of analog input is under adjusted limits
- ▶ Over limit - Alarm is activated when value of analog input is over adjusted limits
- ▶ Under limit + FIs - Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
- ▶ Over limit + FIs - Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrm + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Following alarm types are available for analog inputs:

- ▶ Sensor fail
- ▶ Warning
- ▶ Wrm+Sd
- ▶ BOC (Breaker open and Cool down)

Note: Type and direction of protection for analog inputs is adjustable in PC tool LiteEdit.

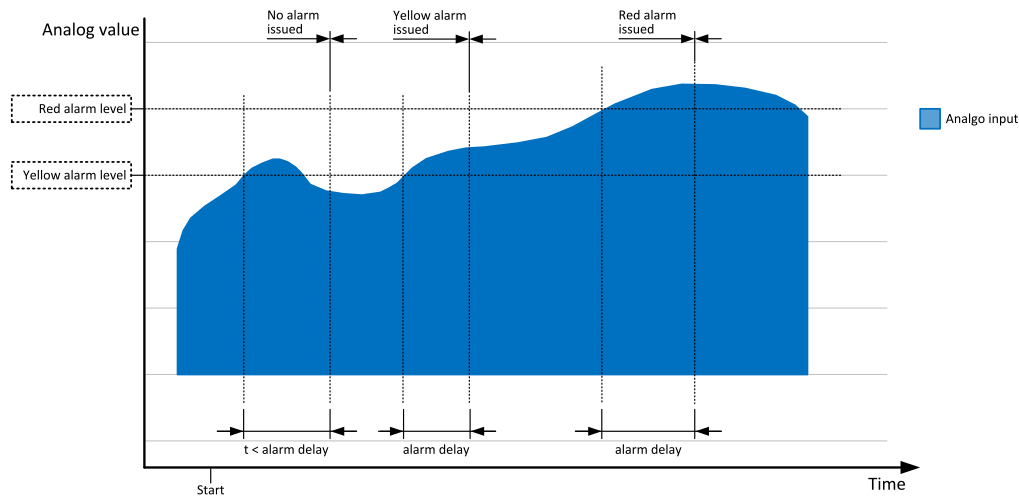



Image 5.3 Analog input alarm evaluation principle

Alarm handling

There are two different alarm categories regarding the period when the alarms are evaluated. The category is selectable for alarms assigned to binary/analog inputs and fixed for built-in alarms. The categories are the following:

- ▶ The alarm is evaluated all the time when the controller is switched on.
- ▶ The alarm is evaluated only when the engine is running. This type should be used for e.g. oil pressure. These alarms begin to be evaluated after the engine has been started with the delay given by the setpoint **ProtectHoldOff** (page 117).

If an alarm is being evaluated and the appropriate alarm condition is fulfilled, the delay of evaluation will start to run. If the conditions persist, the alarm will activate. The alarm will not activate if the condition is dismissed while the delay is still running.

After pressing the  button or activating the binary input **FAULTRESBUTTON** (PAGE 160), all active alarms change to confirmed state. Confirmed alarms will disappear from the Alarm List as soon as the respective condition dismisses. If the condition is dismissed before acknowledging the alarm, the alarm will remain in the Alarm List as inactive.

Built-in alarms

Breaker alarms

Breaker	
ACB	Breaker is opened if there is overcurrent or breaker trip.
BCB	Breaker is opened if there is overcurrent, overvoltage or breaker trip.
GCB	Breaker is opened if there is overcurrent, overvoltage, undervoltage or breaker trip.
LCB	Breaker is opened if there is overcurrent or breaker trip.

Note: If there is any feedback alarm, all breakers are opened.

Voltage protections

Voltage protections for battery and generator are active only when generator is running. Limits for undervoltage and overvoltage are common for battery and generator. In case that **UbattComp** (page 144) is higher **Gen >V Sd** (page 123) and generator is not running, all breakers are opened.

Current protections

Current protections are active all the time.

Alarm states

An alarm can have following states:

- ▶ Active alarm: the alarm condition persists, alarm delay has elapsed.
- ▶ Inactive alarm: the alarm condition has disappeared, but the alarm has not been confirmed.
- ▶ Confirmed alarm: the alarm condition persists, but the alarm has already been confirmed.

Alarm types - Level 1

The Level 1 alarm indicates that a value or parameter is out of normal limits, but has still not reached critical level. This alarm does not cause any actions regarding the gen-set control.

Warning (Wrn)

The alarm appears in the Alarm List and is recorded into the history log. Activates the output **AL COMMON WRN** (PAGE 169) as well as the standard alarm outputs (**HORN** (PAGE 177) and **ALARM** (PAGE 169)).

Alarm types - Level 2

The Level 2 level alarm indicates that a critical level of the respective value or parameter has been reached.

Note: *It is not possible to start the engine if any red level protection is active or not confirmed.*

IMPORTANT: The gen-set can start by itself after acknowledging the alarms if there is no longer an active red alarm and the controller is in AUTO or TEST mode!

Shutdown (Sd)

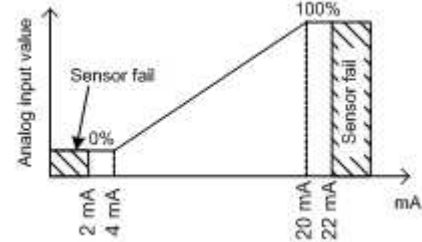
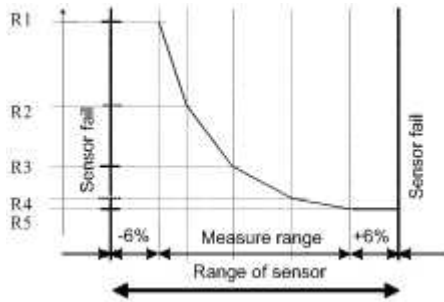
The alarm appears in the Alarm List and is recorded into the history log. It causes immediate stop of the Gen-set without unloading and cooling phase. Also GCB breaker is open. The gen-set cannot be started again while there is a shutdown alarm in the Alarm List. Activates the output **AL COMMON Sd** (PAGE 168) as well as the standard alarm outputs (**HORN** (PAGE 177) and **ALARM** (PAGE 169)).

Breaker open and cool down(BOC)

When the BOC alarm comes up, engine is stopped slowly over cooling state.

Sensor fail detection (FLS)

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



5.2.7 Operating modes

Selecting the operating mode is done through and buttons on the front panel or by changing the **ControllerMode** (page 80) setpoint (from the front panel or remotely).

Note: If this setpoint is configured as password-protected, the correct password must be entered prior to attempting to change the mode via this setpoint.

Note: The mode cannot be changed from front panel if Access Lock input is active.

The following binary inputs can be used to force one respective operating mode independent of the mode setpoint selection:

- ▶ REMOTE OFF (PAGE 163)
- ▶ REMOTE MAN (PAGE 163)
- ▶ REMOTE AUT (PAGE 163)

If the respective input is active the controller will change the mode to the respective position according to the active input. If multiple inputs are active, the mode will be changed according to priorities of the inputs. The priorities match the order in the list above. If all inputs are deactivated, the mode will return to the original position given by the setpoint.

OFF

No start of the gen-set is possible. Controller is in Not ready status and the gen-set cannot be started any way. All breakers are open. , and buttons are inactive. Also the appropriate binary inputs for external buttons are not active. Automatic charging function is also deactivated.

MAN

The engine can be started and stopped manually using the and buttons (or external buttons wired to the appropriate binary inputs). Automatic charging function is deactivated. Breakers can be closed manually via appropriate binary input or via button. See the list of binary inputs:

- ▶ ACB BUTTON (PAGE 158)
- ▶ BCB BUTTON (PAGE 158)
- ▶ GCB BUTTON (PAGE 161)
- ▶ LCB BUTTON (PAGE 161)

Generator voltage is regulated to **U Gen Nom** (page 92) value. Behavior of regulation is adjusted via setpoints in the setpoint groups **RegulatorRegulator** (page 112) and **Engine ParamsEngine Params** (page 99).

AUT

The controller does not respond to buttons ,  and  buttons. The engine is started and stopped automatically. Reasons for automatic start:

- ▶ Start based on battery voltage - compensated battery voltage **UbattComp** (page 144) is lower than **U Start** (page 89)
- ▶ Start based on consumed battery capacity - **BatteryOut** (page 146) value is higher **DischargeLimit** (page 95)
- ▶ Start based on **REM START/STOP** (PAGE 162)
- ▶ Start based on **EXT START/STOP** (PAGE 160)
- ▶ Start based on **SERVICECYCLEST** (PAGE 164)
- ▶ Start based on **NextStartDelay** (page 92)
- ▶ Start based on **Timer1Function** (page 127) or **Timer2Function** (page 129)

Reasons for automatic stop:

- ▶ Stop based on battery voltage - compensated battery voltage **UbattComp** (page 144) is equal to **U Gen Nom** (page 92) and charging current is lower than **I Absorb Stop** (page 91).
- ▶ Stop based on consumed battery capacity - **BatteryIn** (page 146) value is higher **ChargeLimit** (page 94)
- ▶ Stop based on **REM START/STOP** (PAGE 162)
- ▶ Stop based on **EXT START/STOP** (PAGE 160)
- ▶ Stop based on **SERVICECYCLEST** (PAGE 164) - **ServiceCycle** (page 93) timer counts down
- ▶ Stop based on **ChrgTimeout** (page 93)
- ▶ Stop based on **Timer1Function** (page 127) or **Timer2Function** (page 129) - timers count down

In AUT mode, BCB and LCB breakers are closed all the time. Breakers are opened only when there is alarm of second level. GCB breaker is closed only when gen-set is running.

IMPORTANT: Difference between UbattComp (page 144) and Ugen (page 144) has to be lower than 2V to close GCB.

ACB is closed only when GCB is opened. Before start of charging cycle, ACB is opened. After charging cycle, when GCB is opened, ACB is automatically closed again.

IMPORTANT: ACB and GCB can't be closed together.

5.2.8 Breaker control

The following power switches are controlled by the controller:

- ▶ ACB - Aux circuit breaker
- ▶ BCB - battery circuit breaker
- ▶ GCB - generator circuit breaker
- ▶ LCB - load circuit breaker

The control outputs must be configured and wiring of the power switches must be provided in such a way, that the controller has full control over the breakers – i.e. the controller can open and close the breaker at any time.

The breaker must respond within max. 5 seconds to a close and open command. Special attention should be paid to opening of motorized circuit breakers, as it could take more than 5 seconds on some types.

Breaker control output

Close/Open	An output for control of a contactor. Its state represents the breaker position requested by the controller. The breaker must react within 5 seconds to a close or open command, otherwise an alarm is issued.
------------	--

Behavior of breakers depends on controller mode. For more information see **Operating modes on page 65**.

Breaker fail detection

Breaker fail detection is based on binary output breaker close/open comparing with binary input breaker feedback.

IMPORTANT: It is necessary to configure breaker feedback to use this function.

IMPORTANT: Also it is possible to use breakers without feedbacks. In this case there is no check of breaker real state.

There are three different time delays for breaker fail detection – see following diagrams.

When binary output breaker close/open is in steady state and breaker feedback is changed the breaker fail is detected immediately (no delay).

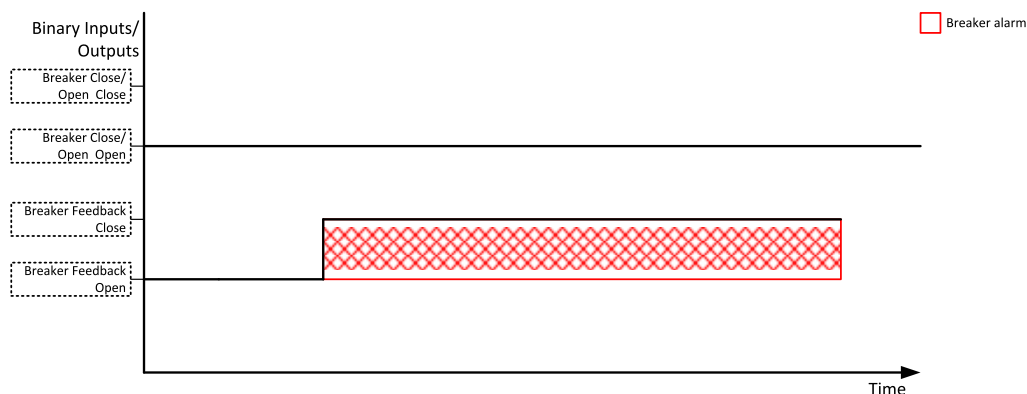


Image 5.4 Breaker fail - breaker close/open in steady position - open

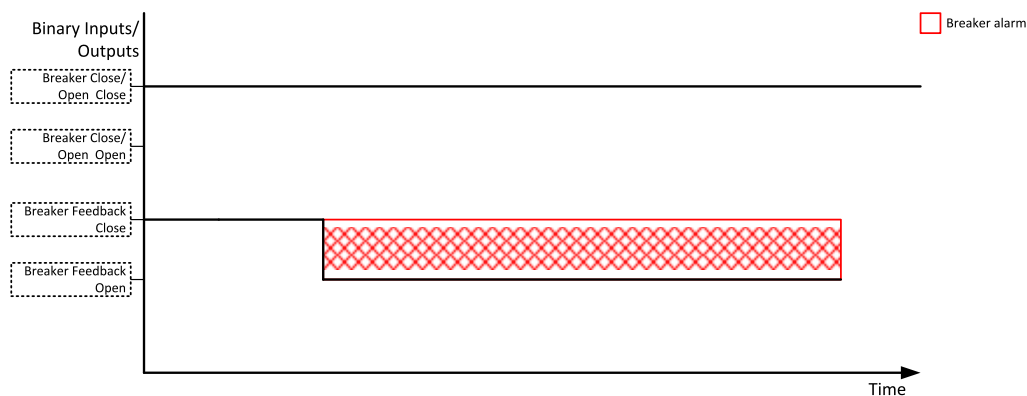


Image 5.5 Breaker fail - breaker close/open in steady position - close

When binary output breaker close/open opens there is 5 sec delay for breaker fail detection.

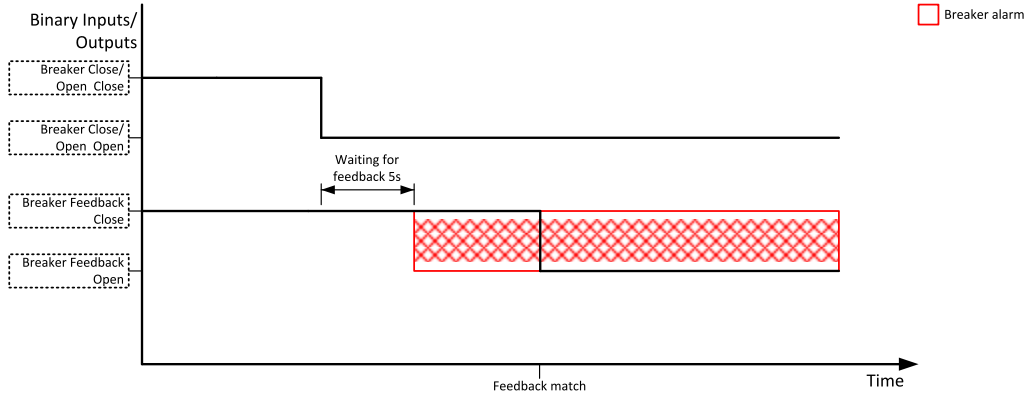


Image 5.6 Breaker fail - breaker close/open opens

When binary output breaker close/open closes there is 5 sec delay for breaker fail detection.

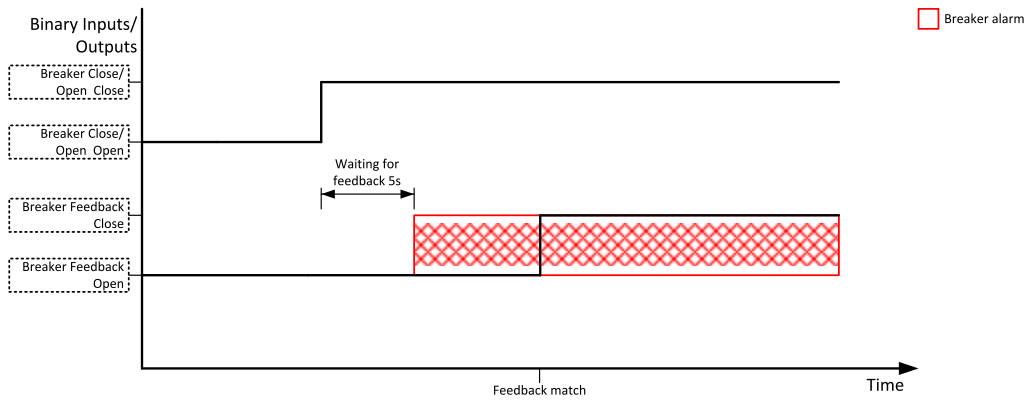


Image 5.7 Breaker fail - breaker close/open closes

6 Communication

6.1 Direct cable connection 69
 6.2 Remote connection 70

 back to Table of contents

6.1 Direct cable connection

InteliLite Telecom DC can be connected directly with PC via optional communication plug-in modules IL-NT RS232, IL-NT RS232-485 or IL-NT S-USB.

Use the standard serial/USB cable to connect PC with controller. In the area with electromagnetic interference should be used shielded cables.

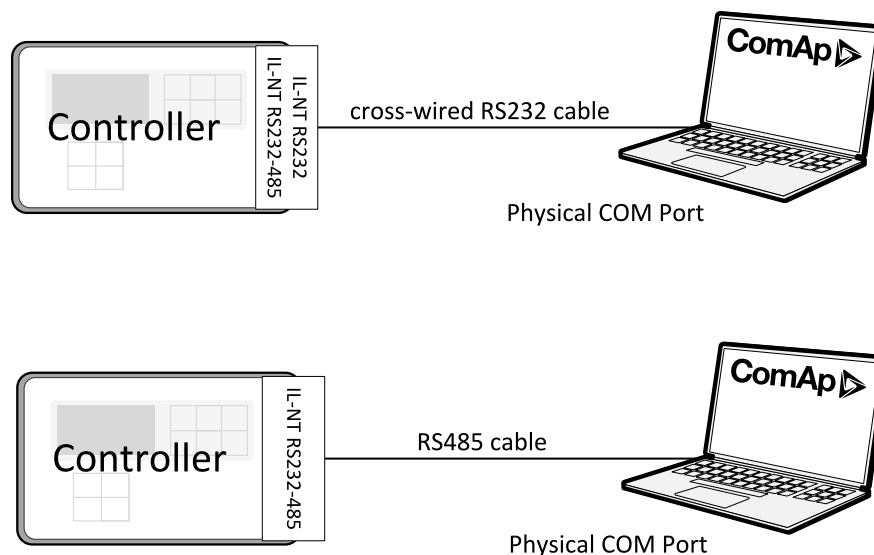
Make sure the grounding system on controller and PC – COM port (negative of the PC DC supply) are identical – before the first direct connection. There must not be any voltage between these two points otherwise the internal reversible fuse in controller burns out. The simple solution is to assure, that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

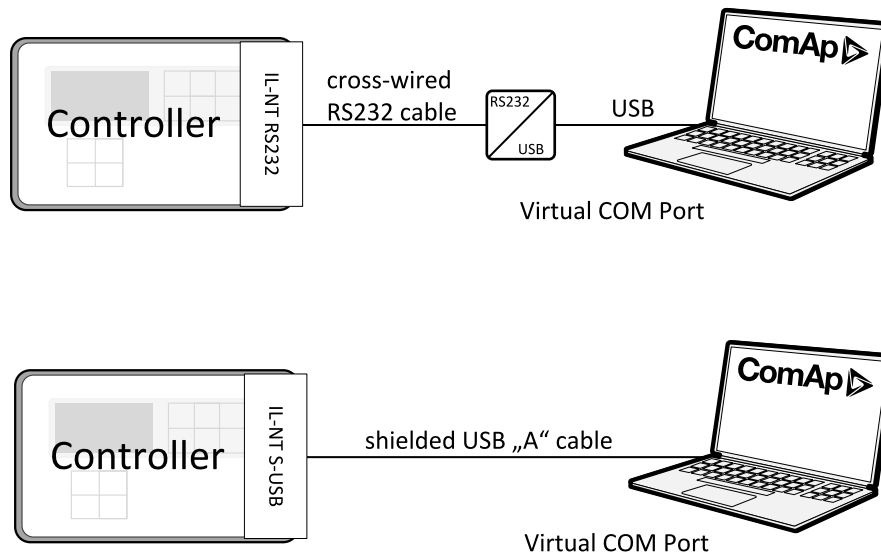
The setpoint **COM1 Mode (page 83)** or **COM2 Mode (page 83)** (according to the interface used) must be set to DIRECT position for this kind of connection.

The communication speed of direct connection is up to 38400 bps, via USB it is up to 115200 bps.

The RS-485 communication line has to be terminated by 120 Ω resistors on both ends. RS-485 uses channel COM2 in InteliLite Telecom DC.

Note: Refer to [Inteli Communication Guide](#) for all additional information.





Note: It is possible to create multiple controller connection through RS-485. Be aware of controller address collision. Manage address setting for each controller in setpoint Comms Settings: **ControllerAddr** (page 83)

6.2 Remote connection

6.2.1 Internet connection

InteliLite Telecom DC controllers can be monitored from PC tools as LiteEdit or InteliMonitor over the Internet using IB-Lite plug-in module or using IB-NT Internet Bridge module connected to the controller via IL-NT RS232. For settings see **Comms Settings on page 83**.

6.2.2 AirGate connection

InteliLite Telecom DC controllers can be monitored from PC tools as LiteEdit or InteliMonitor via Internet and using of AirGate technology.

AirGate technology is for easy plug and play wireless communication. Common SIM card with GPRS service is suitable for this system. It overcomes problems with special SIM card (fixed and public IP) necessity, with firewalls and difficult communication settings. For AirGate connection is possible to use plug-in communication modules IB-Lite and IL-NT GPRS or combination of plug-in module IL-NT RS232 and external IB-NT internet bridge. For setting see **Comms Settings on page 83**

6.2.3 Modbus connection

Modbus protocol was implemented into the controllers to allow design of own supervision software for customer or to use ComAp SCADA software.

Modem connection

PC can be connected to the controller also remotely via modems. Either an analog, GSM or 3G modem must be connected to the RS-232 interface. **Comms Settings (page 83) Settings: COM1 Mode (page 83)** has to be set to MODEM.

7 Technical data

Power supply

Power supply range	8-36 V DC
Power supply drop-out immunity	50 ms (from min. 10 V)
Power consumption	approx. 200 mA/8 V; 50 mA/36 V
Peak power consumption (LT)	approx. 0.56 A/8 V; 1.8 A/36 V
Maximal allowable current	4 A
Backup battery type	CR 1225
Estimated backup battery lifetime	10 years

Operating conditions

Operating temperature	- 20 to +70 °C
Operating temperature (LT version)	- 40 to +70 °C
Operating humidity	EN 60068-2-30:2005 25/55°C, RH 95%, 48hours
Protection degree (front panel)	IP65
Vibration	5-25 Hz, +/- 1.6 mm; 25-100 Hz, a = 4 g
Shocks	max 200 m/s ²
Storage temperature	-30 to +80 °C

Physical dimensions

Dimensions	185 x 125 x 60 mm (WxHxD)
Mounting cutout size	175 x 115 mm (WxH)

Standard conformity

Electromagnetic compatibility	EN 61000-6-1:2007
	EN 61000-6-2 ed.3:2006
	EN 61000-6-3:2007 +A1:2011+AC:2012-08
	EN 61000-6-4 :2007+A1:2011
Low voltage directive	EN 61010-1:2010 +cor.1:2011-05

Binary inputs

Number of binary inputs	7
Galvanic insulation	Not insulated
Input range	0 - 36V DC
Close contact indication	< 0,8 VDC
Open contact indication	> 2 VDC
Input resistance	4.2 kΩ

Binary outputs

Number of binary outputs	7
Galvanic insulation	Not insulated
Type	Transistor, switching to negative supply terminal
Operating voltage	8-36 V DC
Switching current	500 mA (suppression diodes required for inductive loads)

Analog inputs

Power supply range	8-36 V DC
Number of analog inputs	9
Galvanic insulation	Not insulated
Electrical range	3x 0~2500 Ω
	2x -65 V DC ~ +65 V DC

	4x 0 ~ +10 V DC
Resolution	10 bits, 4 digits
Supported sensor types	Predefined: VDO 10Bar, VDO Temperature, VDO Fuel level etc. User-defined: up to 30 points non-linear sensors can be defined by the user
Precision	1 % from the range

Pick-up input

Input voltage	2–70 Vpp
Frequency range	4 Hz–10 kHz (min 2 Vpp @ 4 kHz, 6 Vpp @ 10 kHz)
Accuracy	0.2%

Remote communication interface

RS-232	Optional using the plug-in module IL-NT RS232, D-SUB9M socket
RS-485	Optional using the plug-in module IL-NT RS232-485, plug-in terminal block
Baud rate	Depending on selected mode (up to 57600 bps)
USB	Optional using the plug-in module IL-NT S-USB
Ethernet	Optional using the plug-in module IB-Lite
Cell	Optional using the plug-in module IL-NT GPRS

Extension module interface

Type	CAN bus
Galvanic insulation	Insulated, 500 V
Baud rate	250 kbps
Bus length	Max. 200 m
Termination resistor	120 Ω, built-in, jumper activated

[🔍 back to Table of contents](#)

8 Appendix

8.1 Controller objects	74
8.2 Alarms	185
8.3 Modules	199

 [back to Table of contents](#)

8.1 Controller objects

8.1.1 List of controller objects types

8.1.2 Setpoints	75
8.1.3 Values	142
8.1.4 Logical binary inputs	156
8.1.5 Logical binary outputs	165


 [back to Appendix](#)

8.1.2 Setpoints

What are the Setpoints:

Setpoints are analog, binary or special data objects which are used for adjusting the controller to the specific environment. Setpoints are organized into groups according to their meaning. Setpoints can be adjusted from the controller front panel, PC tools, MODBUS, etc.

Setpoints password protection:

Each setpoint can be protected by a password against unauthorized changes. Password protection can be assigned to the setpoints during the configuration procedure. See the chapter Operator guide for instructions on how to enter and modify a password. See also the LiteEdit help to learn about working with a password in LiteEdit. Password protection can be adjusted in LiteEdit in Modify configuration window by pressing  icon.

Gen-set name:

User defined name, used for generating set = unit identification at remote phone or mobile connection. Gen-set name is maximally 15 characters long and have to be entered using LiteEdit software.

List of setpoint groups

Basic Settings	78
Comms Settings	83
Battery Charge	89
Engine Params	99
Regulator	112
Engine Protect	117
Gener Protect	122
Date/Time	126
Sensor Spec	130
AIO module	136
SMS/E-Mail	139

For full list of setpoints go to the chapter **List of setpoints (page 76)**.

List of setpoints

Gen-set Name	78	I Absorb Stop	91	ECU SpeedAdj	107
CurrSelection	78	IAbsorStopDel	92	RetToSpeedAdj	107
Gear Teeth	78	U Gen Nom	92	MinSpeedLim	108
RPMbyWterminal	79	NextStartDelay	92	MaxSpeedLim	108
Nominal RPM	79	ChrgTimeout	93	Speed Ramp	108
RPM Source	80	ServiceCycle	93	TauSpeedActuat	109
ControllerMode	80	BatteryTempSel	93	0%ofSpeedReq	109
Reset To MAN	81	Batt Temp Comp	94	100%ofSpeedReq	110
Backlight Time	81	Curr Temp Comp	94	Running Timer	110
Panel Button	82	ChargeLimit	94	FuelTankVolume	110
ControllerAddr	83	DischargeLimit	95	MaxFuelDrop	111
COM1 Mode	83	I FullChrgStop	95	KindOfRegul	112
COM2 Mode	83	FullChrgLimit	95	Reg Bias	112
ModemIniString	84	FullChrgTimeout	95	Reg Gain	113
ModbusComSpeed	84	FullChrgCycle	96	Reg Integral	114
IBLite IP Addr	84	U LoadComp Rng	96	Reg CMP Input	115
IBLite NetMask	85	I LoadComp Min	97	Reg CMP On	115
IBLite GatelP	85	I LoadComp Max	98	ExcitReq Ramp	115
IBLite DHCP	85	I LoadComp Chr	98	ExcitUpLimit	116
ComAp Port	86	Starting RPM	99	ExcitDnLimit	116
APN Name	86	Starting Oil P	99	Excit Gain	116
APN User Name	86	Prestart Time	100	Excit Integral	116
APN User Pass	86	Preglow Time	100	ProtectHoldOff	117
AirGate	87	MaxCrank Time	100	BIN6 Del	117
AirGate IP	87	CrnkFail Pause	100	Horn Timeout	117
SMTP User Name	87	Crank Attempts	101	Overspeed Sd	118
SMTP User Pass	88	Idle Time	101	Underspeed	118
SMTP Server IP	88	Idle Speed	102	UnderspeedSd	119
Contr MailBox	88	Cooling Speed	102	AI1 Wrn	119
Time Zone	88	Cooling Time	102	AI1 Sd	119
DNS IP Address	89	AfterCool Time	102	AI1 Del	119
U Start	89	Stop Time	103	AI2 Wrn	120
AutStartDel	89	Fuel Solenoid	103	AI2 Sd	120
I Max Charge	90	FuelSol Offset	104	AI2 Del	120
I Gen Nom	90	D+ Function	105	AI3 Wrn	120
U Absorb Start	91	ECU FreqSelect	106	AI3 Sd	121
U Start	91	ECU Control	107	AI3 Del	121

Batt Overvolt	121	Calibr AIO1	133
Batt Under V	121	Calibr AIO2	133
Batt Volt Del	122	Calibr AIO3	134
Gen CB Del	122	Calibr AIO4	134
WrmMaintenance	122	Calibr AIO9-1	134
Gen >V Wrm	122	Calibr AIO9-2	134
Gen <V Wrm	123	Calibr AIO9-3	135
Gen >V Sd	123	Calibr AIO9-4	135
Gen <V Sd	123	Calibr AIO9-5	135
Gen V Del	123	Calibr AIO9-6	135
Load >A Wrm	124	Calibr AIO9-7	136
Load >A Sd	124	Calibr AIO9-8	136
Batt >A Wrm	124	Calibr AIO9-9	136
Batt >A Sd	124	AIO AI1 Wrm	136
Gen >A Wrm	125	AIO AI1 Sd	137
Gen >A Sd	125	AIO AI1 Del	137
Aux >A Wrm	125	AIO AI2 Wrm	137
Aux >A Sd	125	AIO AI2 Sd	137
Overcurr Del	126	AIO AI2 Del	138
Time Stamp Per	126	AIO AI3 Wrm	138
SummerTimeMod	126	AIO AI3 Sd	138
Time	126	AIO AI3 Del	138
Date	127	AIO AI4 Wrm	139
Timer1Function	127	AIO AI4 Sd	139
Timer1 Repeat	128	AIO AI4 Del	139
Timer1 ON Time	128	Yel Alarm Msg	139
Timer1Duration	128	Red Alarm Msg	140
Timer2Function	129	TelNo/Addr Ch1	140
Timer2 Repeat	129	TelNo/Addr Ch2	141
Timer2 ON Time	130	SMS Language	141
Timer2Duration	130		
Calibr AI 1	130		
Calibr AI 2	130		
Calibr AI 3	131		
Calibr AI 4	131		
Calibr AI 5	131		
Calibr AI 6	132		
Calibr AI 7	132		
Calibr AI 8	132		
Calibr AI 9	133		

 **back to Setpoints**

Basic Settings

Gen-set Name

Setpoint group	Basic Settings	Related FW	1.2.0
Range [units]	15 characters		
Default value	IL-NT TLC-DC	Alternative config	NO
Step	-		
Comm object	8637	Related applications	TLC-DC
Description			
User defined name, used for generating set = unit.			

CurrSelection

Setpoint group	Basic Settings	Related FW	1.2.0
Options	Ge+Bat+Ld / Ge+Ba+Ax / Gen+Load / Gen+Batt / Batt+Load / Ge+Ba+Ld-Ax / Ge+Ba+Ld+Ax		
Default value	Ge+Ba+Ld+Ax	Alternative config	NO
Step	-		
Comm object	13911	Related applications	TLC-DC
Description			
Selection of various current measuring points depends on the system wiring and configuration.			
Preferred: Ge+Ba+Ld-Ax, Ge+Ba+Ld+Ax: Dedicated for IntelLite Telecom DC with AIO9/1 external module where all values are measured or configured to Not used.			
Other options: Ge+Bat+Ld, Ge+Ba+Ax, Gen+Load, Gen+Batt, Batt+Load: Used if AIO9/1 module is not installed.			

Gear Teeth

Setpoint group	Basic Settings	Related FW	1.2.0
Range [units]	0 .. 500 [-]		
Default value	120	Alternative config	NO
Step	1		
Comm object	8252	Related applications	TLC-DC
Description			
The number of teeth on the engine gear for the pick-up sensor.			
The setpoint is ignored when ECU is configured.			

RPMbyWterminal

Setpoint group	Basic Settings	Related FW	1.2.0
Range [units]	0,50 .. 2,00 [-]		
Default value	1,00	Alternative config	NO
Step	0,01		
Comm object	13915	Related applications	TLC-DC
Description			
The constant of this setpoint multiplies the speed value obtained from the controller input RPM.			
<p><i>Note: The default value is and must be 1, when the classical pick-up speed sensor is used to measure the engine speed. The setpoint is useful when the engine does not have the speed sensor and the speed is measured by the W 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).</i></p>			

Nominal RPM

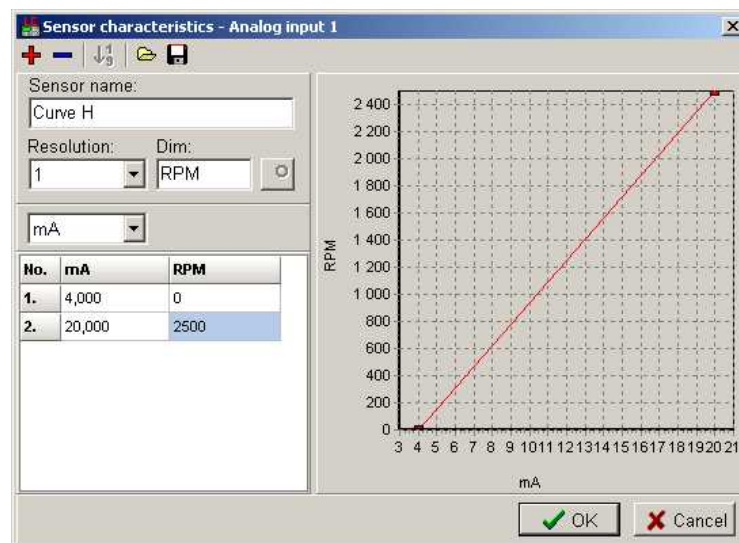
Setpoint group	Basic Settings	Related FW	1.2.0
Range [units]	100 .. 4000 [RPM]		
Default value	1500	Alternative config	NO
Step	1 RPM		
Comm object	8253	Related applications	TLC-DC
Description			
Nominal engine speed, base for overspeed protection and scale on RPM gauges.			

RPM Source

Setpoint group	Basic Settings	Related FW	1.2.0
Options	PickUp, AIO-AIN1, AIO-AIN2, AIO-AIN3, AIO-AIN4		
Default value	PickUp	Alternative config	NO
Step	-		
Comm object	12142	Related applications	TLC-DC

Description

Switch from where the RPM is measured. When source is Analog input the converted value is going to be in RPM range.



ControllerMode

Setpoint group	Basic Settings	Related FW	1.2.0
Range [units]	OFF, MAN, AUT		
Default value	OFF	Alternative config	NO
Step	-		
Comm object	8315	Related applications	TLC-DC

Description

Equivalent to Controller mode changes by or buttons.

Note: Controller Mode change can be separately password protected.

Reset To MAN

Setpoint group	Basic Settings	Related FW	1.2.0
Options	ENABLED, DISABLED		
Default value	DISABLED	Alternative config	NO
Step	-		
Comm object	9983	Related applications	TLC-DC
Description			
<p>DISABLED: Controller stays in AUT mode after Fault reset. Default state.</p> <p>ENABLED: Automatic switch from AUT to MAN mode after Fault reset to avoid automatic engine start. This function is active for Shut down protection only.</p>			

Backlight Time

Setpoint group	Basic Settings	Related FW	1.2.0
Range [units]	0 .. 241 [min]		
Default value	15	Alternative config	NO
Step	1 min		
Comm object	10121	Related applications	TLC-DC
Description			
The display backlight is switched off after timeout. "0" means that the display lights all the time.			

Panel Button

Setpoint group	Basic Settings	Related FW	1.2.0
Options	Nom/Idle, N/I Init, CloseLoad, Toggle		
Default value	Nom/Idle	Alternative config	NO
Step	-		
Comm object	12619	Related applications	TLC-DC
Description			
<p>Adjust the function of front panel button ^{I/O}.</p> <p>Nom/Idle:</p> <p>Switches between Nominal and Idle speed request. The function is allowed in MAN mode only, after reaching the status RUN and the requested speed set by the setpoint ECU SpeedAdj. (i.e. not during IDLE speed warm-up run in Starting status).</p> <p>N/I Init:</p> <p>Switching between Nominal and Idle speed request. After the starting, the speed according to the setpoint Idle Speed is reached and this status is maintained until the I/O button is pressed. The function is allowed in MAN mode only and is blocked during Cooling time.</p> <p>Note: When LBI Nominal/Idle is configured (to a physical binary input), it has priority and the switching between the nominal and the idle speed by I/O button is blocked.</p> <p>CloseLoad:</p> <p>When the engine is in the status Ready to Load, this option switches ON and OFF the LBO Close Load. When the engine is not in the status Ready to Load, the button has no influence.</p> <p>Note: The applications without the information about the speed cannot reach the status Ready to Load and therefore, the load cannot be switched by the I/O button. Necessary settings: setpoint Gear teeth = 0, setpoint RPM source = Pickup (no ECU), the condition sufficient for LBO Close Load activating by the I/O button is the Running state.</p> <p>Toggle:</p> <p>Switches ON and OFF the LBO Toggle, no other consequences.</p> <p>Note: Panel LED above Toggle button is lit when particular function is activated.</p>			

Comms Settings

ControllerAddr

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	1 .. 32 [-]		
Default value	1	Alternative config	NO
Step	1		
Comm object	24537	Related applications	TLC-DC
Description			
Controller identification number. It is possible to set controller address different from the default value (1) so that more IL controllers can be interconnected (via RS-485) and accessed e.g. from Modbus terminal.			
<i>Note: When opening connection to the controller it's address has to correspond with the setting in PC tool. From LiteEdit it is only possible to connect to controllers with address 1.</i>			

COM1 Mode

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	DIRECT, MODEM, MODBUS, ECU LINK		
Default value	DIRECT	Alternative config	NO
Step	-		
Comm object	24522	Related applications	TLC-DC
Description			
Communication protocol switch the COM1 channel.			
DIRECT: LiteEdit communication protocol via direct cable.			
MODEM: LiteEdit communication protocol via modem.			
MODBUS: Modbus protocol. See detailed description in Inteli Communication Guide .			
ECU LINK: Protocol for communication with Cummins engines via Modbus.			

COM2 Mode

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	DIRECT, MODBUS, ECU LINK		
Default value	DIRECT	Alternative config	NO
Step	-		
Comm object	24451	Related applications	TLC-DC
Description			
Communication protocol switch the COM2 channel.			
DIRECT: LiteEdit communication protocol via direct cable.			
MODBUS: Modbus protocol. See detailed description in Inteli Communication Guide .			
ECU LINK: Protocol for communication with Cummins engines via Modbus.			

ModemIniString

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	0 ..31 characters [-]		
Default value		Alternative config	NO
Step	-		
Comm object	24436	Related applications	TLC-DC
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.			

ModbusComSpeed

Setpoint group	Comms Settings	Related FW	1.2.0
Options	9600, 19200, 38400, 57600		
Default value	9600	Alternative config	NO
Step	-		
Comm object	24477	Related applications	TLC-DC
Description			
If the Modbus mode is selected on COM1 or COM2 channels, the Modbus communication speed in bps can be adjusted here.			

IBLite IP Addr

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	0 .. 15 characters [-]		
Default value	192.168.1.254	Alternative config	NO
Step	-		
Comm object	24376	Related applications	TLC-DC
Description			
If DHCP is DISABLED this setpoint is used to adjust the IP address of the ethernet interface of the controller. Ask your IT specialists for help with this setting.			
If DHCP is ENABLED this setpoint is used to display the IP address, which has been assigned by the DHCP server.			

IBLite NetMask

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	0 .. 15 characters [-]		
Default value	255.255.255.0	Alternative config	NO
Step	-		
Comm object	24375	Related applications	TLC-DC
Description			
<p>If DHCP is DISABLED this setpoint is used to adjust the IP address of the ethernet interface of the controller. Ask your IT specialists for help with this setting.</p> <p>If DHCP is ENABLED this setpoint is used to display the IP address, which has been assigned by the DHCP server.</p>			

IBLite GateIP

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	0 .. 15 characters [-]		
Default value	192.168.1.1	Alternative config	NO
Step	-		
Comm object	24373	Related applications	TLC-DC
Description			
<p>If DHCP is DISABLED this setpoint is used to adjust the IP address of the gateway of the network segment where the controller is connected.</p> <p>If DHCP is ENABLED this setpoint is used to display the gateway IP address which has been assigned by the DHCP server. A gateway is a device which connects the respective segment with the other segments and/or Internet.</p>			

IBLite DHCP

Setpoint group	Comms Settings	Related FW	1.2.0
Options	DISABLED, ENABLED		
Default value	ENABLED	Alternative config	NO
Step	-		
Comm object	24259	Related applications	TLC-DC
Description			
<p>The setpoint is used to select the method how the ethernet connection is adjusted.</p> <p>DISABLED: The ethernet connection is adjusted fixedly according to the setpoints <i>IP Addr</i>, <i>NetMask</i>, <i>GateIP</i>, <i>DNS IP Address</i>. This method should be used for classic ethernet or Internet connection. When this type of connection is opening the controller is specified by its IP address. That means it would be inconvenient if the IP address were not fixed (static).</p> <p>ENABLED: The ethernet connection settings is obtained automatically from the DHCP server. The obtained settings is then copied to the related setpoints. If the process of obtaining the settings from DHCP server is not successful the value 000.000.000.000 is copied to the setpoint IP address and the module continues trying to obtain the settings.</p>			

ComAp Port

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	0 .. 65 535 [-]		
Default value	23	Alternative config	NO
Step	-		
Comm object	24374	Related applications	TLC-DC
Description			
<p>This setpoint is used to adjust the port number, which is used for ethernet connection to a PC with any of ComAp PC program (i.e. LiteEdit, InteliMonitor).</p> <p>This setpoint should be adjusted to 23, which is the default port used by all ComAp PC programs. A different value should be used only in special situations as e.g. sharing one public IP address among many controllers or to overcome a firewall restrictions.</p>			

APN Name

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	Text string		
Default value		Alternative config	NO
Step	-		
Comm object	24363	Related applications	TLC-DC
Description			
Name of APN access point for GPRS network provided by GSM/GPRS operator.			

APN User Name

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	Text string		
Default value		Alternative config	NO
Step	-		
Comm object	24361	Related applications	TLC-DC
Description			
User name for APN access point provided by GSM/GPRS operator.			

APN User Pass

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	Text string		
Default value		Alternative config	NO
Step	-		
Comm object	24360	Related applications	TLC-DC
Description			
User password for APN access point provided by GSM/GPRS operator.			

AirGate

Setpoint group	Comms Settings	Related FW	1.2.0
Options	ENABLED, DISABLED		
Default value	ENABLED	Alternative config	NO
Step	-		
Comm object	24365	Related applications	TLC-DC
Description			
<p>This setpoint selects the ethernet connection mode.</p> <p>DISABLED: This is a standard mode, in which the controller listens to the incoming traffic and answers the TCP/IP queries addressed to him. This mode requires the controller to be accessible from the remote device (PC), i.e. it must be accessible at a public and static IP address if you want to connect to it from the Internet.</p> <p>ENABLED: This mode uses the "AirGate" service, which hides all the issues with static/public address into a black box and you do not need to take care about it. You just need only a connection to the Internet. The AirGate server address is adjusted by the setpoint AirGate IP.</p>			

AirGate IP

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	Domain name or IP address		
Default value	airgate.comap.cz	Alternative config	NO
Step	-		
Comm object	24364	Related applications	TLC-DC
Description			
<p>This setpoint is used for entering the domain name or IP address of the AirGate server. Use the free AirGate server provided by ComAp at address "airgate.comap.cz" if your company does not operate its own AirGate server.</p>			

SMTP User Name

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	0 .. 31 characters [-]		
Default value		Alternative config	NO
Step	-		
Comm object	24370	Related applications	TLC-DC
Description			
<p>Use this setpoint to enter the user name for the SMTP server.</p>			

SMTP User Pass

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	0 .. 15 characters [-]		
Default value		Alternative config	NO
Step	-		
Comm object	24369	Related applications	TLC-DC
Description			
Use this setpoint to enter the password for the SMTP server.			

SMTP Server IP

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	0 .. 31 characters [-]		
Default value		Alternative config	NO
Step	-		
Comm object	24368	Related applications	TLC-DC
Description			
This setpoint is used for entering the domain name (e.g. "smtp.yourprovider.com") or IP address (e.g. 74.125.39.109) of the SMTP server. Ask your internet provider or IT manager for this information.			
<p><i>Note: You may also use one of the free SMTP servers, e.g. "smtp.gmail.com". However, note that some free SMTP servers may cause delays (up to several hours) when sending e-mails. Proper setting of SMTP-related setpoints as well as the controller mailbox are essential for sending alerts via e-mails.</i></p>			

Contr MailBox

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	Text string		
Default value		Alternative config	NO
Step	-		
Comm object	24367	Related applications	TLC-DC
Description			
Enter an existing e-mail address into this setpoint. This address will be used as sender address in active e-mails that will be sent from the controller.			

Time Zone

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	GMT-12:00 .. GMT +13:00 [hours]		
Default value	GMT+2:00	Alternative config	NO
Step	+1:00 hour		
Comm object	24366	Related applications	TLC-DC
Description			
This setpoint is used to select the time zone where the controller is located. See your computer time zone setting (click on the time indicator located in the rightmost position of the windows task bar) if you are not sure about your time zone.			

DNS IP Address

Setpoint group	Comms Settings	Related FW	1.2.0
Range [units]	0 .. 15 characters [-]		
Default value	8.8.8.8	Alternative config	NO
Step	-		
Comm object	24362	Related applications	TLC-DC
Description			
The setpoint is used to adjust the domain name server (DNS), which is needed to translate domain names in email addresses and server names into correct IP addresses.			

Battery Charge

U Start

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0,0 .. 65,0 [V]		
Default value	47,0	Alternative config	NO
Step	0,1 V		
Comm object	13924	Related applications	TLC-DC
Description			
<i>Ustart</i> is starting level for the battery charging cycle. As soon the compensated battery voltage <i>Ucomp</i> drops under certain level the generator starts charging.			
Related setpoints: <i>AutStartDel</i>			
<p>Note: <i>Ustart</i> level depends on the type of battery. Producer of the battery bank should provide this information. For VRLA batteries is usually going about 50% of Depth of Discharge.</p>			

AutStartDel

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. 600 [s]		
Default value	2	Alternative config	NO
Step	1 s		
Comm object	13922	Related applications	TLC-DC
Description			
Automatic Start Delay. The DC generator starts with delay. For more details see Battery voltage start on page 53 . Setpoint avoids unwanted start of the DC generator.			
Related setpoints: <i>U start</i>			

I Max Charge

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0,0 .. 1000,0 [A]		
Default value	20,0	Alternative config	NO
Step	0,1 A		
Comm object	13921	Related applications	TLC-DC

Description

This is nominal (maximal) charging current which can be achieved in Bulk cycle. To this value is regulated charging current for battery bank in Bulk cycle during standard charging or while is used *Ext start/stop* signal.

This limit charging value can be reduced if the battery temperature go over 50°C by temperature compensation – see setpoint *Curr Temp Comp*.

Note: *Ustart level depends on the type of battery. Producer of the battery bank should provide this information. Usually is this value in the range 0,1-0,3°C, where C is battery capacity in Ah.*

Example: For battery with C=1600Ah, maximum charging current is given by producer as 0,15°C. In this case *I Max Charge* is going to be adjusted as 240A.

I Gen Nom

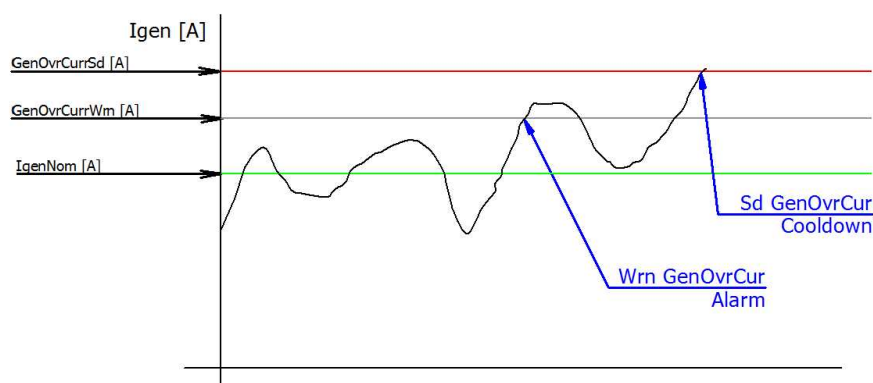
Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0,0 .. 1000,0 [A]		
Default value	20,0	Alternative config	NO
Step	0,1 A		
Comm object	8275	Related applications	TLC-DC

Description

Maximal output current of the generator. As soon the DC generator achieves *I Gen Nom* any other increasing of *Igen* will be restricted or will be reduced.

Note: *Nominal current of the generator is given by used alternator and should be specify by alternator producer. For design of the system should be on mind that nominal output current of the DC generator should be the same or higher than maximum charging current of the battery bank and consumption of the load together.*

Related setpoints: *GenOvrCurrWrn*, *GenOvrCurrSd* and *OvercurrentDelay*



U Absorb Start

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0,0 .. 65,0 [V]		
Default value	50,0	Alternative config	NO
Step	0,1 V		
Comm object	13923	Related applications	TLC-DC
Description			
<p>Constant level of voltage is achieved in Absorption cycle, to this level is working regulation in Absorption cycle. Can be used optimization by temperature compensation, see setpoint <i>Batt Temp Comp</i> with reference temperature 25°C.</p> <p>Note: <i>U Absorption level depends on the type of battery. Producer of the battery bank should provide this information.</i></p>			

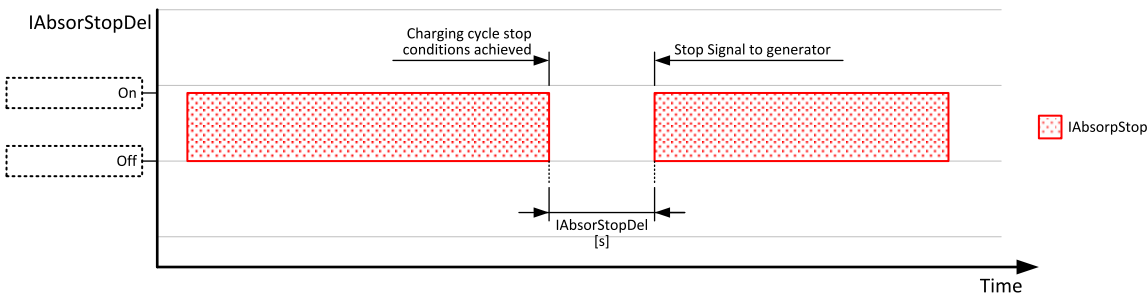
U Start

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. 600 [s]		
Default value	5 s	Alternative config	NO
Step	1 s		
Comm object	14918	Related applications	TLC-DC
Description			
<p>Delay is used at the end of the bulk phase. When battery voltage reach level adjusted via setpoint U Absorb Start (page 91), delay will start countdown. Charge cycle will switch into absorption phase after countdown delay.</p>			

I Absorb Stop

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0,0 .. 200,0 [V]		
Default value	2,0	Alternative config	NO
Step	0,1 A		
Comm object	13925	Related applications	TLC-DC
Description			
<p><i>I Absorb Stop</i> specifies battery current level for charging cycle termination. If the charging current drop to this level the DC generator is stopped after <i>IAbsorpStopDel</i>.</p> <p>Related setpoints: <i>IAbsorpStopDel</i></p> <p>Note: <i>I Absorb Stop level depend on the type of battery. Producer of the battery bank should provide this information. Usually is this value in the range 0.01-0.03°C, where C is battery capacity in Ah.</i></p> <p>Example: There is a battery with C=1600 Ah, maximum charging current is given by the producer as 0.015°C. In this case <i>I Max Charge</i> is going to be adjusted as 24 A.</p>			

IAbsorStopDel

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. 600 [s]		
Default value	0	Alternative config	NO
Step	1 s		
Comm object	13927	Related applications	TLC-DC
Description			
Delay between termination of charging cycle and engine stop procedure.			
Related setpoints: / Absorp Stop			
			

U Gen Nom

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0,0 .. 65,0 [V]		
Default value	50,0	Alternative config	NO
Step	0,1 V		
Comm object	13920	Related applications	TLC-DC
Description			
Setpoint is giving nominal voltage of the DC generator, where DC generator will regulate to this level in MAN mode.			
<i>Note: It is possible to use DC generator in MAN mode as stable DC supply.</i>			

NextStartDelay

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. 300 [min]		
Default value	30	Alternative config	NO
Step	1 min		
Comm object	13928	Related applications	TLC-DC
Description			
Delay between previous finished charging cycle and new charging cycle. Feature can avoid unwanted start of the DC generator.			

ChrgTimeout

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. 999 [min]		
Default value	60	Alternative config	NO
Step	1 min		
Comm object	13929	Related applications	TLC-DC
Description			
Set the maximum time period of charging cycle. The charging process is finished as soon as ChrgLimitTime elapsed regardless on other charging conditions and “Wm ChrgTimeout” message is reported in history.			
<i>Note: ChrgLimitTime should be adjusted a bit longer than expected standard charging characteristic given by battery producer.</i>			
Example: Adjustment can avoid running of the generator for charging batteries, which are damaged. In the case the continuous load supplying isn't priority of the system.			

ServiceCycle

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. 300 [min]		
Default value	30	Alternative config	NO
Step	1 min		
Comm object	11893	Related applications	TLC-DC
Description			
Service cycle time – The battery can be charged in AUT mode regardless on battery voltage (<i>U compens</i>) for service purpose. The activation can be done in both operation states Stop or Run by binary input <i>ServiceCycleSt</i> .			
<i>Note: If the Service Cycle is activated while the generator is running, the engine will be stopped after Service cycle time regardless on other charging conditions.</i>			

BatteryTempSel

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	OFF, AIN3, AIO1, AIO2, AIO3, AIO4, AIO9/1		
Default value	OFF	Alternative config	NO
Step	-		
Comm object	13910	Related applications	TLC-DC
Description			
Selection of battery temperature compensation enables or disables compensation feature. Setpoint allows adjust input for temperature sensor.			
OFF: Temperature compensation measurement and correction is disabled, $U_{batt} = U_{batComps}$. Default adjustment.			
AIN3: Resistive analog input number 3 of the control unit can be used for temperature sensor. (0-2400 Ω)			
AIO1...AIO4: Any of the analog inputs from plug-in IL-NT AIO module can be used for temperature sensing. (0-2600 Ω, 0-20mA, 0-4V)			
AIO9/1: Temperature is measured by AIO9/1: AIN9			

Batt Temp Comp

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. 2000 [mV/°C]		
Default value	0	Alternative config	NO
Step	1 mV/°C		
Comm object	13209	Related applications	TLC-DC
Description			
<p>Temperature compensation constant make correction of measured battery voltage depends on the temperature. The system has higher accuracy of charging characteristic. Battery is changing its voltage capacity depends on temperature, compensation is recommended to use in areas where exist big differences in temperatures between charging cycles as in deserts and so on.</p>			

Curr Temp Comp

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0,0 .. 10,0 [A/°C]		
Default value	0,0	Alternative config	NO
Step	0,1 A/°C		
Comm object	13932	Related applications	TLC-DC
Description			
<p>Temperature compensation constant reduces maximal battery charging current <i>I Max Charge</i>.</p> <p>Note: Battery temperature compensation depends on the type of battery. Producer of the battery bank should provide this information.</p> <p>Note: Enter the temperature compensation constant for the entire cell assembly. E.g.: battery 48 V, 24 cells (2 V/cell) - Temperature compensation constant given by the battery manufacturer -5.0 mV/°C per one cell - Temperature compensation constant for complete battery → $-5.0 * 24 = -120$ mV/°C.</p>			

ChargeLimit

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. 10000 [Ah]		
Default value	500	Alternative config	NO
Step	1 Ah		
Comm object	13930	Related applications	TLC-DC
Description			
<p>Limit to finish the charging procedure and stop the engine. The charging current is monitored all the time. The battery is charged and the actual <i>BatteryIn</i> [Ah] value is calculated. When the actual <i>BatteryIn</i> value is over the <i>ChargeLimit</i> the engine stops.</p>			

DischargeLimit

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	1 .. 10000 [Ah]		
Default value	1000	Alternative config	NO
Step	1 Ah		
Comm object	13931	Related applications	TLC-DC
Description			
Limit to start engine to charge battery. The discharging current is monitored all the time. The battery is connected to the load and the actual <i>BatteryOut</i> [Ah] value is calculated. When the actual <i>BatteryOut</i> value is over the <i>DischargeLimit</i> the engine starts and charges battery till the <i>ChargeLimit</i> is reached.			

I FullChrgStop

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0,0 .. 200,0 [A]		
Default value	1,0 A	Alternative config	NO
Step	0,1 A		
Comm object	14691	Related applications	TLC-DC
Description			
If full charge cycle is being performed, the stop charge current level is taken from this setpoint instead of I Absorb Stop (page 91).			

FullChrgLimit

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. 5000 [Ah]		
Default value	500 Ah	Alternative config	NO
Step	1 Ah		
Comm object	14689	Related applications	TLC-DC
Description			
If full charge cycle is being performed, the stop charge capacity level is taken from this setpoint instead of ChargeLimit (page 94).			

FullChrgTimeout

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. 999 [min]		
Default value	60 min	Alternative config	NO
Step	1 min		
Comm object	14690	Related applications	TLC-DC
Description			
If full charge cycle is being performed, the stop charge time duration is taken from this setpoint instead of ChrgTimeout (page 93).			

FullChrgCycle

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. 99 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	14692	Related applications	TLC-DC
Description			
Standard charging cycles are counted and every cycle with number that equals <i>FullChrgCycle</i> will be performed as per conditions above. I.e. limits of time/capacity or current are taken from "Full Charge" setpoints instead of standard charging setpoints.			

U LoadComp Rng

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0,0 .. 10,0 [V]		
Default value	0,0 V	Alternative config	NO
Step	0,1 V		
Comm object	14695	Related applications	TLC-DC
Description			
Adjustable voltage range of compensation for battery voltage based on load current. Minimum is $-U_{LoadCom Rng}/2$. Maximum is $U_{LoadComp Rng}/2$.			
<p>Example: for 5 V is the range -2,5 V if load current is MAX and +2,5 V if Load current is MIN.</p>			

I LoadComp Min

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	0 .. I LoadComp Max (page 98) [A]		
Default value	10 A	Alternative config	NO
Step	1 A		
Comm object	14696	Related applications	TLC-DC

Description

Minimum load current increases U_{Batt} voltage level by $U_{LoadComp Rng}$ (page 96)/2.

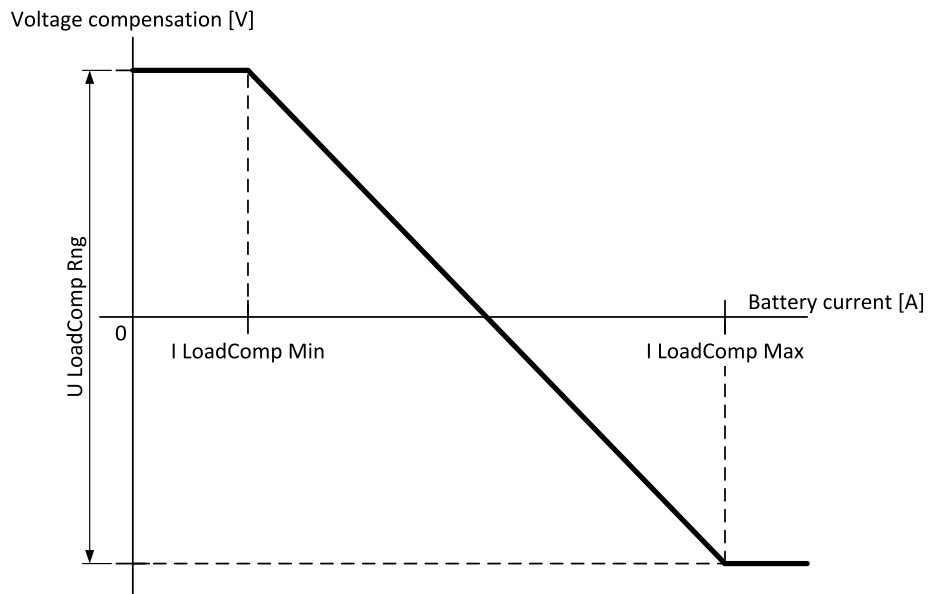


Image 8.1 Current compensation

I LoadComp Max

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	I LoadComp Min (page 97) .. 10 000 A		
Default value	200 [A]	Alternative config	NO
Step	1 A		
Comm object	14697	Related applications	TLC-DC

Description

Maximum load current decreases *U Batt* voltage level by *U LoadComp Rng* (page 96)/2.

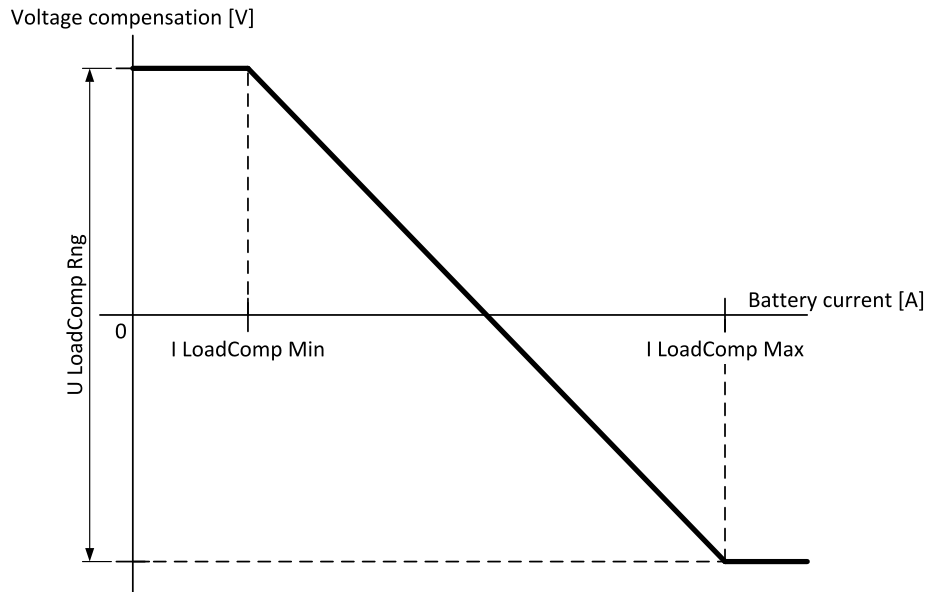


Image 8.2 Current compensation

I LoadComp Chr

Setpoint group	Battery Charge	Related FW	1.2.0
Range [units]	1 .. 10 [-]		
Default value	1	Alternative config	NO
Step	1		
Comm object	14698	Related applications	TLC-DC

Description

This setpoint adjusts the load character in time. This value is important for correct calculation of average current. If the load fluctuates slightly, use lower number. If the load fluctuates fast (big changes in short time), use higher number.

Engine Params

Starting RPM

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	5 .. 1500 [RPM]		
Default value	350	Alternative config	NO
Step	1 RPM		
Comm object	9095	Related applications	TLC-DC
Description			
<p>“Firing” speed when InteliLite Telecom DC controller stops cranking (<i>Starter</i> goes OFF). <i>Sd Underspeed</i> protection is activated when RPM drops back below the <i>Starting RPM</i> for more than 5 second the engine starting procedure.</p> <p>Note: Limit is ignored when <i>Gear Teeth</i> = 0 i.e. in engine operation without speed pickup (running state is indicated from <i>D+</i> or <i>Starting Oil P</i>).</p> <p><i>RPM meas fail</i> indication: Can appear during "Cranking state" i.e. <i>Starter</i> (or J1939 Start command) is activated then one running condition was detected (<i>D+</i> was activated or (<i>POil</i> > <i>Starting Oil P</i>) condition was filled).</p> <p>Example: Starter was switched off based on previous condition and within time (Cranking time and fix 5s) minimum RPM does not appear (<i>RPM</i> > <i>Starting RPM</i>), then is activated <i>RPM meas fail</i>.</p>			

Starting Oil P

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0,0 .. 10,0 [Bar]		
Default value	4,5	Alternative config	NO
Step	0,1 Bar		
Comm object	9681	Related applications	TLC-DC
Description			
<p>Controller stops cranking (<i>Starter</i> goes OFF) when Oil Pressure (typically measured on AIN1) is over <i>Starting Oil P</i>.</p> <p>Note: Oil Pressure can be also measured on binary sensor. Then is necessary adjust AIN1 as Binary input and <i>Starting Oil P</i> = 1.</p> <p>Note: There are three conditions for stop cranking:</p> <ul style="list-style-type: none"> ▶ <i>Starting RPM</i> (just in case the Gear teeth > 0), ▶ <i>Starting OilP</i> and ▶ <i>D+</i> (if enabled). <p>Starter goes off when any of these conditions is valid.</p>			

Prestart Time

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0 .. 600 [s]		
Default value	2	Alternative config	NO
Step	1 s		
Comm object	8394	Related applications	TLC-DC
Description			
Time of the <i>PRESTART</i> output closed prior to the engine start – i.e. before the binary outputs <i>Fuel solenoid</i> and <i>Starter</i> are closed and opens when <i>Starting RPM</i> speed is reached. Set to zero if you want to leave the output <i>PRESTART</i> opened.			

Preglow Time

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0 .. 600 [s]		
Default value	0	Alternative config	NO
Step	1 s		
Comm object	11836	Related applications	TLC-DC
Description			
Time of the Glow Plugs output closed prior to the engine start.			
<div style="border: 1px solid black; padding: 5px; background-color: #f0f0f0;"> <p>IMPORTANT: Set to zero if you want to leave the output Glow Plugs opened.</p> </div>			
<div style="border: 1px solid black; padding: 5px; background-color: #f0f0f0;"> <p><i>Note: Function with shorter period (Prestart time or Preglow time) starts later to finish both in the same time – when Starting RPM speed is reached.</i></p> </div>			

MaxCrank Time

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	1 .. 60 [s]		
Default value	5	Alternative config	NO
Step	1 s		
Comm object	8256	Related applications	TLC-DC
Description			
This setpoint is giving maximum time limit of engine cranking.			

CrnkFail Pause

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	5 .. 60 [s]		
Default value	8	Alternative config	NO
Step	1 s		
Comm object	8257	Related applications	TLC-DC
Description			
Pause between crank (engine start) attempts.			

Crank Attempts

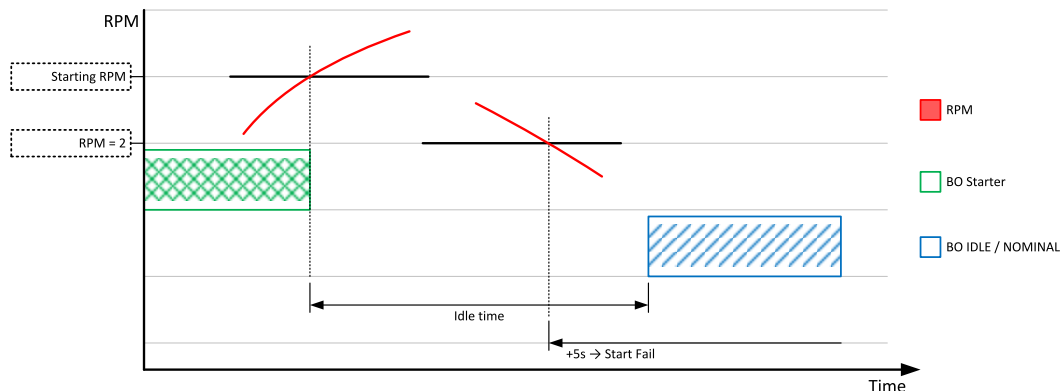
Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	1 .. 10 [-]		
Default value	3	Alternative config	NO
Step	1		
Comm object	8255	Related applications	TLC-DC
Description			
Maximum number of crank (engine start) attempts.			

Idle Time

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0 .. 600 [s]		
Default value	12	Alternative config	NO
Step	1 s		
Comm object	9097	Related applications	TLC-DC
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 expires the *IDLE/NOMINAL* output closes. Binary output *IDLE/NOMINAL* opens during Cooling period again.

Note: Engine can be switched between Idle and Running state by Binary input Nominal/Idle in MAN mode.



Idle Speed

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	Starting RPM...MinSpeedLim [RPM]		
Default value	800	Alternative config	NO
Step	1 RPM		
Comm object	9946	Related applications	TLC-DC
Description			
Speed request in engine Idle state i.e. after engine start or when switched to Idle in MAN mode by Binary input NOMINAL/IDLE and after engine shutdown.			

Cooling Speed

Setpoint group	Engine Params	Related FW	1.2.0
Options	IDLE, NOMINAL		
Default value	NOMINAL	Alternative config	NO
Step	-		
Comm object	10046	Related applications	TLC-DC
Description			
Options: Selects the function of the Binary output IDLE/NOMINAL during engine Cooling state.			
IDLE: Cooling is executed at Idle Speed.			
NOMINAL: Cooling is executed at Nominal Speed.			
<i>Note: Binary output IDLE/NOMINAL must be configured and connected to speed governor. Engine Idle speed must be adjusted on speed governor.</i>			

Cooling Time

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0 .. 3600 [s]		
Default value	180	Alternative config	NO
Step	1 s		
Comm object	8258	Related applications	TLC-DC
Description			
Run time of the unloaded engine to cool the engine before stop.			

AfterCool Time

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0 .. 3600 [s]		
Default value	180	Alternative config	NO
Step	1 s		
Comm object	8662	Related applications	TLC-DC
Description			
Run time of engine after cooling pump. Binary output COOLING PUMP is closed when the engine starts and opens <i>AfterCool</i> time delayed after engine stops.			

Stop Time

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0 .. 240 [s]		
Default value	60	Alternative config	NO
Step	1 s		
Comm object	9815	Related applications	TLC-DC
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:			
<ul style="list-style-type: none"> ▶ RPM < 2, ▶ Oil pressure < Starting Oil P and ▶ D+ input isn't active. 			
Stop fail is detected if there is difference between those conditions.			

Fuel Solenoid

Setpoint group	Engine Params	Related FW	1.2.0
Options	DIESEL, GAS		
Default value	DIESEL	Alternative config	NO
Step	-		
Comm object	9100	Related applications	TLC-DC
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: In this mode of operation the output closes to open the gas valve and enable the engine to start. The delay of FUEL SOLENOID output activation in relation to STARTER output is defined by <i>FuelSol offset</i> . The output closes only if RPM > 30 (i.e. the starter motor is engaged). The output opens if there is any reason to stop the engine or in pause between repeated starts.			
Note: In the case of gas engine, the under speed protection cannot be blocked by the SD OVERRIDE function. For gas engines, it is strongly recommended to use the pick-up sensor, as non-zero RPM detection is required during the start procedure.			

FuelSol Offset

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0,0 .. 30,0 [s]		
Default value	0,5	Alternative config	NO
Step	0,1 s		
Comm object	10525	Related applications	TLC-DC

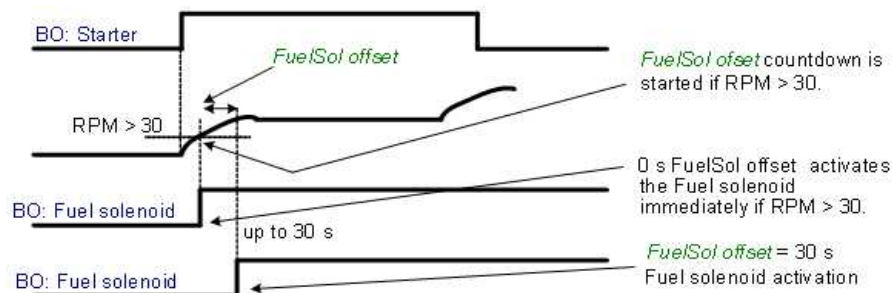
Description

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

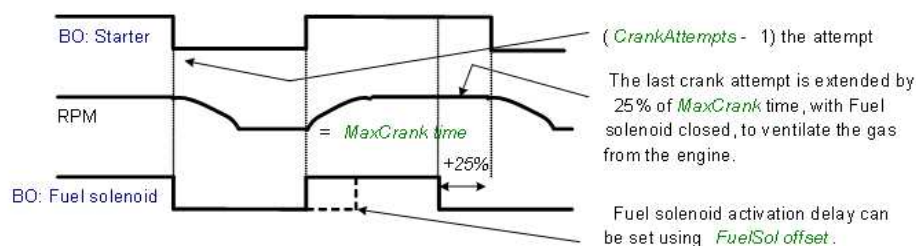
Engine starting procedure when *Engine params: Fuel solenoid* = GAS

Note: A new feature has been added which prolongs the last cranking attempt by 25% of *MaxCrank* time with closed Fuel valve (FUEL SOLENOID binary output) in order to ventilate the remaining gas. This function is valid only when *Engine params: Fuel solenoid* = GAS

Note: Is modified functionality of the Ignition binary output. The Ignition binary output will close 1 second (fixed value) after activation of binary output Fuel solenoid (when Fuel solenoid = GAS setting is active). Generally, the output closes after reaching value of *CrankRPM* = 30RPM (fixed value). The output opens after stopping of the engine or during crank fail pauses among crank attempts.



Note: A new feature has been added which prolongs the last cranking attempt by 25% of *MaxCrank* Time (page 100) time with closed Fuel valve (Fuel Solenoid binary output) in order to ventilate the remaining gas. This function is valid only when *Engine params: = GAS*



Note: The Ignition binary output will close 1 second (fixed value) after activation of binary output Fuel solenoid (when Fuel solenoid = GAS setting is active). Generally, the output closes after reaching value of *CrankRPM* = 30RPM (fixed value). The output opens after stopping of the engine or during crank fail pauses among crank attempts.

D+ Function

Setpoint group	Engine Params	Related FW	1.2.0
Options	ENABLED, CHRGFAIL, DISABLED		
Default value	DISABLED	Alternative config	NO
Step	-		
Comm object	9683	Related applications	TLC-DC
Description			
<p>ENABLED: The D+ terminal is used for both functions - “running engine” detection and charge fail detection.</p> <p>CHRGFAIL: The D+ terminal is used for charge fail detection only.</p> <p>DISABLED: The D+ terminal is not used.</p> <p><i>Note: The magnetization current is provided independently on this setpoint value. The D+ charge fail protection becomes active after Engine params: Idle time reaches zero.</i></p>			

ECU FreqSelect

Setpoint group	Engine Params	Related FW	1.2.0
Options	PRIMARY, SECONDARY, DEFAULT		
Default value	DEFAULT	Alternative config	NO
Step	-		
Comm object	12926	Related applications	TLC-DC
Description			
<p>This setpoint should be used only for Volvo and Scania engines.</p> <p>Volvo – “Volvo Aux” is selected in ECU configuration: Primary or secondary engine speed is set by Frequency select bits in VP Status frame.</p> <p>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.</p> <p>Frequency change for Volvo Penta engines with EMS2</p> <p>This description refers to the Volvo Penta Application bulletin 30-0-003. The procedure for changing engine speed on the D9 and D16 engines is different from the D12 engine. There is no system reset on the EMS2 unit; therefore the procedure is changed.</p> <p>Procedure if ECU not energized:</p> <ol style="list-style-type: none"> 1. Switch the IL controller to MAN Mode. 2. Power up the ECU. 3. Change the setpoint <i>ECU FreqSelect</i> and confirm it by pressing Enter 4. Press the Stop button on the IL controller. <p>IMPORTANT: The whole procedure (step 2 to 4) must not exceed 10 seconds.</p> <p>Procedure with ECU powered on:</p> <ol style="list-style-type: none"> 1. Switch the IL controller to MAN Mode. 2. Press the Stop button on the IL controller. 3. Change the setpoint <i>ECU FreqSelect</i> and confirm it by pressing Enter 4. Press the Stop button on the IL controller. <p>IMPORTANT: The whole procedure (step 2 to 4) must not exceed 10 seconds.</p>			

ECU Control

Setpoint group	Engine Params	Related FW	1.2.0
Options	ENABLED, DISABLED		
Default value	ENABLED	Alternative config	NO
Step	-		
Comm object	11086	Related applications	TLC-DC
Description			
<p>The setpoint enables adjustment of the electronic engine control by following settings.</p> <p>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.</p> <p>DISABLED: Control of an electronic engine is fully blocked and the IntelliLite Telecom DC can only monitor the values of an electronic engine.</p>			

ECU SpeedAdj

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	MinSpeedLim...MaxSpeedLim [RPM]		
Default value	1500	Alternative config	NO
Step	1 RPM		
Comm object	13095	Related applications	TLC-DC
Description			
<p>Enables to adjust engine speed in ECU via CAN bus. Speed request value after the <i>Idle time</i> is over and no other speed selection is activated. Speed request in % range is calculated using the setpoints <i>0% of SpeedReq</i> and <i>100% of SpeedReq</i>.</p>			

RetToSpeedAdj

Setpoint group	Engine Params	Related FW	1.2.0
Options	DISABLED, ENABLED		
Default value	DISABLED	Alternative config	NO
-	1 V		
Comm object	11838	Related applications	TLC-DC
Description			
<p>Selection among LBI <i>Speed Sel1, 2, 3</i> behaviors.</p> <p>DISABLED: Speed request is set by LBI Speed Sel1, 2, 3 (see appropriate 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.</p> <p>ENABLED: Speed request goes to <i>ECU SpeedAdj</i> when the LBI <i>Speed Sel1, 2, 3</i> are opened. Speed request can be changed by Binary inputs <i>Speed Up</i> and <i>Speed Down</i> when LBI <i>Speed Sel1, 2, 3</i> are closed.</p>			

MinSpeedLim

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	Starting RPM...MaxSpeedLim [RPM]		
Default value	1200	Alternative config	NO
Step	1 RPM		
Comm object	10096	Related applications	TLC-DC
Description			
The setpoint presets the minimum engine speed in the “Running” operation state. Also see other conditions in the chapter below.			

MaxSpeedLim

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	MinSpeedLim...4000 [RPM]		
Default value	2700	Alternative config	NO
Step	1 RPM		
Comm object	10097	Related applications	TLC-DC
Description			
The setpoint presets the maximum engine speed in the “Running” operation state. Also see other conditions in the chapter below.			

Speed Ramp

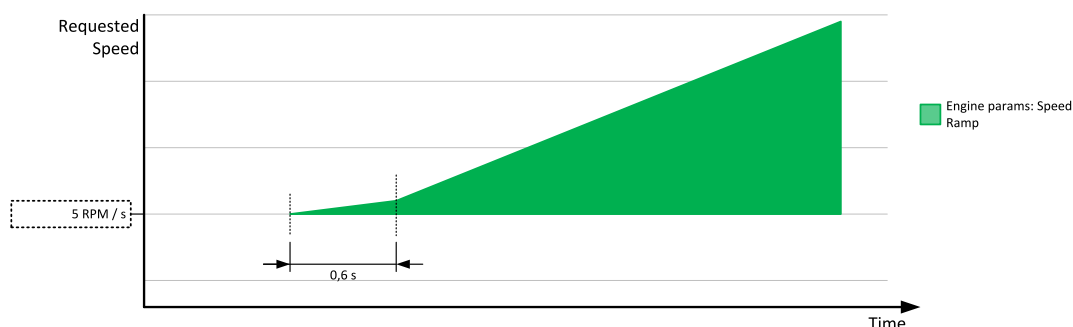
Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	1...MaxSpeedLim [RPM/s]		
Default value	50	Alternative config	NO
Step	1 RPM/s		
Comm object	10148	Related applications	TLC-DC

Description

Any Speed request change is done via this Ramp function. The Ramp via Binary SPEEDUP and SPEEDDOWN inputs is dual rate, see below.

The Binary inputs SPEEDUP and SPEEDDOWN ramp function is for the 0.6 s constant 5 RPM/s.

Does not depend on Engine params: *Speed Ramp setting*. This enables fine setting of Engine speed to specific value e.g. 1500 RPM.



TauSpeedActuat

Setpoint group	Engine Params	Related FW	1.2.0
Options	1,0 .. 300,0 s		
Default value	10,0 s	Alternative config	NO
Step	0,1 s		
Comm object	10784	Related applications	TLC-DC
Description			
<p>Time constant of the speed actuator connected to the binary outputs SPEED UP (PAGE 182) and SPEED DOWN (PAGE 182). Setting of this parameter affects the length of the pulses on these binary outputs. This is to match the reaction of the controller's regulator with the reaction time of the actuator. Adjust the setpoint to the pulse duration which is needed for the speed control device to travel from minimal position to the maximal position (these positions are adjusted via setpoints MinSpeedLim (page 108) and MaxSpeedLim (page 108)).</p>			

0%ofSpeedReq

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0 .. 3000 [RPM]		
Default value	0	Alternative config	NO
Step	1 RPM		
Comm object	11125	Related applications	TLC-DC
Description			
<p>Limit for Speed Request transformation from RPM to % range for ECU engines using % format. See practical example below.</p> <p>Example: If ECU is configured, then on one of the measurement screen you can see two lines <i>SpeedReq Abs</i> and <i>SpeedReq Rel</i>.</p> <p>In default setting:</p> <p>0 RPM = 0%</p> <p>800 RPM = 33.3%</p> <p>2400 RPM = 100%</p> <p>Different setting:</p> <p>800 RPM = 0%</p> <p>1200 RPM = 33.3%</p> <p>2400 RPM = 100%</p> <p>It is possible easily configure own output curve and use it for analog output Speed Request.</p>			

100%ofSpeedReq

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0 .. 4000 [RPM]		
Default value	2000	Alternative config	NO
Step	1 RPM		
Comm object	11126	Related applications	TLC-DC
Description			
Limit for Speed Request transformation from RPM to % range for ECU engines using % format.			

Running Timer

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0 .. 1000 [min]		
Default value	0	Alternative config	NO
Step	1 min		
Comm object	11837	Related applications	TLC-DC
Description			
Automatic engine stop in MAN mode or delayed engine stop in AUT mode. Start engine in MAN mode by <i>START</i> button. Engine stops itself after <i>Running Timer</i> is over. Engine stays running when <i>Running Timer</i> = 0.			

FuelTankVolume

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0 .. 10000 [L]		
Default value	200	Alternative config	NO
Step	1 L		
Comm object	11103	Related applications	TLC-DC
Description			
This setpoint is describing volume of fuel tank for counting fuel consumption depending on Fuel level drop.			

MaxFuelDrop

Setpoint group	Engine Params	Related FW	1.2.0
Range [units]	0 .. 50 [%/h]		
Default value	25	Alternative config	NO
Step	1 %/h		
Comm object	12373	Related applications	TLC-DC
Description			
<p>This is setting protection against the fuel leakage or theft. Function monitors the Fuel level value (AIN3) in percentage scale without decimals. The alarm and history record "<i>Wm FuelTheft</i>" is activated when Fuel level change is faster than setpoint limit. Function is switched off when <i>Max Fuel Drop</i> = 0 %/h. The drop out limit on stopped engine is 5% to avoid unwanted Alarm activation due to AIN3: Fuel level fluctuations. Active alarm "<i>Wm FuelTheft</i>" can be sent via SMS and displayed by WebSupervisor (if used).</p> <p>IMPORTANT: Set 0 to disable the Fuel Theft Protection function.</p> <p><i>Note: For fuel level and measurement, protection and for temperature can be used the same analog inputs, make sure that one of features is disabled or different inputs are used.</i></p>			

Regulator

KindOfRegul

Setpoint group	Regulator	Related FW	1.2.0
Options	EXCIT, SPEED		
Default value	EXCIT	Alternative config	NO
Step	-		
Comm object	13912	Related applications	TLC-DC

Description

InteliLite Telecom DC supports the regulation of both types of DC gensets:

- ▶ Variable speed DC genset - regulation of Speed
- ▶ Single speed DC genset - regulation of Excitation

Set the *KindOfRegul* setpoint accordingly to what you want to control.

EXCIT: Regulation of excitation, used at Single speed DC gensets.

For this case configure the value *BatteryCharge: ExcitRequest* to AIO9/1 analog output AO1. Conversion output curve where max *Excitation Request* = 10000 can be converted to full AO1 range = 100,00% (= 10 V DC or 20 mA).

Corresponding generator excitation PI loop setpoints are *Regulator: ExcitReqRamp, ExcitUpLimit, ExcitDnLimit, ExcitGain, Excit Integral*.

SPEED: Regulation of RPM, used at Variable speed DC gensets.

For this case configure the value Engine Values: *SpeedReq Abs* [RPM]: to AIO9/1 analog output AO1. Conversion output curve where max *SpeedReqAbs* (depends on engine) can be converted to full AO1 range = 100,00% (= 10 V DC or 20 mA).

Corresponding engine speed control PI loop setpoints are *Regulator: Reg Bias, Reg Gain, Reg Integral* and *Engine params: MinSpeedLim, MaxSpeedLim*.

Note: DC generator with PMG is usually controlled by Speed regulation loop, but in case of unexpected unload generator can easily get to overspeed and is shutdown. In this case is recommended to use AVR control with droop function to avoid fluctuation and overvoltage device as e.g. Zener diode. For DC generators where alternator is composed from more than three poles is preferable to use excitation control of AVR, be sure that AVR is possible to control by our analog output signal as PWM (5V, 500 Hz), 0-20 mA or 0-4.5 V. Even DC alternator needs rectifier depends on the requirements from customer, but usually voltage ripples shouldn't be more than 1%, so it is recommended to use DC alternator with in build rectifier or to use some simple rectifier, because is going about low voltage application is possible to use rectify bridges with power diodes and capacitors.

Reg Bias

Setpoint group	Regulator	Related FW	1.2.0
Range [units]	0 .. 10000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11848	Related applications	TLC-DC

Description

Regulator bias is constant value at the PI regulator output.

Reg Gain

Setpoint group	Regulator	Related FW	1.2.0
Range [units]	-200,0 .. 200,0 [%]		
Default value	10,0	Alternative config	NO
Step	0,1 %		
Comm object	11846	Related applications	TLC-DC
Description			
This setpoint is giving regulator gain factor.			

Reg Integral

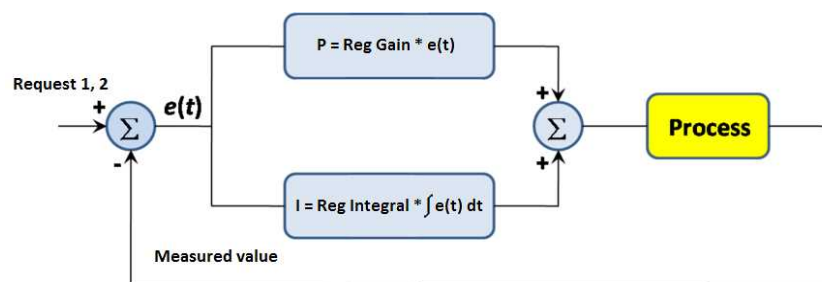
Setpoint group	Regulator	Related FW	1.2.0
Range [units]	0,0 .. 100,0 [%]		
Default value	10,0	Alternative config	NO
Step	0,1 %		
Comm object	11847	Related applications	TLC-DC

Description

This setpoint is giving regulator integration factor.

InteliLite Telecom DC controllers include PI loop for speed or analog output regulation. This loop is working like Proportional-Integral regulation with setpoints *Reg Gain* and *Reg Integral* for each part and these parts affect each other.

The controller output is given by:



Here are two tuning 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.

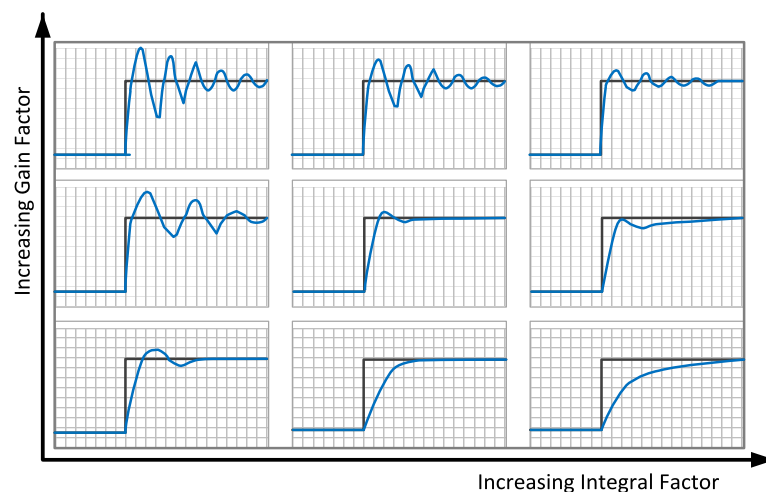


Image 8.3 PI Loop process tuning

Reg CMP Input

Setpoint group	Regulator	Related FW	1.2.0
Options	CU:AI1, CU:AI2, CU:AI3, CU:AI4, CU:AI5, CU:AI6, CU:AI7, CU:AI8, CU:AI9, AIO:AI1, AIO:AI2, AIO:AI3, AIO:AI4		
Default value	CU:AI1	Alternative config	NO
Step	-		
Comm object	11839	Related applications	TLC-DC
Description			
Setpoint for comparator (with hysteresis) analog input selection. Available for all controller analog inputs or for IL-NT-AIO plug-in module inputs. Comparator output is linked to LBO SPEEDSWITCH.			

Reg CMP On

Setpoint group	Regulator	Related FW	1.2.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11841	Related applications	TLC-DC
Description			
Limit to close LBO SPEEDSWITCH.			

Reg CMP Off

Setpoint group	Regulator	Related FW	1.2.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11840	Related applications	TLC-DC
Description			
Limit to open the LBO SPEEDSWITCH.			

ExcitReq Ramp

Setpoint group	Regulator	Related FW	1.2.0
Range [units]	1 .. 10000 [1/s]		
Default value	1000	Alternative config	NO
Step	1 [1/s]		
Comm object	11854	Related applications	TLC-DC
Description			
Ramp for excitation output step: 1 [1/s] Range: 1...10000 [1/s] Default: 1000 [1/s]			

ExcitUpLimit

Setpoint group	Regulator	Related FW	1.2.0
Range [units]	0 .. 10000 [-]		
Default value	10000	Alternative config	NO
Step	1		
Comm object	11855	Related applications	TLC-DC
Description			
Excit limit regulator PI output upper limit.			

ExcitDnLimit

Setpoint group	Regulator	Related FW	1.2.0
Range [units]	0 .. 10000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11856	Related applications	TLC-DC
Description			
Excitation limit regulator PI output low limit.			

Excit Gain

Setpoint group	Regulator	Related FW	1.2.0
Range [units]	-200,0 .. 200,0 [%]		
Default value	10,0	Alternative config	NO
Step	0,1 %		
Comm object	11857	Related applications	TLC-DC
Description			
This is setpoint is giving Excitation limit gain factor.			

Excit Integral

Setpoint group	Regulator	Related FW	1.2.0
Range [units]	0,0 .. 100,0 [%]		
Default value	10,0	Alternative config	NO
Step	0,1 %		
Comm object	11858	Related applications	TLC-DC
Description			
This setpoint is giving Excitation limit integration factor.			
<p>Note: Requested speed or excitation has to be connected to the analog output of the controller, control unit doesn't have in build analog output, that's why is used plug-in module IL-NT AIO or external module AIO9/1. Then is necessary over window Modify configuration to configure value SpeedReq Abs or ExcitRequest to the analog output of the module.</p>			

Engine Protect

ProtectHoldOff

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	0 .. 300 [s]		
Default value	5	Alternative config	NO
Step	1 s		
Comm object	8262	Related applications	TLC-DC
Description			
During the start of the engine, some engine protections have to be blocked (e.g. Oil pressure). The protections are unblocked after the <i>ProtectHoldOff</i> time. The time starts after reaching <i>Starting RPM</i> .			

BIN6 Del

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	0 .. 300 [s]		
Default value	1	Alternative config	NO
Step	1 s		
Comm object	10131	Related applications	TLC-DC
Description			
Specific protection delay is possible to use on Binary Input 6. Delay is active for Wm or Sd protection only - not for functions like Rem Start/Stop. Protection delay is active for both Binary input NO / NC configuration. <i>BIN6 Del</i> starts after <i>ProtectHoldOff</i> when BI6 protection is configured "Running only".			

Horn Timeout

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	0 .. 600 [s]		
Default value	10	Alternative config	NO
Step	1 s		
Comm object	8264	Related applications	TLC-DC
Description			
Max time limit of horn sounding. Note: 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 <i>Horn timeout</i> has elapsed.			

UnderspeedSd

Setpoint group	Engine Protect	Related FW	1.2.0
Options	DISABLED, ENABLED		
Default value	ENABLED	Alternative config	NO
Step	-		
Comm object	11415	Related applications	TLC-DC
Description			
DISABLED:			
Disables the <i>SdUnderspeed</i> protection in case the engine RPM drops below the <i>Starting RPM</i> .			
ENABLED:			
Function as on the describing <i>Underspeed</i> setpoint.			

AI1 Wrn

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	0,0 .. 10,0 [Bar]		
Default value	2,0	Alternative config	NO
Step	0,1 Bar		
Comm object	8369	Related applications	TLC-DC
Description			
Warning limit level for Analog Input 1.			

AI1 Sd

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	0,0 .. 10,0 [Bar]		
Default value	1,0	Alternative config	NO
Step	0,1 Bar		
Comm object	8370	Related applications	TLC-DC
Description			
Shutdown limit level for Analog Input 1.			

AI1 Del

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	0 .. 180 [s]		
Default value	3	Alternative config	NO
Step	1 s		
Comm object	8365	Related applications	TLC-DC
Description			
Delay for Analog Input 1 alarm.			

AI2 Wrn

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	-100 .. 10000 [°C]		
Default value	80	Alternative config	NO
Step	1 °C		
Comm object	8375	Related applications	TLC-DC
Description			
Warning limit level for Analog Input 2.			

AI2 Sd

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	-100 .. 10000 [°C]		
Default value	90	Alternative config	NO
Step	1 °C		
Comm object	8376	Related applications	TLC-DC
Description			
Shutdown limit level for Analog Input 2.			

AI2 Del

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	0 .. 180 [s]		
Default value	5	Alternative config	NO
Step	1 s		
Comm object	8371	Related applications	TLC-DC
Description			
Delay for Analog Input 2 alarm.			

AI3 Wrn

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	-100 .. 10000 [-]		
Default value	20	Alternative config	NO
Step	1		
Comm object	8381	Related applications	TLC-DC
Description			
Warning limit level for Analog Input 2.			

AI3 Sd

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	-100 .. 10000 [-]		
Default value	10	Alternative config	NO
Step	1		
Comm object	8382	Related applications	TLC-DC
Description			
Shutdown limit level for Analog Input 3.			

AI3 Del

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	0 .. 180 [s]		
Default value	10	Alternative config	NO
Step	1 s		
Comm object	8377	Related applications	TLC-DC
Description			
Delay for Analog Input 3 alarm.			

Batt Overvolt

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	Batt undervolt...40,0 [V]		
Default value	36,0	Alternative config	NO
Step	0,1 V		
Comm object	9587	Related applications	TLC-DC
Description			
High supply voltage Warning limit.			

Batt Under V

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	8,0...Batt overvolt [V]		
Default value	18,0	Alternative config	NO
Step	0,1 V		
Comm object	8387	Related applications	TLC-DC
Description			
Low supply voltage Warning limit.			

Batt Volt Del

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	0 .. 600 [s]		
Default value	5	Alternative config	NO
Step	1 s		
Comm object	8383	Related applications	TLC-DC
Description			
Delay for low and high supply voltage alarm.			

Gen CB Del

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	0 .. 600 [s]		
Default value	5	Alternative config	NO
Step	1 s		
Comm object	13222	Related applications	TLC-DC
Description			
Delay in between Aux CB open and Gen CB closed as well as Gen CB open and AUX CB close.			

WrnMaintenance

Setpoint group	Engine Protect	Related FW	1.2.0
Range [units]	0 .. 10000 [h]		
Default value	10000	Alternative config	NO
Step	1 h		
Comm object	9648	Related applications	TLC-DC
Description			
There is a timer that is counting down when engine running. Service time alarm appears if reaches zero.			
Note: Value 10000 is turning off the WrnMaintenance protection.			

Gener Protect

Gen >V Wrn

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	Gen <V Wrn...65,0 [V]		
Default value	60,0	Alternative config	NO
Step	0,1 V		
Comm object	11359	Related applications	TLC-DC
Description			
Generator overvoltage protection. Above this limit a Warning alarm is activated.			

Gen <V Wrn

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	0,0...Gen >V Wrn [V]		
Default value	12,0	Alternative config	NO
Step	0,1 V		
Comm object	11363	Related applications	TLC-DC
Description			
Generator undervoltage protection. Below this limit a Warning alarm is activated.			

Gen >V Sd

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	Gen <V Sd...65,0 [V]		
Default value	60,0	Alternative config	NO
Step	0,1 V		
Comm object	11357	Related applications	TLC-DC
Description			
Generator overvoltage protection. Above this limit a Shutdown alarm is activated.			

Gen <V Sd

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	0,0... Gen >V Sd [V]		
Default value	12,0	Alternative config	NO
Step	0,1 V		
Comm object	11361	Related applications	TLC-DC
Description			
Generator undervoltage protection. Below this limit a Shutdown alarm is activated.			

Gen V Del

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	0 .. 600 [s]		
Default value	3	Alternative config	NO
Step	1 s		
Comm object	11358	Related applications	TLC-DC
Description			
Delay for Gen >V / Gen <V alarm.			

Load >A Wrn

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	0,0...Load >A Sd [A]		
Default value	65,0	Alternative config	NO
Step	0,1 A		
Comm object	13913	Related applications	TLC-DC
Description			
Limit for load overcurrent Warning alarm.			

Load >A Sd

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	Load >A Wrn ...1000,0 [A]		
Default value	70,0	Alternative config	NO
Step	0,1 A		
Comm object	13914	Related applications	TLC-DC
Description			
Limit for load overcurrent Shutdown alarm.			

Batt >A Wrn

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	0,0...Batt >A Sd [A]		
Default value	65,0	Alternative config	NO
Step	0,1 A		
Comm object	13918	Related applications	TLC-DC
Description			
Limit for battery overcurrent warning alarm.			

Batt >A Sd

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	Batt >A Wrn ...1000,0 [A]		
Default value	70,0	Alternative config	NO
Step	0,1 A		
Comm object	13919	Related applications	TLC-DC
Description			
Limit for battery overcurrent Shutdown alarmt.			

Gen >A Wrn

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	0,0...Gen >A Sd [A]		
Default value	65,0	Alternative config	NO
Step	0,1 A		
Comm object	13916	Related applications	TLC-DC
Description			
Limit for generator overcurrent Warning alarm. Related setpoints: <i>IgenNom</i> .			

Gen >A Sd

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	Gen >A Wrn ...1000,0 [A]		
Default value	70,0	Alternative config	NO
Step	0,1 A		
Comm object	13917	Related applications	TLC-DC
Description			
Limit for generator overcurrent Shutdown alarm.			

Aux >A Wrn

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	0,0...Aux >A Sd [A]		
Default value	65,0	Alternative config	NO
Step	0,1 A		
Comm object	13210	Related applications	TLC-DC
Description			
Limit for auxiliary overcurrent Warning alarm.			

Aux >A Sd

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	Aux >A Wrn ...1000,0 [A]		
Default value	70,0	Alternative config	NO
Step	0,1 A		
Comm object	13211	Related applications	TLC-DC
Description			
Limit for auxiliary overcurrent Shutdown alarm.			

Overcurr Del

Setpoint group	Gener Protect	Related FW	1.2.0
Range [units]	0,0 ..10,0 [s]		
Default value	0,0	Alternative config	NO
Step	0,1 s		
Comm object	13926	Related applications	TLC-DC
Description			
Comon overcurrent delay for all overcurrent protections (for Generator, Battery, Load and Auxiliary).			

Date/Time

Time Stamp Per

Setpoint group	Date/Time	Related FW	1.2.0
Range [units]	0 .. 200 [min]		
Default value	60	Alternative config	NO
Step	1 min		
Comm object	8979	Related applications	TLC-DC
Description			
This setpoint is dedicated to adjustment of time interval for periodical history records.			

SummerTimeMod

Setpoint group	Date/Time	Related FW	1.2.0
Options	DISABLED, WINTER, SUMMER, WINTER-S, SUMMER-S DISABLED		
Default value	DISABLED	Alternative config	NO
Step	-		
Comm object	8727	Related applications	TLC-DC
Description			
Automatic switching between summer and wintertime is disabled.			
WINTER (SUMMER):			
Automatic switching between summer and winter time is enabled and it is set to winter (summer) season.			
WINTER-S (SUMMER-S):			
Modification for southern hemisphere.			

Time

Setpoint group	Date/Time	Related FW	1.2.0
Range [units]	0:00:00 .. 23:59:59 [-]		
Default value	0:00:00	Alternative config	NO
Step	1		
Comm object	24554	Related applications	TLC-DC
Description			
Set actual time.			

Date

Setpoint group	Date/Time	Related FW	1.2.0
Range [units]	Date		
Default value	1.1.2006	Alternative config	NO
Step	-		
Comm object	24553	Related applications	TLC-DC
Description			
Set actual date.			

Timer1Function

Setpoint group	Date/Time	Related FW	1.2.0
Options	NoFunc, AutoRun, AutoRegCMP, AutoBatt, LightTowerON		
Default value	NoFunc	Alternative config	NO
Step	-		
Comm object	11660	Related applications	TLC-DC
Description			
No Func:			
Operates just corresponding LBO EXERC TIMER 1 according the <i>Timer1</i> setting, see Timer1 Repeat (page 128) , Timer1 ON Time (page 128) and Timer1Duration (page 128) . Function operates in all (OFF-MAN-AUT)modes.			
AutoRun:			
Engine automatically starts and stops in AUT mode (similar to LBI REM START/STOP, the same record in the history) according the <i>Timer1</i> setting.			
AutoRegCMP:			
Start and stop engine in AUT mode according to the LBO SPEEDSWITCH - see Reg CMP Input on page 115 . The comparator function (output) works opposite when Regulator: <i>Reg CMP On < Reg CMP Off</i> . The Date/Time: <i>Timer1 repeat</i> , <i>Timer1 ON time</i> , <i>Timer1Duration</i> settings are not important in this case.			
AutoBatt:			
Engine starts when actual <i>Battery voltage < Engine protect: Batt undervolt + Batt volt del</i> and stays running for Date/Time: <i>Timer1 Duration</i> . Function operates in AUT mode.			
LightTowerON:			
Binary output LIGHTTOWERON is activated when the timer condition <i>Timer1 On time</i> is met with internal clocks. Time and binary output is deactivated if the <i>Timer1Duration</i> elapsed, except binary input LIGHTTOWERON is active.			

Timer1 Repeat

Setpoint group	Date/Time	Related FW	1.2.0
Options	NONE, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, WEDNESDAY, FRIDAY, SATURDAY, SUNDAY, MON-FRI, MON-SAT, MON-SUN, SAT-SUN		
Default value	NONE	Alternative config	NO
Step	-		
Comm object	10045	Related applications	TLC-DC
Description			
This setpoint defines <i>Timer1</i> activation. Binary output EXERC TIMER 1 is internally linked with REM START/STOP binary input. 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.			

Timer1 ON Time

Setpoint group	Date/Time	Related FW	1.2.0
Range [units]	0:00:00 .. 23:59:59 [-]		
Default value	5:00:00	Alternative config	NO
Step	1		
Comm object	10042	Related applications	TLC-DC
Description			
Sets the time when EXERC TIMER 1 output is activated.			

Timer1Duration

Setpoint group	Date/Time	Related FW	1.2.0
Range [units]	1 .. 1440 [min]		
Default value	5	Alternative config	NO
Step	1 min		
Comm object	10044	Related applications	TLC-DC
Description			
Adjusts duration of EXERC TIMER 1 output.			

Timer2Function

Setpoint group	Date/Time	Related FW	1.2.0
Options	NoFunc, AutoRun, AutoRegCMP, AutoBatt, LightTowerON		
Default value	NoFunc	Alternative config	NO
Step	-		
Comm object	11661	Related applications	TLC-DC
Description			
<p>No Func: Operates just corresponding LBO EXERC TIMER 2 according the <i>Timer2</i> setting, see <i>Timer2 Repeat (page 129)</i>, <i>Timer2 ON Time (page 130)</i> and <i>Timer2Duration (page 130)</i>. Function operates in all (OFF-MAN-AUT) modes.</p> <p>AutoRun: Engine automatically starts and stops in AUT mode (similar to LBI REM START/STOP, the same record in the history) according the <i>Timer2</i> setting.</p> <p>AutoRegCMP: Start and stop engine in AUT mode according to the LBO SPEEDSWITCH - see Reg CMP Input on page 115. The comparator function (output) works opposite when Regulator: <i>Reg CMP On < Reg CMP Off</i>. The Date/Time: <i>Timer2 repeat</i>, <i>Timer2 ON time</i>, <i>Timer2Duration</i> settings are not important in this case.</p> <p>AutoBatt: Engine starts when actual <i>Battery voltage < Engine protect: Batt undervolt + Batt volt del</i> and stays running for Date/Time: <i>Timer2 Duration</i>. Function operates in AUT mode.</p> <p>LightTowerON: Binary output LIGHTTOWERON is activated when the timer condition <i>Timer2 ON time</i> is met with internal clocks. Time and binary output is deactivated if the <i>Timer2Duration</i> elapsed, except binary input LIGHTTOWERON is active.</p>			

Timer2 Repeat

Setpoint group	Date/Time	Related FW	1.2.0
Options	NONE, MONDAY, TUESDAY, WEDNESDAY, THURSDAY, WEDNESDAY, FRIDAY, SATURDAY, SUNDAY, MON-FRI, MON-SAT, MON-SUN, SAT-SUN		
Default value	NONE	Alternative config	NO
Step	-		
Comm object	10202	Related applications	TLC-DC
Description			
<p>This setpoint defines <i>Timer2</i> activation. Binary output EXERC TIMER 2 is internally linked with REM START/STOP binary input. Refer to binary inputs for details.</p> <p>NONE: Timer function is disabled.</p> <p>MONDAY, TUESDAY, WEDNESDAY, THURSDAY, WEDNESDAY, FRIDAY, SATURDAY, SUNDAY: Timer is activated on daily basis.</p> <p>MON-FRI, MON-SAT, SAT-SUN: Timer is activated on selected day interval.</p>			

Timer2 ON Time

Setpoint group	Date/Time	Related FW	1.2.0
Range [units]	0:00:00 .. 23:59:59 [-]		
Default value	5:00:00	Alternative config	NO
Step	1		
Comm object	10199	Related applications	TLC-DC
Description			
Display day time when EXERC TIMER 2 output is activated.			

Timer2Duration

Setpoint group	Date/Time	Related FW	1.2.0
Range [units]	1 .. 1440 [min]		
Default value	5	Alternative config	NO
Step	1 min		
Comm object	10201	Related applications	TLC-DC
Description			
Adjusts duration of EXERC TIMER 2 output.			

Sensor Spec

Calibr AI 1

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	8431	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of IntelliLite Telecom DC analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: Calibration constants have to be adjusted when measured value is near the alarm level.</i>			

Calibr AI 2

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	8407	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of IntelliLite Telecom DC analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: Calibration constants have to be adjusted when measured value is near the alarm level.</i>			

Calibr AI 3

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	8467	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of Intelilite Telecom DC analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: Calibration constants have to be adjusted when measured value is near the alarm level.</i>			

Calibr AI 4

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11917	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of Intelilite Telecom DC analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: Calibration constants have to be adjusted when measured value is near the alarm level.</i>			

Calibr AI 5

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11918	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of Intelilite Telecom DC analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: Calibration constants have to be adjusted when measured value is near the alarm level.</i>			

Calibr AI 6

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11599	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of Intelilite Telecom DC analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: Calibration constants have to be adjusted when measured value is near the alarm level.</i>			

Calibr AI 7

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11914	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of Intelilite Telecom DC analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: Calibration constants have to be adjusted when measured value is near the alarm level.</i>			

Calibr AI 8

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11915	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of Intelilite Telecom DC analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: Calibration constants have to be adjusted when measured value is near the alarm level.</i>			

Calibr AI 9

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11916	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of IntelliLite Telecom DC analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: Calibration constants have to be adjusted when measured value is near the alarm level.</i>			

Calibr AIO1

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11919	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of plug-in analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: These setpoints are visible only when IL-NT AIO plug-in module is configured.</i>			

Calibr AIO2

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11920	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of plug-in analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: These setpoints are visible only when IL-NT AIO plug-in module is configured.</i>			

Calibr AIO3

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	11921	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of plug-in analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: These setpoints are visible only when IL-NT AIO plug-in module is configured.</i>			

Calibr AIO4

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000 .. 1000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	13640	Related applications	TLC-DC
Description			
Calibrate the constant to adjust the measured value of plug-in analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.			
<i>Note: These setpoints are visible only when IL-NT AIO plug-in module is configured.</i>			

Calibr AIO9-1

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000,0 .. 1000,0 [-]		
Default value	0	Alternative config	NO
Step	0,1		
Comm object	13641	Related applications	TLC-DC
Description			
Calibration constants for external AIO9/1 module analog inputs.			
<i>Note: These setpoints are visible only when AIO9/1 extension module is configured.</i>			

Calibr AIO9-2

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000,0 .. 1000,0 [-]		
Default value	0	Alternative config	NO
Step	0,1		
Comm object	13642	Related applications	TLC-DC
Description			
Calibration constants for external AIO9/1 module analog inputs.			
<i>Note: These setpoints are visible only when AIO9/1 extension module is configured.</i>			

Calibr AIO9-3

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000,0 .. 1000,0 [-]		
Default value	0	Alternative config	NO
Step	0,1		
Comm object	13643	Related applications	TLC-DC
Description			
Calibration constants for external AIO9/1 module analog inputs.			
<i>Note: These setpoints are visible only when AIO9/1 extension module is configured.</i>			

Calibr AIO9-4

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000,0 .. 1000,0 [-]		
Default value	0	Alternative config	NO
Step	0,1		
Comm object	13644	Related applications	TLC-DC
Description			
Calibration constants for external AIO9/1 module analog inputs.			
<i>Note: These setpoints are visible only when AIO9/1 extension module is configured.</i>			

Calibr AIO9-5

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000,0 .. 1000,0 [-]		
Default value	0	Alternative config	NO
Step	0,1		
Comm object	13645	Related applications	TLC-DC
Description			
Calibration constants for external AIO9/1 module analog inputs.			
<i>Note: These setpoints are visible only when AIO9/1 extension module is configured.</i>			

Calibr AIO9-6

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000,0 .. 1000,0 [-]		
Default value	0	Alternative config	NO
Step	0,1		
Comm object	13646	Related applications	TLC-DC
Description			
Calibration constants for external AIO9/1 module analog inputs.			
<i>Note: These setpoints are visible only when AIO9/1 extension module is configured.</i>			

Calibr AIO9-7

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000,0 .. 1000,0 [-]		
Default value	0	Alternative config	NO
Step	0,1		
Comm object	13647	Related applications	TLC-DC
Description			
Calibration constants for external AIO9/1 module analog inputs.			
<i>Note: These setpoints are visible only when AIO9/1 extension module is configured.</i>			

Calibr AIO9-8

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000,0 .. 1000,0 [-]		
Default value	0	Alternative config	NO
Step	0,1		
Comm object	13648	Related applications	TLC-DC
Description			
Calibration constants for external AIO9/1 module analog inputs.			
<i>Note: These setpoints are visible only when AIO9/1 extension module is configured.</i>			

Calibr AIO9-9

Setpoint group	Sensor Spec	Related FW	1.2.0
Range [units]	-1000,0 .. 1000,0 [-]		
Default value	0	Alternative config	NO
Step	0,1		
Comm object	13649	Related applications	TLC-DC
Description			
Calibration constants for external AIO9/1 module analog inputs.			
<i>Note: These setpoints are visible only when AIO9/1 extension module is configured.</i>			

AIO module

AIO AI1 Wrn

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	-100 .. 10000 [-]		
Default value	400	Alternative config	NO
Step	1		
Comm object	13650	Related applications	TLC-DC
Description			
The level for IL-NT AIO plug-in card Analog input 1 Warning alarm detection.			

AIO AI1 Sd

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	-100 .. 10000 [-]		
Default value	400	Alternative config	NO
Step	1		
Comm object	13654	Related applications	TLC-DC
Description			
The level for IL-NT AIO plug-in card Analog input 1 Shutdown alarm detection.			

AIO AI1 Del

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	0 .. 180 [s]		
Default value	5	Alternative config	NO
Step	1 s		
Comm object	13658	Related applications	TLC-DC
Description			
Delay for IL-NT AIO plug-in card Analog input 1 alarm.			

AIO AI2 Wrn

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	-100 .. 10000 [-]		
Default value	400	Alternative config	NO
Step	1		
Comm object	13651	Related applications	TLC-DC
Description			
The level for IL-NT AIO plug-in card Analog input 2 Warning alarm detection.			

AIO AI2 Sd

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	-100 .. 10000 [-]		
Default value	400	Alternative config	NO
Step	1		
Comm object	13655	Related applications	TLC-DC
Description			
The level for IL-NT AIO plug-in card Analog input 2 Shutdown alarm detection.			

AIO AI2 Del

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	0 .. 180 [s]		
Default value	5	Alternative config	NO
Step	1 s		
Comm object	13659	Related applications	TLC-DC
Description			
Delay for IL-NT AIO plug-in card Analog input 2 alarm.			

AIO AI3 Wrn

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	-100 .. 10000 [-]		
Default value	400	Alternative config	NO
Step	1		
Comm object	13652	Related applications	TLC-DC
Description			
The level for IL-NT AIO plug-in card Analog input 3 Warning alarm detection.			

AIO AI3 Sd

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	-100 .. 10000 [-]		
Default value	400	Alternative config	NO
Step	1		
Comm object	13656	Related applications	TLC-DC
Description			
The level for IL-NT AIO plug-in card Analog input 3 Shutdown alarm detection.			

AIO AI3 Del

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	0 .. 180 [s]		
Default value	5	Alternative config	NO
Step	1 s		
Comm object	13660	Related applications	TLC-DC
Description			
Delay for IL-NT AIO plug-in card Analog input 3 alarm.			

AIO AI4 Wrn

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	-100 .. 10000 [-]		
Default value	0	Alternative config	NO
Step	1		
Comm object	13653	Related applications	TLC-DC
Description			
The level for IL-NT AIO plug-in card Analog input 4 Warning alarm detection.			

AIO AI4 Sd

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	-100 .. 10000 [-]		
Default value	400	Alternative config	NO
Step	1		
Comm object	13657	Related applications	TLC-DC
Description			
The level for IL-NT AIO plug-in card Analog input 4 Shutdown alarm detection.			

AIO AI4 Del

Setpoint group	AIO module	Related FW	1.2.0
Range [units]	0 .. 180 [s]		
Default value	5	Alternative config	NO
Step	1 s		
Comm object	13661	Related applications	TLC-DC
Description			
Delay for IL-NT AIO plug-in card Analog input 4 alarm.			

SMS/E-Mail

Yel Alarm Msg

Setpoint group	SMS/E-Mail	Related FW	1.2.0
Options	OFF, ON		
Default value	OFF	Alternative config	NO
Step	-		
Comm object	8482	Related applications	TLC-DC
Description			
Set this setpoint to ON if you want to get messages when a yellow (Warning) alarm occurs.			
<p>Note: The target address (cellular network phone number or e-mail address) must be set correctly to the setpoint(s) TelNo/Addr Ch1 resp. TelNo/Addr Ch2.</p>			

Red Alarm Msg

Setpoint group	SMS/E-Mail	Related FW	1.2.0
Options	OFF, ON		
Default value	OFF	Alternative config	NO
Step	-		
Comm object	8484	Related applications	TLC-DC
Description			
Set this setpoint to ON if you want to get messages when a red (Shutdown) alarm occurs.			
<i>Note: The target address (cellular network phone number or e-mail address) must be set correctly to the setpoint(s) TelNo/Addr Ch1 resp. TelNo/Addr Ch2.</i>			

TelNo/Addr Ch1

Setpoint group	SMS/E-Mail	Related FW	1.2.0
Range [units]	0 .. 31 characters[-]		
Default value		Alternative config	NO
Step	-		
Comm object	9597	Related applications	TLC-DC
Description			
Enter either a valid cellular network phone number or e-mail address to this setpoint, where the alarm messages shall be sent.			
<i>Note: 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.</i>			
IMPORTANT: These setpoints can be modified from PC only! For cellular network 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 at the beginning.			

TelNo/Addr Ch2

Setpoint group	SMS/E-Mail	Related FW	1.2.0
Range [units]	0 .. 31 characters[-]		
Default value		Alternative config	NO
Step	-		
Comm object	9598	Related applications	TLC-DC
Description			
Enter either a valid cellular network phone number or e-mail address to this setpoint, where the alarm messages shall be sent.			
<p><i>Note: 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.</i></p>			
<p>IMPORTANT: These setpoints can be modified from PC only! For cellular network 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 at the beginning.</p>			

SMS Language

Setpoint group	SMS/E-Mail	Related FW	1.2.0
Range [units]	1 .. 2 [-]		
Default value	1	Alternative config	NO
Step	-		
Comm object	11394	Related applications	TLC-DC
Description			
Select 1 to receive a message in primary controller language or 2 for secondary one.			

8.1.3 Values

What values are:

Values are displayed on the controller screen or are accessible via icon in the LiteEdit PC tool.

See the table with all values visible in LiteEdit.

Note: Some values are visible only if the ECU unit is configured.

List of value groups

Battery Charge	144
Engine	146
Statistics	147
Controller I/O	149
Date/Time	152
IL Info	153
AIO Module	154
AIO9/1	155

For full list of values go to the chapter **List of values (page 143)**.

List of values

Ugen	144	D+	150
Ubatt	144	Bin Inputs	150
UbattComp	144	Bin Outputs	151
UbattCompTemp	144	RemoteControl	151
UbattCompLoad	144	GSM SignalLvl	151
Uload	144	GSM ErrorRate	151
Uaux	145	GSM Diag Code	151
Igen	145	AirGate Diag	152
Iload	145	AirGate ID	152
Iaux	145	Modem Status	152
BatteryTemp	145	Time	152
BatteryIn	146	Date	152
BatteryOut	146	Engine State	153
ExcitRequest	146	Timer Text	153
RPM	146	Timer Value	153
SpeedReq Abs	146	FW Version	153
Run Hours	147	Application	153
Num Starts	147	FW Branch	153
Maintenance	147	PasswordDecode	154
Num E-Stop	147	Recharg Status	154
Shutdowns	147	AIO AI1	154
DayFuelConsum	147	AIO AI2	154
TotFuelConsum	148	AIO AI3	154
TotBattChrg	148	AIO AI4	155
TotBattDischrg	148	Battery Temp	155
NumOfCycles	148	InteliAOUT	155
NumOfFullCyclcs	148		
Oil Pressure	149		
Engine Temp	149		
Fuel Level	149		
AIN4	149		
AIN5	149		
AIN6	149		
AIN7	150		
AIN8	150		
AIN9	150		
Battery Volts	150		

Battery Charge

Ugen

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [V]		
Comm object	14370	Related applications	TLC-DC
Description			
Generator voltage.			

Ubatt

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [V]		
Comm object	14371	Related applications	TLC-DC
Description			
Battery voltage without temperature compensation.			

UbattComp

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [V]		
Comm object	14372	Related applications	TLC-DC
Description			
Battery voltage with all compensation.			

UbattCompTemp

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [V]		
Comm object	14699	Related applications	TLC-DC
Description			
Calculated value of temperature compensation.			

UbattCompLoad

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [V]		
Comm object	14700	Related applications	TLC-DC
Description			
Calculated value of current compensation.			

Uload

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [V]		
Comm object	14373	Related applications	TLC-DC

Description
Load voltage, if measured.

Uaux

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [V]		
Comm object	14374	Related applications	TLC-DC
Description	Auxiliary voltage, if measured.		

Igen

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [A]		
Comm object	8267	Related applications	TLC-DC
Description	Generator current.		

Ibatt

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [A]		
Comm object	11655	Related applications	TLC-DC
Description	Battery current – visible in LiteEdit only. Ibatt >0 means discharging; Ibatt <0 means charging.		

Iload

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [A]		
Comm object	11654	Related applications	TLC-DC
Description	Load current - can be measured or calculated.		

Iaux

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [A]		
Comm object	11656	Related applications	TLC-DC
Description	Auxiliary current usually calculated, can be measured when using AIO9/1 module.		

BatteryTemp

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	0,1 [°C]		
Comm object	8250	Related applications	TLC-DC

Description
Battery bank temperature.

BatteryIn

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	1 [Ah]		
Comm object	8265	Related applications	TLC-DC
Description	Battery charging current counter – optional condition for charging stop.		

BatteryOut

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	1 [Ah]		
Comm object	8266	Related applications	TLC-DC
Description	Battery discharging current counter (optional condition for charging start).		

ExcitRequest

Value group	Battery Charge	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	11647	Related applications	TLC-DC
Description	Requested excitation output signal.		

Engine

RPM

Value group	Engine	Related FW	1.2.0
Resolution [units]	1 [RPM]		
Comm object	8209	Related applications	TLC-DC
Description	Engine RPM.		

SpeedReq Abs

Value group	Engine	Related FW	1.2.0
Resolution [units]	1 [RPM]		
Comm object	13094	Related applications	TLC-DC
Description	Requested speed of engine regulation output signal in RPM.		

Statistics

Run Hours

Value group	Statistics	Related FW	1.2.0
Resolution [units]	0,1 [h]		
Comm object	8206	Related applications	TLC-DC
Description			
Running hours of the DC generator.			

Num Starts

Value group	Statistics	Related FW	1.2.0
Resolution [units]	1 [-]		
Comm object	8207	Related applications	TLC-DC
Description			
Number of engine starts.			

Maintenance

Value group	Statistics	Related FW	1.2.0
Resolution [units]	1 [h]		
Comm object	9648	Related applications	TLC-DC
Description			
Remainin runnigh hours to activate Maintenance warning alarm, see WrnMaintenance on page 122.			

Num E-Stop

Value group	Statistics	Related FW	1.2.0
Resolution [units]	1 [-]		
Comm object	11195	Related applications	TLC-DC
Description			
Number of engine emergency stops.			

Shutdowns

Value group	Statistics	Related FW	1.2.0
Resolution [units]	1 [-]		
Comm object	11196	Related applications	TLC-DC
Description			
Number of engine shutdowns.			

DayFuelConsum

Value group	Statistics	Related FW	1.2.0
Resolution [units]	1 [L]		
Comm object	9040	Related applications	TLC-DC

Description
Day consumption counted per day by internal hours, reset everyday on midnight. Hours adjusted in group of setpoints <i>Date/Time</i> or reset by binary input <i>CLEARDAYCONS</i> .

TotFuelConsum

Value group	Statistics	Related FW	1.2.0
Resolution [units]	1 [L]		
Comm object	9817	Related applications	TLC-DC
Description	Total consumption. Reset possible by binary input <i>CLEARTOTALCONS</i> .		

TotBattChrg

Value group	Statistics	Related FW	1.2.0
Resolution [units]	1 [Ah]		
Comm object	13433	Related applications	TLC-DC
Description	Total battery charge.		

TotBattDischrg

Value group	Statistics	Related FW	1.2.0
Resolution [units]	1 [Ah]		
Comm object	13434	Related applications	TLC-DC
Description	Total battery discharge.		

NumOfCycles

Value group	Statistics	Related FW	1.2.0
Resolution [units]	1 [-]		
Comm object	13435	Related applications	TLC-DC
Description	Number of charging cycles – i.e. from engine start to stop in AUT mode.		

NumOfFullCyclcs

Value group	Statistics	Related FW	1.2.0
Resolution [units]	1 [-]		
Comm object	14693	Related applications	TLC-DC
Description	Statistic value for counting the number of full cycles.		

Controller I/O

Oil Pressure

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	8227	Related applications	TLC-DC
Description			
Analog input 1 value. Typically Oil Pressure measurement.			

Engine Temp

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	8228	Related applications	TLC-DC
Description			
Analog input 2 value. Typically Engine Temperature measurement.			

Fuel Level

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	8229	Related applications	TLC-DC
Description			
Analog input 3 value. Typically Fuel Level measurement.			

AIN4

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	9159	Related applications	TLC-DC
Description			
Configurable			

AIN5

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	9160	Related applications	TLC-DC
Description			
Configurable			

AIN6

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	9155	Related applications	TLC-DC

Description
Configurable

AIN7

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	9156	Related applications	TLC-DC
Description	Configurable		

AIN8

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	9157	Related applications	TLC-DC
Description	Configurable		

AIN9

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	9158	Related applications	TLC-DC
Description	Configurable		

Battery Volts

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	0,1 [V]		
Comm object	8213	Related applications	TLC-DC
Description	Voltage of battery supplying the controller.		

D+

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	0,1 [V]		
Comm object	10603	Related applications	TLC-DC
Description	Alternator D+ terminal measurement.		

Bin Inputs

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	8235	Related applications	TLC-DC

Description
Binary inputs statuses.

Bin Outputs

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	8239	Related applications	TLC-DC
Description	Binary outputs statuses.		

RemoteControl

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	10627	Related applications	TLC-DC
Description	Remote control inputs statuses.		

GSM SignalLvl

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	1 [%]		
Comm object	11895	Related applications	TLC-DC
Description	IL-NT GPRS module shows the strength of the GSM signal. It is a relative value helping to find the best signal and for troubleshooting cases.		

GSM ErrorRate

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	12199	Related applications	TLC-DC
Description	IL-NT GPRS module shows this information for relative evaluation of signal quality. The lower value, the higher the signal quality.		

GSM Diag Code

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	11270	Related applications	TLC-DC
Description	Diagnostic code for the IL-NT GPRS communication module. Standard GSM modems usually support this value as well. It helps in troubleshooting.		

AirGate Diag

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	11271	Related applications	TLC-DC
Description			
Diagnostic code for AirGate connection. It helps in troubleshooting.			

AirGate ID

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	12385	Related applications	TLC-DC
Description			
Identification name generated by AirGate server for the purpose of establishing communication via WebSupervisor, LiteEdit or InteliMonitor.			

Modem Status

Value group	Controller I/O	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	12485	Related applications	TLC-DC
Description			
Status of the modem if connected to COM1.			

Date/Time

Time

Value group	Date/Time	Related FW	1.2.0
Resolution [units]	Time		
Comm object	24554	Related applications	TLC-DC
Description			
Shows current Time.			

Date

Value group	Date/Time	Related FW	1.2.0
Resolution [units]	Date		
Comm object	24553	Related applications	TLC-DC
Description			
Shows current Date.			

IL Info

Engine State

Value group	IL Info	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	8330	Related applications	TLC-DC
Description			
Shows general information about the IntelliLite controller - Engine state.			

Timer Text

Value group	IL Info	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	8954	Related applications	TLC-DC
Description			
Shows general information about the IntelliLite controller - Timer text.			

Timer Value

Value group	IL Info	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	8955	Related applications	TLC-DC
Description			
Shows general information about the IntelliLite controller - Timer value.			

FW Version

Value group	IL Info	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	8393	Related applications	TLC-DC
Description			
Shows general information about the IntelliLite controller - Firmware version.			

Application

Value group	IL Info	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	8480	Related applications	TLC-DC
Description			
Shows general information about the IntelliLite controller - Application number.			

FW Branch

Value group	IL Info	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	8707	Related applications	TLC-DC

Description
Shows general information about the IntelliLite controller - Firmware branch.

PasswordDecode

Value group	IL Info	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	9090	Related applications	TLC-DC
Description	Shows general information about the IntelliLite controller - Password decode number - requested by technical support (together with the Serial Number) in case of forgotten password.		

Recharg Status

Value group	IL Info	Related FW	1.2.0
Resolution [units]	[-]		
Comm object	13820	Related applications	TLC-DC
Description	Shows general information about the IntelliLite - Recharge status.		

AIO Module

AIO AI1

Value group	AIO Module	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	11862	Related applications	TLC-DC
Description	IL-NT AIO module Analog Input 1 value.		

AIO AI2

Value group	AIO Module	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	11863	Related applications	TLC-DC
Description	IL-NT AIO module Analog Input 2 value.		

AIO AI3

Value group	AIO Module	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	11864	Related applications	TLC-DC
Description	IL-NT AIO module Analog Input 3 value.		

AIO A14

Value group	AIO Module	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	11865	Related applications	TLC-DC
Description			
IL-NT AIO module Analog Input 4 value.			

AIO9/1

Battery Temp

Value group	AIO9/1	Related FW	1.2.0
Resolution [units]	0,1 [°C]		
Comm object	13523	Related applications	TLC-DC
Description			
Temperature of battery bank measured by AIO9/1 analog input.			

InteliAOUT

Value group	AIO9/1	Related FW	1.2.0
Resolution [units]	Configurable		
Comm object	13524	Related applications	TLC-DC
Description			
Output value of Analog output of AIO9/1 module.			

8.1.4 Logical binary inputs

What Logical binary inputs are:

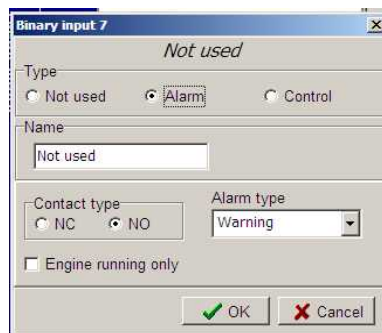
Logical binary inputs are inputs for binary values and functions.

Any Binary input can be configured to any IntelliLite Telecom DC controller input terminal or changed to different function by LiteEdit PC tool. There is adjustable delay when any binary input is configured as protection.

Configuration of binary inputs:

Each binary input can be configured in several ways. The settings can be made in the PC program LiteEdit, in Modify configuration window. After choosing a specific binary input, its window appears where the user can choose if the binary input will be used for protection (option Alarm) or for control (option Control) function.

Binary Alarm configuration items – see the picture and the table with explanations.



Name		14 characters ASCII string
Contact type	NC	Normally closed
	NO	Normally opened
Alarm type	Warning	
	A+H indication	
	Shutdown	
	BOC	
Alarm active	All the time	
	Engine running only	

Alphabetical groups of Logical binary inputs

LBI: A	158
LBI: B	158
LBI: C	159
LBI: E	160
LBI: F	160
LBI: G	161
LBI: H	161
LBI: L	161
LBI: N	162
LBI: R	162
LBI: S	163

For full list of Logical binary inputs go to the chapter **List of LBI (page 157)**.

List of LBI

ACB Button	158
ACB Feedback	158
ACB Trip	158
Access Lock	158
BCB Button	158
BCB Feedback	159
BCB Trip	159
ClearDayCons	159
ClearTotalCons	159
Emergency MAN	160
Emergency Stop	160
Ext Start/Stop	160
FaultResButton	160
GCB Button	161
GCB Feedback	161
GCB Trip	161
HornResButton	161
Lang Selection	161
LCB Button	161
LCB Feedback	162
LCB Trip	162
LightTowerON	162
Nominal/Idle	162
Rem Start/Stop	162
RemControlLock	163
Remote AUT	163
Remote MAN	163
Remote OFF	163
Sd Override	163
ServiceCycleSt	164
Speed Down	164
Speed Up	164
Start Button	164
Stop Button	164

LBI: A

ACB Button

Related FW	1.2.0	Related applications	TLC-DC
Comm object	592		
Description			
Use this input to control ACB by external button.			

ACB Feedback

Related FW	1.2.0	Related applications	TLC-DC
Comm object	562		
Description			
This is feedback signal from the generator circuit breaker. If the LBI ACB FEEDBACK is configured the breaker sequences are checked and protected by shutdown alarm message <i>Sd ACB Fail</i> .			

ACB Trip

Related FW	1.2.0	Related applications	TLC-DC
Comm object	566		
Description			
In MAN mode is control over auxiliary breaker given by binary output ACB CLOSE/OPEN. If mode is change from AUT to MAN mode status of breaker depends on the state of this binary input.			

Access Lock

Related FW	1.2.0	Related applications	TLC-DC
Comm object	288		
Description			
If the input is closed, no setpoints can be adjusted from controller front panel and engine mode (OFF-MAN-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.			

LBI: B

BCB Button

Related FW	1.2.0	Related applications	TLC-DC
Comm object	590		
Description			
Use this input to control BCB by external button.			

BCB Feedback

Related FW	1.2.0	Related applications	TLC-DC
Comm object	530		
Description			
This is feedback signal from the battery circuit breaker. If the BCB FEEDBACK is configured then breaker sequences are checked and protected by shutdown alarm message <i>Sd BCB Fail</i> .			

BCB Trip

Related FW	1.2.0	Related applications	TLC-DC
Comm object	564		
Description			
In MAN mode is control over battery breaker given by binary output BCB CLOSE/OPEN. If mode is change from AUT to MAN mode status of breaker depends on the state of this binary input.			

LBI: C

ClearDayCons

Related FW	1.2.0	Related applications	TLC-DC
Comm object	220		
Description			
<p><i>DayFuelConsum</i> is the counter which cumulates the instantaneous consumption coming from ECU. It shows the total consumption since the counter reset. Counter reset happen at the midnight of the controller clocks. LBI CLEARDAYCONS resets the counter <i>DayFuelConsum</i>.</p> <p>Note: The function works when the controller is connected to an ECU or in other case is consumption counted from the changes of analog input value Fuel rate and setpoint Engine params: <i>FuelTankVolume</i>.</p>			

ClearTotalCons

Related FW	1.2.0	Related applications	TLC-DC
Comm object	221		
Description			
<p><i>TotFuelConsum</i> is the counter which cumulates the instantaneous consumption coming from ECU. It shows the total consumption since last reset by LBI CLEARTOTALCONS. This LBI resets the counter <i>TotFuelConsum</i>.</p> <p>Note: The function works when the controller is connected to an ECU or in other case is consumption counted from the changes of analog input value Fuel rate and setpoint Engine params: <i>FuelTankVolume</i>.</p>			

LBI: E

Emergency MAN

Related FW	1.2.0	Related applications	TLC-DC
Comm object	295		
Description			
<p>If the input is activated the controller behaves in the same way as 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 <i>Sd Stop fail</i> is blocked. The controller shows <i>Emerg Man</i> 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 can be activated in any controller mode.</p>			

Emergency Stop

Related FW	1.2.0	Related applications	TLC-DC
Comm object	286		
Description			
<p>If the input is opened, shut down is immediately activated. Input is inverted (normally closed) in default configuration.</p> <p>IMPORTANT: 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.</p>			

Ext Start/Stop

Related FW	1.2.0	Related applications	TLC-DC
Comm object	285		
Description			
<p>Binary input is used for external request for engine run in AUT mode only. If used DC generator output is controlled to constant current level.</p> <p>Note: <i>Output of the generator doesn't follow charging cycle of the battery. This way of starting is usually used in case of additional smart charger which distribute specific current to each cell of battery bank. For example could be taken Lithium battery charging system.</i></p>			

LBI: F

FaultResButton

Related FW	1.2.0	Related applications	TLC-DC
Comm object	298		
Description			
<p>Binary input has the same function as <i>Fault reset</i> button on the controller front panel.</p>			

LBI: G

GCB Button

Related FW	1.2.0	Related applications	TLC-DC
Comm object	589		
Description			
Use this input to control GCB by external button.			

GCB Feedback

Related FW	1.2.0	Related applications	TLC-DC
Comm object	529		
Description			
This is feedback signal from the generator circuit breaker. If the LBI GCB FEEDBACK is configured then the breaker sequences are checked and protected by shutdown alarm message <i>Sd GCB Fail</i> .			

GCB Trip

Related FW	1.2.0	Related applications	TLC-DC
Comm object	563		
Description			
In MAN mode is control over generator breaker given by binary output GCB CLOSE/OPEN. If mode is change from AUT to MAN mode status of breakers depends on the state of this binary input.			

LBI: H

HornResButton

Related FW	1.2.0	Related applications	TLC-DC
Comm object	299		
Description			
Binary input has the same function as <i>Horn reset</i> button on the controller front panel.			

LBI: L

Lang Selection

Related FW	1.2.0	Related applications	TLC-DC
Comm object	303		
Description			
Switch between two languages of controller's display texts.			

LCB Button

Related FW	1.2.0	Related applications	TLC-DC
Comm object	591		
Description			
Use this input to control LCB by external button.			

LCB Feedback

Related FW	1.2.0	Related applications	TLC-DC
Comm object	531		
Description			
This is feedback signal from the generator circuit breaker. If the LBI LCB FEEDBACK is configured the breaker sequences are checked and protected by shutdown alarm message <i>Sd LCB Fail</i> .			

LCB Trip

Related FW	1.2.0	Related applications	TLC-DC
Comm object	565		
Description			
In MAN mode is control over load breaker given by binary output LCB CLOSE/OPEN. If mode is change from AUT to MAN mode status of breaker depends on the state of this binary input.			

LightTowerON

Related FW	1.2.0	Related applications	TLC-DC
Comm object	575		
Description			
Binary input activates binary output LIGHTTOWERON.			

LBI: N

Nominal/Idle

Related FW	1.2.0	Related applications	TLC-DC
Comm object	304		
Description			
Input is switching the controller between running states Nominal/Idle. Active NOMINAL/IDLE input activates binary output IDLE/NOMINAL too and sends the Speed request = <i>Engine params: Idle speed</i> and/or activates the (binary) IDLE command to the ECU .			
Note: <i>It is working in MAN mode only.</i>			
Active input deactivates the binary output READY TO LOAD during the engine running state. READY TO LOAD can be activated back again if NOMINAL/IDLE LBI is is opened (and if other conditions are fulfilled) .			

LBI: R

Rem Start/Stop

Related FW	1.2.0	Related applications	TLC-DC
Comm object	616		
Description			
Activating this LBI starts the engine.			

RemControlLock

Related FW	1.2.0	Related applications	TLC-DC
Comm object	294		
Description			
If the input is active, setpoints writing or command sending from the external terminal is disabled.			

Remote AUT

Related FW	1.2.0	Related applications	TLC-DC
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.			

Remote MAN

Related FW	1.2.0	Related applications	TLC-DC
Comm object	290		
Description			
If the input is active, MAN mode is forced to the controller independently on the position of the MODE selector.			

Remote OFF

Related FW	1.2.0	Related applications	TLC-DC
Comm object	289		
Description			
If closed, controller is switched to OFF mode (there are three modes OFF-MAN-AUT). When opens controller is switched back to previous mode.			
Note: This binary input is connected to the schedule timer switch to possible avoiding of engine start.			

LBI: S

Sd Override

Related FW	1.2.0	Related applications	TLC-DC
Comm object	287		
Description			
If the input is closed all alarms are disabled except the binary input EMERGENCY STOP and "engine overspeed protection".			
<ul style="list-style-type: none"> ▶ all alarms are detected ▶ front panel RED LED blinks or lights ▶ alarm is recorded on the alarm list screen ▶ BUT engine remains running. 			
IMPORTANT: Warning Sd Override is indicated in the Alarm list if Sd Override mode active to inform the operator that the engine is not protected.			

ServiceCycleSt

Related FW	1.2.0	Related applications	TLC-DC
Comm object	397		
Description			
Binary input activates service charging cycle in AUT mode for preadjusted time. Adjusting of the time period is possible by setpoint <i>ServiceCycle</i> .			

Speed Down

Related FW	1.2.0	Related applications	TLC-DC
Comm object	306		
Description			
Decreases the speed request value sent via CAN bus or via analog output.			

Speed Up

Related FW	1.2.0	Related applications	TLC-DC
Comm object	305		
Description			
Increases the speed request value sent via CAN bus or via analog output.			

Start Button

Related FW	1.2.0	Related applications	TLC-DC
Comm object	296		
Description			
Binary input has the same function as Start button on the controller front panel. It is active in MAN mode only.			

Stop Button

Related FW	1.2.0	Related applications	TLC-DC
Comm object	297		
Description			
Binary input has the same function as Stop button on the controller front panel. It is active in MAN mode only.			

8.1.5 Logical binary outputs

What Logical binary outputs are:

Logical binary outputs are outputs for binary values and functions.

Any Binary output can be configured to any Intelilite Telecom DC controller output terminal or changed to different function by LiteEdit PC tool.

Alphabetical groups of Logical binary outputs

LBO: A	167
LBO: B	170
LBO: C	173
LBO: E	175
LBO: F	176
LBO: G	176
LBO: H	177
LBO: I	177
LBO: L	177
LBO: M	178
LBO: N	178
LBO: P	179
LBO: R	179
LBO: S	181
LBO: T	183
LBO: W	183

For full list of Logical binary outputs go to the chapter **List of LBO (page 166)**.

List of LBO

ACB Close/Open	167	ChrgAlternFail	173	RemoteControl8	180
Air Valves	167	ChrgTimeout	174	Running	181
AL AI1 Sd	167	Close Load	174	Sd AnmAIO1	181
AL AI1 Wrn	167	Cooling Pump	174	Sd AnmAIO2	181
AL AI2 Sd	167	Cooling	174	Sd AnmAIO3	181
AL AI2 Wrn	167	Ctrl HeartBeat	174	Sd AnmAIO4	181
AL AI3 Sd	168	ECU Comm Error	175	ServiceCycleSt	181
AL AI3 Wrn	168	ECU Comm OK	175	Speed Down	182
AL BatteryFail	168	ECU PowerRelay	175	Speed Up	182
AL Common BOC	168	ECU RedLamp	175	SpeedSwitch	182
AL Common Fls	168	ECU YellowLamp	175	Starter	182
AL Common Sd	168	Exerc Timer 1	175	Stop Pulse	182
AL Common Wrn	169	Exerc Timer 2	176	Stop Solenoid	183
AL Overspeed	169	Fault Reset	176	Toggle	183
AL Start Fail	169	Fuel Solenoid	176	Wrn AnmAIO1	183
AL Stop Fail	169	GCB Close Open	176	Wrn AnmAIO2	183
AL Underspeed	169	Glow Plugs	176	Wrn AnmAIO3	183
Alarm	169	Horn	177	Wrn AnmAIO4	184
BCB Close/Open	170	Idle/Nominal	177		
BI1 Status	170	Ignition	177		
BI2 Status	170	LCB Close Open	177		
BI3 Status	170	LightTowerON	178		
BI4 Status	170	Maintenance	178		
BI5 Status	171	Mode AUT	178		
BI6 Status	171	Mode MAN	178		
BI7 Status	171	Mode OFF	178		
BI8 Status	171	Not Used	178		
BI9 Status	171	Prestart	179		
BI10 Status	172	Ready To Load	179		
BIO8 1 Status	172	Ready	179		
BIO8 2 Status	172	RemoteControl1	179		
BIO8 3 Status	172	RemoteControl2	179		
BIO8 4 Status	172	RemoteControl3	180		
BIO8 5 Status	173	RemoteControl4	180		
BIO8 6 Status	173	RemoteControl5	180		
BIO8 7 Status	173	RemoteControl6	180		
BIO8 8 Status	173	RemoteControl7	180		

LBO: A

ACB Close/Open

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1086		
Description			
Binary output is closing the Auxiliary Circuit Breaker according to the charging algorithm in the AUT mode. In MAN mode it corresponds to the state of the binary input ACB CLOSE/OPEN.			

Air Valves

Related FW	1.2.0	Related applications	TLC-DC
Comm object	471		
Description			
Output for Air Valves controlling, it closes together with the PRESTART and opens after the engine is stopped.			

AL AI1 Sd

Related FW	1.2.0	Related applications	TLC-DC
Comm object	521		
Description			
Output closes if the Analog input 1 Shutdown alarm activates (typically Oil Pressure). The output opens, if alarm is not active and the FAULT RESET is pressed.			

AL AI1 Wrn

Related FW	1.2.0	Related applications	TLC-DC
Comm object	522		
Description			
Output closes if the Analog input 1 Warning alarm activates (typically Oil Pressure). The output opens, if the alarm is not active and the FAULT RESET is pressed.			

AL AI2 Sd

Related FW	1.2.0	Related applications	TLC-DC
Comm object	523		
Description			
Output closes if the Analog input 2 Shutdown alarm activates (typically Engine Temperature). The output opens, if the alarm is not active and the FAULT RESET is pressed.			

AL AI2 Wrn

Related FW	1.2.0	Related applications	TLC-DC
Comm object	524		
Description			
Output closes if the Analog input 2 Warning alarm activates. The output opens, if the alarm is not active and the FAULT RESET is pressed.			

AL AI3 Sd

Related FW	1.2.0	Related applications	TLC-DC
Comm object	525		
Description			
Output closes if the Analog input 3 Shutdown alarm activates (typically Fuel Level). The output opens, if the alarm is not active and the FAULT RESET is pressed.			

AL AI3 Wrn

Related FW	1.2.0	Related applications	TLC-DC
Comm object	526		
Description			
Output closes if the Analog input 3 Warning alarm activates. The output opens, if the alarm is not active and the FAULT RESET is pressed.			

AL BatteryFail

Related FW	1.2.0	Related applications	TLC-DC
Comm object	517		
Description			
Output closes when controller performs reset during start procedure (probably due to weak power supply) or battery supply over/under voltage warning appears. The output opens, if the alarm is not active and the FAULT RESET is pressed.			

AL Common BOC

Related FW	1.2.0	Related applications	TLC-DC
Comm object	776		
Description			
Output closes when any BOC alarm appears. The output opens, if no BOC alarm is active and the FAULT RESET is pressed.			

AL Common Fls

Related FW	1.2.0	Related applications	TLC-DC
Comm object	520		
Description			
Output closes when any sensor fail alarm appears. The output opens, if no Warning alarm is active and the FAULT RESET is pressed .			

AL Common Sd

Related FW	1.2.0	Related applications	TLC-DC
Comm object	519		
Description			
Output closes when any Shutdown alarm appears. The output opens, if no Sd alarm is active and the FAULT RESET is pressed.			

AL Common Wrn

Related FW	1.2.0	Related applications	TLC-DC
Comm object	518		
Description			
Output closes when any Warning alarm appears. The output opens, if no Warning alarm is active and the FAULT RESET is pressed.			

AL Overspeed

Related FW	1.2.0	Related applications	TLC-DC
Comm object	513		
Description			
Output closes if the engine over speed alarm activates. The output opens, if the alarm is not active and the FAULT RESET is pressed.			

AL Start Fail

Related FW	1.2.0	Related applications	TLC-DC
Comm object	515		
Description			
Output closes after the engine start-up fails. The output opens, if the alarm is not active and the FAULT RESET is pressed.			

AL Stop Fail

Related FW	1.2.0	Related applications	TLC-DC
Comm object	512		
Description			
Output closes when the engine has to be stopped, but speed or oil pressure is detected. This protection goes active 60 s after the stop command. The output opens, if the alarm is not active and the FAULT RESET is pressed.			

AL Underspeed

Related FW	1.2.0	Related applications	TLC-DC
Comm object	514		
Description			
Output closes if the engine <i>Sd Underspeed</i> alarm activates, i.e. when RPM is below the <i>Engine params: Starting RPM</i> limit. The output opens, if the alarm is not active and the FAULT RESET is pressed .			

Alarm

Related FW	1.2.0	Related applications	TLC-DC
Comm object	472		
Description			
The output closes if any Warning, BOC or Shutdown comes up or the engine malfunctions The output opens if the FAULT RESET is pressed. The output closes again if a new fault comes up.			

LBO: B

BCB Close/Open

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1085		
Description			
Binary output is closing Battery Circuit Breaker according to the charging algorithm in the AUT mode. In MAN mode it corresponds to the state of the binary input BCB CLOSE/OPEN.			

BI1 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	527		
Description			
In case the binary input is configured to any control function, the binary output depicts the state of the binary input. BI1, BI2, BI3, BI4, BI5, BI6 are assigned for controller binary inputs. Inputs BI7, BI8, BI9, BI10 are assigned for IL-NT IO1 optional card.			

BI2 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	528		
Description			
In case the binary input is configured to any control function, the binary output depicts the state of the binary input. BI1, BI2, BI3, BI4, BI5, BI6 are assigned for controller binary inputs. Inputs BI7, BI8, BI9, BI10 are assigned for IL-NT IO1 optional card.			

BI3 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	529		
Description			
In case the binary input is configured to any control function, the binary output depicts the state of the binary input. BI1, BI2, BI3, BI4, BI5, BI6 are assigned for controller binary inputs. Inputs BI7, BI8, BI9, BI10 are assigned for IL-NT IO1 optional card.			

BI4 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	530		
Description			
In case the binary input is configured to any control function, the binary output depicts the state of the binary input. BI1, BI2, BI3, BI4, BI5, BI6 are assigned for controller binary inputs. Inputs BI7, BI8, BI9, BI10 are assigned for IL-NT IO1 optional card.			

BI5 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	531		
Description			
In case the binary input is configured to any control function, the binary output depicts the state of the binary input. BI1, BI2, BI3, BI4, BI5, BI6 are assigned for controller binary inputs. Inputs BI7, BI8, BI9, BI10 are assigned for IL-NT IO1 optional card.			

BI6 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	532		
Description			
In case the binary input is configured to any control function, the binary output depicts the state of the binary input. BI1, BI2, BI3, BI4, BI5, BI6 are assigned for controller binary inputs. Inputs BI7, BI8, BI9, BI10 are assigned for IL-NT IO1 optional card.			

BI7 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	533		
Description			
In case the binary input is configured to any control function, the binary output depicts the state of the binary input. BI1, BI2, BI3, BI4, BI5, BI6 are assigned for controller binary inputs. Inputs BI7, BI8, BI9, BI10 are assigned for IL-NT IO1 optional card.			

BI8 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	586		
Description			
In case the binary input is configured to any control function, the binary output depicts the state of the binary input. BI1, BI2, BI3, BI4, BI5, BI6 are assigned for controller binary inputs. Inputs BI7, BI8, BI9, BI10 are assigned for IL-NT IO1 optional card.			

BI9 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	587		
Description			
In case the binary input is configured to any control function, the binary output depicts the state of the binary input. BI1, BI2, BI3, BI4, BI5, BI6 are assigned for controller binary inputs. Inputs BI7, BI8, BI9, BI10 are assigned for IL-NT IO1 optional card.			

BI10 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	588		
Description			
In case the binary input is configured to any control function, the binary output depicts the state of the binary input. BI1, BI2, BI3, BI4, BI5, BI6 are assigned for controller binary inputs. Inputs BI7, BI8, BI9, BI10 are assigned for IL-NT IO1 optional card.			

BIO8 1 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	550		
Description			
In case the assigned binary input of IL-NT BIO8 optional card is configured to any control function, the output propagates the state of the respective input. These binary outputs are possible to configure only if the IL-NT BIO8 is configured.			

BIO8 2 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	551		
Description			
In case the assigned binary input of IL-NT BIO8 optional card is configured to any control function, the output propagates the state of the respective input. These binary outputs are possible to configure only if the IL-NT BIO8 is configured.			

BIO8 3 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	552		
Description			
In case the assigned binary input of IL-NT BIO8 optional card is configured to any control function, the output propagates the state of the respective input. These binary outputs are possible to configure only if the IL-NT BIO8 is configured.			

BIO8 4 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	553		
Description			
In case the assigned binary input of IL-NT BIO8 optional card is configured to any control function, the output propagates the state of the respective input. These binary outputs are possible to configure only if the IL-NT BIO8 is configured.			

BIO8 5 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	554		
Description			
In case the assigned binary input of IL-NT BIO8 optional card is configured to any control function, the output propagates the state of the respective input. These binary outputs are possible to configure only if the IL-NT BIO8 is configured.			

BIO8 6 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	555		
Description			
In case the assigned binary input of IL-NT BIO8 optional card is configured to any control function, the output propagates the state of the respective input. These binary outputs are possible to configure only if the IL-NT BIO8 is configured.			

BIO8 7 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	556		
Description			
In case the assigned binary input of IL-NT BIO8 optional card is configured to any control function, the output propagates the state of the respective input. These binary outputs are possible to configure only if the IL-NT BIO8 is configured.			

BIO8 8 Status

Related FW	1.2.0	Related applications	TLC-DC
Comm object	557		
Description			
In case the assigned binary input of IL-NT BIO8 optional card is configured to any control function, the output propagates the state of the respective input. These binary outputs are possible to configure only if the IL-NT BIO8 is configured.			

LBO: C

ChrgAlternFail

Related FW	1.2.0	Related applications	TLC-DC
Comm object	501		
Description			
Output closes if engine is running and D+ input not energized. The output opens, if the alarm is not active and the FAULT RESET is pressed			
Note: Threshold level for D+ input is 80% supply voltage.			

ChrgTimeout

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1399		
Description			
Output closes if the <i>Wrm ChrgTimeout</i> alarm activates. Maximum charging time is adjusted by setpoint <i>Battery Charge: ChrgLimitTime</i> .			

Close Load

Related FW	1.2.0	Related applications	TLC-DC
Comm object	755		
Description			
Output is controlled by panel ON/OFF button when Basic settings: <i>Panel Button</i> = Close Load, engine is running and no Sd/BOC alarm is active. CLOSE LOAD output is not closed in Idle and Cooling states and is disconnected when any Sd/BOC alarm is activated.			

Cooling Pump

Related FW	1.2.0	Related applications	TLC-DC
Comm object	469		
Description			
The output closes when the engine starts and it opens after <i>AfterCool time</i> elapses after the stop of the engine.			

Cooling

Related FW	1.2.0	Related applications	TLC-DC
Comm object	486		
Description			
The output closes when the engine is in Cooling state.			

Ctrl HeartBeat

Related FW	1.2.0	Related applications	TLC-DC
Comm object	496		
Description			
The output signalizes watchdog reset. In a healthy state it flashes at 500 ms rate. It stops flashing when the unit reset occurs and the new controller start-up fails.			

LBO: E

ECU Comm Error

Related FW	1.2.0	Related applications	TLC-DC
Comm object	559		
Description			
The output is an inversion of binary output ECU COMMOK.			
Example: The output is closed when ECU is not communicating and all values from ECU show #####.			

ECU Comm OK

Related FW	1.2.0	Related applications	TLC-DC
Comm object	558		
Description			
If the ECU communicates properly the output is active. If the ECU is not communicating and all ECU values are showing ##### the output is not active.			

ECU PowerRelay

Related FW	1.2.0	Related applications	TLC-DC
Comm object	562		
Description			
The output closes at the beginning of PRESTART and it opens if the engine shall be stopped.			

ECU RedLamp

Related FW	1.2.0	Related applications	TLC-DC
Comm object	561		
Description			
The output copies the Shutdown information from ECU.			

ECU YellowLamp

Related FW	1.2.0	Related applications	TLC-DC
Comm object	560		
Description			
The output copies the Warning information from ECU.			

Exerc Timer 1

Related FW	1.2.0	Related applications	TLC-DC
Comm object	491		
Description			
Output activates when the <i>Timer1</i> is active. Simultaneously the engine is started when it is in AUT mode.			

Exerc Timer 2

Related FW	1.2.0	Related applications	TLC-DC
Comm object	492		
Description			
Output activates when the <i>Timer2</i> is active. Simultaneously the engine is started when it is in AUT mode.			

LBO: F

Fault Reset

Related FW	1.2.0	Related applications	TLC-DC
Comm object	488		
Description			
One second pulse as echo for panel Fault reset button.			

Fuel Solenoid

Related FW	1.2.0	Related applications	TLC-DC
Comm object	464		
Description			
<p>Closed output opens the fuel solenoid and enables the engine start.</p> <p>The output opens if:</p> <ul style="list-style-type: none"> ▶ EMERGENCY STOP comes or ▶ cooled engine is stopped or ▶ in pause between repeated starts 			

LBO: G

GCB Close Open

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1015		
Description			
Binary output is closing the Generator Circuit Breaker according to the algorithm in the AUT mode. In MAN mode it corresponds to the state of the binary input GCB Close/Open.			

Glow Plugs

Related FW	1.2.0	Related applications	TLC-DC
Comm object	574		
Description			
The output controls the Glow Plugs, is closes prior to the engine start and opens when Starting RPM is reached. During repeated crank attempts the output is closed too. The output could be used for pre-glow or pre-heat.			

LBO: H

Horn

Related FW	1.2.0	Related applications	TLC-DC
Comm object	473		
Description			
<p>The output closes if:</p> <ul style="list-style-type: none"> ▶ any warning or shutdown comes up or ▶ the engine malfunctions <p>The output opens if:</p> <ul style="list-style-type: none"> ▶ FAULT RESET is pressed or ▶ HORN RESET is pressed or ▶ Max time of LBO HORN is exceeded (<i>Horn timeout</i>). <p>The output closes again if a new fault comes up.</p>			

LBO: I

Idle/Nominal

Related FW	1.2.0	Related applications	TLC-DC
Comm object	470		
Description			
<p>The output either follows the NOMINAL/IDLE binary input or I/O button (if set) in MAN mode or follows the engine state in AUT mode: The output IDLE/NOMINAL closes after the timer <i>Idle time</i> elapses. The Idle time counter starts to countdown when Start speed reached. The Underspeed protection is not evaluated during idle time. Start fail protection occurs if the RPM drop below 2 RPM during Idle state.</p> <p>Note: When LBI NOMINAL/IDLE is configured (to a physical binary input), it has priority and the switching between the nominal and the Idle speed on I/O button is blocked.</p>			

Ignition

Related FW	1.2.0	Related applications	TLC-DC
Comm object	467		
Description			
<p>The output closes after reaching CrankRPM value (fixed 30 RPM). The output opens after stopping of the engine or in pause during repeated start.</p>			

LBO: L

LCB Close Open

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1004		
Description			
<p>Binary output is closing the Load Circuit Breaker according to the charging algorithm in the AUT mode. In MAN mode it corresponds to the state of the binary input LCB CLOSE/OPEN.</p>			

LightTowerON

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1154		
Description			
State of the binary output is activated by the function in setpoint group <i>Date/Time: Timer1Function</i> or <i>Timer2Function</i> or by binary input LIGHTTOWERON. Active binary input state has priority before Timer function.			

LBO: M

Maintenance

Related FW	1.2.0	Related applications	TLC-DC
Comm object	495		
Description			
Output closes if the Maintenance alarm activates. Service time is adjusted by setpoint <i>Engine protect: WrmMaintenance</i> .			

Mode AUT

Related FW	1.2.0	Related applications	TLC-DC
Comm object	499		
Description			
The output is closed if AUT mode is selected.			

Mode MAN

Related FW	1.2.0	Related applications	TLC-DC
Comm object	498		
Description			
The output is closed if MAN mode is selected.			

Mode OFF

Related FW	1.2.0	Related applications	TLC-DC
Comm object	497		
Description			
The output is closed if OFF mode is selected.			

LBO: N

Not Used

Related FW	1.2.0	Related applications	TLC-DC
Comm object	462		
Description			
Output has no function.			

LBO: P

Prestart

Related FW	1.2.0	Related applications	TLC-DC
Comm object	468		
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.			

LBO: R

Ready To Load

Related FW	1.2.0	Related applications	TLC-DC
Comm object	484		
Description			
The output is closed if engine is running and no alarm is active - it is possible to close load. The output opens when <i>Wrm Underspeed</i> protection is active and during cooling state.			

Ready

Related FW	1.2.0	Related applications	TLC-DC
Comm object	482		
Description			
The output is closed if following conditions are fulfilled:			
<ul style="list-style-type: none"> ▶ Engine is not running and ▶ No Shutdown or BOC alarm is active ▶ Controller is not in OFF mode 			

RemoteControl1

Related FW	1.2.0	Related applications	TLC-DC
Comm object	649		
Description			
It allows to configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or IntelliMonitor and it can be also controlled via Modbus communication.			

RemoteControl2

Related FW	1.2.0	Related applications	TLC-DC
Comm object	650		
Description			
It allows to configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or IntelliMonitor and it can be also controlled via Modbus communication.			

RemoteControl3

Related FW	1.2.0	Related applications	TLC-DC
Comm object	651		
Description			
It allows to configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or InteliMonitor and it can be also controlled via Modbus communication.			

RemoteControl4

Related FW	1.2.0	Related applications	TLC-DC
Comm object	652		
Description			
It allows to configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or InteliMonitor and it can be also controlled via Modbus communication.			

RemoteControl5

Related FW	1.2.0	Related applications	TLC-DC
Comm object	653		
Description			
It allows to configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or InteliMonitor and it can be also controlled via Modbus communication.			

RemoteControl6

Related FW	1.2.0	Related applications	TLC-DC
Comm object	654		
Description			
It allows to configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or InteliMonitor and it can be also controlled via Modbus communication.			

RemoteControl7

Related FW	1.2.0	Related applications	TLC-DC
Comm object	655		
Description			
It allows to configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or InteliMonitor and it can be also controlled via Modbus communication.			

RemoteControl8

Related FW	1.2.0	Related applications	TLC-DC
Comm object	656		
Description			
It allows to configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or InteliMonitor and it can be also controlled via Modbus communication.			

Running

Related FW	1.2.0	Related applications	TLC-DC
Comm object	485		
Description			
Output closes if the engine is in Running state.			

LBO: S

Sd AnImAIO1

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1215		
Description			
Output closes if the shutdown alarms for IL-NT AIO analog input 1 activates. The output opens, if the alarm is not active and the FAULT RESET is pressed.			

Sd AnImAIO2

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1216		
Description			
Output closes if the shutdown alarms for IL-NT AIO analog input 2 activates. The output opens, if the alarm is not active and the FAULT RESET is pressed.			

Sd AnImAIO3

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1217		
Description			
Output closes if the shutdown alarms for IL-NT AIO analog input 3 activates. The output opens, if the alarm is not active and the FAULT RESET is pressed.			

Sd AnImAIO4

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1218		
Description			
Output closes if the shutdown alarms for IL-NT AIO analog input 4 activates. The output opens, if the alarm is not active and the FAULT RESET is pressed.			

ServiceCycleSt

Related FW	1.2.0	Related applications	TLC-DC
Comm object	775		
Description			
Binary output SERVICECYCLEST is active during time period, which is given by setpoint <i>ServiceCycle</i> , after the activation of service cycle by binary input SERVICECYCLEST.			

Speed Down

Related FW	1.2.0	Related applications	TLC-DC
Comm object	57		
Description			
Outputs Speed Down and SPEED UP (PAGE 182) are designed for speed control at gen-sets, where the governor supports binary control.			

Speed Up

Related FW	1.2.0	Related applications	TLC-DC
Comm object	56		
Description			
Outputs SPEED DOWN (PAGE 182) and SPEED UP are designed for speed control at gen-sets, where the governor supports binary control.			

SpeedSwitch

Related FW	1.2.0	Related applications	TLC-DC
Comm object	590		
Description			
Binary output from Speed switch comparator, output corresponds to the comparator state – see Reg CMP Input on page 115.			

Starter

Related FW	1.2.0	Related applications	TLC-DC
Comm object	463		
Description			
<p>Closed relay energizes the starter of the engine.</p> <p>The relay opens if:</p> <ul style="list-style-type: none"> ▶ the starting speed is reached or ▶ maximum time of cranking is exceeded or ▶ request to stop comes up 			

Stop Pulse

Related FW	1.2.0	Related applications	TLC-DC
Comm object	466		
Description			
Output is active for 1 second after the STOP SOLENOID output activation. This signal is typically sent to ECU in case of engine stop request.			

Stop Solenoid

Related FW	1.2.0	Related applications	TLC-DC
Comm object	465		
Description			
<p>The closed output energizes the Stop solenoid to stop the engine. The output is active at least for <i>Stop time</i>. If the stop lasts longer; it stays active until all symptoms say the engine is stopped.</p> <p>The engine is stopped if:</p> <ul style="list-style-type: none"> ▶ RPM < 2 and ▶ Oil pressure < <i>Engine params: Starting Oil P</i> <p>Note: <i>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).</i></p>			

LBO: T

Toggle

Related FW	1.2.0	Related applications	TLC-DC
Comm object	756		
Description			
<p>Output is controlled by panel 0/1 button when Basic settings: <i>Panel Button</i> = Toggle. This setting changes the Toggle output without any relation to Engine state or Alarm activity even if in OFF mode.</p>			

LBO: W

Wrn AnImAIO1

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1211		
Description			
<p>Output closes if the Warning alarm for IL-NT AIO analog input 1 activates. The output opens, if the alarm is not active and the FAULT RESET is pressed.</p>			

Wrn AnImAIO2

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1212		
Description			
<p>Output closes if the Warning alarm for IL-NT AIO analog input 2 activates. The output opens, if the alarm is not active and the FAULT RESET is pressed.</p>			

Wrn AnImAIO3

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1213		
Description			
<p>Output closes if the Warning alarm for IL-NT AIO analog input 3 activates. The output opens, if the alarm is not active and the FAULT RESET is pressed.</p>			

Wrn AnImAIO4

Related FW	1.2.0	Related applications	TLC-DC
Comm object	1214		
Description			
Output closes if the Warning alarm for IL-NT AIO analog input 4 activates. The output opens, if the alarm is not active and the FAULT RESET is pressed.			

8.2 Alarms

What alarms are:

The controller evaluates two levels of alarms. For more information please see **Alarm management on page 61**.

8.2.1 Alarm levels in the controller

8.2.2 Alarms level 1	186
8.2.3 Alarms level 2	193

8.2.2 Alarms level 1

What alarms level 1 are:

Short description of alarms level 1.

Types of alarms level 1

Warning (Wm) 188

For full list of Alarms level 1 go to **List of alarms level 1 (page 187)**.

List of alarms level 1

ActCallCH1Fail	188
ActCallCH2Fail	188
DPF RegenInhib	188
HEST Lamp	188
CheckDPFStatus	188
ChrgAlternFail	188
Low BackupBatt	189
Regener Needed	189
RegenerNeeded!	189
Sd Override	189
Wrn AuxOvrCur	189
Wrn Batt Volt	189
Wrn BattOvrCur	190
Wrn ECU alarm	190
Wrn ECU Comm	190
Wrn EngTempLow	190
Wrn FuelTheft	190
Wrn GenOvrCur	191
Wrn LoadOvrCur	191
Wrn PoorChrg	191
Wrn RA fail	191
Wrn Ucomp Hi	191
Wrn Ucomp Low	191
Wrn Ugen Hi	192
Wrn Ugen Low	192
Wrn Underspeed	192
WrnChrgTimeout	192
WrnMaintenance	192

Warning (Wrn)

ActCallCH1Fail

Alarm Type	Warning
Alarmlist message	ActCallCH1Fail
Alarm evaluated	
Related applications	TLC-DC
Description	Active call on channel 1 failed.

ActCallCH2Fail

Alarm Type	Warning
Alarmlist message	ActCallCH2Fail
Alarm evaluated	
Related applications	TLC-DC
Description	Active call on channel 2 failed.

DPF RegenInhib

Alarm Type	Warning
Alarmlist message	DPF RegenInhib
Alarm evaluated	
Related applications	TLC-DC
Description	ECU indicates DPF Regeneration Inhibit.

HEST Lamp

Alarm Type	Warning
Alarmlist message	HEST Lamp
Alarm evaluated	
Related applications	TLC-DC
Description	High Exhaust System Temperature

CheckDPFStatus

Alarm Type	Warning
Alarmlist message	CheckDPFStatus
Alarm evaluated	
Related applications	TLC-DC
Description	Check DPF status

ChrgAlternFail

Alarm Type	Warning
Alarmlist message	ChrgAlternFail
Alarm evaluated	

Related applications	TLC-DC
Description	Failure of alternator for charging the battery.

Low BackupBatt

Alarm Type	Warning
Alarmlist message	Low BackupBatt
Alarm evaluated	
Related applications	TLC-DC
Description	RTC backup battery is flat.

Regener Needed

Alarm Type	Warning
Alarmlist message	Regener Needed
Alarm evaluated	
Related applications	TLC-DC
Description	DPF filter requires regeneration.

RegenerNeeded!

Alarm Type	Warning
Alarmlist message	RegenerNeeded!
Alarm evaluated	
Related applications	TLC-DC
Description	DPF filter requires regeneration.

Sd Override

Alarm Type	Warning
Alarmlist message	Sd Override
Alarm evaluated	
Related applications	TLC-DC
Description	Sd Override mode is active. Engine is not protected.

Wrn AuxOvrCur

Alarm Type	Warning
Alarmlist message	Wrn AuxOvrCur
Alarm evaluated	
Related applications	TLC-DC
Description	Auxiliary current is too high.

Wrn Batt Volt

Alarm Type	Warning
Alarmlist message	Wrn Batt Volt
Alarm evaluated	

Related applications	TLC-DC
Description	Battery voltage is out of limits given by bat <i>Batt Overvolt</i> and <i>Batt Under V</i> setpoints.

Wrn BattOvrCur

Alarm Type	Warning
Alarmlist message	Wrn BattOvrCur
Alarm evaluated	
Related applications	TLC-DC
Description	Battery current is too high.

Wrn ECU alarm

Alarm Type	Warning
Alarmlist message	Wrn ECU alarm
Alarm evaluated	
Related applications	TLC-DC
Description	ECU alarm list is not empty

Wrn ECU Comm

Alarm Type	Warning
Alarmlist message	Wrn ECU Comm
Alarm evaluated	
Related applications	TLC-DC
Description	ECU communication failed.

Wrn EngTempLow

Alarm Type	Warning
Alarmlist message	Wrn EngTempLow
Alarm evaluated	
Related applications	TLC-DC
Description	Engine temperature is too low.

Wrn FuelTheft

Alarm Type	Warning
Alarmlist message	Wrn FuelTheft
Alarm evaluated	
Related applications	TLC-DC
Description	Fuel theft indication alarm.

Wrn GenOvrCur

Alarm Type	Warning
Alarmlist message	Wrn GenOvrCur
Alarm evaluated	
Related applications	TLC-DC
Description	Generator current is too high.

Wrn LoadOvrCur

Alarm Type	Warning
Alarmlist message	Wrn LoadOvrCur
Alarm evaluated	
Related applications	TLC-DC
Description	Load current is too high.

Wrn PoorChrg

Alarm Type	Warning
Alarmlist message	Wrn PoorChrg
Alarm evaluated	
Related applications	TLC-DC
Description	Possible failure within charging circuitry.

Wrn RA fail

Alarm Type	Warning
Alarmlist message	Wrn RA fail
Alarm evaluated	
Related applications	TLC-DC
Description	Warning alarm in case of lost connection to IGL-RA15 module.

Wrn Ucomp Hi

Alarm Type	Warning
Alarmlist message	Wrn Ucomp Hi
Alarm evaluated	
Related applications	TLC-DC
Description	Compensated voltage is too high.

Wrn Ucomp Low

Alarm Type	Warning
Alarmlist message	Wrn Ucomp Low
Alarm evaluated	
Related applications	TLC-DC
Description	Compensated voltage is too low.

Wrn Ugen Hi

Alarm Type	Warning
Alarmlist message	Wrn Ugen Hi
Alarm evaluated	
Related applications	TLC-DC
Description	Generator voltage is too high.

Wrn Ugen Low

Alarm Type	Warning
Alarmlist message	Wrn Ugen Low
Alarm evaluated	
Related applications	TLC-DC
Description	Generator voltage is too low.

Wrn Underspeed

Alarm Type	Warning
Alarmlist message	Wrn Underspeed
Alarm evaluated	
Related applications	TLC-DC
Description	Engine speed is too low.

WrnChrgTimeout

Alarm Type	Warning
Alarmlist message	WrnChrgTimeout
Alarm evaluated	
Related applications	TLC-DC
Description	Charging procedure is longer than <i>ChrgTimeout</i> setpoint value.

WrnMaintenance

Alarm Type	Warning
Alarmlist message	WrnMaintenance
Alarm evaluated	
Related applications	TLC-DC
Description	The period for servicing is set by the <i>WrnMaintenance</i> setpoint. The protection comes active if the running hours of the engine reach this value.

8.2.3 Alarms level 2

What alarms level 2 are:

Short description of alarms level 2.

Types of alarms level 2

Shutdown (Sd)195

For full list of alarms level 2 go to **List of alarms level 2 (page 194)**.

List of alarms level 2

ACB Fail	195
BCB Fail	195
Emergency Stop	195
GCB Fail	195
ChrgAlternFail	195
LCB Fail	196
RPM meas fail	196
Sd AuxOvrCurr	196
Sd BatteryFlat	196
Sd BattOvrCurr	196
Sd GenOvrCurr	197
Sd iAIO fail	197
Sd IOM fail	197
Sd LoadOvrCurr	197
Sd NotOilPress	197
Sd Overspeed	197
Sd StartFail	198
Sd Stop fail	198
Sd Ucomp Hi	198
Sd Ucomp Low	198
Sd Ugen High	198
Sd Ugen Low	198
Sd Underspeed	199

Shutdown (Sd)

ACB Fail

Alarm Type	Shutdown
Alarmlist message	ACB Fail
Alarm evaluated	
Related applications	TLC-DC
Description	Shutdown protection activated due to ACB failure - incorrect feedback information received.

BCB Fail

Alarm Type	Shutdown
Alarmlist message	BCB Fail
Alarm evaluated	
Related applications	TLC-DC
Description	Shutdown protection activated due to BCB failure - incorrect feedback information received.

Emergency Stop

Alarm Type	Shutdown
Alarmlist message	Emergency Stop
Alarm evaluated	
Related applications	TLC-DC
Description	If the input <i>Emergency Stop</i> is opened, shutdown is immediately activated.

GCB Fail

Alarm Type	Shutdown
Alarmlist message	GCB Fail
Alarm evaluated	
Related applications	TLC-DC
Description	Shutdown protection activated due to GCB failure - incorrect feedback information received.

ChrgAlternFail

Alarm Type	Shutdown
Alarmlist message	ChrgAlternFail
Alarm evaluated	
Related applications	TLC-DC
Description	Failure of alternator for charging the battery.

LCB Fail

Alarm Type	Shutdown
Alarmlist message	LCB Fail
Alarm evaluated	
Related applications	TLC-DC
Description	Shutdown protection activated due to LCB failure - incorrect feedback information received.

RPM meas fail

Alarm Type	Shutdown
Alarmlist message	RPM meas fail
Alarm evaluated	
Related applications	TLC-DC
Description	Failure of magnetic pick-up sensor for speed measurement. This alarm appears, if starter was disengaged for other reason than over crossing starting speed (like oil pressure or D+) and at the end of timer Max Crank Time there are no RPM > Starting speed detected.

Sd AuxOvrCurr

Alarm Type	Shutdown
Alarmlist message	Sd AuxOvrCurr
Alarm evaluated	
Related applications	TLC-DC
Description	Auxiliary current is too high

Sd BatteryFlat

Alarm Type	Shutdown
Alarmlist message	Sd BatteryFlat
Alarm evaluated	
Related applications	TLC-DC
Description	If the controller switches off during starting sequence due to bad battery condition it doesn't try to start again and activates this protection.

Sd BattOvrCurr

Alarm Type	Shutdown
Alarmlist message	Sd BattOvrCurr
Alarm evaluated	
Related applications	TLC-DC
Description	Battery current is too high.

Sd GenOvrCurr

Alarm Type	Shutdown
Alarmlist message	Sd GenOvrCurr
Alarm evaluated	
Related applications	TLC-DC
Description	Generator current is too high.

Sd iAIO fail

Alarm Type	Shutdown
Alarmlist message	Sd iAIO fail
Alarm evaluated	
Related applications	TLC-DC
Description	Shutdown alarm in case of lost connection to AIO9/1 module.

Sd IOM fail

Alarm Type	Shutdown
Alarmlist message	Sd IOM fail
Alarm evaluated	
Related applications	TLC-DC
Description	IOM module communication failure. Shutdown is activated.

Sd LoadOvrCurr

Alarm Type	Shutdown
Alarmlist message	Sd LoadOvrCurr
Alarm evaluated	
Related applications	TLC-DC
Description	Load current is too high.

Sd NotOilPress

Alarm Type	Shutdown
Alarmlist message	Sd NotOilPress
Alarm evaluated	
Related applications	TLC-DC
Description	No information about the oil pressure from the binary oil pressure sensor.

Sd Overspeed

Alarm Type	Shutdown
Alarmlist message	Sd Overspeed
Alarm evaluated	
Related applications	TLC-DC
Description	The protection comes active if the speed is greater than <i>Overspeed</i> setpoint.

Sd StartFail

Alarm Type	Shutdown
Alarmlist message	Sd StartFail
Alarm evaluated	
Related applications	TLC-DC
Description	Gen-set start failed. All crank attempts were tried without success.

Sd Stop fail

Alarm Type	Shutdown
Alarmlist message	Sd Stop fail
Alarm evaluated	
Related applications	TLC-DC
Description	Gen-setstop failed.

Sd Ucomp Hi

Alarm Type	Shutdown
Alarmlist message	Sd Ucomp Hi
Alarm evaluated	
Related applications	TLC-DC
Description	Compensated voltage is too high.

Sd Ucomp Low

Alarm Type	Shutdown
Alarmlist message	Sd Ucomp Low
Alarm evaluated	
Related applications	TLC-DC
Description	Compensated voltage is too low.

Sd Ugen High

Alarm Type	Shutdown
Alarmlist message	Sd Ugen High
Alarm evaluated	
Related applications	TLC-DC
Description	Generator voltage is too high.

Sd Ugen Low

Alarm Type	Shutdown
Alarmlist message	Sd Ugen Low
Alarm evaluated	
Related applications	TLC-DC
Description	Generator voltage is too low.

Sd Underspeed

Alarm Type	Shutdown
Alarmlist message	Sd Underspeed
Alarm evaluated	
Related applications	TLC-DC
Description	During starting of the engine when the RPM reach the value of Starting RPM setpoint the starter is switched off and the speed of the engine can drop under Starting RPM again. Then the Underspeed protection becomes active. Protection evaluation starts 5 seconds after reaching StartingRPM.

8.3 Modules

8.3.1 List of supported modules

8.3.2 Peripheral modules	199
8.3.3 Plug-in modules	201

8.3.2 Peripheral modules

List of Peripheral modules

Extension modules	199
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Extension modules

List of Extension modules

AIO9/1	199
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AIO9/1

The AIO9/1 external module should be used with IntelliLite Telecom DC controller in telecom application. The module measures battery, generator, load and auxiliary voltage and current without additional sensors. AIO9/1 analog output can control the engine speed or generator voltage.

Features:

- ▶ 4x differential inputs AI1 to AI4 for voltage measurement in range of 0 – 65 V DC or -65 – 0 V DC (supporting grounded battery plus as well).
- ▶ 4x shielded, differential millivolt inputs AI5 to AI8 for measurement on resistor shunts (± 75 mV) for DC current measuring.
- ▶ Speed Governor or Voltage Regulator output: 1x galvanically separated analog output with 0 – 20 mA, 0 – 10 V DC, PWM option.
- ▶ Resistance analog input 0 – 2500 Ω for temperature sensor (charging temperature compensation).
- ▶ All inputs are linked to specific AIO9/1 terminals (not configurable except sensor characteristics).

Analog output of extension module AIO9/1			
Output	Signal	terminal	Range
Current	mA	I	4 – 20 mA
Voltage	V	U	0 – 5 V
PWM	PWM	P	200 Hz
Ground	GND	12	

Communication and supply terminals	
Signal	Terminal
CAN H	H
CAN L	L
COM	COM
SUPPLY POSITIVE	+
SUPPLY NEGATIVE	-

Typical application - wiring diagram

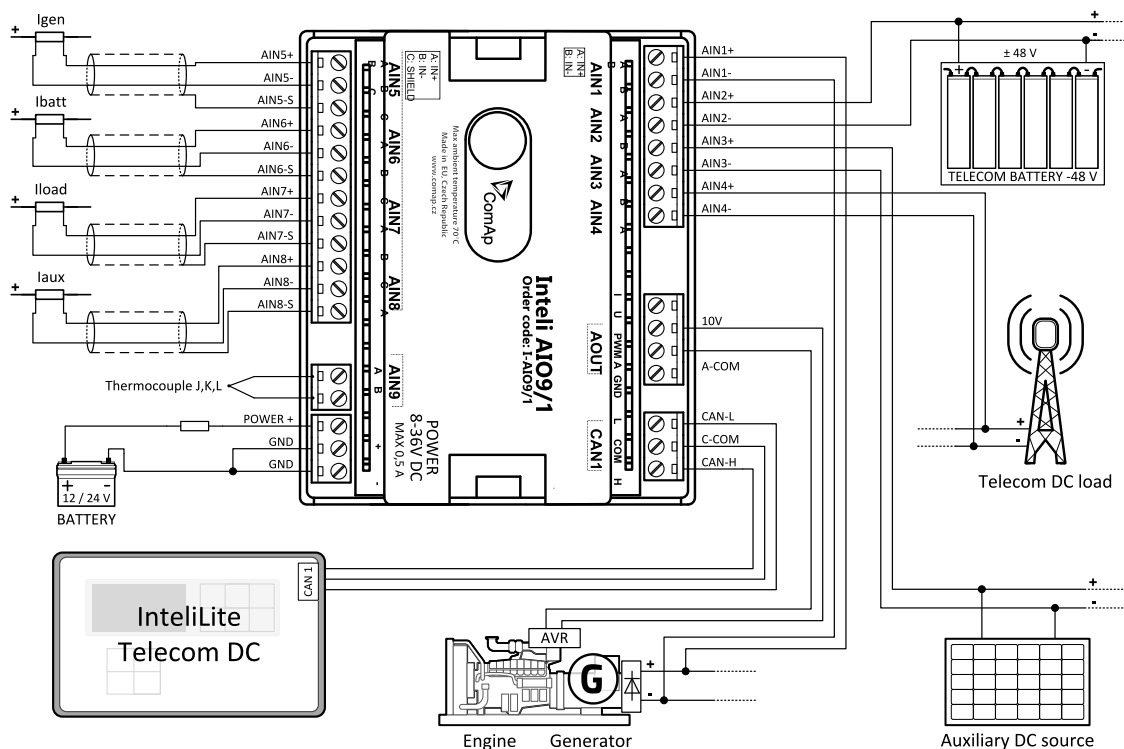


Image 9.1 AIO9/1 wiring

Modify default configuration according to actual project wiring – e.g. set corresponding Analog input as not used when not used.

8.3.3 Plug-in modules

List of Plug-in modules

Communication modules	201
Extension modules	204

Communication modules

List of Communication modules

IL-NT RS232	201
IL-NT RS232-485	201
IL-NT S-USB	202
IB-Lite	203
IL-NT GPRS	203

IL-NT RS232

IL-NT RS232 is an optional plug-in card which enables IntelliLite Telecom DC controller an RS-232 serial communication. This is required for computer or Modbus connection. The card has to be inserted into the expansion “Communication module” slot from the back side of the controller, similarly to extension modules.

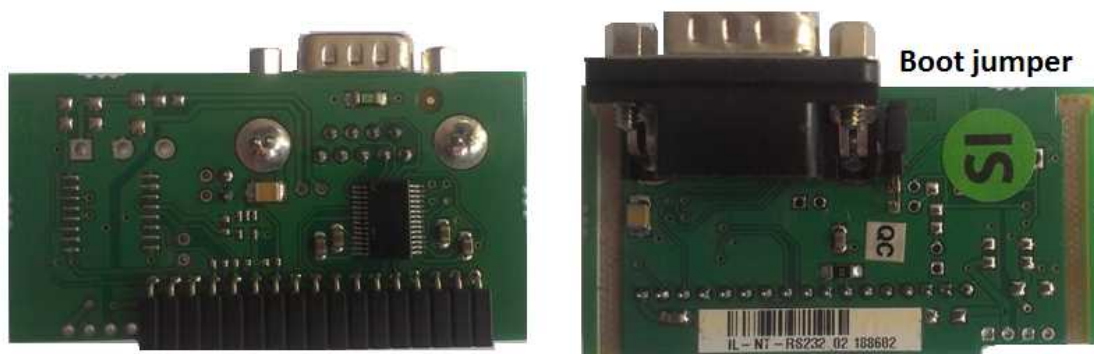


Image 9.2 IL-NT RS232

Boot jumper programming

In case of interrupted programming or other software failure it is possible to use the boot jumper programming to restore the controller to working order.

- ▶ Connect the controller to PC, run LiteEdit and wait until connection bar at bottom turns red.
- ▶ Run programming process via menu Controller -> Programming and cloning – Programming.
- ▶ Select correct firmware and confirm dialog. Than follow instructions in LiteEdit.

Or follow video guide “Boot Jumper Programming” at <http://www.comap.cz/support/training/training-videos/>

IL-NT RS232-485

IL-NT RS232-485 is an optional plug-in card which enables IntelliLite Telecom DC controller an RS-232 and RS-485 serial communication. This is required for computer or Modbus connection. The IL-NT RS232-485 is a dual

port module with RS-232 and RS-485 interfaces at independent COM channels. The RS-232 is connected to COM1 and RS-485 to COM2. Adjustment of communication type, baud rate etc. is via Comms Setting group of setpoint in LiteEdit or the controller screen.

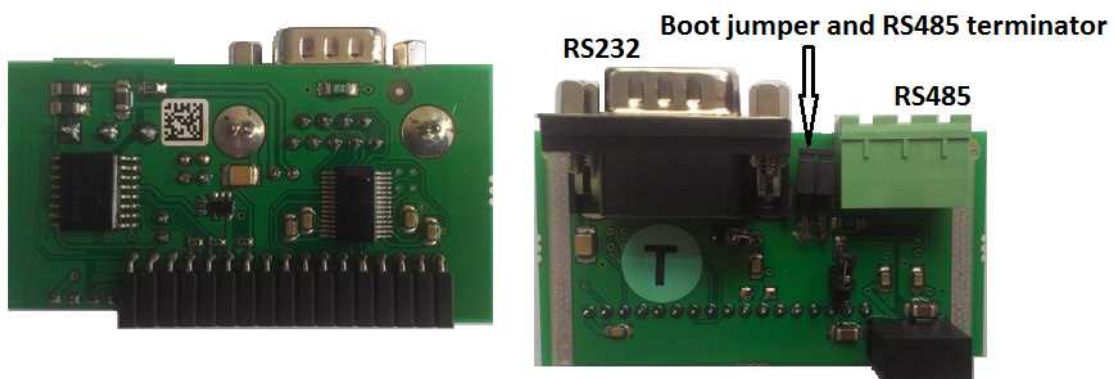


Image 9.3 IL-NT RS232 - 485

IL-NT S-USB

IL-NT S-USB is an optional plug-in card enabling communication of IntelliLite Telecom DC controller via USB port. This is required for computer connection. This module contains USB slave port, which is connected internally to the COM1 of the controllers. It is designed as an easy removable service module.

This module requires a FTDI USB Serial converter driver installed in the PC. The driver creates a virtual serial port (COM) in the PC, which must be used in LiteEdit as communication port when a connection is being opened.

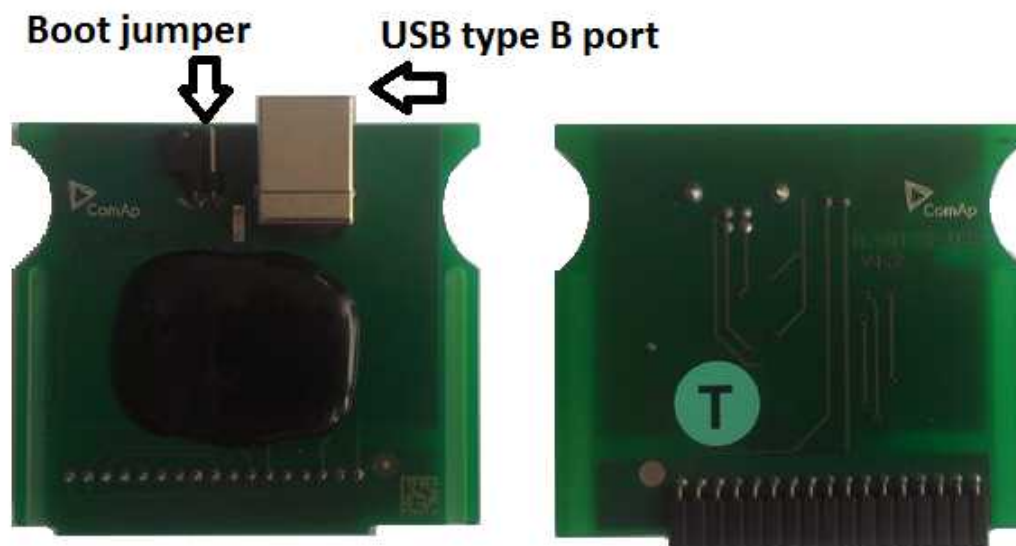


Image 9.4 IL-NT S-USB

Note: The FTDI driver is installed together with LiteEdit.

When the USB cable from the controller is plugged-in first time into different USB ports on the PC including USB hubs, it can be recognized as new hardware and the drivers are installed again with different number of the virtual serial port.

IMPORTANT: Use shielded USB cable only! (ComAp order code: USB-LINK CABLE 1.8m)

IB-Lite

IB-Lite is an optional plug-in card with Ethernet 10/100 Mbps interface and 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 IntelliMonitor through Ethernet network, for sending active e-mails and for integration of the controllers into a building management (Modbus/TCP or SNMP v1 protocol).

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

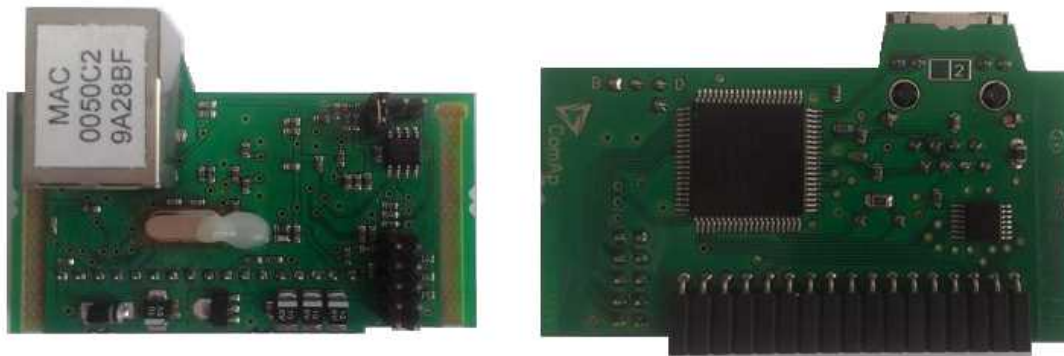


Image 9.5 IB-Lite

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.

The module requires configuration settings before usage. See [IB-Lite Reference Guide](#).

IL-NT GPRS

IL-NT GPRS is optional plug-in card, which works as GSM/GPRS modem which can work in two modes of operation based on settings in setpoint COM1 Mode.

- ▶ Settings DIRECT = module works in GPRS network and enables connection via AirGate to LiteEdit and WebSupervisor as well as sending SMS alarms.
- ▶ Settings MODEM = module works as standard GSM modem enabling CSD (Circuit Switch Data) connection to controller with LiteEdit or other ComAp PC SW and sending alarm SMSes.

Module is usually used for connection to remote monitoring and controlling system WebSupervisor <http://websupervisor.comap.cz> or to PC tools. Module is capable of sending alarm SMS based on settings in SMS/Email setpoint group.

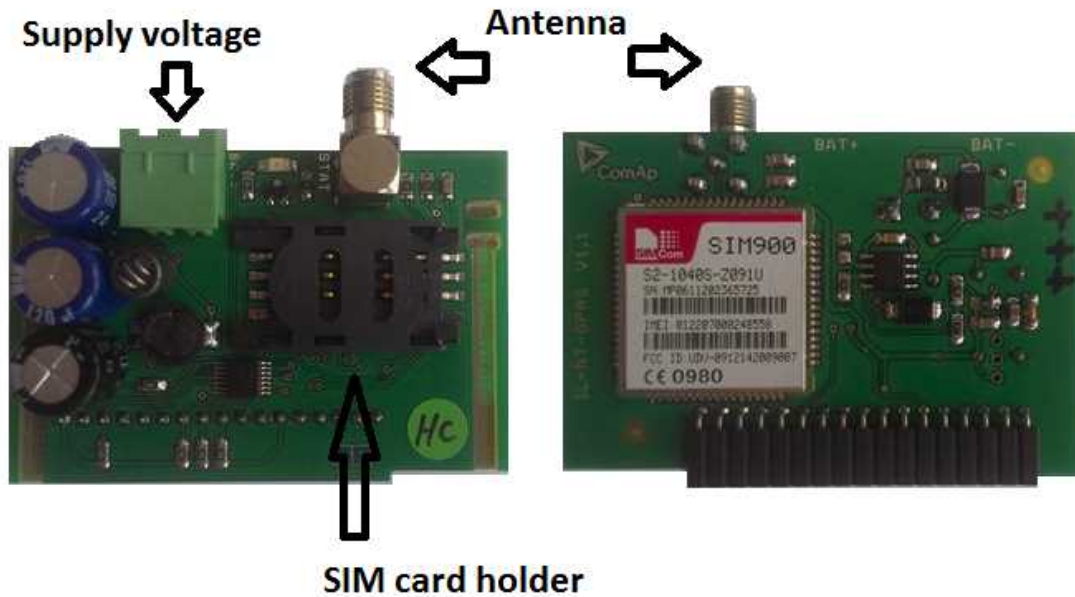


Image 9.6 IL-NT GPRS

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to both controller and module. Power supply shall be switched on also is same time to both module and controller. Fail to follow these instructions (power supply active only in controller or only in module) can lead to module or controller failure.

IMPORTANT: GPRS and CSD connection is not suitable for firmware update process, kindly used wired connection instead like RS-232, USB, RS-485 or ethernet via IB-Lite.

Quick guide how to start using this module is in chapter Remote Communication - Short guide how to start using IL-NT GPRS module or on ComAp webpage <http://www.comap.cz/products/detail/IL-NT-GPRS>

Use of this plug-in brings WSUP Locate function. This function allows monitoring actual engine position based on GSM signal information. The position is automatically updated and stored in WSV history. You can track the position of the engine in WebSupervisor even in history.

Unlike GPS system, the function works indoor or wherever the GSM signal is. Precision of localization is not as precise as with GPS and depends on density of operator's GSM/BTS tower around the controller.

Extension modules

List of Extension modules

IL-NT AIO205

IL-NT AIO

IL-NT AIO is an optional plug-in card. This card offers additional 4 analog inputs and 1 analog output. Analog inputs can be used for different types of sensors (resistive, current and voltage) and variable analog output, which can be used as a voltage output, current output or PWM. Adjustment of extension plug-in module is possible via LiteEdit.

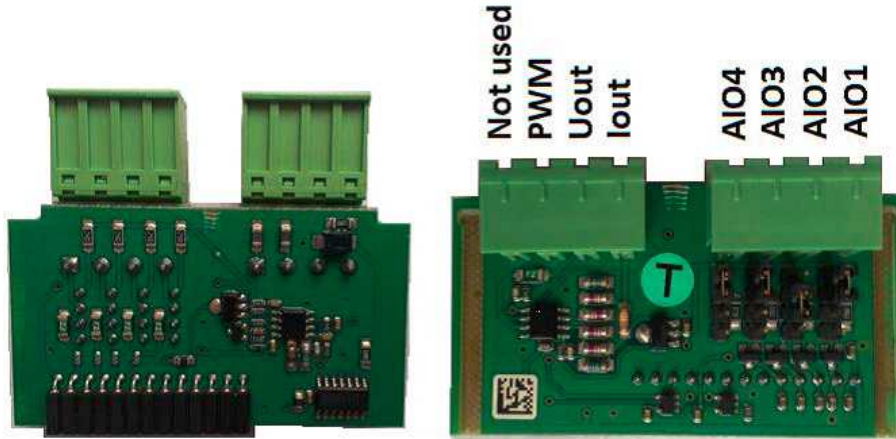


Image 9.7 IL-NT AIO

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

Input or Output	Description
A11 – A14	2400 Ω / 4 V / 20 mA
Iout	0 – 20 mA (max 22 mA) max 100 Ω load
Uout	0 – 4,5 V (max 10 mA)
PWM	PWM 5 V / 15 mA / 500 Hz
Not used	Do not connect

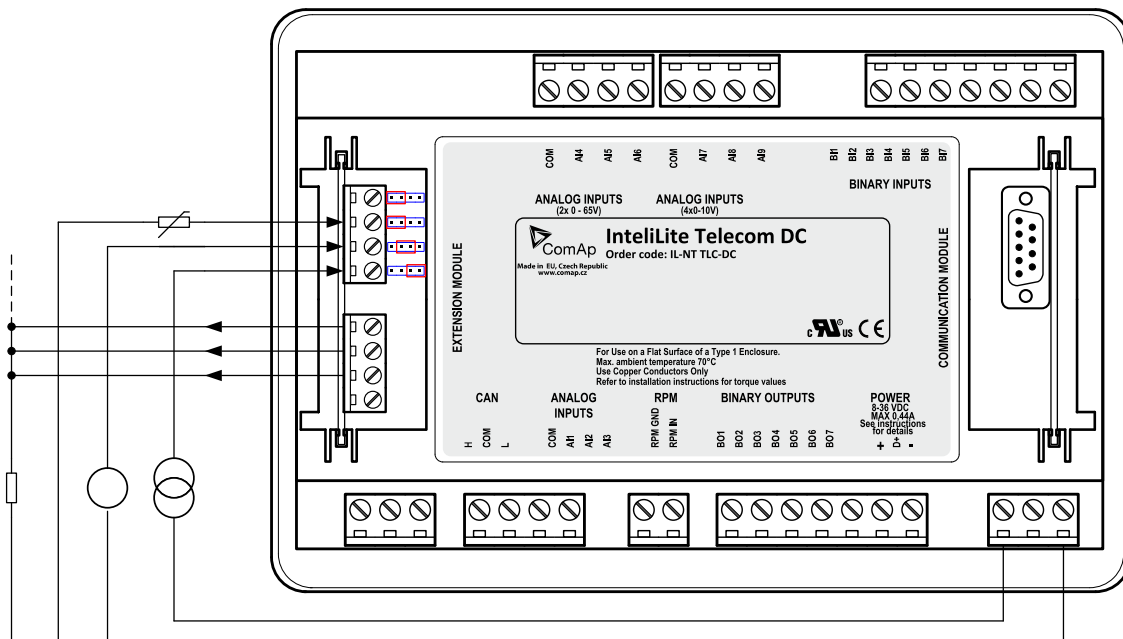


Image 9.8 IL-NT AIO wiring

IL-NT AOUT8

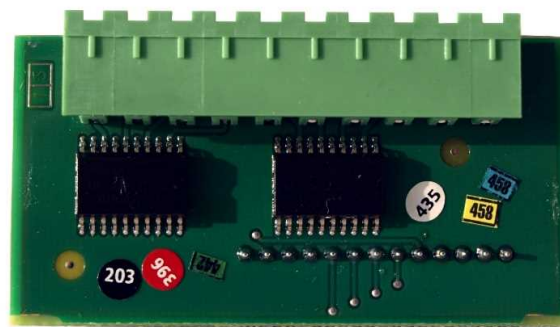


Image 9.9 IL-NT AOUT8

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

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

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

Technical data

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

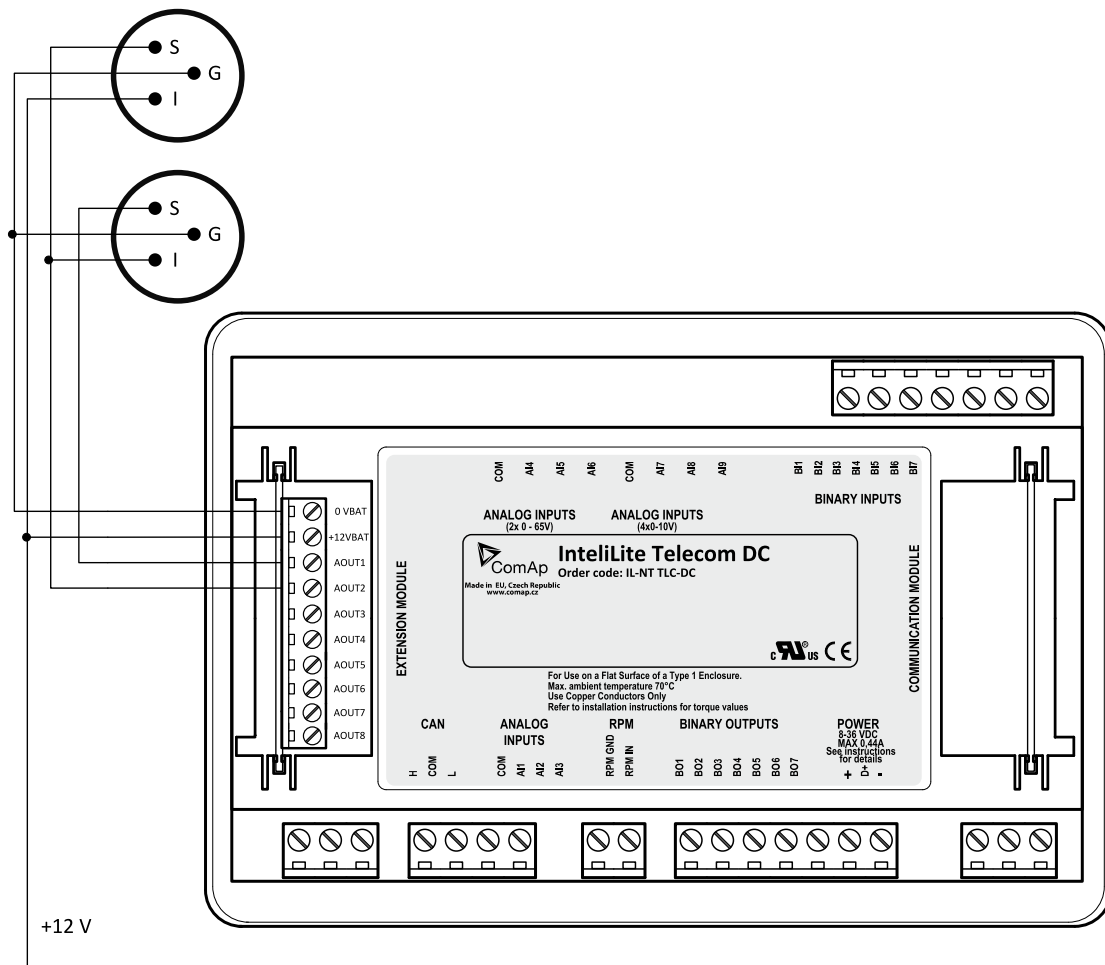


Image 9.10 IL-NT AOUT8 wiring example

IL-NT BIO8

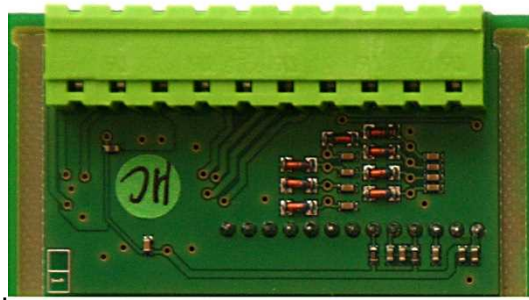


Image 9.11 IL-NT BIO8

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

INPUTS1	8 mixed binary inputs or outputs
OUTPUTS1	

There is no possibility to set address of module.

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

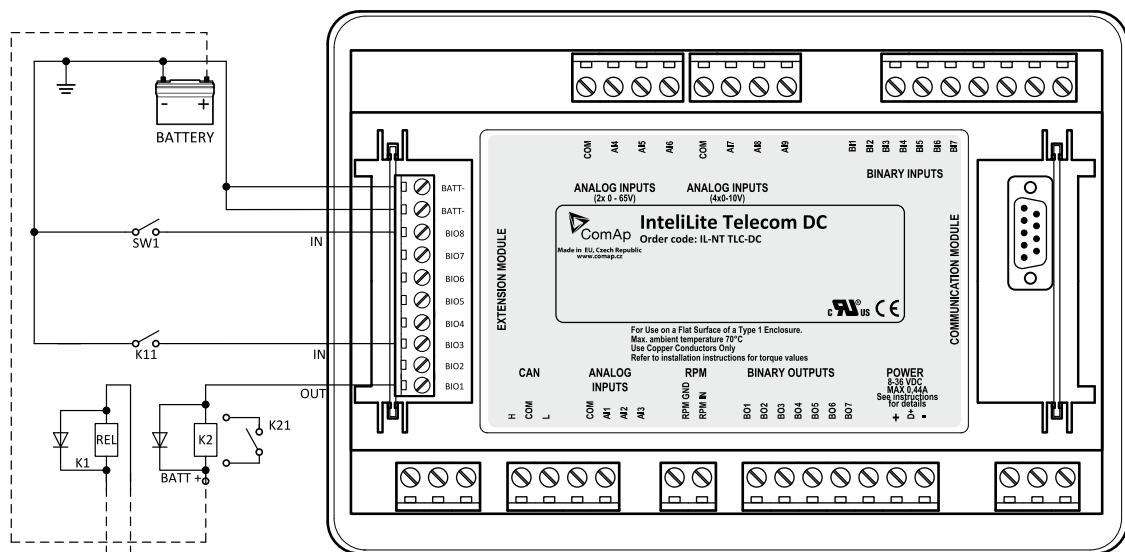


Image 9.12 IL-NT BIO8 wiring example

IL-NT IO1

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

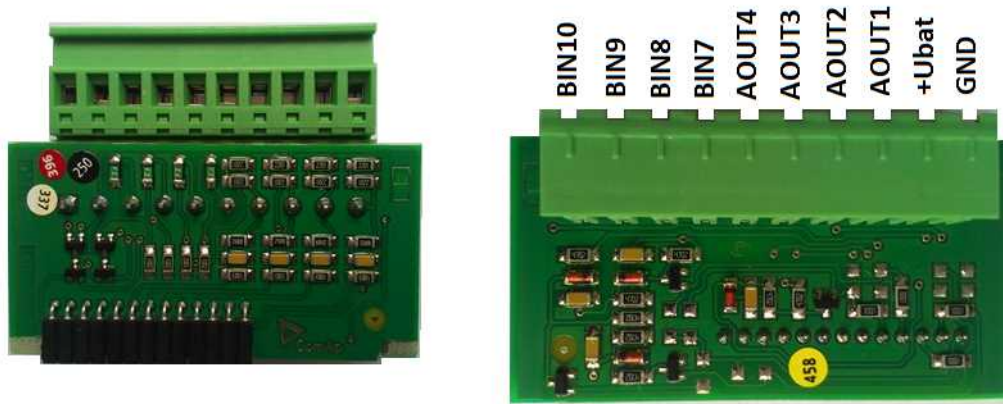


Image 9.13 IL-NT IO1

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

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

