

InteliDrive EM

Controller for Electric Motors with Protections, Remote Wireless Control and Simple Regulation

SW version 1.7.0

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1.1 Clarification of Notation

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

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

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

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

1.2 About this guide

This manual describes IntelliDrive EM 1.7.0 software, which is designed to control a classical asynchronous motors three or single phase.

Installation package	ID-EM-1.3.IWE (install in the PC by double click and import to the controller by LiteEdit program. LiteEdit is the PC program to monitor and set up the controller, freely available on www.comap-control.com . The firmware is compatible with LiteEdit v.4.5.6 and higher).
Firmware	ID-EM-1.4.mhx
Archive	ID-EM-1.4.aif

1.3 Document history

Revision number	Version	Author	Date
9	1.7.0	20.6.2019	Petr Weinfurt
8	1.6.0	17.4.2019	Lukáš Bečka
7	1.6.0	27.11.2017	Petr Weinfurt
6	1.5.0	21.2.2013	Adéla Procházková
5	1.4.0	9.11.2012	Adéla Procházková
4	1.3.0	15.3.2012	Jiří Ullsperger
3	1.2.0	8.2.2012	Jiří Ullsperger
2	1.1.0	20.1.2012	Jiří Ullsperger
1	1.0.0	7.7.2011	Jiří Ullsperger

1.4 CAUTION!

IMPORTANT:

!!! Dangerous voltage!!!

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

Always connect grounding terminals!

In no case disconnect IntelliDriveEM CT terminals, if the CT is present !

IMPORTANT:

Adjust setpoints

All parameters are preadjusted to their typical or safe values. Nevertheless before the first start-up, some set points must be adjusted according to the motor parameters.

The following instructions are for qualified personnel only. To avoid personal injury do not perform any action not specified in this Global Guide!

1.5 Remote control

IntelliDrive EM controller can be remotely controlled. When you want to work on the motor or driven machine, make sure that nobody can remotely start the motor.

To be sure:

- Disconnect power supply voltage of the controller, or
- ensure that all parameters described in this manual, which affects the remote control, are OFF, or
- disconnect power supply voltage of the motor.

Note: Because of the large variety of IntelliDrive EM parameters settings, it is not possible to describe every combination. Some IntelliDrive EM functions are subject to changes depending on SW version. The data in this manual describe the product only and are not a guarantee of performance.

1.6 Legal notice

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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.

1.7 Certificates and standards

> EN 60068-2-30:2005 25/55°C, RH 95%, 48hours > EN 61000-6-1 > EN 61000-6-2 > EN 61000-6-3 > EN 61000-6-4 > UL 6200	 
All certificates and standards are available on: webstore.iec.ch	

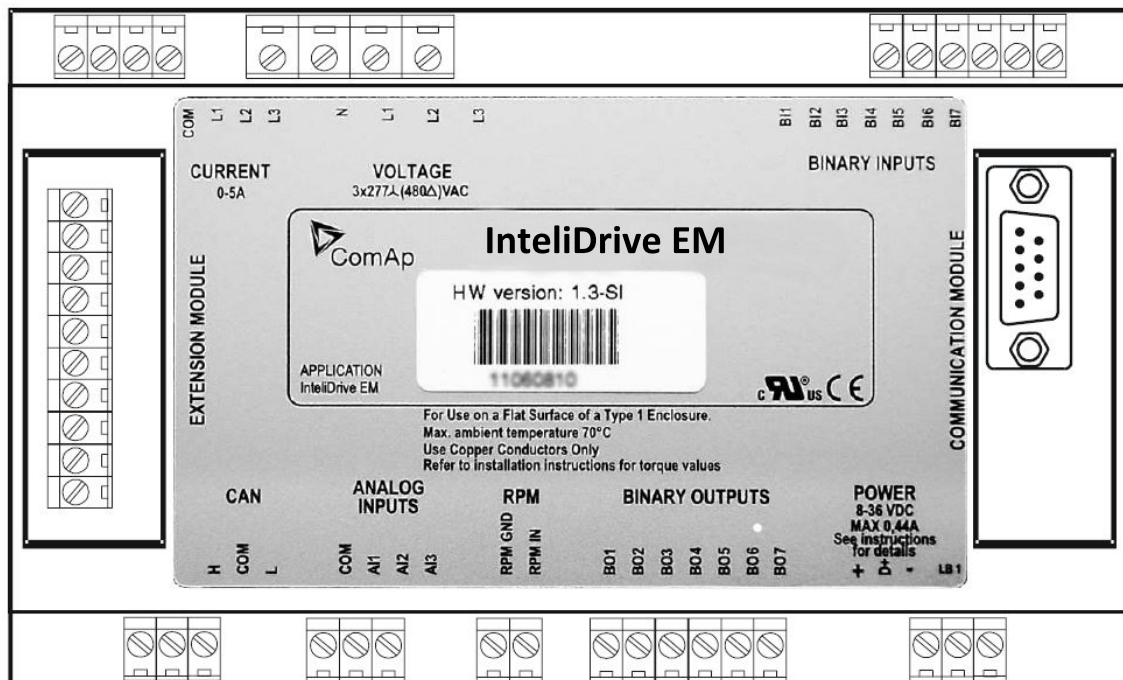
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2 Installation and wiring

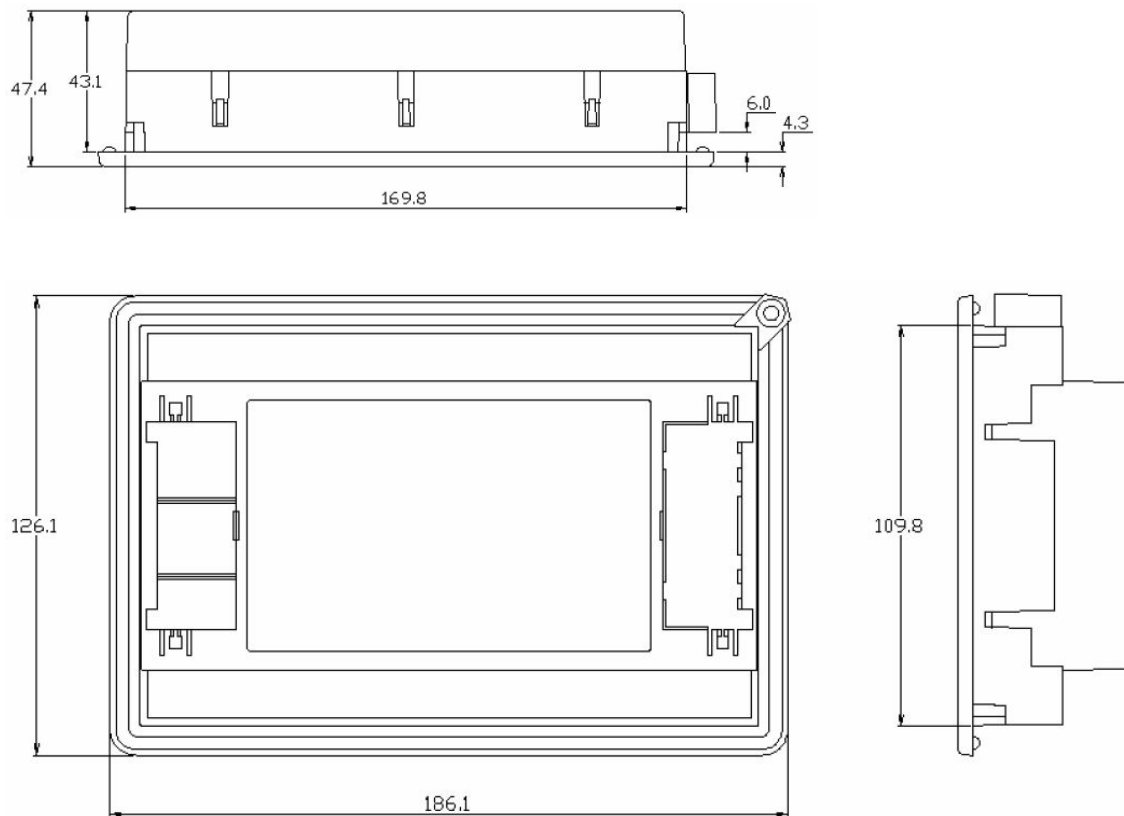
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2.1 Terminals

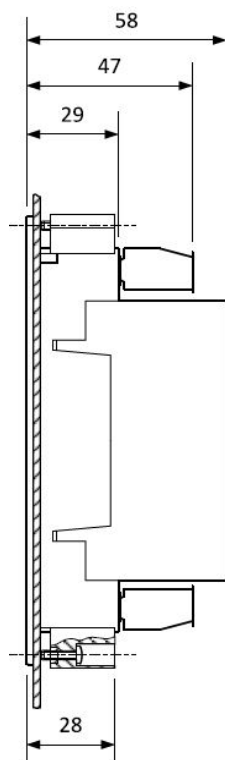


2.2 Dimensions



2.3 Mounting

Panel door mounting



Overview of parameter x

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

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

Note: The controller is to be mounted onto the switchboard door. The requested cut-out size is 175 × 115 mm. Use the screw holders delivered with the controller to fix the controller into the door. Recommended torque for holders is 0.15 N·m.

2.4 How to install

2.4.1 General

To ensure proper function:

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

2.4.2 Power supply wiring

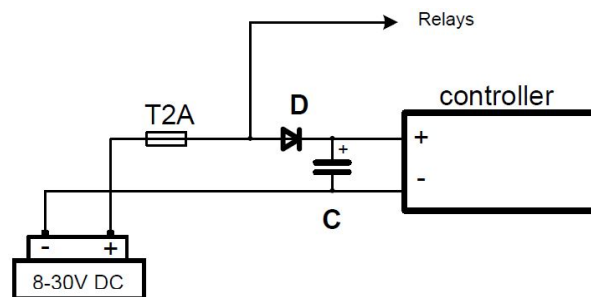
To ensure proper function:

- Use min. power supply cable of 1.5mm²
- Maximum continuous DC power supply voltage is 36VDC. Maximum allowable power supply voltage is 38VDC. The controller power supply terminals are protected against large pulse power disturbances. When there is a potential risk of the controller being subjected to conditions outside its capabilities, an outside protection device should be used.

Note: The maximum allowable current through the controller's negative terminal is 4A (this is dependent on binary output load).

The controller includes internal capacitors that allow the controller to continue operation if the battery voltage dips occurs. If the voltage before dip is 10V, after 100ms the voltage recovers to 7 V, the controller continues operating. During this voltage dip the controller screen backlight can turn off and on but the controller keeps operating.

It is possible to further support the controller by connecting the external capacitor and separating diode:



2.4.3 Power supply fusing

Note: A fuse should be connected in-line with the power supply positive terminal to the controller and modules. These items should never be connected directly to the power supply.

Fuse value and type depends on number of connected devices and wire length. Recommended fuse (not fast) type - T1A – T2A. Not fast due to internal capacitors charging during power up.

2.4.4 Binary input and output wiring

Find the list of the default LBI and LBO assigned to the input/output terminals in the chapter “Inputs and outputs”. Just LBI and LBO necessary for the basic control of one three-phase asynchronous motor are configured and are supposed to be connected according to the table here below.

Note: By means of LiteEdit, any of LBI and LBO can be assigned to any of physical terminals according to the user application requirements.

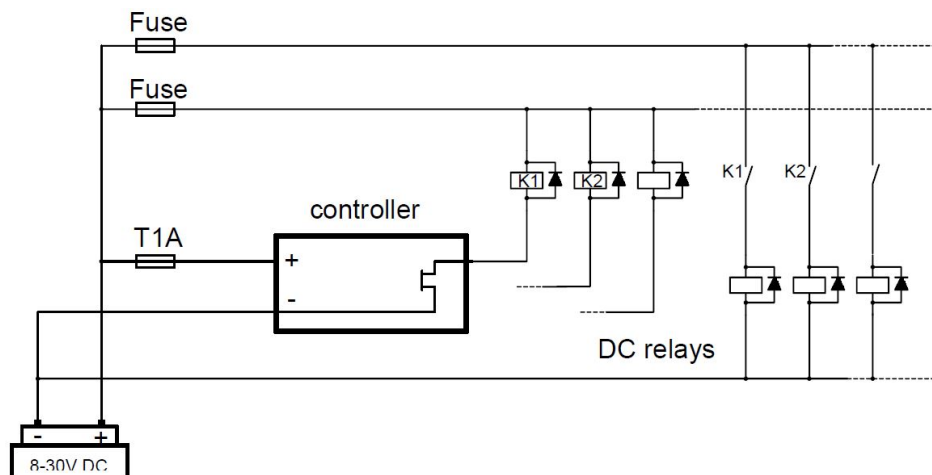
Basic signals to control the control of one delta-start asynchronous motor

Signal	Type of signal	To connect to
KM1	LBO	The coil of the contactor KM1 of the motor M1, this contactor energizes the motor.
KM2	LBO	The coil of the contactor KM2 of the motor M1, this contactor switches the motor coils into star connection.
KM3	LBO	The coil of the contactor KM3 of the motor M1, this contactor switches the motor coils into delta connection.
KM1 feedback	LBI	The information about the status of the KM1 contactor. The terminal with this LBI is to be connected to the NO auxiliary contact of the KM1 contactor.
KM2 feedback	LBI	The information about the status of the KM2 contactor. The terminal with this LBI is to be connected to the NO auxiliary contact of the KM2 contactor.
KM3 feedback	LBI	The information about the status of the KM3 contactor. The terminal with this LBI is to be connected to the NO auxiliary contact of the KM3 contactor.

Note: When the voltage and/or the current of the contactor coils overpasses the voltage and current of the controller BOUT, an auxiliary relay must be insert between the BOUT and the contactor coil.

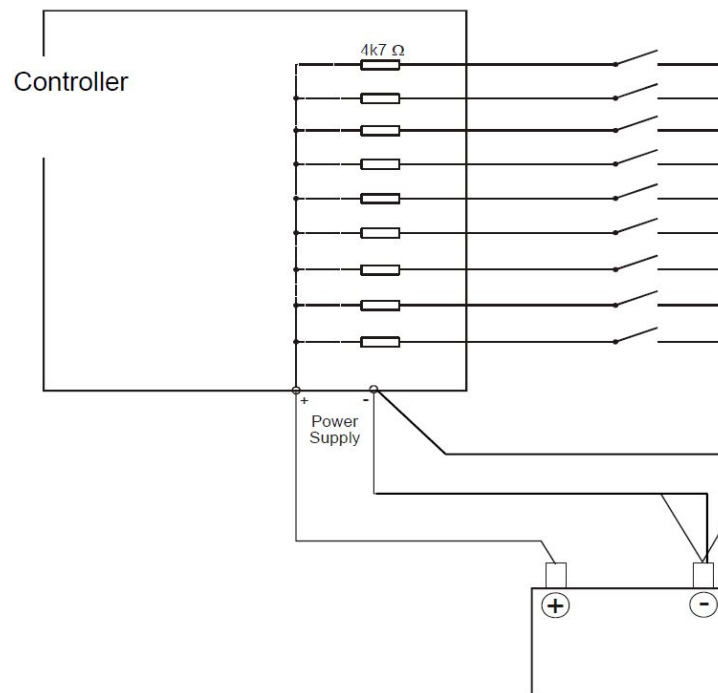
Binary output wiring

Do not connect binary outputs directly to DC relays without protection diodes.



Binary input wiring

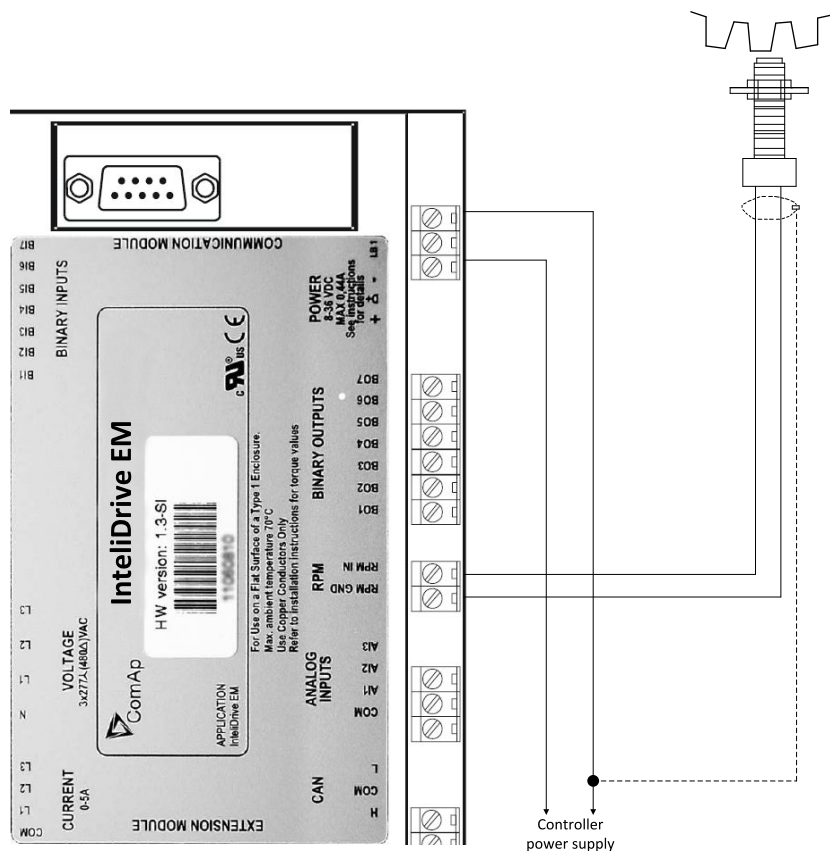
The common pole of contacts is connected to (-) pole of power supply. It is preferable to choose the (-) pole of controller.



2.4.5 Magnetic pick-up

Magnetic pick-up is an option. RPM monitoring brings the possibility to watch motor speed, record it in the history and use the protection activated when the speed goes off set limits.

To ensure proper function, use a shielded cable.



2.4.6 Three Phase Applications

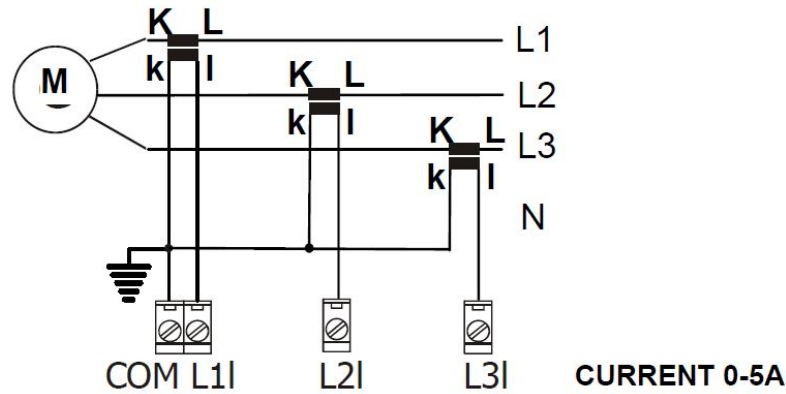
Basic settings for the connections most common three phase motor – set **Connection Type** (page 72) to the option 3f. Other setpoints to set in order to reach the intended behavior of the control function are (amongst other SPs) mainly **KM Feedback** (page 72), **KindOfStarting** (page 86), **NomVolts Ph-N** (page 69), **Nomin power** (page 85), **Nomin current** (page 85), **OverCurrent Sd** (page 102) and **OverCur Sd Del** (page 103) and **Amps IDMT Del** (page 103).

2.4.7 Current measurement

The current measurement by means of current transformer is a facultative option. Installing the CT brings the possibility to measure current, record it in the history and use several protections starting with over current protection until the protection against too low mechanical load (idle course).

To ensure proper function:

- Use cables of 2.5mm²
- Use transformers to 5A
- Connect CT according to following drawings



2.4.8 Voltage measurement

Note: No separation transformers for three wires voltage connection are needed.

2.5 Single phase applications

There is not a separate archive file for single-phase applications. Use standard archive (file with the type ail) and change the setpoint TypeOf Wiring.

Basic settings for the connections most common three phase motor

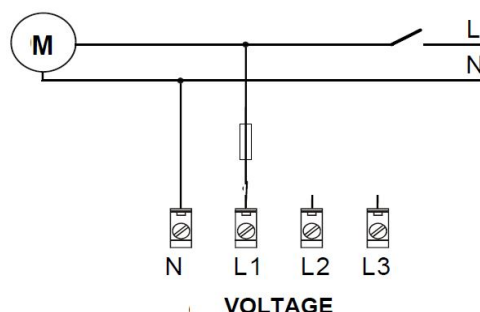
Set **Connection Type** (page 72) to the option 1f.

Other setpoints to set in order to reach the intended behavior of the control function are (amongst other SPs) mainly **KM Feedback** (page 72), **KindOfStarting** (page 86), **NomVolts Ph-N** (page 69), **Nomin power** (page 85), **Nomin current** (page 85), **OverCurrent Sd** (page 102) and **OverCur Sd Del** (page 103) and **Amps IDMT Del** (page 103).

2.5.1 Recommended wirings

Mains single-phase voltage has to be connected to L1 voltage terminal and N terminal. Phase current has to be connected to L1 and COM terminals.

2.5.2 Voltage measurement

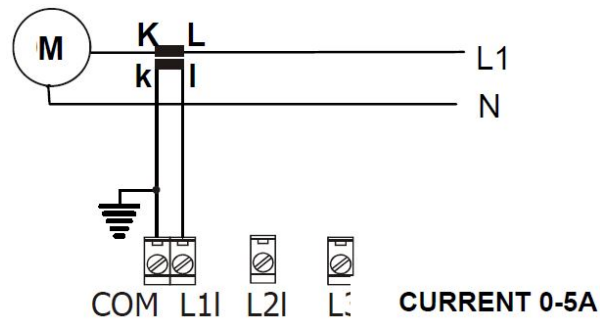


Note: Switchboard lightning strikes protection according standard regulation is expected!

2.5.3 Current measurement

To ensure proper function, use cables of 2.5mm^2 , use transformers to 5A.

Connect CT according to following drawings. Terminals L2I and L3I are opened.



2.6 Analog inputs

Three analog inputs are available on the controller.

2.6.1 Configuration

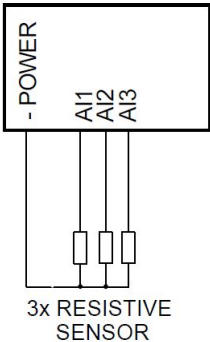
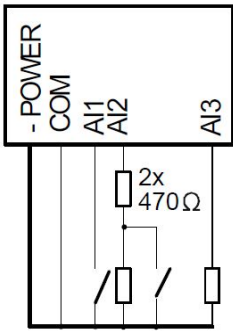
Each analog input can be configured by LiteEdit software following way.

Analog input item	LiteEdit		Possibility
Type	Type	Not used	Analog input isn't used
		Alarm	Analog input is used
Analog input name	Name		Up to 14 ASCII characters
Config of input	Config	Analog	Analog measuring in specified range.
		Binary	Binary: open/close - threshold 750 Ω .
		Tri-state	Three-state: open/close - threshold 750 Ω , Failure <10 Ω or > 2400 Ω
Physical dim	Dim	bar, %, °C, ...	Up to 3 ASCII characters (Valid only for analog inputs)
Polarity	Contact type	NC	Valid only for binary and three-state inputs
		NO	Valid only for binary and three-state inputs
Protection direction	Protection	Over	Overstep. Sensor fail does not activate protection.
		Over+Fls	Overstep and Sensor fail activates protection.
		Under	Under step. Sensor fail does not activate protection.
		Under+Fls	Under step and Sensor fail activates protection.
Sensor characteristic	Sensor		User curve A
		Curve A	User curve B
		Curve B	User curve C
		Curve C	
			IEC 751, range -20 to 120 °C
		PT 1000	DIN 43760, range -20 to 120 °C
		NI 1000	
		VDO Temp	
		VDO Press	
		VDO Level	
Decimal points	Dec	4-20mA/100	20mA/10.0Bar, ext. R 120 Ω
		4-20mA/ 60	20mA/6.0Bar ext R 120 Ω
		0, 1, 2	Number of decimal points (Valid only for analog inputs)

User Curves A, B, C are adjustable in LiteEdit.

Each Analog input has separate set points for two level alarm setting. Analog input alarm levels and delay adjust in **Group: Motor Protect (page 94)**.

2.6.2 Connection of the controller analog inputs

 3x RESISTIVE SENSOR	Standard connection of three resistive sensors to analog inputs.
	Mixed connection of the control unit analog inputs: > AI1 – binary input > AI2 – three state input > AI3 – analog resistive input

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

To ensure a proper function use shielded cables, especially for length over >3m. Shielding should be connected to the sensor body.

2.6.3 Current output transducers

Note: Analog inputs of the controller are mainly designed for resistor sensors.

In special case transducers to 4-20mA output can be used for pressure measuring (10.0Bar or 6.0Bar). Use predefined 4-20mA/100 or 4-20mA/60 sensors.

This method reduces the input resolution by less than 50%. Some types of transducers are not suitable for connection to the control unit analog inputs because of influencing by IntelliLite analog input.

2.6.4 As binary input

Open, close state are detected, threshold level is 750Ω.

2.6.5 As three state input

Open, close and failure state are detected. Threshold level is 750Ω, failure is detected when circuit resistance is <10Ω or > 2400Ω.

2.6.6 Unused analog inputs

Configure Type = Not used.

2.6.7 Wiring of the three-phase motor contactors with the full feedback

This example shows how to connect the contactors to the controller when the one only M1 motor is to be controlled and the blocking between the contactors is ensured fully by the controller.

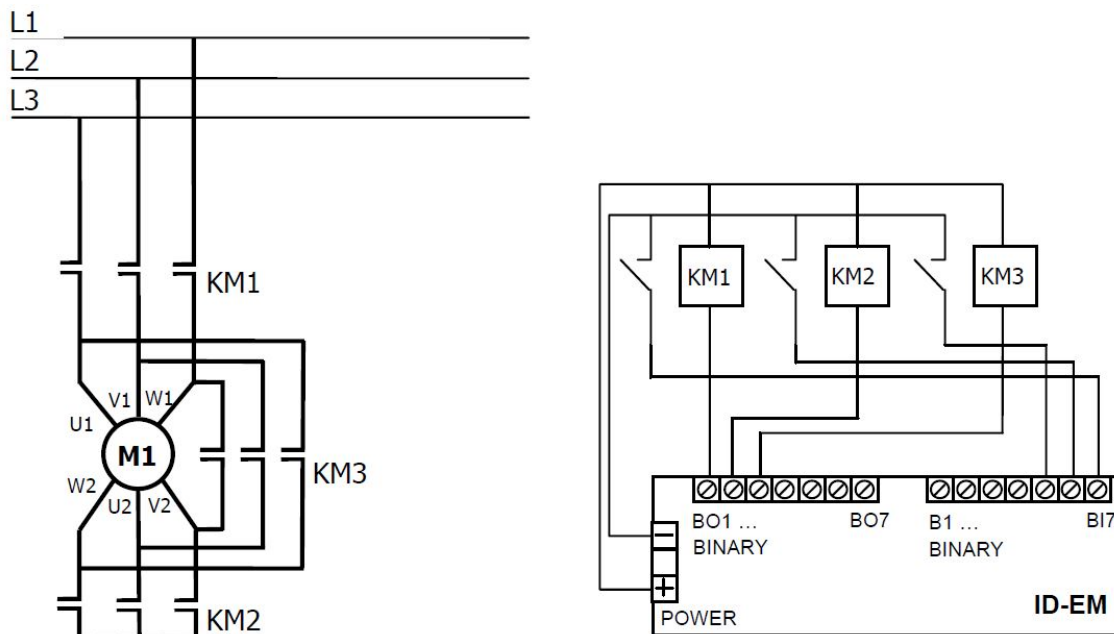
Settings corresponding to the wiring here below

- > Connection Type (page 72) = 3f
- > KM Feedback (page 72) = YES
- > KindOfStarting (page 86) = Y-D

Note: The wiring corresponds to the default settings of inputs and outputs defined in the archive file (AIL).

IMPORTANT:

The wiring example doesn't solve the protection from touch potential !
The wiring example doesn't solve the current protections !



2.6.8 Wiring of the three-phase motor contactors with the combined feedback

This example shows how to connect the maximum number of motors – 6, by three different ways. Let suppose that the motors M1, M2 and M3 are “big” whilst M4, M5, M6 are “small”. M1-M3 are started “delta/star”, whilst M4-M6 are started in the direct mode (by one contactor only).

Let's also suppose that the M1 and M2 are more important for the technology than M3, so that the contactors of M1 and M2 are blocked by the controller, whilst the delta/star contactors of M3 (3KM2 and 3KM3) are blocked by the classical way using their auxiliary NC contacts in order to spare the controller binary inputs.

Overview of used motor connections

Motor	M1	M2	M3	M4	M5	M6
Starting	Y / D	Y / D	Y / D	Direct	Direct	Direct
Blocking by						

Binary outputs on the controller (to set in LiteEdit, in the window Modify)

Binary output	BO1	BO2	BO3	BO4	BO5	BO6	BO7
Coil of the contactor	KM1	KM2	KM3	2KM1	2KM2	2KM3	3KM1

Binary inputs on the controller (to set in LiteEdit, in the window Modify)

Binary input	BO1	BO2	BO3	BO4	BO5	BO6	BO7
aux. contact of the contactor	KM1	KM2	KM3	2KM1	2KM2	2KM3	3KM1

Binary inputs and outputs on the IL-NT BIO8plug-in module (to set in LiteEdit, in the window Modify)

Binary input or outputx	B1	B2	B3	B4	B5	B6	B7	B8
Coil of the contactor	3KM2	3KM3		4KM1		5KM1		6KM1
aux. contact of the contactor			4KM1		5KM1		6KM1	

Note:

x: each channel of the IL-NT-BIO8 plug-in module can be configured as the binary input or output.

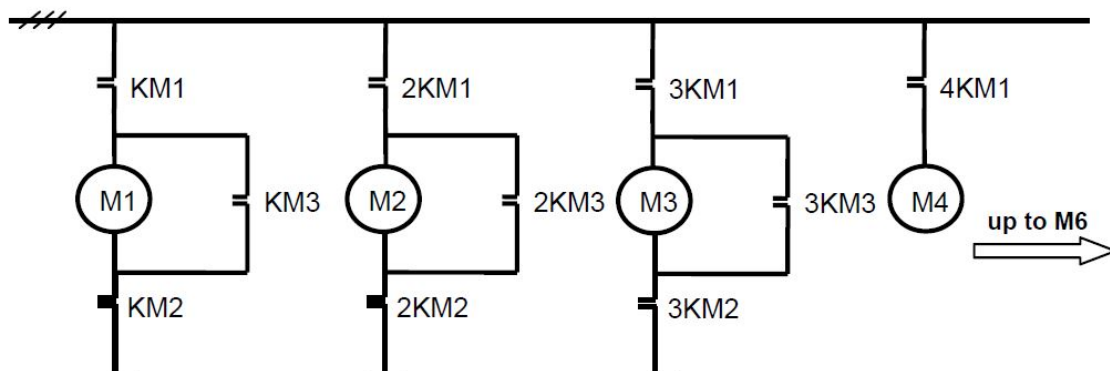
Settings

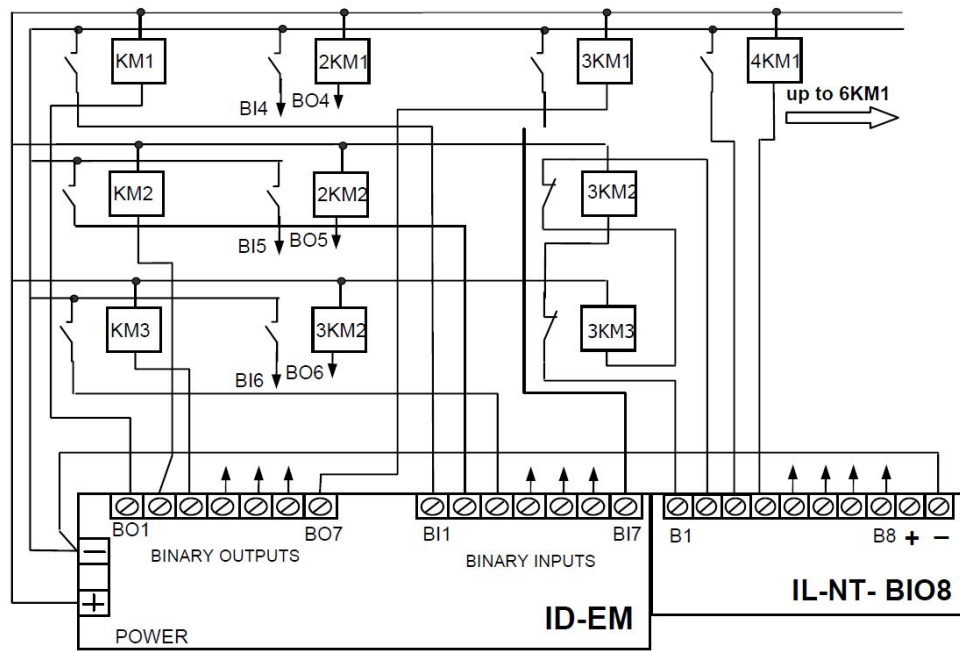
ConnectionType	3f
KM Feedback	YES
KindOFStarting	Y-D

IMPORTANT:

The wiring example doesn't solve the protection from touch potential!

The wiring example doesn't solve the current protections!





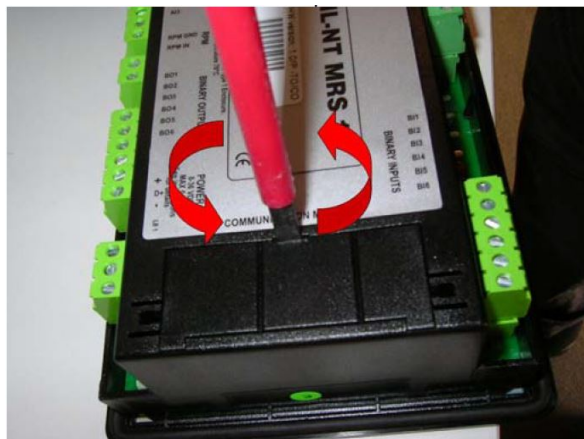
2.7 Installing RS232 Communication Module

RS232 Communication Module is chosen as example how to install a communication module. To install RS232 communication module:

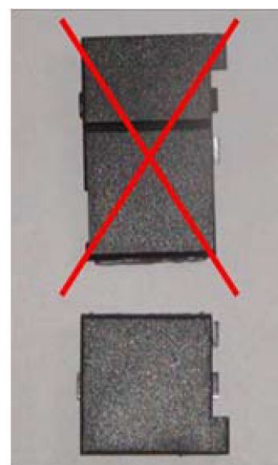
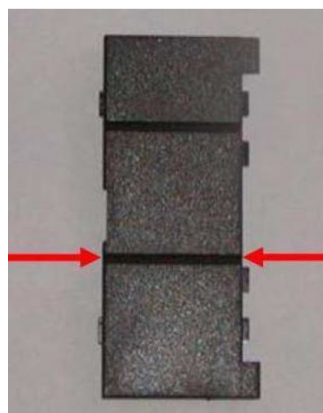
1. Insert a screwdriver into the slot of the cover.



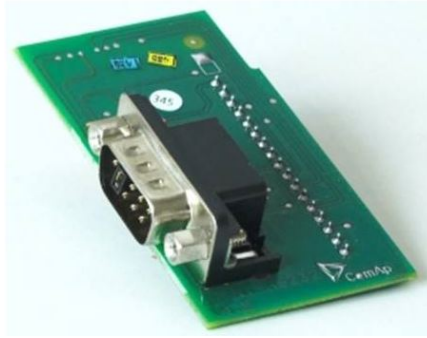
2. Move the screwdriver to set apart the small cover. **Be careful!**



3. Remove the small cover.
4. Break apart the small cover into two pieces. **Do not throw away the smaller part!**



5. Take RS232 communication module.



6. Plug RS232 communication module into the slot of the controller.
7. Put back the small cover.



 **back to Installation and wiring**

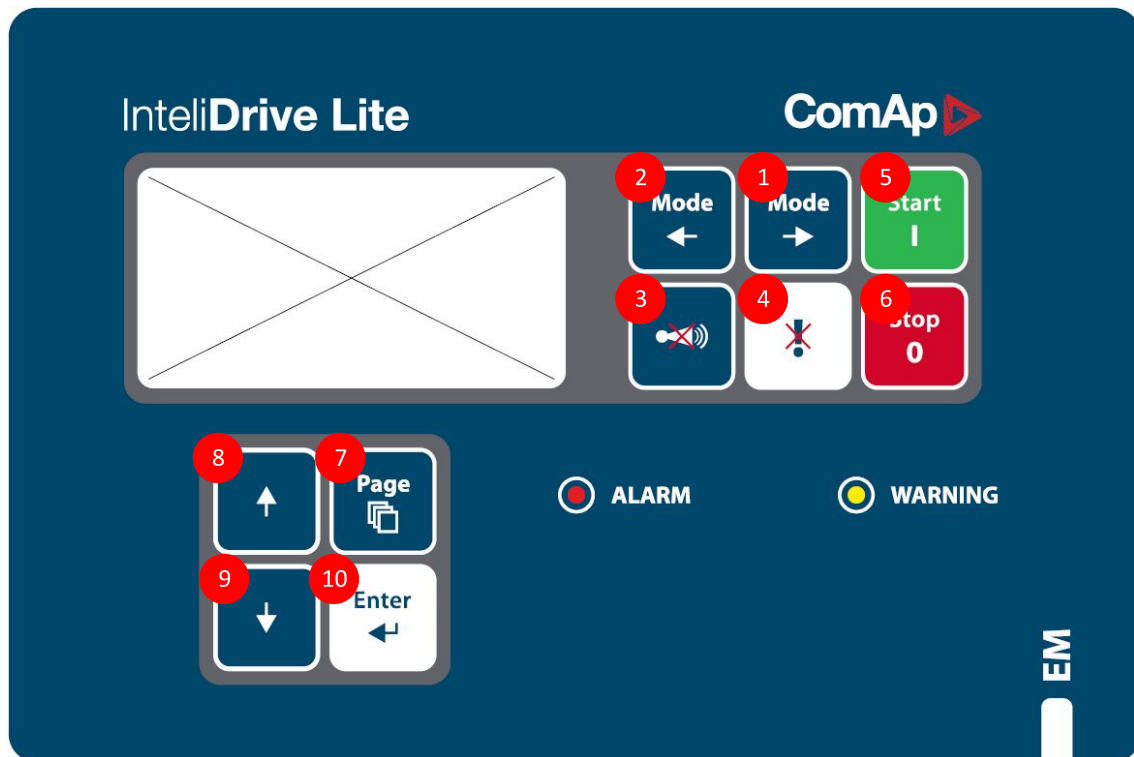
3 Controller setup

3.1 Operator interface	26
3.2 MEASUREMENT screens description	29
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3.1 Operator interface

3.1.1 Pushbuttons



Number	Button	Description
1	MODE →	Cyclic forward selection the gen-set operation mode (OFF -> MAN -> AUT)
2	← MODE	Cyclic backward selection the gen-set operation mode (AUT -> MAN -> OFF)
3	HORN RESET	Deactivates the HORN
4	FAULT RESET	Acknowledges faults and alarms
5	START	Start of the motor
6	STIO	Stop of the motor
7	PAGE	Cyclic selection of the display mode(MEASUREMENT->ADJUSTEMENT)
8	↑	Select the set point, select the screen or increase set point value
9	↓	Select the set point, select the screen or decrease set point value
10	ENTER	Confirm set point value

3.1.2 LEDs

ALARM	Indicates active or inactive, but still not reset shutdown alarm.
WARNING	Indicates active or inactive, but still not reset warning alarm.

3.1.3 How to start motor?

Motor start can be activated:

1. Locally via panel Start, Stop buttons.
2. Remotely wired to Binary inputs StartButton, StopButton.
3. Remote Start button (BI-Timer1Strt) to run motor for preadjusted time: Motor stops automatically after time is over. See Timer Function
4. Automatic Motor start based on internal “calendar” timer.
5. Automatic Motor start in AUT mode based on the input chosen by SP CtrlByAIN/BIN.
6. Remotely via serial line RS232 or RS485 – using PC software LiteEdit.
7. Remotely via SMS message.
8. Remotely via internet.

Note: Any start/stop is recorded to History log and can be reported via SMS, email or WSV.

3.1.4 How to select the controller mode?

Use **MODE**→ or ←**MODE** to select requested gen-set operation mode (OFF – MAN – AUT).

3.1.5 Display menus

There are 2 display menus available: MEASUREMENT and ADJUSTMENT

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

3.1.6 How to view measured data?

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

3.1.7 How to view and edit set points?

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

3.1.8 How to change the display contrast?

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

Note: Only in MEASUREMENT menu.

3.1.9 How to check the serial number and software revision?

Press **ENTER** and then **PAGE**. On the display you can see The control unit INFO screen for 10 seconds. The control unit INFO screen contains:

1. **Motor Name (page 69)**
2. The control unit serial number (8 character number)
3. SW version: the first is the firmware version number, the second is configuration table number.
4. Application: ID-EM
5. Branch: ID-EM

Note: Only in MEASUREMENT menu.

3.1.10 How to change language?

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

Note: Before choosing a new language, this one must be loaded from PC by LiteEdit.

3.1.11 How to find active alarms?

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

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

	Description
* Wrn Temperature	Active not accepted alarm
Wrn Temperature	Active accepted alarm
* Wrn Temperature	Inactive not accepted alarm
	Inactive accepted alarm

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

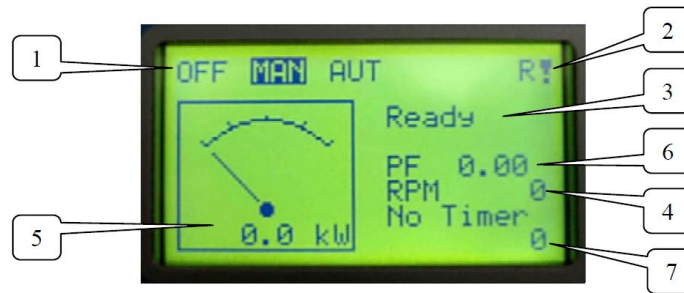
Note: Alarm list does not activate when you are reviewing the values or setpoints.

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

Control from the front panel

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

3.2 MEASUREMENT screens description



Number	Description
1	Operation mode of the motor
2	Indication of: active access lock "L", Remote communication "R" and alarm "I"
3	Status of the motor
4	RPM of the motor
5	Active power
6	Power factor
7	Timer - event's counting time (e.g. "Y run" when the motor starts)

3.2.1 Mains screen

L1-N, L2-N, L3-N

L1-L2, L2-L3, L3-L1

Freq

I (triple bargraph of phase currents)

3.2.2 Analog inputs screen

The bargraphs according to the definition of analog inputs can be scrolled by ↓ button. See also Analog Input chapter.

3.2.3 Binary inputs

BI1 to BI7.

3.2.4 Binary outputs

BO1 to BO7.

3.2.5 Speed

RPM	The real speed of the motor (is displayed only when the speed sensor is wired to the controller).
Required RPM	The speed requirement generated by the controller and sent to the frequency changer

3.2.6 Power

Tot	The consumption in kW, power factor and the apparent power of the motor.
L1, L2, L3	The consumption in kW, power factor and the apparent power of the respective phase. In the case of single phase motor, only the phase L1 is displayed.

Note: In the case when several motors are controlled by the single controller, the current transformer wiring determines what motors are included in this consumption measurement.

3.2.7 Statistic

- Run hours M1
- Run hours M2
- Run hours M3
- Run hours M4
- Run hours M5
- Run hours M6
- Energy kWh
- Energy kVArh

Counters can be cleared or set through LiteEdit. Set statistics command in menu Controller.

3.2.8 Alarm list

Alarm list includes

- Active unacknowledged alarms
- Active acknowledged alarms
- Inactive unacknowledged alarms

See more in the chapter **How to find active alarms? (page 28)**.

3.3 Controller modes

3.3.1 OFF mode

No start of the motor is possible. Outputs **KM1** (PAGE 159), **KM2** (PAGE 159) and **KM3** (PAGE 160) are not energized.

No reaction if buttons **START**, **STOP** are pressed.

3.3.2 MAN mode

START - starts the motor.

STOP stops the motor.

Note:

The motor can run without load unlimited time.

The controller does not automatically stop the running motor in MAN mode.

*The controller does not start the motor when **REM START/STOP** (PAGE 144) is closed.*

*The start and stop signals can be provided by extern pushbuttons connected to **STARTBUTTON** (PAGE 147) and **STOPBUTTON** (PAGE 147). These two LBI must be configured to two physical binary inputs.*

3.3.3 AUT mode

The controller does not respond to the buttons **START**, **STOP**.

The motor start/stop request is given by the binary input **REM START/STOP** (PAGE 144) or an analog input value.

Note: See the **CtrlByAIN/BIN** (page 108), **Start by AIN** (page 108) and **Start by AIN** (page 108).

3.4 Functions

3.4.1 Motor Starting Modes	32
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3.4.10 Communication with the controller	43

InteliDrive EM is a comprehensive controller to control electric asynchronous motor.

The controller is equipped with a powerful graphic display showing icons, symbols and bar-graphs for intuitive operation. InteliDrive EM automatically starts the motor when all conditions are met, protects it and then stops it on an external signal or by pressing push buttons. It is possible to control up to 6 motors by one controller.

The key feature of InteliDrive EM is its easy-to-use operation and installation.

3.4.1 Motor Starting Modes

It is possible to control single-phase or three-phase motors.

Starting mode depends on **KindOfStarting** (page 86) and corresponding I/O configuration. Following options are available:

- Direct On/Off starting
- Y-D starting
- Y-D optimized starting
- Starting by the soft starter
- Starting and pressure control by the frequency changer

Direct Starting

Only small motors which do not overpass the maximal possible current can be started directly by one contactor.

This way of starting requires only one BIN and one BOUT per motor, so that up to 6 motors can be control in the multiple control mode (**Multiple Control** (page 107) = 6 Direct).

Y-D Starting

The most common starting of three phase asynchronous motors, when the stator coils are connected to the star, and after the motor gains the speed and the current decreases, the connection changes in delta. This way of starting decreases three times the inrush current.

This way of starting requires three Binary outputs per motor, so up to 3 motors can be controlled in the multiple control mode. The IL-NT BIO8 plug-in module is needed in such case to increase number of binary outputs.

The time of star stage is set by **StarterDel** (page 87). The delay between starting command and motor start is set by **Braking Delay** (page 113) – see corresponding **Brake Release** (page 156).

Y-D Optimized Starting

Like the option „Y-D Starting“, but this option requires the CT in the power circuit.

Like the option „Y-D Starting“, but this option requires the CT in the power circuit. The delta connection is switched automatically once the inrush current sinks under the limit set by **Y-D SwitchCurr** (page 87). If the time of the “star” running exceeds **StarterDel** (page 87), the motor is stopped and the **Sd Start** alarm is activated.

Starting using the Softstarter

The softstarter serves to launch and stop the motor softly without current and mechanical strokes. Various systems of softstarter control are supported. Set **KindOfStarting** (page 86), **SoftStartConf** (page 88) and **StarterDel** (page 87). **StarterDel** (page 87) defines both the time of starting and stopping of the motor. And configure LBI and LBO according to the wiring. See **KM1** (PAGE 159), **KM2** (PAGE 159), **KM3** (PAGE 160),

Note: When the motor is to be stopped, it is done softly, so that **KM2** (PAGE 159) and **KM3** (PAGE 160) are deactivated and once the delay **StarterDel** (page 87) has expired, then **KM1** (PAGE 159) is deactivated as well. Only when **OverCurrent Sd** (page 102) or **EMERGENCY STOP** (PAGE 140) occurs, all **KM1** (PAGE 159), **KM2** (PAGE 159) and **KM3** (PAGE 160) are deactivated at once.

Starting and Speed Control using the Frequency Changer

The frequency changer is used when the continuous speed or (e.g.) pressure regulation is required. **KM1** (PAGE 159) is activated at moment of the start and deactivated for the stop so that it can be used as the signal which activates the frequency changer and also switch the possible mains contactor. The required speed is sent to the frequency changer in the form of the analog output signal (LAO) Required RPM.

The value of required speed can be set by **Nominal RPM** (page 70), **RPM1** (page 92), **RPM2** (page 93) or can be read from the AIO RPM Input. One of these four sources can be selected by the combination of **SS1** (PAGE 147), see the table bellow.

SS1	0	1	0	1
SS2	0	0	1	1
Source of signal	SP Nom RPM	SP RPM1	SP RPM2	SP RPM Input

Every time when some change of Required RPM is required, the speed of change is limited by **StarterDel** (page 87) and **Stopping Ramp** (page 89).

Motor Start and Stop

- In MAN mode
 - The only motor M1 can be started and stopped by the panel buttons **Start** and **Stop** in MAN mode.
- In AUT mode
 - The motors (6Direct or 3Y-D) can be separately started and stopped
 - by six **REMSTART/STOP** (PAGE 146) (2RemStart/Stop, 3RemStart/Stop, ...6RemStart/Stop) or
 - by Analog input value – AIN selected by **CtrlByAIN/BIN** (page 108) = AINx and corresponding Start and Stop limits - see **Start by AIN** (page 108), **Stop by AIN** (page 109), ... 6Start by AIN, 6Stop by AIN.

All running motors are stopped when **Multiple Control** (page 107) = 3Y-D or 6Direct and the user switches the mode from AUT to MAN. Motors were started by **REMSTART/STOP** (PAGE 146) or by Analog input level – see **CtrlByAIN/BIN** (page 108) in this case.

3.4.2 Number of Motors – Single/Multiple control

The controller can control

- > Just one motor M1,
- > One motor M1 with M2 as back-up
- > Up to three three-phase (Y-D) motors M1, M2, M3
- > Up to six single phase motors M1-M6.

Choose the number of desired motors by **KindOfStarting** (page 86) and configure appropriate LBIs (the feedbacks from the contactors KMx feedback) and LBO (to switch the coils of motor contactors, e.g. **KM1** (PAGE 159)...).

Note: If there are more motors to control together than 6, use several controllers. The controllers can communicate by their LBI and LBO (**REMOTE OFF** (PAGE 146), **KM1** (PAGE 159) etc).

3.4.3 Back-up Mode

When the motor M1 fails, the motor M2 is started automatically and the warning **Wrn BackUpActiv** is generated. The backup is activated (motor M2 is started) only for alarms listed in the list below.

Kind of Starting versus Multiple Control setting

Some combinations of SP Kind of Starting and SP MultiplControl are not allowed.

Compatibility settings of the both SP are shown in the table below.

When the controller is off-line and the settings are done in LiteEdit, the wrong combinations can not be blocked. In this case, the setting is corrected when the archive configuration is loaded in the controller. Then, the SP Multiple Control is automatically switched to the option No and the message **Wrn SP Incomp** is generated.

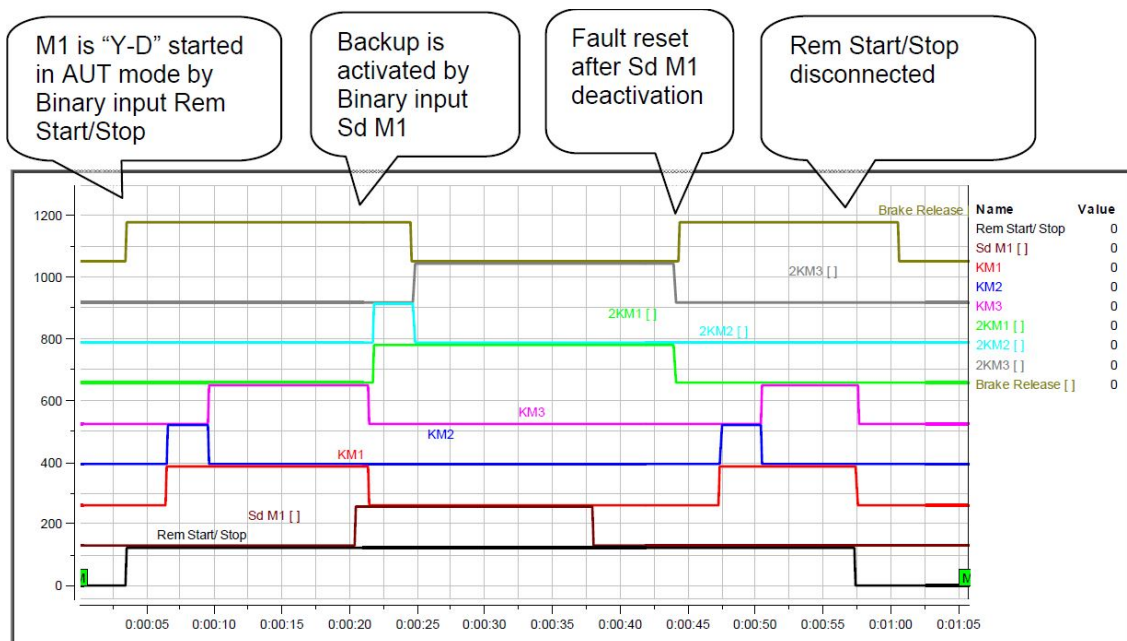
SP Kind of Starting		Direct	Y/D and Y/D Opti	SoftStart	f-changer
SP MultiplControl	No	OK	OK	OK	OK
	3Y-D	n.a.	OK	n.a.	n.a.
	6Direct	OK	n.a.	n.a.	n.a.
	Back-Up	OK	OK	n.a.	n.a.

M1 fail

When the motor M1 fails, the motor M2 is started automatically and the warning Wrn "BackUpActiv" is generated. The backup is activated (motor M2 is started) only for alarms listed in the list below.

Alarms activating backup	Alarms not activating backup
OverCurrent Sd	Sd Volt L1, 2, 3 Under/Over
Amps IDMT Del	Sd V Unbal
YDOptiStartFls	Sd LoadTooLow
SoftStartFls	Sd from AIN3 and more
Sd Under/Over Speed	Sd IOM Fail
Sd ChngKMxfailed	Sd RPMMeasFail
Sd from AIN1 and 2	Sd BatteryFlat
Sd from BIN1 and 2	Sd Stop fail
WrnMaintenRun (apart from Backup, this alarm is Wrn only)	Sd Chng yKMxfailed (y from 2 to 6)
	Sd from AIN3 and more
	Sd from BIN3 and more
	WrnMaintenAge

Motor Params	KindOfStarting	Y-D
	Starter Del	3s
Functions	MultiplControl	Back up
	Braking Delay	5s



After the fault reset of the Wrn BackUpActiv, the motor M2 stops and the back-up status is deactivated.

RPM Control Example

I/O configuration: LBI SS1 (SS1 (PAGE 147)) for RPM1 (page 92) Sped request.

Setpoint settings

Group	Setpoint	Settings
Basic settings	Connection Type (page 72)	3f
	KM Feedback (page 72)	YES or NO
Motor Params	KindOfStarting (page 86)	f-Changer
	Reg Gain (page 91)	xxx
	Reg Integral (page 91)	xxx
	Reg Bias (page 91)	xxx
	Ramp (page 88)	xxx
	Real RPM Sel (page 90)	Pickup
	Req RPM AIN (page 90)	NONE **)
	RPM1 (page 92) *)	25
Functions	Multiple Control (page 107)	NO
	CtrlByAIN/BIN (page 108)	BIN
Basic Settings	ControllerMode (page 71)	MAN or AUT

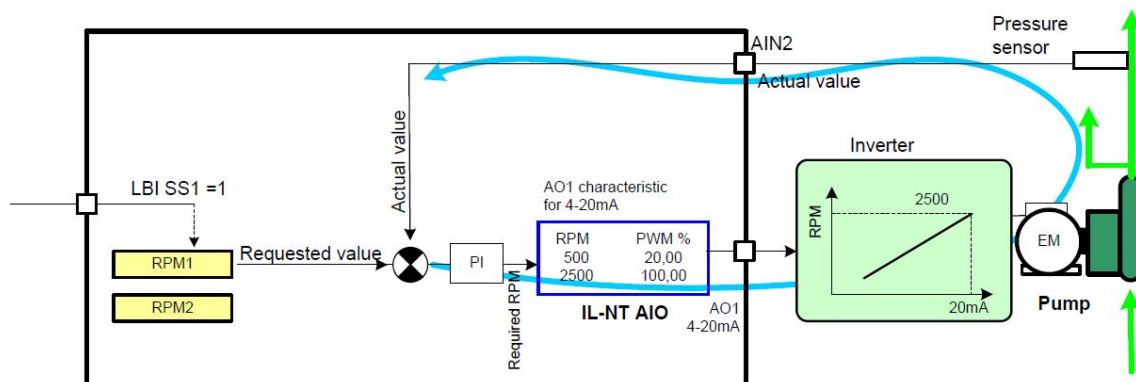
Note:

*) **RPM1 (page 92)** is active only when **SS1 (PAGE 147)** is configured and closed. It is request for actual RPM measured by in this example by pickup.

) When **SS1=1 request = **RPM1**; when **SS2=1** request = **RPM2**; when **SS1=SS2=1** request = **Req RPM AIN** (see **SS1 (PAGE 147)**).

Pressure Control Loop Example

Task: pressure control by Motor RPM using the frequency exchanger (inverter)



I/O configuration

AINx	Pressure measuring in 0.1 Bar
LBI SS1	To select internal pressure request

Setpoint settings

Group	Setpoint	Settings
Basic settings	Connection Type (page 72)	3f
	KM Feedback (page 72)	YES or NO
Motor Params	KindOfStarting (page 86)	f-Changer
	Reg Gain (page 91)	xxx
	Reg Integral (page 91)	xxx
	Reg Bias (page 91)	xxx
	Ramp (page 88)	xxx
	Real RPM Sel (page 90) *)	e.g. AIN2
	Req RPM AIN (page 90)	NONE ***)
	RPM1 (page 92) **)	25
Functions	Multiple Control (page 107)	NO
	CtrlByAIN/BIN (page 108)	BIN
Basic Settings	ControllerMode (page 71)	MAN or AUT

Note:

*) Requested value for control loop = AIN2 in this example and can be configured for pressure sensor.

) **RPM1 (page 92) is active only when **SS1 (PAGE 147)** is configured and closed. It is request for actual value measured in this example on AIN2. In case AIN2 sensor characteristic is in 5.0 Bar (format with one decimal) then for request e.g. 2.5 Bar the RPM1 = 25.

***) When SS1=1 request = RPM1; when SS2=1 request = RPM2; when SS1=SS2=1 request =Req RPM AIN (see SS1 (page 147)).

Manual RPM Setting over F-changer

Function: EM RPM is changed by speed trim connected to AIN3 in MAN mode.

Configuration: AIN3 ohm = Requested RPM

Setpoint settings

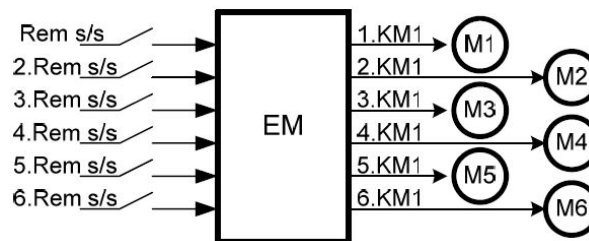
Group	Setpoint	Settings
Motor Params	KindOfStarting	f-Changer
	Req RPM AIN	e.g. AIN3
	Ramp	= 200 /s
	Real RPM Sel	OFF (ZERO)

6 Motors control

Simple On/Off control by binary inputs.

Setpoint settings

Group	Setpoint	Settings
Basic settings	ConnectionType	3f
	KM Feedback	YES or NO
Motor Params	KindOfStarting	DIRECT
Functions	MultipControl	YES
	Ctrl By AIN/BIN	BIN or AIN
	Braking Delay	5s
Basic Settings	Controller Mode	MAN or AUT



3.4.4 Automatic Braking

BRAKE RELEASE (PAGE 156) can control the motor brake. The brake is released before the motor is supposed to run and activated after the stop with a security delay, the brake is activated again.

Note: To tune the behavior of the braking, use **Braking Delay (page 113)**.

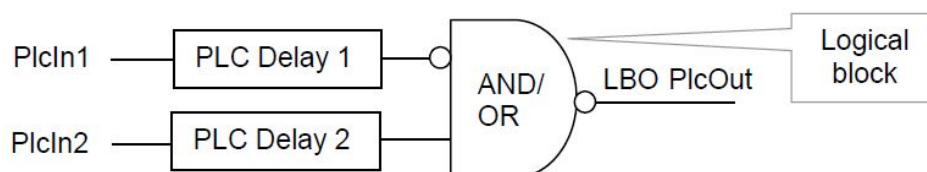
3.4.5 SCADA

This function allows the user to create its own screen on the PC which typically shows a graphical simplified diagram of the motors and electrical devices wiring. The diagram can also contain mechanical equipment linkages such tubes, shafts, clutches, valves etc. The majority graphical elements can carry the functional meaning so that it is possible to see their status etc.

Note: For more information, [see IntelliMonitor Reference Guide on www.ComAp.cz](http://www.ComAp.cz), the chapter 4, Singleline diagram editor.

3.4.6 PLC

Using PLC group setpoints enables modify following structure.



	Function	Setpoint
Logical block	AND, OR or EQL(XOR)	Function (page 120)
PLC Delay 1	Input 1 delay Input 1 inversion	Plc Delay 1 (2) (page 121) NegPlcIn1 (page 120)
PLC Delay 2	Input 2 delay	Plc Delay 1 (2) (page 121)
PlcOut	Output inversion	NegPlcOut (page 121)
PlcIn1	Input 1	ConnectPlcIn1 (page 121)
PlcIn2	Input 2	ConnectPlcIn2 (page 122)

In order to make the PLC work, it is necessary either to assign **ConnectPlcOut (page 122)** to a LBI by the means of the **ConnectPlcOut (page 122)**, or to assign **PLC OUT (PAGE 164)** to a BOUT by LiteEdit configuration tool. **PLC OUT (PAGE 164)** is NOT USED by default.

Note: When **PLC OUT (PAGE 164)** is assign to a same LBI as a BIN, **PLC OUT (PAGE 164)** has priority. PLC function can cause the start of motor at the moment when it is not supposed. Be careful when configuring the PLC functions.

Comparators

Two comparators with adjustable analog input, limits and Logical Binary Output are available to setup in **Group: PLC (page 120)** – see **Comp1 AIN (page 122)**, **Comp1 OFF lim (page 123)**, **Comp1 ON lim (page 123)** and **Comp2 AIN (page 123)**, **Comp2 OFF lim (page 124)**, **Comp2 ON lim (page 124)**.

Counter

Counts the pulses (rising edges) on BIN7. The min pulse length to be recognized is 100 ms. Counter is available just on BIN7 no configuration is needed.

Any other function can be configured on BIN7 - for example **REMSTART/STOP (PAGE 146)** – i.e. excerpt of starting and stopping the motor counts the number of starts.

Counter mode (page 134) affects the counter behavior:

- Counter mode = OFF: no counting.
- Counter mode = Always: all time counting
- Counter mode = Running: the counting only when the controller is in the status Running.

CounterConstant (page 134) is coefficient between the pulse number and value displayed on the main screen as "Total" and in LiteEdit - Statistics. It is visible only when **Counter mode (page 134)** = Always or Running.

"Total" is located on the main screen on the same position with "RPM". Visibility depends on settings **Counter mode (page 134)** and **Show RPM (page 71)** – the latest selected.

3.4.7 Timer Functions

The controller is equipped by two timers which can be used to several time functions according to the user settings.

To set the behavior of the timers, use the setpoints from **Group: Date/Time (page 127)**.

3.4.8 Motor Protection List

To protect the motors M2 – M6, use the LBI M1 Protect, ... M6 Protect. Each LBI can be configured with the option Sd or Wrn. The option Sd stops all the motors, whilst the option Wrn keeps other motors running (just the failed motor is stopped with corresponding alarm message).

Note: The LBI M1 Protect is available for the motor M1 too, even if this motor protection is based on voltage and current measurement.

This is useful for very small motors because the separate thermal relay can be cheaper than a CT for the same current.

Protection Overview

Protections presented in the table below are intended to protect the motor or/and the driven machine. Each protection can be customized by corresponding setpoint.

Protection	Description	Relative setpoints
Motor Voltage	Protection against overvoltage and under voltage of the motor's power supply.	OverVoltage (page 105)
		UnderVoltage (page 105)
		Ove/UndVoltDel (page 105)
Voltage Unbalance	Protection against the difference between phase voltages. Protection is inactive in the case of single-phase motor.	Volt unbal (page 106)
		Volt unbal del (page 106)
		Connection Type (page 72)
Motor Overload Protection	Protection against current overload. The setpoint allows the modification of the time constant, i.e. the reaction delay of the protection. To make this protection operational, connect the CT to the controller.	Amps IDMT Del (page 103)
OverCurrent and torque	Protection stops the motor quickly when Nominal OverCurrent Sd (page 102) Current corrected by percentage value of OverCurrent Sd (page 102) is over passed. OverCur Sd Del (page 103) allows the delay of the shutdown. This protects the motor against the sudden overcurrent, or the driven machine in the case of jamming etc. To make this protection operational, connect the CT to the controller.	OverCurrent Sd (page 102)
		OverCur Sd Del (page 103)
Speed	Protection stops the motor when the speed passes under or over the set zone. To make this protection operational, connect the	Overspeed Sd (page 96)

Protection	Description	Relative setpoints
	speed sensor to the controller .	Underspeed Sd (page 96)
Minimal Load	Protection will stop the motor if the power consumption passes under the set level. The motor is stopped only when the condition lasts more than the set delay. This function is useful to survey the driven machine, e.g. if a pump lacks water in its inlet. To make this protection operational, connect the CT to the controller.	LowLoadLimit (page 101)
		Mot prot del (page 94)
General Analog Protection AI1	The function surveys the value of analog input AI1. Two alarm limits are watched, one for warning only, the second one to stop the motor. To declare the alarm, the condition must last more than AIN1 Delay. The protection can be set in both increasing and decreasing trends. For more info see Logical analog inputs on page 1.	AI1 Wrn (page 97)
		AI1 Sd (page 97)
		AI1 del (page 97)
General Analog Protection AI2	Analogical to General Analog Protection AI1	AI2 Wrn (page 98), AI2 Sd (page 98), AI2 del (page 98)
General Analog Protection AI3	Analogical to General Analog Protection AI1	AI2 Wrn (page 98), AI2 Sd (page 98), AI2 del (page 98)
Controller Power Supply Voltage	Protection against over voltage and under voltage of the controller power supply voltage.	DCVoltageOver (page 100)
		DCVoltageUnder (page 100)
Maintenance Period	The warning message is generated when one of the two following conditions are met: > Motor Run Hours reached the level of WrnMaintenRun (page 102) > The current date reached the date set in WrnMaintenAge (page 102). The options are to be used according to the maintenance rules and the motor requirements. See more about Run Hours in MEASUREMENT screens description (page 29).	WrnMaintenRun (page 102)

Protection	Description	Relative setpoints
		WrnMaintenAge (page 102)
Phases reversal	The protection against the opposite order of Connection Type (page 72) phases. The protection is active only when Connection Type (page 72) = 3f. Then, in the case when the phases order is inverted, the controller generates an alarm according to Phase Reversal (page 107): > SP Phase Reversal = Wrn: >> WrnPhaseRevers is generated. > SP Phase Reversal = Sd: >> SdPhaseRevers is generated.	Connection Type (page 72)
		Phase Reversal (page 107)

Wiring Rules for More than One Motor

CT wiring

The Current Transformer can be wired to measure current of the motor M1 only or all motors. When the CT measures the total current, the internal over-current current protections and the optimized starting Y-D can not be used.

Optimized starting Y-D

The optimized starting Y-D can be used for the motor M1 only (CT measures M1 only).

Protections when SP Multiple Control = 3Y-D a 6Direct

The full protection is ensured for the motor M1 only. Emergency Stop stops all motors, the other rules see in the table.

Protection principle	The generated Sd stops	The origin of the Sd
U	All motors	Common power supply voltage
I	M1	Current evaluation, current too high
Emergency Stop	All motors	User
Analog signal	All motors	From any AI with configured alarm
Binary signal	Only the motor relative to the LBI	By activating LBI Mx protect, for each motor separately
Wrong start	All motors	When the start of a motor failed (the start lasted too long, or the wrong feedback from a contactor).
Load to low	M1	Current evaluation – current too low
Speed	M1	M1

Voltage Protections in AUT mode

The voltage protections (**OverVoltage** (page 105), **UnderVoltage** (page 105) and **Volt unbal** (page 106)) are evaluated as Warning when no motor is running and Shut-down when a motor is running.

When the motor is running in the mode AUT and one of these protections generates the Sd, the motor is stopped, but if the reason of the Sd alarm disappears (the mains voltage recovers), the Sd is erased so that the motors can start again (if the start is required at this moment) – without **FAULT RESET** (PAGE 158).

3.4.9 Types of Asynchronous Motor and their Wiring

Different types of asynchronous motor can be controlled by ID-EM controller - after corresponding setpoints setting and proper wiring. See below:

Motor	Kind of Starting	Current Transformer	Comment
Single-phase	Direct, SoftStarter	without CT	
Single-phase	Direct, SoftStarter	with CT	CT allows the use of the currentbased thermal protection, over current protection, low power protection. The current, power and PF can be measured and recorded
Three-phase	Y/D, Direct, SoftStarter, F-changer	without three-phase CT	
Three-phase	Y/D, Direct, SoftStarter, F-changer	with three-phase CT	As for single-phase, plus Y/D starting optimization (v.1.1)

3.4.10 Communication with the controller

Direct Connection of the Controller to PC

The simplest way to connect the controller to PC is by IL-NT RS232 or IL-NT S-USB plug-in module.

All possibilities

IL-NT RS232	Plug-in module to enable the controller for RS232
IL-NT S-USB	Communication plug-in module
IB-Lite	Internet/Ethernet plug-in module
IL-NT GPRS	Plug-in module

The plug-in module is to be inserted into the communication slot at the back of the controller.

Remote Communication

Plug-In module IL-NT GPRS allows the establishing of the wireless connection to the Internet or control of the motor by SMS from a mobile phone. The connection to the Ethernet network (and so to an intranet or the internet) can be established with the plug-in module IB-Lite. Then, it is possible to monitor and control the motor at distance with LiteEdit or IntelliMonitor PC program.

Once the connection to the internet is established, it is also possible to use WebSupervisor, a powerful tool for remote monitoring.

Note: The firmware is compatible with LiteEdit v.4.5.6 and higher.

 **back to Functions**

3.5 Alarm management

Following alarms are available:

- > Sensor fail
- > Warning
- > Shut down

3.5.1 Sensor fail (FLS)

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

3.5.2 Warning (WRN)

When warning comes up, only alarm outputs and common warning output are closed. Information about warning event is also in **List of possible alarms (page 45)**.

3.5.3 Shut down (SD)

When the shut-down alarm comes up, The control unit opens outputs **KM1 (PAGE 159)**, **KM2 (PAGE 159)** and **KM3 (PAGE 160)** to stop the motor immediately. Alarm outputs and common shutdown output are closed. Active or not reset protection disables start.

3.5.4 List of possible alarms

Events specification	Alarm type	Description
ActCalICH1Fail, ActCalICH2Fail	WRN	The required SMS could not be sent.
BackUpActive	WRN	The motor M1 was stopped because of its failure, the motor M2 was started instead of M1. The motor M1 can be reactivated by the confirmation of this alarm (e.g. by the panel button).
Binary input	Configurable	Configurable Warning/Shutdown alarms on the inputs of controller.
EmergencyStop	SD	If EMERGENCY STOP (PAGE 140) is opened shutdown is immediately activated.
ChngKM1failed Sd or ChngxKMyfailed Sd	SD	The feedback of the contactor KM1 (PAGE 159) (or xKMy) is wrong (the feedback is read from the auxiliary contact of the contactor).
Low BackupBatt	WRN	RTC backup battery is flat (battery inside of the controller)
Mains Unb	SD/Wrn	The mains voltage is unbalanced more than the value of Volt unbal (page 106) . WRN when no motor is running, Sd when a motor is running.
OverCurr	WRN	The message appears in the multiple control mode. The maximal admissible current of the motor M1 according to OverCurrent Sd (page 102) was

Events specification	Alarm type	Description
		overpassed for the period longer than OverCur Sd Del (page 103) . Other motors keep running.
OverCurrent Sd	SD	The maximal admissible current according to OverCurrent Sd (page 102) was overpassed for the period longer than OverCur Sd Del (page 103) .
Overspeed	SD	The protection comes active if the speed is greater than Overspeed Sd (page 96) .
ParamFail	NONE	Wrong checksum of parameters. Happens typically after downloading new firmware or changing of the parameter. The controller stays in INIT mode. Check all parameters, write at least one new parameter.
PickupFault	SD	Failure of magnetic pick-up sensor for speed measurement.
Sd "Name of analog input"	SD	Level of AINx is smaller or higher (depends on parameter Direction in the window of this AINx in Modify menu) than setpoint AINx Sd of Motor Protect Group.
Sd LoadTooLow	SD	The power consumption is lower than LowLoadLimit (page 101) is. It means that the load is not in its normal state.
Sd Volt L1 < V Sd	SD	The mains voltage sank under the UnderVoltage (page 105) during the run of at least one motor.
Sd Volt L1 > V Sd	SD	The mains voltage exceeded OverVoltage (page 105) during the run of at least one motor.
SdMaintenRun (service time)	SD	The period for servicing is set by WrnMaintenRun (page 102) . The protection comes active if the running hours of the motor reach this value. In the back-up mode, the message stops the motor M1 and starts the motor M2.
SdPhaseRevers	SD	The message appears when Phase Reversal (page 107) = ShutDown, and when the order of phases L1, L2 and L3 was corrupted.
SoftStNotReady Sd	SD	The start by the softstarter is chosen (KindOfStarting (page 86)), the start is requested and the softstarter is not ready (SOFTSTARTCONF (PAGE 146) , and SoftStartConf (page 88)).
Stop fail	SD	Motor stop failed.
ThermicProt	WRN	The message appears in the multiple control mode. The motor M1 was stopped by the "thermic relay" protection. Other motors keep running.
ThermicProtect Sd	SD	The "thermic relay" protection. This protection protects the motor M1 only. To set this protection, see Amps IDMT Del (page 103) .

Events specification	Alarm type	Description
Underspeed	SD	The protection comes active if the speed is greater than Underspeed Sd (page 96) . Protection evaluation starts after reaching status Running.
Wrn "Name of analog input"	WRN	Level of AINx is smaller or higher (depends on parameter Direction in the window of this AINx in Modify menu) than setpoint AINx Wrn of Motor Protect Group. Note: The text of alarm message takes the name of AIN (if AIN is renamed).
Wrn Batt Volt	WRN	The power supply voltage of the controller is out of the range which is defined by DCVoltageOver (page 100) and DCVoltageUnder (page 100) .
Wrn LoadTooLow	WRN	In the multi-motor mode, when the power consumption is lower than LowLoadLimit (page 101) is, the motor M1 is stopped but other motors keep running.
Wrn PLC active	WRN	Means that the PLC output is assigned to a LBI. In the case of a wrong setting, it could cause the start of motor at the moment when it is not supposed.
Wrn RA15 fail	WRN	Warning alarm in case of lost connection to IGL-RA15 module.
Wrn SP Incomp	WRN	Some combinations of KindOfStarting (page 86) and Multiple Control (page 107) are not allowed. When the controller is of-line and the settings are done in LiteEdit, the wrong combinations can not be blocked. In this case, the setting is corrected when the archive configuration is uploaded into the controller. Then, Multiple Control (page 107) is automatically switched to the option No and the message Wrn SP Incomp is generated.
Wrn Volt L1 < V	WRN	The mains voltage sank under UnderVoltage (page 105) and no motor is supposed to be running.
Wrn Volt L1 > V	WRN	The mains voltage exceeded OverVoltage (page 105) and no motor is supposed to be running.
WrnM1Stopped or WrnMxStopped	WRN	The motor Mx was stopped by its protection (M1 PROTECT (PAGE 143)). The other motors keep running. Until the signal of M1 PROTECT (PAGE 143) is active, the alarm lasts.
WrnMaintenAge	WRN	The current date reaches the date set by WrnMaintenAge (page 102) .

Events specification	Alarm type	Description
WrnMaintenRun	WRN	The period for servicing is set by WrnMaintenRun (page 102) . The protection comes active if the running hours of the motor reach this value.
WrnPhaseRevers	WRN	The message appears when Phase Reversal (page 107) = Warning, and when the order of phases L1, L2 and L3 was corrupted.
YDOptiStartFls Sd	SD	The current of the motor during the start (the time according to StarterDel (page 87)) did not decrease under the value of Y-D SwitchCurr (page 87) .

3.6 Motor operation states

3.6.1 Motor states

Init	Autotest during controller power on
Not ready	Motor is not ready to start
Ready	Motor is ready to run
Starting	Motor is under voltage in Y wiring (KM1 and KM2 contactors are ON)
Running	Starting is over, motor is running
Stop	Stop
Shutdown	Shut-down alarm activated
EmergMan	Emergency Manual motor operation

3.6.2 History file

The controller stores a record of each important event into the history file. The history file seats 100 records. When the history file is full, the oldest records are removed.

3.7 Supported Plug-in Modules

	Unit or module	Description	Optional/ Obligatory
	InteliDrive EM	Central unit	Obligatory
Communication modules			
1	IL-NT RS232 communication module (page 169)	RS232 communication card	Optional
2	IL-NT RS232-485 communication module (page 170)	Communication module	Optional
3	IL-NT S-USB communication module (page 171)	USB communication module	Optional
4	IL-NT GPRS module (page 173)	GPRS communication module	Optional
5	IB-Lite Ethernet communication plug-in card (page 172)	Internet/Ethernet Module including Web Server	Optional
6	IGL-RA15	Remote annunciator	Optional
Input output modules			
7	IL-NT AIO (page 175)	4 analog inputs and 1 analog output	Optional
8	IL-NT AOUT8 – 8 gauge driver module (page 174)	8 analog outputs card	Optional
9	IL-NT BIO8 Binary input/output module (page 178)	8 input or output binary channels	Optional
11	IL-NT IO1 – extension I/O module (page 176)	4 analog outputs and 4 binary inputs	Optional

Note: The item 1 or 2 or 3 or 5 is necessary for the communication with LiteEdit.

Find more information about remote communication in the chapter "Remote control and data logging".

3.8 Application Examples

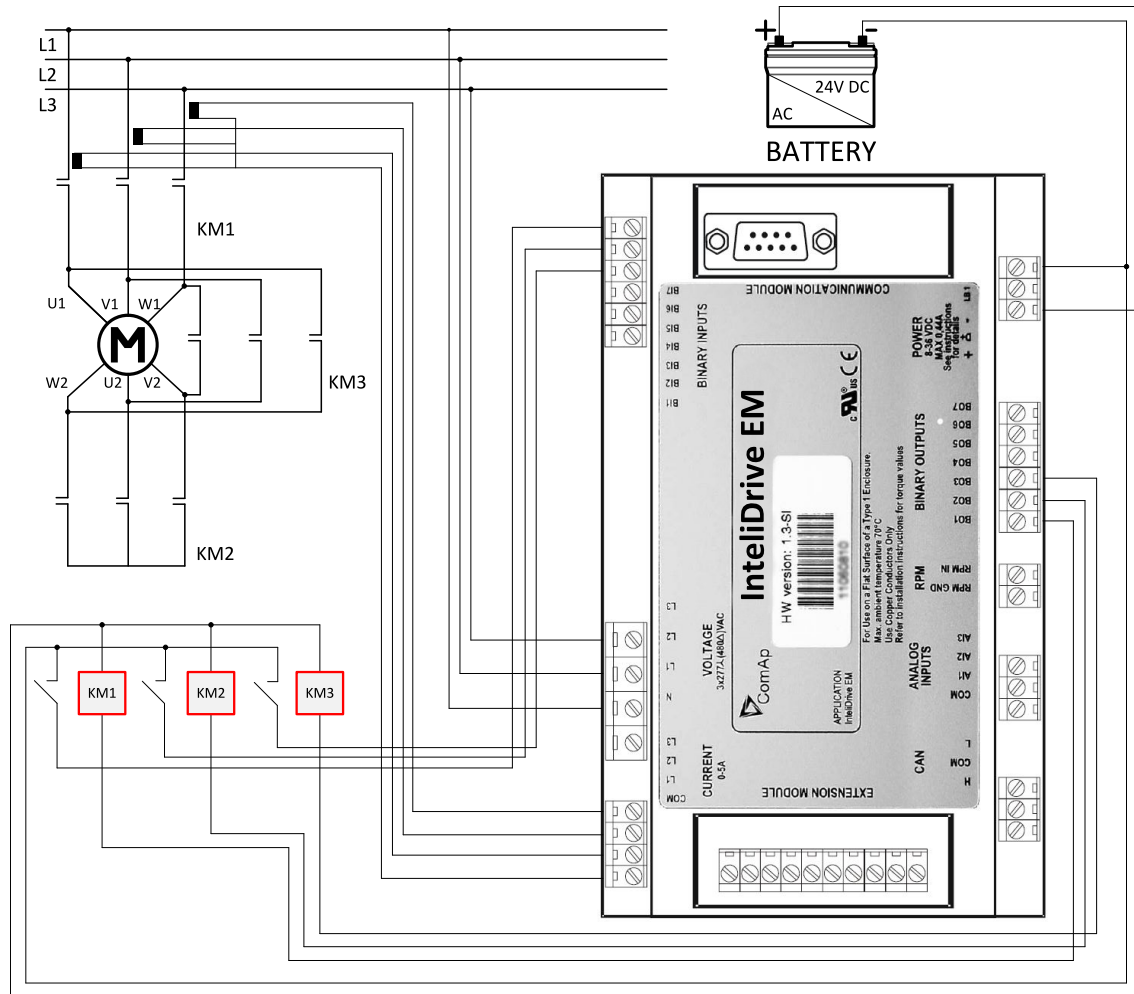
3.8.1 One Three-phase Motor

The motor is started by the very common mode Y-D, where the stator coils are connected to the star (**KM2** (PAGE 159)) and after the motor gains the speed so that the current decreases, the coils are connected to the delta wiring (**KM3** (PAGE 160)).

Group	Setpoint	Settings
Basic settings	Connection Type (page 72)	3f
	KM Feedback (page 72)	YES or NO
Motor Params	KindOfStarting (page 86)	Y-D or Y-D Optim
	StarterDel (page 87)	2s
Functions	Multiple Control (page 107)	NO
	CtrlByAIN/BIN (page 108)	BIN or AIN
	Braking Delay (page 113)	5s
Basic Settings	ControllerMode (page 71)	MAN or AUT

Apart from the above mentioned setpoints e.g. related to electric protections **NomVolts Ph-N** (page 69), **Nomin power** (page 85), **Nomin current** (page 85), **OverCurrent Sd** (page 102) and **OverCur Sd Del** (page 103) and **Amps IDMT Del** (page 103).

Motor can be started (stopped) in MAN mode by ID-EM panel START (STOP) button or in AUT mode by **REMSTART/STOP** (PAGE 146) or by Analog input (when value is over/under **Start by AIN** (page 108)/**Stop by AIN** (page 109)).



Note: The wiring corresponds to the default settings of inputs and outputs defined in the archive file (AIL).

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4 Communication

Possible ways of remote communication:

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4.1 By direct wired serial communication

Use IN-NT RS232, IL-NT RS485 or IN-NT USB plug-in module.

This way is mainly intended for the communication with PC and LiteEdit program. Other useful PC programs are IntelliMonitor to realize and watch the Scada screen and WinScope to visualize the trends of values.

4.1.1 PC software – LiteEdit

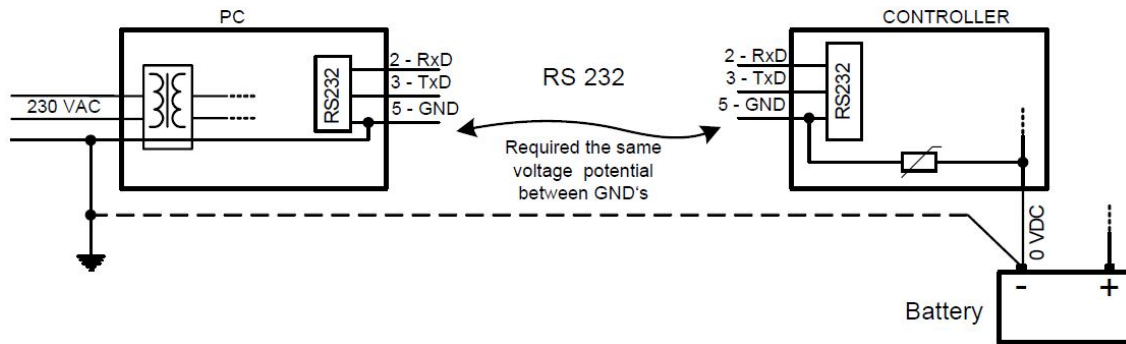
On the PC (for direct or modem connection) has to be installed the ComAp' s software package LiteEdit. (based on Windows 95 or newer platform)

LiteEdit enables:

- > Read the quantities
- > Adjust all set points
- > Control the motor
- > Configure the controller
- > Select software configuration
- > Modify alarm inputs and outputs
- > Modify password, commands protections
- > Direct, modem or Internet communication

The firmware is compatible with LiteEdit v.4.5.6 and higher.

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



4.2 By remote display

Use another controller unit ID-FLX-Lite and upload into the firmware IL-NT-RD, freely available on Comap web pages. The both units (the engine controller and the second one which takes the role of the so called remote display) have to be connected together by the serial line RS485. The both controllers must be equipped by plug-in cards IL-NT RS232-485.

IL-NT RS232-485 settings:

- Close the terminator jumper of at least one station.
- For longer distances, close the terminator jumper on the both stations.
- The troubles with the communication establishing on a long distance can be solved by closing the jumpers Pull Down and Pull Up, this is to try and use the best result.

4.3 By wired internet

Use IB-Lite Internet/Ethernet plug-in module.

Use IB-Lite Internet/Ethernet plug-in module. By internet, the controller can be connected to the PC with the same programs like in the case of direct connection. There is also possible to use ComAp web application WEB Supervisor to monitor and control the motor.

For more information, see Web Supervisor Reference Guide on www.ComAp.cz

4.4 By wireless GPRS internet

Use IL-NT GPRS plug-in module.

4.4.1 Internet connection with IL-NT-GPRS module

- Apart of the controller and IL-NT GPRS module, antenna and SIM card with GPRS are required.
- Contact SIM card operator for getting GPRS APN name, username and password.
- Make sure SIM card does not require PIN code. If it does, it is possible to disable it in every common Mobile telephone.
- Power up the ComAp controller.
- Enter correct APN Name, APN UserName and APN UserPass in controller's Comms Settings.

Set

- > COM1 Mode = DIRECT.
- > Switch off ComAp controller.
- > Place the SIM card into slot on IL-NT GPRS card, plug in the IL-NT GPRS card into communication
- > Slot on back side of ComAp controller.
- > Connect the antenna to designated SMA connector.
- > Connect power supply to IL-NT GPRS module. It supports 8-36V DC voltage.
- > Power up the system.
- > Wait for approx 2 - 4 minutes for first connection of the system to AirGate . Then navigate to last of measurement screens where you will find signal strength bar and AirGate ID value.



Once this AirGate ID is displayed, connection via AirGate was successful. This value will be needed for LiteEdit or WebSupervisor connection.



Image 4.1 AirGate connection dialog in LiteEdit

4.5 By SMS

Use IL-NT GPRS plug-in module.

4.5.1 SMS message format

SMS message format:

- > Start with # character, followed controller address, followed colon character and access code,
- > Commands are comma separated,
- > Commands are not case sensitive,
- > Maximum message length is limited up to 160 characters,
- > Controller answers only message with valid Access code,
- > Answer exceeds 160 characters is separated to more messages.

4.5.2 SMS message header

Every SMS must start with header in format:

#address:access command1, command2

where

<i>address</i>	is controller address 1 to 32,
<i>access</i>	is valid access code set-up by PC SW (up to 15 characters length),
<i>#</i>	character indicates beginning of message,
<i>:</i>	character separates controller address and access code

Note: For direct communication to one controller is possible skip address setting.

4.5.3 SMS message commands

Controller address

Controller address is unique controller identification number located in setpoint group Basic Settings : Contr addr [1 to 32].

Syntax	#XX XX ... controller address [1 to 32]
Example	#5 Message is addressed to controller with address 5.

Access code

InteliGen/InteliSys Access code is 15 characters length string. Access code is separated from controller address by column.

Syntax	#5:X X ... controller access code up to 15 characters length
Example	#5:accesscode Message is addressed to controller with address 5 and its access code is set to value 'accesscode'.

Read value or setpoint

Command for reading of selected value or setpoint. Return value is in appropriate numerical or string format.

Syntax	r XXXX (or rXXXX) r ... command XXXX... value or setpoint code
Example	#5:accesscode r 8252 Reading of setpoint 8252 (8252 = Gear teeth)

Note: Access code can't contain space character. Access code can be changed in InteliMonitor only.

Adjust setpoint

Command for adjusting of selected setpoint. Answer message contains only confirmation of successful adjusting or appropriate error.

Syntax	w XXXX YYYY (or wXXXX YYYY) w ... command XXXX... setpoint code YYYY... value of setpoint in appropriate format
Example	#5:accesscode w 8252 144 Adjusting of setpoint 8252 to value 144 (8252 = Gear teeth).
Return code	ok ... adjusting setpoint was correct w_err ... adjusting setpoint was not successful er_pass ... adjusting setpoint required that valid password was entered er_old ... command for adjusting was read out from SMS during GSM modem initialization – in this case command will not be served.

Enter password

Password setting command. Password has to be set before adjusting of protected setpoint or calling protected gen-set control command. Setting password command is not necessary before every adjusting. Password is a number in range 0 to 65535 and is valid for all rest of SMS.

Syntax	p PPPP (or pPPPP) p ... command PPPP... password
Example	#5:accesscode p 1234, w 8252 144 Setting password before adjusting protected setpoint.
Return code	ok ... setting password was successful er_pass ... setting password is not valid

Motor control

SMS command for invoking gen-set control command as Start, Stop, Fault reset etc.

Syntax	c Y (or cY) c ... command Y ... type of operation <table><tr><th>Y</th><th>Type of operation</th><th>Y</th><th>Type of operation</th></tr><tr><td>1</td><td>Start</td><td>7</td><td>MCB-ON</td></tr><tr><td>2</td><td>Stop</td><td>8</td><td>MCB-OFF</td></tr><tr><td>3</td><td>Horn Reset</td><td>9</td><td>GCB-ON/OFF</td></tr><tr><td>4</td><td>Fault Reset</td><td>10</td><td>MCB-ON/OFF</td></tr><tr><td>5</td><td>GCB-ON</td><td>11</td><td>Next Mode</td></tr><tr><td>6</td><td>GCB-OFF</td><td>12</td><td>Previous Mode</td></tr></table>	Y	Type of operation	Y	Type of operation	1	Start	7	MCB-ON	2	Stop	8	MCB-OFF	3	Horn Reset	9	GCB-ON/OFF	4	Fault Reset	10	MCB-ON/OFF	5	GCB-ON	11	Next Mode	6	GCB-OFF	12	Previous Mode
Y	Type of operation	Y	Type of operation																										
1	Start	7	MCB-ON																										
2	Stop	8	MCB-OFF																										
3	Horn Reset	9	GCB-ON/OFF																										
4	Fault Reset	10	MCB-ON/OFF																										
5	GCB-ON	11	Next Mode																										
6	GCB-OFF	12	Previous Mode																										
Example	#5:accesscode p 1234, c1 Note: This SMS command invokes motor start. Password setting is needed in case of password protection was configured for motor commands.																												
Return code	<table><tr><td>ok</td><td>...</td><td>command was accepted</td></tr><tr><td>er_pass</td><td>...</td><td>valid password was not set before executing the command</td></tr><tr><td>c?</td><td>...</td><td>unknown command</td></tr><tr><td>c_er</td><td>...</td><td>gen-set command execution is not allowed in actual state (e.g. attempt to start the motor in OFF mode).</td></tr><tr><td>er_old</td><td>...</td><td>command was read out from SMS during GSM modem initialization – in this case command will not be served.</td></tr></table>	ok	...	command was accepted	er_pass	...	valid password was not set before executing the command	c?	...	unknown command	c_er	...	gen-set command execution is not allowed in actual state (e.g. attempt to start the motor in OFF mode).	er_old	...	command was read out from SMS during GSM modem initialization – in this case command will not be served.													
ok	...	command was accepted																											
er_pass	...	valid password was not set before executing the command																											
c?	...	unknown command																											
c_er	...	gen-set command execution is not allowed in actual state (e.g. attempt to start the motor in OFF mode).																											
er_old	...	command was read out from SMS during GSM modem initialization – in this case command will not be served.																											

Read Alarm list

Read actual Alarm list.

Syntax	a a ... command
Example	#5:accesscode a Request of actual Alarm list.
Return code	AL=(items of alarm list) ... comma separated items of Alarm list. Exclamation mark in front of Alarm list item indicates inverse record (still active alarm).

Note: Answer message contains at most eight items of Alarm list.
Alarm list is not separated to more messages.

Answer message

Answer message start with # character followed by the controller name. Colon separates this header from return codes of SMS commands. Answer message is generated during serving of received message and is sent in case that 160 characters or end of received message are achieved. Answer message is sent to the originator phone number. Three dots at the end of message indicate separation and next following message.

Example:

```
#5:accesscode r8252,w8252 100,r8252
answer message
#Gen-setname: 144,ok,100
```

Examples of SMS commands

Here are following several examples of SMS messages addresses to controller IG/IS-NT with address 5, named 'Gen-set name'. Access code in this controller is set to 'accesscode' and password is '1234'. In examples are used setpoints and values 8276 – Nomin.power, 10123 – RPM, 8315 – Controller Mode, 8235 – binary inputs, 8296 – Gen > f.

Example: Reading value

SMS	#5:accesscode r8276	read value 8276
Answer	#Gen-set name:100	

Example: Adjusting setpoint

SMS	#5:accesscode p 1234, r8276,w8276 110,r8276	read value 8276, write 110, read value 8276
Answer	#controller name:ok,100,ok,110	Password was accepted, read value of 8276 is 100, writing to 8276 was ok, new value of 8276 is 110
	If wrong password sent: #Gen-set name:p_ er,100, w_pass, 100	Password was not accepted, read value of 8276 is 100 writing to 8276 was not successful read value of 8276 is still 100

Example: Gen-set control and delay time

SMS	#5:accesscode r8276,c1,d30,r10123	read value 8276, invoke gen-set command START, delay 30 sec, read value 10123
Answer	#controller name:110,ok,d_ok,1499	read value of 8276 is 110, Gen-set command START was accepted, confirm delay command, read value of 10123 is 1499

Example: Adjusting special setpoint

SMS	#5:accesscode r8315,w8315 0,r8315	read value 8315, write 0 (index of stringlist type), read value 8315
Answer	# controller name:MAN,ok,OFF	read value of 8315 as string, writing was ok, read new value of 8315 as string

Note: Setpoints Stringlist type (e.g. Controller Mode) is read as string and adjusted as index of string item in string list. e.g. Controller Mode:

Read value [as string]	Write value [as index]
OFF	0
MAN	1
SEM	2
AUT	3
TEST	4

Example: Reading actual Alarm list

SMS	#5:accesscode a	read actual Alarm list
Answer	# controller name:AL=(!Wrn PrimWater temp, !Wrn SecWater temp, Batt volt)	Actual Alarm list contains three items.

4.6 Modbus protocol

The selection of the function of the controller serial port is done via the setpoint RS232 mode in.

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

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

4.6.1 Communication object vs. Register

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

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

🔍 back to Communication

5 Technical data

Power supply

Voltage supply	8-36 VDC
Consumption	40-430 mA depend on supply voltage and temperature
Consumption depends on supply voltage	0.104 A at 8 VDC 0.080 A at 12 VDC 0.051 A at 24 VDC 0.044 A at 30 VDC 0.040 A at 36 VDC
Allowed supply voltage drop-out	100ms from min. 10V return to min. 8 V
Battery voltage measurement tolerance	2 % at 24 V

Operating conditions

Operating temperature	-20 °C to +70 °C
Storage temperature	-30 °C to +80 °C
Protection front panel	IP65
Impact protection	EN 62262, EN 50102 (IK04)
Humidity	95 % non-condensing (EN 60068-2-30)
Low Voltage Directive	EN 61010-1:95 +A1:97
Electromagnetic Compatibility	EN 50081-1:94, EN 50081-2:96 EN 50082-1:99, EN 50082-2:97
Vibration	5 - 25 Hz, ± 1.6 mm 25 - 100 Hz, $a = 4$ g
Shocks	$a = 200$ m/s ²
Heat radiation	9 W
Accessories	2 W (+1 W per module)

Dimensions and weight

Dimensions	180 × 120 × 55 mm
Weight	450 g

Current inputs

Nominal input current (from CT)	5 A
Load (CT output impedance)	< 0.1 Ω
CT input burden	< 0.2 VA per phase ($I_n=5A$)
Max. measured	10 A

current from CT	
Current measurement tolerance	2% from the Nominal current
Max. peak current from CT	150 A/1 s
Max. continuous current	12 A

Voltage inputs

Measuring voltage range	0 – 277 VAC phase to neutral 0 – 480 VAC phase to phase
Maximal measured voltage	340 VAC phase to neutral 600 VAC phase to phase
Input resistance	0.6 M Ω phase to phase 0.3 M Ω phase to neutral
Voltage measurement tolerance	2 % from the Nominal voltage
Overvoltage class	III/2 (EN61010)

Binary inputs

Number of inputs	7
Input resistance	4.2 k Ω
Input range	0-36 VDC
Switching voltage level for close contact indication	0-2 V
Max voltage level for open contact indication	8-36 VDC

Binary open collector outputs

Number of outputs	7
Maximum current	0.5 A
Maximum switching voltage	36 VDC

Analog inputs

Number of inputs	3 resistive
Resolution	10 bits
Maximal resistance range	2500 Ω
Resistance measurement tolerance	$\pm 2 \% \pm 2 \Omega$ out of measured value

Speed pick-up input

Type of sensor	magnetic pick-up (connection by shielded cable is recommended)
Minimum input voltage	2 Vpk-pk (from 4 Hz to 4 kHz)
Maximum input voltage	50 Veff
Minimum measured frequency	4 Hz
Maximum measured frequency	10 kHz
Frequency measurement tolerance	0.2 %

CAN bus interface

Maximal CAN bus length	200 m
Speed	250 kBd
Nominal impedance	120 Ω
Cable type	twisted pair (shielded)
Nominal Velocity of Propagation	min. 75 % (max. 4,4 ns/m)
Wire crosscut	min. 0,25 mm ²
Maximal attenuation (at 1 MHz)	2 dB/100 m

Recommended Industrial Automation & Process Control Cables:

- BELDEN (see www.belden.com):
 - 3082A DeviceBus for Allen-Bradley DeviceNet
 - 3083A DeviceBus for Allen-Bradley DeviceNet
 - 3086A DeviceBus for Honeywell SDS
 - 3087A DeviceBus for Honeywell SDS
 - 3084A DeviceBus for Allen-Bradley DeviceNet

- 3085A DeviceBus for Allen-Bradley DeviceNet
- 3105A Paired EIA Industrial RS485 cable
- LAPP CABLE (see www.lappcable.com)
 - Unitronic BUS DeviceNet Trunk Cable
 - Unitronic BUS DeviceNet Drop Cable
 - Unitronic BUS CAN
 - Unitronic-FD BUS P CAN UL/CSA

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6 Appendix

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Controller objects

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6.1.1 Setpoints

Password

EnterPassword

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

ChangePassword

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

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

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List of setpoints

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Group: Basic settings

Motor Name

Setpoint group	Basic settings	Related FW	1.7.0
Range [units]	[-]		
Default value	el. motor	Force value Alternative config	
Step	-		
Comm object	8637	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
User defined name, used for the control unit identification at remote modem or internet connection. Motor Name is max 14 characters long and has to be entered using LiteEdit software.			

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NomVolts Ph-N

Setpoint group	Basic settings	Related FW	1.7.0
Range [units]	80 .. 11000 [V]		
Default value	231 V	Force value Alternative config	
Step	1 V		
Comm object	8277	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Mains nominal voltage between the phase and the neutral as a base for Over/Undervoltage and Voltage unbalance protection. see Group: Motor Protect on page 94.			

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Gear teeth

Setpoint group	Basic settings	Related FW	1.7.0
Range [units]	1 .. 500 [-]		
Default value	120	Force value Alternative config	
Step	1		
Comm object	8252	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Number of teeth on the motor gear for the pick-up speed sensor. Set to zero, if no pick-up is used.			
Electric motor RPM measuring allows			
➤ Speed control, monitoring and recording into history file ➤ Underspeed/Overspeed protection.			
Note: Actual motor RPM can be measured by controller Analog input instead by magnetic pickup. See <i>Real RPM Sel (page 90)</i> = CU:AIN1 – CU:AIN3; AIO:AIN1 – AIO:AIN4.			

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Nominal RPM

Setpoint group	Basic settings	Related FW	1.7.0
Range [units]	100 .. 4000 [RPM]		
Default value	1480 RPM	Force value Alternative config	
Step	1 RPM		
Comm object	8253	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Nominal RPM as base for Under/Overspeed protection. See Motor Protect setpoint group.			

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Show RPM

Setpoint group	Basic settings	Related FW	1.7.0
Range [units]	YES/NO [-]		
Default value	NO	Force value Alternative config	
Step	-		
Comm object	10596	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
YES	the RPM value is displayed on the controller main screen.		
NO	the RPM value is not displayed on the controller screen.		

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ControllerMode

Setpoint group	Basic settings	Related FW	1.7.0				
Range [units]	OFF/MAN/AUT [-]						
Default value	OFF	Force value Alternative config					
Step	-						
Comm object	8315	Related applications					
Config level	Standard						
Setpoint visibility	Always						
Description							
Equivalent to Controller mode changes by MODE → or ← MODE buttons.							
<table><tr><td>MAN</td><td>Electric motor is Started and Stopped (operated) manually by panel buttons.</td></tr><tr><td>AUT</td><td>Electric motor is operated automatically based on Binary inputs (switches) or Analog sensor values (e.g. pressure, temperature, level etc.).</td></tr></table>				MAN	Electric motor is Started and Stopped (operated) manually by panel buttons.	AUT	Electric motor is operated automatically based on Binary inputs (switches) or Analog sensor values (e.g. pressure, temperature, level etc.).
MAN	Electric motor is Started and Stopped (operated) manually by panel buttons.						
AUT	Electric motor is operated automatically based on Binary inputs (switches) or Analog sensor values (e.g. pressure, temperature, level etc.).						
Note: The controller mode change can be password protected.							

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Connection Type

Setpoint group	Basic settings	Related FW	1.7.0				
Range [units]	3f/1f [-]						
Default value	3f	Force value Alternative config					
Step	-						
Comm object	11628	Related applications					
Config level	Standard						
Setpoint visibility	Always						
Description							
Defines if the motor is single or three phases.							
<table><tr><td>3f</td><td>for three phase motor</td></tr><tr><td>1f</td><td>for single phase motor</td></tr></table>				3f	for three phase motor	1f	for single phase motor
3f	for three phase motor						
1f	for single phase motor						

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KM Feedback

Setpoint group	Basic settings	Related FW	1.7.0
Range [units]	YES/NO [-]		
Default value	YES	Force value Alternative config	
Step	-		
Comm object	11941	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Enables or Disables the testing of contactors feedback.			
YES	After each change of LBO xKMy, the corresponding xKMY FEEDBACK (PAGE 1) is tested and the Sd alarm is activated when feedback does not follow the command within 2 sec. The option YES is recommended.		
NO	Use when the mutual blocking of contactors is wired to spare binary inputs of the controller.		

IMPORTANT: In case the contactor feedback is required, the corresponding LBI xKMy feedback must be configured to any BIN. Using the KM feedback prevents short circuit risk in the case of contactor failure.

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Sprinkler

Setpoint group	Basic settings	Related FW	1.7.0
Range [units]	ENABLE/DISABLE [-]		
Default value	DISABLE	Force value Alternative config	
Step	-		
Comm object	14603	Related applications	-
Config level	Standard		
Setpoint visibility	Always		
Description			
> If Enabled – Shutdown alarms except overcurrent, overspeed and emergency stop do not stop the engine in AUT mode > If Disabled – All functionalities remain without change			

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Group: Communication Settings

ControllerAddr

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	1 .. 32 [-]		
Default value	1	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Controller identification number. It is possible to set controller address different from the default value (1) so that more IL controllers can be interconnected (via RS485) and accessed e.g. from Modbus terminal.			
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.			

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COM1 Mode

Setpoint group	Communication Settings	Related FW	1.7.0								
Range [units]	DIRECT/MODEM/MODBUS/ECU LINK [-]										
Default value	DIRECT	Force value Alternative config									
Step	-										
Comm object		Related applications									
Config level	Standard										
Setpoint visibility	Always										
Description											
Communication protocol switch for the COM1 channel.											
<table><tr><td>DIRECT</td><td>LiteEdit communication protocol via direct cable.</td></tr><tr><td>MODEM</td><td>LiteEdit communication protocol via modem.</td></tr><tr><td>MODBUS</td><td>Modbus protocol. See detailed description in IntelliCommunication guide.</td></tr><tr><td>ECU LINK</td><td>Protocol for communication with Cummins engines via Modbus.</td></tr></table>				DIRECT	LiteEdit communication protocol via direct cable.	MODEM	LiteEdit communication protocol via modem.	MODBUS	Modbus protocol. See detailed description in IntelliCommunication guide.	ECU LINK	Protocol for communication with Cummins engines via Modbus.
DIRECT	LiteEdit communication protocol via direct cable.										
MODEM	LiteEdit communication protocol via modem.										
MODBUS	Modbus protocol. See detailed description in IntelliCommunication guide.										
ECU LINK	Protocol for communication with Cummins engines via Modbus.										
Note: For details on communication speed and other technical parameters please see Technical data on page 62. For detail description see Modbus protocol on page 61. Since IL-NT version 1.3 controller supports register oriented modbus.											

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COM2 Mode

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	DIRECT/MODBUS/ECU LINK [-]		
Default value	DIRECT	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Communication protocol switch for the COM2 channel, if dual communication module is plugged in.			
DIRECT	LiteEdit communication protocol via direct cable.		
MODBUS	Modbus protocol. See detailed description in IntelliCommunication guide.		
ECU LINK	Protocol for communication with Cummins engines via Modbus.		
Note: For details on communication speed and other technical parameters please see Technical data on page 62 .			
For detail description see Modbus protocol on page 61 . Since IL-NT version 1.3 controller supports register oriented modbus.			

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ModemIniString

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value		Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
If your modem needs some additional initialization AT commands (i.e. because of national telephony network differences), it can be entered here. Otherwise leave this setpoint blank.			

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ModbusComSpeed

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	9600,19200, 38400, 57600 [bps]		
Default value	9600 bps	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
If the Modbus mode is selected on COM1 or COM2 channels, the Modbus communication speed in bps can be adjusted here.			

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IBLite IP Addr

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value	192.168.1.254	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
If DHCP is DISABLED this setpoint is used to adjust the IP address of the ethernet interface of the controller. Ask your IT specialist 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.			

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IBLite NetMask

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value	255.255.255.0	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
If DHCP is DISABLED this setpoint is used to adjust the IP address of the ethernet interface of the controller. Ask your IT specialist 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.			

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IBLite GateIP

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value	192.168.1.1	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
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.			
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.			

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IBLite DHCP

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	ENABLED/DISABLED [-]		
Default value	ENABLED	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
The setpoint is used to select the method how the ethernet connection is adjusted.			
> DISABLED >> The ethernet connection is adjusted fixedly according to the setpoints >> DNS IP Address (page 84),IBLite IP Addr (page 76) IBLite NetMask (page 77), IBLite GateIP (page 77). >> This method should be used for classic ethernet or Internet connection. When this type of connection is opening the controller is specified by it's IP address. That means it would be inconvenient if the IP address were not fixed (static). > 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 IBLite GateIP (page 77) and the module continues trying to obtain the settings.			

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ComAp Port

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	0 .. 65535 [-]		
Default value	23	Force value Alternative config	
Step	1		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
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. IntelliLite, IntelliMonitor). 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.			

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APN Name

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value		Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Name of APN access point for GPRS network provided by GSM/GPRS operator.			

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APN User Name

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value		Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
User name for APN access point provided by GSM/GPRS operator.			

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APN User Pass

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value		Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
User password for APN access point provided by GSM/GPRS operator.			

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AirGate

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	ENABLED/DISABLED [-]		
Default value	ENABLED	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint selects the ethernet connection mode.			
> 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. > 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 AirGateserver address is adjusted by AirGate IP (page 81).			

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AirGate IP

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value	airgate.comap.cz	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
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 it's own AirGate server.			

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SMTP User Name

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value		Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Use this setpoint to enter the user name for the SMTP server.			

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SMTP User Pass

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value		Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Use this setpoint to enter the password for the SMTP server.			

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SMTP Server IP

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value		Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
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. Please ask your internet provider or IT manager for this information. Note: You may also use one of free SMTP servers, e.g. smtp.gmail.com. However, please note that some free SMTP servers may cause delays (in hours..) when sending e-mails. If you do not want to send active e-mails, you may leave this setpoint blank, as well as other setpoints related to SMTP server and e-mail settings. Proper setting of SMTP-related setpoints as well as controller mailbox are essential for sending alerts via e-mails.			

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Contr Mail Box

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value		Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
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.			

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Time Zone

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value	GMT +2:00	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
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.			
Note: <i>If the time zone is not selected properly the active e-mails may contain incorrect information about sending time, which may result in confusion when the respective problem actually occurred.</i>			

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DNS IP Address

Setpoint group	Communication Settings	Related FW	1.7.0
Range [units]	[-]		
Default value	8.8.8.8	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
If DHCP is DISABLED this setpoint is used to adjust the domain name server (DNS), which is needed to traslate domain names in e-mail addresses and server names into correct IP addresses.			
If DHCP is ENABLED this setpoint is used to display DNS server, which has been assigned by the DHCP server.			

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Group: Motor Params

Nomin power

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	0.6 .. 3000.0 [kW]		
Default value	10.0 kW	Force value Alternative config	
Step	0.1 kW		
Comm object	8276	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Nominal power of the electric motor as base for Low Load protection. See LowLoadLimit (page 101) and Mot prot del (page 94) .			

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Nomin current

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	0.1 .. 1500 [A]		
Default value	15.0 A	Force value Alternative config	
Step	0.1 A		
Comm object	8275	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Nominal current of the electric motor as base for overcurrent and IDMT protections of the first electric motor.			

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KindOfStarting

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	Direct/Y-D/Y-D Optim/SoftStart/F-changer [-]		
Default value	Y-D	Force value Alternative config	
Step	-		
Comm object	10058	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Selection of electric motor starting. Must follow the electric motor wiring.			
Direct	Each electric motor has just one on/off contactor driven by Binary output KM1 (PAGE 159), 2KM1, 3KM1, 4KM1, 5KM1, 6KM1.		
Y-D	Star-Delta starting with 3 contactors. The starting delay (Y duration) is defined by StarterDel (page 87). Each of three contactors is driven by Binary output triplets KM1+KM2+KM3, 2KM1+2KM2+2KM3, 3KM1+3KM2+3KM3. <i>Note: Max three electric motors can be Delta-Star started.</i>		
Y-D Optim	Like Y-D option, but the starting delay is not predefined by a setpoint. The initial Y starting connection is switched to the D connection when the phase current sinks under the limit Y-D SwitchCurr (page 87) x Nomin current (page 85). If the current does not sink before Starting Delay, the engine is stopped and an alarm is activated. <i>Note: Current measuring is required for this option. Only the first one motor can be controlled with this option by KM1 (PAGE 159)+KM2 (PAGE 159)+KM3 (PAGE 160).</i>		
SoftStart	Start with the soft starter. See also SoftStartConf (page 1) and StarterDel (page 1). The start signal for soft starter is KM1 (page 1).		
F-Changer	Start (and run) with the frequency changer. See also Ramp (page 88), Stopping Ramp (page 89), RPM1 (page 92) and RPM2 (page 93). After the start command the KM1 (PAGE 159) is activated to energize the frequency changer, and the required speed displayed under the name Req RPM AIN (page 90). To wire the required speed to the frequency changer input, use a plug-in module with the analog output (IL-NT AIO, etc).		

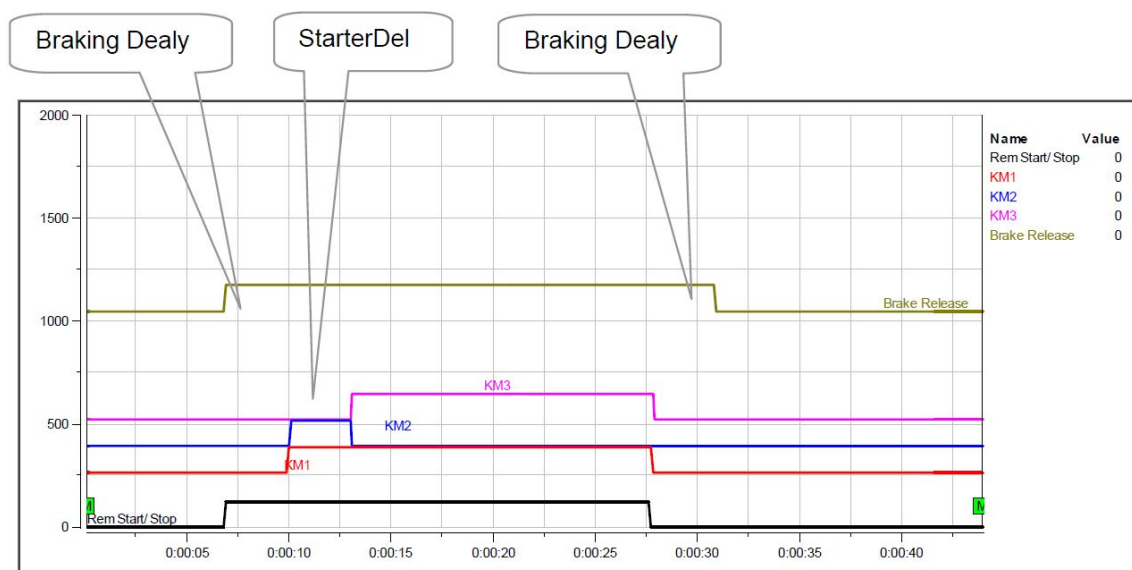
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StarterDel

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	0 .. 500 [s]		
Default value	6 s	Force value Alternative config	
Step	1 s		
Comm object	9097	Related applications	
Config level	Standard		
Setpoint visibility	Always		

Description

Duration of starting phase Y in case the **KindOfStarting** (page 86) = Y-D.



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Y-D SwitchCurr

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	0.5 .. 15 [-]		
Default value	1.00	Force value Alternative config	
Step	0.01		
Comm object	8433	Related applications	
Config level	Standard		
Setpoint visibility	Always		

Description

Relative current coefficient to switch the connection from the Y to the D during the motor starting when **KindOfStarting** (page 86) = Y-D Optim.

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SoftStartConf

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	No, Before, After [-]		
Default value	No	Force value Alternative config	
Step	-		
Comm object	11942	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Way to test the softstarter feedback.			
No	No test is required before and during the start with a softstarter.		
Before	Use this option when the soft starter gives the logical signal with the meaning “Ready to start”. The status of SOFTSTARTCONF (PAGE 146) is tested before start – i.e. KM1 (PAGE 159) activation. This can be used to bypass the softstarter by a contactor controlled by KM3 (PAGE 160). If the SOFTSTARTCONF (PAGE 146) is not activated, the start is blocked and the Sd alarm is generated.		
After	The confirmation of the softstarter (SOFTSTARTCONF (PAGE 146)) is expected after the start, when the motor have reached the full speed and the softstarter is fully open. After the confirmation, KM3 (PAGE 160) is activated. This can be used to bypass the softstarter by a contactor controlled by KM3 (PAGE 160). If the SOFTSTARTCONF (PAGE 146) is not activated in time, the start is blocked and the Sd alarm is generated.		
Note: see KindOfStarting on page 86.			

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Ramp

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	10 .. 3000 [RPM/s]		
Default value	600	Force value Alternative config	
Step	1 RPM/s		
Comm object	8434	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Acceleration used for the changes of required speed (when frequency changer is used).			

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Stopping Ramp

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	10 .. 3000 [RPM/s]		
Default value	600	Force value Alternative config	
Step	1 RPM/s		
Comm object	8435	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Deceleration used for the changes of required speed (when frequency changer is used).			

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MinSpeedLim

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	0 .. MaxSpeedLim (page 89) [RPM]		
Default value		Force value Alternative config	
Step	1		
Comm object	10096	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
The setpoint presets the minimum engine speed in the “Running” operation state. Also see other conditions in the chapter below.			

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MaxSpeedLim

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	MinSpeedLim (page 89) .. 4000 [RPM]		
Default value		Force value Alternative config	
Step	1		
Comm object	10097	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
The setpoint presets the maximum engine speed in the “Running” operation state. Also see other conditions in the chapter below.			

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Req RPM AIN

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	CU:AIN1 .. CU:AIN3, AIO:AIN1 .. AIO:AIN4 [-]		
Default value	NONE	Force value Alternative config	
Step	-		
Comm object	10594	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Selection of analog input for PI loop request - required speed (or pressure) when SS1 (PAGE 147) = 1 (i.e. configured and closed). The IL-NT AIO plug-in module is needed as interface to frequency changer.			

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Real RPM Sel

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	[list of analog inputs]		
Default value	Pickup	Force value Alternative config	
Step	-		
Comm object	12142	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Choose here the analog input which will serve as the required speed when SS1 (PAGE 147) = 1 (when frequency changer is used). ➤ CU:AIN1 .. CU:AIN3, AIO:AIN1 .. AIO:AIN4 : Analog input selection ➤ Pickup: The actual RPM value is measured from the magnetic pick-up. ➤ None: Required speed (Req RPM AIN (page 90)) is connected directly to the Logical analog output REQUIRED RPM i.e. controller gives only the required value to Frequency exchanger - RPM is adjusted directly without PI loop The analog output REQUIRED RPM is to be assigned to IL-NT AIO (or IL-NT IO1) analog output. The regulator works in both MAN and AUT mode. To activate this function set KindOfStarting (page 86) = f-Changer.			

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Reg Bias

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	[-]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	11848	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Control loop output LAO: Required RPM value in controller OFF mode or in case KindOfStarting (page 86) is not set to f-Changer.			

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Reg Integral

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	0.0 .. 100.0 [%]		
Default value	10.0 %	Force value Alternative config	
Step	0.1 %		
Comm object	11847	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Integral factor of PI loop.			

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Reg Gain

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	-200.0 .. 200.0 [%]		
Default value	10.0 %	Force value Alternative config	
Step	0.1 %		
Comm object	11846	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Gain factor of PI loop.			

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RPM1

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	10 .. 4000 [RPM]		
Default value	500 RPM	Force value Alternative config	
Step	1 RPM		
Comm object	8436	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Required RPM.			
This setpoint servers as the required value (speed) when LBI SS1 = 1 and LBI SS2=0 (when frequency changer is used) (for more info see SS1 (PAGE 147)).			

[!\[\]\(3e4b9f92398aee6fac0baea2461d3afa_img.jpg\) back to List of setpoints](#)

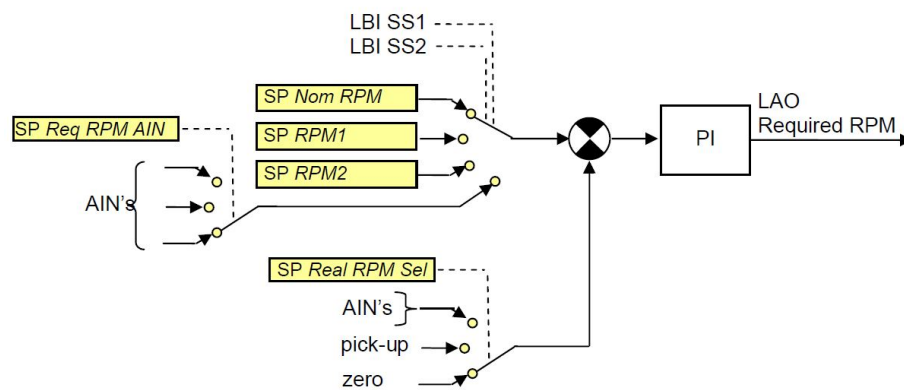
RPM2

Setpoint group	Motor Params	Related FW	1.7.0
Range [units]	10 .. 4000 [RPM]		
Default value	1000 RPM	Force value Alternative config	
Step	1 RPM		
Comm object	8437	Related applications	
Config level	Standard		
Setpoint visibility	Always		

Description

Required RPM.

This setpoint serves as the required value (speed) when LBI SS1 = 0 and LBI SS2=1 (when frequency changer is used) (for more info see **SS1 (PAGE 147)**).



Input for the requested value of the process variable is to be chosen by the combination of SP Req RPM AIN and the LBI SS1 and SS2.

SS1	0	1	0	1
SS2	0	0	1	1
Source of signal	SP NomRPM	SP RPM1	SP RPM2	SP Req RPM AIN

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Group: Motor Protect

Mot prot del

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 300 [s]		
Default value	5 s	Force value Alternative config	
Step	1 s		
Comm object	8262	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
<i>Note: Changing value of setpoint has no effect on already running counter, new value is applied after restart of sequence.</i>			
<i>Note: The delay is blocking all RunningOnly protections until the timer expires.</i>			

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CT Ratio

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	1 .. 5000 [A/5A]		
Default value	50 /5A	Force value Alternative config	
Step	1 A		
Comm object	8274	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Motor phases current transformers ratio. Set up according to the type of used current transformer and according to the required range of current measurement.			
Note: The current inputs are over loadable by 90%.			

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PT Ratio

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	1 .. 200 [V/V]		
Default value	1.0 /1	Force value Alternative config	
Step	0.1 V/V		
Comm object	9579	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Motor voltage transformers ratio. Set up according to the type of used current .			

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HigherSecurity

Setpoint group	Motor Protect	Related FW	1.7.0				
Range [units]	Normal/Standard [-]						
Default value	Normal	Force value Alternative config					
Step	-						
Comm object	13174	Related applications					
Config level	Standard						
Setpoint visibility	Always						
Description							
<table><tr><td>Normal</td><td>Standard behavior.</td></tr><tr><td>HigherSec</td><td>Controller is forced to OFF mode in case of any Shut-down alarm even if other (MAN or AUT) controller mode is forced by REMOTE MAN (PAGE 146) or REMOTE AUT (PAGE 145). Only exception is active Backup mode when Multiple Control (page 107) = Back up.</td></tr></table>				Normal	Standard behavior.	HigherSec	Controller is forced to OFF mode in case of any Shut-down alarm even if other (MAN or AUT) controller mode is forced by REMOTE MAN (PAGE 146) or REMOTE AUT (PAGE 145) . Only exception is active Backup mode when Multiple Control (page 107) = Back up.
Normal	Standard behavior.						
HigherSec	Controller is forced to OFF mode in case of any Shut-down alarm even if other (MAN or AUT) controller mode is forced by REMOTE MAN (PAGE 146) or REMOTE AUT (PAGE 145) . Only exception is active Backup mode when Multiple Control (page 107) = Back up.						

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Horn timeout

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 600 [s]		
Default value	10 s	Force value Alternative config	
Step	1 s		
Comm object	8264	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Max time limit of horn sounding. Set to zero if you want to leave the output HORN open. Horn timeout starts again from the beginning if a new alarm appears before previous Horn timeout has elapsed.			

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Overspeed Sd

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	90 .. 150 [%]		
Default value	115 %	Force value Alternative config	
Step	1 % of Nominal RPM (page 70)		
Comm object	8263	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for over speed protection			

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Underspeed Sd

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 120 [%]		
Default value	0 %	Force value Alternative config	
Step	1 % of Nominal RPM (page 70)		
Comm object	8260	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for under speed protection			

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AI1 Wrn

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	[-]		
Default value	80.0 °C	Force value Alternative config	
Step	-		
Comm object	8369	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold level for ANALOG INPUT 1			
Unit, step and range are adjustable in Modify window.			

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AI1 Sd

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	[-]		
Default value	90.0 °C	Force value Alternative config	
Step	-		
Comm object	8370	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown threshold level for ANALOG INPUT 1			
Unit, step and range are adjustable in Modify window.			

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AI1 del

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 900 [s]		
Default value	3 s	Force value Alternative config	
Step	1 s		
Comm object	8365	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for ANALOG INPUT 1			

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AI2 Wrn

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	[-]		
Default value	80 °C	Force value Alternative config	
Step	-		
Comm object	8375	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold level for ANALOG INPUT 2			
Unit, step and range are adjustable in Modify window.			

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AI2 Sd

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	[-]		
Default value	90 °C	Force value Alternative config	
Step	-		
Comm object	8376	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown threshold level for ANALOG INPUT 2			
Unit, step and range are adjustable in Modify window.			

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AI2 del

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 900 [s]		
Default value	5 s	Force value Alternative config	
Step	1 s		
Comm object	8371	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for ANALOG INPUT 2			

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AI3 Wrn

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	[-]		
Default value	20 %	Force value Alternative config	
Step	-		
Comm object	8381	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold level for ANALOG INPUT 3			
Unit, step and range are adjustable in Modify window.			

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AI3 Sd

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	[-]		
Default value	10 %	Force value Alternative config	
Step	-		
Comm object	8382	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown threshold level for ANALOG INPUT 3			
Unit, step and range are adjustable in Modify window.			

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AI3 del

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 900 [s]		
Default value	10 s	Force value Alternative config	
Step	1 s		
Comm object	8377	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for ANALOG INPUT 3			

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DCVoltageOver

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	8 .. 40 [V]		
Default value	36.0 V	Force value Alternative config	
Step	0.1 V		
Comm object	9587	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold for high controller power supply voltage.			

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DCVoltageUnder

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	[V]		
Default value	8.0 V	Force value Alternative config	
Step	-		
Comm object	8387	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			

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DCVoltageDel

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 600 [s]		
Default value	5 s	Force value Alternative config	
Step	1 s		
Comm object	8383	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for low controller power supply voltage alarm.			

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LowLoadLimit

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 3300 [kW]		
Default value	0.0 kW	Force value Alternative config	
Step	1 kW		
Comm object	12161	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown threshold for low power load. Examples of use: controller stops the pump when the water runs out; or, a driver belt breaks.			
Note: To make possible this protection, the wiring circuit must be equipped by current transformers.			

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LoadLowLimDel

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 180 [s]		
Default value	5 s	Force value Alternative config	
Step	-		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
<i>Note: Changing value of setpoint has no effect on already running counter, new value is applied after restart of sequence.</i>			
<i>Note: Function - delay of protection LoadTooLow.</i>			

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WrnMaintenRun

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 10000 [h]		
Default value	8760 h	Force value Alternative config	
Step	1 h		
Comm object		Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Counts down when motor is running. If reaches zero, a warning message appears.			

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WrnMaintenAge

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	[calendar date]		
Default value	1.1.2014	Force value Alternative config	
Step	-		
Comm object	10104	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
If the current date reaches the setpoint value, a warning message appears. This is useful for motors or driven machines which are not in use a great deal but which it is necessary to maintain regularly.			

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OverCurrent Sd

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 1000 [%]		
Default value	150 %	Force value Alternative config	
Step	1 % of Nomin current (page 85)		
Comm object	8282	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for motor overcurrent (in % of Nomin current (page 85)).			
The time of this protection does not depend on the overcurrent size, i.e. the time of reaction depends on OverCur Sd Del (page 103) only.			
This protection can use to protect the driven machine in the case of a mechanical seizure etc.			

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OverCur Sd Del

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0.0 .. 400.0 [%]		
Default value	4.00 %	Force value Alternative config	
Step	0.1 %		
Comm object	9991	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for motor overcurrent alarm.			

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Amps IDMT Del

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	1 .. 650.0 [s]		
Default value	40.0 s	Force value Alternative config	
Step	1 s		
Comm object	8283	Related applications	
Config level	Standard		

Setpoint visibility	Always
----------------------------	--------

Description

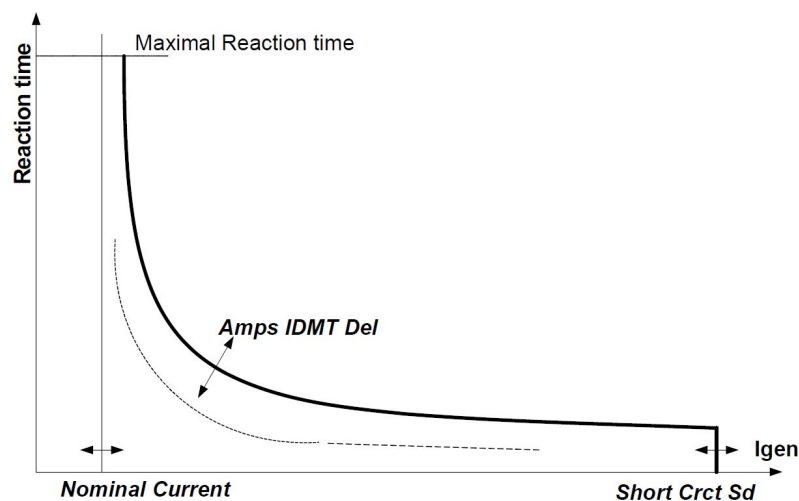
IDMT curve shape selection. Amps IDMT Del is Reaction time of IDMT protection for 200% overcurrent $I_{gen} = 2 * \text{Nomin current}$ (page 85).

IDMT is “very inverse” over current protection. Reaction time is not constant but depends on over current level according following formula.

$$\text{Reaction time} = \frac{\text{Amps IDMT Del} * \text{Nomin Current}}{I_{ph} - \text{Nomin Current}}$$

In the case of three phase wiring, I_{ph} is maximal value of all measured phases of current.

Note: To simulate the breaker characteristic “C” according to the IEC EN 60255-3 standard, Amps IDMT Del must be at least 30. The bigger the value is, the slower the reaction of the protection is. Be careful to optimize the ratio of the current transformer in order not to saturate the current inputs of the controller and at the same time not to decrease the measurement precision in the range of nominal values. See also **CT Ratio** (page 94).



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OverVoltage

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	UnderVoltage (page 105) .. 200 [%]		
Default value	110 %	Force value Alternative config	
Step	1 % of NomVolts Ph-N (page 69)		
Comm object	8291	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for mains overvoltage. All three phases are checked. Maximum out of three is used.			

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UnderVoltage

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. OverVoltage (page 105) [%]		
Default value	85 %	Force value Alternative config	
Step	1 % of NomVolts Ph-N (page 69)		
Comm object	8293	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for mains under voltage.			

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Ove/UndVoltDel

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0.0 .. 600.0 [s]		
Default value	2.0 s	Force value Alternative config	
Step	0.1 s		
Comm object	8292	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for mains under voltage and over voltage alarm.			

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Volt unbal

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0 .. 200 [%] of Nominal voltage		
Default value	10 %	Force value Alternative config	
Step	1 % of NomVolts Ph-N (page 69)		
Comm object	8288	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for phase voltage unbalance alarm.			

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Volt unbal del

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	0.0 .. 600.0 [s]		
Default value	3.0 s	Force value Alternative config	
Step	0.1 s		
Comm object	8289	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for voltage unbalance alarm.			

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Phase Reversal

Setpoint group	Motor Protect	Related FW	1.7.0
Range [units]	[Wrn/Sd]		
Default value	Warning	Force value Alternative config	
Step	-		
Comm object	10597	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
The protection against the opposite order of phases.			
The protection is active only when Connection Type (page 72) = 3f. Then, in the case when the phases order is inversed, the controller generates an alarm according to the Phase Reversal :			
➤ SP Phase Reversal = Wrn: WrnPhaseRevers is generated. ➤ SP Phase Reversal = Sd: SdPhaseRevers is generated.			

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Group: Functions

Multiple Control

Setpoint group	Functions	Related FW	1.7.0
Range [units]	[No/3Y-D/6Direct/Back Up]		
Default value	No	Force value Alternative config	
Step	-		
Comm object	10595	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
No	The controller provides the full control of one motor only. The setpoints and variables relative to other motors are inactive (SP 2StopByAin, LBI 3KM1 feedback etc).		
3Y-D	Apart from the main motor M1, the controller can start and stop other two motors M2 and M3 each of which can be wired Y-D.		
6Direct	Apart from the main motor M1, the controller can start and stop other five motors M2 – M6 each of which can be control by means of one contactor (KM1, 2KM1, 3KM1 etc).		
Back Up	The option for two motors. When the main motor M1 fails, the controller starts the motor M2 which behaves like M1 during the M1 failure.		

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CtrlByAIN/BIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	[BIN/BININV/CU:AIN1-3/AIO:AIN1-4]		
Default value	BIN	Force value Alternative config	
Step	-		
Comm object	13292	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
BIN	The motor starts if REMSTART/STOP (PAGE 146) is closed. This function (together with BININV) allows the motor to start and stop according to the status of a sensor with a binary output. Example: If the level of water exceeds the point where the sensor is, the pump is activated.		
BININV	The inverse function to BIN. The motor starts if REMSTART/STOP (PAGE 146) is open.		
AIN1-3	The motor starts when the value on the AINx meets the value of setpoint Start by AIN (page 108) . The motor stops when the value on the AINx meets the value of setpoint Stop by AIN (page 109) .		
AIO:AIN1-4	The same function as the previous one (AIN1-3). In order these AIN are available, an auxiliary module with analog inputs (e.g. IL-NT AIO) must be connected to the controller.		

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Start by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	0 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	11658	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 1-st motor start - i.e. for KM1 (PAGE 159) activation, see CtrlByAIN/BIN (page 108) .			
Note: Set levels according AIN sensor characteristic resolution without decimals.			

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Stop by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	0 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	11689	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 1 st motor stop - i.e. for KM1 (PAGE 159) deactivation, see CtrlByAIN/BIN (page 108) .			
Note: Start stop function is inverted in case the Start limit is lower than Stop limit.			

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2Start by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8438	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 2 nd motor start - see CtrlByAIN/BIN (page 108) .			
Note: Set levels according AIN sensor characteristic resolution without decimals.			

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3Start by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8440	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 3 rd motor start - see CtrlByAIN/BIN (page 108) .			
Note: Set levels according AIN sensor characteristic resolution without decimals.			

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4Start by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8420	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 4 th motor start - see CtrlByAIN/BIN (page 108).			
Note: Set levels according AIN sensor characteristic resolution without decimals.			

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5Start by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8422	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 5 th motor start - see CtrlByAIN/BIN (page 108).			
Note: Set levels according AIN sensor characteristic resolution without decimals.			

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6Start by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8424	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 6 th motor start - see CtrlByAIN/BIN (page 108).			
Note: Set levels according AIN sensor characteristic resolution without decimals.			

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2Stop by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8439	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 2 nd motor stop, see CtrlByAIN/BIN (page 108).			
Note: Start stop function is inverted in case the Start limit is lower than Stop limit.			

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3Stop by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8441	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 3 rd motor stop, see CtrlByAIN/BIN (page 108) .			
Note: Start stop function is inverted in case the Start limit is lower than Stop limit.			

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4Stop by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8421	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 4 th motor stop, see CtrlByAIN/BIN (page 108) .			
Note: Start stop function is inverted in case the Start limit is lower than Stop limit.			

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5Stop by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8423	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 5 th motor stop, see CtrlByAIN/BIN (page 108) .			
Note: Start stop function is inverted in case the Start limit is lower than Stop limit.			

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6Stop by AIN

Setpoint group	Functions	Related FW	1.7.0
Range [units]	-10000 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8425	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Level for 6 th motor stop, see CtrlByAIN/BIN (page 108) .			
Note: Start stop function is inverted in case the Start limit is lower than Stop limit.			

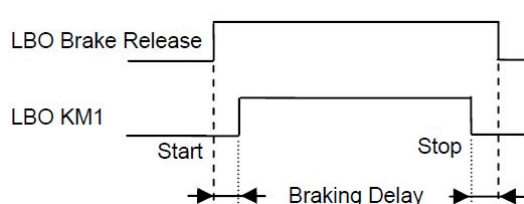
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Start/StopDelay

Setpoint group	Functions	Related FW	1.7.0
Range [units]	0 .. 900 [s]		
Default value		Force value Alternative config	
Step	1		
Comm object	13293	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint defines a delay before start or stop of motor by analog input for all 6 Start/stop levels in Multiple Control (page 107) = 6Direct mode			

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Braking Delay

Setpoint group	Functions	Related FW	1.7.0
Range [units]	0 .. 10 [s]		
Default value	0 s	Force value Alternative config	
Step	1 s		
Comm object	8394	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
The delay for braking release advance.			
			

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Group: Extension I/O

AnInAI01 lev1

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-100 .. 10000 [CU]		
Default value	0	Force value Alternative config	
Step	1 CU		
Comm object	8762	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold level for the first analog input of the auxiliary I/O module with analog inputs (when present).			
Unit, step and range are adjustable in Modify window, see Alarm management on page 45 .			
Note: Because control unit itself has three analog inputs, the dimension index of this first external input is 4, and so on.			

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AnInAIO1 lev2

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-100 .. 10000 [CU]		
Default value	0	Force value Alternative config	
Step	1 CU		
Comm object	8766	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown threshold level for the first analog input of the auxiliary I/O module, see Alarm management on page 45 .			

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AnInAIO1 del

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	0 .. 180 [s]		
Default value	0	Force value Alternative config	
Step	1 s		
Comm object	8770	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for AnInAIO1 protection.			

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Calibr AIO1

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-1000 .. 1000 [CU]		
Default value	0	Force value Alternative config	
Step	1 CU		
Comm object	8793	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the zero of the measured analog inputs value. Physical dimension of calibrating constant is corresponding to Analog input.			

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AnInAI02 lev1

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-100 .. 10000 [U5]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	8763	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold level for the first analog input of the auxiliary I/O module with analog inputs (when present).			
Unit, step and range are adjustable in Modify window, see Alarm management on page 45 .			
<i>Note: Because control unit itself has three analog inputs, the dimension index of this first external input is 4, and so on.</i>			

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AnInAI02 lev2

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-100 .. 10000 [U5]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	8767	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown threshold level for the first analog input of the auxiliary I/O module, see Alarm management on page 45.			

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AnInAIO2 del

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	0 .. 180 [s]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	8771	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for AnInAIO2 protection.			

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Calibr AIO2

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-1000 .. 1000 [CU]		
Default value	0	Force value Alternative config	
Step	1 CU		
Comm object	8794	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the zero of the measured analog inputs value. Physical dimension of calibrating constant is corresponding to Analog input.			

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AnInAI03 lev1

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-100 .. 10000 [U6]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8764	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold level for the first analog input of the auxiliary I/O module with analog inputs (when present).			
Unit, step and range are adjustable in Modify window, see Alarm management on page 45.			
<i>Note: Because control unit itself has three analog inputs, the dimension index of this first external input is 4, and so on.</i>			

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AnInAI03 lev2

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-100 .. 10000 [U6]		
Default value	0	Force value Alternative config	
Step	-		
Comm object	8768	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Shutdown threshold level for the first analog input of the auxiliary I/O module, see Alarm management on page 45.			

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AnInAIO3 del

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	0 .. 180 [s]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	8772	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for AnInAIO3 protection.			

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Calibr AIO3

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-1000 .. 1000 [U6]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	8795	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the zero of the measured analog inputs value. Physical dimension of calibrating constant is corresponding to Analog input.			

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AnInAIO4 lev1

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-100 .. 10000 [U7]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	8765	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			

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AnInAIO4 lev2

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-100 .. 10000 [U7]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	8769	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			

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AnInAIO4 del

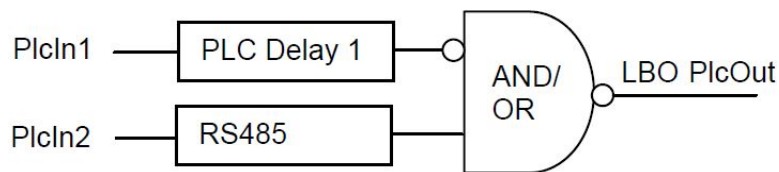
Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	0 .. 180 [s]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	8773	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description	Delay for AnInAIO4 protection.		

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Calibr AIO4

Setpoint group	Extension I/O	Related FW	1.7.0
Range [units]	-1000 .. 1000 [U7]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	8796	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description	Calibrating constant to adjust the zero of the measured analog inputs value. Physical dimension of calibrating constant is corresponding to Analog input.		

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Group: PLC**Function**

Setpoint group	PLC	Related FW	1.7.0
Range [units]	[AND/OR/EQL]		
Default value	AND	Force value Alternative config	
Step	-		
Comm object	11935	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Logical function selection (EQL means XOR).			

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NegPlcIn1

Setpoint group	PLC	Related FW	1.7.0
Range [units]	[NO/YES]		
Default value	NO	Force value Alternative config	
Step	-		
Comm object	11936	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
PLC input 1 inversion.			

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NegPlcOut

Setpoint group	PLC	Related FW	1.7.0
Range [units]	[NO/YES]		
Default value	NO	Force value Alternative config	
Step	-		
Comm object	11937	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
PLC output inversion.			

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Plc Delay 1 (2)

Setpoint group	PLC	Related FW	1.7.0
Range [units]	0 .. 180 [s]		
Default value	0 s	Force value Alternative config	
Step	1 s		
Comm object	8432	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay of PLC input 1 (or 2) LBI PlcIn1 (2).			
Delay for both - rising and falling edge. The PLC logic sampling period is 300 msec.			

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ConnectPlcIn1

Setpoint group	PLC	Related FW	1.7.0
Range [units]	[list of BIN + list of LBO]		
Default value	BIN1	Force value Alternative config	
Step	-		
Comm object	11938	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Selection of the PLC input 1 function.			

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ConnectPlcIn2

Setpoint group	PLC	Related FW	1.7.0
Range [units]	[list of BIN + list of LBO]		
Default value	BIN2	Force value Alternative config	
Step	-		
Comm object	11939	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Selection of the PLC input 2 function.			

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ConnectPlcOut

Setpoint group	PLC	Related FW	1.7.0
Range [units]	[list of BOUT + list of LBI, Not Used]		
Default value	Not Used	Force value Alternative config	
Step	-		
Comm object	11940	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Selects the Logical Binary Input the PLC OUT (PAGE 164) is connected to.			
To connect PLC OUT (PAGE 164) to physical controller output use LiteEdit – configuration tool.			

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Comp1 AIN

Setpoint group	PLC	Related FW	1.7.0
Range [units]	[list of AINs]		
Default value	Not Used	Force value Alternative config	
Step	-		
Comm object	13099	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Comparator 1 Analog input selection.			

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Comp1 OFF lim

Setpoint group	PLC	Related FW	1.7.0
Range [units]	-30000 .. 30000 [-]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	13100	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Comparator 1 output “Comp1” is opened when input value is below this limit.			

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Comp1 ON lim

Setpoint group	PLC	Related FW	1.7.0
Range [units]	-30000 .. 30000 [-]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	13101	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Comparator 1 output “Comp1” is closed when input value is over this limit.			

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Comp2 AIN

Setpoint group	PLC	Related FW	1.7.0
Range [units]	[list of AINs]		
Default value	Not Used	Force value Alternative config	
Step	-		
Comm object	13102	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Comparator 2 Analog input selection.			

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Comp2 OFF lim

Setpoint group	PLC	Related FW	1.7.0
Range [units]	-30000 .. 30000 [-]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	13103	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Comparator 2 output “Comp2” is opened when input value is below this limit.			

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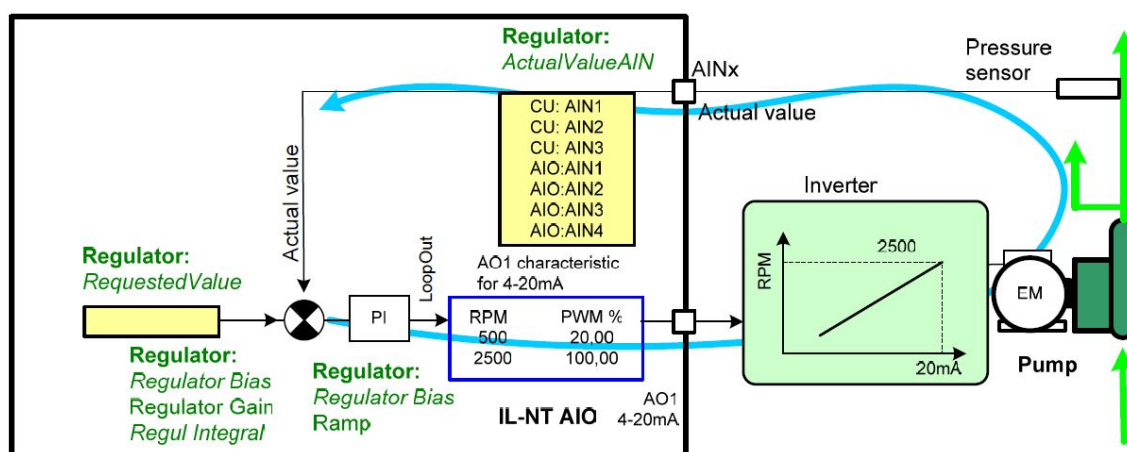
Comp2 ON lim

Setpoint group	PLC	Related FW	1.7.0
Range [units]	-30000 .. 30000 [-]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	13104	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Comparator 2 output “Comp2” is closed when input value is over this limit.			

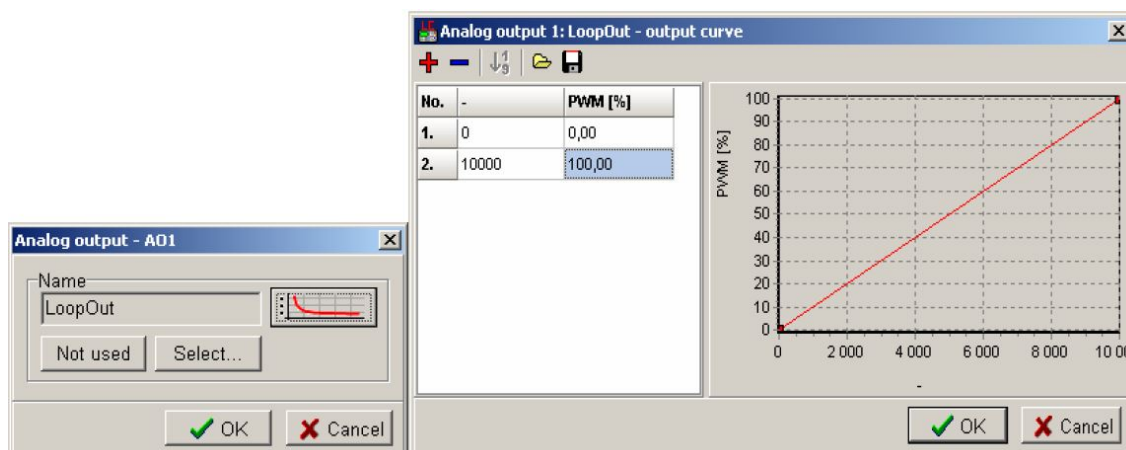
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Group: Regulator

Regulator is active in MAN and AUT mode – in Running state. In other states is output fixed on Regulator Bias value as well as in case of invalid Actual value.



Regulator output value name is LoopOut with range from 0 to 10000. For full analog output range configure AIO-AO1 according pictures below.



ActualValueAIN

Setpoint group	Regulator	Related FW	1.7.0
Range [units]	[CU:AIN1 ... CU:AIN3, AIO:AIN1 ... AIO:AIN4]		
Default value	None	Force value Alternative config	
Step	-		
Comm object	13205	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Selection of regulator Analog input = actual value.			

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RequestedValue

Setpoint group	Regulator	Related FW	1.7.0
Range [units]	0 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	13201	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Regulator requested value (just one) does not follow the Actual value AIN format.			
Example: When Actual value format is 0,0 to 10,0 Bar then for 5 Bar request set RequestedValue = 50.			

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Regulator Bias

Setpoint group	Regulator	Related FW	1.7.0
Range [units]	0 .. 10000 [-]		
Default value	0	Force value Alternative config	
Step	1		
Comm object	13202	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Regulator output when is PI loop inactive:			
> In OFF mode,			
> Actual value fail			
> Not running or Not ready states			

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Regulator Gain

Setpoint group	Regulator	Related FW	1.7.0
Range [units]	-200.0 .. 200.0 [%]		
Default value	10.0 %	Force value Alternative config	
Step	0.1 %		
Comm object	13203	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
PI loop gain factor.			

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Regul Integral

Setpoint group	Regulator	Related FW	1.7.0
Range [units]	0.0 .. 100.0 [%]		
Default value	10.0 %	Force value Alternative config	
Step	0.1 %		
Comm object	13204	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
PI loop integral factor.			

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Ramp

Setpoint group	Regulator	Related FW	1.7.0
Range [units]	10 .. 3000 [1/s]		
Default value	600	Force value Alternative config	
Step	1		
Comm object	8434	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Max output change limit. Normally set to 3000 to not influence the Integral factor.			

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Group: Date/Time**Time stamp per**

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	0 .. 240 [min]		
Default value	60 min	Force value Alternative config	
Step	1 min		
Comm object	8979	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Time interval for periodic history records.			

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SummerTimeMod

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	[DISABLED/WINTER/SUMMER,WINTER-S,SUMMER-S]		
Default value	DISABLED	Force value Alternative config	
Step	-		
Comm object	8727	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
DISABLED		Automatic switching between summer and wintertime is disabled.	
WINTER (SUMMER)		Automatic switching between summer and wintertime is enabled and it is set to winter (summer) season.	
WINTER-S (SUMMER-S)		Modification for southern hemisphere.	

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Time

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	[HHMMSS]		
Default value	0:00:00	Force value Alternative config	
Step	-		
Comm object	24554	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Actual real time.			

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Date

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	[DDMMYYYY]		
Default value	1.1.2006	Force value Alternative config	
Step	-		
Comm object	24553	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Actual date.			

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Timer1Function

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	[No Func/Auto Run/Mode OFF]		
Default value	No Func	Force value Alternative config	
Step	-		
Comm object	11660	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
It is possible to choose out of 3 following Timer functions. Binary output Exerc Timer X is always activated when Timer is active regardless of chosen Timer function. Timer functions require controller running in AUT mode.			
No Func	There is not any other function, but binary output Timer1..2 activation.		
AutoRUN	When this option is chosen then the Timer output is also internally connected to the Remote TEST binary input.		
Mode OFF	When this option is chosen then the Timer output is also internally connected to the Remote OFF binary input.		

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Timer2Function

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	[No Func/Auto Run/Mode OFF]		
Default value	No Func	Force value Alternative config	
Step	-		
Comm object	11661	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			

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Timer1 Repeat

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	[NONE/MONDAY/TUESDAY/WEDNESDAY/THURSDAY/WEDNESDAY/FRIDAY/SATURDAY/SUNDAY/MON-FRI/MON-SAT/MON-SUN/SAT-SUN]		
Default value	NONE	Force value Alternative config	
Step	-		
Comm object	10045	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Determinates repetition of TIMER 1 activation. Binary output 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.	

[back to List of setpoints](#)

Timer2 Repeat

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	[NONE/MONDAY/TUESDAY/WEDNESDAY/THURSDAY/WEDNESDAY/FRIDAY/SATURDAY/SUNDAY/MON-FRI/MON-SAT/MON-SUN/SAT-SUN]		
Default value	NONE	Force value Alternative config	
Step	-		
Comm object	10202	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Determinates repetition of TIMER 2 activation. Binary output TIMER 2 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.	

[back to List of setpoints](#)

Timer1 ON Time

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	[-]		
Default value	5:00:00	Force value Alternative config	
Step	-		
Comm object	10042	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Day time when Timer 1 output activates.			

 [back to List of setpoints](#)

Timer2 ON Time

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	[-]		
Default value	5:00:00	Force value Alternative config	
Step	-		
Comm object	10199	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Day time when Timer 2 output activates.			

 [back to List of setpoints](#)

Timer1 Duration

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	1 .. 1440 [min]		
Default value	5 min	Force value Alternative config	
Step	1 min		
Comm object	10044	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Duration for which Timer 1 output is active.			

 [back to List of setpoints](#)

Timer2 Duration

Setpoint group	Date/Time	Related FW	1.7.0
Range [units]	1 .. 1440 [min]		
Default value	5 min	Force value Alternative config	
Step	1 min		
Comm object	10201	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Duration for which Timer 2 output is active.			

[back to List of setpoints](#)

Group: Sensors Spec

AI1 Calibration

Setpoint group	Sensors Spec	Related FW	1.7.0
Range [units]	-1000 .. 1000 [unit is adjustable in Modify window]		
Default value	0.0 °C	Force value Alternative config	
Step	1		
Comm object	8431	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the zero of the measured analog inputs value. Physical dimension of calibrating constant is corresponding to Analog input.			
Note: Calibration constants have to be adjusted when measured value is near the alarm level or when the connection to PC is not available.			
LiteEdit PC software offers more powerful curves that the user can set to accommodate the sensor characteristic to the analog input.			

[back to List of setpoints](#)

AI2 Calibration

Setpoint group	Sensors Spec	Related FW	1.7.0
Range [units]	-1000 .. 1000 [unit is adjustable in Modify window]		
Default value	0.0 °C	Force value Alternative config	
Step	1		
Comm object	8407	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the zero of the measured analog inputs value. Physical dimension of calibrating constant is corresponding to Analog input.			
Note: Calibration constants have to be adjusted when measured value is near the alarm level or when the connection to PC is not available.			
LiteEdit PC software offers more powerful curves that the user can set to accommodate the sensor characteristic to the analog input.			

 [back to List of setpoints](#)

AI3 Calibration

Setpoint group	Sensors Spec	Related FW	1.7.0
Range [units]	-1000 .. 1000 [unit is adjustable in Modify window]		
Default value	0.0 °C	Force value Alternative config	
Step	1		
Comm object	8467	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the zero of the measured analog inputs value. Physical dimension of calibrating constant is corresponding to Analog input.			
Note: Calibration constants have to be adjusted when measured value is near the alarm level or when the connection to PC is not available.			
LiteEdit PC software offers more powerful curves that the user can set to accommodate the sensor characteristic to the analog input.			

 [back to List of setpoints](#)

CounterConstant

Setpoint group	Sensors Spec	Related FW	1.7.0
Range [units]	-1000 .. 1000 [-]		
Default value	1.00	Force value Alternative config	
Step	1		
Comm object	13091	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
Ratio between the pulse number measured on BI7 and the value to display.			

[◀ back to List of setpoints](#)

Counter mode

Setpoint group	Sensors Spec	Related FW	1.7.0
Range [units]	[Off/Always/Running]		
Default value	OFF	Force value Alternative config	
Step	-		
Comm object	13092	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
	OFF	No counting.	
	Always	The counting runs all the time.	
	Running	The counting runs only when the controller is in the status Running.	

[◀ back to List of setpoints](#)

Group: SMS/E-mail

Yel Alarm Msg

Setpoint group	SMS/E-mail	Related FW	1.7.0
Range [units]	[OFF/NO]		
Default value	OFF	Force value Alternative config	
Step	-		
Comm object	8482	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
When a Wrn message appears, the controller sends the message by SMS or e-mail. The destination depends on TelNo/Addr Ch1 (page 136) and TelNo/Addr Ch2 (page 136) .			

[back to List of setpoints](#)

Red Alarm Msg

Setpoint group	SMS/E-mail	Related FW	1.7.0
Range [units]	[OFF/NO]		
Default value	OFF	Force value Alternative config	
Step	-		
Comm object	8484	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
When a Sd event appears, the controller sends the message by SMS or e-mail. The destination depends on TelNo/Addr Ch1 (page 136) and TelNo/Addr Ch2 (page 136) .			

[back to List of setpoints](#)

MsgAfterStart

Setpoint group	SMS/E-mail	Related FW	1.7.0
Range [units]	[OFF/NO]		
Default value	OFF	Force value Alternative config	
Step	-		
Comm object	9983	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
When the setpoint is ON, a SMS message or e-mail is sent after each start or stop of motor.			

[back to List of setpoints](#)

TelNo/Addr Ch1

Setpoint group	SMS/E-mail	Related FW	1.7.0
Range [units]	[-]		
Default value		Force value Alternative config	
Step	-		
Comm object	9597	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
When an alarm appears, the message is sent to this phone number or e-mail address.			
Format: character string			

 [back to List of setpoints](#)

TelNo/Addr Ch2

Setpoint group	SMS/E-mail	Related FW	1.7.0
Range [units]	[-]		
Default value		Force value Alternative config	
Step	-		
Comm object	9598	Related applications	
Config level	Standard		
Setpoint visibility	Always		
Description			
When an alarm appears, the message is sent to this phone number or e-mail address.			
Format: character string			
Note: To allow the communication, the controller must be connected to a telephone modem or to internet.			
For connection, use ComAp auxiliary modules.			

 [back to List of setpoints](#)

6.1.2 Logical binary inputs

Not used



Type

☒ Not used ☐ Alarm ☐ Control

Binary input has no function. Use this configuration when Binary input is not connected.

Alarm



Type

☐ Not used ☒ Alarm ☐ Control

If the input is closed (or opened) selected alarm is activated.

Note: When a binary input is configured as protection, there is fix 1 sec delay.

Binary Alarm configuration items

Name		14 characters ASCII string
Contact type	NC	Normally closed
	NO	Normally opened
Alarm type	Warning	
	Shut down	
Alarm active	All the time	
	Motor running only	

Control



Type

☐ Not used ☐ Alarm ☒ Control

Alphabetical groups of Logical binary inputs

LBI: A	139
LBI: B	139
LBI: E	139
LBI: F	140
LBI: H	140
LBI: K	140
LBI: L	143
LBI: M	143
LBI: R	144
LBI: S	146

For full list of Logical binary inputs go to the chapter **List of LBI (page 138)**.

List of LBI

Access lock	139	SoftStartConf	146
BI-Timer1 STR	139	SS1	147
BI-Timer2 STR	139	SS2	147
Emergency MAN	139	StartButton	147
Emergency Stop	140	StopButton	147
FaultResButton	140		
HornResButton	140	🔍 back to Controller	
KM1 feedback	140	objects	
KM2 feedback	141		
KM3 feedback	141		
2km1 feedback	141		
2km2 feedback	141		
2km3 feedback	141		
3km1 feedback	142		
3km2 feedback	142		
3km3 feedback	142		
4km1 feedback	142		
5km1 feedback	142		
6km1 feedback	143		
Lang Selection	143		
M1 Protect	143		
M2 Protect	143		
M3 Protect	144		
M4 Protect	144		
M5 Protect	144		
M6 Protect	144		
Rem Start/Stop	144		
2Rem Start/Start	144		
3Rem Start/Start	145		
4Rem Start/Start	145		
5Rem Start/Start	145		
6Rem Start/Start	145		
RemControlLock	145		
Remote AUT	145		
Remote MAN	146		
Remote OFF	146		
RemStart/Stop	146		
Sd Override	146		

LBI: A

Access lock

Related FW	1.7.0	Related applications	
Comm object	288		
Description			
If the input is closed, no setpoints can be adjusted from controller front panel and gen-set mode (OFFMAN- AUT) cannot be changed.			
<i>Note: Access lock does not protect setpoints and mode changing from LiteEdit. To avoid unqualified changes, the selected setpoints can be protected by the password.</i>			

🔍 back to List of LBI

LBI: B

BI-Timer1 STR

Related FW	1.7.0	Related applications	
Comm object	342		
Description			
The input activate internal timers (for more info see Group: Date/Time on page 127).			

🔍 back to List of LBI

BI-Timer2 STR

Related FW	1.7.0	Related applications	
Comm object	343		
Description			
The input activate internal timers (for more info see Group: Date/Time on page 127).			

🔍 back to List of LBI

LBI: E

Emergency MAN

Related FW	1.7.0	Related applications	
Comm object	295		
Description			
Stands for Emergency manual. If the input is activated the controller behaves like when switched to OFF mode. Opens all binary outputs.			
After the input is open again, the controller recovers to previous state and behaves according to the actual situation. Function is active in any controller mode.			

🔍 back to List of LBI

Emergency Stop

Related FW	1.7.0	Related applications	
Comm object	286		
Description			
If the input is activated, the shut down is performed immediately. To obtain the highest possible safety, it is recommended to set this signal as normally closed.			
The controller shows “Emerg Man” state and the motor can not be started.			
Note: <i>In case of controller hardware or software fail, the safe stop of the motor is not ensured. To obtain fully safety, it is recommended to realize a separate circuit for disconnection of KM1 contactor.</i>			

[back to List of LBI](#)

LBI: F

FaultResButton

Related FW	1.7.0	Related applications	
Comm object	298		
Description			
Binary input has the same function as Fault reset button on the control unit front panel.			

[back to List of LBI](#)

LBI: H

HornResButton

Related FW	1.7.0	Related applications	
Comm object	299		
Description			
Binary input has the same function as Horn reset button on the control unit front panel.			

[back to List of LBI](#)

LBI: K

KM1 feedback

Related FW	1.7.0	Related applications	
Comm object	493		
Description			
The confirmation of the contactor KM1 correct function. Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM1.			

[back to List of LBI](#)

KM2 feedback

Related FW	1.7.0	Related applications	
Comm object	494		
Description			
The confirmation of the contactor KM2 correct function. Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM2.			

 [back to List of LBI](#)

KM3 feedback

Related FW	1.7.0	Related applications	
Comm object	495		
Description			
The confirmation of the contactor KM3 correct function. Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM3.			

 [back to List of LBI](#)

2km1 feedback

Related FW	1.7.0	Related applications	
Comm object	496		
Description			
The confirmation of the contactor 2KM1 correct function. Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM1.			

 [back to List of LBI](#)

2km2 feedback

Related FW	1.7.0	Related applications	
Comm object	497		
Description			
The confirmation of the contactor 2KM2 correct function. Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM2.			

 [back to List of LBI](#)

2km3 feedback

Related FW	1.7.0	Related applications	
Comm object	498		
Description			
The confirmation of the contactor 2KM3 correct function. Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM3.			

 [back to List of LBI](#)

3km1 feedback

Related FW	1.7.0	Related applications	
Comm object	499		
Description			
The confirmation of the contactor 3KM1 correct function.			
Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM1.			

 [back to List of LBI](#)

3km2 feedback

Related FW	1.7.0	Related applications	
Comm object	500		
Description			
The confirmation of the contactor 3KM2 correct function.			
Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM2.			

 [back to List of LBI](#)

3km3 feedback

Related FW	1.7.0	Related applications	
Comm object	501		
Description			
The confirmation of the contactor 3KM3 correct function.			
Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM3.			

 [back to List of LBI](#)

4km1 feedback

Related FW	1.7.0	Related applications	
Comm object	502		
Description			
The confirmation of the contactor 4KM1 correct function.			
Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM1.			

 [back to List of LBI](#)

5km1 feedback

Related FW	1.7.0	Related applications	
Comm object	505		
Description			
The confirmation of the contactor 5KM1 correct function.			
Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM1.			

 [back to List of LBI](#)

6km1 feedback

Related FW	1.7.0	Related applications	
Comm object	508		
Description			
The confirmation of the contactor 6KM1 correct function.			
Assign this LBI to the BIN which is connected to the auxiliary ON contact of the contactor KM1.			

 [back to List of LBI](#)

LBI: L**Lang Selection**

Related FW	1.7.0	Related applications	
Comm object	303		
Description			
Selects one of two languages, which are predefined in the controller.			
The controller is furnished with English dictionary only. The second language dictionary is to be loaded by LiteEdit.			

 [back to List of LBI](#)

LBI: M**M1 Protect**

Related FW	1.7.0	Related applications	
Comm object	521		
Description			
In AUT mode only when SP MultipleControl = "6Direct" or "3Y-D".			
The built-in motor protections which based on the current watching can be used for the motor M1 only (with some exceptions enabled by a special wiring of the motors and its current transformer). Other motors (M2 –M6) can/must be equipped by a classical protection relay. The tripping contact of the relay is to be connected to LBI Mx Protect.			
When the Mx Protect is activated, the motor Mx is stopped and the warning message Wrn Mx is in Sd appears. Other motors keep running.			
Until the Mx Protect is ON, the warning message lasts, can not be deactivated (by the panel button FAULT RESET and the motor Mx can not be started.			

 [back to List of LBI](#)

M2 Protect

Related FW	1.7.0	Related applications	
Comm object	522		
Description			

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M3 Protect

Related FW	1.7.0	Related applications	
Comm object	523		
Description			

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M4 Protect

Related FW	1.7.0	Related applications	
Comm object	524		
Description			

[◀ back to List of LBI](#)

M5 Protect

Related FW	1.7.0	Related applications	
Comm object	525		
Description			

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M6 Protect

Related FW	1.7.0	Related applications	
Comm object	526		
Description			

[◀ back to List of LBI](#)

LBI: R**Rem Start/Stop**

Related FW	1.7.0	Related applications	
Comm object	285		
Description			
External request for the motor M1 run. AUT mode only.			

[◀ back to List of LBI](#)

2Rem Start/Start

Related FW	1.7.0	Related applications	
Comm object	514		
Description			
External request for motor M2 run. In AUT mode only when SP MultipleControl = "6Direct" or "3Y-D"			

[back to List of LBI](#)

3Rem Start/Start

Related FW	1.7.0	Related applications	
Comm object	515		
Description			
External request for motor M3 run. In AUT mode only when SP MultipleControl = "6Direct" or "3Y-D"			

[back to List of LBI](#)

4Rem Start/Start

Related FW	1.7.0	Related applications	
Comm object	516		
Description			
External request for motor M4 run. In AUT mode only when SP MultipleControl = "6Direct" or "3Y-D"			

[back to List of LBI](#)

5Rem Start/Start

Related FW	1.7.0	Related applications	
Comm object	517		
Description			
External request for motor M5 run. In AUT mode only when SP MultipleControl = "6Direct" or "3Y-D"			

[back to List of LBI](#)

6Rem Start/Start

Related FW	1.7.0	Related applications	
Comm object	518		
Description			
External request for motor M6 run. In AUT mode only when SP MultipleControl = "6Direct" or "3Y-D"			

[back to List of LBI](#)

RemControlLock

Related FW	1.7.0	Related applications	
Comm object	294		
Description			
If the input is active, setpoints writing or command sending from the external terminal is disabled.			

[back to List of LBI](#)

Remote AUT

Related FW	1.7.0	Related applications	
Comm object	291		
Description			
If the input is active, AUT mode is forced to the controller independently on the position of the MODE selector. If another of "remote" inputs is active, then the REMOTE AUT input has the lowest priority.			

[◀ back to List of LBI](#)

Remote MAN

Related FW	1.7.0	Related applications	
Comm object	290		
Description			
If the input is active, MAN mode is forced to the controller independently on the position of the MODE selector.			

[◀ back to List of LBI](#)

Remote OFF

Related FW	1.7.0	Related applications	
Comm object	289		
Description			
If closed, the controller is switched to OFF mode (there are three modes OFF-MAN-AUT). When opens controller is switched back to previous mode.			

[◀ back to List of LBI](#)

RemStart/Stop

Related FW	1.7.0	Related applications	
Comm object	285		
Description			
External request for motor M1 run. In AUT mode only when SP MultipleControl = "6Direct" or "3Y-D"			

[◀ back to List of LBI](#)

LBI: S

Sd Override

Related FW	1.7.0	Related applications	
Comm object	287		
Description			
When the input is active, the motor is not stopped even if a shut down appears. But if the shut down occurred before starting, the start is not allowed even if Sd Override active is active.			

[◀ back to List of LBI](#)

SoftStartConf

Related FW	1.7.0	Related applications	
Comm object	511		
Description			
The confirmation of the softstarter status.			

[◀ back to List of LBI](#)

SS1

Related FW	1.7.0	Related applications		
Comm object	512			
Description				
The combination of two binary inputs SS1 and SS2 are used for selection of which SP is used as required speed, when frequency changer is used.				
SS1	0	1	0	1
SS2	0	0	1	1
Source of signal	SP Nom RPM	SP RPM1	SP RPM2	SP RPM Input

[back to List of LBI](#)

SS2

Related FW	1.7.0	Related applications		
Comm object	513			
Description				
The combination of two binary inputs SS1 and SS2 are used for selection of which SP is used as required speed, when frequency changer is used.				
SS1	0	1	0	1
SS2	0	0	1	1
Source of signal	SP Nom RPM	SP RPM1	SP RPM2	SP RPM Input

[back to List of LBI](#)

StartButton

Related FW	1.7.0	Related applications	
Comm object	296		
Description			
Binary input has the same function as Start button on the Control unit front panel. It is active in MAN mode only.			

[back to List of LBI](#)

StopButton

Related FW	1.7.0	Related applications	
Comm object	297		
Description			
Binary input has the same function as Stop button on the control unit front panel. It is active in MAN mode only.			

[back to List of LBI](#)

6.1.3 Logical binary outputs

Note: Many other intern binary variables LBO (stands for Logical Binary Output) can be configured on physical binary output described here below. If 7 binary inputs of controller are not enough, connect one of auxiliary input/output modules.

Alphabetical groups of Logical binary outputs

LBO: A	150
LBO: B	153
LBO: C	157
LBO: E	157
LBO: F	158
LBO: H	158
LBO: K	159
LBO: M	163
LBO: N	164
LBO: P	164
LBO: R	165
LBO: U	167

For full list of Logical binary outputs go to the chapter **List of LBO (page 149)**.

List of LBO

AI BatteryFail	150	KM1	159
AL Common Fls	150	KM2	159
AL Common Sd	150	KM3	160
AL Common Wrn	150	2km1	160
AL Mains >V	151	2km2	160
AL Mains <V	151	2km3	161
AL Mains Volts	151	3km1	161
AI Overcurrent	151	3km2	161
AL Overload Sd	152	3km3	162
AL Overspeed	152	4km1	162
AL Underspeed	152	5km1	162
ALARM	152	6km1	163
BI1 Status	153	MainsHealthy	163
BI2 Status	153	Maintenance	163
BI3 Status	153	Mode AUT	163
BI4 Status	154	Mode MAN	163
BI5 Status	154	Mode OFF	164
BI6 Status	154	Not used	164
BI7 Status	155	PhaseReveActiv	164
BIO8 1 Status	155	PLC Out	164
BIO8 2 Status	155	Ready	165
BIO8 3 Status	155	Remote Control1	165
BIO8 4 Status	155	Remote Control2	165
BIO8 5 Status	156	Remote Control3	165
BIO8 6 Status	156	Remote Control4	165
BIO8 7 Status	156	Remote Control5	166
BIO8 8 Status	156	Remote Control6	166
Brake Release	156	Remote Control7	166
Comp1	157	Remote Control8	166
Comp2	157	Running	166
Cooling Pump	157	Undervoltage	167
CtrlHeartBeat	157		
ExercTimer1	157		
ExercTimer2	158		
Fault Reset	158		
Horn MAN-AUT	158		
Horn Silenced	158		
Horn	159		

 **back to Controller
objects**

LBO: A

AI BatteryFail

Related FW	1.7.0	Related applications	
Comm object	517		
Description			
Output closes when the alarm Sd BatteryFlat or Wrn Batt Volt appears.			

[⬅ back to List of LBO](#)

AL Common Fls

Related FW	1.7.0	Related applications	
Comm object	520		
Description			
Output closes when any sensor fail alarm appears.			
The output opens, when			
➤ No warning alarm is active and ➤ FAULT RESET is pressed			

[⬅ back to List of LBO](#)

AL Common Sd

Related FW	1.7.0	Related applications	
Comm object	519		
Description			
Output closes when any shut-down alarm appears.			
The output opens, when			
➤ No Sd alarm is active and ➤ FAULT RESET is pressed			

[⬅ back to List of LBO](#)

AL Common Wrn

Related FW	1.7.0	Related applications	
Comm object	518		
Description			
Output closes when any warning alarm appears.			
The output opens, when			
➤ No warning alarm is active and ➤ FAULT RESET is pressed			

[⬅ back to List of LBO](#)

AL Mains >V

Related FW	1.7.0	Related applications	
Comm object	502		
Description			
Output closes when protection Sd Volt >V is active for any of phases L1-L3 .			
The output opens, when			
> No Sd alarm is active > FAULT RESET is pressed			

 [back to List of LBO](#)

AL Mains <V

Related FW	1.7.0	Related applications	
Comm object	503		
Description			
Output closes when protection Sd Volt <V is active for any of phases L1-L3 .			
The output opens, when			
> No Sd alarm is active > FAULT RESET is pressed			

 [back to List of LBO](#)

AL Mains Volts

Related FW	1.7.0	Related applications	
Comm object	509		
Description			
Output closes when any of protections Sd Mains Unbal , Sd Volt <V or Sd Volt >V is active for any of phases L1-L3 .			
The output opens, when			
> No Sd alarm is active > FAULT RESET is pressed			

 [back to List of LBO](#)

AI Overcurrent

Related FW	1.7.0	Related applications	
Comm object	516		
Description			
Output closes when the alarm Sd Amps Unbal or OverCurrent Sd or ThermicProtect appears.			
The output opens, when			
> No Sd alarm is active > FAULT RESET is pressed			

 [back to List of LBO](#)

AL Overload Sd

Related FW	1.7.0	Related applications	
Comm object	511		
Description			
The output is closed when protection Sd Overload is active.			
The output opens, when			
> No Sd alarm is active > FAULT RESET is pressed			

 [back to List of LBO](#)

AL Overspeed

Related FW	1.7.0	Related applications	
Comm object	513		
Description			
Output closes when the motor over speed alarm activates.			
The output opens, when			
> Alarm is not active and > FAULT RESET is pressed			

 [back to List of LBO](#)

AL Underspeed

Related FW	1.7.0	Related applications	
Comm object	514		
Description			
Output closes when the motor under speed alarm activates.			
The output opens, when			
> Alarm is not active and > FAULT RESET is pressed			

 [back to List of LBO](#)

ALARM

Related FW	1.7.0	Related applications	
Comm object	472		
Description			
Output closes when any alarm, shutdown or warning is declared.			
The output opens, when			
> Alarm is not active and > FAULT RESET is pressed			

 [back to List of LBO](#)

LBO: B

BI1 Status

Related FW	1.7.0	Related applications	
Comm object	527		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens when > Alarm is not active and > FAULT RESET is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

[back to List of LBO](#)

BI2 Status

Related FW	1.7.0	Related applications	
Comm object	528		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens when > Alarm is not active and > FAULT RESET is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

[back to List of LBO](#)

BI3 Status

Related FW	1.7.0	Related applications	
Comm object	529		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens when > Alarm is not active and > FAULT RESET is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

[back to List of LBO](#)

BI4 Status

Related FW	1.7.0	Related applications	
Comm object	530		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens when ➤ Alarm is not active and ➤ FAULT RESET is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

 [back to List of LBO](#)

BI5 Status

Related FW	1.7.0	Related applications	
Comm object	531		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens when ➤ Alarm is not active and ➤ FAULT RESET is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

 [back to List of LBO](#)

BI6 Status

Related FW	1.7.0	Related applications	
Comm object	532		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens when > Alarm is not active and > FAULT RESET is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

 [back to List of LBO](#)

BI7 Status

Related FW	1.7.0	Related applications	
Comm object	533		
Description			
The output give information about the assigned binary input. In case the assigned binary input is configured to alarm type, then the output closes when the alarm activates. It opens when ➤ Alarm is not active and ➤ FAULT RESET is pressed In case the assigned binary input is configured to any control function, the output propagates the state of the input.			

[◀ back to List of LBO](#)

BIO8 1 Status

Related FW	1.7.0	Related applications	
Comm object	550		
Description			
Like the BI1 STATUS (PAGE 153) , but for inputs on IL-NT BIO8 plug-in.			

[◀ back to List of LBO](#)

BIO8 2 Status

Related FW	1.7.0	Related applications	
Comm object	551		
Description			
Like the BI2 STATUS (PAGE 153) , but for inputs on IL-NT BIO8 plug-in.			

[◀ back to List of LBO](#)

BIO8 3 Status

Related FW	1.7.0	Related applications	
Comm object	552		
Description			
Like the BI3 STATUS (PAGE 153) , but for inputs on IL-NT BIO8 plug-in.			

[◀ back to List of LBO](#)

BIO8 4 Status

Related FW	1.7.0	Related applications	
Comm object	553		
Description			
Like the BI4 STATUS (PAGE 154) , but for inputs on IL-NT BIO8 plug-in.			

[◀ back to List of LBO](#)

BIO8 5 Status

Related FW	1.7.0	Related applications	
Comm object	554		
Description			
Like the BI5 STATUS (PAGE 154) , but for inputs on IL-NT BIO8 plug-in.			

 [back to List of LBO](#)

BIO8 6 Status

Related FW	1.7.0	Related applications	
Comm object	555		
Description			
Like the BI6 STATUS (PAGE 154) , but for inputs on IL-NT BIO8 plug-in.			

 [back to List of LBO](#)

BIO8 7 Status

Related FW	1.7.0	Related applications	
Comm object	556		
Description			
Like the BI7 STATUS (PAGE 155) , but for inputs on IL-NT BIO8 plug-in.			

 [back to List of LBO](#)

BIO8 8 Status

Related FW	1.7.0	Related applications	
Comm object	557		
Description			
Like the BI1-7 Status , but for inputs on IL-NT BIO8 plug-in.			

 [back to List of LBO](#)

Brake Release

Related FW	1.7.0	Related applications	
Comm object	970		
Description			
This output can be used to control the brake. See also Braking Delay (page 113) .			

 [back to List of LBO](#)

LBO: C

Comp1

Related FW	1.7.0	Related applications	
Comm object	1074		
Description			
Comparators outputs (see Group: PLC on page 120).			

[back to List of LBO](#)

Comp2

Related FW	1.7.0	Related applications	
Comm object	1075		
Description			
Comparators outputs (see Group: PLC on page 120).			

[back to List of LBO](#)

Cooling Pump

Related FW	1.7.0	Related applications	
Comm object	469		
Description			
The output closes during engine running.			
The output is opened when engine is stopped or during Emergency manual mode.			

[back to List of LBO](#)

CtrlHeartBeat

Related FW	1.7.0	Related applications	
Comm object	496		
Description			
Output signalizes watchdog reset. In a healthy state it blinks at 500 ms / 500 ms rate. When watchdog reset occurs, it stops blinking.			

[back to List of LBO](#)

LBO: E

ExercTimer1

Related FW	1.7.0	Related applications	
Comm object	491		
Description			
Output activates when Timer1 is active even if TimerxFunction = No Func. Simultaneously, motor is started when is in AUT mode – depends on timer function setting.			

[back to List of LBO](#)

ExercTimer2

Related FW	1.7.0	Related applications	
Comm object	492		
Description			
Output activates when Timer2 is active even if TimerxFunction = No Func. Simultaneously, motor is started when is in AUT mode – depends on timer function setting.			

[⬅ back to List of LBO](#)

LBO: F**Fault Reset**

Related FW	1.7.0	Related applications	
Comm object	488		
Description			
The output closes when the FAULT RESET is pressed.			

[⬅ back to List of LBO](#)

LBO: H**Horn MAN-AUT**

Related FW	1.7.0	Related applications	
Comm object	1084		
Description			
It is active all time engine is running in MAN or AUT mode. Can be muted by Horn reset button and is activated again when new Alarm comes.			

[⬅ back to List of LBO](#)

Horn Silenced

Related FW	1.7.0	Related applications	
Comm object	1083		
Description			
Indicate state when LBO Horn should be active but was silenced by Horn reset button.			

[⬅ back to List of LBO](#)

Horn

Related FW	1.7.0	Related applications	
Comm object	473		
Description			
The output closes when: > Any warning or shutdown comes up or > The motor malfunctions The output opens when: > FAULT RESET is pressed or > HORN RESET is pressed or > Max time of HORN is exceeded (Horn timeout) The output closes again when a new fault comes up.			

 [back to List of LBO](#)

LBO: K**KM1**

Related FW	1.7.0	Related applications	
Comm object	1065		
Description			
The output is to be connected to the relay, which switches the contactor KM1 on. KM1 and xKM1 are the contactors wired so that they energize the respective motors (even when starting with softstarter or a frequency changer (KindOfStarting (page 86) = SOFTSTART or f-changer)). When the wiring with the softstarter or frequency changer does not have the main contactor that switches the energy to this semiconductor device, the outputs xKM1 is not used.			

 [back to List of LBO](#)

KM2

Related FW	1.7.0	Related applications	
Comm object	772		
Description			
The output is to be connected to the relay, which switches the contactor KM2 (or xKM2) in the case of Y-D starting mode (KindOfStarting (page 86) = Y-D). KM2 and xKM2 are the contactors which switch the three-phase motor winding to the star wiring. When starting with softstarter (KindOfStarting (page 86) = SOFTSTART), this output carries the meaning of the softstarter start and is to be connected to the softstarter. In this case, see the format of softstarter input to ensure the correct operation.			

 [back to List of LBO](#)

KM3

Related FW	1.7.0	Related applications	
Comm object	773		
Description			
The output is to be connected to the relay, which switches the contactor KM3 on in the case of Y-D starting mode (KindOfStarting (page 86) = Y-D). KM3 and xKM3 are the contactors which switch the three-phase motor winding to the delta wiring. When starting with softstarter (KindOfStarting (page 86) = SOFTSTART), the activation of this output informs that the starting process is over and the by-pass contactor can be switched on (if there is any). Note: The by-pass contactor can be incorporated in the softstarter, or can be externally wired.			

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2km1

Related FW	1.7.0	Related applications	
Comm object	971		
Description			
The output is to be connected to the relay, which switches the contactor KM1 on. KM1 and xKM1 are the contactors wired so that they energize the respective motors (even when starting with softstarter or a frequency changer (KindOfStarting (page 86) = SOFTSTART or f-changer)). When the wiring with the softstarter or frequency changer does not have the main contactor that switches the energy to this semiconductor device, the outputs xKM1 is not used.			

 [back to List of LBO](#)

2km2

Related FW	1.7.0	Related applications	
Comm object	972		
Description			
The output is to be connected to the relay, which switches the contactor KM2 (or xKM2) in the case of Y-D starting mode (KindOfStarting (page 86) = Y-D). KM2 and xKM2 are the contactors which switch the three-phase motor winding to the star wiring. When starting with softstarter (KindOfStarting (page 86) = SOFTSTART), this output carries the meaning of the softstarter start and is to be connected to the softstarter. In this case, see the format of softstarter input to ensure the correct operation.			

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2km3

Related FW	1.7.0	Related applications	
Comm object	973		
Description			
The output is to be connected to the relay, which switches the contactor KM3 on in the case of Y-D starting mode (KindOfStarting (page 86) = Y-D). KM3 and xKM3 are the contactors which switch the three-phase motor winding to the delta wiring. When starting with softstarter (KindOfStarting (page 86) = SOFTSTART), the activation of this output informs that the starting process is over and the by-pass contactor can be switched on (if there is any). Note: The by-pass contactor can be incorporated in the softstarter, or can be externally wired.			

 [back to List of LBO](#)

3km1

Related FW	1.7.0	Related applications	
Comm object	974		
Description			
The output is to be connected to the relay, which switches the contactor KM1 on. KM1 and xKM1 are the contactors wired so that they energize the respective motors (even when starting with softstarter or a frequency changer (KindOfStarting (page 86) = SOFTSTART or f-changer)). When the wiring with the softstarter or frequency changer does not have the main contactor that switches the energy to this semiconductor device, the outputs xKM1 is not used.			

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3km2

Related FW	1.7.0	Related applications	
Comm object	975		
Description			
The output is to be connected to the relay, which switches the contactor KM2 (or xKM2) in the case of Y-D starting mode (KindOfStarting (page 86) = Y-D). KM2 and xKM2 are the contactors which switch the three-phase motor winding to the star wiring. When starting with softstarter (KindOfStarting (page 86) = SOFTSTART), this output carries the meaning of the softstarter start and is to be connected to the softstarter. In this case, see the format of softstarter input to ensure the correct operation.			

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3km3

Related FW	1.7.0	Related applications	
Comm object	976		
Description			
The output is to be connected to the relay, which switches the contactor KM3 on in the case of Y-D starting mode (KindOfStarting (page 86) = Y-D). KM3 and xKM3 are the contactors which switch the three-phase motor winding to the delta wiring. When starting with softstarter (KindOfStarting (page 86) = SOFTSTART), the activation of this output informs that the starting process is over and the by-pass contactor can be switched on (if there is any). Note: The by-pass contactor can be incorporated in the softstarter, or can be externally wired.			

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4km1

Related FW	1.7.0	Related applications	
Comm object	977		
Description			
The output is to be connected to the relay, which switches the contactor KM1 on. KM1 and xKM1 are the contactors wired so that they energize the respective motors (even when starting with softstarter or a frequency changer (KindOfStarting (page 86) = SOFTSTART or f-changer)). When the wiring with the softstarter or frequency changer does not have the main contactor that switches the energy to this semiconductor device, the outputs xKM1 is not used.			

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5km1

Related FW	1.7.0	Related applications	
Comm object	980		
Description			
The output is to be connected to the relay, which switches the contactor KM1 on. KM1 and xKM1 are the contactors wired so that they energize the respective motors (even when starting with softstarter or a frequency changer (KindOfStarting (page 86) = SOFTSTART or f-changer)). When the wiring with the softstarter or frequency changer does not have the main contactor that switches the energy to this semiconductor device, the outputs xKM1 is not used.			

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6km1

Related FW	1.7.0	Related applications	
Comm object	983		
Description			
The output is to be connected to the relay, which switches the contactor KM1 on. KM1 and xKM1 are the contactors wired so that they energize the respective motors (even when starting with softstarter or a frequency changer (KindOfStarting (page 86) = SOFTSTART or f-changer)). When the wiring with the softstarter or frequency changer does not have the main contactor that switches the energy to this semiconductor device, the outputs xKM1 is not used.			

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LBO: M**MainsHealthy**

Related FW	1.7.0	Related applications	
Comm object	490		
Description			
Indicates the L1, L2, L3 voltage is in limits UnderVoltage (page 105), OverVoltage (page 105) and Volt unbal (page 106).			

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Maintenance

Related FW	1.7.0	Related applications	
Comm object	495		
Description			
The output closes when the alarm WrnMaintenRun is declared, so when the motor needs the maintenance.			

[back to List of LBO](#)

Mode AUT

Related FW	1.7.0	Related applications	
Comm object	499		
Description			
The output is closed, when AUT mode is selected.			

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Mode MAN

Related FW	1.7.0	Related applications	
Comm object	498		
Description			
The output is closed, when MAN mode is selected.			

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Mode OFF

Related FW	1.7.0	Related applications	
Comm object	497		
Description			
The output is closed, when OFF mode is selected.			

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LBO: N**Not used**

Related FW	1.7.0	Related applications	
Comm object	462		
Description			
Output has no function. The function can be assigned in LiteEdit, window Modify choosing one of the internal variables (LBO).			

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LBO: P**PhaseReveActiv**

Related FW	1.7.0	Related applications	
Comm object	1008		
Description			
Output closes when the alarm WrnPhaseRevers or SdPhaseRevers appears.			

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PLC Out

Related FW	1.7.0	Related applications	
Comm object	986		
Description			
The output of the PLC structure, can be assigned to any BOUT or LBI. See also ConnectPlcOut (page 122).			

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LBO: R

Ready

Related FW	1.7.0	Related applications	
Comm object	482		
Description			
The output is closed when following conditions are fulfilled:			
> Motor is not running and > No Shut down or Slow stop alarm is active > Controller is not in OFF mode			

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Remote Control1

Related FW	1.7.0	Related applications	
Comm object	649		
Description			
Allows configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or InteliMonitor and it can be controlled via Modbus communication.			

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Remote Control2

Related FW	1.7.0	Related applications	
Comm object	650		
Description			
Allows configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or InteliMonitor and it can be controlled via Modbus communication.			

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Remote Control3

Related FW	1.7.0	Related applications	
Comm object	651		
Description			
Allows configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or InteliMonitor and it can be controlled via Modbus communication.			

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Remote Control4

Related FW	1.7.0	Related applications	
Comm object	652		
Description			
Allows configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or InteliMonitor and it can be controlled via Modbus communication.			

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Remote Control5

Related FW	1.7.0	Related applications	
Comm object	653		
Description			
Allows configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or IntelliMonitor and it can be controlled via Modbus communication.			

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Remote Control6

Related FW	1.7.0	Related applications	
Comm object	654		
Description			
Allows configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or IntelliMonitor and it can be controlled via Modbus communication.			

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Remote Control7

Related FW	1.7.0	Related applications	
Comm object	655		
Description			
Allows configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or IntelliMonitor and it can be controlled via Modbus communication.			

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Remote Control8

Related FW	1.7.0	Related applications	
Comm object	656		
Description			
Allows configure Remote control switches to physical binary outputs. These switches are accessible from PC tools LiteEdit or IntelliMonitor and it can be controlled via Modbus communication.			

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Running

Related FW	1.7.0	Related applications	
Comm object	485		
Description			
Output closes when the motor is in Running state.			

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LBO: U**Undervoltage**

Related FW	1.7.0	Related applications	
Comm object	1550		
Description			
The output is closed when alarm UnderVoltage is active.			

[!\[\]\(a0a352b5feace05e670563bc26b6c09b_img.jpg\) back to List of LBO](#)

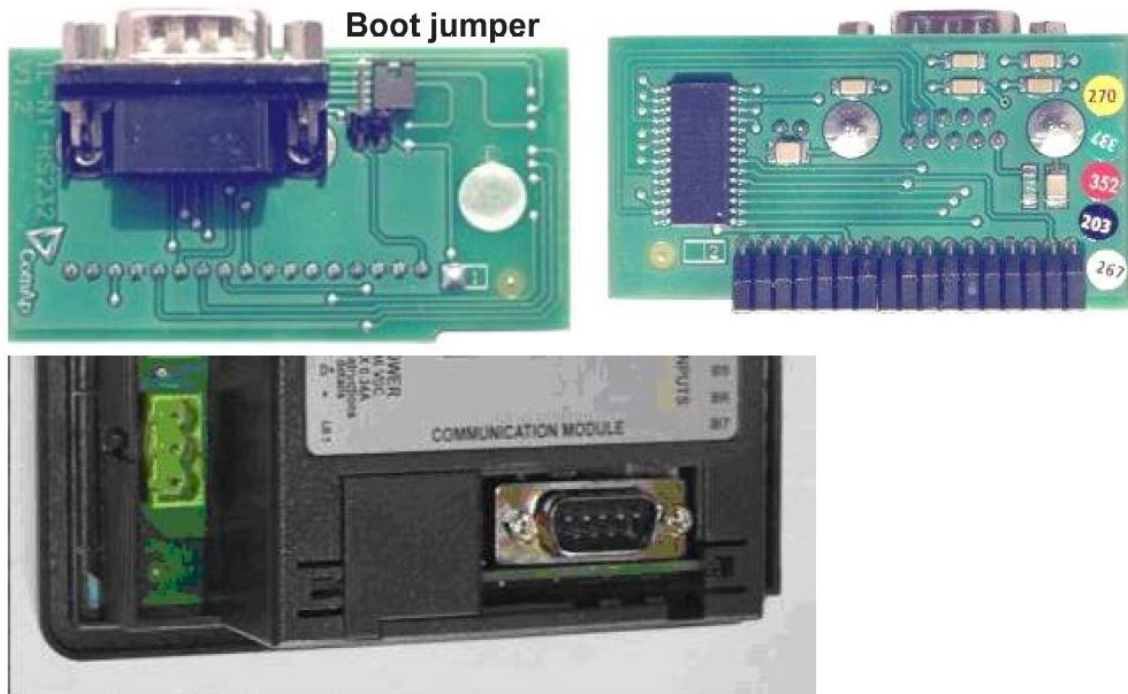
6.2 Extension modules

ID-FLX-Lite components

Accessories	Description	Optional/Obligatory
ID-FLX-Lite	InteliDrive-Lite central unit	Obligatory
Communication plug-in		
IL-NT RS232 communication module (page 169)	RS232 communication card	Optional plug-in
IL-NT RS232-485 communication module (page 170)	Combined communication card	
IL-NT S-USB communication module (page 171)	USB communication card	Optional plug-in
IB-Lite Ethernet communication plug-in card (page 172)	Ethernet/Internet interface	Optional plug-in
IL-NT GPRS module (page 173)	GSM/GPRS modem	Optional plug-in
Extension plug-in		
IL-NT AOUT8 – 8 gauge driver module (page 174)	8 AOUT Gauge driver card	Optional plug-in
IL-NT AIO (page 175)	4xAIN + 1x AOUT	Optional plug-in
IL-NT IO1 – extension I/O module (page 176)	4xBIN + 4xAOUT	Optional plug-in
IL-NT BIO8 Binary input/output module (page 178)	8x BIN or BOUT	Optional plug-in

6.2.1 IL-NT RS232 communication module

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

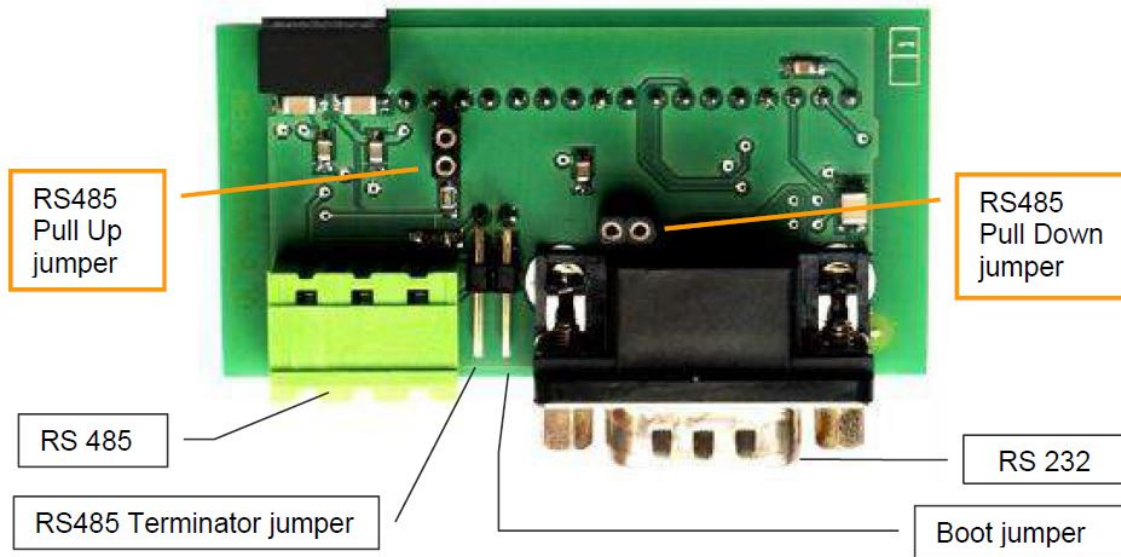


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6.2.2 IL-NT RS232-485 communication module

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

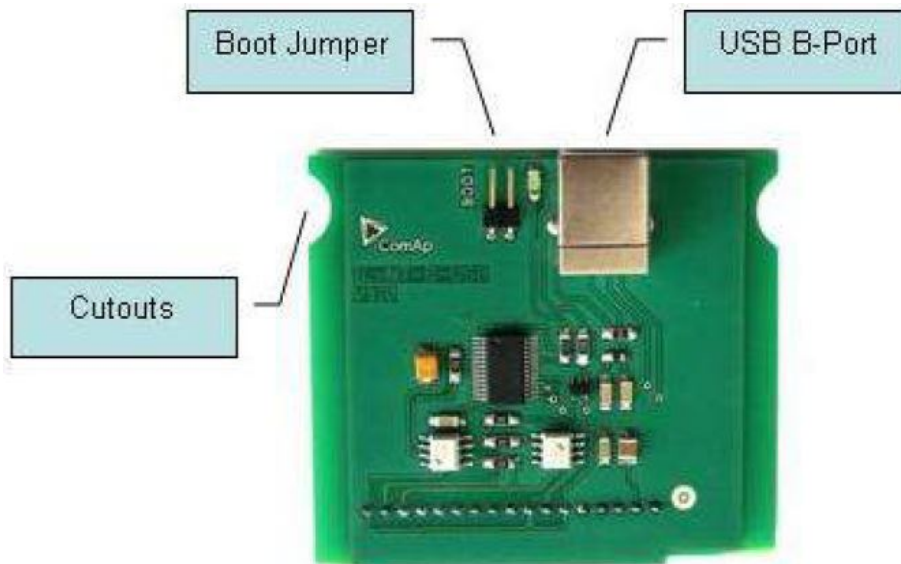
To insert the module, please follow the instructions for IL-NT RS232 module, procedure is analogous. You must open the cover first (use screwdriver to open) and then insert the module into slot. Once you have inserted it, the module will snap under plastic teeth. It is supposed to be installed permanently.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



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6.2.3 IL-NT S-USB communication module

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



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

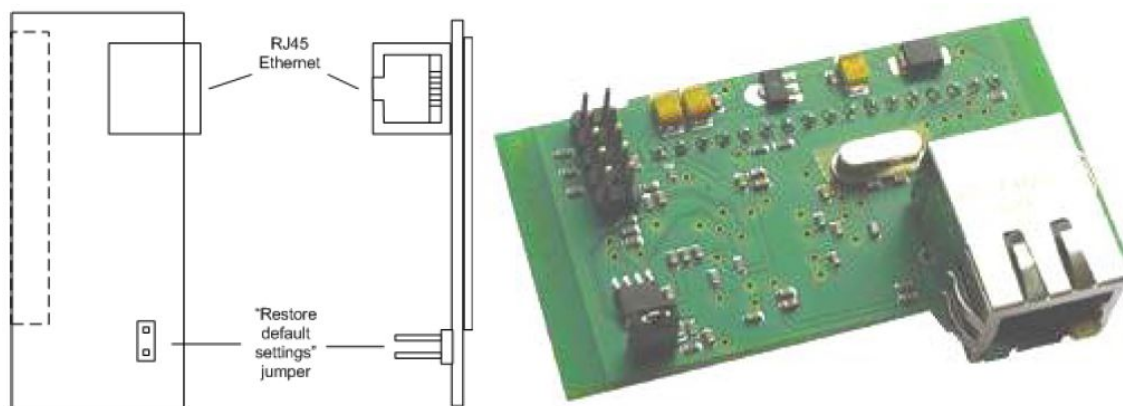
 [back to Extension modules](#)

6.2.4 IB-Lite Ethernet communication plug-in card

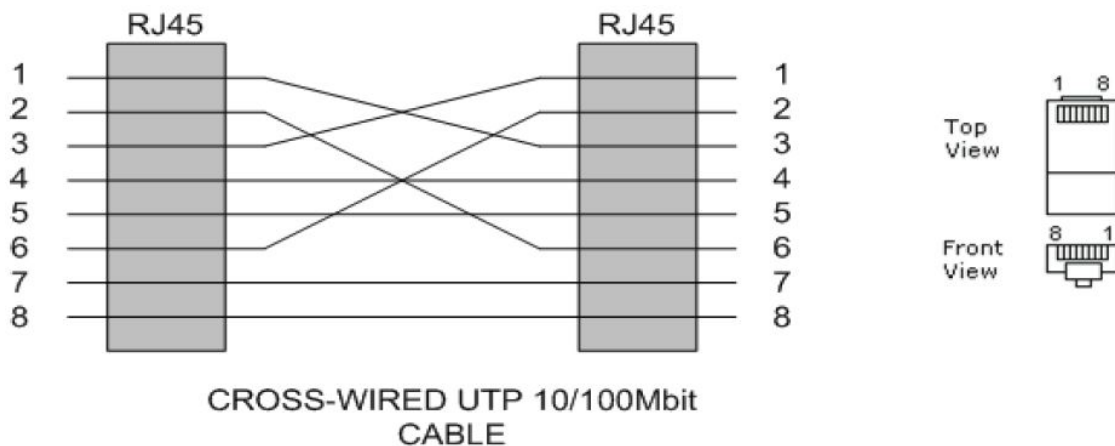
IB-Lite is a plug-in card with Ethernet 10/100 Mbps interface in RJ45 connector. The card is internally connected to both COM1 and COM2 serial channels and provides an interface for connecting a PC with LiteEdit or IntelliMonitor through Ethernet/internet network, for sending active e-mails and for integration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

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

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



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.



Note: The module requires configuration settings before usage. See IB-Lite-1.x Reference Guide.

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6.2.5 IL-NT GPRS module

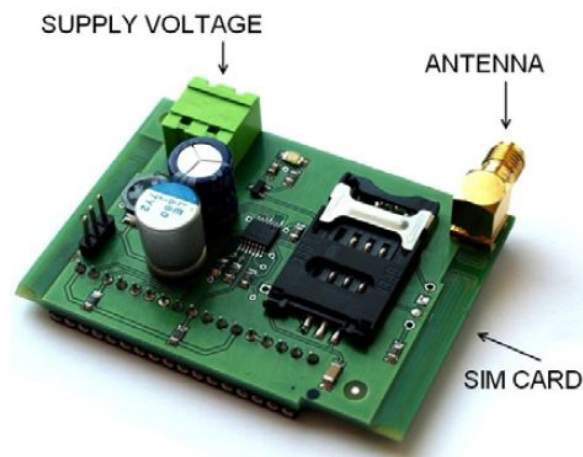
This plug-in module is GSM/GPRS modem which can work in two modes of operation based on settings in setpoint COM1 Mode.

- 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.

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

Note: GPRS and CSD services has to be provided by your GSM/GPRS operator for successful operation.

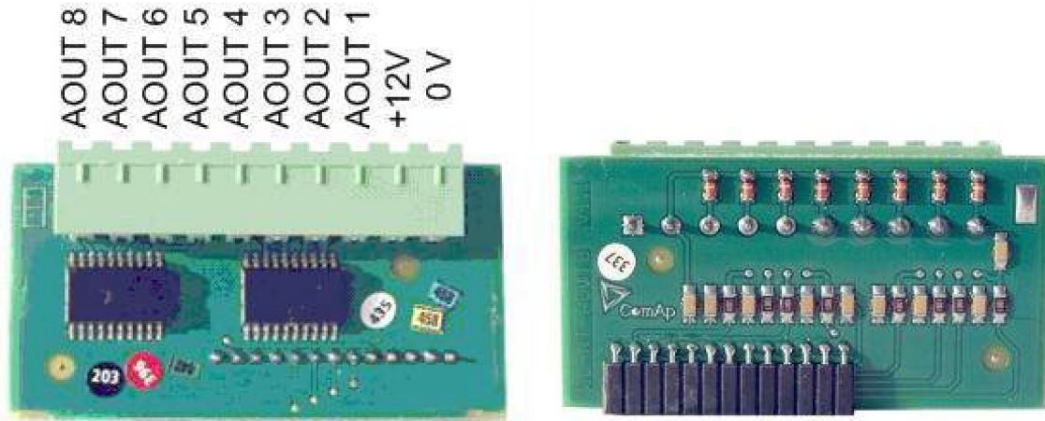
Note: GPRS and CSD connection is not suitable for firmware update process, kindly used wired connection instead like RS232, USB, RS485 or ethernet via IB-Lite!



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6.2.6 IL-NT AOUT8 – 8 gauge driver module

IL-NT AOUT8 is optional plug-in card. Through this card controller can drive up to 8 VDO style industrial/automotive gauges. Gauge type and value are configured in LiteEdit (3.0 or higher) software. Any analog value from controller may be shown in that way. All outputs operate as pwm signal at 1200Hz.



[◀ back to Extension modules](#)

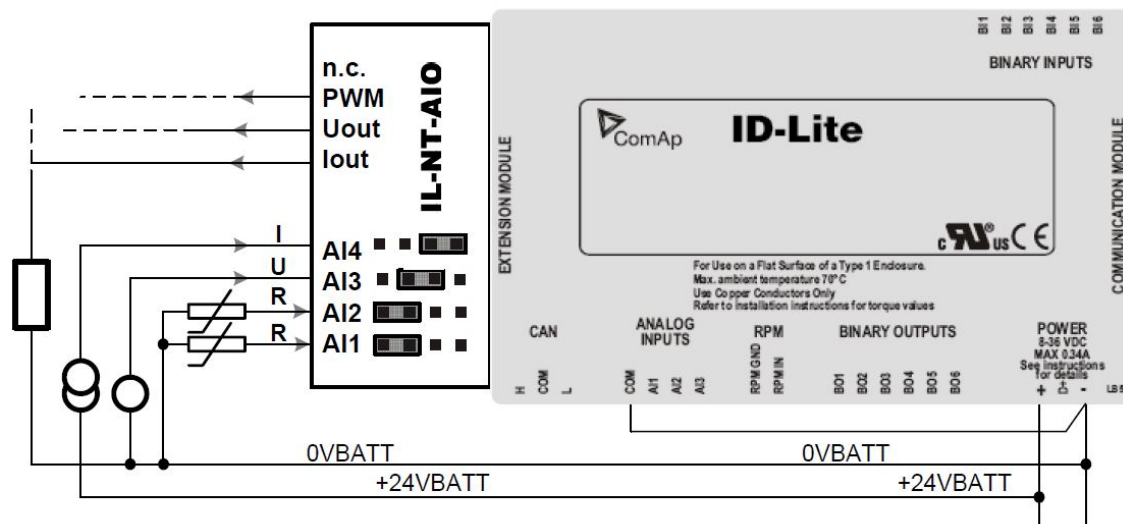
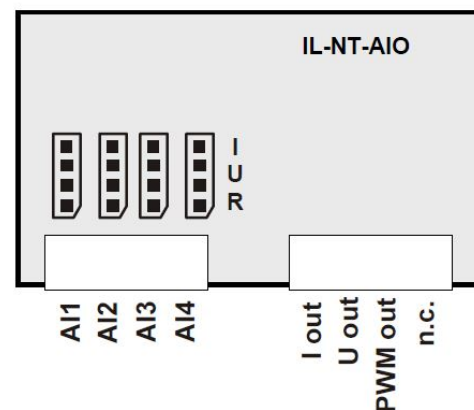
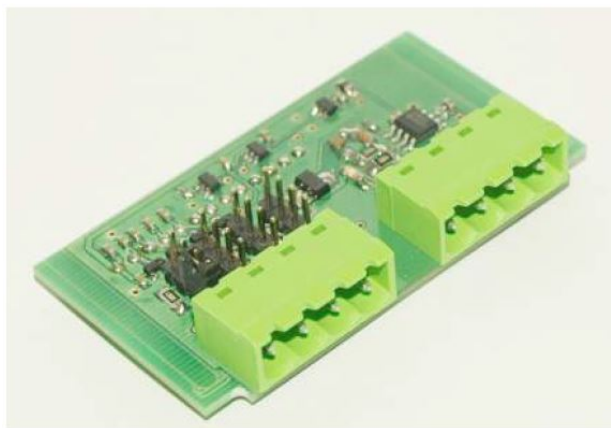
6.2.7 IL-NT AIO

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

AIN1 – AIN4	2600 ohm/20 mA/4V	
AOUT	0 – 20 mA (max 22mA) max 100ohm load 0 – 4.5V (max 10mA) PWM 5V/15mA/500 Hz	I out U out PWM out

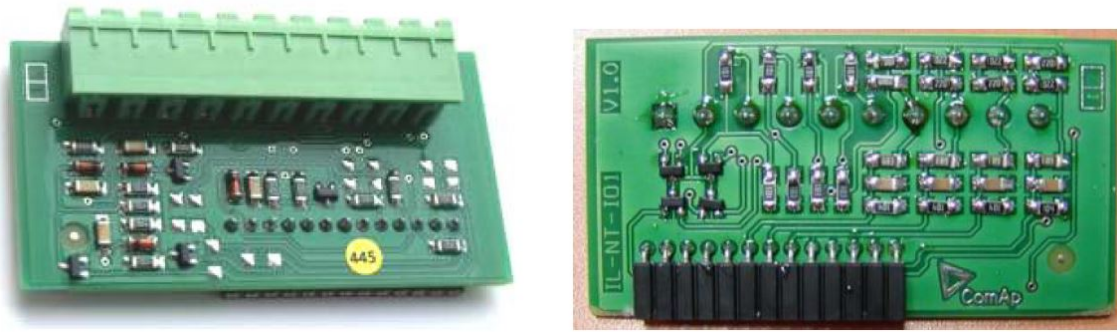
AOUT configuration

	0.00% PWM	100.00% PWM
Uout	0.0 V	4.6 V ± 0.1 V
Iout	0.0 mA	20.6 mA ± 0.1 mA



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6.2.8 IL-NT IO1 – extension I/O module



Module structure and wiring is on the drawing below.

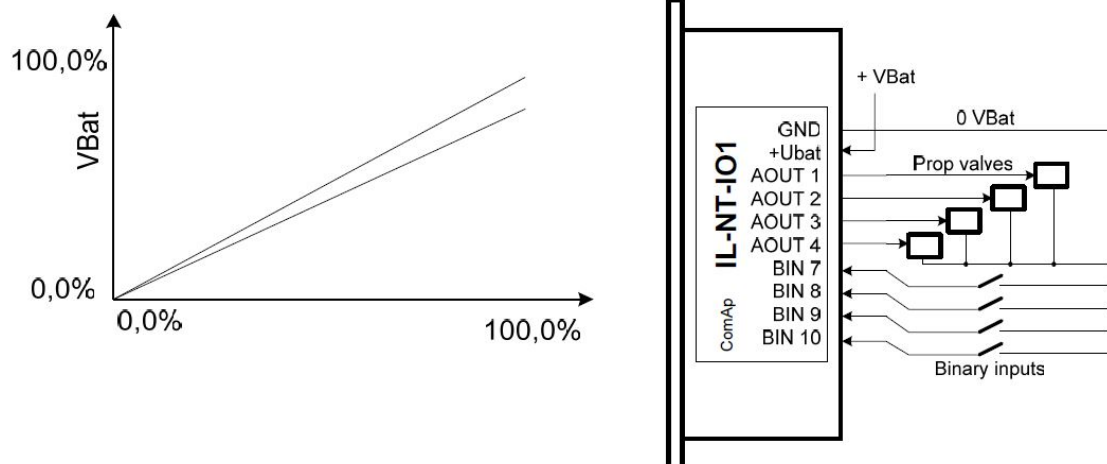
The GND terminal is internally wired with battery minus power supply terminal. The +VBat has to be wired to battery plus power supply on IL-NT-DCU controller. It is possible to connect up to four Proportional valves.

Analog output - AOUT1 to AOUT4 characteristic

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

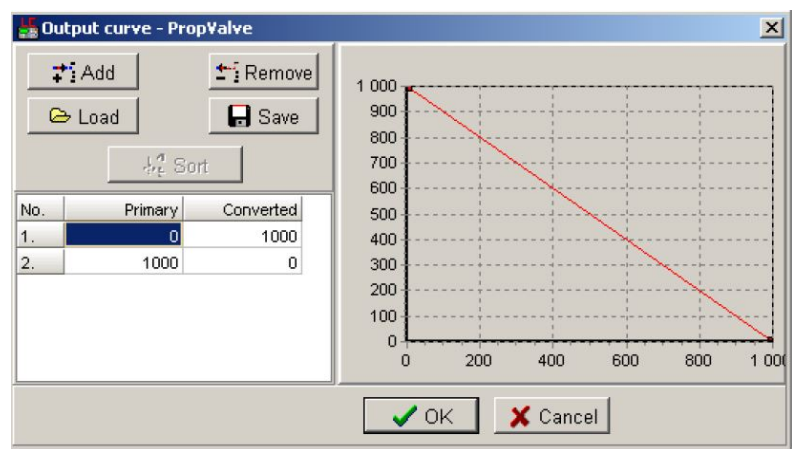
There should be up to one volt lower voltage compare to adjusted % of +VBat voltage.

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



Analog output characteristic

Conversion curves - Output curve – PropValve



Primary value format:

1000 = 100.0%

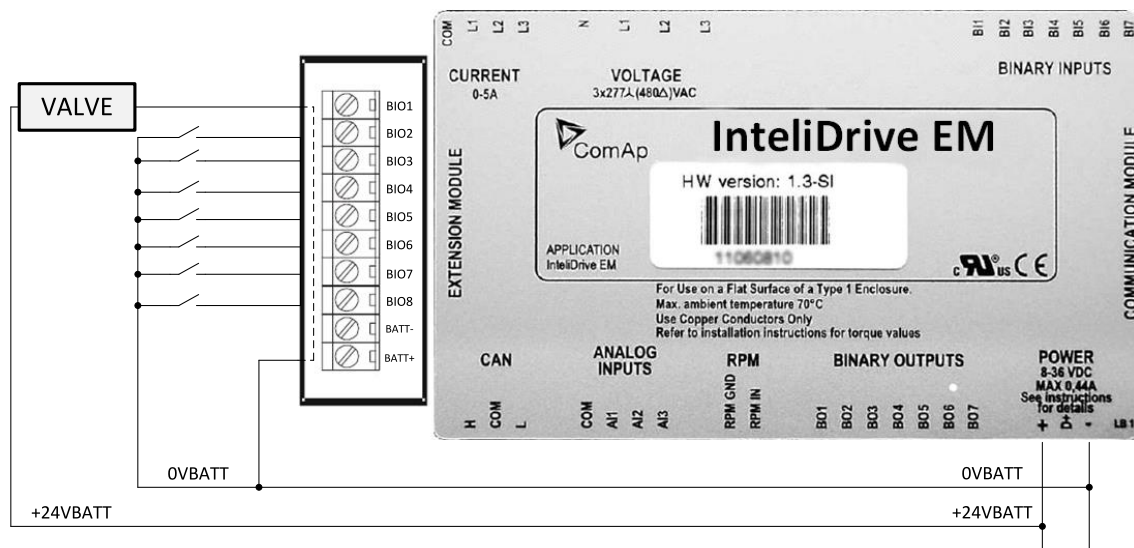
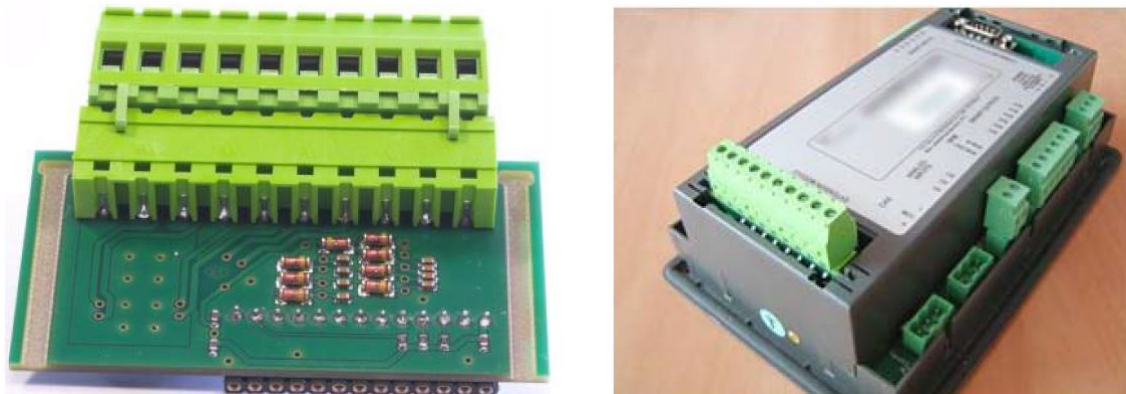
Converted value format:

1000 = 100.0%

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6.2.9 IL-NT BIO8 Binary input/output module

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



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

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