

# InteliDrive DCU Marine

## Expandable engine controller

### SW version 3.4.0

1 Document information .....	6
2 System overview .....	9
3 Application overview .....	27
4 Installation and wiring .....	35
5 Controller setup .....	68
6 Communication .....	94
7 Technical data .....	98
8 Appendix .....	102

# Table of contents

<b>1 Document information</b>	<b>6</b>
1.1 Clarification of notation .....	6
1.2 About this guide .....	6
1.3 Legal notice .....	7
1.4 Document history .....	8
<b>2 System overview</b>	<b>9</b>
2.1 Operator Interface .....	9
2.1.1 Controller screens .....	10
2.1.2 Display menu .....	16
2.1.3 Functions available from ID-DCU Marine front panel keys .....	17
2.1.4 How to change controller language? .....	17
2.1.5 How to change the display backlight intensity? .....	18
2.1.6 How to change the display contrast? .....	18
2.1.7 How to check the serial number and software revision? .....	18
2.1.8 How to find active alarms? .....	18
2.1.9 How to select engine mode? .....	18
2.1.10 How to view and edit setpoints? .....	18
2.1.11 How to view measured data? .....	19
2.1.12 How to view the History menu? .....	19
2.1.13 Main screen indication .....	19
2.2 Controller configuration and monitoring .....	20
2.2.1 AirGate connection to the PC .....	20
2.2.2 Configuration steps .....	21
2.2.3 Direct connection to the PC .....	21
2.2.4 DriveConfig .....	22
2.2.5 Modbus protocol .....	23
2.2.6 Password protection .....	24
2.2.7 WebSupervisor .....	25
2.3 List of supported modules .....	25
<b>3 Application overview</b>	<b>27</b>
3.1 ID-DCU Marine .....	27
3.1.1 Default archives .....	27
3.1.2 Operational modes .....	28
3.3.1 Universal states .....	29
3.4 ID-RPU .....	30



3.4.1 ID-RPU functions .....	31
3.4.2 ID-RPU overspeed setting .....	33
<b>4 Installation and wiring</b> .....	<b>35</b>
4.1 Terminal and dimensions .....	35
4.1.1 ID-DCU Marine .....	35
4.1.2 Communication lines wiring .....	36
4.1.3 ECU .....	36
4.1.4 ID-DCU Marine dimensions .....	36
4.1.5 ID-COM terminals .....	37
4.1.6 ID-DCU Marine terminals .....	38
4.1.7 ID-DCU xx -LT version with display preheating .....	39
4.1.8 ID-RPU terminals .....	39
4.1.9 ID-SCM Speed control module .....	40
4.1.10 ID-SCM1 .....	42
4.1.11 IntelliVision 5 CAN, IntelliVision 5 CAN Backlit .....	43
4.1.12 IntelliVision 8, IntelliVision 8 Marine .....	45
4.1.13 IntelliVision 12Touch OEM .....	45
4.2 Recommended wiring .....	47
4.2.1 Bus/Communication architecture .....	47
4.2.2 Electronic engine without redundancy line .....	49
4.2.3 Engine without ECU (mechanical engine) .....	50
4.2.4 I-CB wiring and configuration .....	50
4.2.5 ID-RPU wiring .....	51
4.2.6 Recommended wiring according to DNV rules .....	51
4.2.7 Wiring example - Complete system without RPU .....	53
4.3 Getting started .....	53
4.3.1 How to install .....	53
4.3.2 Analog as Binary input .....	56
4.3.3 Analog as three state (tristate) binary input .....	56
4.3.4 Analog Sensor availability with controller .....	56
4.3.5 Analog Sensors availability with extension modules .....	57
4.3.6 Binary inputs/outputs on ID-DCU Marine .....	58
4.3.7 Binary output separation .....	59
4.3.8 Connection of ID-DCU Marine analog inputs .....	60
4.3.9 ID-DCU Marine Analog inputs hardware configuration .....	60
4.3.10 ID-DCU Marine Analog inputs software configuration .....	62
<b>5 Controller setup</b> .....	<b>68</b>
5.1 Function description details .....	68

5.1.1 Engine running state .....	68
5.1.2 Protections .....	68
5.1.3 Universal states .....	75
5.2 PLC - programmable functions .....	76
5.2.1 General specification .....	76
5.2.2 List of available PLC functions .....	77
5.2.3 PLC configuration example .....	81
5.3 Shared IO and Virtual IO .....	88
5.3.1 Virtual Binary Outputs (VBOU) module .....	88
5.3.2 Shared virtual inputs and outputs .....	88
5.3.3 Distributed binary inputs and outputs .....	90
5.4 Multiple ECU modules support .....	91
5.4.1 Multi ECU Configuration with DriveConfig .....	91
<b>6 Communication</b> .....	<b>94</b>
6.1 IntelliDrive - Engine ECU communication .....	94
6.1.1 Example of standard J1939 engine .....	94
6.1.2 Tier 4 Final .....	94
<b>7 Technical data</b> .....	<b>98</b>
7.1 ID-DCU Marine .....	98
7.2 CAN bus interface .....	100
<b>8 Appendix</b> .....	<b>102</b>
8.1 Controller objects .....	103
8.1.1 List of controller objects types .....	103
8.1.2 Setpoints .....	103
8.1.3 Binary Inputs .....	172
8.1.4 Binary outputs .....	196
8.1.5 Analog Inputs .....	242
8.1.6 Values .....	262
8.2 Extensional modules .....	291
8.2.1 Intelli AIN8 (I-AIN8) .....	291
8.2.2 Intelli AIN8TC .....	301
8.2.3 Intelli IO8/8 (I-IO8/8) .....	306
8.2.4 IS-BIN16/8 .....	314
8.2.5 Intelli AIO9/1 (I-AIO9/1) .....	321
8.2.6 IS-AIN8 .....	326
8.2.7 IS-AIN8TC .....	336
8.2.8 IGS-PTM .....	340

8.2.9 InternetBridge-NT .....	347
8.2.10 I-CB Communication bridge .....	348
8.2.11 I-AOUT8 .....	349
8.2.12 ID-COM .....	354
8.2.13 Theory of binary inputs and outputs .....	356

# 1 Document information

1.1 Clarification of notation .....	6
1.2 About this guide .....	6
1.3 Legal notice .....	7
1.4 Document history .....	8

## 1.1 Clarification of notation

**Note:** This type of paragraph calls readers attention to a notice or related theme.

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

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

## 1.2 About this guide

InteliDrive DCU Marine is a specialized engine controller for Marine applications. It controls, monitors and protects the engine in single (Auxiliary) or variable (Propulsion) speed operational modes. The controller can communicate with Engine Management System via the CAN serial line using standard J1939 or another (KWP2000) communication protocol.

InteliDrive controllers are equipped with a monochromatic graphic display with icons, symbols and bar-graphs for intuitive operation, which together with high functionality sets new standards in engine controls.

### ► Engine functions

- Engine sequencing and control (start/stop, warm-up and cool-down, pre-lubrication etc.)
- Engine monitoring and protections (2 or more level analog inputs protection, adjustable delays)
- Speed measurement from magnetic pick-up or from ECU
- Running hours meter, number of starts counter
- Configurable 14 Binary inputs and Outputs and 8 Analog inputs
- Setpoints are adjustable via InteliDrive panel or via PC software
- 3 level password protection
- On screen Alarm and ECU Alarm indication
- Event and time driven engine history for back tracing
- Two or more languages selectable in controller

### ► Communication

- RS232 / Modbus RTU
- Analog or GSM modem
- Internet

- Engines with Engine Electronic Control Unit: J1939, J1587, KWP2000
- Extension units for more I/O and Remote Display panel.

▶ **Physical**

- 180x120 mm front panel mounted case
- Graphic back-lit LCD display 128x64 pixel resolution with icons and bar graphs
- LED status indicators / Lamp test

▶ **ID – RPU Redundant Protection Unit**

- 1 Emergency stop input
- 5 Shutdown inputs
- 1 RPM input
- Common warning and common shutdown output terminals
- Stop solenoid, fuel solenoid outputs
- Redundant power supply
- I/O broken wire detection

## 1.3 Legal notice

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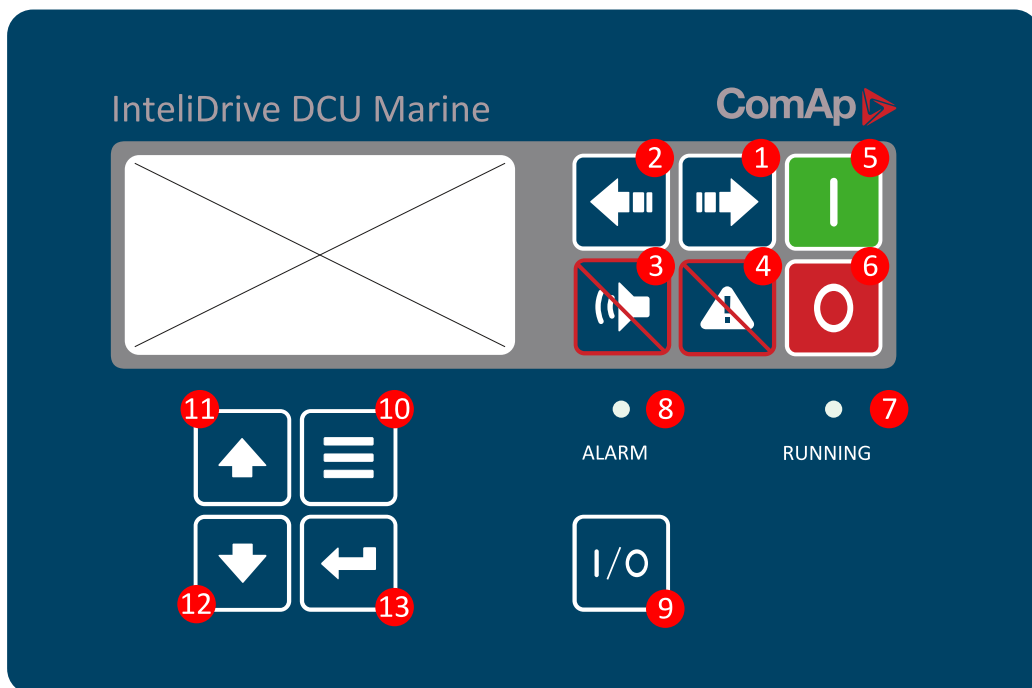
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# 2 System overview









- 2.1 Operator Interface ..... 9
- 2.2 Controller configuration and monitoring ..... 20
- 2.3 List of supported modules ..... 25

[back to Table of contents](#)

## 2.1 Operator Interface



1		Cycle forward through engine operation modes: <b>OFF -&gt; AUX / EME / HRB / PRP.</b>
2		Cycle backward through engine operation modes: <b>OFF &lt;- AUX / EME / HRB / PRP.</b>
3		Deactivates the HORN.
4		Acknowledges faults and alarms.
5		Starts the engine in <b>AUX, EME, HRB, PRP</b> mode.

6		Stops the engine in <b>AUX, EME, HRB, PRP</b> mode (hold time = 1 sec).
7		GREEN = Engine running.
8		RED (blink) = Alarm list contains not confirmed alarm. RED (lit) = Alarm list contains confirmed alarm.
9		Button for Close load or Clutch Binary output control.
10		Cycles through the display screens MEASUREMENT->ADJUSTEMENT->HISTORY.
11		Select the set point, select the screen or increase set point value.
12		Select the set point, select the screen or decrease set point value.
13		Confirm set point value.

**Note:**

**Stop** button hold time is 0,5 sec. to avoid unwanted engine stop.

The 2nd (0,5 sec) push of the **Stop** button cancels the 'cooling state' of the engine and stops the engine immediately. To avoid the cancel of the 'cooling state' by the 2nd push of the **Stop** button, use LBI card of the DriveConfig tool and make the association of **Access Lock** to the **Cooling** logical binary output of the 'Source' column. It causes locking of the front panel buttons during the Cooling state.

## 2.1.1 Controller screens

There are three screen groups available on ID controller: Measuring – Setpoints – History.

Measuring screen will be divided to more groups – ID-DCU Marine, BIN/BOUT, AIN.

### Measuring (instruments) screens

Screen	Content
Hidden, but available by Key combination, see <b>Functions available from ID-DCU Marine front panel keys (page 17)</b>	
	Info screen: Fw and App. version, s.n., .. Language list and switch.
	Language screen
	Fast edit screen
Available using ↑ or ↓ front panel keys	



	ECU diagnostics code list
	Alarm list
1 = Main screen	ID Mode, RPM1, Engine state, Oil Pressure and Coolant temperature (alternatively Aftertreatment values) Indication: <b>LOC</b> (Local), Alarm (in AL or ECU list), <b>R</b> Remote data connection active, <b>L</b> Access Lock
2	Analog 1 to Analog 4 , 4x single bargraph
3	Analog 5 to Analog 8 , 4x single bargraph (if they are configured)
4	Battery ID-DCU Marine, bargraph, Engine Cylinders statistic temperatures, Engine states timer
5	ID-DCU Marine BI 1 to 7
6	ID-DCU Marine BI 8 to 14
7	ID-DCU Marine BO 1 to 7
8	ID-DCU Marine BO 8 to 14
9	Statistics: Run hours, Number of starts, Service time
10	GPS speed (value is shared from other devices)
Following screens appears depend on configuration	
Opt	Analog 1 to Analog 8, Name- value dimension, active alarm is negative (1x IS-AIN8(TC) or Inteli AIN8(TC))
Opt	IS-BIN BI indication 1 to 8
Opt	IS-BIN BI indication 9 to 16
Opt	IS-BIN BO indication 1 to 8
Opt	ECU values I.
Opt	ECU values II.

**Setpoints screens** correspond with Setpoint table above.

## Alarm indication

Possible Alarm list and History record prefixes

Prefix	Meaning
Wrn	Warning
Sd	Shutdown
Cd	Cooldown
Bw	Broken wire
Fls	Sensor fail

Three state Alarm list indication

<b>* Wrn Water temp</b>	Active not accepted alarm
<b>Wrn Water temp</b>	Active accepted alarm
* Wrn Water temp	Inactive not accepted alarm
	Inactive accepted alarm

## ECU Alarm list - SPN/FMI codes screen

	E	n	g	O	i	l	P	r	e	s	s					W	R	N		
	B	o	o	s	t	P	r	e	s	s						F	L	S		
	E	n	g	O	i	l	T	e	m	p						W	R	N		
	6	2	9													F	L	S		
>	E	n	g	C	o	o	I	T	e	m	p					F	L	S		
S	P	1	1	0			O	C	7			F	M	3			E	1	0	

- SP SPN number (Suspect Parameter Number) is a particular code for each fault
- OC OC number (Occurrence Count) is ECU internal counter for each combination of SPN and FMI
- FM FMI number (Failure Mode Identifier) is a particular code for each cause of fault
- E Module index of ECU module, which transmits a fault

## Info screen

Info	Comment
InteliDrive	Product type
ComAp 2019	Company name, year of release
ID	Controller type
Serial: 0200FFFF	Controller serial number
Sw ver: 3.4.0	Software version
Appl: AUX	Application
Branch: DCU Marine	Firmware branch

## Statistic values

		It is calculated:
1	Run Hours	Each finished 60 minutes when engine is running.
2	NumSuccStarts	Each successful start (starter is switched off due to RPM> Starting RPM) is calculated. Each external (manual) engine start.
3	NumUnscStarts	Each finished unsuccessful cranking - MaxCrank time is over and engine is not started.
4	Service Time	It is decreased each finished 60 minutes when engine is running.
5	DayCons	Daily fuel consumption, every liter of fuel is calculated.
6	TripCons	Trip fuel consumption, every liter of fuel is calculated.

7	Memo1	Each time rising edge is detected with LBI: Memo1 Trigger
8	Memo2	Each time rising edge is detected with LBI: Memo2 Trigger
9	MomAvgFICon L	<p>Momentary average fuel consumption per nautical mile. Calculated from fuel consumption and boat speed.</p> <p>Result is not rounded, e.g. 9/100 is displayed as 0,0</p> <p>If FuelConsumpt is 0 then MomAvgFICon L is displayed as invalid value #####.</p>

**Note:** Statistic values can be adjusted from IntelliMonitor, password 3 level protected by default.

**Note:** Internal display does not support Unsigned Long values so it does not display correctly values higher than 2,147,483,647. Could be roughly says that issue is connected with values having 10 digits and more. If there is higher value, it treats it as Signed long and show it as negative with "-" (minus sign). Workaround: If numbers with 10 digits has unlogically minus mark number should be recalculated.

## History records

Following table does not contain Wm, Sd and FIs messages from external units.

Events specification	Protection type	Information available on binary output
<b>Alarms</b>		
Wm Analog input 1 to 8	WRN	YES
Sd Analog input 1 to 8	SD	YES
ID-DCU Marine Binary input 1 to 14	Configurable	YES
ID-DCU Marine Battery voltage <, >	WRN	YES
Wm SHBIN 1 to 6	WRN	
Sd SHBIN 1 to 6	SD	
Wm DISTBIN 1 to 32	WRN	
Sd DISTBIN 1 to 32	SD	
Wm SHAIN 1 to 4	WRN	
Sd SHAIN 1 to 4	SD	
Wm CommError(1) to (10)	WRN	
Sd CommError(1) to (10)	SD	
Wm RPU Fail	WRN	
Sd RPU Fail	SD	
Bw RPU FuelSol	BW	
Bw RPU StopSol	BW	
Wm RPU Fail	WRN	
Sd RPU Fail	SD	
ID-RPU A Battery voltage <, >	WRN	
ID-RPU B Battery voltage <, >	WRN	
Wm DETCON	WRN	
Sd DETCON	SD	

Wm SCM Fail	WRN	
Sd SCM Fail	SD	
Start fail	WRN	YES
ParamFail	NONE	
Overspeed	SD	YES
Underspeed	WRN	YES
EmergencyStop	SD	
Pickup fail	WRN	
Stop fail	WRN	YES
WmServiceTime	WRN	
ChrgAlternFail	WRN	YES
Fault reset		
LOC mode ON		YES
LOC mode OFF		
Harbour mode ON		YES
Harbour mode OFF		
SecBattery		YES
ID-RPU Sd1 Broken wire	WRN	
ID-RPU Sd2 Broken wire	WRN	
ID-RPU Sd3 Broken wire	WRN	
ID-RPU Sd4 Broken wire	WRN	
ID-RPU Sd5 Broken wire	WRN	
ID-RPU Stop sol.Broken wire	WRN	
ID-RPU Fuel sol.Broken wire	WRN	
Wm RPM diff	WRN	YES

Engine events	Note
<b>Starts</b>	
Button start	Start from ID-DCU Marine panel
CAN control + Button start	Start from ID-DCU Marine
RS232 control + Button start	Start from InteliMonitor
Remote start	ID-DCU Marine binary input
RemRepStart	ID-DCU Marine binary input
Blackout start	ID-DCU Marine binary input
Button start	ID-DCU Marine panel button
Extern Start	External engine start
<b>Stops</b>	
Engine stop	Stop from ID-DCU Marine panel or BI

CAN control + Engine stop	Stop from ID-DCU Marine
RS232 control + Engine stop	Stop from IntelliMonitor
Stop button	ID-DCU Marine panel button
<b>Other Events</b>	
Fault reset	ID-DCU Marine panel button
LOC mode ON	ID-DCU Marine panel button
LOC mode OFF	ID-DCU Marine panel button
HRB mode ON	ID-DCU Marine panel button
HRB mode OFF	ID-DCU Marine panel button
RS232 control	Start, Stop, Fault reset, I/O button from IntelliMonitor or ID-DCU Marine
RS485 control	Start, Stop, Fault reset, I/O button from IntelliMonitor or ID-DCU Marine
Modem control	Start, Stop, Fault reset, On/Off from Modem
SMS control	Received command from GSM modem
CAN control	Received command via CAN bus e.g. from ID-DCU Marine or IG-IB/IB-NT
ActCallCH1-OK	Successful active call on channel 1
ActCallCH2-OK	Successful active call on channel 2
ActCallCH3-OK	Successful active call on channel 3
ActCallCH1Fail	Failure of active call on channel 1
ActCallCH2Fail	Failure of active call on channel 2
ActCallCH3Fail	Failure of active call on channel 3
Extern start	Manual engine starter handling.
Engine stop	Engine changed state from
Emerg.man ON	Emergency manual mode ON
Emerg.man OFF	Emergency manual mode OFF
Clutch ON	Binary output clutch was closed
Clutch OFF	Binary output clutch was opened
Switched on	Controller was switched on
Cfg loaded	Configuration archive was changed
FwLoaded	Firmware upgrade
Time stamp	Depends on setpoint setting period
Password set	Any level from any terminal
Password changed	Any level from any terminal
Access set	Access code was set
Access changed	Access code was changed
Watchdog	Controller internal watchdog protection

Param fail	Setpoints checksum fail
RTC battery	RTC battery fail
System	Controller system related record
TimeModeChange	Winter/Summer time change
Overload	Engine overload
OthrCommEr	Intercontroller communication error
Battery Flat	Controller reset during cranking
OP RPMdep	Out of Oil pressure RPM dependent limit indication
CP RPMdep	Out of Cooling pressure RPM dependent limit indication
Battery A volt	Battery A voltage of RPU is out of limits
Battery B volt	Battery B voltage of RPU is out of limits
Close Load ON	Close Load output is closed
Close Load OFF	Close Load output is opened
SwitchToBatt B	ID-RPU power supply switched to battery B
SdOverride ON	Sd Override function activated
SdOverride OFF	Sd Override function deactivated

**Note:** Value name can't exceed 11 characters to be recorded to History file with prefix (Wm, Fls etc.). Longer names characters are canceled.

Corresponding Sd BINx, Sd BOUTx or Sd AINx is indicated in Alarm list and history record when communication with any extension units (IS-BIN, IS-AIN, IGS-PTM) is interrupted.

**Example:** When IS-BIN16/8 is configured for addresses: Binary inputs = BIN1, BIN2 and Binary outputs = BOUT1, then three messages Sd BIN1, Sd BIN2, Sd BOUT1 are indicated after communication is interrupted.

**Note:** Any "State" information can be configured to any binary output by DriveConfig software.

## 2.1.2 Display menu

There are 4 display menus available: MEASUREMENT, External measurement, ADJUSTMENT and HISTORY.

Each menu consists of several screens. Pressing the **Page** button repeatedly will scroll the user through the menu screens.

## 2.1.3 Functions available from ID-DCU Marine front panel keys

Function	Key combination	From where
Contrast increase	Enter + ↑	Main screen
Contrast decrease	Enter + ↓	
Info screen	Enter + Page	
LOC (Local) mode ON	Enter + Mode→ (Right)	
LOC (Local) mode OFF	Enter + ←Mode (Left)	
Fast edit	Enter hold for 4 sec.	
Fault code reset	Fault reset	Alarm list
ECU fault code reset	Fault reset	ECU Alarm list
Requested speed increase	↑	Fast edit screen
Requested speed decrease	↓	
Request confirmation and exit	Enter active when Engine params: EnLocalSpeed = ENABLED	
Exit without confirmation	Page	
Backlight increase	Enter + ↑	
Backlight decrease	Enter + ↓	
Go to Language screen	Page	Info screen
Info screen exit	Automatic after 10 sec to Main screen	
Language selection	↑ or ↓	Language screen
Language screen exit	Enter	

► The system supports following character sets:

- West European - Code page 1252 in Windows
- East European - Code page 1250 in Windows
- Russian - Code page 1251 in Windows
- Turkish - Code page 1254 in Windows
- Simplified Chinese - Code page 936 in Windows.

**Note:** If the configuration table has a code page that is not supported in the display processor, “Unsupported code page” message appears on the ID-DCU Marine screen. Press **Page** to return back to Language selection.

**Note:** The Fast Edit function is available only in case of accessible parameter, i.e. if entered password level on ID-DCU Marine corresponds to protected level of parameter associated to Fast Edit function.

## 2.1.4 How to change controller language?

Go to Info screen by pressing **Page** + **Enter**. Press **Page** to go to Language screen. Select language ↑ or ↓ a press Page to confirm selection and exit window.

## 2.1.5 How to change the display backlight intensity?

Press **Enter** and **↑** or **↓** at the same time to adjust the best display backlight.

**Note:** Only in INFO screen.

## 2.1.6 How to change the display contrast?

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

**Note:** Only in MEASUREMENT menu.

## 2.1.7 How to check the serial number and software revision?

Hold down the **Enter** and the press **Page**. On the display you can see Controller INFO screen for 10 seconds:

Controller name	(see <b>Basic Settings</b> group)
Controller serial number	(8 characters number)
SW version	Standard numbering in format M.N.P.B
Application	AUX/ CMB/ EME/ PRP
Branch	DCU-Marine

**Note:** Only in MEASUREMENT screen.

## 2.1.8 How to find active alarms?

Active alarm list and J1939 alarm list are the last two screens in the MEASUREMENT menu.

Select MEASUREMENT menu. Press **↑** and you will see the list of all active alarms with the number of alarms at the top-right corner. Inverted alarms are still active. Non-inverted alarms are not active, but not yet confirmed.

Press **Fault reset** accepts alarms of active (visible screen). 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, parameters or history.*

*The Fault reset button is inactive when controller screen is switched to any other than Alarm list or ECU Alarm list.*

## 2.1.9 How to select engine mode?

Use **Mode →** or **Mode ←** to select requested engine operation mode.

**Note:** Switching to **OFF** mode is blocked on running engine as well as the automatic switching prior to controller programming.

## 2.1.10 How to view and edit setpoints?

1. Pressing the **Page** button repeatedly will scroll the user through the menu screens. Select the ADJUSTMENT screen.
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.

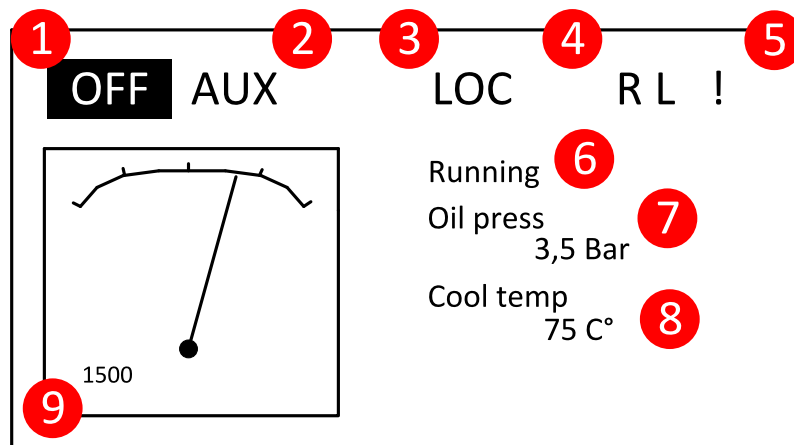
### 2.1.11 How to view measured data?

Pressing the **Page** button repeatedly will scroll the user through the menu screens. Select the MEASUREMENT screen. Use **↑** and **↓** to select the screen with requested data.

### 2.1.12 How to view the History menu?

1. Pressing the **Page** button repeatedly will scroll the user through the menu screens. Select the HISTORY screen.
2. Use **↑** or **↓** to select a requested record.
3. Use **Enter** to select requested screen (record items) within displayed records

### 2.1.13 Main screen indication



<b>1</b>	Active controller mode (inverse)
<b>2</b>	Available mode
<b>3</b>	Controller <b>LOC</b> (Local) mode indication
<b>4</b>	<b>R</b> = Remote connection indication (connection to IntelliMonitor is active) <b>L</b> = Access lock indication

5	Record in Alarm list
6	State machine indication
7	Oil Pressure ( <b>MainScrAna1</b> ) indication
8	Coolant Temperature ( <b>MainScrAna2</b> ) indication
9	RPM indication

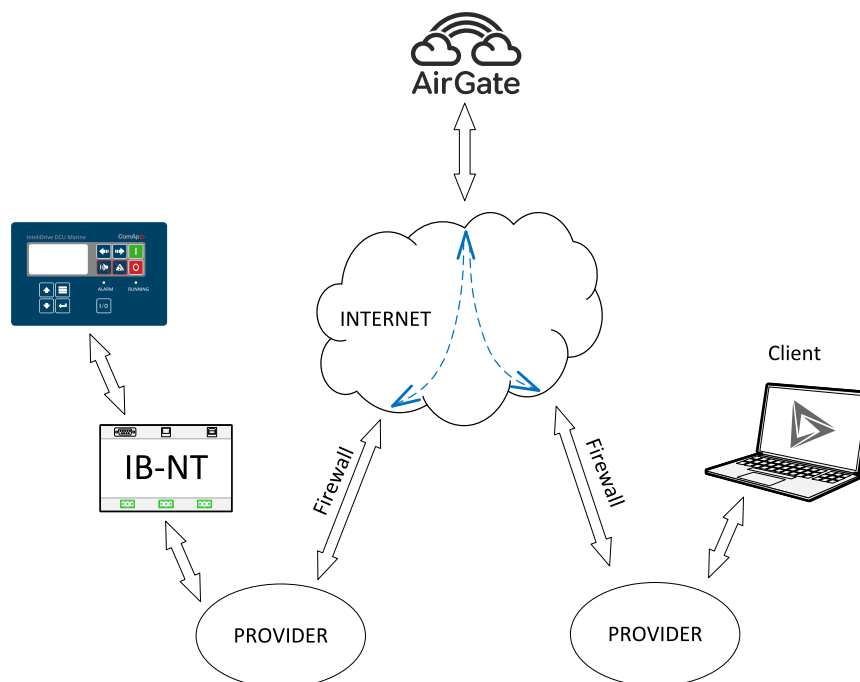
## 2.2 Controller configuration and monitoring

InteliDrive Install Suite is pack contains separate PC software tools related to ComAp products. The main components are: DriveConfig (DC), InteliMonitor (IMON) and InteliDDE server.

DriveConfig and InteliMonitor is based on Windows Vista/Win7/Win8 or higher platform.

### 2.2.1 AirGate connection to the PC

This connection type is used for connection to controller (s), that are connected to the Internet, however they do not have public and static IP address. The controllers connect by InternetBridge-NT module to the AirGate server and cyclically ask whether there is a connection request from a client or not. On the other side the clients (only ComAp PC applications - DriveConfig, InteliMonitor and WebSupervisor) connect to the AirGate server instead of connecting directly to the controller. The server then creates a "tunnel" between the client and the controller.



**Note:** InternetBridge-NT (IB-NT) connection into Internet network can be done via Ethernet or Cellular connection. The Ethernet connection can be realized by direct access using fixed and public IP address as well as by private network access using dynamic non-public IP address (behind Firewall, NAT, DHCP server etc. – situation illustrated in the picture above).

**Note:** AirGate ID needed as parameter for connection creation is assigned to InternetBridge-NT (IB-NT) module. Second parameter for connection to a particular controller is controller's address (there can be connected up to 8 ID-DCU Marine controllers via CAN2 bus to one IB-NT module).

## 2.2.2 Configuration steps

Following configuration steps are available in DriveConfig software:

- ▶ Configure addresses of Extension modules when more inputs and outputs are required
- ▶ Configure J1939 interface when Electronic engine is connected
- ▶ Configure Binary inputs as Protection or Function
- ▶ Configure Binary outputs
- ▶ Configure Analog inputs as Protection or Function
- ▶ Define user sensors
- ▶ Configure History record
- ▶ Configure password protection
- ▶ Configure additional PLC logic
- ▶ Modify screens for IntelliVision displays
- ▶ Manage ECU Fault codes
- ▶ Add/Translate the language

### Translator

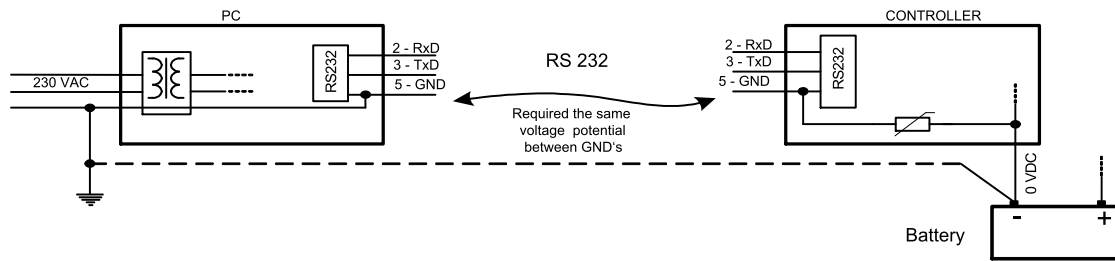
The Translator enables to translate all or some texts to up 5 languages that could be available in controller. Controller language can be changed from panel buttons. It is possible to operate different languages on each ID-DCU Marine, Remote panel and IntelliMonitor.

**Note:** Check all screens if some texts are not shortened.

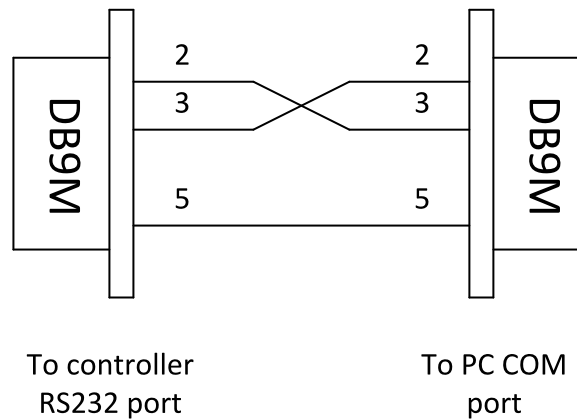
## 2.2.3 Direct connection to the PC

InteliDrive can be connected directly with PC via RS232 interface. Use the standard cable RS232 cable to connect PC with InteliDrive controller.

**Note:** Make sure the grounding system on controller and PC – COM port (negative of the PC DC supply) are identical – before the first direct connection. There must not be any voltage between these two points otherwise the internal PTC protection activates and interrupts RS232 communication. In such case disconnect RS232 line wait a minute for PTC recovery and try again. The simple solution is to assure, that the PC supply 240/20V is ground free (GND terminal is not connected).



### SERIAL „CROSS-WIRED“ CABLE



## 2.2.4 DriveConfig

Standard installation pack contains following controller file types:

Firmware	Application file (archive)
ID-DCU-Marine-3.4.0.mhx	DCU-Marine-AUX-3.4.0.aid DCU-Marine-EME-3.4.0.aid DCU-Marine-CMB-3.4.0.aid DCU-Marine-PRP-3.4.0.aid

Delivered controller contains firmware and default configuration. Any Application file can be modified by customer using DriveConfig PC software. It is possible to download Application file from the controller, modify it and download back. There must be corresponding version of Application file with firmware in controller.

**Note:** Configuration aid file does not contain the History record when had been read from the IntelliDrive controller by DriveConfig.

**Note:** To load History file from IntelliDrive use IntelliMonitor software only.

### Application file - archive

There exists one binary type of configuration file only. Config file “\*.aid” contains:

- ▶ Complete I/O configuration (include extension modules if any)
- ▶ Setpoints setting
- ▶ All available languages

Configuration file can be opened (Open file or Load from ID) modified and stored to the PC (Save, Save as) or downloaded to Controller (Store to ID).

## DriveConfig functions

Tool for ID-DCU Marine controller and extension modules configuration

- ▶ Extension modules addressing
- ▶ All I/O function or protection configuration
- ▶ Setpoints adjusting
- ▶ Sensor characteristics modification
- ▶ History record modification
- ▶ Password level protection modification (password value must be changed in IntelliMonitor)
- ▶ Additional PLC logic creating
- ▶ IntelliVision displays screens modification
- ▶ ECU Fault codes management
- ▶ Controller firmware (mhx file) upgrade
- ▶ Controller application file Up/Down load
- ▶ Language translator enables (not available in version 1.0)
  - Create Dictionary between two languages (Dictionary can be used repeatedly)
  - Translate current text in Controller (in any language)
  - Add new language (up to controller memory limit)

## PC to ID-DCU Marine controller connection

- ▶ Uploading or downloading procedure only (no continuous on-line connection)
- ▶ Direct RS232 connection
- ▶ Modem and internet connection

## 2.2.5 Modbus protocol

- ▶ Direct connection: RS232, RS485
- ▶ Modem connection
- ▶ 9600, 19200, 38400, 57600 or 115200 bps, 8 data bits, 1 stop bit, no parity
- ▶ Transfer mode RTU
- ▶ Function 3 (Read Multiply Registers)
- ▶ Function 6 (Write Single Register)
- ▶ Function 16 (Write Multiply Registers)
- ▶ The response to an incoming message is sent with minimum 4.096 ms delay after message reception

The complete description of Modbus communication protocol can be found in Modbus Protocol Reference Guide [PI MBUS\\_300.pdf](#) and Open Modbus Specification Release 1.0. Both documents are available from web site at [Modbus\\_TCP\\_Standard.doc](#).

## Communication object vs. Register

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

**Note:** *It is possible to download the Actual IntelliDrive controller object description corresponding to actual configuration from on-line controller or from aid archive using DriveConfig software.  
Detail Modbus command description see in ComAp Communication guide.*

## 2.2.6 Password protection

Password is a four-digit number. Only setpoints associated with the entered password level can be modified.

There are three levels of password protection.

- 0 - User level allows change of non-protected setpoints only
- 1 - Operator level allows change of setpoints protected by Operator level 1.
- 2 - Master level allows change of setpoints protected by Operator 1. and Master level 2.
- 3 - Supervisor highest level allows all setpoints or configuration changes, firmware upgrade.

There can be password protected:

- ▶ Setpoints (depends on configuration)
- ▶ Statistics values (Level 3 only)
- ▶ Engine commands (depends on configuration)

Even though one level may have been set from the front panel, the affected setpoints are not accessible from IntelliMonitor (direct or Modem) until this level is set in IntelliMonitor (direct or Modem). Setpoints opened from front panel are automatically closed 15 minutes after the last key has been depressed or when wrong value of password is set.

- ▶ Any password can be changed once that level password or higher has been entered if the change is made from IntelliMonitor PC tool.
- ▶ Password level 3 must be entered at first to change any password if the change is made by controller front panel buttons.

**Note:**

*"Engine Cmd" Password protection blocks Engine commands: Start, Fault reset, Horn reset from front panel ID-DCU Marine, by IntelliMonitor, Modbus, ID-DCU Marine, IntelliVision 5 CAN (Backlit), IntelliVision 8 Marine or SMS.*

*"Engine Cmd" Password protection does not block: activation via Binary inputs.*

*The following three options protect against modification of statistics values from IntelliMonitor.*

*There is no other access to modify statistics - i.e. can not be changed from panel.*

*Clear statistics is common protection for all three statistic values.*

*Setting of statistic is possible protect separately - from Monitor only*

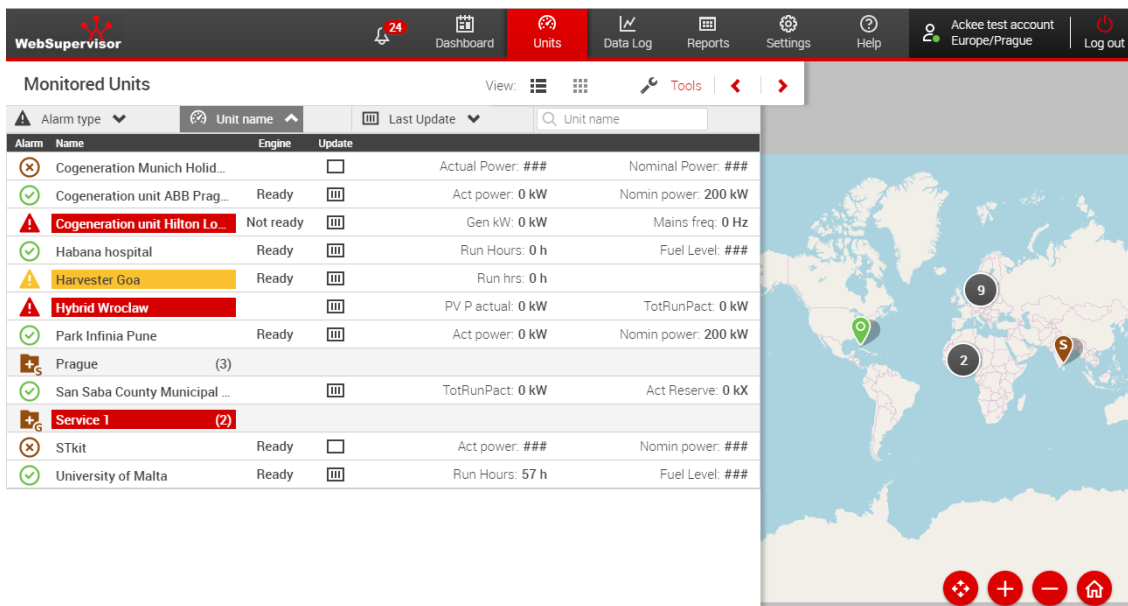
## 2.2.7 WebSupervisor

WebSupervisor is web based system designed for monitoring and controlling ComAp controllers via the Internet. This system offers a number of beneficial features that help optimize revenue for machinery fleets, as each piece of equipment can be individually monitored for all important operation values.

### ID-DCU Marine connection into WebSupervisor

Connection of ID-DCU Marine controllers can be realized in two different ways:

1. Internet connection via AirGate - using InternetBridge-NT (IB-NT). No fixed and public IP address is needed.
2. Internet connection without AirGate - using InternetBridge-NT (IB-NT) or IG-IB module. The module has to have fixed and public IP address.



**Note:** The WebSupervisor ComAp tool is supported from ID-DCU Marine version 2.2, specifically from ID-DCU-MARINE-W-2.2.mhx firmware.

## 2.3 List of supported modules

Product	Description	Order code
Inteli AIN8	8 Analog inputs (R, I, V) and 1 pulse/frequency input	<a href="#">I-AIN8</a>
Inteli AIN8TC	8 Thermocouple Analog inputs	<a href="#">I-AIN8TC</a>
Inteli IO8/8	8 Binary inputs, 8 Binary outputs and 2 Analog outputs packed in a small unit (HW)	<a href="#">I-IO8/8</a>

Product	Description	Order code
	switchable to IO16/0). HW switchable to IO16/0 - 16 Binary inputs	
IS-BIN 16/8	16 configurable galvanically separated inputs, 8 configurable outputs	<a href="#">IS-BIN16/8</a>
Inteli AIO9/1	9 Analog inputs (4x DC, 4x thermocouples, 1x R)	<a href="#">I-AIO9/1</a>
IS-AIN8	8 Analog inputs packed in a rugged metal unit	<a href="#">IS-AIN8</a>
IS-AIN8TC	8 analog inputs for thermocouple measurement, supports J, K, L types	<a href="#">IS-AIN8TC</a>
IGS-PTM	8 Binary inputs, 8 Binary outputs, 4 Analog inputs and 1 Analog output	<a href="#">IGS-PTM</a>
IB-NT	Internet bridge	<a href="#">IB-NT</a>
I-CB	Communication bridge	<a href="#">I-CB</a>
I-AOUT8	8 Analog outputs	<a href="#">I-AOUT8</a>

You can get more information on wiring of standard extension modules in the chapter **Extensional modules** (page 291).

 [back to System overview](#)



# 3 Application overview

3.1 ID-DCU Marine ..... 27  
 3.4 ID-RPU ..... 30

[back to Table of contents](#)

## 3.1 ID-DCU Marine

### 3.1.1 Default archives

The ID-DCU Marine controller can be configured for auxiliary, emergency, combined (constant speed engines) or propulsion mode engines. The configuration can be changed in the DriveConfig software by selecting appropriate archive file.

Application		Archive file	Available modes	Engine start / stop
<b>AUX</b>	Auxiliary	ID-DCU Marine-AUX-3.4.0.aid	<b>OFF - AUX</b>	<b>BI Blackout Start</b> <b>BI Remote Start</b> <b>BI Remote Stop</b> <b>BI Rem Start/Stop</b> ID-DCU Marine <b>Start / Stop</b> button
<b>EME</b>	Emergency	ID-DCU Marine-EME-3.4.0.aid	<b>OFF - EME (Standby)</b>	<b>BI Blackout Start</b> <b>BI Remote Start</b> <b>BI Remote Stop</b> <b>BI Rem Start/Stop</b> ID-DCU Marine <b>Start / Stop</b> button
<b>CMB</b>	Combined	ID-DCU Marine-CMB-3.4.0.aid	<b>OFF - EME - HRB (Standby-"Manual")</b>	<b>EME, HRB:</b> <b>BI Blackout Start</b> <b>BI Remote Start</b> <b>BI Remote Stop</b> <b>BI Rem Start/Stop</b> ID-DCU Marine <b>Start / Stop</b> button
<b>PRP</b>	Propulsion	ID-DCU Marine-PRP-3.4.0.aid	<b>OFF - PRP</b>	<b>BI RemRepStart</b> <b>BI Remote Start</b> <b>BI Remote Stop</b> <b>BI Rem Start/Stop</b> ID-DCU Marine <b>Start / Stop</b> button

## 3.1.2 Operational modes

### 3.2 LOC (Local) mode

**LOC** (Local) mode can be set in any mode mentioned above – **AUX, EME, HRB, PRP**. ID-DCU Marine receives only commands entered from the ID-DCU Marine front panel in LOC (Local) mode. All external interfaces – binary inputs **Remote Start, Blackout Start, RemRepStart, Remote Stop, Rem Start/Stop** and serial line commands are disabled.

**LOC** (Local) mode is activated and deactivated using ID-DCU Marine front panel buttons: Enter + Mode→ to activate, Enter + ←Mode to deactivate. Active **LOC** (Local) mode is indicated in the upper right corner of the ID-DCU Marine display.

### OFF mode

All ID-DCU Marine controller and ID-RPU binary outputs are switched off. Engine can't be started or running engine is stopped, prelubrication function is not active. Firmware and controller configuration can be changed in **OFF** mode only. **OFF** mode is available in all applications – **AUX, EME, CMB** and **PRP** mode.

### 3.3 Auxiliary mode (AUX archive)

- ▶ **AUX** mode is designed for auxiliary engines.
- ▶ Controller starts and stops the engine according to the binary inputs **Blackout Start** or **Remote Start, Rem Start/Stop, Remote Stop** or to the ID-DCU Marine **Start / Stop** buttons. Binary inputs **Blackout Start** and **Remote Start** and **Remote Stop** are inactive in **LOC** (Local) mode.
- ▶ All engine protections and all configured shutdown protections are active. Controller continuously monitors all available engine parameters (oil pressure, water temperature, RPM, fuel level etc.). The engine will stop and activates **Common Warning** and **Common Shutdown** outputs and writes record to the history file when detects any active Shut down alarm. This condition can be signaled by Active call feature to remote operator via modem, SMS or e-mail.

### Emergency mode (EME archive)

- ▶ The engine is used for emergency engines.
- ▶ Controller starts and stops the engine according to the binary inputs **Blackout Start** or **Remote Start, Rem Start/Stop, Remote Stop** or to the ID-DCU Marine **Start / Stop** buttons. Binary inputs **Blackout Start** and **Remote Start** and **Remote Stop** are inactive in **LOC** (Local) mode.
- ▶ The controller still measures all engine parameters. But it only records to the history file and can notify remote operator via Active call when detects any parameter out of range.
- ▶ **The only active shut down protection is engine overspeed and Emergency stop.**

### Combined - Harbour mode (CMB archive)

ID-DCU Marine can be switched to **EME** or **HRB** mode by ID-DCU Marine Mode panel buttons.

- ▶ EME mode behavior is like above.
- ▶ In HRB mode the controller operates like in AUX mode (all engine protections are active) but message "HARBOUR MODE" in Alarm list and Binary outputs HRB mode and binary output Common Alarm is active.

- ▶ Controller starts and stops the engine according to the binary inputs Blackout Start or Remote Start, Rem Start/Stop, Remote Stop or to the ID-DCU Marine Start / Stop buttons. Binary inputs Blackout Start and Remote Start and Remote Stop are inactive in LOC (Local) mode.

### Propulsion mode (PRP archive)

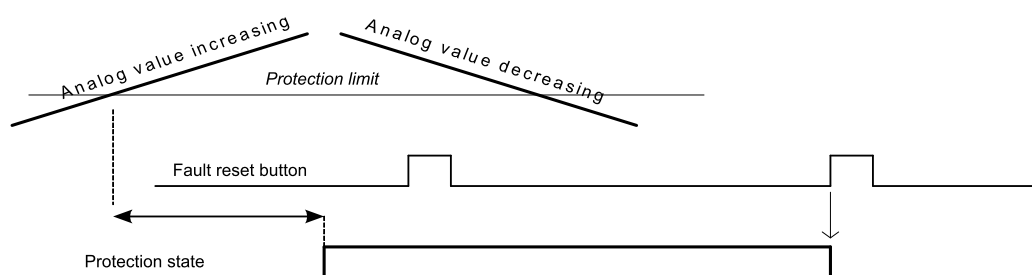
- ▶ PRP mode is designed for multiple propulsion engines with variable speed
- ▶ Controller starts and stops the engine according to the binary inputs RemRepStart or Remote Start, Rem Start/Stop, Remote Stop or to the ID-DCU Marine Start / Stop buttons. Binary inputs RemRepStart and Remote Start and Remote Stop are inactive in LOC (Local) mode.
- ▶ All engine protections and all configured shutdown protections are active. Controller continuously monitors all available engine parameters (oil pressure, water temperature, RPM, fuel level etc.). The engine will stop and activates Common Warning and Common Shutdown outputs and writes record to the history file when detects any active Shut down alarm. This condition can be signaled by Active call feature to remote operator via modem, SMS or e-mail.

### Other functions

Controller (except OFF mode) accepts when engine is started outside controller (by hand) or when controller power supply is switched-on on already running engine.

## 3.3.1 Universal states

State is a value joined to each Analog input or value. State indicates if any protection configured on corresponding analog input is active or not. When there is any state configured as protection the corresponding Binary output appears in Analog protection list and can be used for selective external indication of the Alarm. State is resetted (output is opened) when corresponding Alarm is not active and confirmed (Fault reset was pressed).

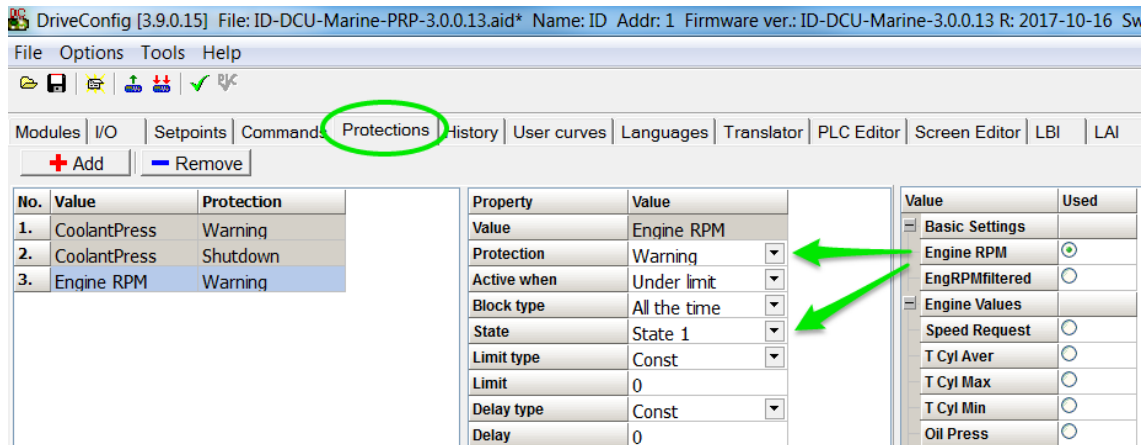


There are seven universal (free) states available in ID-DCU Marine-3.4.0 that are not joined to any value or input.

They can be used mostly for some values that have not state (e.g. RPM or other that are not measured on Analog input). This way can be configured protection to any ID-DCU Marine internal value or more levels external indication.

Example of Universal state1 configuration to Engine speed (Warning for Engine speed > 1600RPM, 1s):

This configuration is available in DriveConfig – Expert mode.



### 3.4 ID-RPU

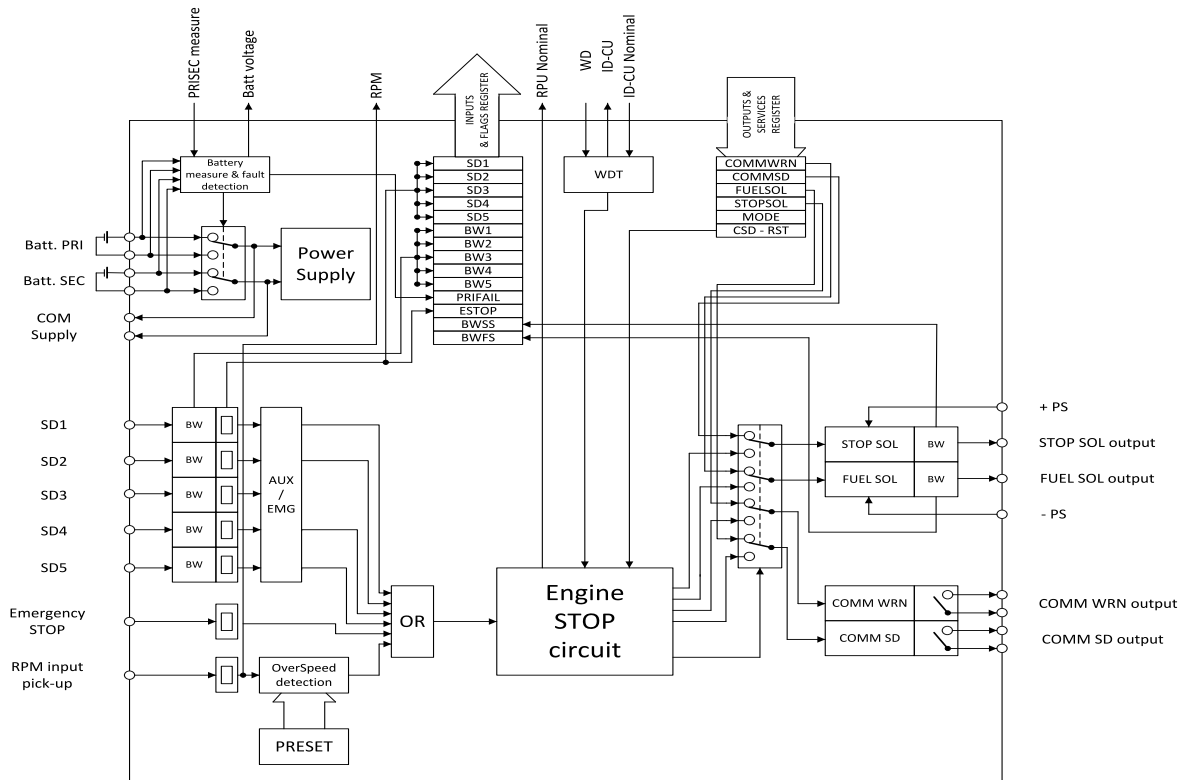


Image 3.1 Redundancy protection unit

**Note:** Maximal torque to tight main screw is 0.25 Nm.

#### Binary information from ID-RPU to ID-DCU Marine

Symbol	Meaning
SD1 .. SD5	State of all binary inputs SD1-SD5
BW1 .. BW5	State of all BW protections
PRIFAIL	Primary A battery fail = switched to B battery

ESTOP	Binary input Emergency stop state
BWSS	Stop solenoid output BW indication
BWFS	Fuel solenoid output BW indication

### Binary information from ID-DCU Marine to ID-RPU

Symbol	Meaning
COMMWRN	Binary output Common warning
COMMSD	Binary output Common shut down
FUELSOL	Binary output Fuel solenoid
STOPSOL	Binary output Stop solenoid
MODE	Controller application <b>AUX - EME</b> (or Sd override active)

## 3.4.1 ID-RPU functions

ID-RPU (InteliDrive Redundant Protection Unit) is designed for marine applications. This no microprocessor unit provides redundant engine protection, RPM measuring and back-up power supply switching for the control system.

ID-RPU monitors InteliDrive central unit and in the case of fail switches itself to the backup mode or Emergency backup mode and protects the engine using its own binary EMERGENCY STOP and SHUT DOWN inputs and FUEL and STOP SOLENOID outputs.

The ID-RPU unit has three operational modes:

#### ► Normal

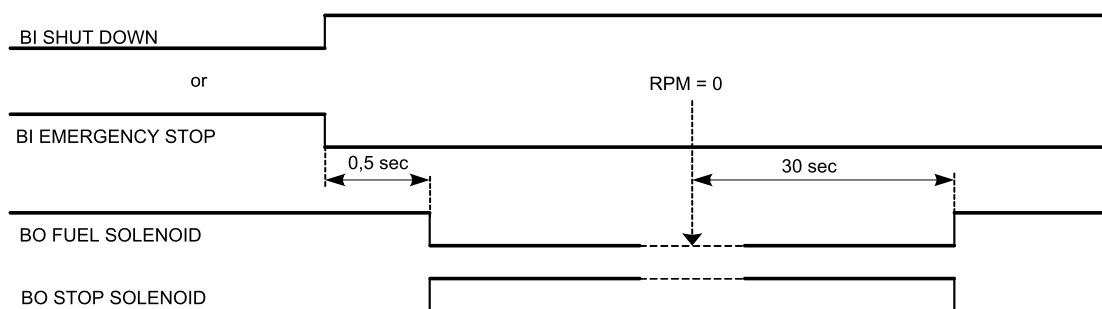
ID-DCU Marine is working and periodically sends the watchdog impulses to the ID-RPU. All ID-RPU inputs and outputs are processed via ID-DCU Marine.

#### ► Backup

ID-RPU unit doesn't receive watchdog impulses from the ID-DCU Marine. The Shut down (Sd1 to Sd5), Emergency stop inputs (fix 0,5 sec delay) and Overspeed protection are processed via RPU only. ID-RPU stays in the mode that was before ID-DCU Marine fail.

#### ► Emergency backup

ID-DCU Marine was in EME mode (or Sd override function was active) before fail. The only Emergency stop and Overspeed protection is active in this mode. Shut down Sd1 to Sd5 inputs are inactive. ID-RPU starts to Emergency backup mode after power on without active ID-DCU Marine.



### Power supply terminals A+, A-, B+, B-, COM+, COM-

The ID-RPU module has two independent power input terminals and one power output terminals. The power output is supplied from battery A and if this voltage drops under 8V, the relay switches to the power supply B.

Battery B is switched to A when: Batt A > 10VDC and Fault reset button is pressed on ID-DCU Marine or Batt reset button is pressed on ID-RPU when ID-DCU Marine is out of order. The voltage switching levels is fix set in the ID-RPU.

## Binary inputs SD1 .. SD5 – shutdown channels

Include broken wire detection. The input logic is Normally Opened. Inputs are NOT active if controller unit is in **EME** mode or **Sd override** is active. No LED indication.

***Note:** There is no I/O state or Broken wire LED indication on ID-RPU module. All indications are visible on ID-DCU Marine screen include Alarm list and History record.*

## Binary input Emergency stop

No Broken wire detection. The input logic is Normally Closed. Input is active in all **EME**, **AUX** and **PRP** modes. No LED indication.

## Binary output COMM SD

Output indicates any shutdown Alarm.

**Normal mode:** the output is controlled from ID-DCU Marine (Binary output Comm Sd)

**Backup mode:** the output is activated if RPU emergency stop or SD1 – SD5 become active.

## Binary output COMM WRN

Common warning indication.

**Normal mode:** the output is controlled from ID-DCU Marine (Binary output Comm Wrn)

**Backup mode:** the output is ACTIVE.

## Binary output STOP SOL

Stop solenoid output (high side switch) with broken wire (BW) detection active on opened output.

**Normal mode:** the output is controlled from the ID-DCU Marine. The logical output Stop solenoid must be configured to this output in the configuration of ID-DCU Marine. In case the stop solenoid is not used, the output must be configured as not used, otherwise broken wire protection will be detected.

**Backup mode:** the output is activated in case of any shutdown and released 10s after zero RPM reached.

## Binary output FUEL SOL

Fuel solenoid output (high side switch) with broken wire (BW) detection active on opened output.

**Normal mode:** the output is controlled from the ID-DCU Marine. The logical output Fuel solenoid must be configured to this output in the configuration of ID-DCU Marine. If fuel solenoid is not connected to the output, set Source of the output as Not Used to avoid activation of broken wire protection..

**Backup mode:** If no shutdown protection active, the output is closed.

## SEC RPM IN, SEC RPM GND

Terminals for the secondary RPM pickup. It is possible to connect two redundancy pickups or one pickup to ID-DCU Marine and to the ID-RPU in parallel. The ID-RPU will detect overspeed failure on running engine.

## Battery voltage measuring

ID-RPU senses battery voltage on both power supply inputs. Those values are connected to the ID-DCU Marine through the CANOVN connector. There is one common Battery V>, V< and delay limit for all three batteries.

## Watchdog

ID-DCU Marine periodically (~ 0.2s) sends an impulse to the ID-RPU. ID-RPU backup mode is activated after 1s without watchdog pulse.

Required CtrlHeartBeat rate is 100ms : 100ms

## Overspeed protection

The ID-RPU overspeed protection is active in the case of ID-DCU Marine fail only (backup mode). Overspeed limit can be set by DIP switch (accessible after cover removal).

## ID-RPU Emergency / Auxiliary mode operation

ID-RPU only reflects ID-DCU Marine setting following way. ID-DCU Marine controller modes are selected on ID-DCU Marine only.

ID-RPU binary inputs	Emergency mode	Auxiliary mode
Emergency stop	Active	Active
Shutdown Sd1 - Sd5	Inactive	Active

ID-RPU is switched to Emergency mode after power-on reset without ID-DCU Marine.

## ID-RPU operation in the case of ID-DCU Marine fault

The ID-RPU itself can never start the engine because of the engine starter is controlled from ID-DCU Marine. ID-RPU will leave all own binary outputs in the last state when ID-DCU Marine fail is detected (engine stays running after ID-DCU Marine fail). ID-RPU activates corresponding binary outputs when Emergency stop, Engine overspeed protection or some Shutdown input (not in EME mode or Sd override), is activated.

### 3.4.2 ID-RPU overspeed setting

ID-RPU Overspeed limit is set via two DIP switches: Prefix and Speed preset.

OT switch in On (1) position activates Overspeed Test = Reduce Overspeed limit to 50%.



## Example of Prefix and Speed preset calculation

<b>Required overspeed limit:</b>	RPM over = 1600 RPM
<b>Basic settings:</b>	Gear teeth = 120

Speed preset formula:  $N = \{ [ ( \text{RPMover} \times \text{Gear teeth} ) / 60 ] / C \} + 1$

1. Step:  $X = (\text{RPMover} \times \text{Gear teeth}) / 60 = 3200$
2. Step select coefficient C according table and corresponding DIP Prefix

**Table 1**

X range	C	Prefix
2016 to 8128	32	1000
504 to 2032	8	0100
126 to 508	2	0010
1 to 127	0,5	0001

**X = 3200 is in the range 2016 to 8128 → C = 32; Prefix = 1000**

3. Step: Speed preset =  $3200 / 32 + 1 = 101$ ; -> 01100101 in binary format.
4. Step: set Prefix = 1000 and Speed preset = 01100101

**Table 2. Another examples of overspeed setting**

RPMover	Gear teeth	Prefix	Speed preset	DIP8
1800	150	1000	141	10001101
1800	120	1000	113	01110001
1800	60	0100	226	11100010
1000	30	0010	251	11111011

### Speed preset binary conversion examples

Speed preset	DIP8
0	00000000
1	00000001
2	00000010
4	00000100
8	00001000
16	00010000
32	00100000
64	01000000
128	10000000
255	11111111

[🔍 back to Application overview](#)



# 4 Installation and wiring

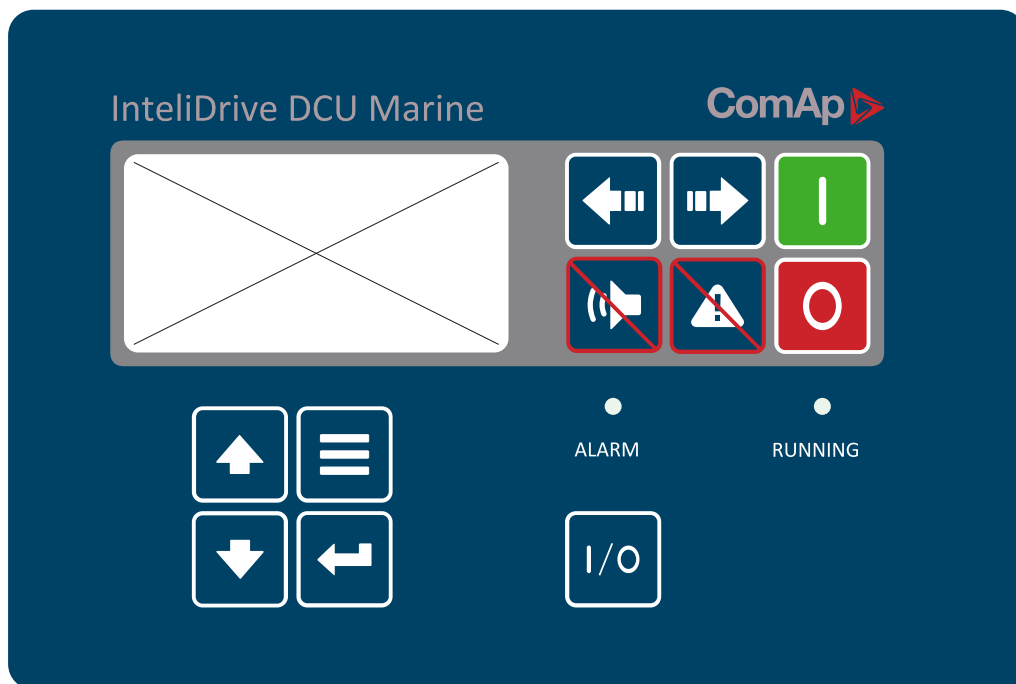
4.1 Terminal and dimensions ..... 35  
 4.2 Recommended wiring ..... 47  
 4.3 Getting started ..... 53

 back to Table of contents

## 4.1 Terminal and dimensions

### 4.1.1 ID-DCU Marine

The front panel of the IntelliDrive controller is intended for installation in an overall enclosure – rubber seal for IP 65 - Technical data (page 98)

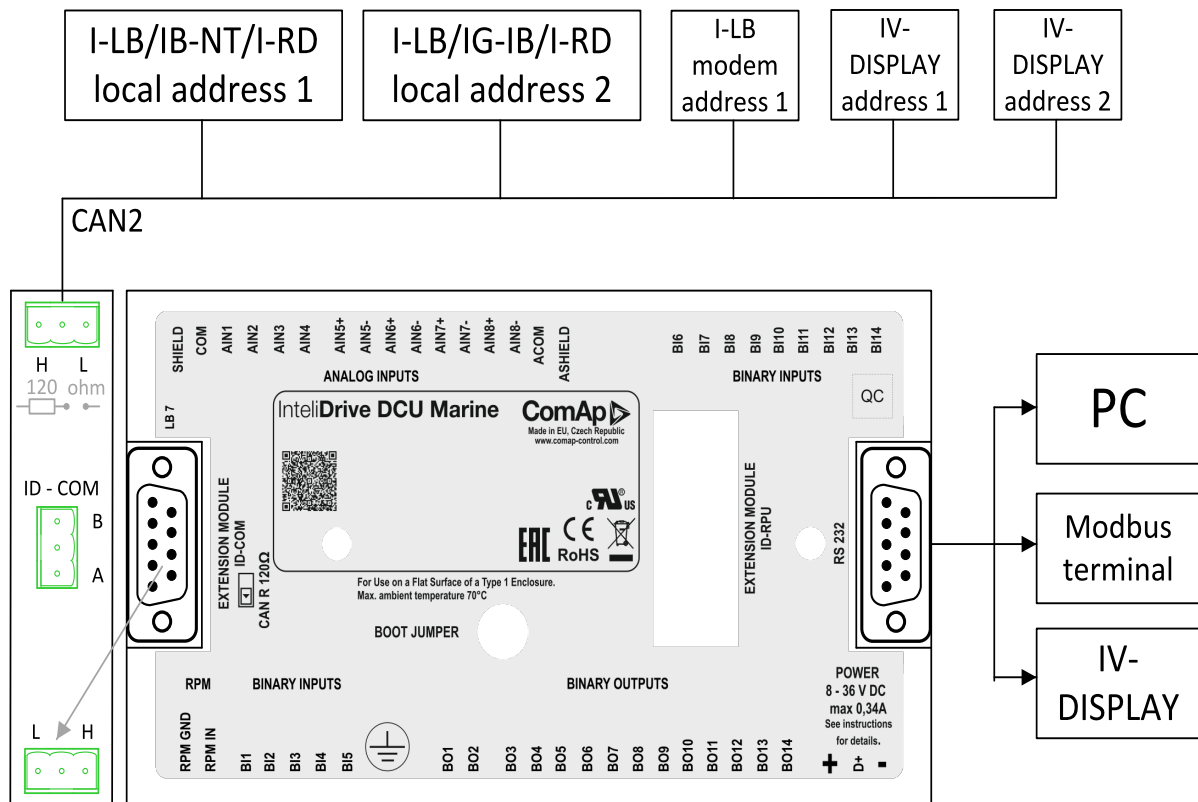


#### Front panel LED

Left RED	Active alarm indication	Blinks when new alarm is activated. Steady lights after "Fault reset" confirmation - when alarm is still active. Disappears after "Fault reset" confirmation.- when alarm is inactive.
Right GREEN	Engine running indication	Light when engine is running.

**Note:** Please check the last software version.

## 4.1.2 Communication lines wiring

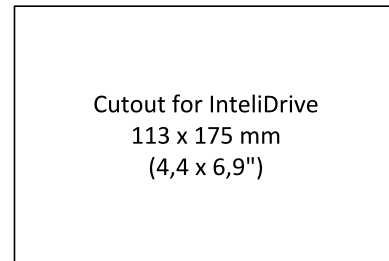
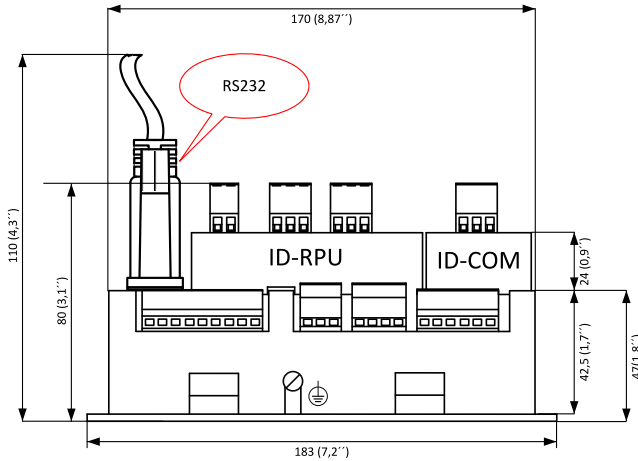
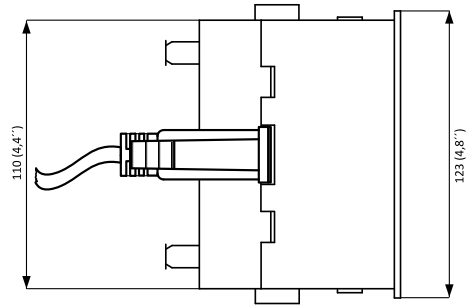
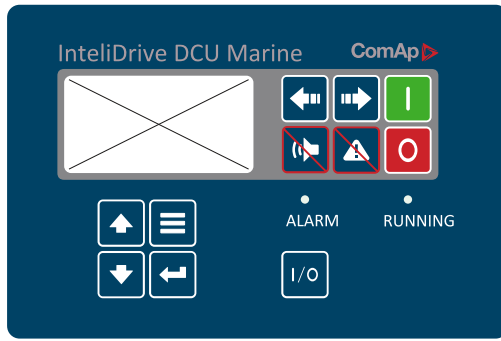


## 4.1.3 ECU

Electronic Control Unit is kind of extension module connected to CAN1 bus or serial line and communicating via electronic signal (J1939 or Modbus protocol). Generally can read binary and analog values from engine (inputs) and transmit binary outputs (e.g. Start, Stop commands) and analog outputs (e.g. Speed request). ECU size (count of input and output resources) are configurable and depends on controller possibilities.

## 4.1.4 ID-DCU Marine dimensions

ID-COM and ID-SCM are mounted directly to ID-DCU Marine case.



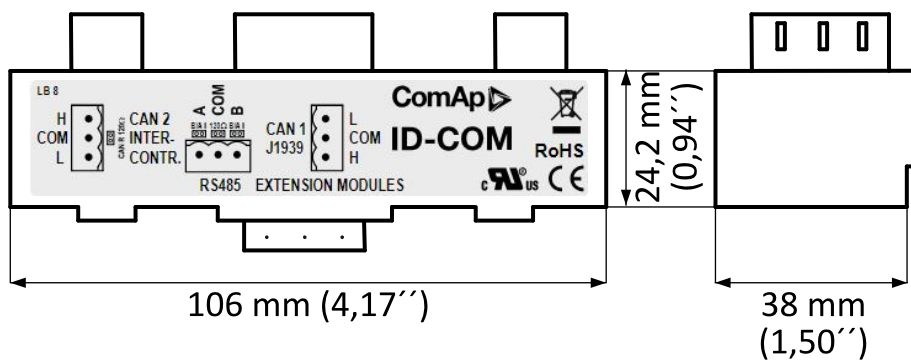
**Note:** ID-DCU Marine box is fixed using four screw clips.

**Note:** Maximal torque to tight main screw is 0.25 Nm.

### 4.1.5 ID-COM terminals

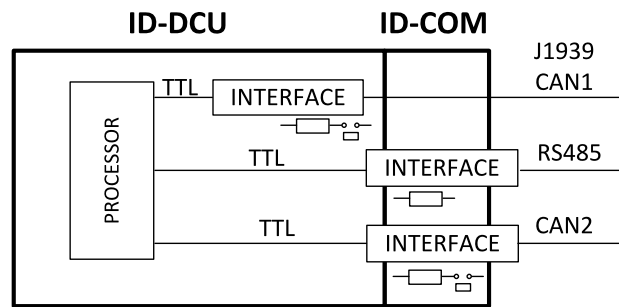
Communication interface ID-COM is mounted directly to ID-DCU Marine box.

The new standard ID-COM will only be with the RS485 interface.



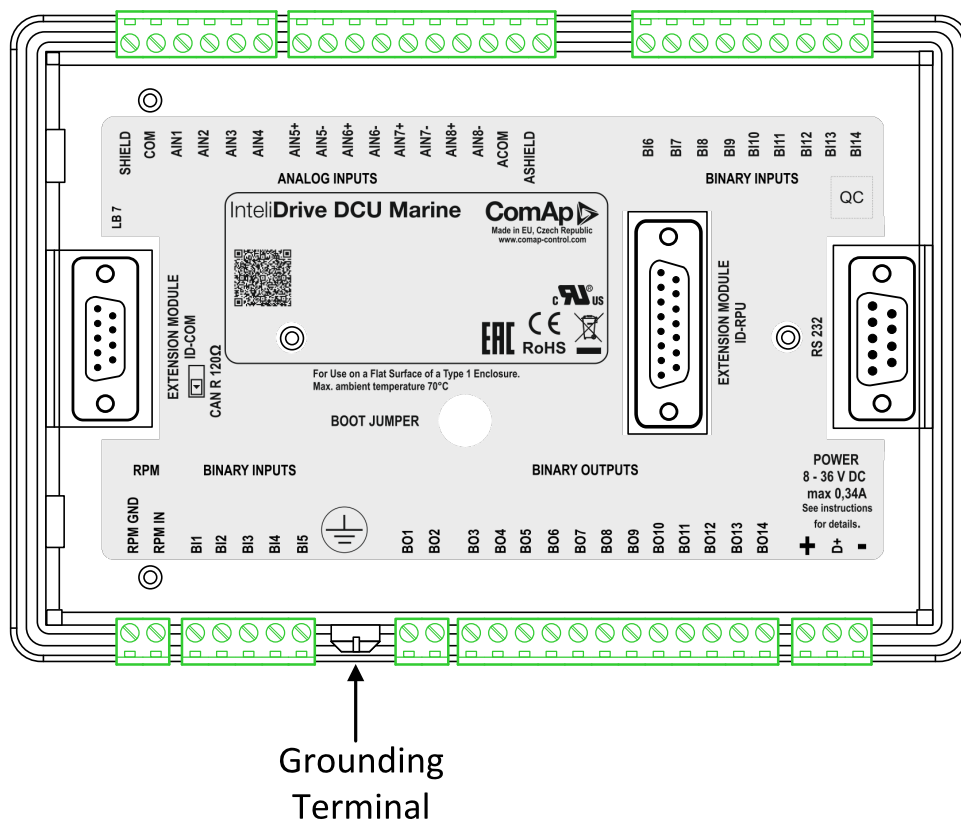
**Note:** Maximal torque to tight main screw is 0.25 Nm.

CAN1	Extension modules:	EMS, IS-AIN8(TC), IS-BIN16/8, IGS-PTM, IGL-RA15
CAN2	Intercontroller:	I-LB+, IG-IB, IB-NT, others ID-DCU Marine



**Note:** Put jumper to connect the internal 120 Ω terminating resistor for CAN2 interface. ID-COM module is not required when inter-controller CAN2 line is not used. In this case connect Extension modules CAN1 directly to Extension modules port ID-COM on ID-DCU Marine (9-pin connector: 5=H, 9=L).

### 4.1.6 ID-DCU Marine terminals

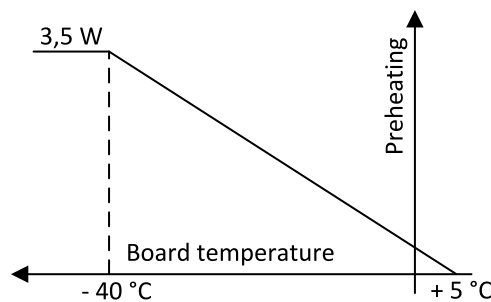


<b>RPM</b>	Primary RPM
<b>BI1 to BI14</b>	Binary inputs, active when closed to minus power supply
<b>BO1 to BO14</b>	Binary outputs; Low side switch; 0,5 Amps each;

<b>D+</b>	D plus terminal
<b>AIN1 to AIN4</b>	Analog inputs - group 1
<b>AIN5+, AIN5- AIN6+, AIN6- AIN7+, AIN7- AIN8+, AIN8-</b>	Analog inputs - group 2

### 4.1.7 ID-DCU xx -LT version with display preheating

LT is an option for extending of operating temperature range from -20 to -40 °C. Heating foil is not part of standard ID-DCU and ID-MCU (without -LT extension).

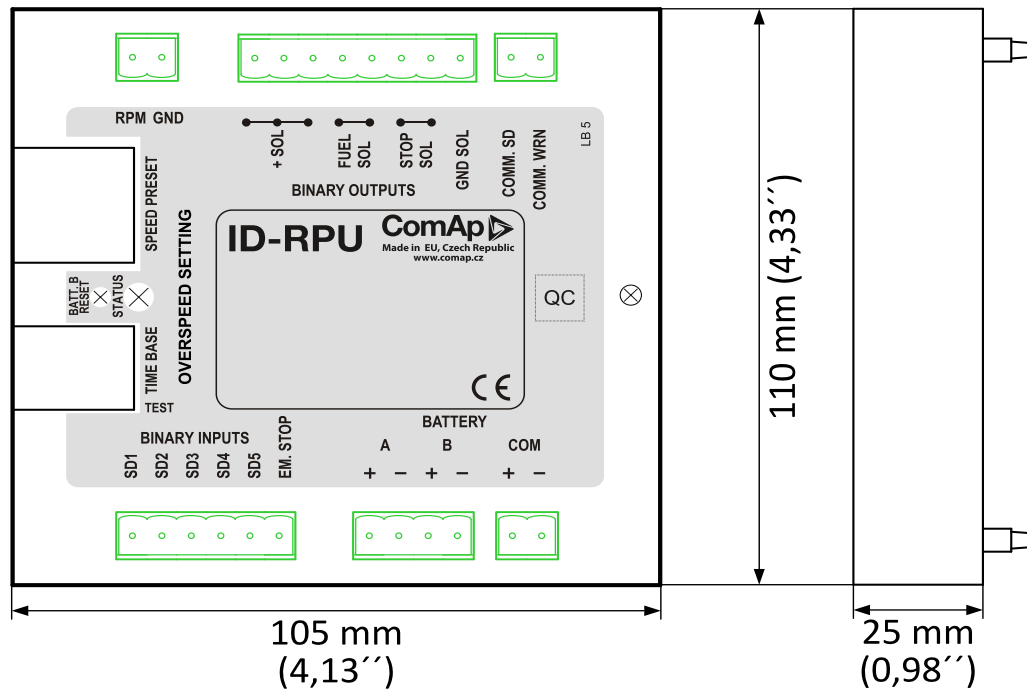


The only one low temperature sensitive part is the controller display.

ID-DCU -LT version contains a preheating foil on the display activated below +5°C (measured on the PCB). Heating is switched off when controller power supply is below 10VDC (together with display backlight).

### 4.1.8 ID-RPU terminals

Redundant Protection Unit. ID-RPU is mounted directly to ID-DCU Marine box.



<b>RPM</b>	Secondary RPM
<b>+SOL</b>	Common power supply for galvanic separated Fuel solenoid and Stop solenoid outputs.
<b>FUEL SOL</b>	Fuel solenoid output, High side switch (8 Amps), BW detection in open state or above 1 amp load
<b>STOP SOL</b>	Stop solenoid output, High side switch (8 Amps), BW detection in open state or above 1 amp load
<b>GND SOL</b>	Common GND for Fuel and Stop solenoid outputs
<b>COMM.SD</b>	Common Shut down output, Low side switch (0,5 Amps)
<b>COMM.WRN</b>	Common Warning output, Low side switch (0,5 Amps)
<b>SD1 to SD5</b>	Shut down inputs, BW detection, Normally open
<b>EM.STOP</b>	Emergency stop input, Normally closed
<b>A+, A-</b>	Primary battery
<b>B+, B-</b>	Secondary battery
<b>COM+, COM-</b>	Battery A, B output to ID-DCU Marine

**Note:** 10 kΩ resistor must be connected in parallel to SD1 to SD5 inputs.

#### 4.1.9 ID-SCM Speed control module

ID-SCM module is interface module for IntelliDrive controller application. Module is mounted directly to ID-DCU Marine controller case. Module power supply: 8 to 36VDC.

## Inputs

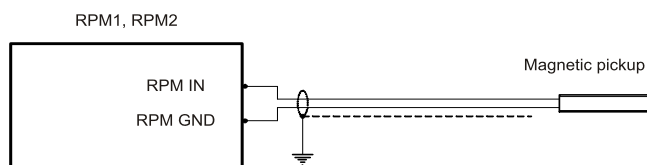
RPM1, RPM2: Two inputs for frequency (e.g. flow) measuring. Expected sensor is magnetic pickup – with maximal frequency range up to 8 kHz. The output values SCM Freq1, SCM Freq2 calculation use setpoints SCM unit: FreqRate1 and FreqRate2 - see below.

Closed jumper divides input frequency by 16 - recommended for higher frequency (>1000Hz) measuring. Jumper position does not influence output value range.

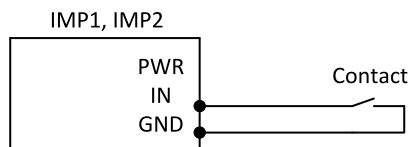
Jumper	RPM input nominal frequency range
Closed	> 1000 Hz
Closed or Opened	500 - 1000 Hz
Opened	500 Hz

IMP1, IMP2: Two impulse inputs for integral (e.g. consumption) measuring. It is expected NPN – open collector (active) impulse sensor with maximal frequency range up to 60 Hz. Minimal pulse duration is 1ms. The output values SCM Imp1, SCM Imp2 calculation use setpoints SCM unit: TransferRate1 and TransferRate2 - see below.

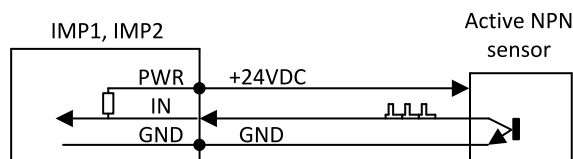
### ID-SCM inputs wiring example



Magnetic pickup wiring to RPM1 and RPM2 inputs.



Contact sensor wiring to IMP1 and IMP2 inputs.



Active NPN sensor wiring to IMP1 and IMP2 inputs.

**Note:** Maximal torque to tight main screw is 0.25 Nm.

## Outputs



### 4.1.10 ID-SCM1

#### Technical data

**Power supply:** internal supply from ID-DCU Marine (8 to 36 VDC)

**Operating temperature range:** -40°C to +70°C

**Number of analog outputs:** 1, no galvanic separation

**Analog output refreshment:** 100 ms

#### Analog output options

- ▶ PWM 1600 Hz (fix), 5V level, max 10 mA
- ▶ 0 to 10VDC  $\pm$  1%, 10 k $\Omega$  output resistance
- ▶ 0 to 10VDC  $\pm$  1%, max 5 mA (voltage output)

#### Configuration in DriveConfig

- ▶ Module = SCM
- ▶ I/O – Analog outputs – SCM - AOUT1 (only)
  - Source
  - Low convert limit
  - Hi convert limit

#### Description

- ▶ ID-SCM1 can only be configured as ID-SCM.
- ▶ ID-SCM1 has only 1 analog output unlike ID-SCM which has 3 AOUTs (plus 4 values and 4 setpoints).
- ▶ Control value **Speed Governor** is send on ID-SCM1 AOUT - equivalent output on ID-SCM is 3rd AOUT (with PWM)



- Invalid values are shown in SCM values
- SCM setpoints are not used (setpoints not affects the function)

**Note:** Maximal torque to tight main screw is 0.25 Nm.

### 4.1.11 IntelliVision 5 CAN, IntelliVision 5 CAN Backlit

5" color display. IntelliVision 5 CAN is offered in two hardware modifications:

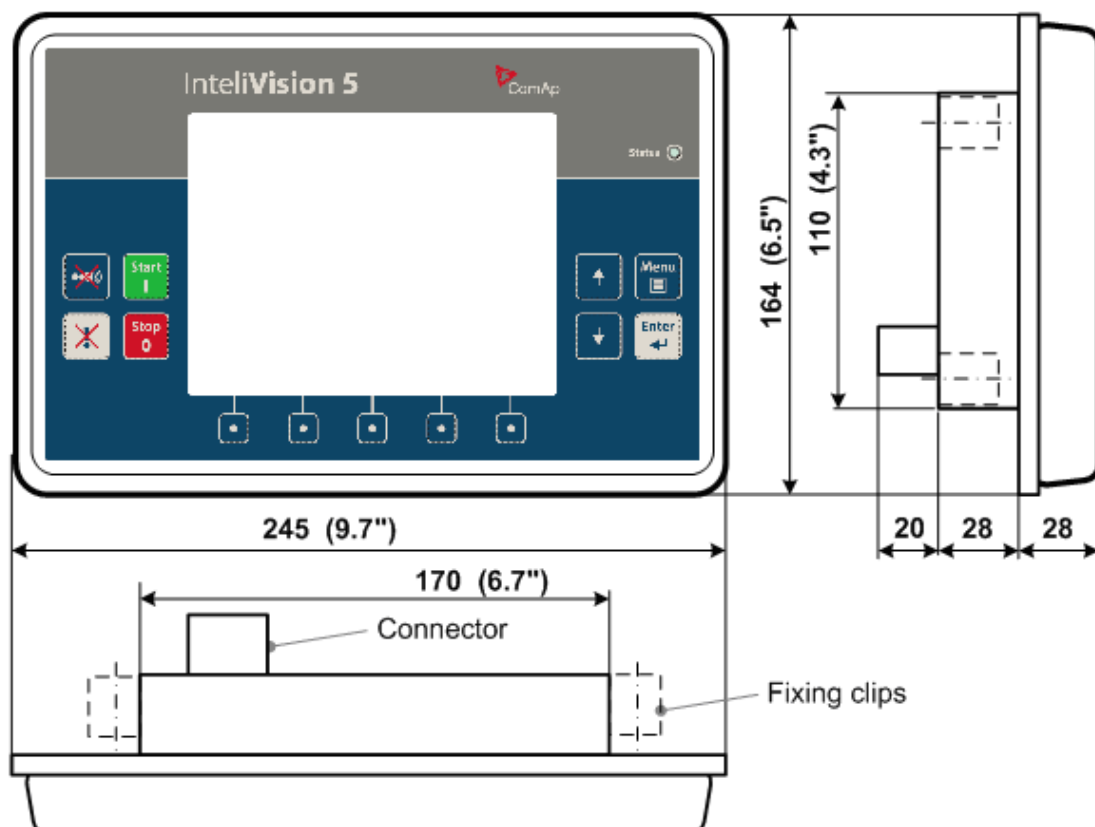
- ▶ IntelliVision 5 CAN
- ▶ IntelliVision 5 CAN Backlit

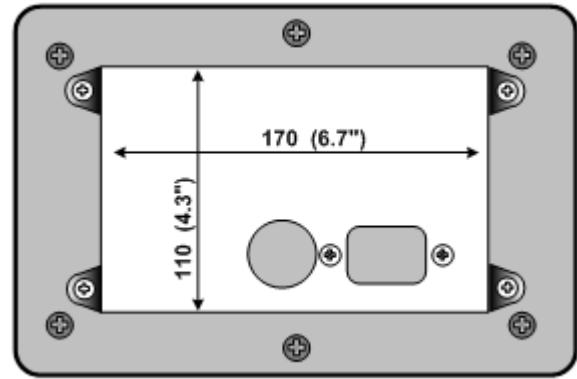
The only HW difference between two versions is presence of standard or backlight keyboard version, i.e. if there is present a feature of back-lighted buttons or not. Both versions are IP65 protected from all sides, equipped with binary output switch for HORN signaling, CAN interface is galvanically separated.

The IntelliVision 5 CAN version is intended to use with IntelliDrive controllers only (ID-DCU, ID-DCU Marine, ID-Mobile, ID-Mobile Logger), Backlit version supports also IntelliGen-NT and IntelliSys NT controllers.

Depending on customer preferences there can be used optional accessories:

- ▶ IntelliVision 5 Harness-2
  - 2m prefabricated cable with unassigned wires at the end
- ▶ IntelliVision 5 IP 65 Connector
  - connector set containing connector body and 10 corresponding terminal female pins
- ▶ ECU Simulator
  - set containing supported USB/CAN converter and various cabling, for new firmware / font / logo download into the IntelliVision 5 CAN





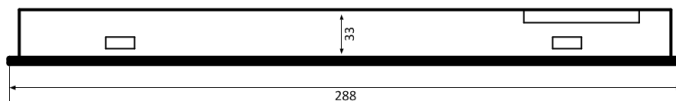
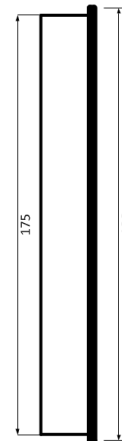
## IntelVision 5 CAN connector wiring

1	GND	5	UBatt
2	A/B IN	6	CAN-L
3	BO-A	7	COM
4	BO-B	8	CAN-H

<b>1 - 5</b>	Power supply 8 – 36VDC
<b>6 - 8</b>	CAN bus (with galvanic separation)
<b>3 - 4</b>	Binary output configured for Horn function. It is Solid State Relay with galvanic separation. Max 36VDC/0,5A (like free contact).
<b>2 – 1</b>	Analog/Binary Input for display and buttons backlit control. Connect resistive pot for continuous backlit change: 0Ω ~ 0%; 2400Ω ~ 100%. Or just place contact to switch between 0% and 100% intensity.

**Note:** It is possible to connect up to five IntelVision 5 CAN or four IntelVision 8 displays to common CAN2 bus. The display addresses must be different in this case.

### 4.1.12 IntelliVision 8, IntelliVision 8 Marine



Cutout for IV-DISPLAY  
163 x 122



### 4.1.13 IntelliVision 12Touch OEM

IntelliVision 12Touch, industrial operator panel equipped with a 12,1" colour, multi-touch screen, is dedicated together with the main ComAp controller to visualize and control single gen-set and drive controllers in various applications.

It is designed as an intuitive, easy to use Plug and Play solution and delivers high visibility of all engine data, monitoring information and trend history in a bright, colorful and impressive industrial capacitive touch based design. The Plug and Play solution ensures the User buy the display unit and controllers, puts it together and it works for most of the applications. No additional programming skills or learning complicated tools are needed. The display unit allows the configuration of all the controller parameters. The display unit also supports the extended trending of the specified values.



Image 4.1 IntelliVision 12Touch

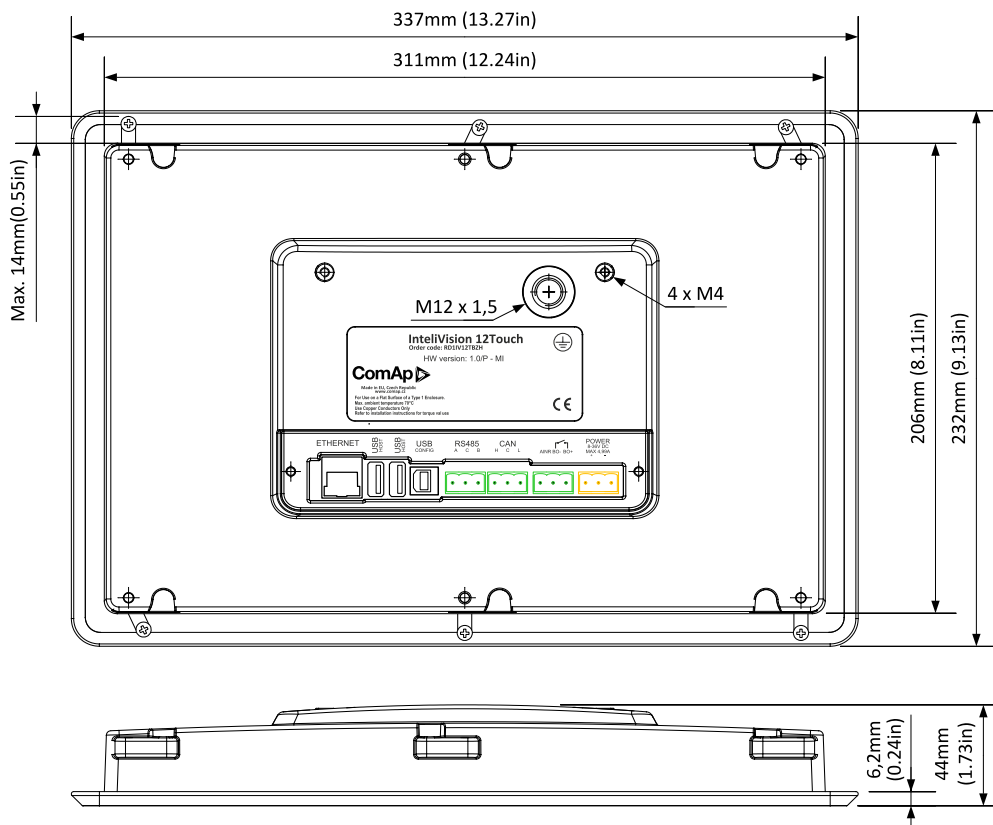


Image 4.2 IntelliVision 12Touch - dimensions

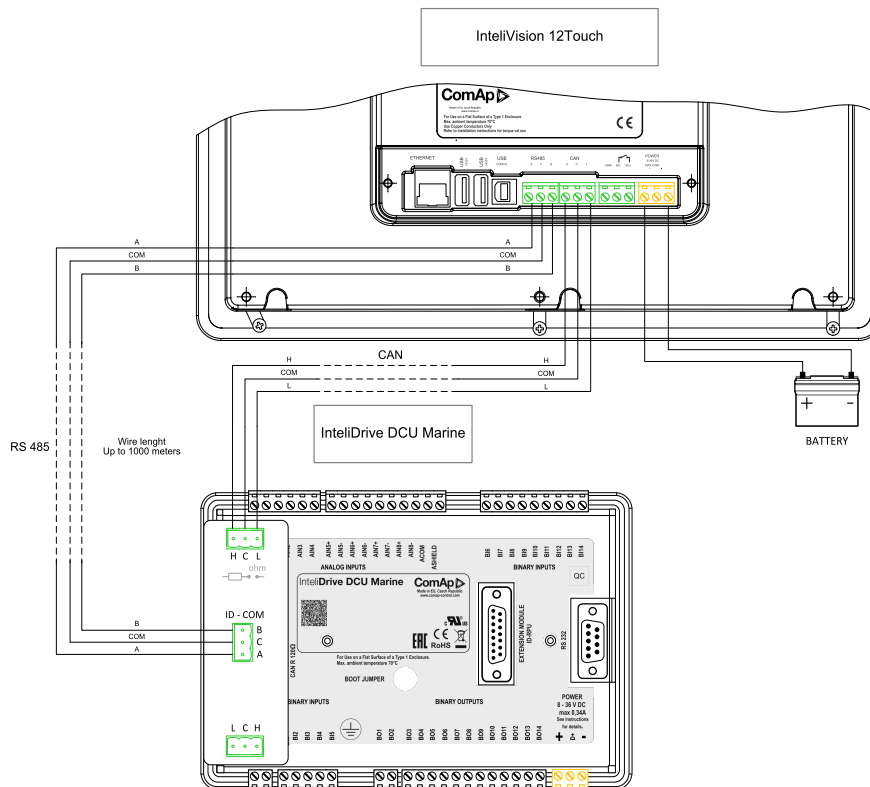


Image 4.3 Wiring example: ID-DCU Marine to IntelliVision 12Touch

**Note:** For more information see [IntelliVision 12Touch Globa guide](#)

## 4.2 Recommended wiring

### 4.2.1 Bus/Communication architecture

#### RS232

One of following possibilities is available:

- ▶ PC software interface (DriveConfig, IntelliMonitor).
- ▶ Modbus protocol option for SCADA systems.
- ▶ Analog or GSM Modem interface.
- ▶ IG-IB – internet interface.

#### CAN1 / J1939 / KWP2000

CAN1 is data line for controller Inputs/Outputs extension. It is possible to connect following extension modules:

- ▶ ECU (Engine Control Unit),
- ▶ IGS-PTM (8 BI, 8BO, 4AI, 1AO),
- ▶ IS-AIN8 (8AI),
- ▶ IS-AIN8TC (8AI – TC only),
- ▶ IS-BIN 16/8 (16BI, 8BO),
- ▶ Intelli IO8/8 (8 or 16 BI, 8 or 0 BO, 2AO).

Full physical CAN interface on ID-DCU Marine is available, no ID-COM interface needed. Maximal CAN bus length is up to 200m

## **CAN2**

Inter-controller CAN for multiple engines applications. ID-COM module is necessary. It is possible to connect

- ▶ ID-DCU Marine controllers and/or
- ▶ IG-MU (Direct cable, analog modem or GSM modem interface) and/or
- ▶ IG-IB (Internet interface) and/or
- ▶ IB-NT and/or

The data rate is selectable in two levels: 250 kBd for 200 meters line and 50 kBd for 900 meters line.

## **Redundancy line (e.g.J1708)**

There are 2 data lines in the system, one CAN SAE J1939 datalink and one SAE J1708/J1587 datalink. The J1939 datalink is used for control and monitoring data. The J1708/J1587 datalink is used for redundancy control and monitoring mainly in Volvo Penta systems.

The specific ID-COM interface is necessary to use for synchronous J1708/1587 data line.

## **CAN bus Connection rules**

CAN bus line must be connected in series, from one unit to the next (no star, no cable stubs, no branches) both ends must be by the 120  $\Omega$  (internal or external) resistor terminated.

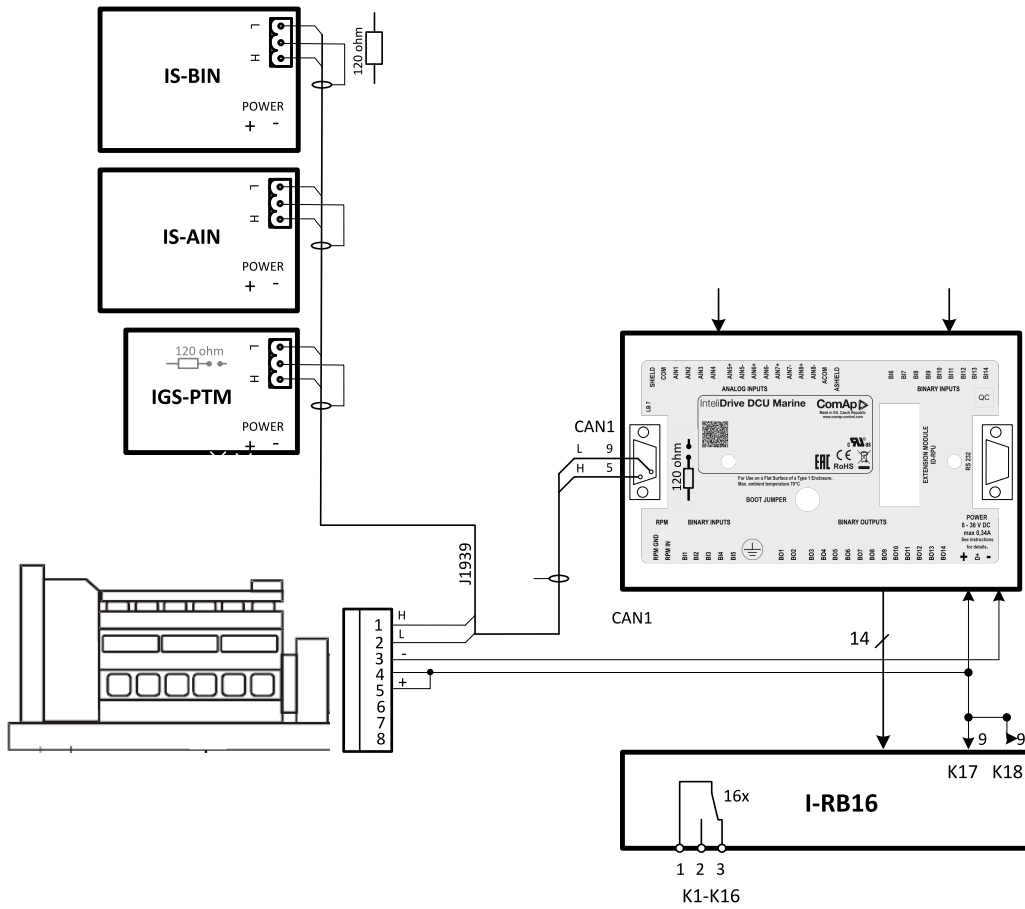
Maximal CAN2 bus length is up to 200 meters when Basic settings: CAN bus mode = 250 kBd or up to 900 meters when Basic settings: CAN bus mode = 50 kBd.

For CAN data cables details see chapter Technical data – Communication interface. CAN cable shielding connect to ID-DCU Marine case.

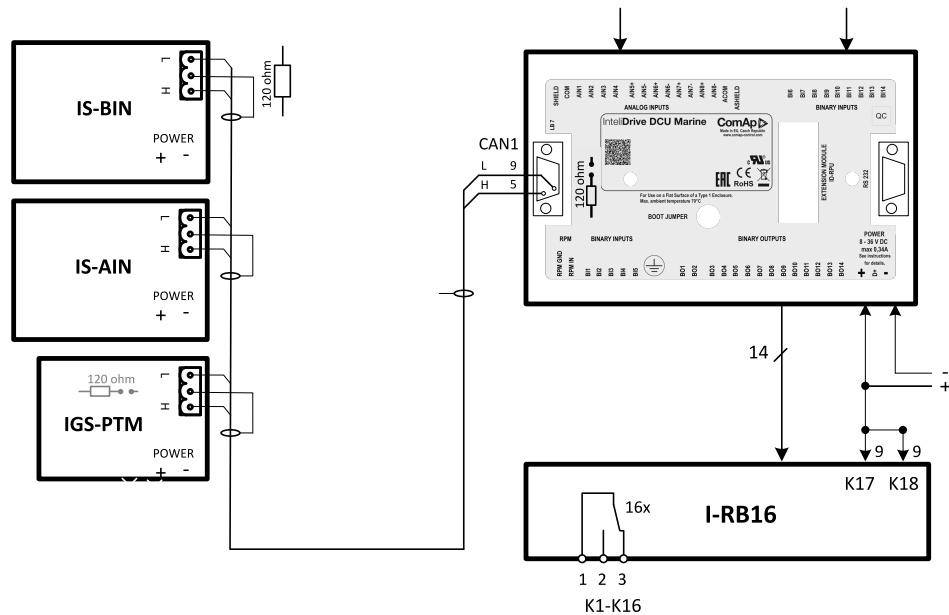
ID-DCU Marine contains internal 120  $\Omega$  resistor over jumper setting on CAN1 bus. Use D SUB9 male connector: CAN H = 5, CAN L = 9, COMMON = 3 and 8.

IGS-PTM unit contains internal jumper-removable 120  $\Omega$  resistor. To be sure check resistor presence by ohmmeter. Unit with internal resistor should be connected to the end of CAN2 line.

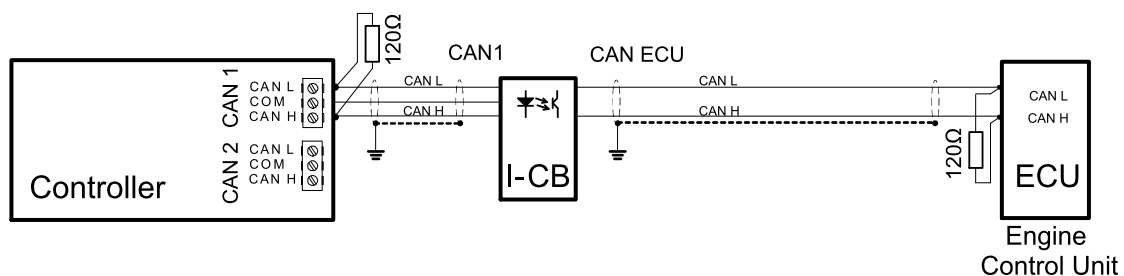
## 4.2.2 Electronic engine without redundancy line



### 4.2.3 Engine without ECU (mechanical engine)



### 4.2.4 I-CB wiring and configuration

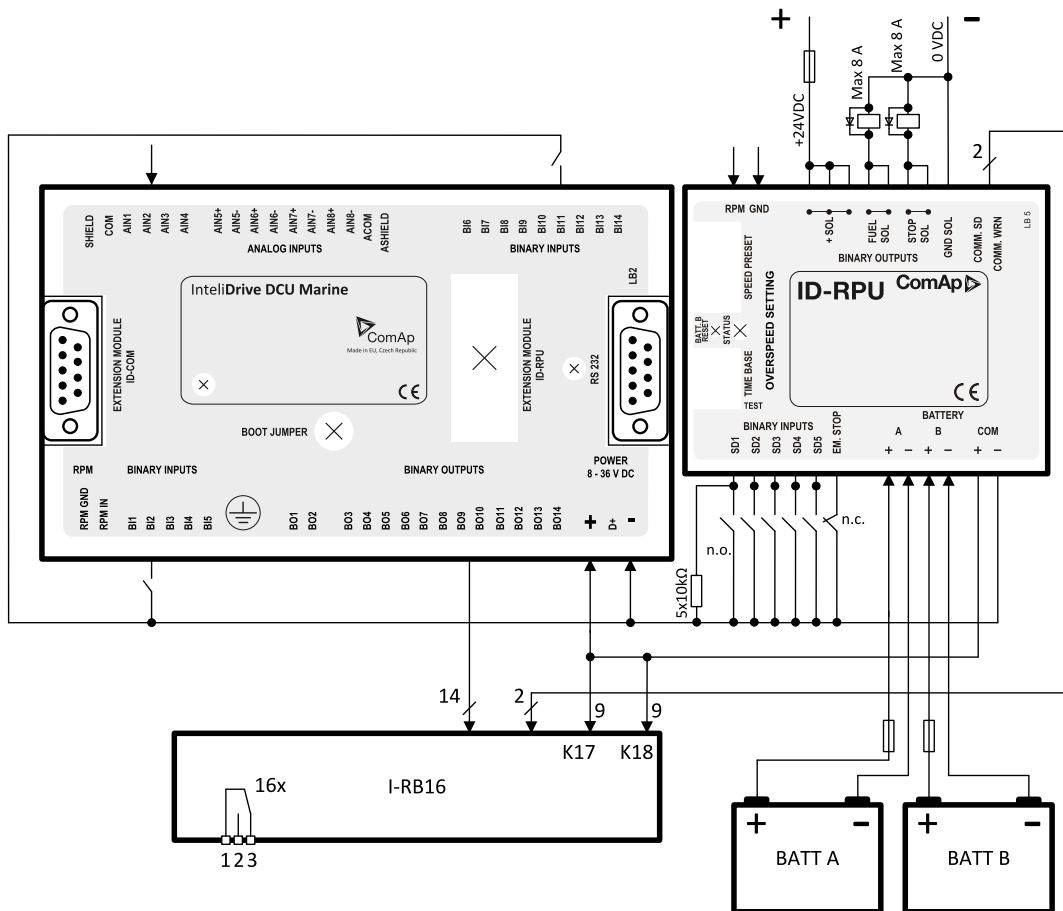


1. Configure I-CB using I-CBEdit software. Configured I-CB behaves like fictive IS-AIN and IS-BIN units (or better said as Generci extensions). I-CB configuration associates selected values (from ECU database) received from Engine Control Unit to selected CAN addressees (fictive IS-AIN, IS-BIN inputs and outputs).
2. Configure corresponding CONTROLLER CAN addresses in PC configuration tool.
3. Configure separate inputs and outputs in corresponding Analog, Binary inputs, outputs in PC configuration tool.

**Note:** In case of CAT engines, there is RS232 connection between I-CB and CCM.



## 4.2.5 ID-RPU wiring

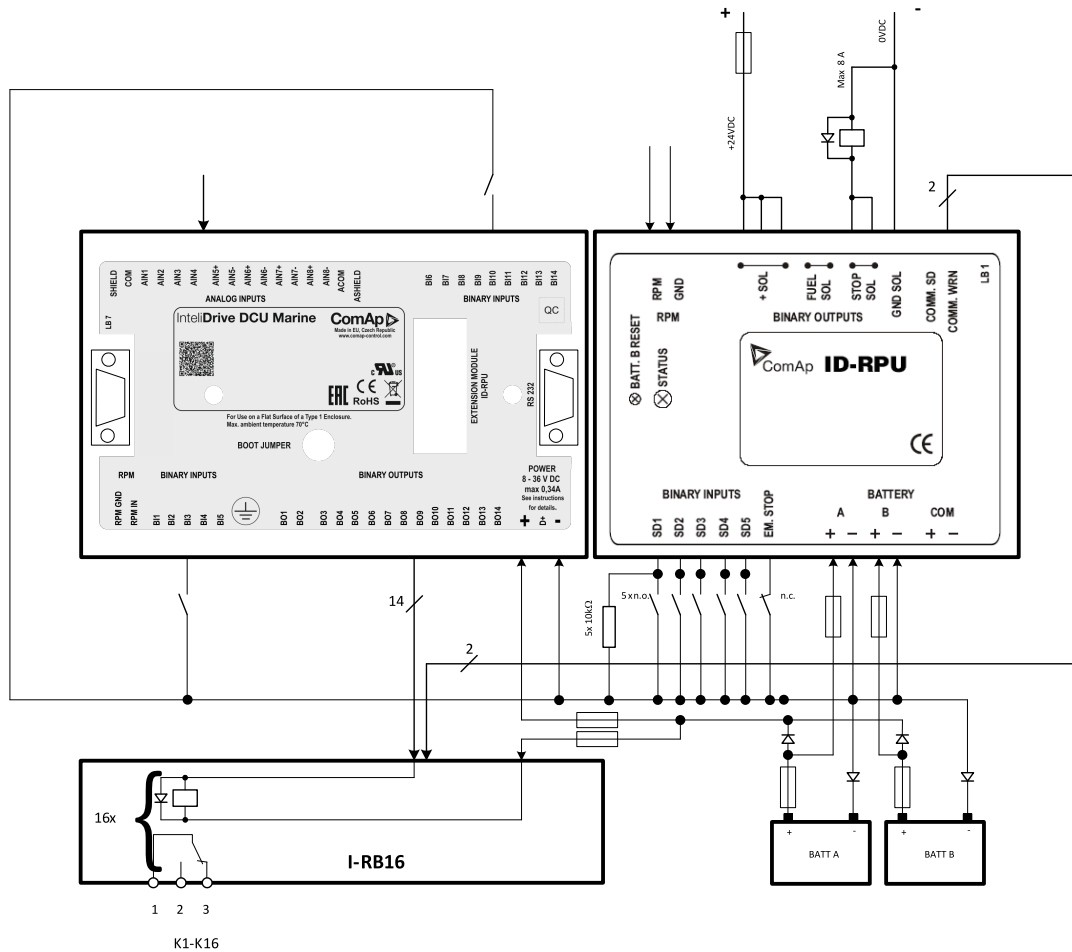


**Note:**

*BW protection of the ID-RPU outputs Fuel solenoid and Stop solenoid is active in open state only. To avoid BW detection configure not wired inputs or outputs of ID-RPU as Not used by DriveConfig sw. Battery minus terminals are separated. See also Recommended wiring according to DNV rules (page 51).*

## 4.2.6 Recommended wiring according to DNV rules

There is recommended wiring diagram of IntelDrive DCU Marine controller + ID-RPU module following latest DNV requirements for mutual independency of control, alarm and safety systems. IntelDrive DCU Marine provides features of control and alarm system, ID-RPU provides features of safety system.



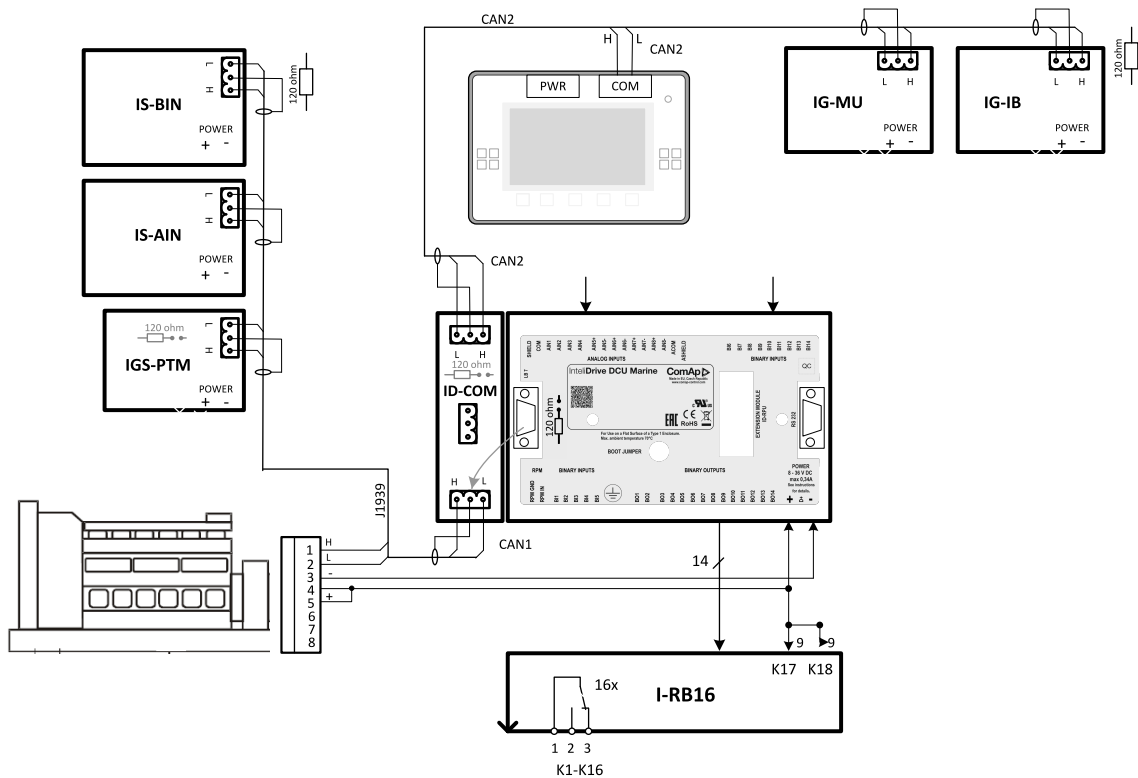
**Note:** Fuses must be dimensioned in descending order in direction from batteries to devices.

**Note:** It is required to use two independent actuators for engine stopping

1. Actuator controlled by ID-RPU / STOP SOL output
2. Actuator controlled by ID-DCU / BOx output (configured to Stop Solenoid function)

**Note:** Emergency stop button contacts type NC (Normally Closed) can be directly incorporated into circuit controlling ID RPU / EM. STOP input. It is also acceptable to use relay NC contacts in the circuit connected to ID RPU / EM. STOP input (relay coil is controlled by emergency stop circuit) in case of NO (Normally Opened) emergency stop circuit type, if it is required by application.

## 4.2.7 Wiring example - Complete system without RPU



## 4.3 Getting started

### 4.3.1 How to install

**Note:** All components shall be used within marked electrical ratings – see chapter Technical data.

### Binary output protections

Do not connect binary outputs directly to DC relays without protection diodes. Use protection diodes even if the relays are not connected directly to controller outputs. Use a fast recovery 3A / 50V diodes.

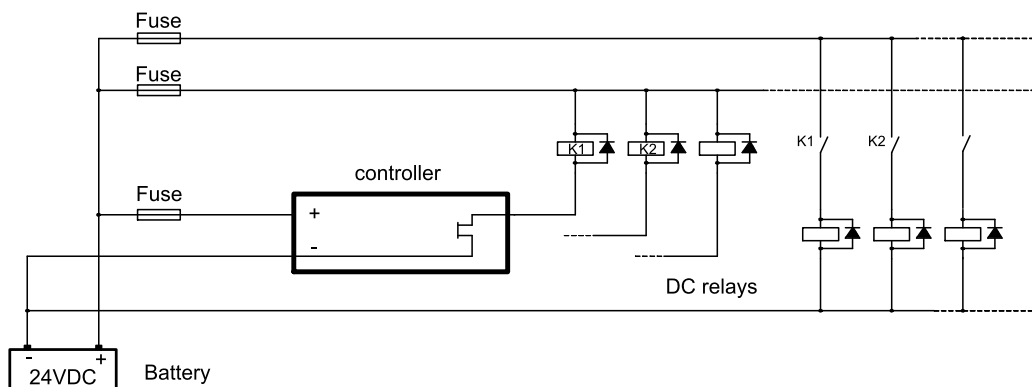


Image 4.4 Example of controller protection

**Note:** External fuse rated max. 2.5A shall be used to limit current from the binary outputs.

## General

To ensure proper function:

- ▶ Use grounding terminals. The IntelliDrive DCU Marine power feeding input is galvanically isolated from controller body, use the grounding terminal for proper grounding.
- ▶ Wiring for binary inputs and analog inputs must not be lead parallel with high voltage/current cables.
- ▶ Analog and binary inputs should be provided with shielded cables, especially when length >3m.

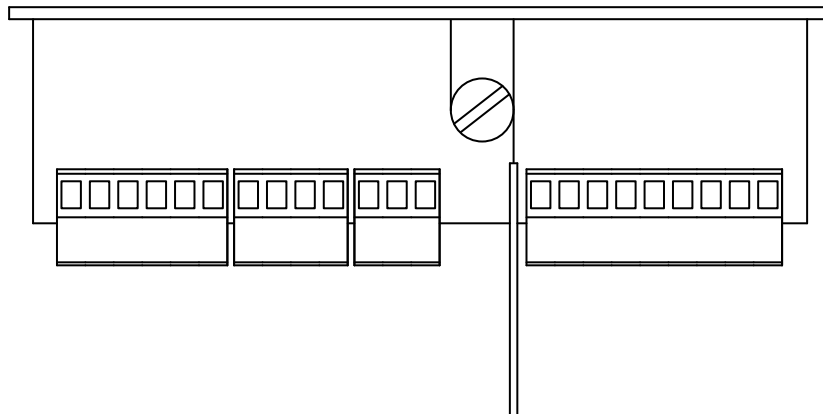
## Grounding

To ensure proper function:

The shortest possible piece of wire should be used when grounding the controller.

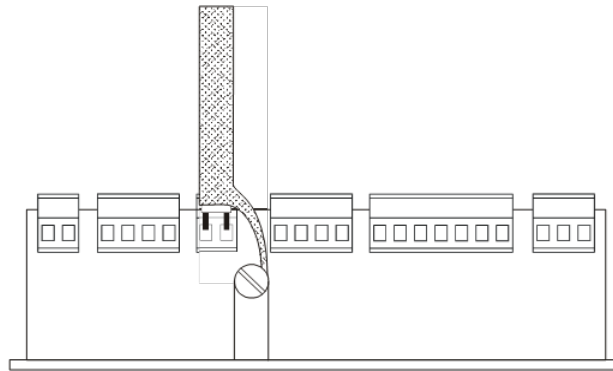
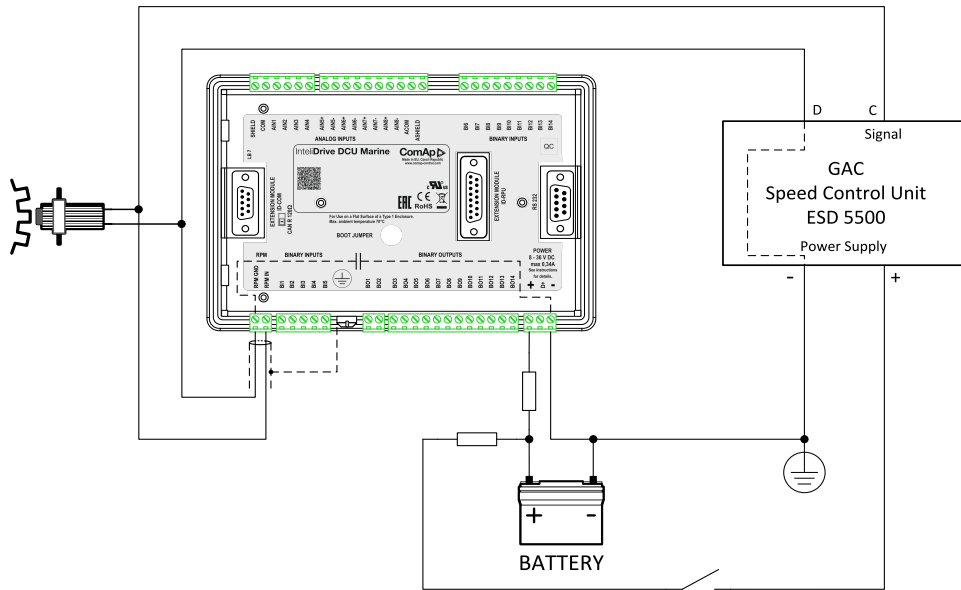
Use cable min. 2,5mm<sup>2</sup>.

The “-“ terminal of the battery has to be properly grounded.



## Magnetic pick-up

To ensure proper function use a shielded cable.



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

## Power supply fusing

External fuse rated max. 2.5A shall be used to limit current from the power supply to the controller and modules. Controller and I/O modules should never be connected directly to the starting battery.

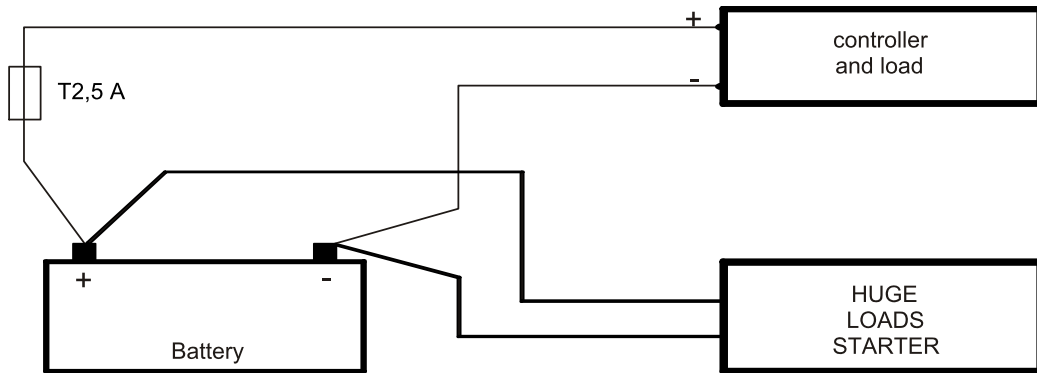
Fuse value and type depends on number of connected devices and wire length.

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

## Power supply

- ▶ Use min. power supply cable of 1.5 mm<sup>2</sup> to ensure proper function.
- ▶ Maximum continuous DC power supply voltage is 36VDC.
- ▶ Maximum allowable power supply voltage is 39VDC – see chapter Technical data.

**Note:** For redundancy power supply use ID-RPU module – see chapter Recommended wiring.



**Note:**

The IntelliDrive DCU Marine controller should be grounded properly in order to protect against atmospheric discharges!

Install separate conductors for signal and power inputs. Allow for conductor voltage drop when determining conductor size. All power supplies must have common ground.

When there is a potential risk of the controller being subjected to conditions outside its capabilities - an outside protection device should be used.

### 4.3.2 Analog as Binary input

To use Analog input as binary configure following characteristics:

Primary	Converted
0	0
1000	1

### 4.3.3 Analog as three state (tristate) binary input

Open, close and failure (broken wire, short wire) states are detected. Threshold level is 750 Ω, failure is detected when circuit resistance is <10 Ω or > 2400 Ω

### 4.3.4 Analog Sensor availability with controller

Table of supported sensors with controller.

	IntelliDrive-AI1-4	IntelliDrive AI5-8
PT100 [°C]		Y
PT1000 [°C]	Y	Y
NI100 [°C]		Y
NI1000 [°C]	Y	Y
PT100 [°F]		Y
PT1000 [°F]	Y	Y
NI100 [°F]		Y
NI1000 [°F]	Y	Y

Thermocpl J [°C]		Y
Thermocpl K [°C]		Y
Thermocpl L [°C]		Y
Thermocpl J [°F]		Y
Thermocpl K [°F]		Y
Thermocpl L [°F]		Y
4-20 mA active	Y	Y
+20 mA active	Y	Y
0-250 Ω	Y	Y
0-2400 Ω	Y	Y
0-4 V	Y	
0-5 V		Y
+1 V		Y
0-100 mV		Y
Tristate	Y	Y

### 4.3.5 Analog Sensors availability with extension modules

Table of supported sensors on various modules. Do not configure sensors that are not supported on the input.

	IS-AIN8	I-AIN8	IS-AIN8TC	I-AIN8TC	I-AIO 9/1	IGS-PTM
not used analog input	Y	Y	Y	Y	Y	Y
user curves	Y	Y			Y	Y
PT100 [°C]	Y	Y				Y
PT1000 [°C]	Y	Y			Y	
NI100 [°C]	Y	Y				Y
NI1000 [°C]	Y	Y			Y	
Thermocpl J [°C]	Y		Y	Y	Y	
Thermocpl K [°C]	Y		Y	Y	Y	
Thermocpl L [°C]	Y		Y	Y	Y	
4-20 mA passive	Y	Y				Y
4-20 mA active	Y	Y				Y
0-20 mA passive	Y	Y				*
±20 mA active	Y	Y				Y*
0-250 Ω	Y	Y				Y
0-2400 Ω	Y	Y			Y	Y**
0-2.4 V	Y	Y				
±1 V	Y	Y				
0-10 V	Y	Y				
0-100 mV	Y					Y

PT100 [°F]	Y	Y				Y
PT1000 [°F]	Y	Y			Y	
NI100 [°F]	Y	Y				Y
NI1000 [°F]	Y	Y			Y	
Thermocpl J [°F]	Y		Y	Y	Y	
Thermocpl K [°F]	Y		Y	Y	Y	
Thermocpl L [°F]	Y		Y	Y	Y	
Tristate						
Thermo(nc) J [°C]	Y		Y	Y	Y	
Thermo(nc) K [°C]	Y		Y	Y	Y	
Thermo(nc) L [°C]	Y		Y	Y	Y	
Thermo(nc) J [°F]	Y		Y	Y	Y	
Thermo(nc) K [°F]	Y		Y	Y	Y	
Thermo(nc) L [°F]	Y		Y	Y	Y	
0-5 V		Y				
0-10 kΩ		Y				
±65 V					Y	
±75 mV					Y	

**Note:**

\* IGS-PTM has hardware range 0-20mA but offered sensor in DriveConfig is ±20mA

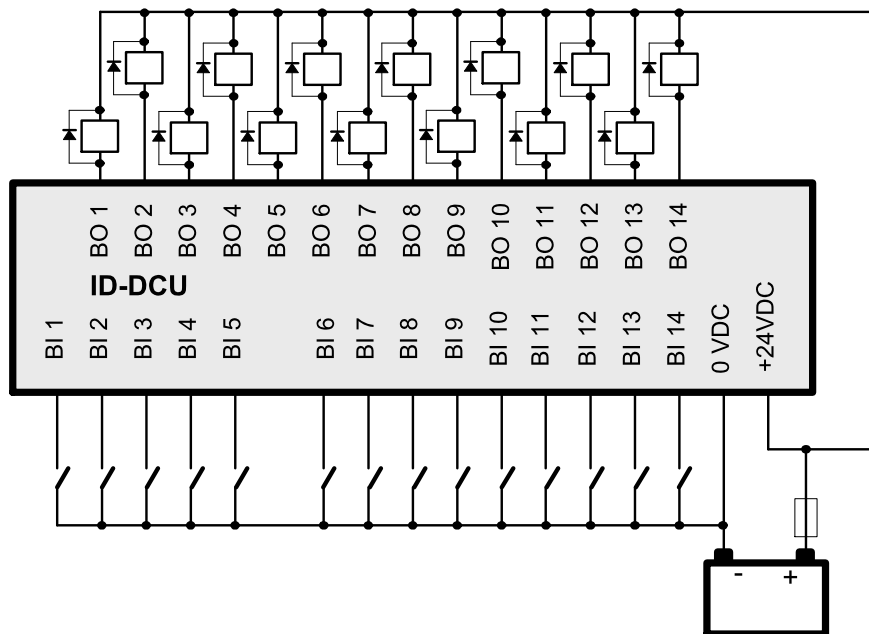
\*\* IGS-PTM has hardware range 0-250Ω only - DriveConfig offers correct sensor for I/O configuration but for User define input curve only sensor 0-2400Ω.

**Note:** Fahrenheit sensors are supported from IS-AIN8 of sw version 2.2 only.

### 4.3.6 Binary inputs/outputs on ID-DCU Marine

Use wiring cables min. of 1.0 mm<sup>2</sup> to ensure proper function.



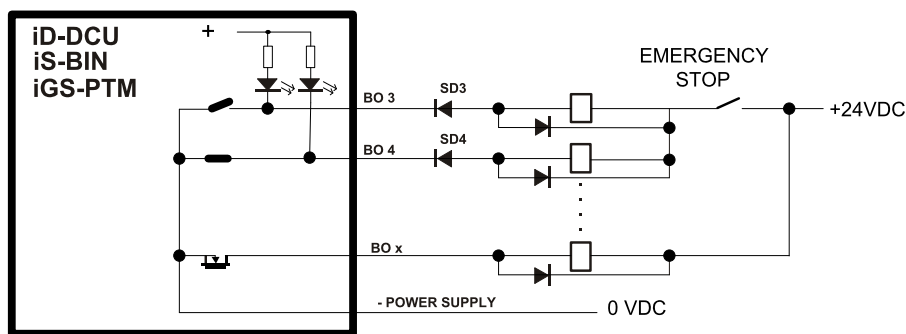


**Note:** Incorrect polarity of the binary output connection may cause a damage of the binary outputs.

### 4.3.7 Binary output separation

In some special cases e.g. when Relays plus terminal is disconnected via EMERGENCY STOP contact, the binary outputs must be separated using diodes to avoid false Binary output LED indication.

In the Example below when EMERGENCY STOP contact is opened, the BO3 LED should light (without separating diode SD3) even if the BO3 output is opened.



### 4.3.8 Connection of ID-DCU Marine analog inputs

	<p>Standard connection of resistive sensors to ID-DCU Marine analog inputs AI1 to AI8. The COM terminal must be always connected to the negative power terminal.</p>
	<p>Different sensors connection to ID-DCU Marine. AI configuration jumpers must be in corresponding position and corresponding DriveConfig configuration according to used sensor.</p> <p>Analog input common terminal COM has to be connected to ID minus Power supply terminal.</p> <p>Mixed connection of ID-DCU Marine analog inputs:</p> <ul style="list-style-type: none"> <li>AI2, AI7 - current sensor</li> <li>AI1, AI5 - resistive sensor</li> <li>AI3, AI8 - voltage input</li> <li>AI6- thermocouple (voltage)</li> <li>AI4 - Not used</li> </ul>
	<p>Mixed connection of IntelliDrive analog inputs:</p> <ul style="list-style-type: none"> <li>AI1, AI2, AI5, AI6 - resistive sensor</li> <li>AI3, AI7 - binary input</li> <li>AI4, AI8 - three state input</li> </ul> <p>Analog input common terminal COM has to be connected to ID minus Power supply terminal.</p>

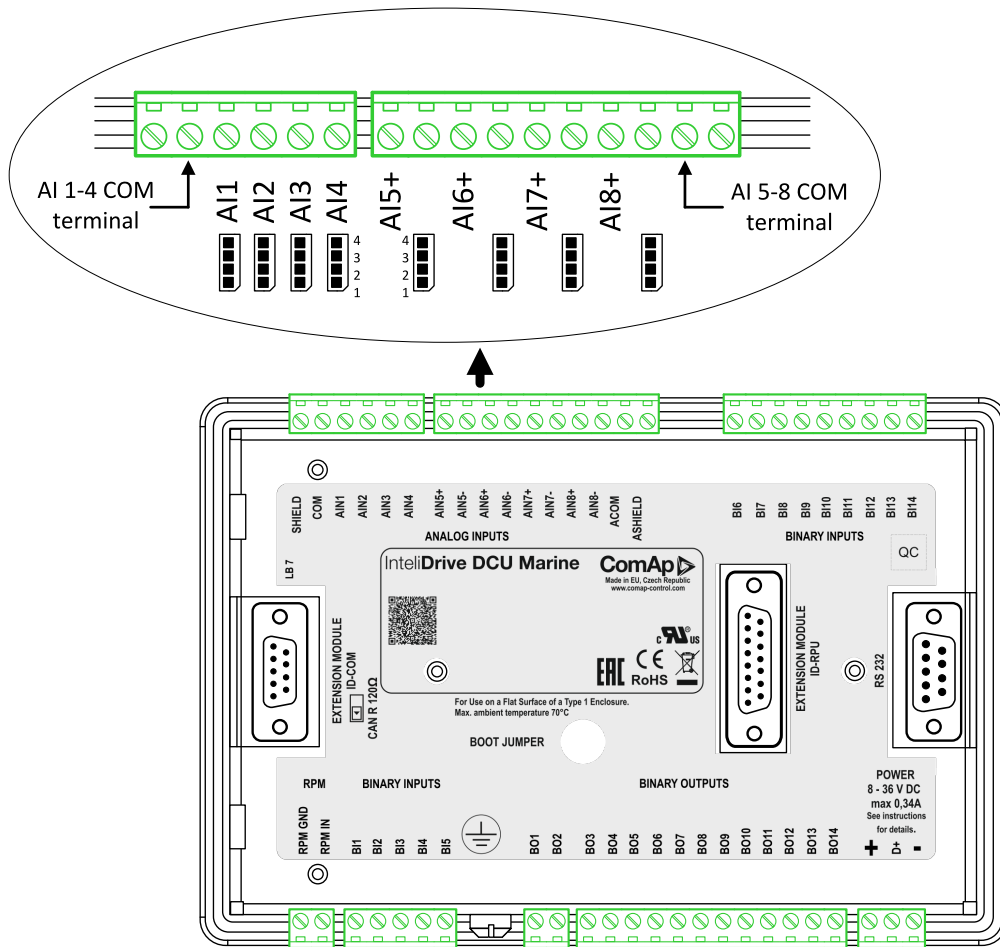
To ensure a proper function use shielded cables, especially for length over >3 m.

### 4.3.9 ID-DCU Marine Analog inputs hardware configuration

Configure Analog inputs AI1-AI8 connection by jumpers on PCB (remove cover).

#### Controller default jumper setting from production

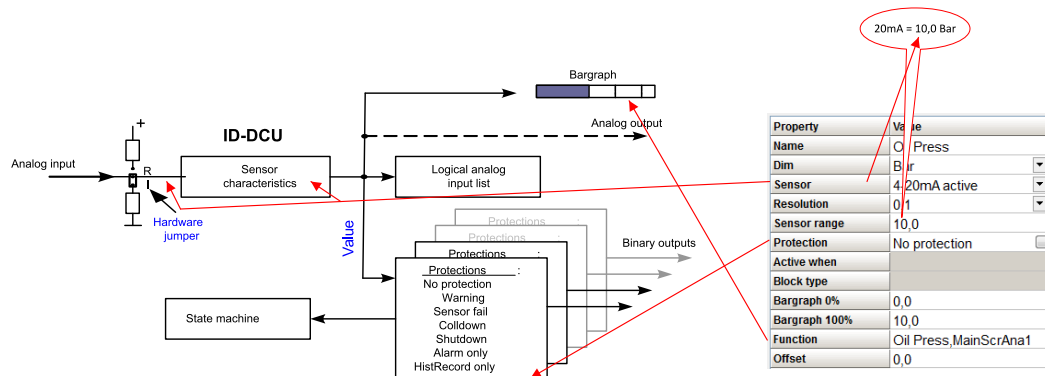
AI1 to AI4	Current sensor
AI5 to AI8	Resistance sensor



	<p>Current Measurement</p> <p>- Jumper on pins 1-2.</p>
	<p>Voltage (thermocouples AI5-AI8) measurement</p> <p>- Jumper on pins 2-3.</p>
	<p>Resistance measurement</p> <p>- Jumper on pins 3-4.</p>

**Note:** Maximal voltage on controller Differential analog inputs AI5 to AI8 is in the range  $-2$  to  $+5$  VDC against minus power supply terminal!

## 4.3.10 ID-DCU Marine Analog inputs software configuration



**Note:** ID-DCU Marine hardware jumper must correspond with software configuration.

### Configuration

See drawing above

Property	Value
Name	Value name is displayed on the screens and in the Alarm list and History record. Enter up to 14 ASCII characters. Name is automatically set to Function name if function is selected from the Logical function list see Function item.
Dim	Dimension is displayed on the screens. Select dimension from the list or add a new one.
Sensor	Select sensor from the list or create a customer sensor characteristics in User sensor window. There must be corresponding analog input hardware jumper setting in IntelliDrive controller. See Sensor availability in table below.
Resolution	Output value (reading) resolution. DriveConfig indicates when Resolution is out of the value range.
Sensor range	Full output value (reading) range for 20 mA (current), 250 Ω, 2400 Ω (resistive), 1 V, 4V, 5V, 100 mV (voltage) sensor.
Protection	Select from the list. Configure two protection levels as standard or more levels (window) protection in Expert mode.
Active when	Configure direction Over or Under limit when protection is activated. Options "Under limit+FIs" and "Over limit+FIs" means that the protection is activated in case of Analog Input value is Under/Over the protection limit or in case that non valid value (#####) is indicated on the Analog Input. More details in <b>Protections (page 68)</b>
Block type	Configure protection activity: All the time or Engine running with three different adjustable delays when protection is active after engine start (RPM > Starting RPM).
Bargraph 0%	Bargraph starting value.

Bargraph 100%	Bargraph ending value.
Function	Select from the list if function is required or leave free if input is a protection only.
Offset	Measured value offset.

**Note:** Some configuration items (e.g. Protection) stay without change when Property - Sensor is changed to None.

## Sensors availability

Sensors available on ID-DCU Marine AI1 - AI4	Resolution	Sensor range	HW jumper
Pt1000/°C, Ni1000/°C, Pt1000/°F, Ni1000/°F	Fix, not configurable		Resistance: 3-4
4-20 mA active, ±20 mA active (measures + only)	Adjustable - see Hint below.	For 20 mA input	Current: 1-2
0-250 Ω, 0-2400 Ω		For 250 or 2400 Ω Input	Resistance: 3-4
Tristate			Resistance: 3-4
0 to 4 VDC	Adjustable		Voltage: 2-3

Sensors available on ID-DCU Marine AI5 - AI8	Resolution	Sensor range	HW jumper
Pt100/°C, Pt1000/°C, Ni100/°C, Ni1000/°C, Pt100/°F, Pt1000/°F, Ni100/°F, Ni1000/°F	Fix, not configurable		Resistance: 3-4
Thermocpl J/°C, Th K/°C, Th/°C, Thermocpl J/°F, Th. K/°F, ThL/°F	Fix, not configurable		Voltage: 2-3
4-20 mA active, ±20 mA active	Adjustable - see Hint below.	For 20 mA input	Current: 1-2
0-250 Ω, 0-2400 Ω		For 250 or 2400 Ω input	Resistance: 3-4
±1 V, 0-100 mV		For 1V or 100mV	Voltage: 2-3
Tristate			Resistance: 3-4
0 to 5 VDC	Adjustable		Voltage: 2-3

## Configuration examples

- Conversion from 4-20 mA to 6.0 Bar Oil pressure sensor (Wm+Sd protection and Oil press function)

Property	Value	Logical function	Used
Name	Oil Press	LCD Brightness	<input type="checkbox"/>
Dim	Bar	Engine Speed	<input type="checkbox"/>
Sensor	4-20mA active	Oil Press	<input checked="" type="checkbox"/>
Resolution	0,1	Coolant Press	<input type="checkbox"/>
Sensor range	10,0	Coolant Temp	<input type="checkbox"/>
Protection	No protection	Requested RPM	<input type="checkbox"/>
Active when		Engine Torque	<input type="checkbox"/>
Block type		Fuel ConsAct	<input type="checkbox"/>
Bargraph 0%	0,0	FuelConsump	<input type="checkbox"/>
Bargraph 100%	10,0	BoatSpeed	<input type="checkbox"/>
Function	Oil Press,MainScrAna1	MainScrAna1	<input checked="" type="checkbox"/>
Offset	0,0	MainScrAna2	<input type="checkbox"/>
		Memory1	<input type="checkbox"/>

- Conversion from  $\pm 1V$  input to engine speed request 0 to 100 %

No.	CU 0-1/+1 V (x)	Converted (y)
1.	-1,0000	0,0
2.	1,0000	100,0

No	HW configuration	Name	Resolution
1.	CU 0-1/+1 V	Input sensor 1	0,1

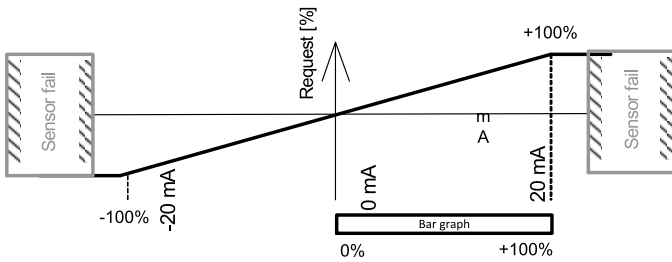
I/O	Name	Property	Value	Logical function	Used
Binary inputs	Used: 14/14	Name	Requested RPM	LCD Brightness	<input type="checkbox"/>
Binary outputs	Used: 14/14	Dim	%	Engine Speed	<input type="checkbox"/>
Analog inputs	Used: 4/8	Sensor	Input sensor 1	Oil Press	<input type="checkbox"/>
ID	Used: 4/8	Resolution	0,1	Coolant Press	<input type="checkbox"/>
AIN1	Oil Press	Sensor range	0,0	Coolant Temp	<input type="checkbox"/>
AIN2	Coolant Temp	Protection	No protection	Requested RPM	<input checked="" type="checkbox"/>
AIN3	CoolantPress	Active when		Engine Torque	<input type="checkbox"/>
AIN4	Ain CU 4	Block type		Fuel ConsAct	<input type="checkbox"/>
AIN5	Requested RPM	Bargraph 0%	0,0	FuelConsump	<input type="checkbox"/>
AIN6	Ain CU 6	Bargraph 100%	200,0	BoatSpeed	<input type="checkbox"/>
AIN7	Ain CU 7	Function	Requested RPM	MainScrAna1	<input type="checkbox"/>
AIN8	Ain CU 8	Offset	0,0	MainScrAna2	<input type="checkbox"/>

**Note:**

HW configuration: CU 0-1 V can be used for characteristics  $\pm 1 V$ , but this  $\pm$  characteristics can be configured to AI5 to AI8 inputs only!

Sensor range (gray background) automatically follows the User sensor characteristics (zero value at the above picture is not important).

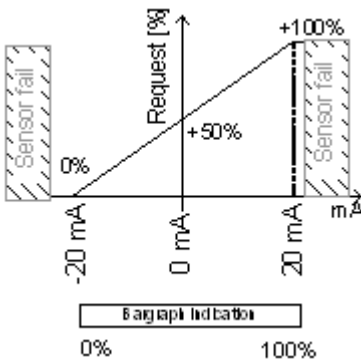
- Conversion from  $\pm 20 mA$  to  $\pm 100 \%$  request



Sensor characteristics  $\pm 20\text{mA}$  works in full  $\pm$  range on ID-DCU Marine AI5 to AI8 only. ID-DCU Marine AI1 to AI4 measures 0 to 20 mA range only. Default sensor characteristics creates conversion to  $\pm 100\%$ . Bargraph indicates only positive values 0 to +100%.

I/O	Name	Property	Value
Binary inputs	Used: 14/14	Name	Requested RPM
Binary outputs	Used: 14/14	Dim	%
Analog inputs	Used: 4/8	Sensor	+20mA active
ID	Used: 4/8	Resolution	0,01
AIN1	Oil Press	Sensor range	100,00
AIN2	Coolant Temp	Protection	No protection
AIN3	CoolantPress	Active when	
AIN4	Ain CU 4	Block type	
AIN5	Requested RPM	Bargraph 0%	0,00
AIN6	Ain CU 6	Bargraph 100%	100,00
AIN7	Ain CU 7	Function	Requested RPM
AIN8	Ain CU 8	Offset	0,00

► Conversion from  $\pm 20\text{mA}$  to +100% request with User sensor



Sensor characteristics  $\pm 20\text{mA}$  works in full  $\pm$  range on ID-DCU Marine AI5 to AI8 only. ID-DCU Marine AI1 to AI4 measures 0 to 20 mA range only.

1. Create User sensor as below.
2. Configure user sensor instead default  $\pm 20\text{mA}$  sensor.
3. Configure Bargraph 100% to correspond User sensor.

Bargraph indicates full 0 to 100% range in this case.

1. Create sensor like below.

No.	HW configuration	Name	Resolution
1.	CU 0-20/+20mA	Input sensor 1	1

No.	CU 0-20/+20mA (x)	Converted (y)
1.	-20,000	0
2.	20,000	100

2. Configure user sensor instead default  $\pm 20\text{mA}$  sensor.

I/O		Name	Property	Value
Binary inputs	Used: 11/14		Name	Ain CU 6
Binary outputs	Used: 13/14		Dim	%
Analog inputs	Used: 3/8		Sensor	Input sensor 1
ID	Used: 3/8		Resolution	1
AIN1	Oil Press		Sensor range	0
AIN2	Coolant Temp		Protection	No protection
AIN3	Ain CU 3		Active when	
AIN4	Ain CU 4		Block type	
AIN5	Ain CU 5		Bargraph 0%	0
AIN6	Ain CU 6		Bargraph 100%	100
AIN7	Ain CU 7		Function	
AIN8	Ain CU 8			

### User sensor examples

Availability	Configuration
AI1 to AI4 AI5 to AI8 Analog input jumper = 1-2 (current)	0 - 20mA / 600 
AI1 to AI4 AI5 to AI8	4 - 20mA / 100,0 



<p>AI5 to AI8 Analog input jumper = 2-3 (voltage)</p>	<p>0 - 1V / 10,000</p>
<p>AI5 to AI8</p>	<p>0 - 100mV / 100,00</p>
<p>AI1 to AI4 AI5 to AI8 Analog input jumper = 3-4 (resistance)</p>	<p>0 - 1200 Ω / 100</p>

**Note:**  
It is possible to set up to 30 points non-linear sensor characteristics.  
Connect external resistors (voltage divider) to extend input voltage range.

# 5 Controller setup

- 5.1 Function description details ..... 68
- 5.2 PLC - programmable functions ..... 76
- 5.3 Shared IO and Virtual IO ..... 88
- 5.4 Multiple ECU modules support ..... 91

 [back to Table of contents](#)

## 5.1 Function description details

Section describing more detailed settings of selected controller functions.

### 5.1.1 Engine running state

RPM > Engine params: **Starting RPM** or

Logical Analog Input **Oil Press** > Engine params: **Starting Poil** or

Logical Analog Input **Coolant Press** > Engine params: **StartPCoolant (PRP only)** or

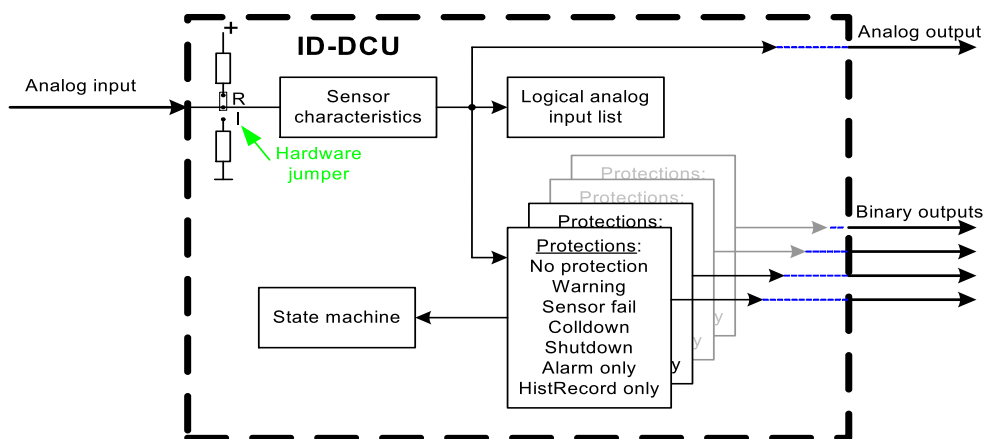
active BI **RunIndication1** or

active BI **RunIndication2** or

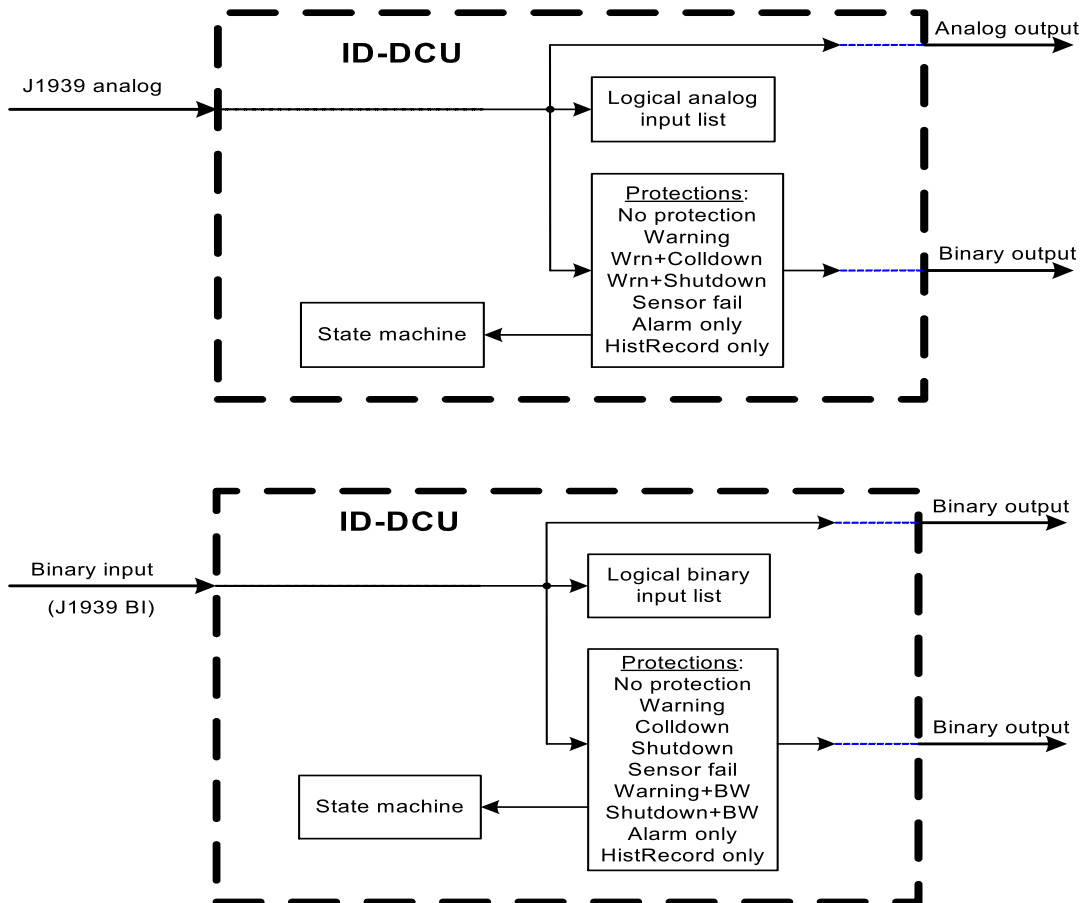
active BI **RunIndication3**.

### 5.1.2 Protections

Brief description of the controller's protection - basic settings and use cases.

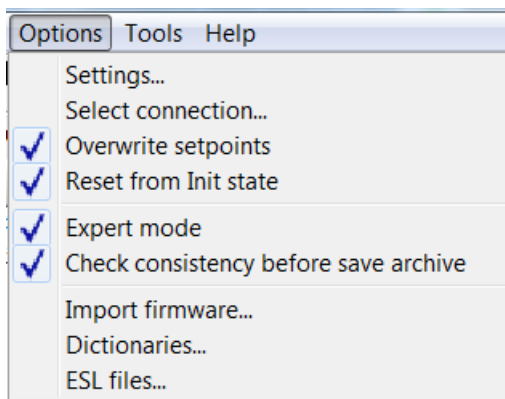


**Note:** There are visible only the first two bar graph marks for protection limits indication on ID-DCU Marine screen !!!

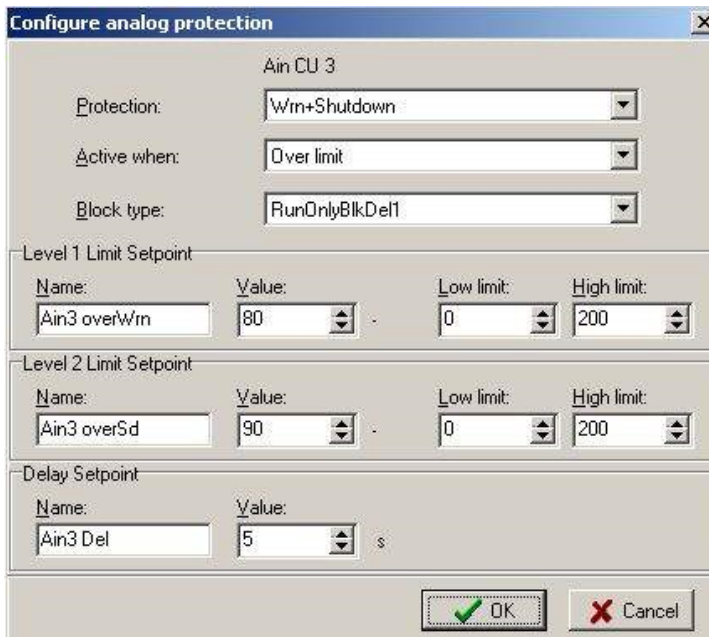


## How to configure analog input window protection

1. Switch DriveConfig to EXPERT mode.



2. Configure standard two level analog protection



3. Add another protections in EXPERT window. There can be set the same delay for all four limits.

		+ Add		- Remove				+ Add		- Remove	
No.	Protection	Property	Value	Name	Used	Value	Lo limit	Hi limit	Dim		
1.	Warning	Protection type	Warning	Ain3 overWrn	<input checked="" type="checkbox"/>	80	0	200	-		
2.	Shutdown	Active when	Over limit	Ain3 overSd	<input type="checkbox"/>	90	0	200	-		
3.	Warning	Block type	RunOnlyBlkDel1	Ain3 underWrn	<input type="checkbox"/>	60	0	200	-		
4.	Shutdown	Univ.state	None	Ain3 underSd	<input type="checkbox"/>	50	0	200	-		
		Limit type	Setpoint								
		Limit	Ain3 overWrn								
		Delay type	Setpoint								
		Delay	Ain3 Del								

## Set up protection activation

Setting the "Active when" parameter has several options with a specific evaluation.

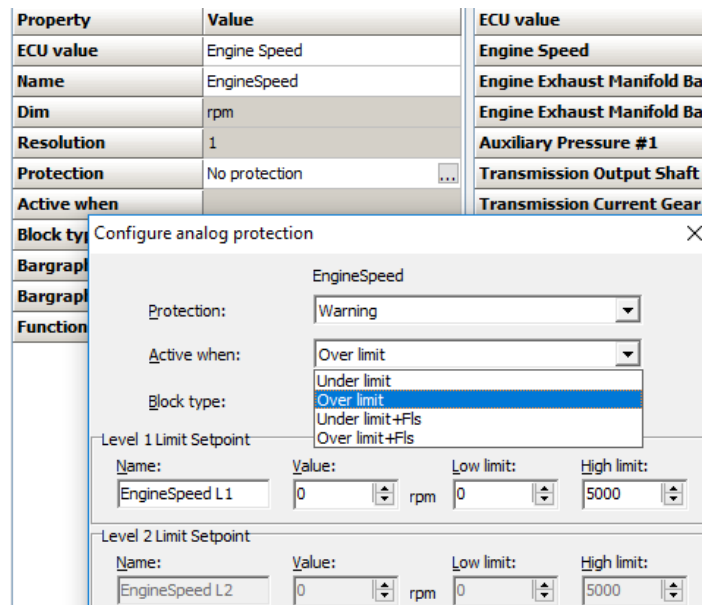


Image 5.1 Select when the protection will be activated - DriveConfig

## Under limit

Protection is announced when it gets below the limit *Level 1 (and Level 2) Limit Setpoint: Value*. The delay of *Delay Setpoint: Value* can be applied to the protection. Alarm notification in the alarm list and in history

Sensor defect when receiving invalid or no value, announces the **FIs Analog input name** (where Analog input name = will be the specific electronic (ECU, I-CB, shared) value on which the protection is configured)

## Over limit

Protection is announced when it gets over the limit *Level 1 (and Level 2) Limit Setpoint: Value*. The delay of *Delay Setpoint: Value* can be applied to the protection. Alarm notification in the alarm list and in history

Sensor defect when receiving invalid or no value, announces the **FIs Analog input name**

## Under limit+FIs

Protection is announced when it gets below the limit *Level 1 (and Level 2) Limit Setpoint: Value*. The delay of *Delay Setpoint: Value* can be applied to the protection. Alarm notification in the alarm list and in history

Sensor defect when receiving invalid or no value, announces the **FIs Analog input name** + At the same time the type of configured protection **Wrn Analog input name** or **Sd Analog input name** (and other types according to Controller options) is also declared

**Note:** Thus, when the sensor fails, up to 3 alarms can occur for one value = Wrn, Sd, FIs

## Over limit+FIs

Protection is announced when it gets over the limit *Level 1 (and Level 2) Limit Setpoint: Value*. The delay of *Delay Setpoint: Value* can be applied to the protection. Alarm notification in the alarm list and in history

Sensor defect when receiving invalid or no value, announces the **FIs Analog input name** + At the same time the type of configured protection **Wrn Analog input name** or **Sd Analog input name** (and other types according to Controller options) is also declared

**Note:** Thus, when the sensor fails, up to 3 alarms can occur for one value = Wrn, Sd, FIs

## Sensor fail protection

Protection Sensor Fail (often only the FLS prefix is used) can be used with electronic modules and ID-RPU module only. Protection is activate only if there is failure of receiving data and value is in logical 0.

Fls will be triggered based on real failure in logical 0 only for electronic units. Fls will not be triggered if binary is in logical 1 and for physical inputs.

When the Fls is declared (based on an invalid value), the particular value is "hashed" - the user sees ##### and the color graphics terminals are additionally colored (IMON, Intelivision)

### **The feature of communication with the ECU during a partial failure of the communication**

*If there is no complete communication failure (Communication error is not detected), the sensor fail is not indicated.*

*This may not be noticeable when protecting the ECU module Protection = No protection. If a configured data frame is not received, from otherwise functioning electronic communications, its value remains the last valid one. There is no alarm Fls Analog input name, and if the last valid value has triggered a 1st or 2nd level alarm, the alarm is still active.*

### Delay of Sensor fail notification

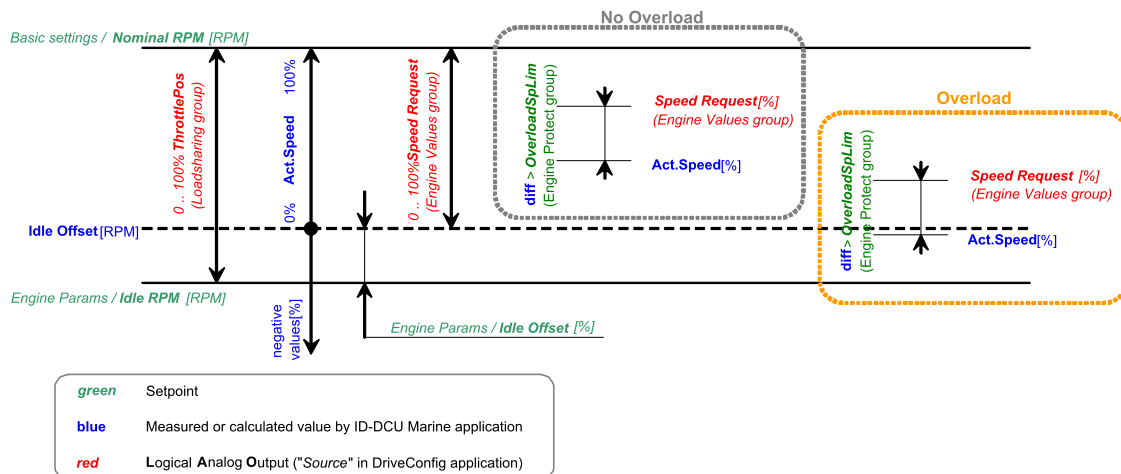
At the beginning of communication (after the state Communication Error), we monitor receiving of the first valid frame, then the timer starts 3000ms during which the announcement of a sensor fail **Fls Analog input name** is blocked.

### Other conditions for Sensor fail alarm

Announcement of failure (and other protections) of the ECU value of the type anain is blocked when:

- ▶ ain\_idx is not ECU ain\_idx
- ▶ when configured ECU is not communicating
- ▶ when evaluation of ECU communication failure is blocked
  - ECU Power Relay (in logical 0) block CommFail alarm and FLS alarm
  - ECUComFailBlck (in logical 1) block only CommFail alarm, FLS alarm will be announced!
- ▶ Announcement of failure (and other protection) of the ECU value of the binin type is blocked if a communication error with ECU is declared in AL
- ▶ activated in the same way as LBO ECU Comm Lost
  - activated after timeout based on ESF (quickest RX frame + 100ms, at least 300ms)
  - activated 3s after controller start if ECU does not communicate
  - deactivated immediately after ECU starts to communicate
  - ECU alarm can be blocked by LBI or by ECU Power relay mechanism
  - LBO ECU Comm. Fail mirroring alarm activity but it is activated even if protection blocked (see above) and even if protection level of module is set to no protection
- ▶ deactivated 3s after deactivation of LBO ECU Comm Lost
- ▶ LBI ECU Comm Fail Block or deactivated ECU power relay (if used) also blocks FLS protection on ECU inputs

## Requested RPM, Overload protection (PRP only)



$$\text{Idle Offset [RPM]} = \text{Idle RPM [RPM]} + (\text{Idle Offset [\%]} / 100) \times (\text{Nominal RPM [RPM]} - \text{Idle RPM [RPM]})$$

$$\text{Act.Speed [\%]} = \frac{\text{Act.Speed [RPM]} - \text{Idle Offset [RPM]}}{\text{Nominal RPM [RPM]} - \text{Idle Offset [RPM]}} \times 100$$

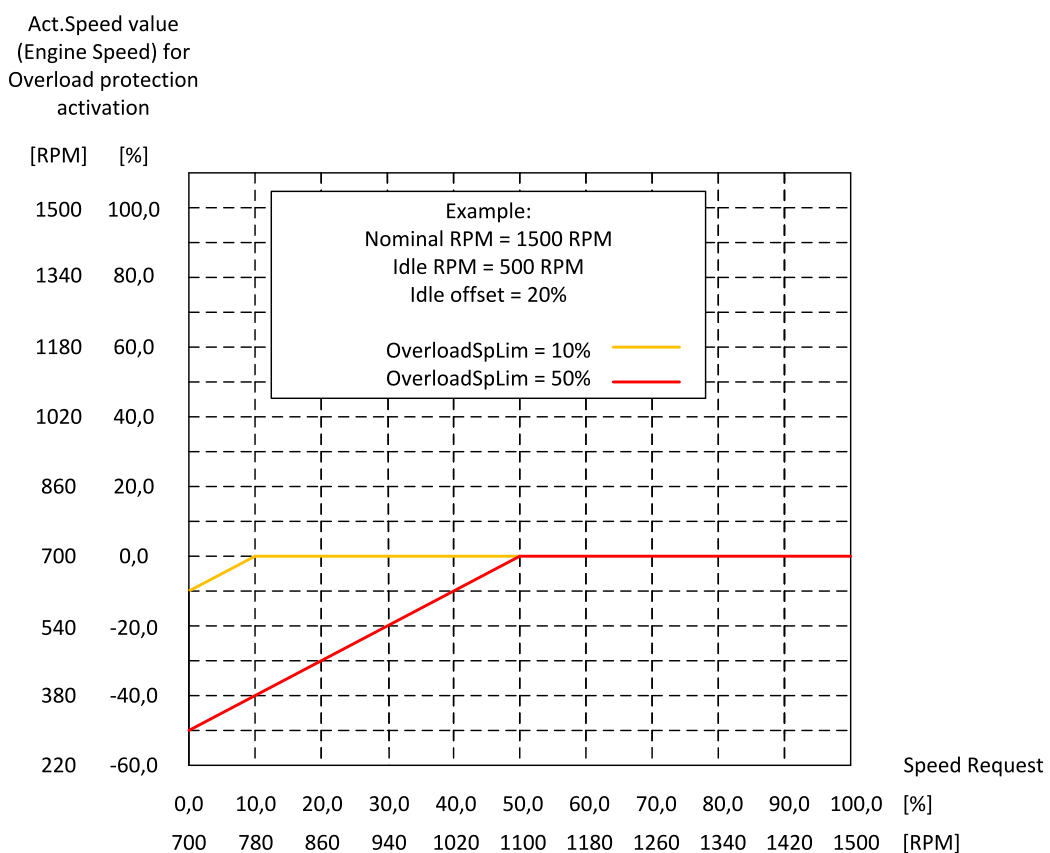
- ▶ **Engine Values:** **Speed Request** is value in the range 0,0 to 100,0%.
- ▶ **Engine Values:** **Speed Request** can be changed
  - From analog input configured as Logical Analog Input Requested RPM.
  - Via binary inputs Speed Up, Speed Down with ramp **BI Speed Ramp**.
  - From ID panel using Fast edit function.
  - See Engine Values: **Speed Request** charts for **Engine Values (page 265)** and **Engine Values (page 265)** modes.
- ▶ When Logical Analog Input Requested RPM indicates sensor fail or it is not configured and Binary input **Back Up Speed** is closed the **Loadsharing: ThrottlePos** value is adjusted to the **Loadsharing: Back Up Speed**, the **ThrottlePos** value change is influenced by ramp **Loadsharing: RQSP Ramp**.
- ▶ When binary input **Fire Speed** is closed the Clutch is disconnected and the **Loadsharing: ThrottlePos** is set to **Engine params: FireAlarmSpeed**, the **ThrottlePos** value change is influenced by ramp **Loadsharing: RQSP Ramp**.
- ▶ For 100% of **Engine Values: Speed Request** the controller sends 100,0% **Loadsharing: ThrottlePos** (TP) to the ECU, for 0,0% of Engine Values: **Speed Request** sends the value of the setpoint **Idle offset**.
- ▶ The setpoints **Nominal speed [RPM]** and **Idle speed [RPM]** have to be set to real values that the engine is running at 100% TP respectively 0% TP

## Overload protection (PRP only)

- ▶ Overload protection and corresponding Alarm message is activated when following conditions are valid in period longer than **Overload del**:

$$\begin{aligned}
 & \text{Speed Request [\%]} - \text{Act.Speed [\%]} > \text{OverloadSpLim [\%]} \\
 & \text{and} \\
 & \text{Act.Speed [\%]} < 0 \%
 \end{aligned}$$

Example describing Overload protection activation, i.e. when the Engine speed falls down below yellow or brown limit.

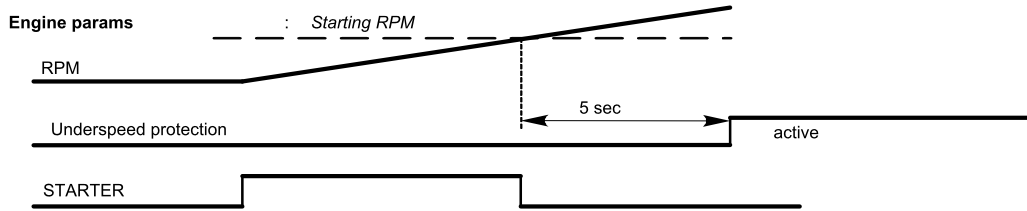


**Note:** Set **Engine Params: Idle offset** = 0% and **Engine Protect: OverloadSpLim** = 100% to disable Overload protection functionality, i.e. if the protection is not requested by an application.

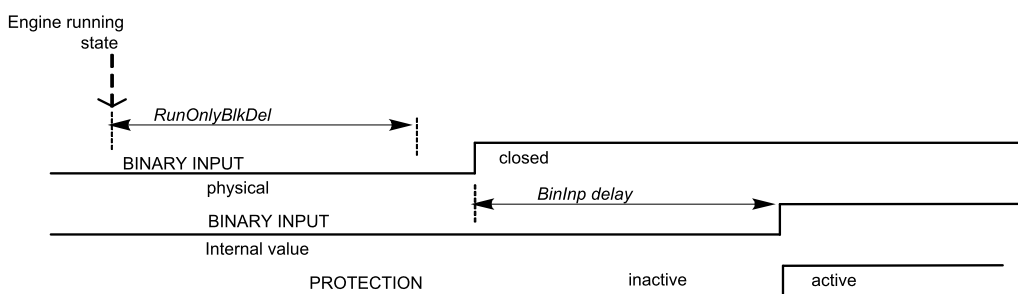
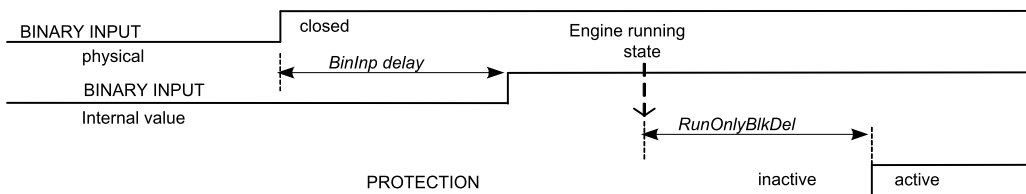
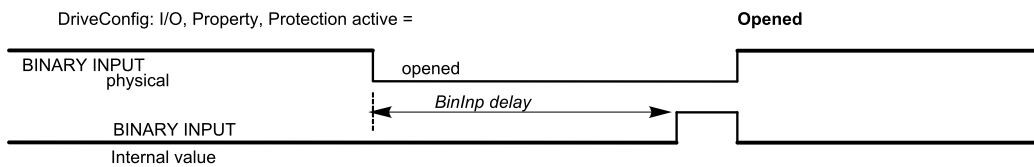
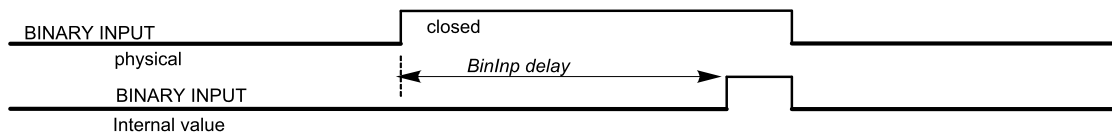
## Under speed protection

Under speed protection is activated 5 sec after RPM > **Engine params: Starting RPM**. Engine underspeed is detected when RPM drops below setpoint **Engine Protect: UnderSpeed**.





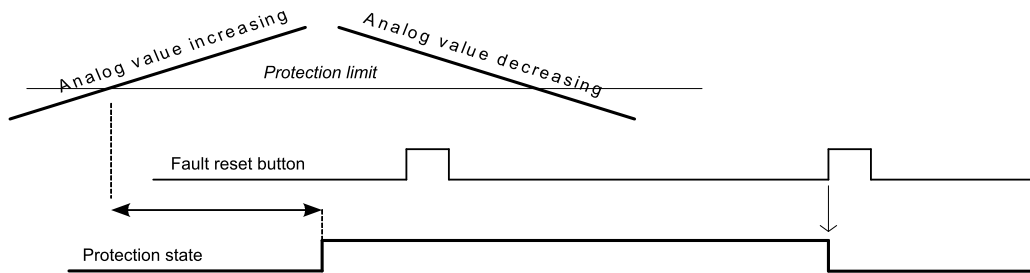
## Protection delay and blocking



### 5.1.3 Universal states

State is a value joined to each Analog input or value. State indicates if any protection configured on corresponding analog input is active or not. When there is any state configured as protection the corresponding Binary output appears in Analog protection list and can be used for selective external indication of the Alarm.

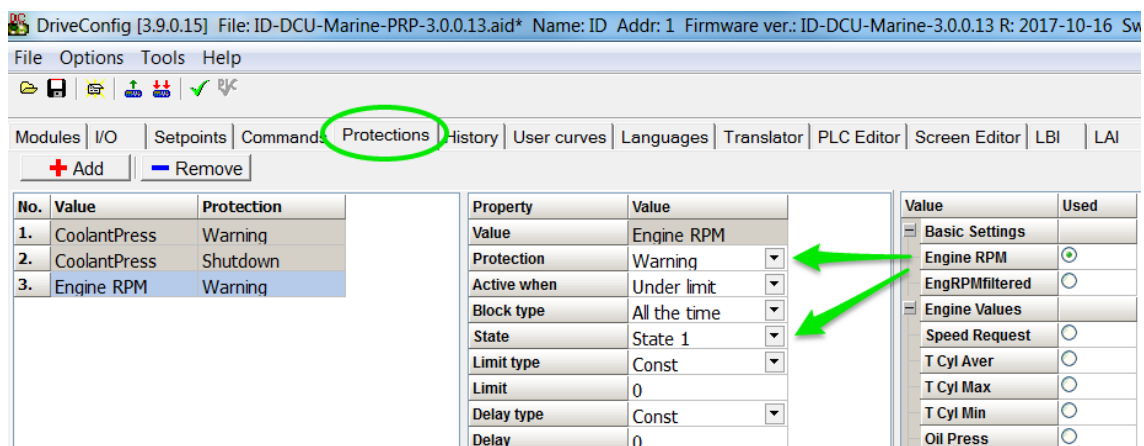
State is resetted (output is opened) when corresponding Alarm is not active and confirmed (Fault reset was pressed).



There are seven universal (free) states available in ID-DCU Marine-3.4.0 that are not joined to any value or input.

They can be used mostly for some values that have not state (e.g. RPM or other that are not measured on Analog input). This way can be configured protection to any ID-DCU Marine internal value or more levels external indication.

Example of Universal state1 configuration to Engine speed (Warning for Engine speed > 1600RPM, 1s): This configuration is available in DriveConfig – Expert mode.



## 5.2 PLC - programmable functions

Following programmable functions are available in ID-DCU Marine-3.4.0 software.

Use DriveConfig-3.3 or higher software to configure PLC functions.

### 5.2.1 General specification

- ▶ Each function output can be configured to:
  - another function input
  - any physical terminal (e.g. to controller's physical Binary Output) - DriveConfig I/O sheet

- ▶ Each function limit (parameter) can be configured as:
  - constant limit (fix): just write requested value into the field (-32768 to +32767)
  - setpoint limit (customer adjustable): click on field and select one from PLC setpoint list
  - any value (e.g. from Analog input): click on field and select one from controller or PLC values list
- ▶ All PLC function analog inputs are signed type and that is why the following analog values must not be configured to any comparator and PID analog input:
  - Load Sharing: ThrottlePos.
  - Info: ECU DiagSource, Timer val, PasswordDecode.
  - Statistics: NumSuccStarts, NumUnscStarts, Service time.
- ▶ All function limits and analog outputs must follow input analog value format:
  - e.g. input value is 0,0 to 10,0 bars, then setpoint limit is e.g. 3,2.
- ▶ Any time and delay limit is in 0,1s step in the range 0,1 to 3276,7 sec.
- ▶ PLC consistency check indicates incorrect PLC configuration.



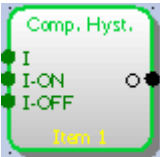


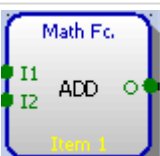
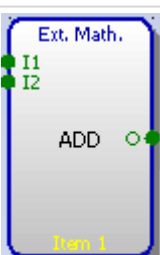
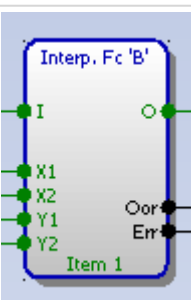
## PLC values

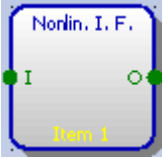
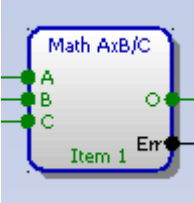
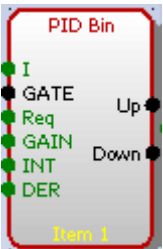
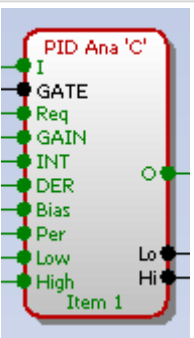
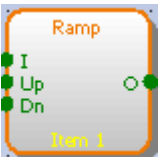
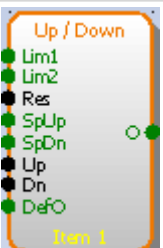

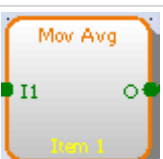
<b>Binary</b>	<p>List contains 128 internal binary values (bits) <b>PLC Bout 1.1 to PLC BOUT 16.8</b> that can be configured as any PLC function binary input or output.</p> <p>Only used <b>PLC Bout x.x</b> can be configured to ID-DCU Marine controller or external modules physical terminals.</p> <p>Used values are visible at controller screen.</p>
<b>Analog</b>	<p>There are available 96 internal analog values <b>PLC Aout 1 to PLC Aout 96</b> that can be configured as any PLC function input or output.</p> <p>Any used <b>PLC Aout x</b> can be configured as physical analog output. Used values are visible at controller screen.</p>
<b>PLC resource</b>	<p>Unsigned value that is automatically used for <b>Counter</b> and <b>Timer</b> functions, 16 PLC resources are available.</p> <p>Values are visible in IntelliMonitor only.</p>

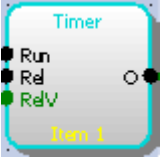
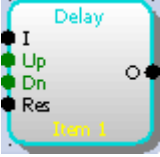
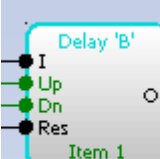
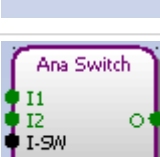


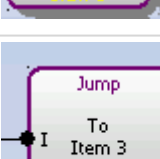
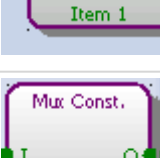

## 5.2.2 List of available PLC functions

**Note:** Exact description of all available PLC functions can be found in DriveConfig-3.3 User Guide or in DriveConfig context help (F1 key when a PLC function is selected).

**IMPORTANT:** Logic for controlling the motor can't be locked in PLC. Certification authority can ask for access to the content locked this way.

PLC Function	Selection Available	Number of available blocks in ID-DCU Marine 3.4.0
 <p>OR / AND I1 I2 AND Item 1</p>	OR/AND	128x
 <p>XOR / RS I1 I2 XOR Item 1</p>	XOR/RS	128x
 <p>Comp. Hyst. I I-ON I-OFF Item 1</p>	Comp Hyst	24x
 <p>Comp. Time I1 I2 Delay Item 1</p>	Comp Time	16x
 <p>Comp. Win. I HIGH LOW Item 1</p>	Comp Win.	16x
 <p>Math Fc. I1 I2 ADD Item 1</p>	Math Fc	16x
 <p>Ext. Math. I1 I2 ADD Item 1</p>	Ext Math Fc	8x
 <p>Interp. Fc 'B' I X1 X2 Y1 Y2 Oor Err Item 1</p>	Interpol Fc 'B'	16x

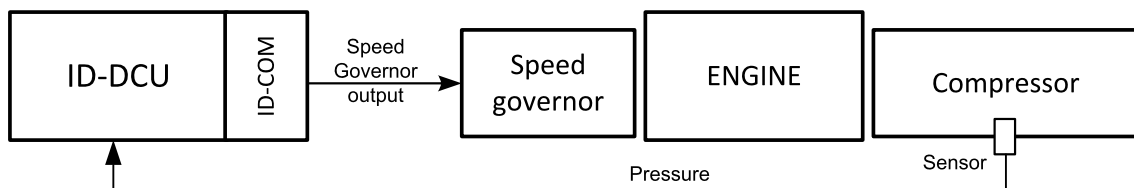
PLC Function	Selection Available	Number of available blocks in ID-DCU Marine 3.4.0
 <p>Norlin. I. F.</p> <p>I</p> <p>Item 1</p>	Nonlin I Fc	4x
 <p>Math AxB/C</p> <p>A</p> <p>B</p> <p>C</p> <p>Item 1</p> <p>Err</p>	Math AxB/C	8x
 <p>PID Bin</p> <p>I</p> <p>GATE</p> <p>Req</p> <p>GAIN</p> <p>INT</p> <p>DER</p> <p>Up</p> <p>Down</p> <p>Item 1</p>	PID Bin	4x
 <p>PID Ana 'C'</p> <p>I</p> <p>GATE</p> <p>Req</p> <p>GAIN</p> <p>INT</p> <p>DER</p> <p>Bias</p> <p>Per</p> <p>Low</p> <p>High</p> <p>Item 1</p> <p>Lo</p> <p>Hi</p>	PID Ana C	8x
 <p>Ramp</p> <p>I</p> <p>Up</p> <p>Dn</p> <p>Item 1</p>	Ramp	4x
 <p>Up / Down</p> <p>Lim1</p> <p>Lim2</p> <p>Res</p> <p>SpUp</p> <p>SpDn</p> <p>Up</p> <p>Dn</p> <p>DefO</p> <p>Item 1</p>	Up/Down	4x
 <p>Inc / Dec</p> <p>Inc</p> <p>Dec</p> <p>Res</p> <p>Item 1</p>	Inc/Dec	2x
 <p>Mov Avg</p> <p>I1</p> <p>Item 1</p>	Mov Avg	4x

PLC Function	Selection Available	Number of available blocks in ID-DCU Marine 3.4.0
 <p>Timer</p> <ul style="list-style-type: none"> <li>Run</li> <li>Rel</li> <li>RelV</li> </ul> <p>Item 1</p>	Timer	4x
 <p>Delay</p> <ul style="list-style-type: none"> <li>I</li> <li>Up</li> <li>Dn</li> <li>Res</li> </ul> <p>Item 1</p>	Delay	16x
 <p>Delay 'B'</p> <ul style="list-style-type: none"> <li>I</li> <li>Up</li> <li>Dn</li> <li>Res</li> </ul> <p>Item 1</p>	Delay B	8x
 <p>Ana Switch</p> <ul style="list-style-type: none"> <li>I1</li> <li>I2</li> <li>I-SW</li> </ul> <p>Item 1</p>	Ana Switch	16x
 <p>Force Hist.</p> <ul style="list-style-type: none"> <li>I</li> </ul> <p>Item 1</p>	Force Hist	4x
 <p>Force Prot.</p> <ul style="list-style-type: none"> <li>Lv1</li> <li>Lv2</li> <li>Fls</li> </ul> <p>Item 1</p>	Force Prot	16x
 <p>Jump</p> <p>To Item 3</p> <p>Item 1</p>	Jump	8x
 <p>Mux Const.</p> <ul style="list-style-type: none"> <li>I</li> </ul> <p>Item 1</p>	Mux Const.	4x
 <p>Counter</p> <ul style="list-style-type: none"> <li>Cnt</li> <li>Lim</li> <li>Clr</li> </ul> <p>Item 1</p>	Counter	16x

PLC Function	Selection Available	Number of available blocks in ID-DCU Marine 3.4.0
	Decomp	8x
	Convert	16x
	3D Map	2x

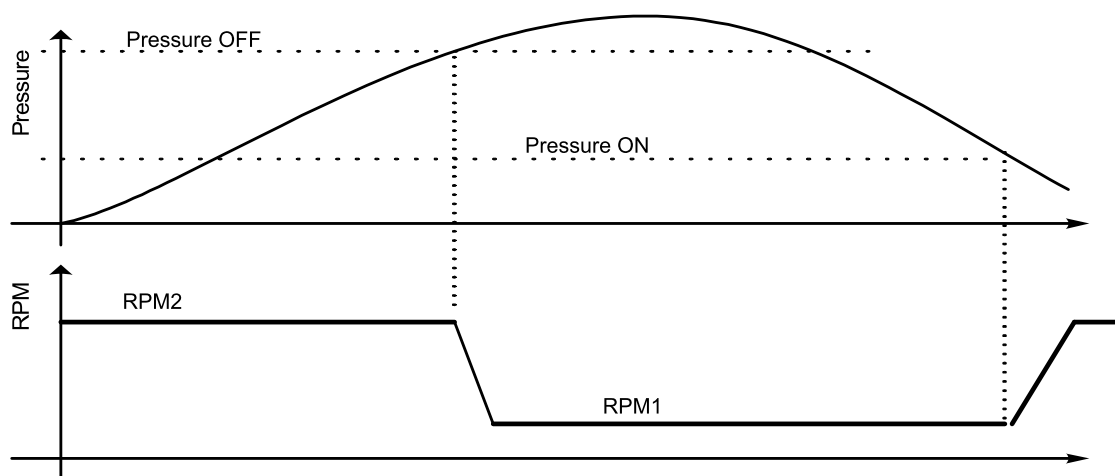
### 5.2.3 PLC configuration example

Let suppose a diesel compressor. The engine speed is controlled via ID-SCM Speed governor analog output (no data communication). InteliDrive measures output pressure.

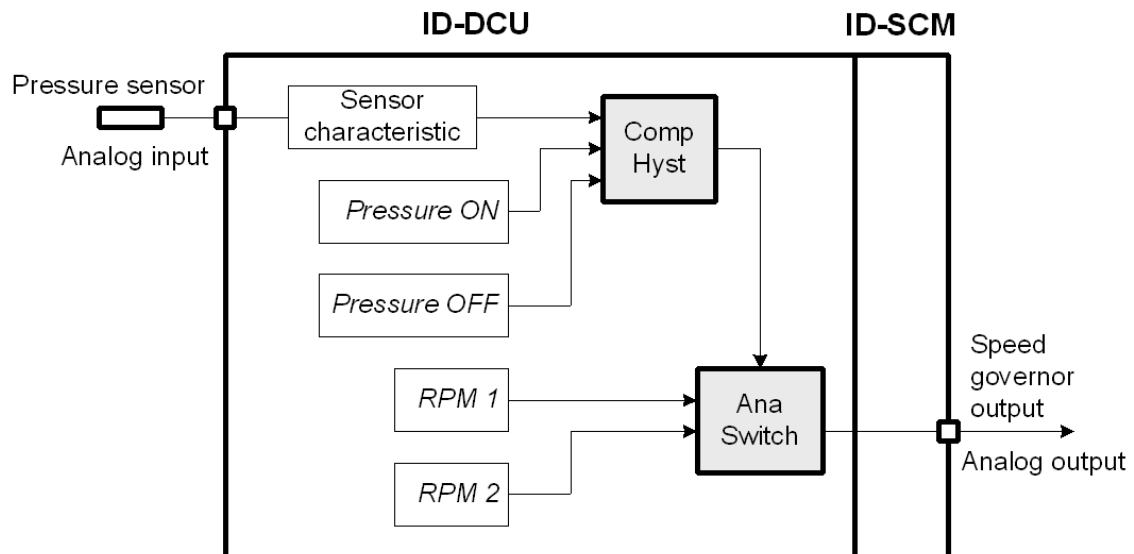


#### Required function

Based on adjustable pressure limits ID controller switch the engine between RPM1 to RPM2. When Pressure drops below Pressure ON limit engine increases from RPM1 to RPM2 and after Pressure increases above Press OFF limit goes back to RPM1.



## Function structure



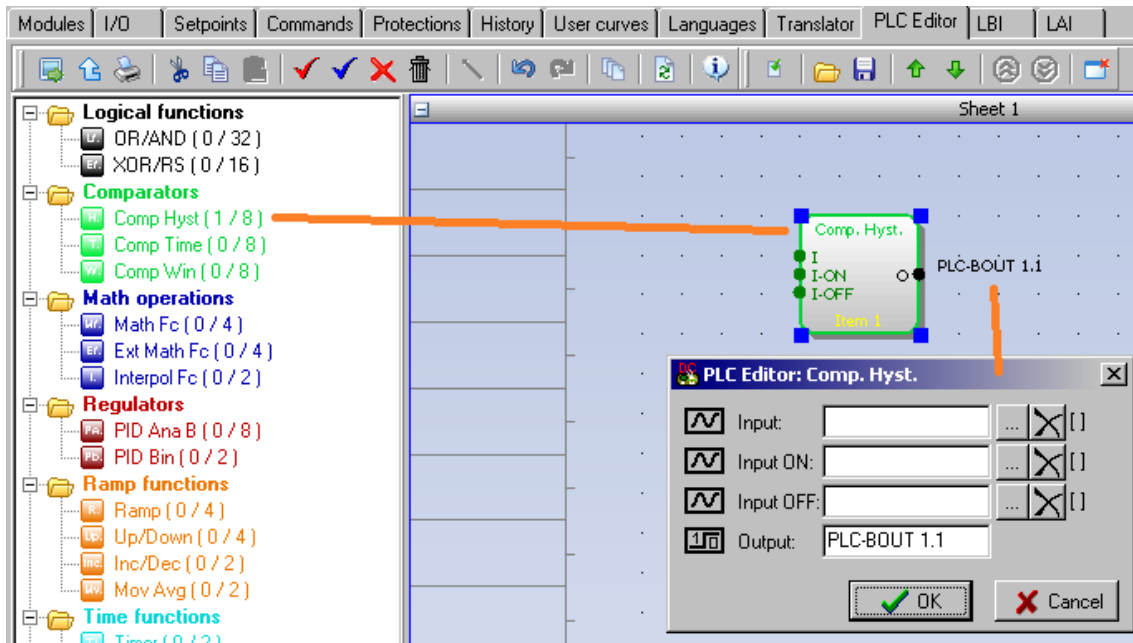
## Configuration steps

1. Start DriveConfig and open default archive ID-DCU-X.aid.
2. Pressure measuring: configure pressure sensor characteristic – suppose range 0 to 10,0 Bars on ID-DCU Marine Analog input 4. Wrn and Sd protection limits should be adjusted over Pressure OFF limit.

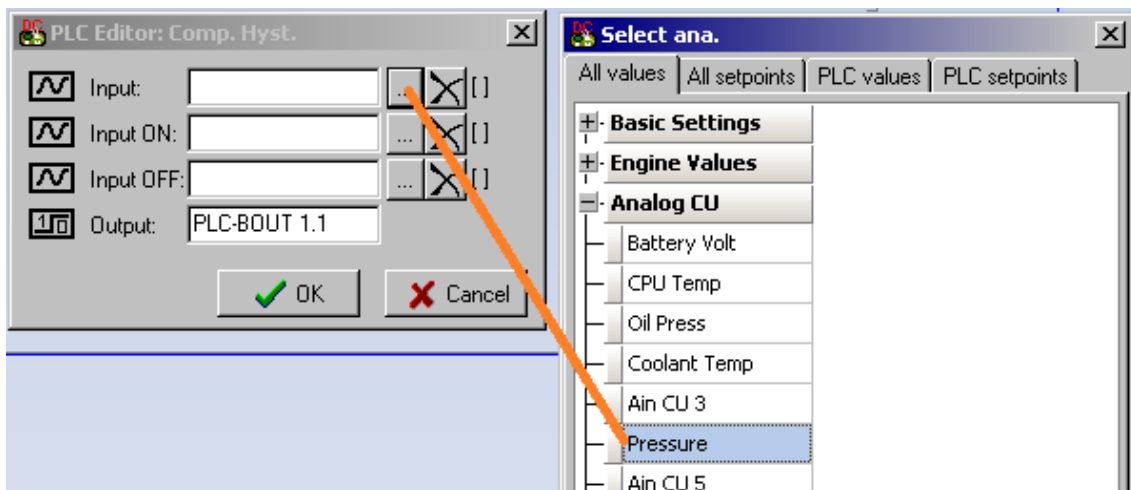
I/O		Property	
Name	Value	Name	Value
± Binary inputs	Used: 13/14	Name	Pressure
± Binary outputs	Used: 14/14	Dim	Bar
− Analog inputs	Used: 3/8	Sensor	4-20mA active
− ID	Used: 3/8	Resolution	0,1
AIN1	Oil press	Sensor range	10,0
AIN2	Coolant press	Protection type	wrn+Shutdown
AIN3	Ain CU 3	Active when	Over limit+Fls
AIN4	Pressure	Block type	RunOnlyBlkDel1
AIN5	Ain CU 5	Bargraph 100%	10,0
AIN6	Ain CU 6	Function	

3. Go to PLC window and drag & drop PLC functional block Comp Hyst, double click the block.

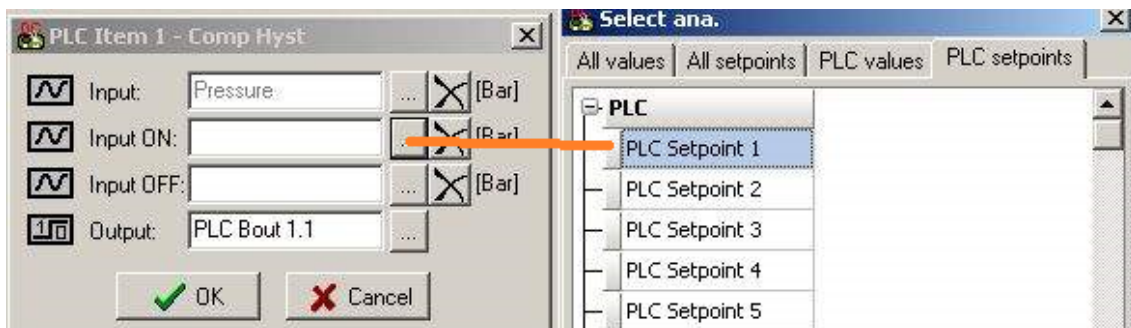




4. Configure Comparator Input: click on  button and select input value from the list.



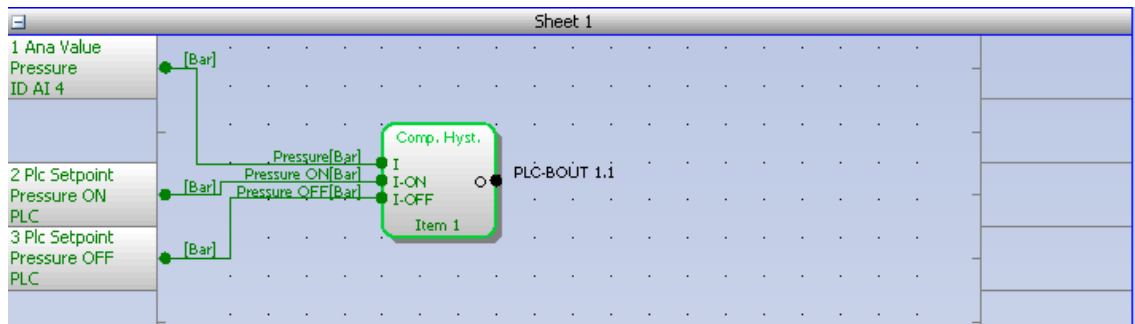
5. Configure comparator limits Input ON, Input OFF as PLC setpoints



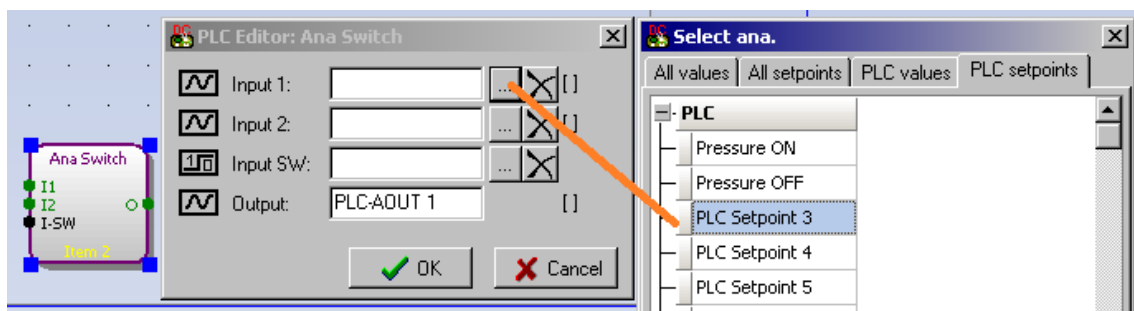
6. Edit setpoint name in PLC setpoints list.



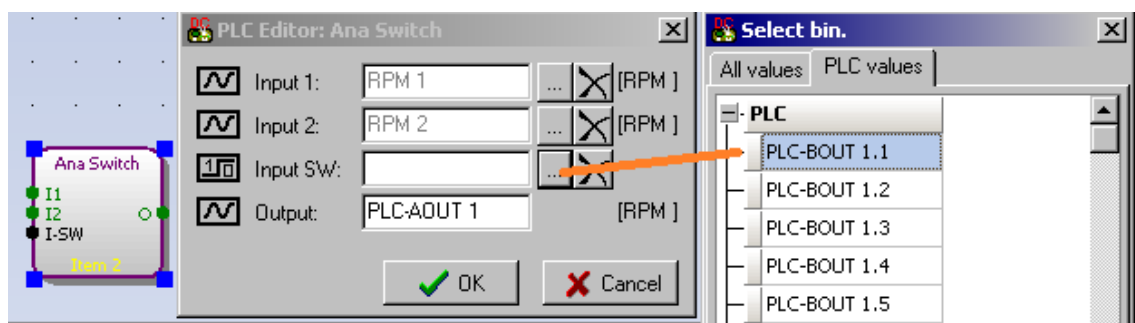
Result look like this



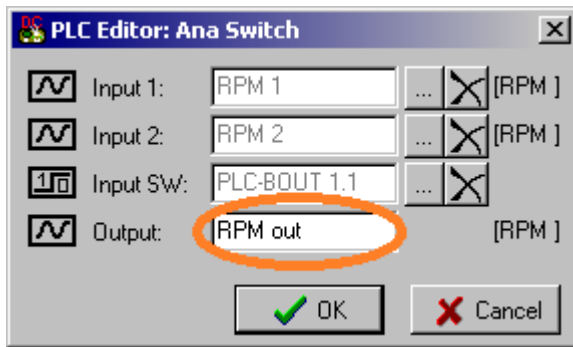
7. Drag & drop PLC functional block Ana Switch, configure Input 1 and Input 2 as PLC setpoints and edit the setpoint names to RPM 1 and RPM 2.



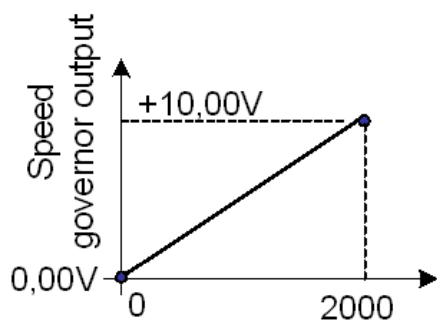
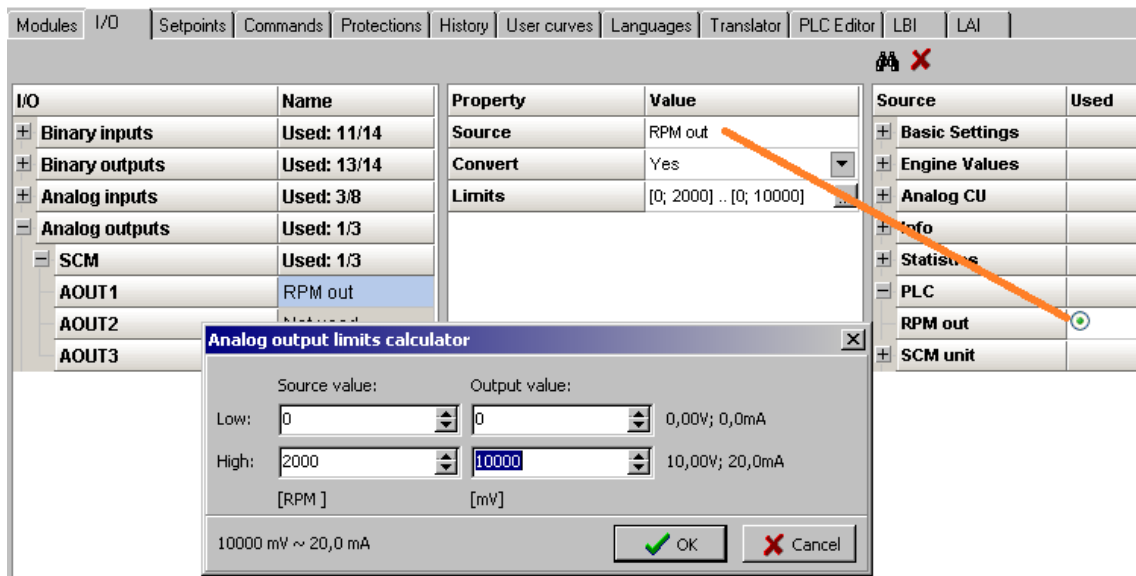
8. Configure binary Input SW: PLC values: PLC Bout 1.1.



9. Rename output to RPM out



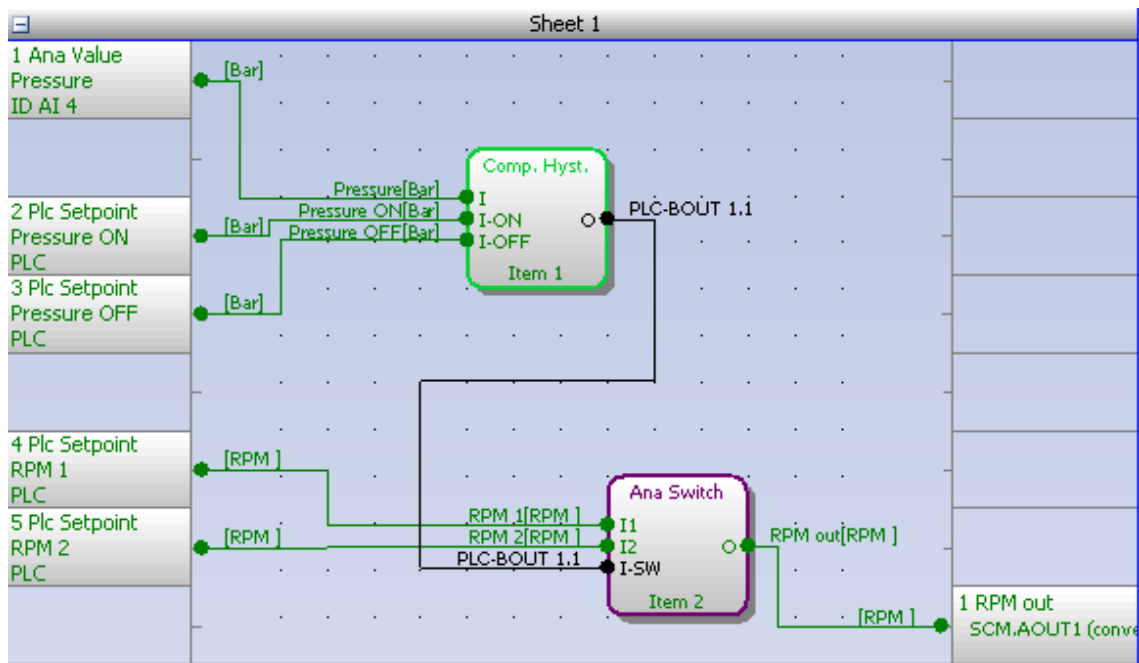
- Go to I/O window and configure analog SCM AOUT1 as RPM out. Then configure output convert Low limit (0 RPM ~ 0.00V output) and High output convert limit (2000 RPM ~ 10.00V output).



Speed governor output characteristics for Lo limit and Hi limit setting above.

Speed governor output voltage in this case (when RPM1= 500 and RPM2=1800) is 9V when pressure is low and 2,5V when pressure is high

- Final PLC layout in DriveConfig



## PLC locking sheet by sheet

From DriveConfig version 3.8.0 it is possible to lock PLC Sheets individually in the controllers supporting this feature. Available are 3 passwords, user can assign one of them to each PLC sheet or leave PLC sheet unlocked.

New button on PLC toolbar to access password settings and login/logout. Button has 3 different colours:

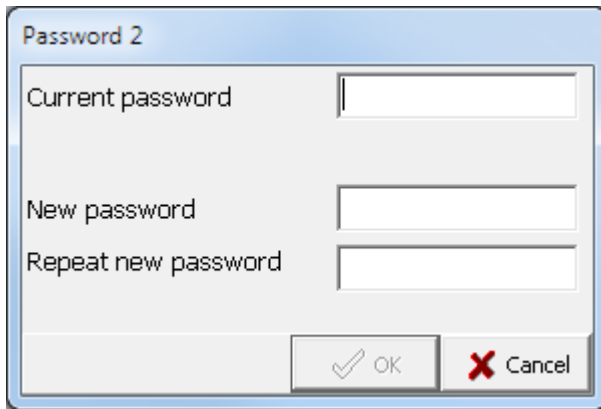
All existing passwords are entered (all PLC sheets with password are unlocked)

Any (but not all) existing passwords are entered (any, but not all PLC sheets with password are unlocked)

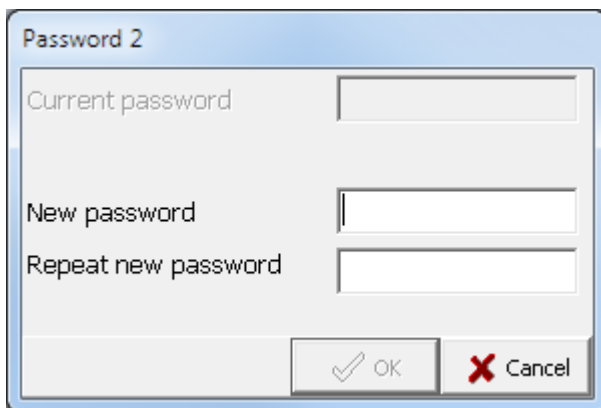
No existing password is entered or no password exists (all PLC sheets with passwords are locked)

In Passwords window user can:

- ▶ Login by entering correct password and clicking red button
- ▶ Logout by clicking green button
- ▶ Create/change password by clicking on "Change" button
  - To change password, current and new password must be entered. New password must be entered twice (match check)

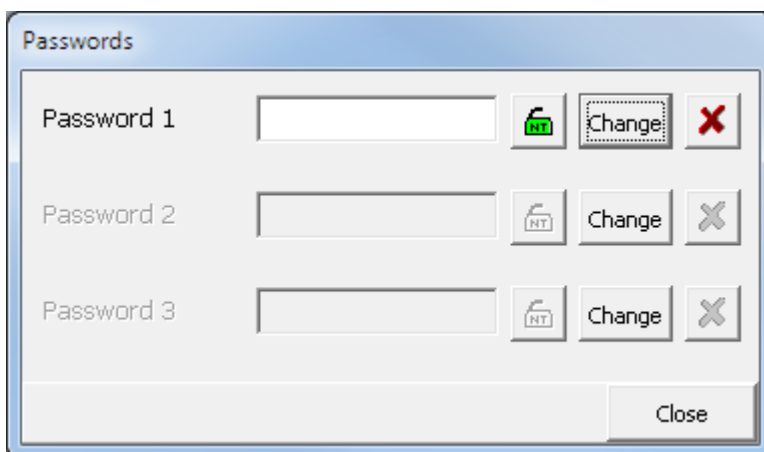


- To create a new password, enter new password twice (match check)



▶ Delete existing password

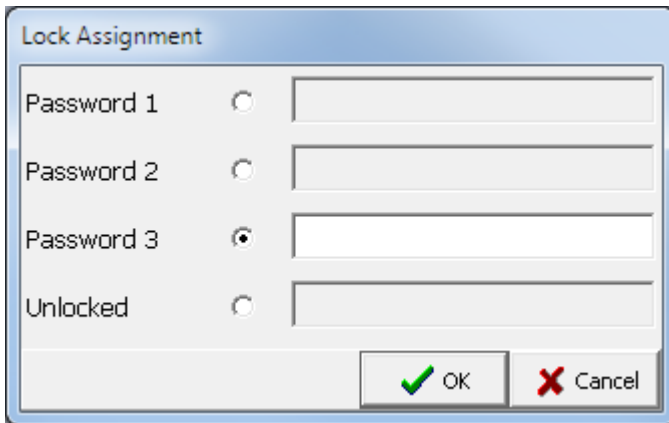
- If password is used for any PLC sheet, password will be removed from appropriate PLC sheets (user has to confirm this). Correct password must be entered.
- If password is not used for any PLC sheet, password is removed immediately without warning. No need to enter correct password.



To assign password to the PLC sheet, click on assign icon in title of PLC sheet:



In configuration window you can assign one of three passwords. It is necessary to enter correct password. If password does not exist, user is asked to create it.



The image shows a dialog box titled "Lock Assignment". It contains four rows, each with a radio button and a text input field:

Password 1	<input type="radio"/>	<input type="text"/>
Password 2	<input type="radio"/>	<input type="text"/>
Password 3	<input checked="" type="radio"/>	<input type="text"/>
Unlocked	<input type="radio"/>	<input type="text"/>

At the bottom right, there are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

**IMPORTANT:** Very important parts of the control algorithm must not be locked in PLC sheets. Certification authorities may request their unlocking if necessary.

## 5.3 Shared IO and Virtual IO

### 5.3.1 Virtual Binary Outputs (VBOU) module

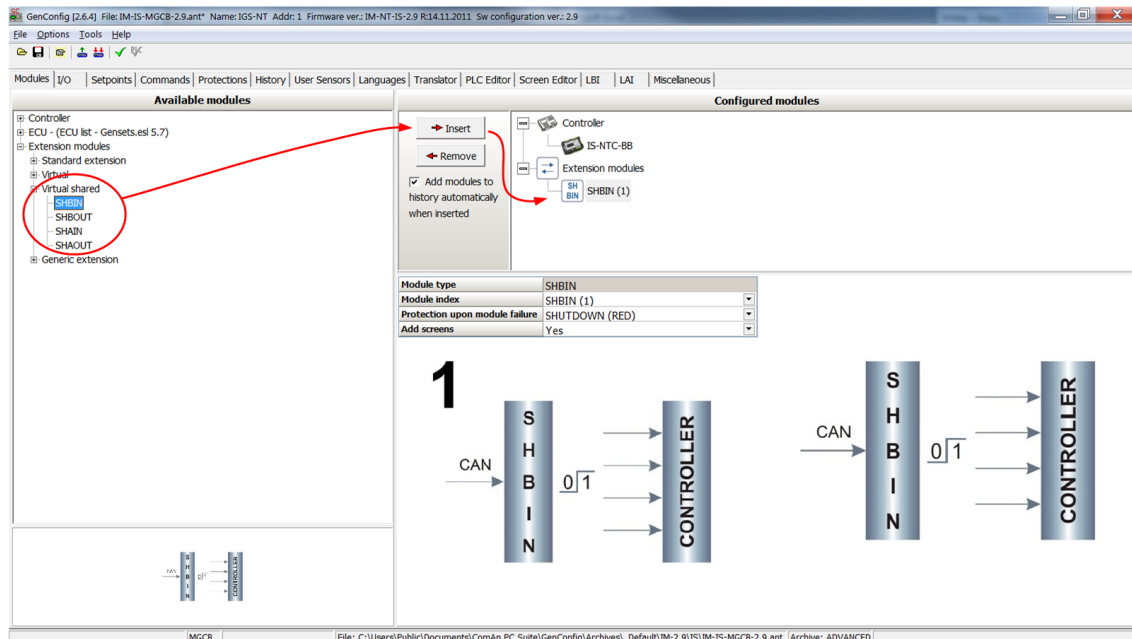
Several virtual modules are available. One of them is Virtual Binary Outputs module (VBOU) which enables use of Prg. states binary signals with the built-in PLC. Prg. states signal can not be directly configured as a PLC module input. Therefore it is necessary to use VBOU module as interface between a Prg. state signal and a PLC module.

Up to 4 VBOU modules are available, each VBOU modules represents 8 binary output signals.

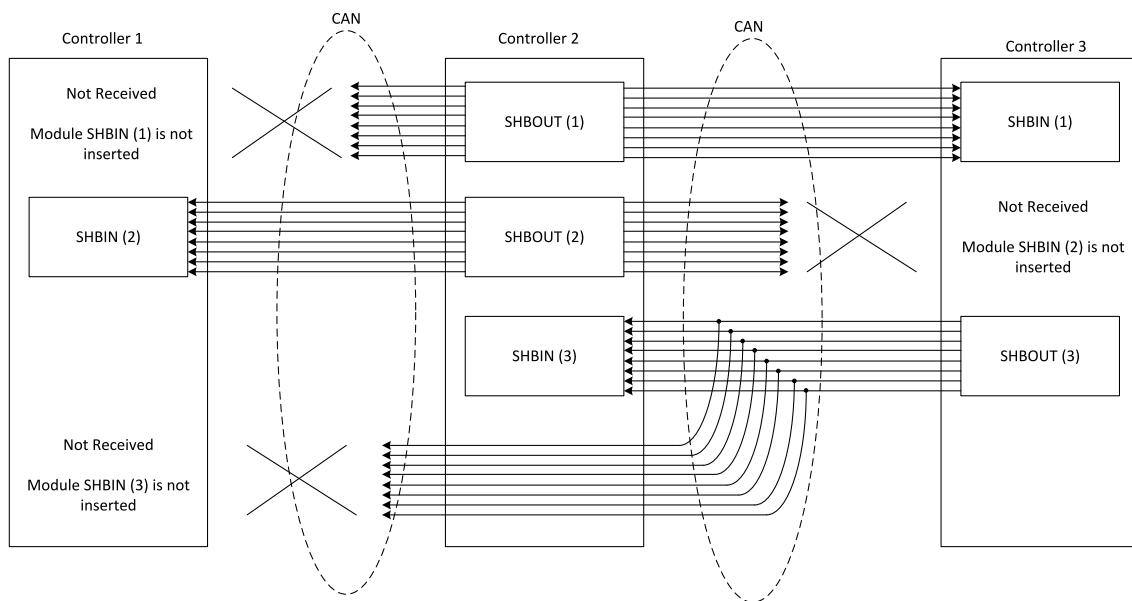
### 5.3.2 Shared virtual inputs and outputs

It is possible to share Binary and Analog values between all the controllers via CAN bus, thus saving physical Inputs and Outputs and excess wiring.

How to add a virtual module is shown in the following picture.



The principal of how shared Binary inputs and Binary outputs work is shown below.

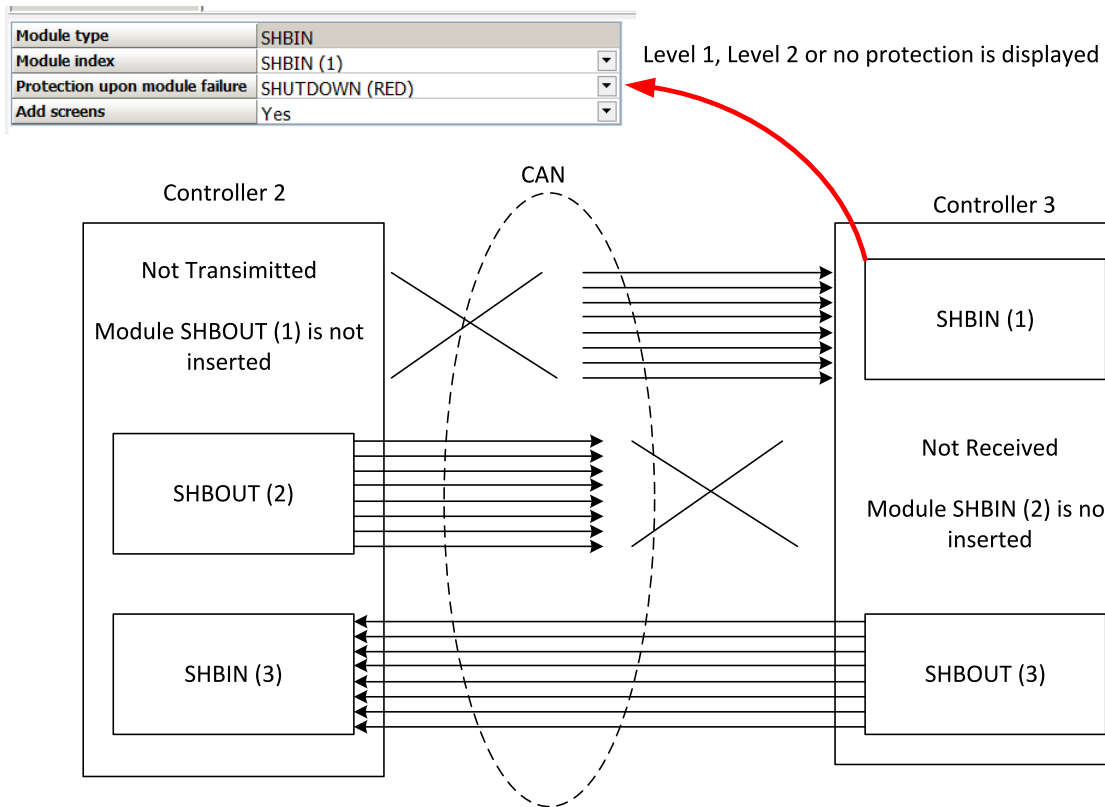


Shared Binary Inputs and Outputs may be used exactly in the same way as standard physical Inputs and Outputs. If SHBIN or SHAIN modules are configured, at least one corresponding module of SHBOUT or SHAOUT (respectively) is needed. If it is not configured, corresponding protection appears because SHBIN or SHAIN will be missing. See the figure below for more information.

**IMPORTANT: For proper function of Shared Binary and Analog Inputs and Outputs, only one source of Shared Binary or Analog Outputs must be configured (i.e. it is not possible to configure in one controller SHBOUT1 and to another one as well SHBOUT1).**

**Note:** Controller sends Shared Binary Outputs each 100ms if there are any changes in any bit position. If there are no changes, controller sends the information with period 1s.

A protection upon module failure can be configured in GenConfig. See the schematic below.



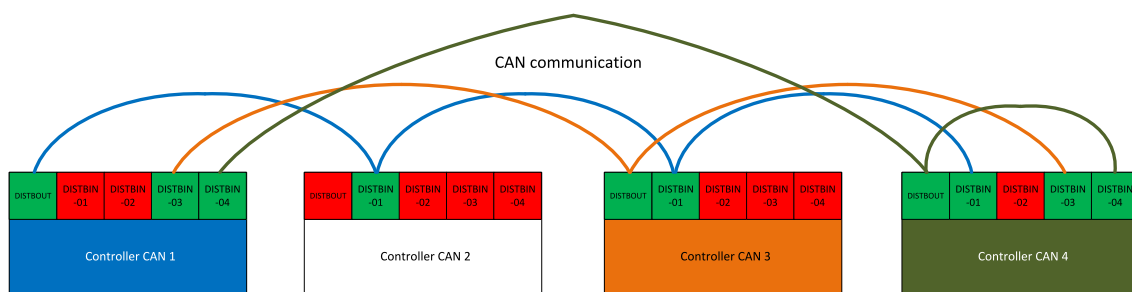
### 5.3.3 Distributed binary inputs and outputs

It is possible to share Binary and Analog values between all the controllers via CAN bus, thus saving physical Inputs and Outputs and excess wiring.

DISTBIN and DISTBOUT work in a different way than SHBIN and SHBOUT. Each controller has one pack of eight DISTBOUT available (if not configured or no function is assigned to any output, it does not broadcast them). The number of DISTBOUT module is not shown in the configuration and it is always corresponding to the CAN address of the controller (e.g. the controller with address 5 will be broadcasting DISTBOUT-05 which can be received if module DISTBIN-05 is configured in another controller. Up to 32 DISTBIN modules can be configured (meaning that the controller will be receiving all DISTBOUT from all the controller, even his own).

It is not possible to change the name of DISTBIN inputs or add protections.

In the example below you can see 4 controllers with various DISTBIN and DISTBOUT configuration.



**Note:** Controller sends Distributed Binary Outputs each 100ms if there are any changes in any bit position. If there are no changes, controller sends the information with period 1s.



## 5.4 Multiple ECU modules support

ID-DCU Marine supports communication with up to 10 ECU modules. ECU means general Electronic Control Unit and it can be engine control unit, speed governor, voltage regulator, ignition etc.

These interfaces can be used for communication with ECU modules:

- ▶ CAN 1 J1939 for CAN bus communication, usually J1939 protocol based communication
- ▶ RS485 for Modbus communication

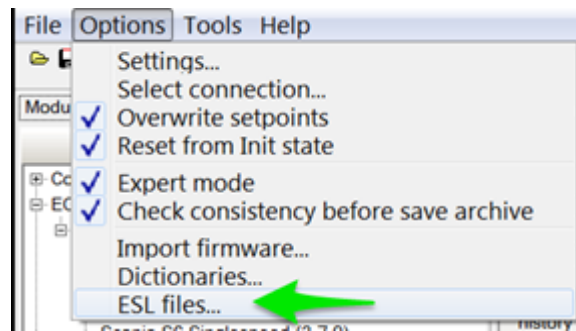
It is possible to combine the interfaces (e.g. engine ECU connected via RS485 with ignition connected via CAN1).

### 5.4.1 Multi ECU Configuration with DriveConfig

Use Modules card in DriveConfig to configure support of ECU modules with the Insert/Remove buttons:

Module type	Cummins CM850
Module index	3
Module name	ECU-2
Module address	1
Controller address	Default (220)
Protection upon module failure	SHUTDOWN (RED)
Add screens	Yes
Display data as	Bargraph
Analog inputs	8
Analog outputs	4
Binary inputs	16
Binary outputs	8
Analog inputs (4B)	2

**IMPORTANT:** Be aware that it is necessary to use ECU list, which enables use of multiple ECU modules. Check and select used ECU list using this option:



Configure modules properties using the marked options:

Add modules to history automatically when inserted

<b>Module type</b>	Standard J1939 engine
<b>Module index</b>	1
<b>Module name</b>	ECU-1
<b>Module address</b>	Default (0)
<b>Controller address</b>	Default (3)
<b>Protection upon module failure</b>	SHUTDOWN (RED) ▼
<b>Add screens</b>	Yes ▼
<b>Display data as</b>	Bargraph
<b>Analog inputs</b>	16 ▼
<b>Analog outputs</b>	4 ▼
<b>Binary inputs</b>	16 ▼
<b>Binary outputs</b>	8 ▼
<b>Analog inputs (4B)</b>	2 ▼

- ▶ **Module type** - type of configured module (e.g. Standard J1939 engine support, ECON-4 speed governor support etc.)
- ▶ **Module index** – module identification number. It is used to associate alarms in alarm list and controller history with a particular ECU module.
- ▶ **Module name** - user adjustable string with up to 10 characters. Default values are ECU, ECU-1 to ECU-9, depending on order in which are modules added.
- ▶ **Module address** – user adjustable number from 0 to 255, which defines address of configured module. Default option is Default (X), X stands for actual address value, which comes from ESC and is assigned to module when the default option is used. It is recommended to use this option and use different setting only if the default one does not work.

**Example:** Set Module address to 5, if engine CAN1 address is 5.

**Note:** ESC is Engine Specific Code, it contains all necessary information about transmitted values, commands and diagnostic messages.

- ▶ **Controller address** – user adjustable number from 0 to 255, which defines address used by controller for communication with the module. Controller can use different address for communication with different modules. Default option is Default (X), X stands for actual address value, which comes from ESC and is used by controller interface for communication with module, when the default option is used. N/A is displayed as **Controller address**, if Modbus is used for communication with a module.

**Note:** Do not confuse Controller address with Comms settings: Contr.address, which is different parameter with independent functionality.

**Note:** ESC is Engine Specific Code, it contains all necessary information about transmitted values, commands and diagnostic messages.

- ▶ **Protection upon module failure** – use it to select type of alarm, which is issued if communication with module fails
- ▶ **Add screens** – use it to display/hide module related screens
- ▶ **Display data as** – information how are analog values displayed
- ▶ **Analog inputs** – Number of analog input values available with module.

**Note:** Total number of available analog input values is limited to 160 with all configured modules (e.g. 4 modules with 40 inputs would use all available inputs).

- ▶ **Analog outputs** – Number of analog output values available with module.

**Note:** Total number of available analog output values is limited to 40 with all configured modules (e.g. 5 modules with 8 outputs would use all available outputs).

- ▶ **Binary inputs** – Number of binary input values available with module.

**Note:** Total number of available binary input values is limited to 160 with all configured modules (e.g. 4 modules with 40 inputs would use all available inputs).

- ▶ **Binary outputs** – Number of binary output values available with module.

**Note:** Total number of available binary output values is limited to 160 with all configured modules (e.g. 4 modules with 40 outputs would use all available outputs).

- ▶ **Analog inputs (4B)** – Number of 4B analog input values available with module.

**Note:** Total number of available 4B analog input values is limited to 20 with all configured modules (e.g. 5 modules with 4 inputs would use all available inputs).

◀ back to Controller setup

# 6 Communication

## 6.1 IntelliDrive - Engine ECU communication

### 6.1.1 Example of standard J1939 engine

List of possible J1939 analog data that can be configured to received in ID-DCU Marine.

Name	Unit
Engine speed	RPM
Actual torque	%
Demand torque	%
Coolant temp	°C
EngineOil temp	°C
Boost Pressure	bar
Intake Manifold Temp	°C
Air Intake pressure	bar
Exhaust Gas Temp	°C
Accelerator Pedal position	%
Percent Load	%
Fuel Rate	L/h
EngOil Filter Diff.Press	bar
Battery Potential (Voltage)	V
Fuel Delivery Pressure	bar
Engine Oil level	%
Crankcase Pressure	bar
Coolant Pressure	bar
Coolant Level	%

**Fault reset** = accepts (confirms) diagnostic message = removes inactive message form ECU Alarm list only when ECU Alarm list is visible.

**Note:** *Fault reset* button is “screen sensitive”. It is active only on selected actual controller screen.

### 6.1.2 Tier 4 Final

Tier 4 Final support generally provides monitoring and control of after-treatment system installed on generators engine. The requirements are defined as:

- ▶ Providing After-Treatment status information by
  - displaying universal lamps (icons)
  - displaying analog and binary values

- ▶ Control of After-Treatment regeneration function by
  - transmitting commands to the ECU

### After-Treatment screen

This screen is shown with configured ECU which supports Tier 4 Final. After-Treatment screen is automatically shown, once any of selected lamps gets active or change status. Deactivating of the lamp will not trigger showing the screen. The screen is then shown until operator switch it to another one. Alarm list screen has lower priority so even new alarm appears, After-treatment screen is still displayed. To avoid displaying blank screen, inactive lamps are represented by "dotted" icons. For no active lamp the screen shows all dotted icons. Please see examples below:

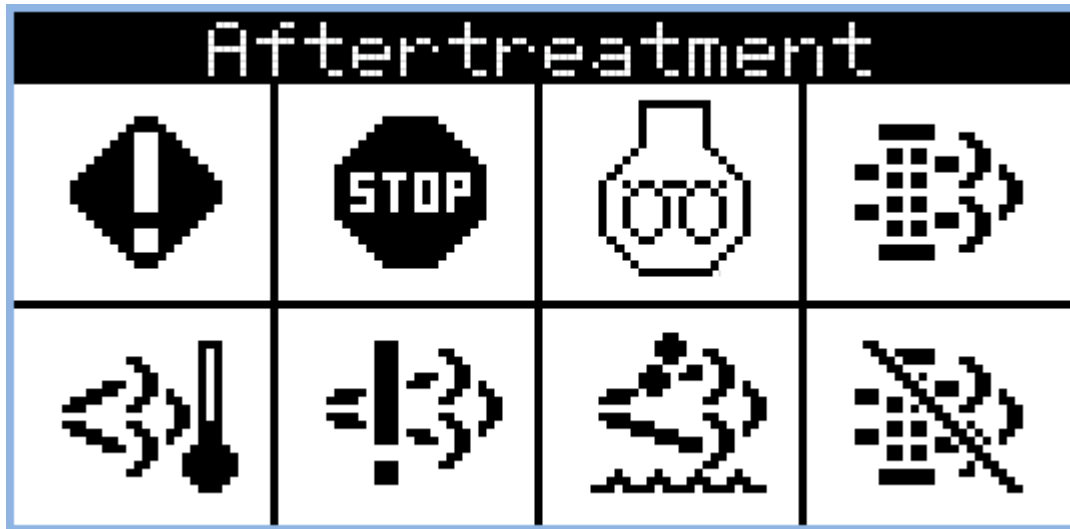


Image 6.1 Example of active Tier 4 Final screen

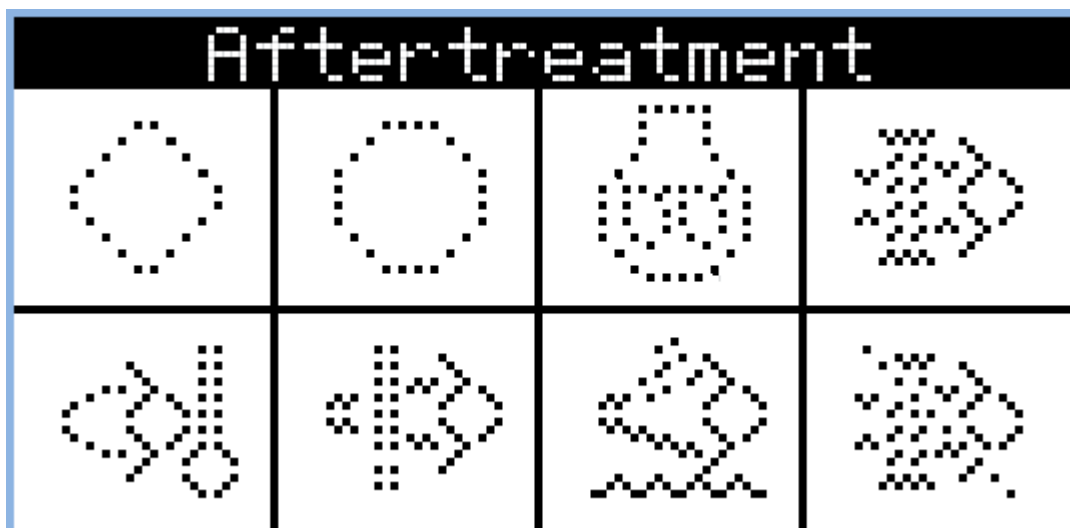





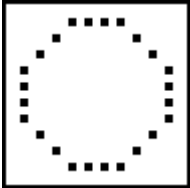

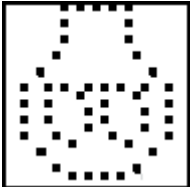
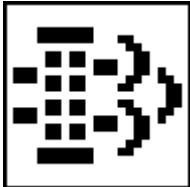
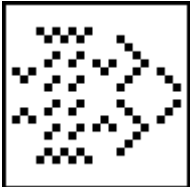

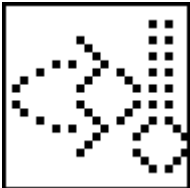
Image 6.2 Example of inactive Tier 4 Final screen


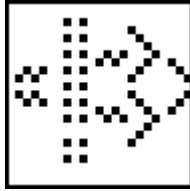

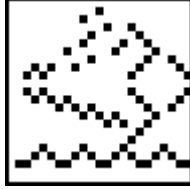

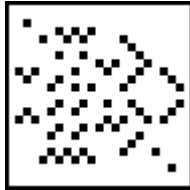
### Universal lamps (icons)

Universal lamp icons are shown on the After-Treatment screen. Based on specific value read in specific frame with specific SPN is every lamp icon either:

- ▶ shown
- ▶ hidden
- ▶ blinking slow (1Hz)
- ▶ blinking fast (2Hz)

**Note:** Lamp icon blinking is defined as displaying active lamp icon and inverse colored active lamp icon in required frequency.

Lamp name	Active icon	Inactive icon	Notes
Amber warning lamp			<b>Note:</b> This value can light or blink on both frequencies.
Red stop lamp			<b>Note:</b> This value can light or blink on both frequencies.
Engine wait to start lamp			
DPF/SCR lamp command			<b>Note:</b> DPF = Diesel Particulate Filter; SCR = Selective Catalytic Reduction. This lamp also activates alarm After-treatment
Exhaust system high temperature lamp command			<b>Note:</b> This lamp also activates alarm After-treatment

Lamp name	Active icon	Inactive icon	Notes
Malfunction indicator lamp			<b>Note:</b> This value can light or blink on both frequencies. This lamp also activates alarm After-treatment
Fluid tank low level indicator			<b>Note:</b> This lamp also activates alarm After-treatment
DPF regeneration inhibited			<b>Note:</b> Indicates the state of diesel particulate filter active regeneration inhibition. This lamp also activates alarm After-treatment

 [back to Communication](#)

# 7 Technical data

## 7.1 ID-DCU Marine

### Power supply

Nominal power supply	24 VDC
Power supply range	8 – 36 VDC
Current consumption (depends on supply voltage)	0.34 A at 8 VDC
	0.12 A at 24 VDC
	0.09 A at 36 VDC
Galvanically isolated from controller body	YES
Battery voltage measurement tolerance	2 % at 24 V
RTC battery life-cycle	10 year

*Note: RTC battery flat causes wrong Date&Time information only.*

### Operating conditions

Operating temperature ID-DCU MARINE	-20 to +70 °C
Operating temperature ID-DCU-LT	-40 to +70 °C
Storage temperature	-30 to +80 °C
Humidity	95 % without condensation
Flash memory data retention time	10 years
Protection front panel	IP65
Standard conformity	
Low Voltage Directive	EN 61010-1:95 +A1:97
Electromagnetic Compatibility	EN 61000-6-2, October 2001
	EN 61000-6-4, October 2001
	IEC 60533, Ed. 2; 1999-11
Vibration	5 – 25 Hz, ±1.6mm
	25 – 100 Hz, a = 4 g
Shocks	a = 200 m/s <sup>2</sup>
Heat radiation	9 W

### Dimensions and weight

Dimensions	(183×123×47 mm)
	See chapter terminals and dimensions
Weight	800 g



### Binary open collector outputs

Number of inputs	14
Input impedance	4.7 k $\Omega$
Input range	0-36 VDC
Switching voltage level for close contact indication	0-2 V
Voltage level for open contact indication	8-36 V
Minimal input duration	110 ms

### Binary open collector outputs

Number of outputs	14
Maximum current - outputs BO1, BO2	1A
Maximum current - outputs BO3 - BO14	0.5 A
Maximum switching voltage	36 VDC

### Speed pick-up input

Type of sensor	magnetic pick-up (connection by shielded cable is recommended)
Input impedance	10 k $\Omega$
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 (min. input voltage 6Vpk-pk)
Frequency measurement tolerance	1.5 %

### D+ function

Max. D+ output current	300 mA
Guaranteed level for signal Charging OK	80 % of supply voltage

### Analog inputs (Not electrically separated)

<b>Group 1 AI1 – AI4</b>	
Number of inputs	4 unipolar
Resolution	10 bits
Jumper selectable range	V, $\Omega$ , mA
Maximal resistance range	2500 $\Omega$
Maximal voltage range	4.0 V
Maximal current range	0 – 20 mA
Input impedance	180 $\Omega$ for mA measuring
Input impedance	>100 k $\Omega$ for V measuring
Resistance measurement tolerance	$\pm 2 \% \pm 2 \Omega$ out of measured value

Voltage measurement tolerance	$\pm 1 \% \pm 1 \text{ mV}$ out of measured value
Current measurement tolerance	$\pm 1 \% \pm 0.5 \text{ mA}$ out of measured value
<b>Group 2 AI5 – AI8</b>	
Number of inputs	4 bipolar
Resolution	Up to 16 bits
Jumper selectable range	V, $\Omega$ , mA, thermo coupler
Maximal resistance range	2500 $\Omega$
Maximal voltage range	$\pm 1000 \text{ mV}$ or 100 mV or 5 V

**Note:** The maximal input voltage offset is in the range from  $-2$  to  $+5 \text{ VDC}$  against controller minus power supply when AI5 to AI8 is used for differential voltage measuring.

<b>Maximal current range</b>	$\pm 0 - 20 \text{ mA}$ active
	0 – 20 mA passive
<b>Input impedance</b>	50 $\Omega$ for mA measuring
<b>Input impedance</b>	>100 k $\Omega$ for V measuring
<b>Resistance measurement tolerance</b>	$\pm 0.5 \% \pm 2 \Omega$ out of measured value
<b>Voltage measurement tolerance</b>	$\pm 0.5 \% \pm 1 \text{ mV}$ out of measured value
<b>Current measurement tolerance</b>	$\pm 0.5 \% \pm 0.5 \text{ mA}$ out of measured value

### RS232 interface

<b>Maximal distance</b>	10 m
<b>Speed</b>	19.2 kBd

## 7.2 CAN bus interface

<b>Max. CAN bus length</b>	
<b>Basic setting: CAN bus mode = 250 kBd</b>	200 m
<b>Basic setting: CAN bus mode = 50 kBd</b>	900 m
<b>Nominal impedance</b>	120 $\Omega$
<b>Cable type</b>	twisted pair (shielded)

Following dynamic cable parameters are important especially for maximal 200 meters CAN bus length and 32 ID-COM units connected:

<b>Nominal Velocity of Propagation</b>	min. 75 % (max. 4.4 ns/m)
<b>Wire crosscut</b>	min. 0.25 mm <sup>2</sup>
<b>Maximal attenuation (at 1 MHz)</b>	2 dB / 100 m

Recommended Industrial Automation & Process Control Cables:

**BELDEN** (see <http://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 <http://www.lappcable.com>)

- ▶ Unitronic BUS DeviceNet Trunk Cable
- ▶ Unitronic BUS DeviceNet Drop Cable
- ▶ Unitronic BUS CAN
- ▶ Unitronic-FD BUS P CAN UL/CSA

🔍 **back to Technical data**

# 8 Appendix

8.1 Controller objects ..... 103

 [back to Table of contents](#)

## 8.1 Controller objects

### 8.1.1 List of controller objects types

8.1.2 Setpoints .....	103
8.1.3 Binary Inputs .....	172
8.1.4 Binary outputs .....	196
8.1.5 Analog Inputs .....	242
8.1.6 Values .....	262

 [back to Appendix](#)

### 8.1.2 Setpoints

#### What setpoints are:

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

Each setpoint can be protected by a password against unauthorized changes. Password protection can be assigned to the setpoints during the configuration procedure.

**IMPORTANT: Do not perform repeated writing of setpoints (e.g. do NOT have a MODBUS 'watchdog' system where PLC periodically writes down a figure into register and then reads the figure). The setpoints are stored in EEPROM memory, which can be overwritten up to 100 000 times without risk of damage or data loss, however it may become damaged, when allowed number of writing cycles is exceeded!**

**The issue with EEPROM memory limit is resolved from ID-DCU Marine firmware version 2.2, setpoint registers were moved into another memory part of the controller.**

#### List of setpoint groups

Password .....	107
Engine commands and Statistics protection .....	108
Basic settings .....	109
Comms settings .....	116
Engine params .....	122
Engine protect .....	133
RPMdep protect (PRP only) .....	143
Load sharing .....	150
Analog inputs .....	156
Act. Calls/SMS .....	159
Date and Time .....	166
ID-SCM unit .....	168
DetCon20 .....	169
Protections .....	172

For full list of setpoints go to the chapter **List of setpoints (page 105)**

 **back to Controller objects**

## List of setpoints

### Group of setpoints:

#### Basic settings

Engine Name .....	109
Mode ID .....	109
Gear Teeth .....	110
RPU Gear Teeth .....	110
Nominal RPM .....	110
ECU Diag .....	111
Governor Mode .....	111
Idle/Nominal .....	112
Speed Select .....	113
RunHourSource .....	113
RHS Index .....	114
LightTimeOff .....	114
Timer ON .....	114
Timer OFF .....	115
Timer Repeat .....	115

### Group of setpoints:

#### Communication

#### Settings

5thRemPan .....	116
CAN Bus Mode .....	116
ControllerAddr .....	117
ECU Diag .....	117
LB/UART Log .....	118
RS232 MBCSpd .....	118
RS232 Mode .....	119
RS232 TermCSpd .....	119
RS485 MBCSpd .....	120
RS485 Mode .....	120
RS485 TermCSpd .....	121
SHxOcol Detect .....	121

### Group of setpoints:

#### Engine parameters

Starting RPM .....	122
--------------------	-----

Starting POil .....	123
StartPCoolant .....	123
Prestart Time .....	124
MaxCrank Time .....	124
CrankFailPause .....	124
Crank Attempts .....	125
Idle RPM .....	125
Idle Offset .....	126
Idle Time .....	126
PrelubrTime .....	127
PrelubrPause .....	127
Stop Time .....	128
Cooling Time .....	128
AfterCoolTime .....	128
D+ function .....	129
Fuel Solenoid .....	130
BI Speed Ramp .....	131
FireAlarmSpeed .....	131
EnLocalSpeed .....	131
Local Speed .....	132

### Group of setpoints:

#### Engine protection

Horn Timeout .....	133
RunOnlyBlkDel1 .....	133
RunOnlyBlkDel2 .....	134
RunOnlyBlkDel3 .....	135
BinInp Delay 1 .....	136
BinInp Delay 2 .....	136
BinInp Delay 3 .....	137
ForceBlockDel1 .....	138
ForceBlockDel2 .....	138
ForceBlockDel3 .....	139
Overspeed .....	139
UnderSpeed .....	140
MinLoadSpeed .....	140
Batt > V .....	140
Batt < V .....	141
Batt Volt Del .....	141
OverloadSpLim .....	141

Overload Del .....	142
Service Time .....	142
ECUAlarmMode .....	142

### Group of setpoints:

#### Load sharing

Load Gain .....	150
Load Int .....	150
Clutch Del .....	150
ClutchMinSpeed .....	151
ClutchMaxSpeed .....	151
Back Up Speed1 .....	152
Back Up Speed2 .....	153
Back Up Speed3 .....	154
MaxCISttPer .....	154
DetectOtherCAN .....	155
ThrottlePos .....	271

### Group of setpoints:

#### RPMdep protection (PRP only)

OPIdleRPMWrm .....	143
OPNomRPMWrm .....	144
OPIdleRPMSd .....	144
OPNomRPMSd .....	145
OilPrRPMdel .....	146
CPIdleRPMWrm .....	147
CPNomRPMWrm .....	147
CPIdleRPMSd .....	148
CPNomRPMSd .....	148
CoolPrRPMdel .....	149

### Group of setpoints:

#### Analog inputs

AIN1 Offset .....	156
AIN2 Offset .....	156
AIN3 Offset .....	156
AIN4 Offset .....	157
AIN5 Offset .....	157
AIN6 Offset .....	157

AIN7 Offset .....	158
AIN8 Offset .....	158

**Group of setpoints:****Act. Calls/SMS****Group of setpoints:****Date/Time**

Time .....	166
Date .....	166
Time Stamp Per .....	166
SummerTimeMod .....	167
EnTimeSync .....	167

**Group of setpoints: ID-SCM unit**

FreqRate1 .....	168
FreqRate2 .....	168
TransferRate1 .....	168
TransferRate2 .....	169

**Group of setpoints:****DetCon20**

IgnRedLimit .....	169
ImmStopLimit .....	170
DecreaseRamp .....	170
TimingRedGain .....	170
DelayLoadRed .....	171

**▲ back to Controller objects**



## Password

There are three levels of password protection.

- ▶ User level allows change of non-protected setpoints only.
- ▶ Operator level allows change of setpoints protected by Operator level.
- ▶ Master level allows change of setpoints protected by Operator and Master level.
- ▶ Supervisor highest level allows all setpoints or configuration changes, firmware upgrade.

**Note:** The asterisk mark "\*" appears before a setpoint name (on controller screen) if the setpoint is password protected.

The asterisk mark is removed only when the password is set from controller's front panel.

The asterisk mark is still visible on controller screen even if the password is set from IntelliMonitor.

**Note:** Even though one level may have been set from the front panel, the affected setpoints are not accessible from IntelliMonitor (direct or Modem) until this level is set in IntelliMonitor (direct or Modem). Setpoints opened from front panel are automatically closed 15 minutes after the last key has been depressed or when wrong value of setpoint is set.

**Note:** It is possible to protect remote Start, Stop commands from IntelliMonitor as well. This three level command protection can be configured from DriveConfig.

## EnterPassword

Password is a four-digit number. Only setpoints associated with the entered password level can be modified.

Use ↑ or ↓ to select the desired password and then hit enter.

- ▶ ChangePassword 1
- ▶ ChangePassword 2
- ▶ ChangePassword 3

**Note:**

- ▶ Any password can be changed once that level password or higher has been entered if the change is made from IntelliMonitor PC tool.
- ▶ Password level 3 must be entered at first to change any password if the change is made by controller front panel buttons.

### To change password protection of Setpoint or Command:

1. Open DriveConfig
2. Select Setpoints or Commands window
3. Set desired protection level: 0 or 1 or 2 or 3

## Access code

- ▶ Can be changed from IntelliMonitor software only (Monitor – Change Access code).
- ▶ Has to be set before remote modem or SMS connection is opened.
- ▶ Can be up to 16 ASCII characters

At first **Password 3** has to be entered before the new Access code can be changed.

## Engine commands and Statistics protection

Commands (Engine Cmd) password protection protects Start, Horn reset, Fault reset commands from controller front panel buttons, remote displays, Modbus line or IntelliMonitor.

Selected Command password level 0, 1, 2, 3 is valid for all engine commands except of Stop. Stop command is password protected separately by “Engine Stop” option.

Separately can be also protected statistic commands: ClearStatistics, SetSucc starts, EngRun hours, SetUnsuc starts.

To set commands protection from DriveConfig:

1. Open DriveConfig
2. Select Commands window
3. Set Password = 0 (no protection) or level 1 or 2 or 3

**Note:** Engine commands password protection works according to the description above from firmware version ID DCU MARINE 2.1 and firmware versions of remote displays listed below. In older firmware versions “Engine Cmd” group contains also Stop command, commands from ID-DCU Marine local panel (buttons directly on the controller) were not password protected in older versions.

*InteliVision 5 CAN (Backlit) – from 1.3*

*InteliVision 8 (Marine) – depends on screen configuration in archive of ID-DCU Marine controller. Default archives for ID-DCU Marine version 2.1 and higher support independent password protection of Stop command according to description above.*

**Note:** All setpoints below can be modified from Remote panel or IntelliMonitor as well.

## Basic settings

### Engine Name

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[-]		
<b>Default value</b>	ID		
<b>Step</b>	[-]		
<b>Comm object</b>	8637	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
User defined name, used for IntelliDrive controller identification with remote connection.			
Engine name is max 14 characters long and have to be entered manually using IntelliMonitor software.			
<i><b>Note:</b> Engine name is not changed when new archive is loaded. Check Engine name after firmware upgrade.</i>			

 [back to List of setpoints](#)

### Mode ID

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[-]		
<b>Default value</b>	OFF		
<b>Step</b>	[-]		
<b>Comm object</b>	8315	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<ul style="list-style-type: none"> <li>▶ Mode ID [ OFF, AUX ]</li> <li>▶ Mode ID [ OFF, EME ]</li> <li>▶ Mode ID [ OFF, EME, HRB ]</li> <li>▶ Mode ID [ OFF, PRP ]</li> </ul>			
Equivalent to Controller mode changes by <b>Mode</b> → or ← <b>Mode</b> buttons.			

 [back to List of setpoints](#)

## Gear Teeth

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	1 .. 500 [-]		
<b>Default value</b>	120		
<b>Step</b>	1		
<b>Comm object</b>	8252	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Number of teeth on the engines flywheel for the pick-up. Setpoint (RPM pickup measuring) is ignored when RPM is received via J1939.			

[back to List of setpoints](#)

## RPU Gear Teeth

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	1 .. 500 [-]		
<b>Default value</b>	120		
<b>Step</b>	1		
<b>Comm object</b>	10920	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Number of teeth on the engines flywheel for the pick-up connected to ID-RPU.			

[back to List of setpoints](#)

## Nominal RPM

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	30 .. 4000 [RPM]		
<b>Default value</b>	1500		
<b>Step</b>	1		
<b>Comm object</b>	8253	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Nominal engine speed, base for Overspeed protection limit and <b>Speed Request (page 265)</b> percentage calculation.			
<p><b>Note:</b> Nominal RPM must correspond to 100 % Throttle position in ECU for correct Load sharing function in PRP application.</p>			

[back to List of setpoints](#)

## ECU Diag

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[ENABLED, DISABLED, EXTERNAL]		
<b>Default value</b>	ENABLED		YES
<b>Step</b>	[-]		
<b>Comm object</b>	10353	<b>Related applications</b>	
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Alarm list indication ECU Diag disabled is indicated when ECU diagnostics is disabled. The ECU Diagnostic is controlled by <b>ECU DiagBick</b> binary input in case of setting to EXTERNAL.			

[back to List of setpoints](#)

## Governor Mode

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[ISOCHRON, DROOP, BIN.INPUT]		
<b>Default value</b>	ISOCHRON		
<b>Step</b>	[-]		
<b>Comm object</b>	10230	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Activates/deactivates the logical binary output Droop Sw, that can be configured as J1939 output to switch ECU mode. BIN.INPUT: ISOCH/DROOP mode is switched via <b>BI DROOP (PAGE 189)</b> (DROOP when closed).			

[back to List of setpoints](#)

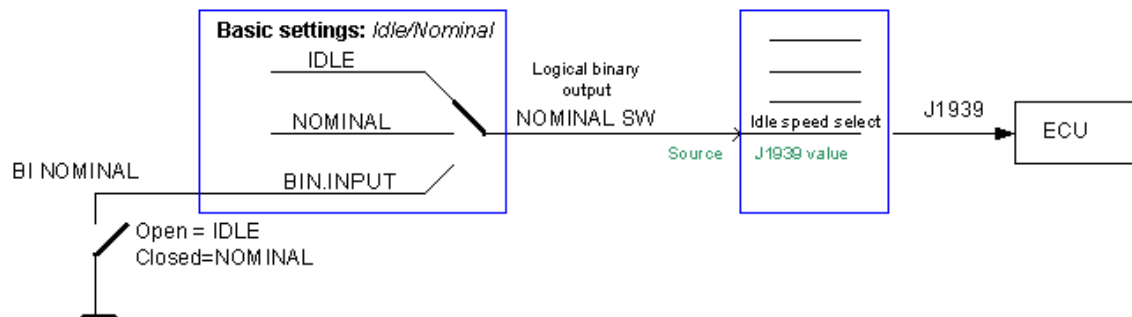
## Idle/Nominal

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[IDLE, NOMINAL, BIN.INPUT]		
<b>Default value</b>	IDLE		
<b>Step</b>	[-]		
<b>Comm object</b>	10336	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

Activates/deactivates the logical binary output Nominal Sw, that can be configured as J1939 output to switch ECU.

BIN.INPUT: IDLE/NOMINAL mode is switched via **BI IDLE (PAGE 189)** (NOMINAL when closed).



[back to List of setpoints](#)

## Speed Select

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0																
<b>Range [units]</b>	[PRIMARY, SECONDARY, BIN.INPUT]																		
<b>Default value</b>	PRIMARY																		
<b>Step</b>	[-]																		
<b>Comm object</b>	10231	<b>Related applications</b>	AUX, EME, CMB																
<b>Config level</b>	Standard																		
<b>Setpoint visibility</b>	Always																		
<b>Description</b>																			
<p>Activates/deactivates the logical binary output Secondary Sw. This output can be configured to J1939 output to switch ECU Nominal – RPM. see Logical BI in table below.</p> <p>BIN.INPUT: PRIMARY / SECONDARY Nominal RPM is selected via <b>BI SECOND RPM (PAGE 189)</b> – see Logical BI in table below.</p>																			
<table border="1"> <thead> <tr> <th>Setpoint name</th> <th>Setpoint setting</th> <th>Logical BO</th> <th>Logical BI</th> </tr> </thead> <tbody> <tr> <td>Governor Mode</td> <td>ISOCHR / DROOP / BIN.INPUT</td> <td>Droop Sw</td> <td>BI Droop</td> </tr> <tr> <td>Speed Select</td> <td>PRIMARY / SECONDARY / BIN.INPUT</td> <td>Second RPM Sw</td> <td>BI Secondr RPM</td> </tr> <tr> <td>Idle/Nominal</td> <td>IDLE / NOMINAL / BIN.INPUT</td> <td>Nominal Sw</td> <td>BI Idle</td> </tr> </tbody> </table>				Setpoint name	Setpoint setting	Logical BO	Logical BI	Governor Mode	ISOCHR / DROOP / BIN.INPUT	Droop Sw	BI Droop	Speed Select	PRIMARY / SECONDARY / BIN.INPUT	Second RPM Sw	BI Secondr RPM	Idle/Nominal	IDLE / NOMINAL / BIN.INPUT	Nominal Sw	BI Idle
Setpoint name	Setpoint setting	Logical BO	Logical BI																
Governor Mode	ISOCHR / DROOP / BIN.INPUT	Droop Sw	BI Droop																
Speed Select	PRIMARY / SECONDARY / BIN.INPUT	Second RPM Sw	BI Secondr RPM																
Idle/Nominal	IDLE / NOMINAL / BIN.INPUT	Nominal Sw	BI Idle																
<p><b>Note:</b> Basic setting: <i>Nominal RPM</i> must correspond to ECU Nominal RPM for 100 % Throttle position in <i>PRP</i> and 50 % in <i>AUX</i>.</p>																			

🔍 back to List of setpoints

## RunHourSource

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[AUTO, INTERNAL, ECU]		
<b>Default value</b>	AUTO		
<b>Step</b>	[-]		
<b>Comm object</b>	8630	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p>AUTO – controller displays valid running hours value received from any ECU module. In case of erratic reading use option ECU and parameter <b>RHS Index</b> to define module, which is source of running hours. Running hours value calculated by controller is used, if no valid value is received.</p> <p>INTERNAL – ID-DCU Marine running hours statistical value is used</p> <p>ECU – controller reads running hours from selected ECU module. Parameter <b>RHS Index</b> is used to select index of module, from which controller reads running hours.</p> <p>In case no ECU support is configured, internal running hours value is used despite <b>RunHoursSource</b> setting.</p>			

🔍 back to List of setpoints

## RHS Index

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	1 .. 10 [-]		
<b>Default value</b>	1		
<b>Step</b>	1		
<b>Comm object</b>	15794	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
RHS Index (RHS means Running Hours Souce ) is index of ECU module, which is used as source of engine running hours.			

⬅ back to List of setpoints

## LightTimeOff

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 250 [min]		
<b>Default value</b>	0		
<b>Step</b>	1		
<b>Comm object</b>	10121	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Timeout for ID display backlight automatic switch off. Zero setting disables display backlight switch off. Backlight is automatically switched on after any key press or Alarm activation.			
<i>Note: LightTimerOff setpoint influences the Remote panel not master controller when changed on Remote panel.</i>			

⬅ back to List of setpoints

## Timer ON

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[hh:mm:ss]		
<b>Default value</b>	0:00:00		
<b>Step</b>	[-]		
<b>Comm object</b>	10042	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
See Timer Repeat (page 115) description.			

⬅ back to List of setpoints



## Timer OFF

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[hh:mm:ss]		
<b>Default value</b>	0:00:00		
<b>Step</b>	[-]		
<b>Comm object</b>	10199	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
See Timer Repeat (page 115) description.			

[back to List of setpoints](#)

## Timer Repeat

<b>Setpoint group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[Never, Mon-Fri, Mon-Sat, Mon-Sun, Sat-Sun ]		
<b>Default value</b>	NEVER		
<b>Step</b>	[-]		
<b>Comm object</b>	10045	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Logical binary output Timer Active is closed when actual time is over the Timer ON and opened when actual time is over Timer OFF. The function depends on Timer Repeat settings. The output is closed when controller is switched On and Timer settings corresponds to closed state.			

[back to List of setpoints](#)

## Comms settings

### 5thRemPan

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[ENABLE, DISABLE]		
<b>Default value</b>	ENABLE		
<b>Step</b>	[-]		
<b>Comm object</b>	24399	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
The parameter switches the address for a 5th ID-DCU Marine display, the fifth ID-DCU Marine display occupies a modem address if ENABLE is set. ENABLE is a default value.			

[back to List of setpoints](#)

### CAN Bus Mode

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[32C, 8C]		
<b>Default value</b>	32C		
<b>Step</b>	[-]		
<b>Comm object</b>	24499	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Inter-controller, IG-IB, IB-NT CAN2 bus speed selection.			
32C: High speed CAN (250 kbd) applicable with up to 32 controllers, CAN bus limited up to 200 meters.			
8C: Low speed CAN (50 kbd) applicable with up to 8 controllers, CAN bus limited up to 900 meters.			
<b>Note:</b> Low speed CAN2 bus use for long distance connection only. Set all connected controllers to the same speed. Other units IG-IB, IB-NT detect CAN bus speed automatically.			
<b>Note:</b> If the controller is connected to IB-NT, set the mode to 8C - verified stable communication speed.			

[back to List of setpoints](#)

## ControllerAddr

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	1 .. 32 [-]		
<b>Default value</b>	1		
<b>Step</b>	1		
<b>Comm object</b>	24537	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Controller identification number. Each controller in the group has to have its own unique number. Default value is 1.			
<i><b>Note:</b> The IntelliDrive <b>ControllerAddr</b> must correspond to IntelliMonitor or DriveConfig communication setup setting when opening Direct or Modem connection.</i>			

[back to List of setpoints](#)

## ECU Diag

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[ENABLED, DISABLED, EXTERNAL]		
<b>Default value</b>	ENABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	10353	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
This setpoint is used to disable reading of diagnostic codes from ECU if an external diagnostic tool is connected to engine.			
Message ECU Diag disabled is displayed in the alarm list while ECU diagnostics is disabled.			
The ECU Diagnostic is disabled/enabled using LBI: <b>ECU DiagBick</b> binary input in case of setting to EXTERNAL.			

[back to List of setpoints](#)

## LB/UART Log

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DISABLED, ENABLED]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	11327	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p>The setpoint enables/disables logging of remote communication activity. If logging is enabled connection and disconnection of each remote terminal as well as entering access code are recorded into the history.</p> <p><i><b>Note:</b> The terminal is disconnected automatically after 5 min of inactivity and next communication request from the same terminal is considered as a new connection. When logging is enabled in certain conditions the history may be filled up with large number of records related to the communication and important records may be overwritten quite fast.</i></p>			

[back to List of setpoints](#)

## RS232 MBCSpd

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[9600, 19200, 38400, 57600, 115200] [bps]		
<b>Default value</b>	9600		
<b>Step</b>	[-]		
<b>Comm object</b>	24477	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p>The setpoint adjusts communication speed of the RS232 interface when <b>RS232 Mode (page 119)</b> is set to Modbus.</p>			

[back to List of setpoints](#)

## RS232 Mode

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[STANDARD, MODBUS]		
<b>Default value</b>	STANDARD		
<b>Step</b>	[-]		
<b>Comm object</b>	24522	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p>Communication protocol selection.</p> <ul style="list-style-type: none"> <li>▶ STANDARD: IntelliDrive (DriveConfig, IntelliMonitor, Remote panel) communication protocol.</li> <li>▶ MODBUS: Modbus RTU protocol.</li> </ul> <p><b>Note:</b> Detailed description of Modbus protocol include some examples, see in <a href="#">IntelliGen Communication guide</a>.</p>			

⬅ back to List of setpoints

## RS232 TermCSpd

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[19200, 38400, 57600, 115200] [bps]		
<b>Default value</b>	38400		
<b>Step</b>	[-]		
<b>Comm object</b>	24341	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p>The setpoint adjusts communication speed of the RS232 interface when <b>RS232 Mode (page 119)</b> is set to STANDARD.</p> <p><b>Note:</b> If the controller is connected to IB-NT via the RS232 interface, set the speed to 57600 - the supported communication speed.</p>			

⬅ back to List of setpoints

## RS485 MBCSpd

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[9600, 19200, 38400, 57600, 115200] [bps]		
<b>Default value</b>	9600		
<b>Step</b>	[-]		
<b>Comm object</b>	24420	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
The setpoint adjusts communication speed of the RS485 interface when <b>RS485 Mode (page 120)</b> is set to Modbus.			

 [back to List of setpoints](#)

## RS485 Mode

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[STANDARD, MODBUS, ECU LINK]		
<b>Default value</b>	STANDARD		
<b>Step</b>	[-]		
<b>Comm object</b>	24451	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Communication protocol selection.			
<ul style="list-style-type: none"> <li>▶ STANDARD: IntelliDrive (DriveConfig, IntelliMonitor, Remote panel) communication protocol.</li> <li>▶ MODBUS: Modbus RTU protocol.</li> <li>▶ ECU LINK: Connection to an electronic-controlled engine which uses non-J1939 ECU. The proper ECU type must be also configured with GenConfig.</li> </ul>			
<p><b>Note:</b> Detailed description of Modbus protocol include some examples, see in <a href="#">IntelliGen Communication guide</a>.</p>			

 [back to List of setpoints](#)

## RS485 TermCSpd

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[19200, 38400, 57600, 115200] [bps]		
<b>Default value</b>	38400 bps		
<b>Step</b>	[-]		
<b>Comm object</b>	24340	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
The setpoint adjusts communication speed of the RS485 interface when <b>RS485 Mode (page 120)</b> is set to STANDARD.			

[back to List of setpoints](#)

## SHxOcol Detect

<b>Setpoint group</b>	Communication Settings	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DISABLED, ENABLED]		
<b>Default value</b>	ENABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	11024	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
This setpoint is used to enable/disable evaluation of collisions of virtual shared peripheral modules. A collision means that there is more than one source (shared outputs module) active on the CAN2 bus.			
<p><b>Note:</b> In certain situations multiple sites with bus tie breakers may need to have more shared outputs sources as the CAN bus line is in some points interrupted according to bus tie breakers position. Normally a collision would be indicated if there were more sources on the bus and this setpoint can be used to disable the evaluation of collisions in this special case.</p>			

[back to List of setpoints](#)

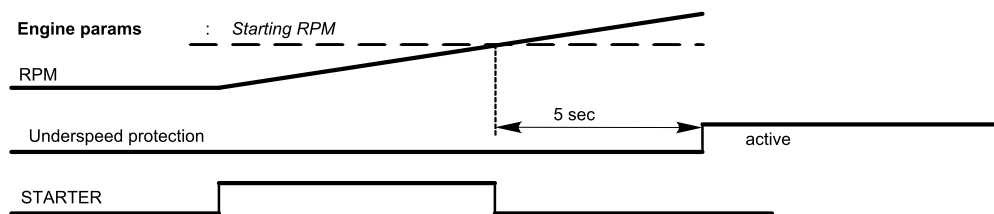
## Engine params

### Starting RPM

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	30 .. 1500 [RPM]		
<b>Default value</b>	350		
<b>Step</b>	1		
<b>Comm object</b>	9095	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

#### Description

“Firing” speed when controller stops cranking = one of the engine running indications.



**Note:** Under speed limit is fix 30 RPM.

[back to List of setpoints](#)



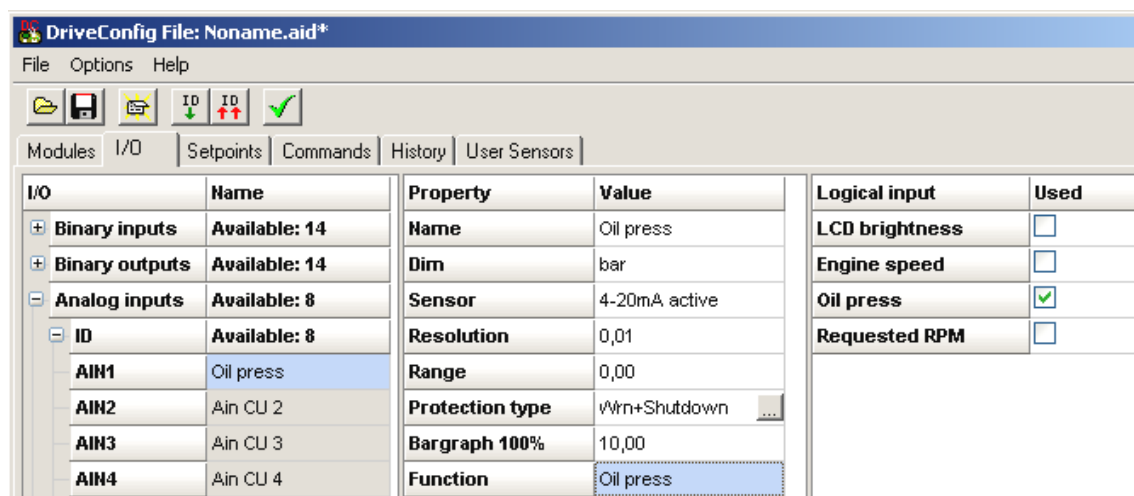
## Starting POil

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 10.0 [Bar]		
<b>Default value</b>	10,0		
<b>Step</b>	0.1		
<b>Comm object</b>	9681	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

Oil pressure limit when controller stops cranking = one of the engine running indications.

To activate this function any Analog input must be configured to Analog logical input Oil press.



**Note:** Step, Range and dimension depend on corresponding Analog input sensor characteristic.

⬅ back to List of setpoints

## StartPCoolant

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 10.0 [Bar]		
<b>Default value</b>	10,0		
<b>Step</b>	0.1		
<b>Comm object</b>	10138	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

Coolant pressure limit = one of the engine running indications. To activate this function any Analog input must be configured to Analog logical input Coolant press.

**Note:** PRP only

**Note:** Step, Range and dimension depend on corresponding Analog input sensor characteristic.

⬅ back to List of setpoints

## Prestart Time

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 600 [s]		
<b>Default value</b>	2		
<b>Step</b>	1		
<b>Comm object</b>	8394	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Time the binary output Prestart is active prior to engine start (Start request sending to ECU). Set to zero if you want to start immediately after Start button is pressed (the Prestart output stays opened). RPM must be zero during <b>Prestart time</b> otherwise the Starting procedure is not activated.			

[back to List of setpoints](#)

## MaxCrank Time

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	1 .. 200 [s]		
<b>Default value</b>	8		
<b>Step</b>	1		
<b>Comm object</b>	8234	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Amount of time the controller will crank the engine in an attempt to start.			

[back to List of setpoints](#)

## CrankFailPause

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	CMB, EME: 3 ..200 [s], AUX, PRP: 0 .. 200 [-]		
<b>Default value</b>	8		
<b>Step</b>	1		
<b>Comm object</b>	8257	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Pause between cranking attempts.			

[back to List of setpoints](#)

## Crank Attempts

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	CMB, EME: 0 .. 200 [-], AUX, PRP: 1 .. 200 [-]		
<b>Default value</b>	3		
<b>Step</b>	1		
<b>Comm object</b>	8255	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Max number of crank attempts.			
CMB, EME: Setting to 0 means unlimited number of starting attempts.			
<p><b>Note:</b> <i>There is one start attempt only in case of panel Start button or REMOTE START (PAGE 180) activation. Number of Cranking attempts based on this setpoint is accepted when start is activated by REMREPSTART (PRP ONLY) (PAGE 1) or BLACKOUT START / REMREPSTART (PAGE 182) (AUX, EME and HRB) only. The setpoint is not followed if Sd Override is active, crank attempts number is then unlimited in case of Blackout Start.</i></p>			
Together with request of unlimited start attempts was created PRESTARTOVRD (PAGE 190) - activation means immediate transition from state Prestart to Cranking.			
Same function was applied to second push of START button. First press of START button activates state Prestart, second press of START button skips prestart period.			

[◀ back to List of setpoints](#)

## Idle RPM

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	Starting RPM.. Nominal RPM [RPM]		
<b>Default value</b>	500		
<b>Step</b>	1		
<b>Comm object</b>	9946	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Default Idle speed (should be the same as Idle speed set with engine ECU).			

[◀ back to List of setpoints](#)

## Idle Offset

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 100.0 [%]		
<b>Default value</b>	0,0		
<b>Step</b>	0.1		
<b>Comm object</b>	10010	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Offset of Idle speed in % of RPM difference between nominal and idle setpoints (Nominal RPM – Idle RPM) – see <b>Function description details on page 68</b>			
<i>Note: 100 % of <b>Engine Values: Requested Speed</b> is the range between <b>Engine params: Idle RPM</b> and <b>Basic setting: Nominal RPM</b>.</i>			

🔍 back to List of setpoints

## Idle Time

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 600 [s]		
<b>Default value</b>	10		
<b>Step</b>	1		
<b>Comm object</b>	9097	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Idle time delay starts when RPM exceeds Starting RPM.			
During the Idle time the <b>IDLE/NOMINAL (PAGE 203)</b> is opened and after then it is closed. <b>IDLE/NOMINAL (PAGE 203)</b> opens during Cooling period (Cooling Time) again.			

🔍 back to List of setpoints

## PrelubrTime

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 600 [s]		
<b>Default value</b>	0		
<b>Step</b>	1		
<b>Comm object</b>	8780	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p>This is the time the binary output Prelubrication is active. The controller will activate binary output Prelubrication for this amount of time, then pause for PrelubrPause, then activate again. This will continue the entire time the engine is not running. Function is not active in controller OFF mode.</p>			

🔍 back to List of setpoints

## PrelubrPause

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	1 .. 4000 [min]		
<b>Default value</b>	1		
<b>Step</b>	1		
<b>Comm object</b>	8781	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p>Time interval between prelubrication cycles –<b>PrelubrTime</b> (page 127).</p> <p><b>Note:</b> To use Prelubrication, configure Binary output Prelubrication at first.          Prelubrication is disabled in controller OFF mode or when PrelubrTime is set to zero.          When engine is running Prelubrication binary output is opened.          Prelubrication starts PrelubrPause after engine stops. Prelubrication starts immediately when:</p> <ul style="list-style-type: none"> <li>- controller power supply turns on</li> <li>- mode changes from OFF to another</li> <li>- Emergency Stop is released</li> </ul>			

🔍 back to List of setpoints

## Stop Time

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 600 [s]		
<b>Default value</b>	60		
<b>Step</b>	1		
<b>Comm object</b>	9815	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Under normal conditions the engine must certainly stop within this period. The period starts by issuing stop command.			

[back to List of setpoints](#)

## Cooling Time

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 600 [s]		
<b>Default value</b>	30		
<b>Step</b>	1		
<b>Comm object</b>	8258	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Runtime of unloaded engine to cool down engine before stopping.			

[back to List of setpoints](#)

## AfterCoolTime

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 600 [s]		
<b>Default value</b>	120		
<b>Step</b>	1		
<b>Comm object</b>	8662	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
COOLING PUMP (PAGE 206) is closed when engine starts and opens with AfterCoolTime delay after engine stopping.			

[back to List of setpoints](#)

## D+ function

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[ENABLED, CHRGFAIL, DISABLED]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	9683	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p><b>ENABLED:</b> The D+ terminal is used for both functions – “running engine” detection and charge fail detection.</p> <p><b>CHRGFAIL:</b> The D+ terminal is used for charge fail detection only</p> <p><b>DISABLED:</b> The D+ terminal is not used.</p> <p><i>Note: Alternator magnetization current is provided independently from the parameter setting.</i></p>			

[◀ back to List of setpoints](#)

## Fuel Solenoid

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DIESEL, GAS]		
<b>Default value</b>	DIESEL		
<b>Step</b>	[-]		
<b>Comm object</b>	9100	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

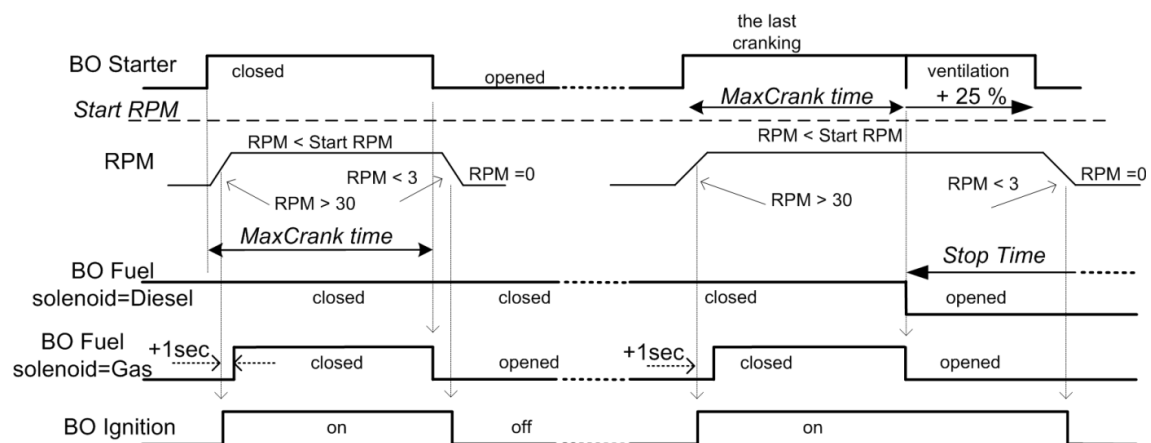
Selection of **FUEL SOLENOID** output function.

**DIESEL:** The output is still closed except the **Stop Time (page 128)** timer if stop command is sent to an engine.

**GAS:** Ignition is activated (binary output Ignition is closed) when RPM is over the 30 RPM (fix value). Gas valve (binary output Gas is closed) is opened 1 sec after Ignition output. Gas output opens after stop command or in pause between repeated start.

If the gas engine is unsuccessful in starting the starter output will stay energized 25 % longer in order to vent the remaining gas.

Example of FUEL SOLENOID output behavior during unsuccessful start.



[back to List of setpoints](#)



## BI Speed Ramp

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 100.0 [%/s]		
<b>Default value</b>	5		
<b>Step</b>	0.1		
<b>Comm object</b>	9984	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Speed ramp setting for <b>SPEED UP (PAGE 188) / SPEED DOWN (PAGE 187)</b> , not for Analog input request.			

🔍 back to List of setpoints

## FireAlarmSpeed

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 100.0 [%]		
<b>Default value</b>	50.0		
<b>Step</b>	0.1 % of Requested RPM range.		
<b>Comm object</b>	10008	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
When <b>FIRE SPEED (PAGE 183)</b> is closed the <b>CLUTCH CONNECT (PRP ONLY) (PAGE 202)</b> opens (this action deactivates loadsharing mode if it was activated before) and <b>ThrottlePos (page 271)</b> is set to <b>Engine params: FireAlarmSpeed</b> value.			

🔍 back to List of setpoints

## EnLocalSpeed

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[ENABLED, DISABLED]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	10098	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
ENABLED: <b>Speed Request (page 265)</b> is defined by <b>Local Speed (page 132)</b> setpoint that can be modified by Fast edit function from front panel (4 sec Enter, / <sup>-</sup> , Enter).			
DISABLED: <b>Speed Request (page 265)</b> is changed via <b>SPEED UP (PAGE 188) / SPEED DOWN (PAGE 187)</b> or via <b>REQUESTED RPM (PAGE 245)</b> , see <b>Speed Request (page 265)</b> t charts for (page 266) and (page 266) modes.			

🔍 back to List of setpoints

## Local Speed

<b>Setpoint group</b>	Engine params	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 100.0 [%]		
<b>Default value</b>	0.0		
<b>Step</b>	0.1		
<b>Comm object</b>	9948	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p>Setpoint specifies <b>Speed Request (page 265)</b> when <b>EnLocalSpeed (page 131)</b> = ENABLED. Setpoint can be changed as standard setpoint or by Fast edit function: press Enter for 4 sec, / set value, press Enter to confirm, see <b>Speed Request (page 265)</b> charts for PRP and AUX / EME / HRB modes.</p>			

 [back to List of setpoints](#)

## Engine protect

### Horn Timeout

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 600 [s]		
<b>Default value</b>	10		
<b>Step</b>	1		
<b>Comm object</b>	8264	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
The maximum time for which is the binary output Horn closed (horn, buzzer will sound). If it is requested to sound hound until alarm is cleared, set the parameter to zero.			

[back to List of setpoints](#)

### RunOnlyBlkDel1

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 60 [s]		
<b>Default value</b>	10		
<b>Step</b>	1		
<b>Comm object</b>	10023	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
This parameter adjusts delay after engine start when alarms configured as RunOnlyBlkDel1 (i.e. "running only", group #1) are started to be evaluated. The "running only" alarms are not beeing evaluated while the engine is not running or then, after start, while the adjusted delay is running.			
For details see drawing, which is part of <b>RunOnlyBlkDel3 (page 135)</b> description.			

[back to List of setpoints](#)

## RunOnlyBlkDel2

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 60 [s]		
<b>Default value</b>	20		
<b>Step</b>	1		
<b>Comm object</b>	10024	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p>This parameter adjusts delay after engine start when alarms configured as RunOnlyBlkDel2 (i.e. "running only", group #2) are started to be evaluated. The "running only" alarms are not being evaluated while the engine is not running or then, after start, while the adjusted delay is running.</p> <p>For details see drawing, which is part of <b>RunOnlyBlkDel3 (page 135)</b> description.</p>			

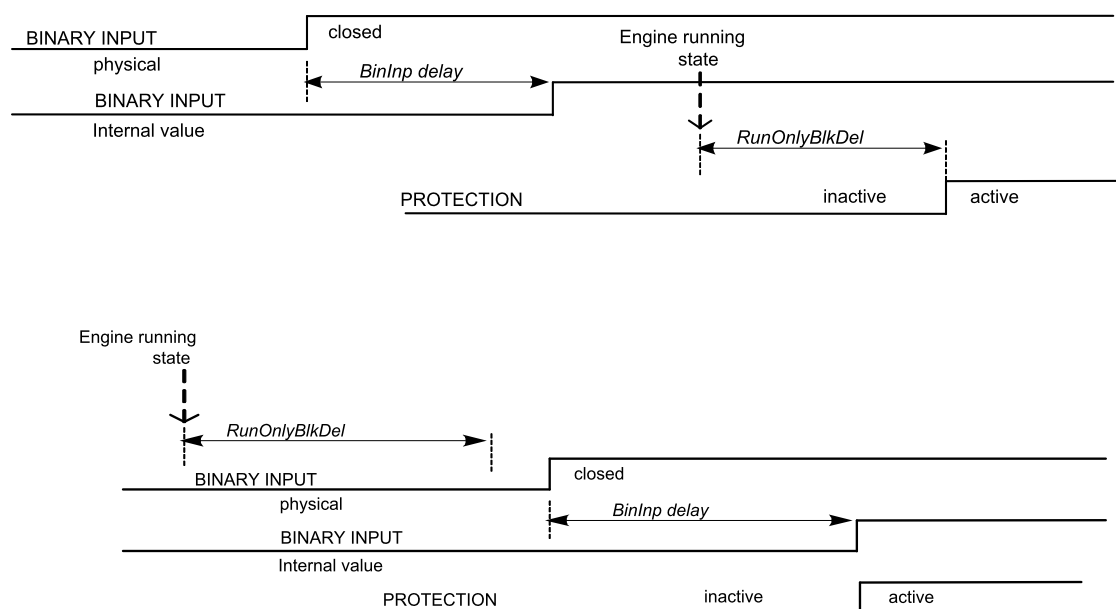
[◀ back to List of setpoints](#)

## RunOnlyBlkDel3

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 60 [s]		
<b>Default value</b>	30		
<b>Step</b>	1		
<b>Comm object</b>	10025	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

This parameter adjusts delay after engine start when alarms configured as RunOnlyBlkDel3 (i.e. "running only", group #3) are started to be evaluated. The "running only" alarms are not being evaluated while the engine is not running or then, after start, while the adjusted delay is running.



#### Note:

**Engine running state =**

*RPM > Starting RPM (page 122) or*

*Analog input Oil Press > Starting POil (page 123) or*

*Analog input Coolant Press > StartPCoolant (page 123) (PRP only) or*

*Active Binary input RunIndication1 or*

*Active Binary input RunIndication2 or*

*Active Binary input RunIndication3.*

[back to List of setpoints](#)

## BinInp Delay 1

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 60 [s]		
<b>Default value</b>	1		
<b>Step</b>	1		
<b>Comm object</b>	10131	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Binary input protection is activated when input is closed for longer time than BinInp delay 1. To use this filter, binary input protection Delay must be configured in DriveConfig to BinInp delay 1. For details see <b>BinInp Delay 3 (page 137)</b> description.			

[back to List of setpoints](#)

## BinInp Delay 2

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 60 [s]		
<b>Default value</b>	5		
<b>Step</b>	1		
<b>Comm object</b>	10132	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Binary input protection is activated when input is closed for longer time than BinInp delay 2. To use this filter, binary input protection Delay must be configured in DriveConfig to BinInp delay 2. For details see <b>BinInp Delay 3 (page 137)</b> description.			

[back to List of setpoints](#)

## BinInp Delay 3

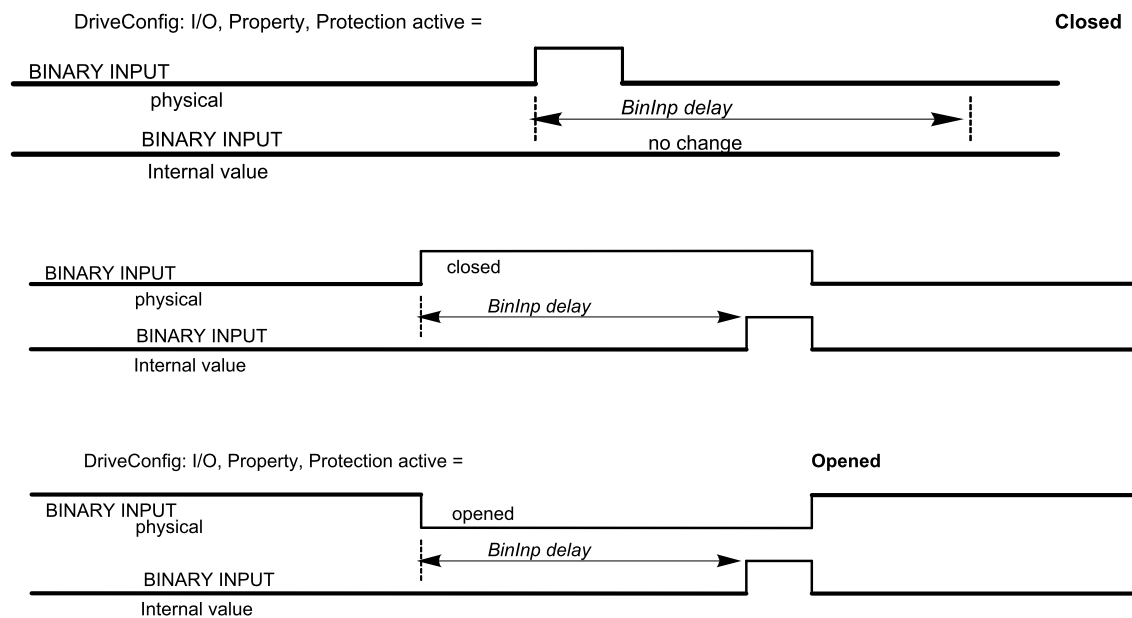
<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 60 [s]		
<b>Default value</b>	10		
<b>Step</b>	1		
<b>Comm object</b>	10133	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

Binary input protection is activated when input is closed for longer time than BinInp delay 3. To use this filter, binary input protection Delay must be configured in DriveConfig to BinInp delay 3.

#### Note:

*BinInp delay x is active only for Binary inputs configured as protection and it is related to protection only. BinInp delay x does not affect optional logical function of an input.*



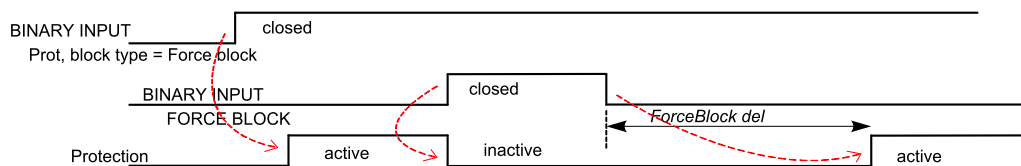
[back to List of setpoints](#)

### ForceBlockDel1

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 60 [s]		
<b>Default value</b>	0		
<b>Step</b>	1		
<b>Comm object</b>	10569	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

#### Description

Delay for Force block protection activation after binary input Force Block 1 is opened. Protection deactivation is without delay. Protection is activated/deactivated independent on engine running or not running state.



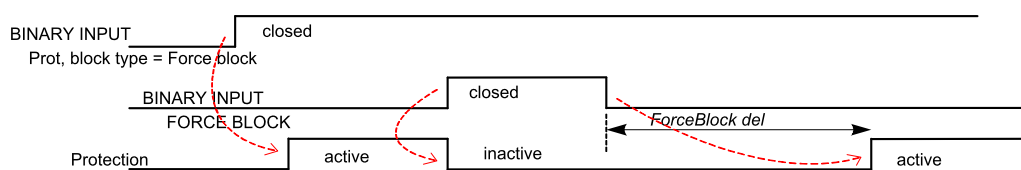
[back to List of setpoints](#)

### ForceBlockDel2

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 60 [s]		
<b>Default value</b>	0		
<b>Step</b>	1		
<b>Comm object</b>	10570	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

#### Description

Delay for Force block protection activation after binary input Force Block 2 is opened. Protection deactivation is without delay. Protection is activated/deactivated independent on engine running or not running state.



[back to List of setpoints](#)

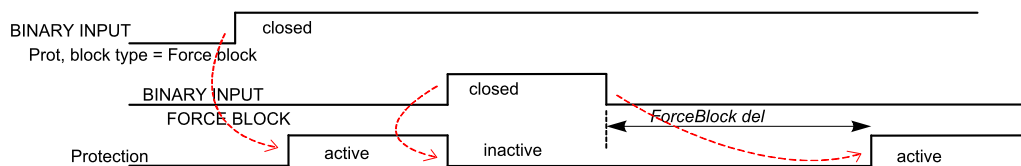


### ForceBlockDel3

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 60 [s]		
<b>Default value</b>	0		
<b>Step</b>	1		
<b>Comm object</b>	10571	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

#### Description

Delay for Force block protection activation after binary input Force Block 3 is opened. Protection deactivation is without delay. Protection is activated/deactivated independent on engine running or not running state.



[back to List of setpoints](#)

### Overspeed

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 200 [%]		
<b>Default value</b>	110		
<b>Step</b>	1 % of Nominal RPM (page 110)		
<b>Comm object</b>	8263	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

#### Description

Threshold for engine overspeed protection.

[back to List of setpoints](#)

## UnderSpeed

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. Starting RPM (page 122) [RPM]		
<b>Default value</b>	30		
<b>Step</b>	1		
<b>Comm object</b>	8260	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Underspeed alarm is activated when engine is running and actual RPM is below the UnderSpeed threshold.			

[back to List of setpoints](#)

## MinLoadSpeed

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. Nominal RPM [RPM]		
<b>Default value</b>	500		
<b>Step</b>	1		
<b>Comm object</b>	10139	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Binary output Ready to load is closed if RPM > MinLoadSpeed and engine is in Running state. Use this output to enable/disable connecting of engine load. MinLoadSpeed is a condition to close <b>CLOSE LOAD</b> (PAGE 207) when panel I/O button is used to connect load to engine.			

[back to List of setpoints](#)

## Batt > V

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	Batt <V.. 40.0 [V]		
<b>Default value</b>	30.0		
<b>Step</b>	0.1		
<b>Comm object</b>	9587	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Warning level for battery over voltage.			

[back to List of setpoints](#)

## Batt < V

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	8.0 .. Batt >V [V]		
<b>Default value</b>	8.0		
<b>Step</b>	0.1		
<b>Comm object</b>	8387	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Warning level for low battery voltage.			

[back to List of setpoints](#)

## Batt Volt Del

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 600 [s]		
<b>Default value</b>	10		
<b>Step</b>	1		
<b>Comm object</b>	8383	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Delay for battery voltage alarms.			

[back to List of setpoints](#)

## OverloadSpLim

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 100.0 [%]		
<b>Default value</b>	20.0		
<b>Step</b>	0.1		
<b>Comm object</b>	9950	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Engine overload protection limit. See <b>Function description details (page 68)</b> .			

[back to List of setpoints](#)

## Overload Del

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 600 [s]		
<b>Default value</b>	10		
<b>Step</b>	1		
<b>Comm object</b>	9947	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Delay for Overload RPM protection limit.			

[back to List of setpoints](#)

## Service Time

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 65535 [h]		
<b>Default value</b>	65535		
<b>Step</b>	1		
<b>Comm object</b>	9648	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Running hours count down counter is decremented when engine is running. Service alarm is indicated in Alarm list and History record is done when counter reaches zero. Service time setpoint is initial counter value and it is gradually decrement when engine runs.			
<p><b>Note:</b> Once the service time has elapsed the Service time will have to be adjusted to non-zero value to clear the alarm and begin a new countdown.</p>			

[back to List of setpoints](#)

## ECUAlarmMode

<b>Setpoint group</b>	Engine protect	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DEFAULT, ALARM ONLY]		
<b>Default value</b>	DEFAULT		
<b>Step</b>	[-]		
<b>Comm object</b>	15813	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
DEFAULT: <b>COMMON WRN (PAGE 200)</b> is activated , if ECU alarm is received by controller.			
ALARM ONLY: <b>COMMON WRN (PAGE 200)</b> is not activated, if ECU alarm is received by controller.			

[back to List of setpoints](#)

## RPMdep protect (PRP only)

Groups	Name	Actual value	Dimension
Basic settings	OPIdleRPMWrn	2,0	Bar
Engine params	OPNomRPMWrn	3,0	Bar
Engine protect	OPIdleRPMscl	1,0	Bar
<b>RPMdep protect</b>	OPNomRPMscl	2,0	Bar
Loadsharing	OilPrRPMdel	5	s
Act. calls/SMS	CPIdleRPMWrn	2,0	Bar
Date/Time	CPNomRPMWrn	3,0	Bar
	CPIdleRPMscl	1,0	Bar
	CPNomRPMscl	2,0	Bar
	CoolPrRPMdel	5	s

RPM dependent Oil pressure and Coolant pressure protections are available in PRP (propulsion) application only. Both protections are by default set to Protection block type = RunOnlyBlkDel1 (Engine running - block delay 1).

There are two setpoints for linear Warning limit, two for Shutdown limit and one for delay. Setpoints adjusting step and range depends on corresponding sensor characteristics.

**Note:** The particular RPM dependent protection is fully disabled if both `xxxIdlexxx` and `xxxNomxxx` parameters are set to value 0,0. I.e. the protection is not activated even if measured value is negative (e.g. when there is a wrong sensor calibration).

### OPIdleRPMWrn

<b>Setpoint group</b>	RPMdep protection (PRP only)	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 10.0 [Bar]		
<b>Default value</b>	0.0		
<b>Step</b>	0.1		
<b>Comm object</b>	10140	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Linear Warning characteristic is defined by two points for <b>Idle RPM (page 125)</b> and <b>Nominal RPM (page 110)</b> . OPIdleRPMWrn defines oil pressure warning level at idle speed.			

[back to List of setpoints](#)

## OPNomRPMWrn

<b>Setpoint group</b>	RPMdep protection (PRP only)	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 10.0 [Bar]		
<b>Default value</b>	0.0		
<b>Step</b>	0.1		
<b>Comm object</b>	10141	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Linear Warning characteristic is defined by two points for <b>Idle RPM (page 125)</b> and <b>Nominal RPM (page 110)</b> . OPNomRPMWrn defines oil pressure warning level at nominal speed. For details see <b>OiPrRPMdel</b> description.			

[▲ back to List of setpoints](#)

## OPIdeRPMSd

<b>Setpoint group</b>	RPMdep protection (PRP only)	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 10.0 [Bar]		
<b>Default value</b>	0.0		
<b>Step</b>	0.1		
<b>Comm object</b>	10142	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Linear Shutdown characteristic is defined by two points for <b>Idle RPM (page 125)</b> and <b>Nominal RPM (page 110)</b> . OPIdeRPMSd defines oil pressure shutdown level at idle speed. For details see <b>OiPrRPMdel (page 146)</b> description.			

[▲ back to List of setpoints](#)

## OPNomRPMSd

<b>Setpoint group</b>	RPMdep protection (PRP only)	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 10.0 [Bar]		
<b>Default value</b>	0.0		YES
<b>Step</b>	0.1		
<b>Comm object</b>	10143	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p>Linear Shutdown characteristic is defined by two points for <b>Idle RPM (page 125)</b> and <b>Nominal RPM (page 110)</b>. OPNomRPMSd defines oil pressure shutdown level at nominal speed. For details see <b>OilPrRPMdel (page 146)</b> description.</p>			

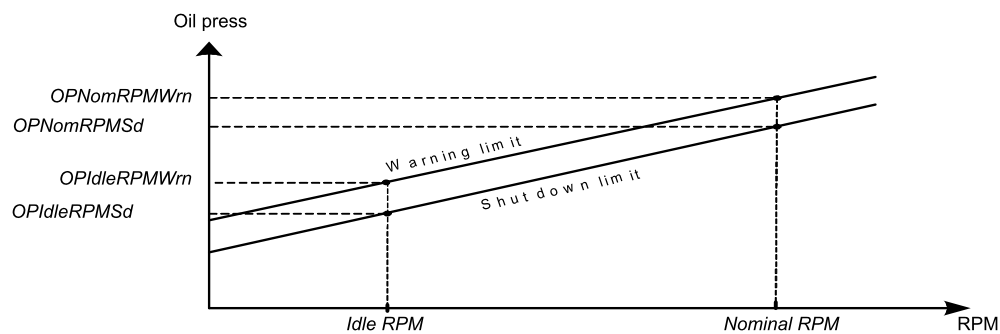
[↶ back to List of setpoints](#)

## OilPrRPMdel

<b>Setpoint group</b>	RPMdep protection (PRP only)	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.. 600 [s]		
<b>Default value</b>	10		
<b>Step</b>	1		
<b>Comm object</b>	10150	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

RPM dependent Oil pressure protection delay. Corresponding protection is activated when Oil pressure is below limit for OilPrRPMdel.



To activate RPM dependent oil pressure protection any analog value has to be linked with OIL PRESS (PAGE 244).

**Note:** RPM dependent oil pressure protection is fix configured Protection block type = Engine running only with RunOnlyBlkDel1 delay.

[back to List of setpoints](#)



## CPIdleRPMWrn

<b>Setpoint group</b>	RPMdep protection (PRP only)	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 10.0 [Bar]		
<b>Default value</b>	0.0		YES
<b>Step</b>	0.1		
<b>Comm object</b>	10144	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Linear Warning characteristic is defined by two points for <b>Idle RPM (page 125)</b> and <b>Nominal RPM (page 110)</b> . <b>CPIdleRPMWrn</b> defines coolant pressure warning level at idle speed. For details see <b>CoolPrRPMdel (page 149)</b> description.			

[↶ back to List of setpoints](#)

## CPNomRPMWrn

<b>Setpoint group</b>	RPMdep protection (PRP only)	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 10.0 [Bar]		
<b>Default value</b>	0.0		YES
<b>Step</b>	0.1		
<b>Comm object</b>	10145	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Linear Warning characteristic is defined by two points for <b>Idle RPM (page 125)</b> and <b>Nominal RPM (page 110)</b> . <b>CPNomRPMWrn</b> defines coolant pressure warning level at nominal speed. For details see <b>CoolPrRPMdel (page 149)</b> description.			

[↶ back to List of setpoints](#)

## CPIdleRPMSd

<b>Setpoint group</b>	RPMdep protection (PRP only)	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 10.0 [Bar]		
<b>Default value</b>	0.0		
<b>Step</b>	0.1		
<b>Comm object</b>	10146	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Linear Shutdown characteristic is defined by two points for <b>Idle RPM (page 125)</b> and <b>Nominal RPM (page 110)</b> . <b>CPIdleRPMSd</b> defines coolant pressure shutdown level at idle speed. For details see <b>CoolPrRPMdel (page 149)</b> description.			

[▲ back to List of setpoints](#)

## CPNomRPMSd

<b>Setpoint group</b>	RPMdep protection (PRP only)	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 10.0 [Bar]		
<b>Default value</b>	0.0		
<b>Step</b>	0.1		
<b>Comm object</b>	10147	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Linear Shutdown characteristic is defined by two points for <b>Idle RPM (page 125)</b> and <b>Nominal RPM (page 110)</b> . <b>CPNomRPMSd</b> defines coolant pressure shutdown level at nominal speed. For details see <b>CoolPrRPMdel (page 149)</b> description.			

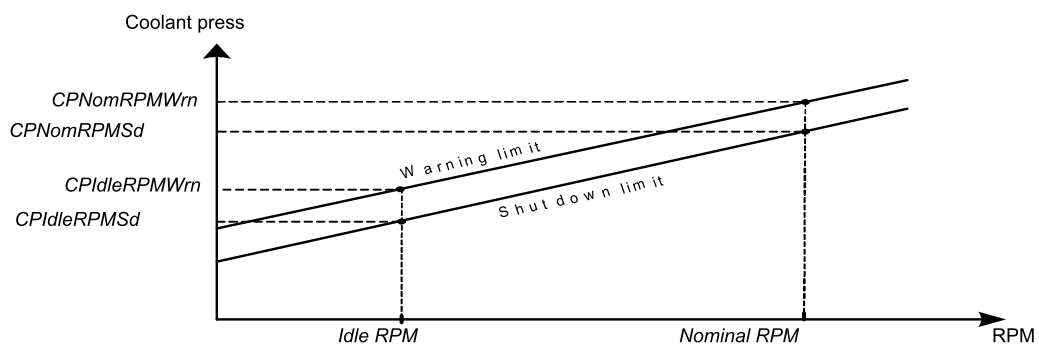
[▲ back to List of setpoints](#)

## CoolPrRPMdel

<b>Setpoint group</b>	RPMdep protection (PRP only)	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 600 [s]		
<b>Default value</b>	10		
<b>Step</b>	1		
<b>Comm object</b>	10151	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

RPM dependent Coolant pressure protection delay. Corresponding protection is activated when Coolant pressure is below limit for CoolPrRPMdel.



To activate RPM dependent coolant pressure protection any analog value has to be linked with **COOLANT PRESS (PRP ONLY) (PAGE 244)**.

**Note:** RPM dependent coolant pressure protection is fix configured Protection block type = Engine running only with RunOnlyBlkDel1 delay.

[back to List of setpoints](#)

## Load sharing

### Load Gain

<b>Setpoint group</b>	Load sharing	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 200.0 [%]		
<b>Default value</b>	5.0		
<b>Step</b>	0.1		
<b>Comm object</b>	8659	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Relative Gain of the load sharing loop.			

[↶ back to List of setpoints](#)

### Load Int

<b>Setpoint group</b>	Load sharing	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 100.0 [%]		
<b>Default value</b>	10.0		
<b>Step</b>	0.1		
<b>Comm object</b>	8713	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Relative Integration factor of the load sharing loop.			

[↶ back to List of setpoints](#)

### Clutch Del

<b>Setpoint group</b>	Load sharing	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 60.0 [s]		
<b>Default value</b>	5		
<b>Step</b>	0.1		
<b>Comm object</b>	9949	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Time between the clutch is switched on/off and the load sharing function is activated.			

[↶ back to List of setpoints](#)

## ClutchMinSpeed

<b>Setpoint group</b>	Load sharing	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. ClutchMaxSpeed [%]		
<b>Default value</b>	0.0		
<b>Step</b>	0.1		
<b>Comm object</b>	10096	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Clutch can be switched on if <b>ClutchMinSpeed</b> < RPM < <b>ClutchMaxSpeed</b> . Limits are in % of the Requested speed. See <b>Function description details (page 68)</b>			
<i>Note: 0.0 % corresponds to (Idle speed + Idle offset) value, 100.0 % corresponds to Nominal speed.</i>			

[back to List of setpoints](#)

## ClutchMaxSpeed

<b>Setpoint group</b>	Load sharing	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	ClutchMinSpeed .. 100.0 [%]		
<b>Default value</b>	100.0		
<b>Step</b>	0.1		
<b>Comm object</b>	10097	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Clutch can be switched on if <b>ClutchMinSpeed</b> < RPM < <b>ClutchMaxSpeed</b> . Limits are in % of Requested speed. See <b>Function description details (page 68)</b> .			
<i>Note: 0.0 % corresponds to (Idle speed + Idle offset) value, 100.0 % corresponds to Nominal speed.</i>			

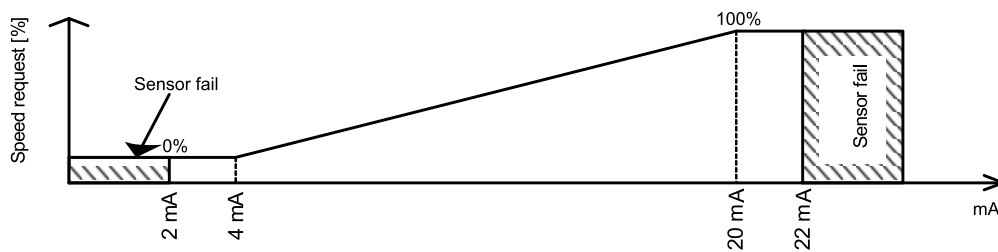
[back to List of setpoints](#)

## Back Up Speed1

<b>Setpoint group</b>	Load sharing	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 100.0 [%]		
<b>Default value</b>	50.0		
<b>Step</b>	0.1		
<b>Comm object</b>	10099	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

See **Load sharing block diagram (page 1)** - the setpoint value is used instead of **Speed Request (page 265)** in loadsharing state, if **BACK UP SPEED1 (PAGE 182)** is active and **REQUESTED RPM (PAGE 245)** reading via analog input is out of range (sensor fail is detected).



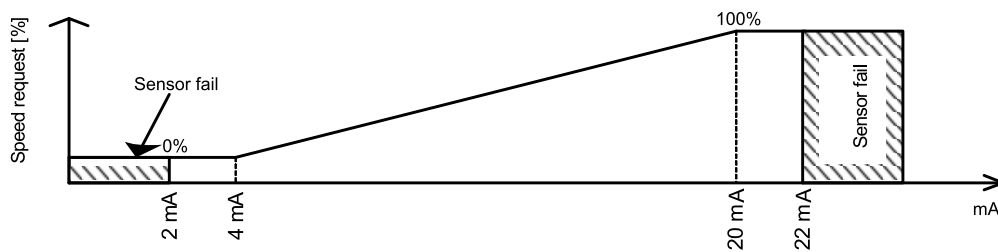
[back to List of setpoints](#)

## Back Up Speed2

<b>Setpoint group</b>	Load sharing	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 100.0 [%]		
<b>Default value</b>	50.0		
<b>Step</b>	0.1		
<b>Comm object</b>	10523	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

See **Load sharing block diagram (page 1)** - the setpoint value is used instead of **Speed Request (page 265)** in loadsharing state, if **BACK UP SPEED1 (PAGE 182)** is active and **REQUESTED RPM (PAGE 245)** reading via analog input is out of range (sensor fail is detected).



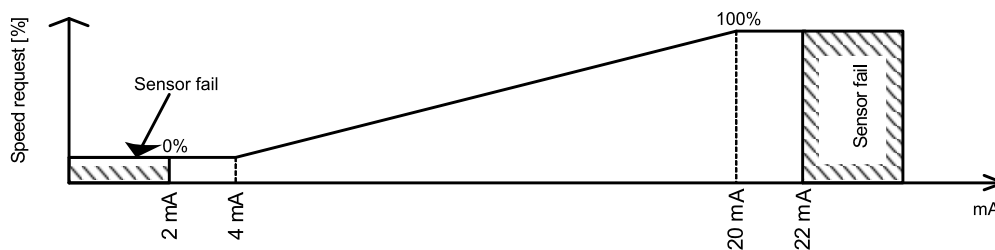
[back to List of setpoints](#)

### Back Up Speed3

<b>Setpoint group</b>	Load sharing	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 100.0 [%]		
<b>Default value</b>	50.0		
<b>Step</b>	0.1		
<b>Comm object</b>	10524	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

#### Description

See **Load sharing block diagram (page 1)** - the setpoint value is used instead of **Speed Request (page 265)** in loadsharing state, if **BACK UP SPEED1 (PAGE 182)** is active and **REQUESTED RPM (PAGE 245)** reading via analog input is out of range (sensor fail is detected).



🔍 back to List of setpoints

### MaxCIstrtPer

<b>Setpoint group</b>	Load sharing	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 600 [s]		
<b>Default value</b>	60		
<b>Step</b>	1		
<b>Comm object</b>	10102	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

#### Description

Engine clutch start protection. Start fail alarm is activated, if engine running condition is not detected during MaxCIstrtPer delay time after **CLUTCH CONNECT (PRP ONLY) (PAGE 202)** is closed.

🔍 back to List of setpoints



## DetectOtherCAN

<b>Setpoint group</b>	Load sharing	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DISABLED, ENABLED]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	9921	<b>Related applications</b>	PRP
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Enables Wrn OthrCommEr warning message when no other unit is recognized on the CAN bus. OTHRCOMMER (PAGE 231) is closed in this case.			

[🔍 back to List of setpoints](#)

## Analog inputs

### AIN1 Offset

<b>Setpoint group</b>	Analog inputs	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	-32767 .. 32767 [-]		
<b>Default value</b>	0		
<b>Step</b>	[-]		
<b>Comm object</b>	8431	<b>Related applications</b>	
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Adjustable offset for AIN1 for calibrating purposes.			

[back to List of setpoints](#)

### AIN2 Offset

<b>Setpoint group</b>	Analog inputs	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	-32767 .. 32767 [-]		
<b>Default value</b>	0		
<b>Step</b>	[-]		
<b>Comm object</b>	8407	<b>Related applications</b>	
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Adjustable offset for AIN2 for calibrating purposes.			

[back to List of setpoints](#)

### AIN3 Offset

<b>Setpoint group</b>	Analog inputs	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	-32767 .. 32767 [-]		
<b>Default value</b>	0		
<b>Step</b>	[-]		
<b>Comm object</b>	8467	<b>Related applications</b>	
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Adjustable offset for AIN3 for calibrating purposes.			

[back to List of setpoints](#)

### AIN4 Offset

<b>Setpoint group</b>	Analog inputs	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	-32767 .. 32767 [-]		
<b>Default value</b>	0		
<b>Step</b>	[-]		
<b>Comm object</b>	8793	<b>Related applications</b>	
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Adjustable offset for AIN4 for calibrating purposes.			

[back to List of setpoints](#)

### AIN5 Offset

<b>Setpoint group</b>	Analog inputs	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	-32767 .. 32767 [-]		
<b>Default value</b>	0		
<b>Step</b>	[-]		
<b>Comm object</b>	8794	<b>Related applications</b>	
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Adjustable offset for AIN5s for calibrating purposes.			

[back to List of setpoints](#)

### AIN6 Offset

<b>Setpoint group</b>	Analog inputs	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	-32767 .. 32767 [-]		
<b>Default value</b>	0		
<b>Step</b>	[-]		
<b>Comm object</b>	8795	<b>Related applications</b>	
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Adjustable offset for AIN6 for calibrating purposes.			

[back to List of setpoints](#)

### AIN7 Offset

<b>Setpoint group</b>	Analog inputs	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	-32767 .. 32767 [-]		
<b>Default value</b>	0		
<b>Step</b>	[-]		
<b>Comm object</b>	8796	<b>Related applications</b>	
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Adjustable offset for AIN7 for calibrating purposes.			

[back to List of setpoints](#)

### AIN8 Offset

<b>Setpoint group</b>	Analog inputs	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	-32767 .. 32767 [-]		
<b>Default value</b>	0		
<b>Step</b>	[-]		
<b>Comm object</b>	11599	<b>Related applications</b>	
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Adjustable offset for AIN8 for calibrating purposes.			

[back to List of setpoints](#)

## Act. Calls/SMS

### Warning Call

<b>Setpoint group</b>	Act. Calls/SMS	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DISABLED, ENABLED]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	8482	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Enables or disables active calls/SMS to selected phone or mobile numbers when a Warning alarm occurs.			

[back to List of setpoints](#)

### Shut Down Call

<b>Setpoint group</b>	Act. Calls/SMS	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DISABLED, ENABLED]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	8484	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Enables or disables active calls to selected phone or mobile numbers when a Shutdown alarm occurs.			

[back to List of setpoints](#)

### Cool Down Call

<b>Setpoint group</b>	Act. Calls/SMS	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DISABLED, ENABLED]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	8485	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Enables or disables active calls/SMS to selected phone or mobile numbers when a Cool down alarm occurs.			

[back to List of setpoints](#)

## AcallCH1-Type

<b>Setpoint group</b>	Act. Calls/SMS	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DISABLED, DATA, SMS, E-MAIL, EML-SMS ]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	9594	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

Up to three separate channels are available for any one of the following types of messages:

<b>DISABLED</b>	Channel is disabled.
<b>DATA</b>	Analog, GSM or ISDN modem connection.
<b>SMS</b>	Channel sends SMS message. Use this option only when GSM modem or InteliBridge-NT is connected.
<b>E-MAIL</b>	Channel sends e-mail. Only when InteliBridge-NT is connected.
<b>EML-SMS</b>	Channel sends short e-mail with SMS like content. Only when InteliBridge-NT is connected.

Email contains:

- ▶ header with serial number and application info.
- ▶ Alarm list
- ▶ 20 History records (reason, date, time)

**Example:** of EML-SMS

AL=(Sd Water Temp,Wrn Water Temp,!Emerg Stop,ActCallCH1Fail)

**Note:** Both SMS and E-MAIL active call types are supported in conjunction with InteliBridge-NT, if cellular interface is used (WAN connection mode = Cellular). E-MAIL only is supported, if Ethernet interface is used (WAN connection mode = Ethernet).

**Note:** To receive DATA active call run InteliMonitor – Type of connection = Active call. InteliMonitor Active call window contains list of received AID files. Each list item contains Engine name, Date, Time, ID serial number.

 [back to List of setpoints](#)

## AcallCH3-Type

<b>Setpoint group</b>	Act. Calls/SMS	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DISABLED, DATA, SMS, E-MAIL, EML-SMS ]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	9596	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

Up to three separate channels are available for any one of the following types of messages:

<b>DISABLED</b>	Channel is disabled.
<b>DATA</b>	Analog, GSM or ISDN modem connection.
<b>SMS</b>	Channel sends SMS message. Use this option only when GSM modem or InteliBridge-NT is connected.
<b>E-MAIL</b>	Channel sends e-mail. Only when InteliBridge-NT is connected.
<b>EML-SMS</b>	Channel sends short e-mail with SMS like content. Only when InteliBridge-NT is connected.

Email contains:

- ▶ header with serial number and application info.
- ▶ Alarm list
- ▶ 20 History records (reason, date, time)

**Example:** of EML-SMS

AL=(Sd Water Temp,Wrn Water Temp,!Emerg Stop,ActCallCH1Fail)

**Note:** Both SMS and E-MAIL active call types are supported in conjunction with InteliBridge-NT, if cellular interface is used (WAN connection mode = Cellular). E-MAIL only is supported, if Ethernet interface is used (WAN connection mode = Ethernet).

**Note:** To receive DATA active call run InteliMonitor – Type of connection = Active call. InteliMonitor Active call window contains list of received AID files. Each list item contains Engine name, Date, Time, ID serial number.

 [back to List of setpoints](#)

### AcallCH1-Addr

<b>Setpoint group</b>	Act. Calls/SMS	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[-]		
<b>Default value</b>	0		
<b>Step</b>	[-]		
<b>Comm object</b>	9597	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Address for channel 1 active call. Each above message type has either phone number or e-mail address associated with it.			

[◀ back to List of setpoints](#)



## AcallCH2-Type

<b>Setpoint group</b>	Act. Calls/SMS	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DISABLED, DATA, SMS, E-MAIL, EML-SMS ]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	9595	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		

### Description

Up to three separate channels are available for any one of the following types of messages:

<b>DISABLED</b>	Channel is disabled.
<b>DATA</b>	Analog, GSM or ISDN modem connection.
<b>SMS</b>	Channel sends SMS message. Use this option only when GSM modem or InteliBridge-NT is connected.
<b>E-MAIL</b>	Channel sends e-mail. Only when InteliBridge-NT is connected.
<b>EML-SMS</b>	Channel sends short e-mail with SMS like content. Only when InteliBridge-NT is connected.

Email contains:

- ▶ header with serial number and application info.
- ▶ Alarm list
- ▶ 20 History records (reason, date, time)

**Example:** of EML-SMS

AL=(Sd Water Temp,Wrn Water Temp,!Emerg Stop,ActCallCH1Fail)

**Note:** Both SMS and E-MAIL active call types are supported in conjunction with InteliBridge-NT, if cellular interface is used (WAN connection mode = Cellular). E-MAIL only is supported, if Ethernet interface is used (WAN connection mode = Ethernet).

**Note:** To receive DATA active call run InteliMonitor – Type of connection = Active call. InteliMonitor Active call window contains list of received AID files. Each list item contains Engine name, Date, Time, ID serial number.

 [back to List of setpoints](#)

### AcallCH2-Addr

<b>Setpoint group</b>	Act. Calls/SMS	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[-]		
<b>Default value</b>	0		
<b>Step</b>	[-]		
<b>Comm object</b>	9598	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Address for channel 2 active call. Each above message type has either phone number or e-mail address associated with it.			

[back to List of setpoints](#)

### AcallCH3-Addr

<b>Setpoint group</b>	Act. Calls/SMS	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[-]		
<b>Default value</b>	0		
<b>Step</b>	[-]		
<b>Comm object</b>	9599	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Address for channel 3 active call. Each above message type has either phone number or e-mail address associated with it.			

[back to List of setpoints](#)

### Num Rings AA

<b>Setpoint group</b>	Act. Calls/SMS	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	1 .. 30 [-]		
<b>Default value</b>	3		
<b>Step</b>	1		
<b>Comm object</b>	24512	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Number of rings prior to open modem connection from PC to controller.			
<p><b>Note:</b> Num Rings AA change is not accepted immediately, but only after controller is switched on or when modem is connected to controller.</p>			

[back to List of setpoints](#)

**A.C.Multiplier**

<b>Setpoint group</b>	Act. Calls/SMS	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	1 .. 250 [-]		
<b>Default value</b>	3		
<b>Step</b>	1		
<b>Comm object</b>	24505	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Setpoint specifies number of attempts to open Active call connection when phone line is engaged.			
<i><b>Note:</b> Timeout for connection is 90 sec and after 120 sec controller starts the next attempt. Incoming calls are blocked when controller is trying to send active call message.</i>			

 [back to List of setpoints](#)

## Date and Time

### Time

<b>Setpoint group</b>	Date/Time	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[HH:MM:SS]		
<b>Default value</b>	12:00:00		
<b>Step</b>	[-]		
<b>Comm object</b>	24554	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Controller internal Real Time Clock adjustment.			

[back to List of setpoints](#)

### Date

<b>Setpoint group</b>	Date/Time	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DD:MM:YY]		
<b>Default value</b>	8.6.2006		
<b>Step</b>	[-]		
<b>Comm object</b>	24553	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Actual date adjustment			

[back to List of setpoints](#)

### Time Stamp Per

<b>Setpoint group</b>	Date/Time	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 240 [min]		
<b>Default value</b>	1		
<b>Step</b>	1		
<b>Comm object</b>	8979	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
The setpoint adjusts time interval of Time stamp history records.			
<p><b>Note:</b> No history Time stamp is recorded when TimeStamp Per = 0. RTC and Date is in each History record.</p>			

[back to List of setpoints](#)

## SummerTimeMod

<b>Setpoint group</b>	Date/Time	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DISABLED, WINTER, SUMMER, WINTER-S, SUMMER-S]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	8727	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<p>The setpoint is used to select mode of automatic time change.</p> <p>EST (European Summer Time) started last Sunday in March. EST ends last Sunday in October.</p> <p>Southern hemisphere is roughly the reverse. Time change depends on location and can vary in 8 weeks time.</p>			
<b>DISABLED</b>	The automatic change to daylight saving time and back is disabled.		
<b>WINTER</b>	The automatic change is enabled, the current season is winter and the controller is located in the northern hemisphere.		
<b>SUMMER</b>	The automatic change is enabled, the current season is summer and the controller is located in the northern hemisphere.		
<b>WINTER-S</b>	The automatic change is enabled, the current season is winter and the controller is located in the southern hemisphere.		
<b>SUMMER-S</b>	The automatic change is enabled, the current season is summer and the controller is located in the southern hemisphere.		

[◀ back to List of setpoints](#)

## EnTimeSync

<b>Setpoint group</b>	Date/Time	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	[DISABLED, ENABLED]		
<b>Default value</b>	DISABLED		
<b>Step</b>	[-]		
<b>Comm object</b>	24217	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
<ul style="list-style-type: none"> <li>▶ The setpoint is used to enable Time synchronization function with IntelliGen-NT and IntelliSys-NT controllers over CAN2 bus.</li> <li>▶ The synchronization is just unidirectional from IntelliGen-NT or IntelliSys-NT controller into IntelliDrive DCU Marine, not vice versa.</li> </ul>			

[◀ back to List of setpoints](#)

## ID-SCM unit

This setpoints are available when the SCM module is configured in DriveConfig / Modules window.

Not possible to use ID-SCM when ID-RPU is used.

### FreqRate1

<b>Setpoint group</b>	SCM unit	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 500 [-]		
<b>Default value</b>	0		
<b>Step</b>	1		
<b>Comm object</b>	10902	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Conversion constant (number of pulses for one RPM) for ID-SCM RPM1 frequency input - SCM Freq1 value. Frequency range max. 8 kHz.			

[back to List of setpoints](#)

### FreqRate2

<b>Setpoint group</b>	SCM unit	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 500 [-]		
<b>Default value</b>	0		
<b>Step</b>	1		
<b>Comm object</b>	10903	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Conversion constant (number of pulses for one RPM) for ID-SCM RPM2 frequency input - SCM Freq2 value. Frequency range max. 8 kHz.			

[back to List of setpoints](#)

### TransferRate1

<b>Setpoint group</b>	SCM unit	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 500 [-]		
<b>Default value</b>	0		
<b>Step</b>	1		
<b>Comm object</b>	10906	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	Always		
<b>Description</b>			
Conversion ratio (number of pulses for increase by 1) for ID-SCM IMP 1 impulse input / SCM Imp1 value. Frequency range max. 60 Hz.			

[back to List of setpoints](#)

## TransferRate2

<b>Setpoint group</b>	SCM unit	<b>Related FW</b>	3.4.0															
<b>Range [units]</b>	0 .. 500 [-]																	
<b>Default value</b>	0																	
<b>Step</b>	1																	
<b>Comm object</b>	10907	<b>Related applications</b>	All															
<b>Config level</b>	Standard																	
<b>Setpoint visibility</b>	Always																	
<b>Description</b>																		
Conversion ratio (number of pulses for increase by 1) for ID-SCM IMP 2 impulse input / SCM Imp2 value. Frequency range max. 60 Hz.																		
<table border="1"> <thead> <tr> <th>Input</th> <th>Setpoint</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>RPM1</td> <td>FreqRate1</td> <td>SCM Freq1</td> </tr> <tr> <td>RPM2</td> <td>FreqRate2</td> <td>SCM Freq2</td> </tr> <tr> <td>IMP1</td> <td>TransferRate1</td> <td>SCM Imp1</td> </tr> <tr> <td>IMP2</td> <td>TransferRate2</td> <td>SCM Imp2</td> </tr> </tbody> </table>				Input	Setpoint	Value	RPM1	FreqRate1	SCM Freq1	RPM2	FreqRate2	SCM Freq2	IMP1	TransferRate1	SCM Imp1	IMP2	TransferRate2	SCM Imp2
Input	Setpoint	Value																
RPM1	FreqRate1	SCM Freq1																
RPM2	FreqRate2	SCM Freq2																
IMP1	TransferRate1	SCM Imp1																
IMP2	TransferRate2	SCM Imp2																
<p><b>Example:</b> To measure actual water flow in liters (or cubic meters) per minute set <b>FreqRate</b> = 10 [ ] when sensor gives 10 pulses per liter (or cubic meters).</p> <p><b>Example:</b> To measure total water consumption in liters (or cubic meters) set <b>TransferRate</b> = 100 [ ] when sensor gives 100 pulses per 1 liter (or cubic meter).</p>																		

⬅ back to List of setpoints

## DetCon20

### IgnRedLimit

<b>Setpoint group</b>	DetCon20	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 255 [-]		
<b>Default value</b>	10		
<b>Step</b>	1		
<b>Comm object</b>	10299	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	DetCon20 support configured		
<b>Description</b>			
Ignition reduction limit is knocking value above which the engine is considered to be knocking. If the value is exceeded, DetCon20 binary output ENGINE KNOCKING is activated and the values assigned to the timing reduction are altered.			

⬅ back to List of setpoints

## ImmStopLimit

<b>Setpoint group</b>	DetCon20	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0 .. 255 [-]		
<b>Default value</b>	40		
<b>Step</b>	1		
<b>Comm object</b>	10304	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	DetCon20 support configured		
<b>Description</b>			
Immediate stop limit is knocking value above which DetCon20 binary output TRIP is activated. This causes engine to shut down if properly wired.			

[back to List of setpoints](#)

## DecreaseRamp

<b>Setpoint group</b>	DetCon20	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 100.0 [%/s]		
<b>Default value</b>	30.0 %/s		
<b>Step</b>	0.1 %/s		
<b>Comm object</b>	10300	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	DetCon20 support configured		
<b>Description</b>			
Decrease ramp specifies rate at which is the timing reduction signal (analog output) decreased as soon as knocking drops below the <b>IgnRedLimit (page 169)</b> (ignition reduction limit).			

[back to List of setpoints](#)

## TimingRedGain

<b>Setpoint group</b>	DetCon20	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 100.0 [%]		
<b>Default value</b>	40.0 %		
<b>Step</b>	0.1 %		
<b>Comm object</b>	10301	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	DetCon20 support configured		
<b>Description</b>			
Timing reduction gain influences rate at which timing reduction signal (analog output) is amplified when knocking is detected.			

[back to List of setpoints](#)



## DelayLoadRed

<b>Setpoint group</b>	DetCon20	<b>Related FW</b>	3.4.0
<b>Range [units]</b>	0.0 .. 25.4 [s]		
<b>Default value</b>	1.0 s		
<b>Step</b>	0.1 s		
<b>Comm object</b>	10303	<b>Related applications</b>	All
<b>Config level</b>	Standard		
<b>Setpoint visibility</b>	DetCon20 support configured		
<b>Description</b>			
Delay after load reduction defines delay of timing signal reduction process after knocking level drops below the IgnRedLimit (page 169).			

[🔍 back to List of setpoints](#)

## Protections

Protection group contains all Analog inputs and Binary inputs protection limits and delays. List is dynamically created during configuration process.

### 8.1.3 Binary Inputs

Any IntelliDrive controller extension physical binary input can be configured as “function” or “protection”.

Following chapter contains Logical binary inputs list that can be configured to any physical input.

ID-DCU Marine binary inputs **Remote Start, Remote Stop, Rem Start/Stop** are not active in LOC (local) mode.

**Note:** Minimal input pulse duration is 120 ms to be detected as valid (binary inputs sampling rate is 100 ms). Adjustable delay can be configured to any binary input when is used as a protection: Standard = 0,5 sec or one of BinInp delay 1, 2, 3 that can be adjusted by corresponding Setpoint BinInp Delay 1, 2, 3.

Input	BI delay configuration	Setpoint
	Standard (0,5s)	
	BinInp delay 1	BinInp Delay 1
	BinInp delay 2	BinInp Delay 2
	BinInp delay 3	BinInp Delay 3

See setpoints BinInp delay 1 [s] etc...

## List of LBI

Access Lock .....	174	Emerg. Manual .....	186
Remote Lock .....	175	EnClutchStart .....	186
Low Brightness .....	176	Sd Override .....	187
Force Block 1 .....	176	Speed Down .....	187
Force Block 2 .....	176	Speed Up .....	188
Force Block 3 .....	177	ECU FltReset .....	188
Fault Reset .....	177	BI Droop .....	189
Horn Reset .....	177	BI Second RPM .....	189
Remote OFF .....	177	BI Idle .....	189
Remote HRB .....	177	Rem Start/Stop .....	189
Remote On/Off .....	178	PrestartOvrd .....	190
ECUComFailBlck .....	178	ClutchBlocking .....	190
EmergencyStop1 /		ModeL Button .....	190
EmergencyStop2 .....	179	ModeR Button .....	190
EmergencyStop1 .....	179	Page Button .....	190
EmergencyStop2 .....	180	Enter Button .....	191
Remote Start .....	180	Up Button .....	191
Remote Stop .....	180	Down Button .....	191
Reg Inhib .....	181	ECU DiagBlck .....	191
RegenForce .....	181	Clear DayCons .....	191
Blackout Start /		Clear TripCons .....	192
RemRepStart .....	182	Memo1 Trigger .....	192
Back Up Speed1 .....	182	Memo2 Trigger .....	192
Back Up Speed2 .....	183	User Mask 1 .....	193
Back Up Speed3 .....	183	User Mask 2 .....	193
Fire Speed .....	183	User Mask 3 .....	194
Rem Clutch .....	183	User Mask 4 .....	194
StartBlocking1 .....	183	Current Gear .....	195
StartBlocking2 .....	184		
StartBlocking3 .....	184		
StartBlocking4 .....	184		
StartBlocking5 .....	184		
Load Blocking .....	184		
RunIndication1 .....	185		
RunIndication2 .....	185		
RunIndication3 .....	185		
Nominal Speed .....	186		
Loaded .....	186		

 **back to Controller objects**

## Access Lock

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	149		
<b>Description</b>			
If the input is closed			
<ul style="list-style-type: none"><li>▶ Panel buttons Start, Stop are inactive</li><li>▶ No setpoints can be adjusted from controller front panel</li><li>▶ Controller mode (e.g. OFF-AUX) cannot be changed</li><li>▶ Fault reset (screen sensitive), Horn reset buttons are still active</li><li>▶ It is possible to list Values, Setpoints and History</li><li>▶ Binary inputs function is without change</li></ul>			
Active Access lock is indicated by “L” in the upper right corner of controller screen.			
<b>Note:</b> Access Lock does not protect Setpoints change, Mode change and START, STOP commands from IntelliMonitor (direct or modem). To avoid unqualified changes of the selected setpoints or commands use password protection.			

 [back to List of LBI](#)

## Remote Lock

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All	
<b>Comm object</b>	150			
<b>Description</b>				
<p>If the input is closed following commands received via RS232 or CAN2 interface (e.g. from IntelliMonitor or from remote display) are inactive:</p> <ul style="list-style-type: none"> <li>▶ Remote engine start, stop commands</li> <li>▶ Fault reset and horn reset</li> <li>▶ Setpoints change</li> </ul> <p>Engine can be started, stopped via Binary inputs (e.g. <b>REMOTE START (PAGE 180)</b>) or via front panel buttons.</p>				
<b>InteliDrive local/remote commands blocking overview</b>				
<b>Note: Y = available, N = blocked</b>				
Device	Command	Access lock	Remote lock	LOC (Local) mode
ID-DCU Marine panel	START	N	Y	Y
	STOP	N	Y	Y
	FLT RES	Y	Y	Y
	HORN RES	Y	Y	Y
	Setpoint change	N	Y	Y
ID-DCU Marine Bin Inputs	Mode change	N	Y	Y
	<b>Remote start</b>	Y	Y	N
	<b>Remote stop</b>	Y	Y	N
External modules Bin Inputs	<b>Remote OFF</b>	Y	Y	N
	<b>start/stop</b>	Y	Y	N
	<b>Remote OFF</b>	Y	Y	N
(RS232 or CAN2)	<b>Remote HBR</b>	Y	Y	N
	STOP	Y	N	N
	FLT RES	Y	N	N
	HORN RES	Y	N	N
	Setpoint change	Y	N	N

	Mode change	Y	N	N
InteliMonitor	START	Y	N	N
(serial line)	STOP	Y	N	N
	FLT RES	Y	N	N
	HORN RES	Y	N	N
	Setpoint change	Y	N	N
	Mode change	Y	N	N

**Note:** When Remote Lock is active, it is still possible to initiate programming of a remotely connected InteliMonitor.

[back to List of LBI](#)

### Low Brightness

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	5		
<b>Description</b>			
Active Binary input switches ID-DCU Marine display backlight between two adjustable intensity levels. Alternative intensity of the backlight can be set independently by ID-DCU Marine panel buttons:			
<ol style="list-style-type: none"> <li>1. Hold Enter and press Page to switch to ID Info screen (from any measure screen)</li> <li>2. Hold Enter and pres / <math>\bar{\quad}</math> arrow key to increase/decrease display brightness</li> </ol>			
The adjusted intensity is stored in non-volatile memory.			
<b>Note:</b> Both backlight levels are default (from production) set to maximum.			

[back to List of LBI](#)

### Force Block 1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	16		
<b>Description</b>			
Active input blocks protections that are configured as “Force Block 1” Prot. block type. Corresponding setpoint is ForceBlockDel1.			

[back to List of LBI](#)

### Force Block 2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	17		
<b>Description</b>			
Active input blocks protections that are configured as “Force Block 2” Prot. block type. Corresponding setpoint is ForceBlockDel2.			

[◀ back to List of LBI](#)

### Force Block 3

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	18		
<b>Description</b>			
Active input blocks protections that are configured as “Force Block 3” Prot. block type. Corresponding setpoint is ForceBlockDel3.			

[◀ back to List of LBI](#)

### Fault Reset

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	152		
<b>Description</b>			
Binary input for Alarm acknowledge (level sensitive) has the same function as controller front panel button Fault reset (i.e. the acknowledge function is screen sensitive).			
<i>Note: There is separated acknowledge for ECU Alarms – see Binary input ECU FLTRESET (PAGE 188)</i>			

[◀ back to List of LBI](#)

### Horn Reset

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	153		
<b>Description</b>			
Binary input <b>Horn Reset</b> is level sensitive.			

[◀ back to List of LBI](#)

### Remote OFF

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	12		
<b>Description</b>			
Controller is switched to OFF mode if input is closed and back to previous mode after is opened. Input is not active in LOC (Local) mode. Active binary input Remote OFF is indicated by “L” character in the right upper corner on ID-DCU Marine screen.			
<i>Note: Remote OFF will switch controller to OFF mode even if the ACCESS LOCK (PAGE 174) orREMOTE LOCK (PAGE 175) is active or Controller mode is password protected.</i>			

[◀ back to List of LBI](#)

### Remote HRB

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	14		
<b>Description</b>			
Controller is switched to <b>HRB</b> mode if closed and back to previous mode if opened. Input is not active in <b>LOC</b> (Local) mode.			

⬅ back to List of LBI

### Remote On/Off

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	161		
<b>Description</b>			
CLOSE LOAD (PAGE 207) is closed/opened depends on the state of Remote On/Off binary input when engine RPM is over <b>MinLoadSpeed</b> (page 140). Remote On/Off is not active in LOC mode.			

⬅ back to List of LBI

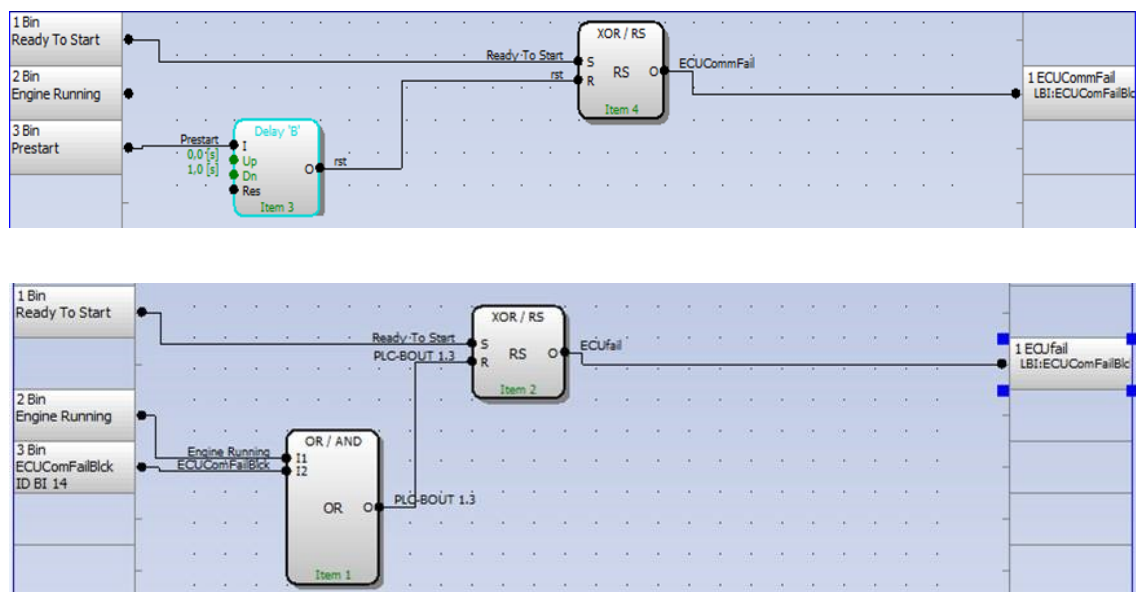
### ECUComFailBck

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	141		
<b>Description</b>			

Active input blocks indication of ECU communication fail e.g. in the case the ECU is switched off.

**Note:** LBI:ECUComFailBck is possible to use during ECU initialization for start of the engine, when ECU POWERRELAY (PAGE 212) is used. By simple logic in PLC editor is possible to avoid alarms while the ECU is getting started. Also at the same time this LBI gives you flexibility to decide, when the communication alarms from ECU are relevant.

#### Example: of PLC Editor



⬅ back to List of LBI



## EmergencyStop1 / EmergencyStop2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	AMF, MRS
<b>Comm object</b>	286		
<b>Description</b>			
<p>If the input is activated, engine shutdown is immediately performed. However, the controller behavior is slightly different compared to other shutdown alarms:</p> <ul style="list-style-type: none"> <li>▶ Outputs Cooling pump and Prelubrication are deactivated as well.</li> <li>▶ This input cannot be overridden with the input Sd override.</li> </ul> <p><b>Note:</b> Because of safety reasons it is recommended to configure this input as Normally closed and use a NC switch.</p> <p><b>IMPORTANT:</b> This is a software function only. It can be extended by a "hard wired" emergency stop function, which means disconnecting power supply from the controller outputs.</p>			

[◀ back to List of LBI](#)

## EmergencyStop1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	927		
<b>Description</b>			
<p>If the input is activated, engine shutdown is immediately performed. However, the controller behavior is slightly different compared to other shutdown alarms:</p> <ul style="list-style-type: none"> <li>▶ COOLING PUMP (PAGE 206) and PRELUBRICATION (PAGE 204) are deactivated as well.</li> <li>▶ This input cannot be overridden with the input Sd override.</li> </ul> <p><b>Note:</b> Because of safety reasons it is recommended to configure this input as Normally closed and use a NC switch.</p> <p><b>IMPORTANT:</b> This is a software function only. It can be extended by a "hard wired" emergency stop function, which means disconnecting power supply from the controller outputs.</p>			

[◀ back to List of LBI](#)

## EmergencyStop2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	928		
<b>Description</b>			
<p>If the input is activated, engine shutdown is immediately performed. However, the controller behavior is slightly different compared to other shutdown alarms:</p> <ul style="list-style-type: none"> <li>▶ <b>COOLING PUMP (PAGE 206)</b> and <b>PRELUBRICATION (PAGE 204)</b> are deactivated as well.</li> <li>▶ This input cannot be overridden with the input Sd override.</li> </ul> <p><b>Note:</b> Because of safety reasons it is recommended to configure this input as Normally closed and use a NC switch.</p> <p><b>IMPORTANT:</b> This is a software function only. It can be extended by a "hard wired" emergency stop function, which means disconnecting power supply from the controller outputs.</p>			

🔍 back to List of LBI

## Remote Start

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	156		
<b>Description</b>			
<p>External "edge sensitive" request for engine start. Binary input is active in all <b>AUX, EME, HRB</b> and <b>PRP</b> modes and inactive in <b>LOC (Local)</b> mode. There is only one start attempt, use <b>REMRESTART (PRP ONLY) (PAGE 1)</b> or <b>Blackout Start (AUX, EME and HRB)</b> binary input for repetitive starting procedure using <b>Crank Attempts (page 125)</b> and <b>CrankFailPause (page 124)</b> until the engine does not start. Unsuccessful start is recorded to Alarm list and History. The second edge on Binary input <b>Remote Start</b> skips the Idle time when engine is running in Idle state.</p> <p>Binary input <b>Remote Start</b> signal is equivalent to ID-DCU Marine front panel <b>Start</b> button.</p>			

🔍 back to List of LBI

## Remote Stop

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	157		
<b>Description</b>			
<p>Engine "edge sensitive" stop request. The first edge changes engine state from running to cooling, the second edge stops engine (skip the rest of cooling). Binary input is inactive in <b>LOC (Local)</b> mode.</p> <p><b>Remote Stop</b> signal is equivalent to ID-DCU Marine front panel <b>Stop</b> button.</p> <p><b>Note:</b> Binary inputs Remote Start and Remote Stop are edge (not level) sensitive. Minimal pulse duration to safely detect the edge is at least the 120 ms (binary input sampling rate is 100 ms).</p>			

🔍 back to List of LBI

### Reg Inhib

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	837		
<b>Description</b>			
Active signal inhibits automatic DPF filter regeneration.			

[◀ back to List of LBI](#)

### RegenForce

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	836		
<b>Description</b>			
Active signal inhibits automatic DPF filter regeneration.			

[◀ back to List of LBI](#)

## Blackout Start / RemRepStart

<b>Related FW</b>	3.4.0	<b>Related applications</b>	AUX, CMB, EME / PRP	
<b>Comm object</b>	158			
<b>Description</b>				
External “edge sensitive” request for engine start. Input is inactive in LOC (Local) mode. Adjustable number of attempts (see setpoints <b>Crank Attempts (page 125)</b> , <b>MaxCrank Time (page 124)</b> and <b>CrankFailPause (page 124)</b> ).				
<b>Engine starting signals</b>				
	Remote Start	Blackout Start	RemRepStart	Panel START button
Input sensitive	Edge sensitive; 2nd edge skips Idle	Edge sensitive;	Edge sensitive;	Edge sensitive; 2nd edge skips Idle
Active in MODE	AUX; EME;HRB; PRP	AUX; EME; HRB	PRP	AUX; EME; HRB; PRP LOC
Inactive in MODE	LOC	LOC	LOC	all time active
Number of starting attempts	1 x	Engine params: Crank Attempts	Engine params: Crank Attempts	1 x
<b>Engine stopping signals</b>				
	Remote Stop	Panel STOP button (1 sec holding time for Stop button activation!)		
Input sensitive	Edge sensitive; 2nd edge skips Cooling	Edge sensitive; 2nd edge skips Cooling		
Active in MODE	<b>AUX; EME; HRB; PRP</b>	<b>AUX; EME; HRB; PRP</b>		
Inactive in MODE	<b>LOC</b>	-		
<b>Note:</b> <i>Crank Attempts (page 125) is not followed if Sd Override is active, crank attempts number is then unlimited in case of Blackout/RemRep Start.</i>				

🔍 back to List of LBI

## Back Up Speed1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	159		
<b>Description</b>			
If input is active and Logical Analog input Requested RPM is not valid (out of range, sensor fail), <b>ThrottlePos (page 271)</b> is set to <b>Back Up Speed1 (page 152)</b> value. <b>ThrottlePos (page 271) = 0.0 %</b> when analog request is out of range and Binary input Back Up Speed is not active.			

🔍 back to List of LBI

## Back Up Speed2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	170		
<b>Description</b>			
If input is active and Logical Analog input Requested RPM is not valid (out of range, sensor fail), <b>ThrottlePos (page 271)</b> is set to <b>Back Up Speed1 (page 152)</b> value. <b>ThrottlePos (page 271)</b> = 0.0 % when analog request is out of range and Binary input Back Up Speed is not active.			

[back to List of LBI](#)

## Back Up Speed3

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	171		
<b>Description</b>			
If input is active and Logical Analog input Requested RPM is not valid (out of range, sensor fail), <b>ThrottlePos (page 271)</b> is set to <b>Back Up Speed1 (page 152)</b> value. <b>ThrottlePos (page 271)</b> = 0.0 % when analog request is out of range and Binary input Back Up Speed is not active.			

[back to List of LBI](#)

## Fire Speed

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	160		
<b>Description</b>			
If active, clutch is disconnected and <b>ThrottlePos (page 271)</b> is set to <b>FireAlarmSpeed (page 131)</b> , the <b>ThrottlePos</b> value change is influenced by ramp specified by <b>RQSP Ramp (page 1)</b> .			

[back to List of LBI](#)

## Rem Clutch

<b>Related FW</b>	3.4.0	<b>Related applications</b>	PRP
<b>Comm object</b>	183		
<b>Description</b>			
If active closes binary output Clutch Connect – see <b>CLUTCH CONNECT (PRP ONLY) (PAGE 202)</b> .			

[back to List of LBI](#)

## StartBlocking1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	68		
<b>Description</b>			
OR logical function of all StartBlocking Logical Binary inputs forces controller NotReady state ( i.e. disables engine start). It is active in LOC (Local) mode as well.			

[back to List of LBI](#)

## StartBlocking2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	580		
<b>Description</b>			
OR logical function of all StartBlocking Logical Binary inputs forces controller NotReady state ( i.e. disables engine start). It is active in LOC (Local) mode as well.			

[▲ back to List of LBI](#)

## StartBlocking3

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	581		
<b>Description</b>			
OR logical function of all StartBlocking Logical Binary inputs forces controller NotReady state ( i.e. disables engine start). It is active in LOC (Local) mode as well.			

[▲ back to List of LBI](#)

## StartBlocking4

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	582		
<b>Description</b>			
OR logical function of all StartBlocking Logical Binary inputs forces controller NotReady state ( i.e. disables engine start). It is active in LOC (Local) mode as well.			

[▲ back to List of LBI](#)

## StartBlocking5

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	583		
<b>Description</b>			
OR logical function of all StartBlocking Logical Binary inputs forces controller NotReady state ( i.e. disables engine start). It is active in LOC (Local) mode as well.			

[▲ back to List of LBI](#)

## Load Blocking

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	182		
<b>Description</b>			
Active input disables the Close load function. No influence when Binary output Close load is closed.			

[▲ back to List of LBI](#)

## RunIndication1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	46		
<b>Description</b>			
<p>Binary input can be used for engine running indication e.g. via Oil pressure contact. Active Running indication blocks engine start (to avoid starter damage).</p> <p>Engine running state = RPM &gt; <b>Starting RPM (page 122)</b> or</p> <p>Analog input Oil pressure &gt; <b>Starting POil (page 123)</b> or</p> <p>Active Binary input <b>RunIndication1</b> or</p> <p>Active Binary input <b>RunIndication2</b> or</p> <p>Active Binary input <b>RunIndication3</b>.</p>			

[back to List of LBI](#)

## RunIndication2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	47		
<b>Description</b>			
<p>Binary input can be used for engine running indication e.g. via Oil pressure contact. Active Running indication blocks engine start (to avoid starter damage).</p> <p>Engine running state = RPM &gt; <b>Starting RPM (page 122)</b> or</p> <p>Analog input Oil pressure &gt; <b>Starting POil (page 123)</b> or</p> <p>Active Binary input <b>RunIndication1</b> or</p> <p>Active Binary input <b>RunIndication2</b> or</p> <p>Active Binary input <b>RunIndication3</b>.</p>			

[back to List of LBI](#)

## RunIndication3

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	48		
<b>Description</b>			
<p>Binary input can be used for engine running indication e.g. via Oil pressure contact. Active Running indication blocks engine start (to avoid starter damage).</p> <p>Engine running state = RPM &gt; <b>Starting RPM (page 122)</b> or</p> <p>Analog input Oil pressure &gt; <b>Starting POil (page 123)</b> or</p> <p>Active Binary input <b>RunIndication1</b> or</p> <p>Active Binary input <b>RunIndication2</b> or</p> <p>Active Binary input <b>RunIndication3</b>.</p>			

[back to List of LBI](#)

## Nominal Speed

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	41		
<b>Description</b>			
Skips Idle Time and switch controller from Idle to Running state when closed before Idle Time is over.			

⬅ back to List of LBI

## Loaded

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	162		
<b>Description</b>			
Binary input function for loaded engine indication.			

⬅ back to List of LBI

## Emerg. Manual

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	45		
<b>Description</b>			
<p>This input is designed to allow the engine to be controlled externally, not by the controller. This feature is especially designed for marine gen-sets, which are supposed to be started manually as the controller has no power supply before the gen-set is started. It may be also useful in case of testing the gen-set or in case of a failure, which does not allow the gen-set to be controlled by the controller, but the gen-set itself is stays operational.</p> <p>The controller behaves following way:</p> <ul style="list-style-type: none"> <li>▶ Shows the text EmergMan in the engine status on the main screen.</li> <li>▶ Stops all functions regarding the engine control, deactivates all outputs related to it except Fuel Solenoid.</li> <li>▶ Stop Fail alarm is not being evaluated and Stop Solenoid is not activated if nonzero speed is detected.</li> <li>▶ When the input is deactivated, the controller takes control over the engine according to the situation in which the gen-set was in the moment of deactivation. I.e. the engine remains running if it was running in the moment the input was deactivated.</li> </ul>			

⬅ back to List of LBI

## EnClutchStart

<b>Related FW</b>	3.4.0	<b>Related applications</b>	PRP
<b>Comm object</b>	163		
<b>Description</b>			
Binary input activates Engine start via clutch. Engine is started by the other running engine via closed clutch - binary output <b>Clutch Connect</b> . See <b>MaxCIStrtPer (page 154)</b> protection setpoint.			

⬅ back to List of LBI



## Sd Override

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	44		
<b>Description</b>			
<p>Blocks all protections except <b>Overspeed (page 139)</b>, Emergency Stop and protections configured as “Sd override” (=Sprinkler).</p> <ul style="list-style-type: none"> <li>▶ All alarms are detected</li> <li>▶ Alarms are recorded on the controller Alarm list screen</li> <li>▶ Alarm are recorded into History</li> <li>▶ Enabled Active calls remains active</li> <li>▶ Controller front panel engine RED LED blinks or lights</li> </ul> <p><b>Note:</b> The setpoint Crank Attempts is not followed if Sd Override is active, crank attempts number is then unlimited in case of Blackout Start.</p>			

⬅ back to List of LBI

## Speed Down

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	164		
<b>Description</b>			
<p><b>Speed Request (page 265)</b> is decreased / increased when the binary input is closed. Speed Down has higher priority when both Up and Down inputs are active. RPM inc/dec rate is defined by <b>BI Speed Ramp (page 131)</b>.</p> <p>Engine speed can be set by <b>REQUESTED RPM (PAGE 245)</b> or by <b>SPEED UP (PAGE 188)</b> and <b>SPEED DOWN (PAGE 187)</b>.</p> <p>Following Speed Request initialization is valid when <b>REQUESTED RPM (PAGE 245)</b> is not configured.</p> <p>Speed Request (Idle) = 0.0 %. Inputs are active in LOC (Local) mode.</p> <p>Speed Request (Running) = 50.0 % for AUX (ECU 50 % = Nominal RPM).</p> <p>Speed Request (Running) = 0.0 % for PRP.</p> <p>See Engine Values: <b>(page 266)</b> and <b>(page 266)</b> modes.</p>			
<b>Dual rate ramp</b>			
<p>The Binary inputs SpeedUp and SpeedDown ramp function is for the 0.6 sec constant 0.4 %/s and does not depend on <b>BI Speed Ramp (page 131)</b> setting. This function enables fine setting of Engine speed to specific like 1500 RPM value.</p>			
<p><b>Note:</b> Minimal Speed Up and Speed Down pulse duration is 110 ms to be accepted by controller.</p>			

⬅ back to List of LBI

## Speed Up

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	165		
<b>Description</b>			
<p><b>Speed Request (page 265)</b> is decreased / increased when the binary input is closed. Speed Down has higher priority when both Up and Down inputs are active. RPM inc/dec rate is defined by <b>BI Speed Ramp (page 131)</b>.</p> <p>Engine speed can be set by Logical Analog Input Requested RPM or by <b>SPEED UP (PAGE 188)</b> and <b>SPEED DOWN (PAGE 187)</b>.</p> <p>Following Speed Request initialization is valid when <b>REQUESTED RPM (PAGE 245)</b> is not configured.</p> <p>Speed Request (Idle) = 0.0 %. Inputs are active in LOC (Local) mode.</p> <p>Speed Request (Running) = 50.0 % for AUX (ECU 50 % = Nominal RPM).</p> <p>Speed Request (Running) = 0.0 % for PRP.</p> <p>See Engine Values: <b>(page 266)</b> and <b>(page 266)</b> modes.</p>			
<b>Dual rate ramp</b>			
<p>The Binary inputs SpeedUp and SpeedDown ramp function is for the 0.6 sec constant 0.4 %/s and does not depend on <b>BI Speed Ramp (page 131)</b> setting. This function enables fine setting of Engine speed to specific like 1500 RPM value.</p>			
<p><b>Note:</b> Minimal Speed Up and Speed Down pulse duration is 110 ms to be accepted by controller.</p>			

🔍 back to List of LBI

## ECU FltReset

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	166		
<b>Description</b>			
<p>Binary input for ECU Alarm acknowledge (level sensitive) has the same function as controller front panel <b>Fault reset</b> button (screen sensitive - active only in ECU Alarm list screen).</p>			
<p><b>Note:</b> Activation of ECU Fault reset will affect IntelliDrive DCU Marine controller only, no reset request is sent to ECU. There is separated acknowledge input for Alarms – see Binary input <b>FAULT RESET (PAGE 177)</b>.</p>			

🔍 back to List of LBI

## BI Droop

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	167		
<b>Description</b>			
This input changes state of logical binary output <b>Droop Sw</b> that can be configured as J1939 output to change ECU mode. Input is active only when <b>Basic setting</b> : Governor Mode = BIN.INPUT (DROOP when closed).			

🔍 back to List of LBI

## BI Second RPM

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	168		
<b>Description</b>			
This input changes state of <b>SECOND RPM SW (AUX, EME, CMB ONLY) (PAGE 208)</b> that can be configured as J1939 output to change ECU mode. Input is active only when <b>Speed Select (page 113)</b> = BIN.INPUT.			

🔍 back to List of LBI

## BI Idle

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	169		
<b>Description</b>			
This input changes state of <b>IDLE/NOMINAL (PAGE 203)</b> that can be configured as J1939 output to change ECU mode. Input is active only when <b>Idle/Nominal (page 112)</b> = BIN.INPUT.			

🔍 back to List of LBI

## Rem Start/Stop

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	172		
<b>Description</b>			
Rem Start/Stop is level signal that activates engine start when closed and stop after is opened. It is inactive in LOC (Local) mode.			
It is not possible to stop engine by panel Stop button and by <b>Remote Stop (page 180)</b> when Rem Start/Stop is active. Rem Start/Stop input can be configured to Binary output Timer active to enable engine automatic start/stop function – see <b>Timer Repeat (page 115)</b> .			
<p><b>Note:</b> Engine “Start fail” is Warning (level 1) protection and does not block another start when Rem Start/Stop is still closed. To prevent unlimited number of starts – configure on <b>START FAIL (PAGE 233)</b> Sd protection.</p>			
<p><b>Note:</b> Engine stays running when Rem Start/Stop is opened in controller LOC (Local) mode.</p>			

🔍 back to List of LBI

## PrestartOvrđ

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	173		
<b>Description</b>			
<p><b>PrestartOvrđ</b> skips the Prestart procedure timing and continues to Cranking. The same effect has repeated press of <b>Start</b> button.</p> <p><b>Example:</b> Finish engine preheating (prelubrication) based on temperature (pressure) limit.</p>			

⬅ back to List of LBI

## ClutchBlocking

<b>Related FW</b>	3.4.0	<b>Related applications</b>	PRP
<b>Comm object</b>	182		
<b>Description</b>			
<p><b>ClutchBlocking</b> can block <b>CLUTCH CONNECT (PRP ONLY) (PAGE 202)</b>. Active input is indicated in Alarm list as “Clutch Blocking” message.</p>			

⬅ back to List of LBI

## ModeL Button

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	200		
<b>Description</b>			
<p>Input simulates the panel ← <b>Mode</b> button</p>			

⬅ back to List of LBI

## ModeR Button

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	201		
<b>Description</b>			
<p>Input simulates the panel <b>Mode</b> → button.</p>			

⬅ back to List of LBI

## Page Button

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	202		
<b>Description</b>			
<p>Input simulates the panel <b>Page</b> button.</p>			

⬅ back to List of LBI

## Enter Button

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	203		
<b>Description</b>			
Input simulates the panel <b>Enter</b> button.			

[▲ back to List of LBI](#)

## Up Button

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	204		
<b>Description</b>			
Input simulates the panel ↑-button.			

[▲ back to List of LBI](#)

## Down Button

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	205		
<b>Description</b>			
Input simulates the panel ↓ button.			

[▲ back to List of LBI](#)

## ECU DiagBlick

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	269		
<b>Description</b>			
Input controls ECU Diagnostic functionality in case of setting ECU Diag = EXTERNAL.			

[▲ back to List of LBI](#)

## Clear DayCons

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	220		
<b>Description</b>			
Rising edge clears Day consumption counter.			

[▲ back to List of LBI](#)

## Clear TripCons

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	221		
<b>Description</b>			
Rising edge clears Trip consumption counter.			

⬅ back to List of LBI

## Memo1 Trigger

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	584		
<b>Description</b>			
Rising edge forces to fill register <b>Statistics: Memo1</b> by <b>MEMORY1 (PAGE 249)</b> actual value. Memo1 Statistics value can be set or resetted by IntelliMonitor command.			

⬅ back to List of LBI

## Memo2 Trigger

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	585		
<b>Description</b>			
Rising edge forces to fill register <b>Statistics: Memo2</b> by <b>MEMORY2 (PAGE 250)</b> actual value. Memo2 Statistics value can be set or resetted by IntelliMonitor command.			

[back to List of LBI](#)

## User Mask 1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All						
<b>Comm object</b>	567								
<b>Description</b>									
<p>This input allows user to activate chosen function in ScreenEditor (tool inside DriveConfig) for particular screen instrument. User may choose from the following functions:</p> <table border="1"> <thead> <tr> <th>None</th> <th>Show</th> <th>Hide</th> </tr> </thead> <tbody> <tr> <td>No action regarding this screen instrument is taken.</td> <td>By default the screen instrument is hidden. If any of mask inputs (<b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b>) connected to this particular screen instrument is activated, this screen instrument is shown.</td> <td>By default the screen instrument is shown. If any of mask inputs (<b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b>) connected to this particular screen instrument is activated, this screen instrument is hidden.</td> </tr> </tbody> </table> <p><i><b>Note:</b> This function can be used to "swap" between two different screen instruments when certain conditions are fulfilled. Logical binary inputs Mask 1..4 can be used to define any custom condition for this "swapping" function.</i></p>				None	Show	Hide	No action regarding this screen instrument is taken.	By default the screen instrument is hidden. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is shown.	By default the screen instrument is shown. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is hidden.
None	Show	Hide							
No action regarding this screen instrument is taken.	By default the screen instrument is hidden. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is shown.	By default the screen instrument is shown. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is hidden.							

[back to List of LBI](#)

## User Mask 2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All						
<b>Comm object</b>	568								
<b>Description</b>									
<p>This input allows user to activate chosen function in ScreenEditor (tool inside DriveConfig) for particular screen instrument. User may choose from the following functions:</p> <table border="1"> <thead> <tr> <th>None</th> <th>Show</th> <th>Hide</th> </tr> </thead> <tbody> <tr> <td>No action regarding this screen instrument is taken.</td> <td>By default the screen instrument is hidden. If any of mask inputs (<b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b>) connected to this particular screen instrument is activated, this screen instrument is shown.</td> <td>By default the screen instrument is shown. If any of mask inputs (<b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b>) connected to this particular screen instrument is activated, this screen instrument is hidden.</td> </tr> </tbody> </table> <p><i><b>Note:</b> This function can be used to "swap" between two different screen instruments when certain conditions are fulfilled. Logical binary inputs Mask 1..4 can be used to define any custom condition for this "swapping" function.</i></p>				None	Show	Hide	No action regarding this screen instrument is taken.	By default the screen instrument is hidden. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is shown.	By default the screen instrument is shown. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is hidden.
None	Show	Hide							
No action regarding this screen instrument is taken.	By default the screen instrument is hidden. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is shown.	By default the screen instrument is shown. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is hidden.							

[back to List of LBI](#)

### User Mask 3

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All						
<b>Comm object</b>	569								
<b>Description</b>									
<p>This input allows user to activate chosen function in ScreenEditor (tool inside DriveConfig) for particular screen instrument. User may choose from the following functions:</p> <table border="1"> <thead> <tr> <th>None</th> <th>Show</th> <th>Hide</th> </tr> </thead> <tbody> <tr> <td>No action regarding this screen instrument is taken.</td> <td>By default the screen instrument is hidden. If any of mask inputs (<b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b>) connected to this particular screen instrument is activated, this screen instrument is shown.</td> <td>By default the screen instrument is shown. If any of mask inputs (<b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b>) connected to this particular screen instrument is activated, this screen instrument is hidden.</td> </tr> </tbody> </table> <p><i><b>Note:</b> This function can be used to "swap" between two different screen instruments when certain conditions are fulfilled. Logical binary inputs Mask 1..4 can be used to define any custom condition for this "swapping" function.</i></p>				None	Show	Hide	No action regarding this screen instrument is taken.	By default the screen instrument is hidden. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is shown.	By default the screen instrument is shown. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is hidden.
None	Show	Hide							
No action regarding this screen instrument is taken.	By default the screen instrument is hidden. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is shown.	By default the screen instrument is shown. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is hidden.							

[◀ back to List of LBI](#)

### User Mask 4

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All						
<b>Comm object</b>	570								
<b>Description</b>									
<p>This input allows user to activate chosen function in ScreenEditor (tool inside DriveConfig) for particular screen instrument. User may choose from the following functions:</p> <table border="1"> <thead> <tr> <th>None</th> <th>Show</th> <th>Hide</th> </tr> </thead> <tbody> <tr> <td>No action regarding this screen instrument is taken.</td> <td>By default the screen instrument is hidden. If any of mask inputs (<b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b>) connected to this particular screen instrument is activated, this screen instrument is shown.</td> <td>By default the screen instrument is shown. If any of mask inputs (<b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b>) connected to this particular screen instrument is activated, this screen instrument is hidden.</td> </tr> </tbody> </table> <p><i><b>Note:</b> This function can be used to "swap" between two different screen instruments when certain conditions are fulfilled. Logical binary inputs Mask 1..4 can be used to define any custom condition for this "swapping" function.</i></p>				None	Show	Hide	No action regarding this screen instrument is taken.	By default the screen instrument is hidden. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is shown.	By default the screen instrument is shown. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is hidden.
None	Show	Hide							
No action regarding this screen instrument is taken.	By default the screen instrument is hidden. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is shown.	By default the screen instrument is shown. If any of mask inputs ( <b>User Mask 1, User Mask 2, User Mask 3, User Mask 4</b> ) connected to this particular screen instrument is activated, this screen instrument is hidden.							

[◀ back to List of LBI](#)



## Current Gear

Related FW	3.4.0	Related applications	All
Comm object	950		
<b>Description</b>			
Output is designed for applications with transmission, where it is necessary to indicate the engine running and the possibility of gear shifting.			
Usually used as a source for the ECU output value.			

⬅ back to List of LBI

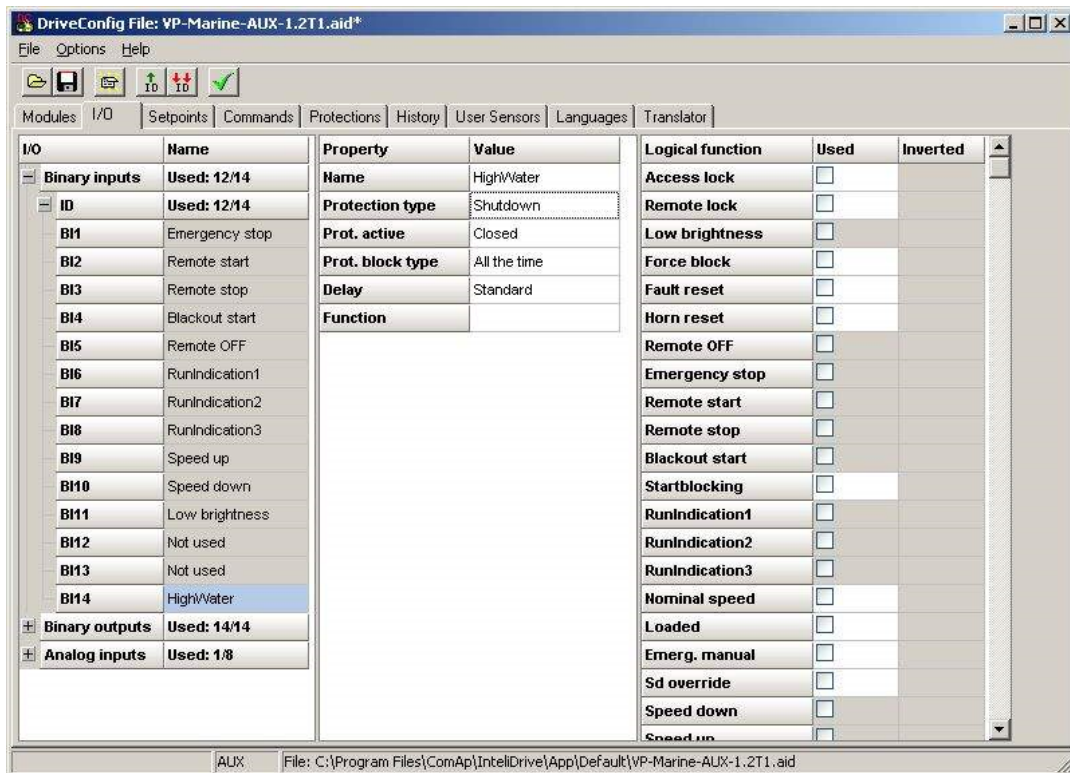
## Binary inputs from J1939 configuration

I/O	Name	Property	Value	J1939 value	Used
<b>Binary inputs</b> Used: 23/38					
ID	Use: 13/14	Name	RedStopLamp	Protect Lamp	<input type="checkbox"/>
BIN-1	Use: 1/8	Protection type	Warning	Amber Warning Lamp	<input type="checkbox"/>
J1939-1	Used: 9/16	Prot. active	Closed	Red Stop Lamp	<input checked="" type="checkbox"/>
	Preheat	Prot. block type	All the time	Malfunction Lamp	<input type="checkbox"/>
2	RedStopLamp	Delay	Standard	Water in Fuel	<input type="checkbox"/>
3	Overspeed	Function		Preheat Indication	<input type="checkbox"/>
		J1939 value	Red Stop Lamp	Running Indication	<input type="checkbox"/>

## Binary inputs protection

I/O	Name	Property	Value	Logical function	Used	Inverted
<b>Binary inputs</b> Used: 11/14						
ID	Used: 11/14	Name	Not used	Access lock	<input type="checkbox"/>	
B11	Emergency stop	Protection type	No protection	Remote lock	<input type="checkbox"/>	
B12	Remote start	Prot. active	No protection	Low brightness	<input type="checkbox"/>	
B13	Remote stop	Prot. block type	Warning	Force block	<input type="checkbox"/>	
B14	Blackout start	Delay	Shutdown	Fault reset	<input type="checkbox"/>	
B15	Remote OFF	Function	Sensor fail	Horn reset	<input type="checkbox"/>	
B16	RunIndication1		Warning + BW	Remote OFF	<input type="checkbox"/>	
B17	RunIndication2		Shutdown + BW	Emergency stop	<input type="checkbox"/>	
B18	RunIndication3		Warning + Fls	Remote start	<input type="checkbox"/>	
B19	Speed up			Remote stop	<input type="checkbox"/>	
B110	Speed down			Blackout start	<input type="checkbox"/>	
B111	Low brightness			Startblocking	<input type="checkbox"/>	
B112	Not used			RunIndication1	<input type="checkbox"/>	
B113	Not used			RunIndication2	<input type="checkbox"/>	
B114	Not used			RunIndication3	<input type="checkbox"/>	
<b>Binary outputs</b> Used: 14/14						
<b>Analog inputs</b> Used: 1/8						

Property: Function line is free, no logical function is (usually) selected.



## 8.1.4 Binary outputs

Depending on Modules configuration there are exist more groups of binary items that can be configured to any physical binary output.

Source	Used	Level
+ Log Bout		
+ Info		
+ RPU unit		
+ Prg. states		
+ Bin protections		
+ Binary CU		
+ RPU unit		

## List of LBO

AmberLamp .....	199	CMB, only) .....		User Button 9 .....	216
Aftertreatment .....	199	Droop Sw .....	208	User Button 10 .....	217
DPF Lamp .....	199	Second RPM Sw (AUX, EME, CMB only) .....	208	User Button 11 .....	217
HEST Lamp .....	199	Stop Pulse .....	209	User Button 12 .....	217
Horn .....	199	Comm AIN Fail .....	209	User Button 13 .....	217
Alarm .....	200	Comm BIN Fail .....	209	User Button 14 .....	217
Common Alarm .....	200	Comm AOUT Fail .....	209	User Button 15 .....	218
Common Wrm .....	200	Comm BOUT Fail .....	209	User Button 16 .....	218
Common Sd .....	200	DEF LowLvlamp .....	209	RegenInhibit .....	218
Common Cd .....	200	Nominal/Idle .....	210	RegenInhibLamp .....	218
Common Fls .....	201	Alarm Blink .....	210	RegenForce .....	218
CMD RegInhOn .....	201	Idle Sw .....	210	WaitToStartLmp .....	219
OFF Mode .....	201	Logical 0 .....	210	RemoteControl1 .....	219
Controller mode .....	201	Logical 1 .....	210	RemoteControl2 .....	219
Not In LOC .....	201	Operational .....	211	RemoteControl3 .....	219
In LOC .....	202	Timer Active .....	211	RemoteControl4 .....	219
CPU Ready .....	202	Alarm BlinkAct .....	211	RemoteControl5 .....	220
Clutch Connect (PRP only) .....	202	Common SdO .....	211	RemoteControl6 .....	220
ClutchBtToggle .....	202	Derating Alarm .....	211	RemoteControl7 .....	220
Idle/Nominal .....	203	RdyForRemStart .....	212	RemoteControl8 .....	220
HEST Lamp .....	203	ECU PowerRelay .....	212	FS-Status .....	221
Starter .....	203	StartButtEcho .....	212	FS-Load .....	221
Stop Solenoid .....	204	StopButtEcho .....	213	SS-Status .....	221
Prelubrication .....	204	FltResButtEcho .....	213	SS-Load .....	222
Prestart .....	205	HrnResButtEcho .....	213	BinOut Power .....	222
Ready To Start .....	205	ClutchButtEcho .....	213	Battery Fail .....	222
Ready To Load .....	205	HrnResBtToggle .....	214	RPU control .....	222
RedStopLamp .....	205	MalfunctLamp .....	214	RPU Watchdog .....	222
Engine Running .....	205	ActLoadShar .....	214	ECU Comm Error .....	223
Ignition .....	206	AirFlaps .....	214	ECU1 Comm Fail .....	223
Unload .....	206	MCU AckButton .....	215	ECU2 Comm Fail .....	223
Cooling .....	206	User Button 1 .....	215	ECU3 Comm Fail .....	223
Fuel Solenoid .....	206	User Button 2 .....	215	ECU4 Comm Fail .....	223
Cooling Pump .....	206	User Button 3 .....	215	ECU5 Comm Fail .....	224
Watchdog .....	207	User Button 4 .....	215	ECU6 Comm Fail .....	224
Close Load .....	207	User Button 5 .....	216	ECU7 Comm Fail .....	224
Close Load (AUX, EME, 207		User Button 6 .....	216	ECU8 Comm Fail .....	224
		User Button 7 .....	216	ECU10 Comm Fail .....	224
		User Button 8 .....	216	CommError 10 .....	224
				ECU11 Comm Fail .....	225

ECU12 Comm Fail .....	225	Pickup Fail .....	232
ECU13 Comm Fail .....	225	Battery Flat .....	232
ECU14 Comm Fail .....	225	Battery Volt .....	232
ECU15 Comm Fail .....	225	WrmService Time .....	232
ECU16 Comm Fail .....	225	Not Lubricated .....	232
Bw RPU FuelSol .....	226	Start Fail .....	233
Bw RPU StopSol .....	226	OP RPMdep .....	233
ECU AlarmList .....	226	CP RPMdep .....	233
UnivState 1 .....	226	Battery A volt .....	233
UnivState 2 .....	226	Battery B volt .....	233
UnivState 3 .....	226	SwitchToBatt B .....	234
UnivState 4 .....	227	Start Blocking .....	234
UnivState 5 .....	227	ClutchBlocking .....	234
UnivState 6 .....	227	Running .....	240
UnivState 7 .....	227	Overspeed .....	240
EcuDiagBlocked .....	227	OilPress .....	240
PLC Message 1 .....	227	OilTemp .....	241
PLC Message 2 .....	228	CoolantLevel .....	241
PLC Message 3 .....	228		
PLC Message 4 .....	228		
PLC Message 5 .....	228		
PLC Message 6 .....	228		
PLC Message 7 .....	228		
PLC Message 8 .....	229		
PLC Message 9 .....	229		
PLC Message 10 .....	229		
PLC Message 11 .....	229		
PLC Message 12 .....	229		
PLC Message 13 .....	229		
PLC Message 14 .....	230		
PLC Message 15 .....	230		
PLC Message 16 .....	230		
Emergency Stop .....	230		
Engine RPM .....	230		
Overload .....	230		
OthrCommEr .....	231		
ChrgAlternFail .....	231		
Stop Fail .....	231		
Overspeed .....	231		
Underspeed .....	231		

**▲ back to Controller objects**

## Source: Log Bout

### AmberLamp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1828		
<b>Description</b>			
Indicates that engine issued a warning.			

[back to List of LBO](#)

### Aftertreatment

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1842		
<b>Description</b>			
Indicates that Aftertreatment control is available with configured engine support.			

[back to List of LBO](#)

### DPF Lamp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1831		
<b>Description</b>			
Active signal indicates that DPF (Diesel Particulate Filter) is starting to overfill with soot because the system is unable to undertake an automatic active regeneration. It starts flashing when the DPF is nearly full, engine power may be reduced.			

[back to List of LBO](#)

### HEST Lamp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1373		
<b>Description</b>			
Indicates High Exhaust System Temperature (HEST). It may be active during DPF regeneration to indicate higher than normal exhaust temperatures.			

[back to List of LBO](#)

### Horn

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1		
<b>Description</b>			
Binary output for Horn, Buzzer alarm acoustic indication. Output is automatically switched off after <b>Horn Timeout (page 133)</b> . Horn is active unlimited time (until Fault reset) when Horn timeout = 0.			

[back to List of LBO](#)

## Alarm

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2		
<b>Description</b>			
The output closes if any alarm is activated and opens after Fault reset even if the Alarm is still active.			

[back to List of LBO](#)

## Common Alarm

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	256		
<b>Description</b>			
The output closes if any Wrn, Sd, Cd, Fls, alarm is active and stays closed until all alarms disappear and Fault reset is pressed = output is opened when Alarm list is empty.			

[back to List of LBO](#)

## Common Wrn

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	3		
<b>Description</b>			
The output closes when any Warning alarm is active. Output opens when all Wrn alarms disappear and Fault reset is pressed (no Wrn alarm in Alarm list).			

[back to List of LBO](#)

## Common Sd

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	4		
<b>Description</b>			
The output closes when any Shut-down alarm is active. Output opens when all Sd alarms disappear and Fault reset is pressed (no Sd alarm in Alarm list).			

[back to List of LBO](#)

## Common Cd

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	257		
<b>Description</b>			
The output closes when any Cool-down alarm is active. Output opens when all Cd alarms disappear and Fault reset is pressed (no Cd alarm in Alarm list).			

[back to List of LBO](#)

## Common FIs

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	6		
<b>Description</b>			
The output closes when any Sensor fail alarm is active. Output opens when all FIs alarms disappear and Fault reset is pressed (no FIs alarm in Alarm list).			

[back to List of LBO](#)

## CMD RegInhOn

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1942		
<b>Description</b>			
Provides feedback information that command (LBI function) <b>REGENINHIBIT</b> (PAGE 218) is active			

[back to List of LBO](#)

## OFF Mode

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	17		
<b>Description</b>			
The output is closed in controller OFF mode.			

[back to List of LBO](#)

## Controller mode

<b>Related FW</b>	3.4.0	<b>Related applications</b>	PRP, AUX, HRB
<b>Comm object</b>	9887		
<b>Description</b>			
<b>PRP Mode (PRP only)</b> The output is closed in controller PRP mode.			
<b>AUX Mode (AUX only)</b> The output is closed in controller AUX mode.			
<b>HRB Mode (CMB only)</b> The output is closed in controller HRB mode.			

[back to List of LBO](#)

## Not In LOC

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	258		
<b>Description</b>			
The output is closed, if LOC (Local) mode is not selected.			

[back to List of LBO](#)

## In LOC

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	259		
<b>Description</b>			
The output is closed, if LOC (Local) mode is selected.			

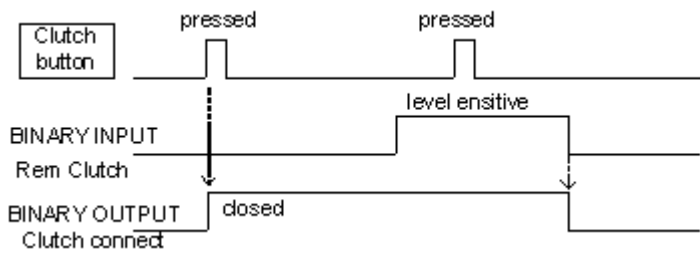
⬅ back to List of LBO

## CPU Ready

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	260		
<b>Description</b>			
CPU indication – output is closed when CPU is ready.			

⬅ back to List of LBO

## Clutch Connect (PRP only)

<b>Related FW</b>	3.4.0	<b>Related applications</b>	PRP
<b>Comm object</b>	261		
<b>Description</b>			
Output is closed if <b>REM CLUTCH (PAGE 183)</b> is active or controller front panel I/O button is pressed and actual engine RPM is between: ClutchMinSpeed and ClutchMaxSpeed.			
Output stays closed even if the RPM goes out of limits above. Can't be opened by button when <b>REM CLUTCH (PAGE 183)</b> is closed. BI Rem clutch is not active in LOC (Local) mode.			
			

⬅ back to List of LBO

## ClutchBtToggle

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1461		
<b>Description</b>			
The first press of <b>0/1</b> - panel Close Load button activates the new LBO <b>ClutchBtToggle</b> , the second press deactivates it, The function operates in all engine modes and states and can be used for some independent PLC function when standard Clutch function is not used.			
Existing function of panel Close load button <b>0/1</b> (LBO Close Load) is without change.			
Close Load function works for remote access from DriveMonitor, Modbus, Modem, ... as well.			

⬅ back to List of LBO



### Idle/Nominal

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	39		
<b>Description</b>			
The output closes during engine start, after Idle time setpoint elapses. The output opens again after Cooling time is finished. The opposite <b>NOMINAL/IDLE (PAGE 210)</b> is available as well.			
<i><b>Note:</b> Connect <b>NOMINAL/IDLE (PAGE 210)</b> to electronic speed governor to switch the speed: opened = IDLE, closed=RATED.</i>			

[▲ back to List of LBO](#)

### HEST Lamp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1373		
<b>Description</b>			
Indicates High Exhaust System Temperature (HEST). It may be active during DPF regeneration to indicate higher than normal exhaust temperatures.			

[▲ back to List of LBO](#)

### Starter

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	24		
<b>Description</b>			
Closed output energizes the engine starter.			

[▲ back to List of LBO](#)

## Stop Solenoid

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	23		

### Description

Stop Solenoid is active for Stop Time and further fixed 12 s after stopping Stop Time. Abort the process (and thus deactivate the active Stop Solenoid) by reactivating the Start (local or remote) command.

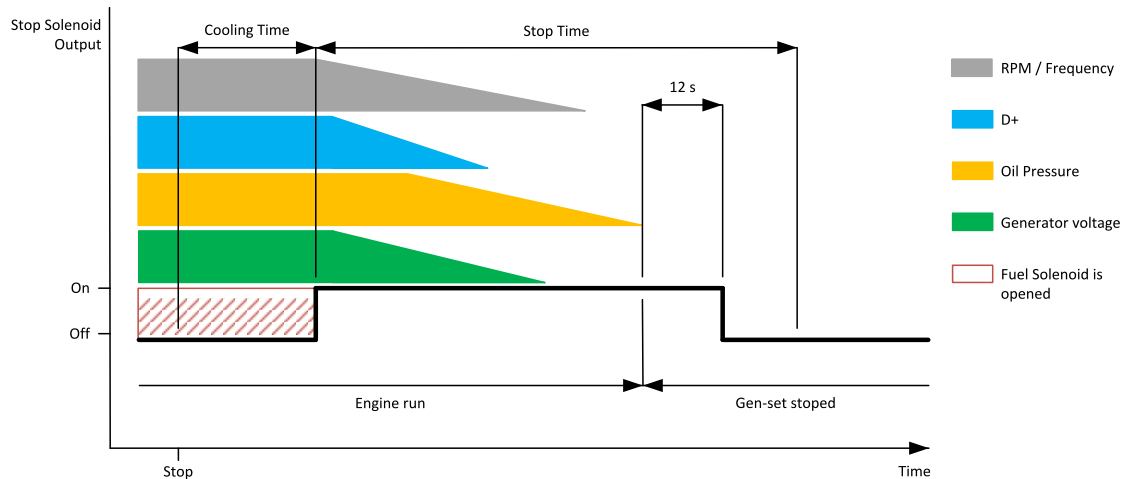


Image 8.1 Stop Solenoid diagram 1

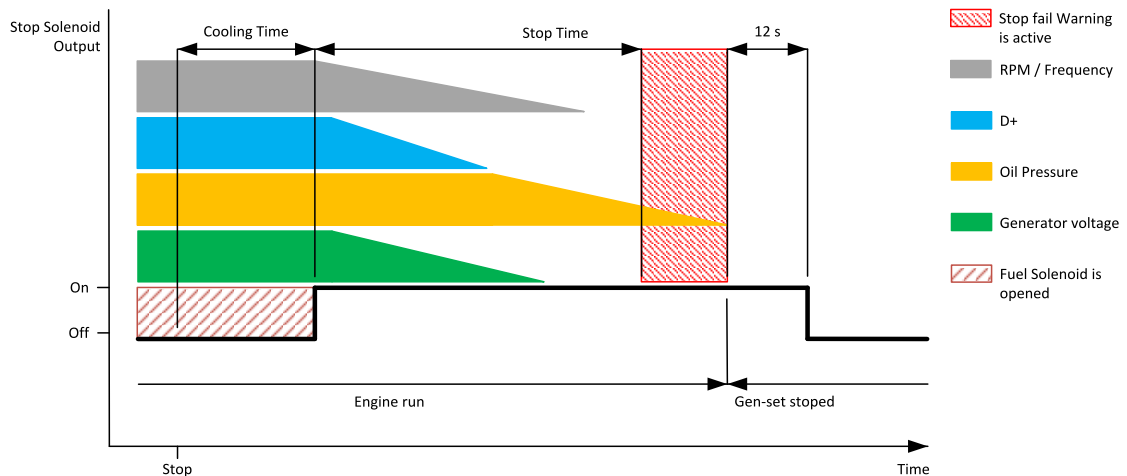


Image 8.2 Stop Solenoid diagram 2

[back to List of LBO](#)

## Prelubrication

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	49		

### Description

Periodic prelubrication function – see **PrelubrTime** (page 127) and **PrelubrPause** (page 127).

[back to List of LBO](#)

## Prestart

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	36		
<b>Description</b>			
Periodic prelubrication function – see <b>PrelubrTime (page 127)</b> and <b>PrelubrPause (page 127)</b> .			

[▲ back to List of LBO](#)

## Ready To Start

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	262		
<b>Description</b>			
Engine ready for start indication: no start blocking alarm is active. Output is active in LOC (Local) mode as well (even if can't be started by binary inputs).			

[▲ back to List of LBO](#)

## Ready To Load

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	67		
<b>Description</b>			
Output closes if the engine is in Running state and can be loaded. Opens in Cooling state. Active only if RPM > MinLoadSpeed (page 140).			

[▲ back to List of LBO](#)

## RedStopLamp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1829		
<b>Description</b>			
Active when continued operation could result in damage to exhaust system, but actual reason of the alarm may not be exhaust system related.			

[▲ back to List of LBO](#)

## Engine Running

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	263		
<b>Description</b>			
It activates when RPM rises above <b>Starting RPM (page 122)</b> and opens when RPM=0.			

[▲ back to List of LBO](#)

## Ignition

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	37		
<b>Description</b>			
Ignition system activation / deactivation during start - stop procedure. The output becomes active during cranking if RPM > 30, becomes inactive during cranking pause and after stop of the engine (RPM = 0).			

⬅ back to List of LBO

## Unload

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	264		
<b>Description</b>			
1 sec (fix) pulse prior to transfer from <b>RUNNING (PAGE 240)</b> to <b>COOLING (PAGE 206)</b> state.			

⬅ back to List of LBO

## Cooling

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	74		
<b>Description</b>			
Closes in cooling state, opens after engine stop.			

⬅ back to List of LBO

## Fuel Solenoid

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	22		
<b>Description</b>			
Closed output opens the fuel solenoid. Adjustable to DIESEL or GAS. See also the <b>Fuel Solenoid (page 130)</b> setpoint description.			

⬅ back to List of LBO

## Cooling Pump

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	40		
<b>Description</b>			
The output closes when engine starts and opens <b>AfterCoolTime (page 128)</b> delayed after stop the engine.			

⬅ back to List of LBO

## Watchdog

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	81		
<b>Description</b>			
Indicates correctly running firmware when cycling on/off with 0.5 s period.			

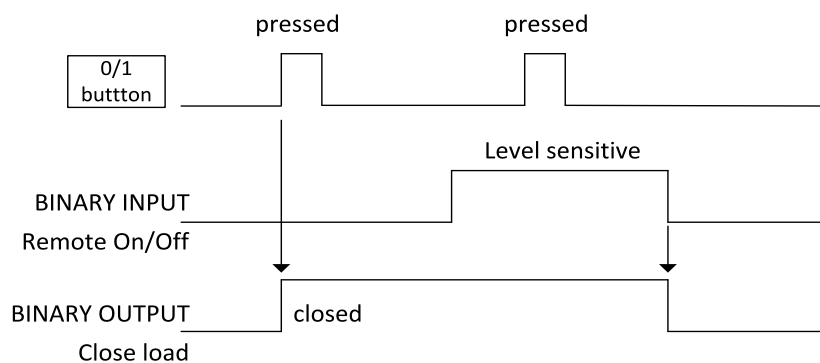
⬅ back to List of LBO

## Close Load

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	755		
<b>Description</b>			

Output is closed when panel 0/1 (On/Off) button is pressed or **REM START/STOP (PAGE 189)** is closed and engine RPM is over **MinLoadSpeed (page 140)**.

Output opens when RPM is below **MinLoadSpeed (page 140)**. Close load can't be opened by button when **REM START/STOP (PAGE 189)** (level sensitive) is closed.



Function can be blocked by binary input Load blocking.

⬅ back to List of LBO

## Close Load (AUX, EME, CMB, only)

<b>Related FW</b>	3.4.0	<b>Related applications</b>	AUX, EME, CMB
<b>Comm object</b>	265		
<b>Description</b>			

The output is closed/opened with rising edge of **REM START/STOP (PAGE 189)** (or I/O front panel button) when engine is in Running state and engine RPM is over MinLoadSpeed. Output opens when RPM is below **MinLoadSpeed (page 140)**. Close load can be opened remotely (e.g. from IntelliMonitor) when **REMOTE ON/OFF (PAGE 178)** is closed.

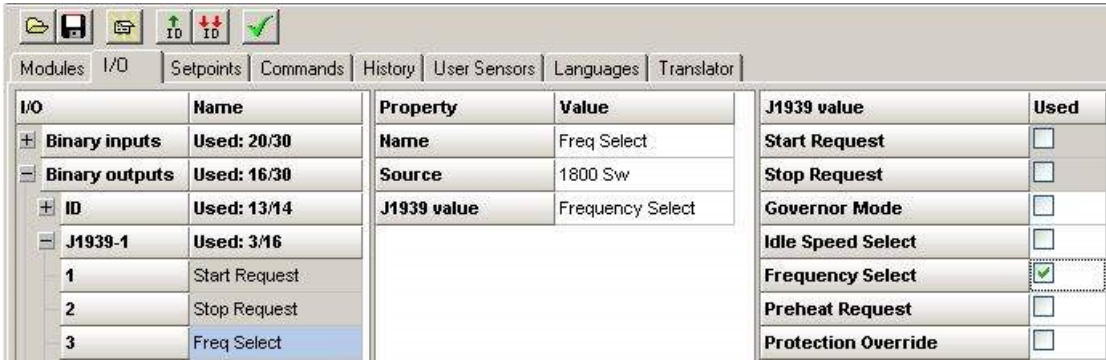
⬅ back to List of LBO

## Droop Sw

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	266		
<b>Description</b>			
The output is closed when <b>Governor Mode (page 111)</b> = DROOP or Governor Mode = BIN.INPUT and corresponding <b>BI DROOP (PAGE 189)</b> is closed. This logical output (Source) can be configured to corresponding J1939 output (e.g. Governor Mode in Volvo-IndustrialD12 Aux).			

⬅ back to List of LBO

## Second RPM Sw (AUX, EME, CMB only)

<b>Related FW</b>	3.4.0	<b>Related applications</b>	AUX, EME, CMB
<b>Comm object</b>	267		
<b>Description</b>			
The output is closed when <b>Speed Select (page 113)</b> = Secondary or Speed Select = BIN.INPUT and corresponding <b>BI SECOND RPM (PAGE 189)</b> RPM is closed. This logical output (Source) can be configured to corresponding J1939 output (e.g. Frequency Select in Volvo-IndustrialD12 Aux) see an example below.			
Function of Speed select implemented in IntelliDrive DCU has no influence on Speed Request by default setting. Logical binary output Second RPM Sw is normally used to select the rated speed, where the exact settings depend on the connected ECU. There is still combination of rated speed + additional speed request.			
<p><b>Example:</b> As a study case, we use controller with ECU protocol Scania S6 where command is through Nominal Speed Offset (proprietary DLN1 message) and for selection of rated speed can be used signal Nominal speed switch 1 and 2.</p> <p><b>Example:</b>  Nominal speed at full load: 1500 rpm  Min offset: -50 rpm  Max offset: +50 rpm  "Nominal speed offset" = <math>0 \times 3A = 58\%</math> =&gt; speed offset = +8 rpm  Referens speed to governor at full load = <math>1500 + 8 = 1508</math> rpm</p>			
			

⬅ back to List of LBO

### Stop Pulse

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	25		
<b>Description</b>			
1 sec pulse is generated in the beginning of Stop procedure.			

[▲ back to List of LBO](#)

### Comm AIN Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	269		
<b>Description</b>			
Communication warning fail when any Analog input module address does not communicate (2 s timeout).			

[▲ back to List of LBO](#)

### Comm BIN Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	270		
<b>Description</b>			
Communication warning fail when any Binary input module address does not communicate (2 s timeout).			

[▲ back to List of LBO](#)

### Comm AOUT Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	271		
<b>Description</b>			
Communication warning fail when any Analog output module address does not communicate (2 s timeout).			

[▲ back to List of LBO](#)

### Comm BOUT Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	272		
<b>Description</b>			
Communication warning fail when any Binary output module address does not communicate (2 s timeout).			

[▲ back to List of LBO](#)

### DEF LowLvlamp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1833		
<b>Description</b>			
Active signal indicates low level of Diesel Exhaust Fluid (DEF). It starts flashing when the DEF tank is nearly empty (e.g. when the level is 10 %), engine power may be reduced.			

[▲ back to List of LBO](#)

## Nominal/Idle

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	274		
<b>Description</b>			
Inverted function to <b>IDLE/NOMINAL (PAGE 203)</b> . The output closes during engine start, after Idle Time setpoint elapses. The output closes again after Cooling Time is finished.			

[◀ back to List of LBO](#)

## Alarm Blink

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	275		
<b>Description</b>			
Function is based on <b>COMMON ALARM (PAGE 200)</b> - stays closed when any alarm is active (at least one item in Alarm list) and opens for 2 sec when any new Alarm is activated. The first activation is delayed 2 sec. No Fault reset influence when at least one alarm is active. Output opens when Alarm list is empty.			

[◀ back to List of LBO](#)

## Idle Sw

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	276		
<b>Description</b>			
The output is closed when <b>Idle/Nominal (page 112)</b> = NOMINAL or Idle/Nominal = BIN.INPUT and corresponding <b>BI IDLE (PAGE 189)</b> is closed. This logical output (Source) can be configured to corresponding J1939 output (e.g. Idle Speed Select in Volvo-IndustrialD12 Aux).			

[◀ back to List of LBO](#)

## Logical 0

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	26		
<b>Description</b>			
Constant value that can be configured to any output (e.g. CurrentGear in Volvo-PRP).			

[◀ back to List of LBO](#)

## Logical 1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	27		
<b>Description</b>			
Constant value that can be configured to any output (e.g. CurrentGear in Volvo-PRP).			

[◀ back to List of LBO](#)



## Operational

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	61		
<b>Description</b>			
Output closes with binary output Prestart and opens with binary output Cooling pump (see <b>AfterCoolTime</b> (page 128))			

[◀ back to List of LBO](#)

## Timer Active

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	277		
<b>Description</b>			
Binary output Timer Active is closed and opened according to Timer setpoints setting. Engine starts and stops when this output is connected (configured) to <b>REM START/STOP (PAGE 189)</b> . Timer is active in all controller modes include OFF mode.			

[◀ back to List of LBO](#)

## Alarm BlinkAct

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	278		
<b>Description</b>			
It follows the panel Red LED. Starts blink after any (Wrn, Sd) Alarm is activated, light after Fault reset, disappear after Fault reset when no alarm is active.			

[◀ back to List of LBO](#)

## Common SdO

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	251		
<b>Description</b>			
Indicates any active protection configured as Shut down Override.			

[◀ back to List of LBO](#)

## Derating Alarm

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	279		
<b>Description</b>			
Power derating indication, information received from communication bus.			

[◀ back to List of LBO](#)

## RdyForRemStart

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	280		
<b>Description</b>			
Indicates Ready state for Remote engine start.			

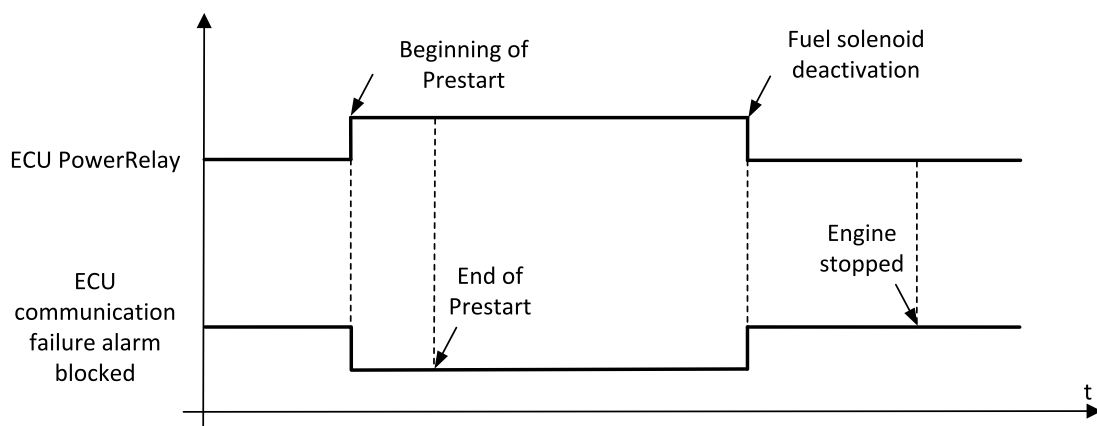
◀ back to List of LBO

## ECU PowerRelay

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	116		
<b>Description</b>			

The output closes at the beginning of prestart and opens if the engine shall be stopped. This output can be used to indicate when the ECU should be powered up i.e. only while the engine is running.

This output also influences evaluation of communication failure with ECU and related FLS alarms from analog inputs read from the ECU. If the output is configured (which means configured on physical binary output or VBOU output), announcement of the communication error is blocked if the engine is switched off including the stopping procedure as shown in the figure.



**Note:** The LBO must be configured on physical binary output or VBOU output. It is not enough to configure it as a PLC input for example.

**Note:** If the LBO: ECUPowerRelay is used to energize ECU unit during the start procedure, the initialization of the ECU unit might take slightly longer time and Wm CommError(x)/Sd CommError(x) might appear. In this case is recommended to use ECUCOMFAILBLCK (PAGE 178), please see this LBI.

◀ back to List of LBO

## StartButtEcho

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	281		
<b>Description</b>			
1 sec pulse is generated after panel Start button is pressed.			

◀ back to List of LBO

### StopButtEcho

<b>Related FW</b>	3.4.0	<b>Related applications</b>	AMF, MRS
<b>Comm object</b>	282		
<b>Description</b>			
1 sec pulse is generated after panel Stop button is pressed.			

[back to List of LBO](#)

### FitResButtEcho

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	283		
<b>Description</b>			
1 sec pulse is generated after panel Fault reset button is pressed. The pulse is generated only in case that Alarm List screen is displayed on the controller, i.e. in the time of possibility to acknowledge alarms.			

[back to List of LBO](#)

### HrnResButtEcho

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	284		
<b>Description</b>			
1 sec pulse is generated after panel Horn reset button is pressed.			

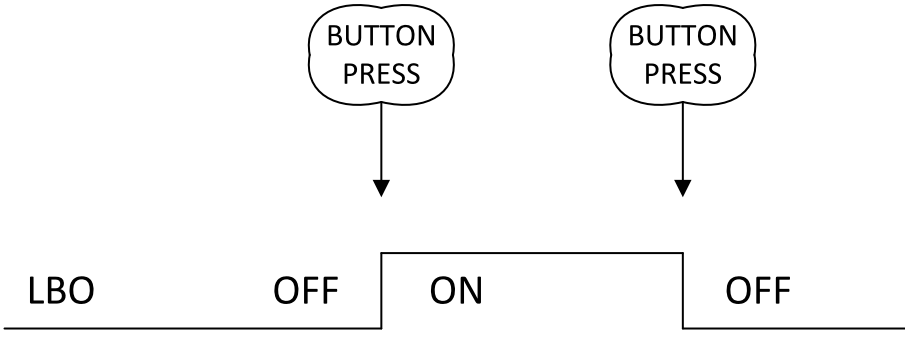
[back to List of LBO](#)

### ClutchButtEcho

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	285		
<b>Description</b>			
1 sec pulse is generated after panel I/O button is pressed.			

[back to List of LBO](#)

## HrnResBtToggle

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1462		
<b>Description</b>			
<p>The first press of <b>Horn Reset</b> panel button activates the new <b>HRNRESBTTOGGLE</b> (PAGE 214), the second deactivates it. The function operates in all engine modes and states. Current Horn reset function of panel button <b>HornReset</b> is still active.</p>			
			
<p><i>Note: Horn reset function works for remote access from DriveMonitor, Modbus, Modem, ... as well</i></p>			

⬅ back to List of LBO

## MalfunctLamp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1832		
<b>Description</b>			
Indicates that emissions related engine fault code is active.			

⬅ back to List of LBO

## ActLoadShar

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	449		
<b>Description</b>			
Indication of active Load sharing.			

⬅ back to List of LBO

## AirFlaps

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	620		
<b>Description</b>			
AirFlaps output is activated with engine starting (when controller enters state Cranking) and it is deactivated 5 s after engine stopping.			

⬅ back to List of LBO

## MCU AckButton

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	736		
<b>Description</b>			
MCU AckButton provides 1 s pulse, which is generated when controller front panel Fault reset button is pressed. It is not activated in case that fault reset is done in a different way, e.g. using remote display or remote communication.			

[▲ back to List of LBO](#)

## User Button 1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	726		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[▲ back to List of LBO](#)

## User Button 2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	727		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[▲ back to List of LBO](#)

## User Button 3

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	728		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[▲ back to List of LBO](#)

## User Button 4

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	729		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[▲ back to List of LBO](#)

### User Button 5

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	730		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### User Button 6

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	751		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### User Button 7

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	752		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### User Button 8

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1087		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### User Button 9

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1088		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### User Button 10

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1089		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### User Button 11

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1090		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### User Button 12

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1091		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### User Button 13

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1092		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### User Button 14

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1093		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### User Button 15

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1094		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### User Button 16

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1095		
<b>Description</b>			
InteliVision function buttons can be assigned to these LBOs User Button 1 .. 16. The configuration of button's functionality is done via ScreenEditor feature in DriveConfig PC application.			

[back to List of LBO](#)

### RegenInhibit

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	960		
<b>Description</b>			
Indicates that automatic DPF filter regeneration is inhibited using <b>REG INHIB (PAGE 181)</b> .			

[back to List of LBO](#)

### RegenInhibLamp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1834		
<b>Description</b>			
Indicates that diesel particulate filter regeneration is inhibited.			

[back to List of LBO](#)

### RegenForce

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	961		
<b>Description</b>			
Indicates that automatic DPF filter regeneration is forced using <b>REGENFORCE (PAGE 181)</b> .			

[back to List of LBO](#)



### WaitToStartLmp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1830		
<b>Description</b>			
Indicates that engine is too cold to start and operator should wait until the signal becomes inactive.			

[▲ back to List of LBO](#)

### RemoteControl1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	141		
<b>Description</b>			
Those eight LBOs can be handled from IntelliMonitor Remote switch window. This way can operator directly handle controller binary outputs or other e.g. PLC functions.			

[▲ back to List of LBO](#)

### RemoteControl2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	142		
<b>Description</b>			
Those eight LBOs can be handled from IntelliMonitor Remote switch window. This way can operator directly handle controller binary outputs or other e.g. PLC functions.			

[▲ back to List of LBO](#)

### RemoteControl3

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	143		
<b>Description</b>			
Those eight LBOs can be handled from IntelliMonitor Remote switch window. This way can operator directly handle controller binary outputs or other e.g. PLC functions.			

[▲ back to List of LBO](#)

### RemoteControl4

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	144		
<b>Description</b>			
Those eight LBOs can be handled from IntelliMonitor Remote switch window. This way can operator directly handle controller binary outputs or other e.g. PLC functions.			

[▲ back to List of LBO](#)

### RemoteControl5

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	145		
<b>Description</b>			
Those eight LBOs can be handled from IntelliMonitor Remote switch window. This way can operator directly handle controller binary outputs or other e.g. PLC functions.			

[back to List of LBO](#)

### RemoteControl6

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	146		
<b>Description</b>			
Those eight LBOs can be handled from IntelliMonitor Remote switch window. This way can operator directly handle controller binary outputs or other e.g. PLC functions.			

[back to List of LBO](#)

### RemoteControl7

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	147		
<b>Description</b>			
Those eight LBOs can be handled from IntelliMonitor Remote switch window. This way can operator directly handle controller binary outputs or other e.g. PLC functions.			

[back to List of LBO](#)

### RemoteControl8

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	148		
<b>Description</b>			
Those eight LBOs can be handled from IntelliMonitor Remote switch window. This way can operator directly handle controller binary outputs or other e.g. PLC functions.			

[back to List of LBO](#)

## Source: RPU unit

Values of ID-RPU unit are available (visible) only when ID-RPU module is selected. States does not activate Alarms.

Following list contains ID-RPU Shut down inputs state that can be configured to Binary outputs.

<b>RPU-SD 1</b>	Indication of ID-RPU Shut down 1 input state.
<b>RPU-SD 2</b>	Indication of ID-RPU Shut down 2 input state.
<b>RPU-SD 3</b>	Indication of ID-RPU Shut down 3 input state.
<b>RPU-SD 4</b>	Indication of ID-RPU Shut down 4 input state.
<b>RPU-SD 5</b>	Indication of ID-RPU Shut down 5 input state.
<b>EmStop RPU</b>	Indication of ID-RPU Emergency stop input state.

## FS-Status

<b>Related FW</b>	3.4.0	<b>Related applications</b>	RPU				
<b>Comm object</b>	10213						
<b>Description</b>							
FUEL SOLENOID (PAGE 206) (FS) status when output is <b>opened</b> :							
<table border="1"> <tr> <td>0</td> <td>OK</td> </tr> <tr> <td>1</td> <td>Fail: Broken wire (<b>BW</b>)</td> </tr> </table>				0	OK	1	Fail: Broken wire ( <b>BW</b> )
0	OK						
1	Fail: Broken wire ( <b>BW</b> )						
Table 8.1 FS-Status							
<i>Note: The High Current is indicated if output current is over 1 A approx.</i>							

⬅ back to List of LBO

## FS-Load

<b>Related FW</b>	3.4.0	<b>Related applications</b>	RPU				
<b>Comm object</b>	10213						
<b>Description</b>							
FUEL SOLENOID (PAGE 206) (FS) status when output is <b>opened</b> :							
<table border="1"> <tr> <td>0</td> <td>OK</td> </tr> <tr> <td>1</td> <td>Fail: Broken wire (<b>BW</b>)</td> </tr> </table>				0	OK	1	Fail: Broken wire ( <b>BW</b> )
0	OK						
1	Fail: Broken wire ( <b>BW</b> )						
Table 8.2 FS-Load							

⬅ back to List of LBO

## SS-Status

<b>Related FW</b>	3.4.0	<b>Related applications</b>	RPU
<b>Comm object</b>	10213		
<b>Description</b>			
STOP SOLENOID (PAGE 204) (SS) status when output is closed – see <b>FS-Status (page 221)</b>			

⬅ back to List of LBO

## SS-Load

<b>Related FW</b>	3.4.0	<b>Related applications</b>	RPU
<b>Comm object</b>	10213		
<b>Description</b>			
STOP SOLENOID (PAGE 204) (SS) status when output is opened – see FS-Load (page 221)			
		FS / SS -Status	FS / SS -Load
	FS / SS is <b>closed</b> , normal operation	1	No meaning
	FS / SS is <b>closed, HC or OT</b>	0	No meaning
	FS / SS is <b>opened</b> , normal operation	No meaning	0
	FS / SS is <b>opened, BW</b>	No meaning	1

⬅ back to List of LBO

## BinOut Power

<b>Related FW</b>	3.4.0	<b>Related applications</b>	RPU
<b>Comm object</b>	10213		
<b>Description</b>			
Status of ID-RPU Fuel solenoid and Stop solenoid power supply terminal. Active when Power supply is NOT connected.			

⬅ back to List of LBO

## Battery Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	RPU
<b>Comm object</b>	10213		
<b>Description</b>			
Indicates that system is switched to Battery B.			

⬅ back to List of LBO

## RPU control

<b>Related FW</b>	3.4.0	<b>Related applications</b>	RPU
<b>Comm object</b>	10213		
<b>Description</b>			
When closed ID-RPU module is active (after ID-DCU Marine fail) for engine Sd and Overspeed protection.			

⬅ back to List of LBO

## RPU Watchdog

<b>Related FW</b>	3.4.0	<b>Related applications</b>	RPU
<b>Comm object</b>	10213		
<b>Description</b>			
ID-RPU watchdog timer is over = ID-DCU Marine fail when closed.			
<b>Note:</b> Fuel and Stop solenoid Broken wire indications are available in the list of Prg.states			

⬅ back to List of LBO

## Source: Prg.states

Programmable states (protections) list. Any item from the following list activates Alarm list indication.

### ECU Comm Error

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	114		
<b>Description</b>			
The output is closed while there is an error in the communication with ECU, i.e. while there is the alarm ECU comm error present in the alarm list.			

[back to List of LBO](#)

### ECU1 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1998		
<b>Description</b>			
J1939 communication fail indication.			

[back to List of LBO](#)

### ECU2 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1999		
<b>Description</b>			
J1939 communication fail indication.			

[back to List of LBO](#)

### ECU3 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2000		
<b>Description</b>			
J1939 communication fail indication.			

[back to List of LBO](#)

### ECU4 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2001		
<b>Description</b>			
J1939 communication fail indication.			

[back to List of LBO](#)

### ECU5 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2002		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### ECU6 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2003		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### ECU7 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2004		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### ECU8 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2005		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### ECU10 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2006		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### CommError 10

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2007		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### ECU11 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2008		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### ECU12 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2009		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### ECU13 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2010		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### ECU14 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2011		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### ECU15 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2012		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### ECU16 Comm Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	2013		
<b>Description</b>			
J1939 communication fail indication.			

[▲ back to List of LBO](#)

### Bw RPU FuelSol

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	323		
<b>Description</b>			
ID-RPU FUEL SOLENOID (PAGE 206) - Broken wire indication.			

[back to List of LBO](#)

### Bw RPU StopSol

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	324		
<b>Description</b>			
ID-RPU STOP SOLENOID (PAGE 204) - Broken wire indication.			
<i>Note: Binary output Stop solenoid and Fuel solenoid broken wire is indicated in open state.</i>			

[back to List of LBO](#)

### ECU AlarmList

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	303		
<b>Description</b>			
Output is closed when at least one item is in ECU Alarm list.			

[back to List of LBO](#)

### UnivState 1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	185		
<b>Description</b>			
Universal states 1 to Universal states 7 indication. See <b>Universal states (page 29)</b> description.			

[back to List of LBO](#)

### UnivState 2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	186		
<b>Description</b>			
Universal states 1 to Universal states 7 indication. See <b>Universal states (page 29)</b> description.			

[back to List of LBO](#)

### UnivState 3

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	187		
<b>Description</b>			
Universal states 1 to Universal states 7 indication. See <b>Universal states (page 29)</b> description.			

[back to List of LBO](#)



### UnivState 4

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	188		
<b>Description</b>			
Universal states 1 to Universal states 7 indication. See <b>Universal states (page 29)</b> description.			

[back to List of LBO](#)

### UnivState 5

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	189		
<b>Description</b>			
Universal states 1 to Universal states 7 indication. See <b>Universal states (page 29)</b> description.			

[back to List of LBO](#)

### UnivState 6

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	190		
<b>Description</b>			
Universal states 1 to Universal states 7 indication. See <b>Universal states (page 29)</b> description.			

[back to List of LBO](#)

### UnivState 7

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	191		
<b>Description</b>			
Universal states 1 to Universal states 7 indication. See <b>Universal states (page 29)</b> description.			

[back to List of LBO](#)

### EcuDiagBlocked

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Output is closed when <b>ECU Diag (page 111)</b> = DISABLED.			

[back to List of LBO](#)

### PLC Message 1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	181		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[back to List of LBO](#)

### PLC Message 2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	182		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 3

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	183		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 4

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	184		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 5

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	372		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 6

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	373		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 7

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	374		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 8

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	375		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 9

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	530		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 10

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	531		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 11

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	532		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 12

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	533		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 13

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	534		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 14

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	535		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 15

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	792		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### PLC Message 16

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	793		
<b>Description</b>			
The output is closed while the alarm generated by the PLC block Force Prot is present in the alarm list.			

[▲ back to List of LBO](#)

### Emergency Stop

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	260		
<b>Description</b>			
Indication of <b>EMERGENCYSTOP1 / EMERGENCYSTOP2 (PAGE 179)</b> .			

[▲ back to List of LBO](#)

### Engine RPM

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Engine speed state indication. Output is closed when no RPM is received from J1939 (sensor fail) or Overspeed or Under speed is detected.			

[▲ back to List of LBO](#)

### Overload

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Active overload protection activation.			

[▲ back to List of LBO](#)

### OthrCommEr

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Intercontroller communication error.			

[back to List of LBO](#)

### ChrgAlternFail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Charger fail detection. D+ output current is limited to cca 300 mA.			
Guaranteed level for signal Charging OK = 90 % of supply voltage.			
There are three possible conditions for stop engine cranking: <b>Starting RPM</b> , <b>StartingPOil</b> and <b>D+ function</b> (when ENABLED). Starter goes off when any of these conditions becomes valid.			

[back to List of LBO](#)

### Stop Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Engine stop fail indication. Stop fail: engine does not reach 0 RPM after stop command within <b>Stop Time</b> (page 128).			

[back to List of LBO](#)

### Overspeed

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	779		
<b>Description</b>			
Engine overspeed indication.			

[back to List of LBO](#)

### Underspeed

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Under speed indication.			

[back to List of LBO](#)

### Pickup Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Pickup fail indication. Pickup fail: lost of RPM signal in running state (other running indication is active).			

⬅ back to List of LBO

### Battery Flat

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
ID-DCU Marine controller reset during Cranking state (see <b>Crank Attempts (page 125)</b> ).			

⬅ back to List of LBO

### Battery Volt

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	1293		
<b>Description</b>			
Indication when battery voltage (ID-DCU Marine power supply) is out of <b>Batt &gt; V (page 140)</b> and <b>Batt &lt; V (page 141)</b> limits.			

⬅ back to List of LBO

### WrnService Time

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Output is closed when Service time (count down) = 0.			
<i>Note: History record and Alarm list indication is activated as well.</i>			

⬅ back to List of LBO

### Not Lubricated

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
The lubrication cycle (PrelubrTime) is not finished after controller Switch on or return from OFF mode.			

⬅ back to List of LBO

### Start Fail

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
The last start attempt was unsuccessful.			

[back to List of LBO](#)

### OP RPMdep

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Out of Oil pressure RPM dependent limit indication.			

[back to List of LBO](#)

### CP RPMdep

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Out of Cooling pressure RPM dependent limit indication.			

[back to List of LBO](#)

### Battery A volt

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
It is closed when the battery A voltage of RPU is out of limits: Engine protection: <b>Batt &gt;V, Batt &lt;V, Batt V del.</b>			

[back to List of LBO](#)

### Battery B volt

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
It is closed when the battery B voltage of RPU is out of limits: Engine protection: <b>Batt &gt;V, Batt &lt;V, Batt V del.</b>			

[back to List of LBO](#)

### SwitchToBatt B

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
It is closed when ID-RPU was switched power supply to the battery B.			

[◀ back to List of LBO](#)

### Start Blocking

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Start blocking indication.			

[◀ back to List of LBO](#)

### ClutchBlocking

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Clutch blocking indication.			

[◀ back to List of LBO](#)





**Source: Bin protections**

List of Binary inputs protection - indication is dynamic. Any protection configured on Binary input appears in Source: Bin protection.

## **Source: Binary Inputs CU**

Binary CU list contains all ID-DCU Marine binary inputs that can be configured to Binary outputs. This source contains binary inputs physical states (no protection activity).

## Source: RPU unit

Values of ID-RPU unit are available (visible) only when ID-RPU module is selected. States does not activate Alarms.

Following list contains ID-RPU Shut down inputs state that can be configured to Binary outputs.

<b>RPU-SD 1</b>	Indication of ID-RPU Shut down 1 input state.
<b>RPU-SD 2</b>	Indication of ID-RPU Shut down 2 input state.
<b>RPU-SD 3</b>	Indication of ID-RPU Shut down 3 input state.
<b>RPU-SD 4</b>	Indication of ID-RPU Shut down 4 input state.
<b>RPU-SD 5</b>	Indication of ID-RPU Shut down 5 input state.
<b>EmStop RPU</b>	Indication of ID-RPU Emergency stop input state.

## **Source: Binary Inputs**

List (depend on modules configuration) contains all Extension modules binary inputs that can be configured to any Binary outputs. This source contains binary inputs physical states (no protection activity).

## Source: J1939

Following list contains all binary values received from J1939 that can be configured to Binary outputs. This list depends on selected ESF file. For more detail see corresponding engine specification.

### Running

Engine running state indication.

### Overspeed

Engine overspeed indication.

### OilPress

Oil pressure out of limit indication.

### OilTemp

Oil temperature out of limit indication.

### CoolantTemp

Coolant temperature out of limit indication.

### Coolant Level

Coolant level out of limit indication.

## Running

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	67		
<b>Description</b>			
Engine running state indication.			

[↶ back to List of LBO](#)

## Overspeed

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	779		
<b>Description</b>			
Engine overspeed indication.			

[↶ back to List of LBO](#)

## OilPress

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	521		
<b>Description</b>			
Oil pressure out of limit indication.			

[↶ back to List of LBO](#)

### OilTemp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	435		
<b>Description</b>			
Oil temperature out of limit indication.			

[◀ back to List of LBO](#)

### CoolantLevel

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>			
<b>Description</b>			
Coolant level out of limit indication.			

[◀ back to List of LBO](#)

## Binary output to J1939 configuration: Source-Value

I/O		Name	Property	Value	J1939 value	Used
Binary inputs		Used: 23/38	Name	Droop Sw	Start Request	<input type="checkbox"/>
Binary outputs		Used: 17/30	Source	Droop Sw	Stop Request	<input type="checkbox"/>
J1939-1		Used: 14/14	J1939 value	Governor Mode	Governor Mode	<input checked="" type="checkbox"/>
1		Start Request			Idle Speed Select	<input type="checkbox"/>
2		Stop Request			Frequency Select	<input type="checkbox"/>
3		Droop Sw			Preheat Request	<input type="checkbox"/>
					Protection Override	<input type="checkbox"/>

I/O		Name	Property	Value	Source	Used
Binary inputs		Used: 23/38	Name	Droop Sw	Not used	<input type="checkbox"/>
Binary outputs		Used: 17/30	Source	Droop Sw	Droop Sw	<input checked="" type="checkbox"/>
J1939-1		Used: 3/16	J1939 value	Governor Mode	Not used	<input type="checkbox"/>
1		Start Request			Stop pulse	<input type="checkbox"/>
2		Stop Request			FaultResetPuls	<input type="checkbox"/>
3		Droop Sw			Comm AIN fail	<input type="checkbox"/>
					Comm BIN fail	<input type="checkbox"/>

## 8.1.5 Analog Inputs

### List of LAI

LCD Brightness .....	244
Engine Speed .....	244
Oil Press .....	244
Oil Temp .....	244
Coolant Press (PRP only) .....	244
Coolant Temp .....	245
Fuel Level .....	245
Requested RPM .....	245
Engine Torque (PRP only) .....	245
Fuel ConsAct .....	246
FuelConsump .....	246
BoatSpeed .....	246
MainScrAna1 .....	247
MainScrAna2 .....	248
Memory1 .....	249
Memory2 .....	250
Cold Temp 1 .....	250
Cold Temp 2 .....	251
Cold Temp 3 .....	251
Cold Temp 4 .....	251



Cyl Temp 1 .....	252
Cyl Temp 2 .....	252
Cyl Temp 3 .....	252
Cyl Temp 4 .....	252
Cyl Temp 5 .....	252
Cyl Temp 6 .....	252
Cyl Temp 7 .....	253
Cyl Temp 8 .....	253
Cyl Temp 9 .....	253
Cyl Temp 10 .....	253
Cyl Temp 11 .....	253
Cyl Temp 12 .....	253
Cyl Temp 13 .....	254
Cyl Temp 14 .....	254
Cyl Temp 15 .....	254
Cyl Temp 16 .....	254

 **back to Controller objects**

## LCD Brightness

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	7		
<b>Description</b>			
Analog input for external LCD brightness setting (e.g. via potentiometer). Keyboard LCD brightness setting does not work when input is configured. Expected value is in the range 0 to 100 %.			

[back to List of LAI](#)

## Engine Speed

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	8		
<b>Description</b>			
RPM value from ECU - J1939.			

[back to List of LAI](#)

## Oil Press

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	9		
<b>Description</b>			
Engine oil pressure, which is displayed at the first controller screen.			
<i>Note: Configure OIL PRESS (PAGE 244) (LAI card in DriveConfig) to display the value at the first controller screen.</i>			

[back to List of LAI](#)

## Oil Temp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	77		
<b>Description</b>			
Universal input for engine oil temperature.			

[back to List of LAI](#)

## Coolant Press (PRP only)

<b>Related FW</b>	3.4.0	<b>Related applications</b>	PRP
<b>Comm object</b>	66		
<b>Description</b>			
Running indication and speed dependable protection in <b>PRP</b> .			

[back to List of LAI](#)

## Coolant Temp

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	67		
<b>Description</b>			
Engine coolant temperature, which is displayed at the first controller screen.			
<i>Note: Configure COOLANT TEMP (PAGE 245) (LAI card in DriveConfig) to display the value at the first controller screen.</i>			

⬅ back to List of LAI

## Fuel Level

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	78		
<b>Description</b>			
Analog input for fuel level in percentage.			

⬅ back to List of LAI

## Requested RPM

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	68		
<b>Description</b>			
AI influences directly <b>Speed Request (page 265)</b> register when configured without ramp. In the case of sensor fail (out of range) is Speed request = 0.0 % for PRP and 50.0 % (=Nominal RPM) for AUX. There is expected range of values 0.0 ... 100.0 % for this Logical Analog input.			
See <b>Speed Request (page 265)</b> charts for <b>(page 266)</b> and <b>(page 266)</b> modes.			

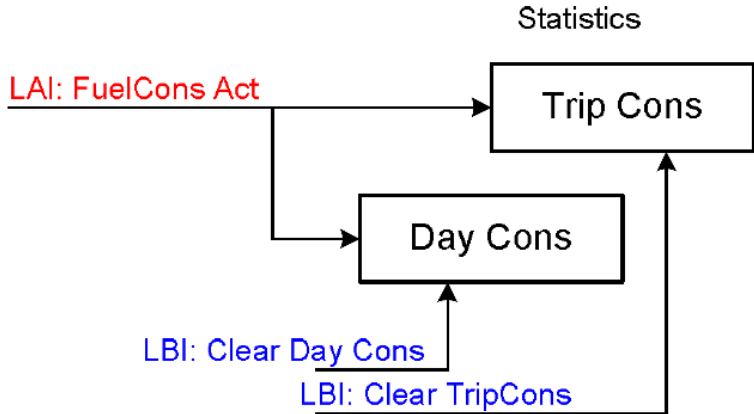
⬅ back to List of LAI

## Engine Torque (PRP only)

<b>Related FW</b>	3.4.0	<b>Related applications</b>	PRP
<b>Comm object</b>	69		
<b>Description</b>			
Actual engine torque in %, received from J1939.			

⬅ back to List of LAI

## Fuel ConsAct

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	82		
<b>Description</b>			
<p>There are two cumulative Statistics registers - values TripCons and DayCons. Those statistic values increment value based on sampling of <b>FUEL CONSACT (PAGE 246)</b>. LAI can be sourced from ECU Fuel Rate [ l/h ] or separate Actual Fuel consumption sensor connected to physical Analog input.</p> <p>Both statistics values is possible to modify in IntelliMonitor – Set Statistics command or clear by <b>CLEAR DAYCONS (PAGE 191)</b> or <b>CLEAR TRIPCONS (PAGE 192)</b>s.</p>			
 <pre> graph TD     LAI[LAI: FuelCons Act] --&gt; TripCons[Trip Cons]     LAI --&gt; DayCons[Day Cons]     LBI1[LBI: Clear Day Cons] --&gt; DayCons     LBI2[LBI: Clear TripCons] --&gt; TripCons     DayCons --&gt; TripCons     </pre>			

🔍 back to List of LAI

## FuelConsump

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	116		
<b>Description</b>			
<p>Analog input for engine fuel consumption value [L/h], which is used for <b>MomAvgFICon L (page 287)</b> calculation</p>			

🔍 back to List of LAI

## BoatSpeed

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	117		
<b>Description</b>			
<p>Analog input for boat speed value [kts], which is used for <b>MomAvgFICon L (page 287)</b> calculation</p>			

🔍 back to List of LAI

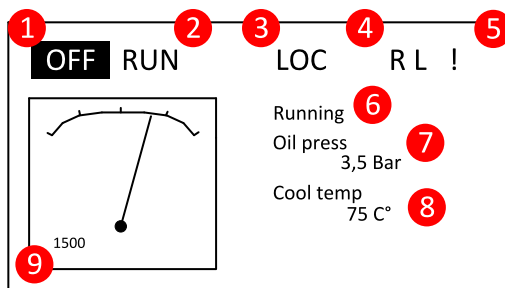
## MainScrAna1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	120		

### Description

Logical Analog Inputs MainScrAna1 or MainScrAna2 enables to redirect any Analog input value on the ID-DCU Marine main screen on “OilPress” and “CoolTemp” position.

**Note:** Default names “OilPress” and “CoolTemp” will not change when the Logical Analog Inputs MainScrAna1 or MainScrAna2 are connected to other source values and has to be changed by translator.



1. Default configuration
  - ▶ ID / AIN\_Function = Oil Press; MainScrAna1
  - ▶ ID / AIN2\_Function = Coolant Temp; MainScrAna2
2. To display e.g. value from AIN3 “AirTemp1” instead “OilPress” (the first position) and AIN4 “AirTemp2” instead “CoolTemp” value:
  - a. Select AIN3 Property Function = MainScrAna1
  - b. Select AIN4 Property Function = MainScrAna2
  - c. Create new language (in DriveConfig Languages) based on English
  - d. Rename (in DriveConfig Translator / Other texts) text “OilPress” to “AirTemp1” in the newly created language
  - e. Rename (in DriveConfig Translator / Other texts) text “CoolTemp” (no space between) to “AirTemp2” in the newly created language
  - f. Switch the ID-DCU Marine controller into newly created and modified language (Enter + Page, Page, select the new language by up/down arrows, Enter)

**Note:** Translate text “OilPress” and “CoolTemp” - no space between words because of similar texts (e.g. Coolant Temp, etc. are located on other screens).

🔍 back to List of LAI

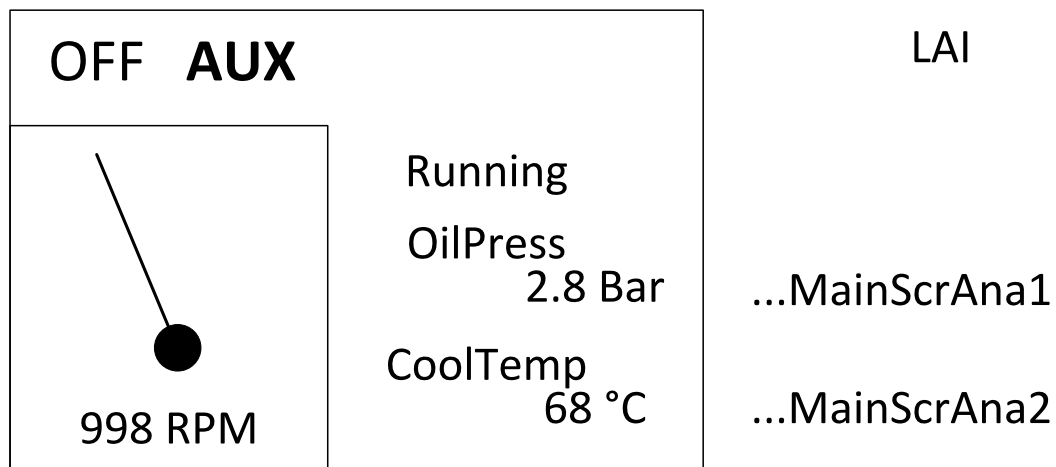
## MainScrAna2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	121		

### Description

Logical Analog Inputs MainScrAna1 or MainScrAna2 enables to redirect any Analog input value on the ID-DCU Marine main screen on “OilPress” and “CoolTemp” position.

**Note:** Default names “OilPress” and “CoolTemp” do not change when the Logical Analog Inputs MainScrAna1 or MainScrAna2 are connected to other source values and has to be changed by translator.



1. Default configuration
  - ▶ ID / AIN\_Function = Oil Press; MainScrAna1
  - ▶ ID / AIN2\_Function = Coolant Temp; MainScrAna2
2. To display e.g. value from AIN3 “AirTemp1” instead “OilPress” (the first position) and AIN4 “AirTemp2” instead “CoolTemp” value:
  - a. Select AIN3 Property Function = MainScrAna1
  - b. Select AIN4 Property Function = MainScrAna2
  - c. Create new language (in DriveConfig Languages) based on English
  - d. Rename (in DriveConfig Translator / Other texts) text “OilPress” to “AirTemp1” in the newly created language
  - e. Rename (in DriveConfig Translator / Other texts) text “CoolTemp” (no space between) to “AirTemp2” in the newly created language
  - f. Switch the ID-DCU Marine controller into newly created and modified language (Enter + Page, Page, select the new language by up/down arrows, Enter)

**Note:** Translate text “OilPress” and “CoolTemp” - no space between words because of similar texts (e.g. Coolant Temp, etc. are located on other screens).

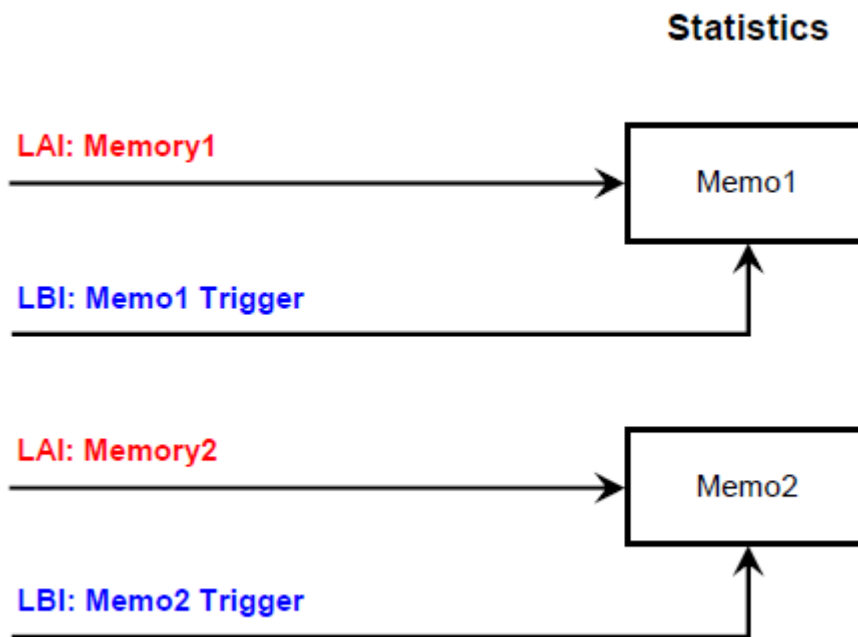
 [back to List of LAI](#)

## Memory1

Related FW	3.4.0	Related applications	All
Comm object	181		

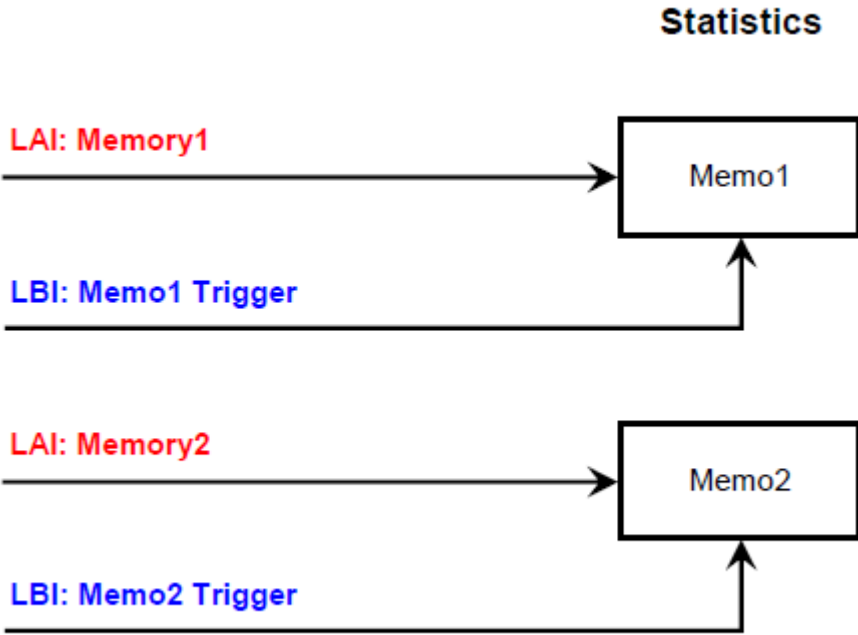
### Description

There are two Statistics registers Memo1 and Memo2. Those statistic values are based on Logical Analog Input Memory1 or Memory2 value in the time of Logical Binary input Memo1 Trigger or Memo2 Trigger rising edge. Both statistics values is possible to modify in IntelliMonitor – Set Statistics command.



[back to List of LAI](#)

## Memory2

Related FW	3.4.0	Related applications	All
Comm object	182		
<b>Description</b>			
<p>There are two Statistics registers Memo1 and Memo2. Those statistic values are based on Logical Analog Input Memory1 or Memory2 value in the time of Logical Binary input Memo1 Trigger or Memo2 Trigger rising edge. Both statistics values is possible to modify in IntelliMonitor – Set Statistics command.</p>			
 <p style="text-align: center;"><b>Statistics</b></p>			

[back to List of LAI](#)

## Cold Temp 1

Related FW	3.4.0	Related applications	All
Comm object	56		
<b>Description</b>			
<p>If there is an additional terminal board between a thermocouple sensor and the IS-AIN8 (TC) module and there is a significant temperature difference between this terminal board and the module, it is necessary to measure the temperature at this terminal board and use this temperature for the thermocouple compensation instead of the internal temperature of the module.</p> <p><b>Cold Temp 1</b> Logical Analog input is intended for measurement of this thermocouple compensation temperature for the IS-AIN8 (TC) module with index #1, <b>Cold Temp 2</b> corresponds to IS-AIN8 (TC) module with index #2 etc.</p> <p><b>Note:</b> <i>Thermocouples without internal compensation "Thermo(nc)..." must be used for this case.</i></p>			

[back to List of LAI](#)



## Cold Temp 2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	57		
<b>Description</b>			
<p>If there is an additional terminal board between a thermocouple sensor and the IS-AIN8 (TC) module and there is a significant temperature difference between this terminal board and the module, it is necessary to measure the temperature at this terminal board and use this temperature for the thermocouple compensation instead of the internal temperature of the module.</p> <p><b>Cold Temp 1</b> Logical Analog input is intended for measurement of this thermocouple compensation temperature for the IS-AIN8 (TC) module with index #1, <b>Cold Temp 2</b> corresponds to IS-AIN8 (TC) module with index #2 etc.</p> <p><b>Note:</b> <i>Thermocouples without internal compensation "Thermo(nc)..." must be used for this case.</i></p>			

[back to List of LAI](#)

## Cold Temp 3

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	58		
<b>Description</b>			
<p>If there is an additional terminal board between a thermocouple sensor and the IS-AIN8 (TC) module and there is a significant temperature difference between this terminal board and the module, it is necessary to measure the temperature at this terminal board and use this temperature for the thermocouple compensation instead of the internal temperature of the module.</p> <p><b>Cold Temp 1</b> Logical Analog input is intended for measurement of this thermocouple compensation temperature for the IS-AIN8 (TC) module with index #1, <b>Cold Temp 2</b> corresponds to IS-AIN8 (TC) module with index #2 etc.</p> <p><b>Note:</b> <i>Thermocouples without internal compensation "Thermo(nc)..." must be used for this case.</i></p>			

[back to List of LAI](#)

## Cold Temp 4

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	59		
<b>Description</b>			
<p>If there is an additional terminal board between a thermocouple sensor and the IS-AIN8 (TC) module and there is a significant temperature difference between this terminal board and the module, it is necessary to measure the temperature at this terminal board and use this temperature for the thermocouple compensation instead of the internal temperature of the module.</p> <p><b>Cold Temp 1</b> Logical Analog input is intended for measurement of this thermocouple compensation temperature for the IS-AIN8 (TC) module with index #1, <b>Cold Temp 2</b> corresponds to IS-AIN8 (TC) module with index #2 etc.</p> <p><b>Note:</b> <i>Thermocouples without internal compensation "Thermo(nc)..." must be used for this case.</i></p>			

[back to List of LAI](#)

### Cyl Temp 1

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	16		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 2

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	18		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 3

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	19		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 4

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	20		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 5

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	21		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 6

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	22		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 7

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	23		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 8

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	24		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 9

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	25		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 10

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	26		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 11

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	27		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 12

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	28		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 13

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	29		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 14

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	30		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 15

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	31		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

### Cyl Temp 16

<b>Related FW</b>	3.4.0	<b>Related applications</b>	All
<b>Comm object</b>	32		
<b>Description</b>			
Analog inputs for engine Cylinder temperature measuring.			

[back to List of LAI](#)

## Analog inputs from J1939 configuration

The image displays two screenshots of the ComAp configuration interface, illustrating the setup for analog inputs from a J1939 configuration.

**Top Screenshot: Analog Inputs Configuration**

I/O	Name	Property	Value	J1939 value	Used	Dim
+	Binary inputs	Used: 23/38				
+	Binary outputs	Used: 17/30				
-	Analog inputs	Used: 9/24				
+	ID	Used: 2/8				
-	J1939-1	Used: 7/16				
	1	RPM		Engine speed	<input type="checkbox"/>	RPM
	2	Coolant temp		Actual Torque	<input type="checkbox"/>	%
	3	Boost Press		Requested Torque	<input type="checkbox"/>	%
	4	Intake Temp		Coolant Temp	<input checked="" type="checkbox"/>	*C

**Bottom Screenshot: Logical Function Configuration**

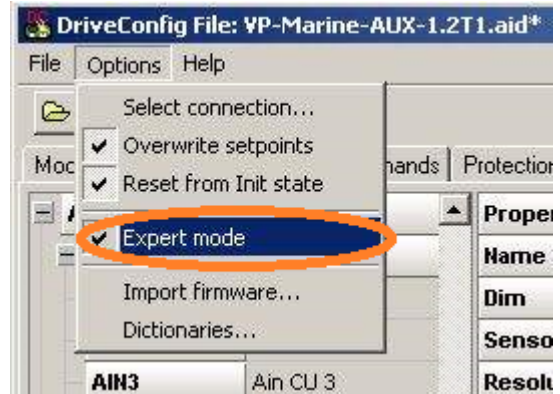
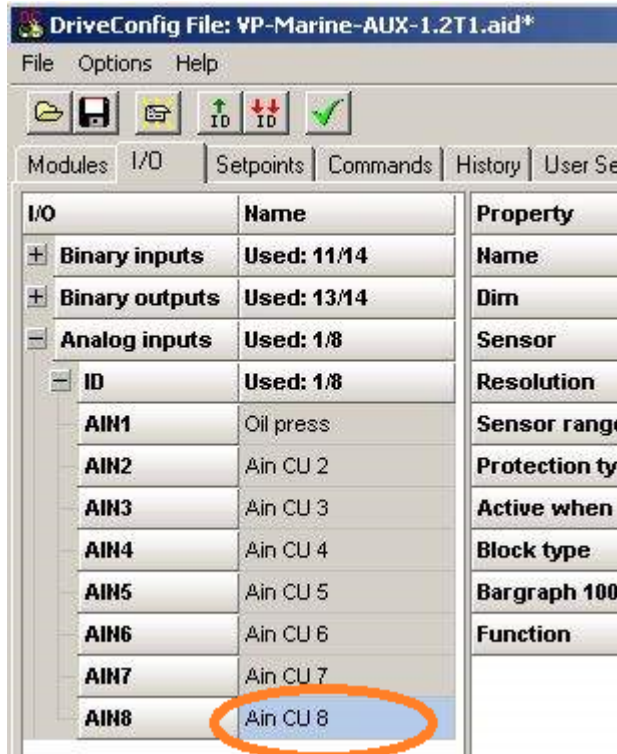
I/O	Name	Property	Value	Logical function	Used
+	Binary inputs	Used: 23/38			
+	Binary outputs	Used: 17/30			
-	Analog inputs	Used: 9/24			
+	ID	Used: 2/8			
-	J1939-1	Used: 7/16			
	1	RPM		LCD brightness	<input type="checkbox"/>
	2	Coolant temp		Engine speed	<input type="checkbox"/>
	3	Boost Press		Oil press	<input type="checkbox"/>
	4	Intake Temp		Coolant press	<input type="checkbox"/>

Orange circles and arrows in the image highlight the configuration details for the 'Coolant temp' input (ID 2) and its corresponding logical function 'Coolant temp' (checked).

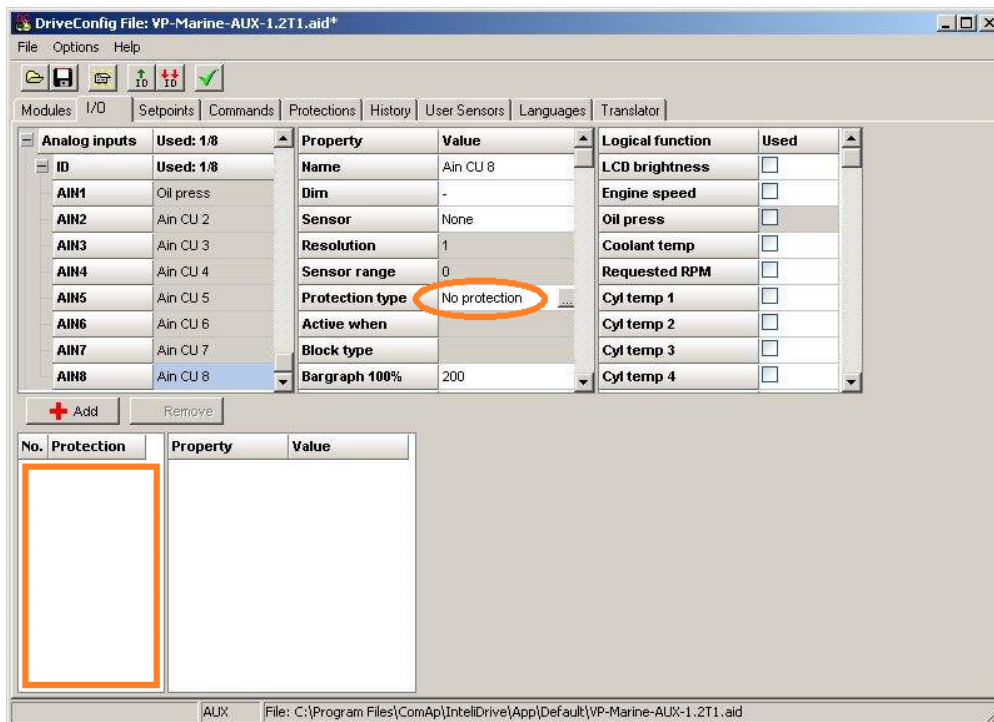
## Analog inputs protection

### Three level protection configuration

1. Switch to I-O , analog inputs, e.g. ID-AIN8
2. Switch to Expert mode

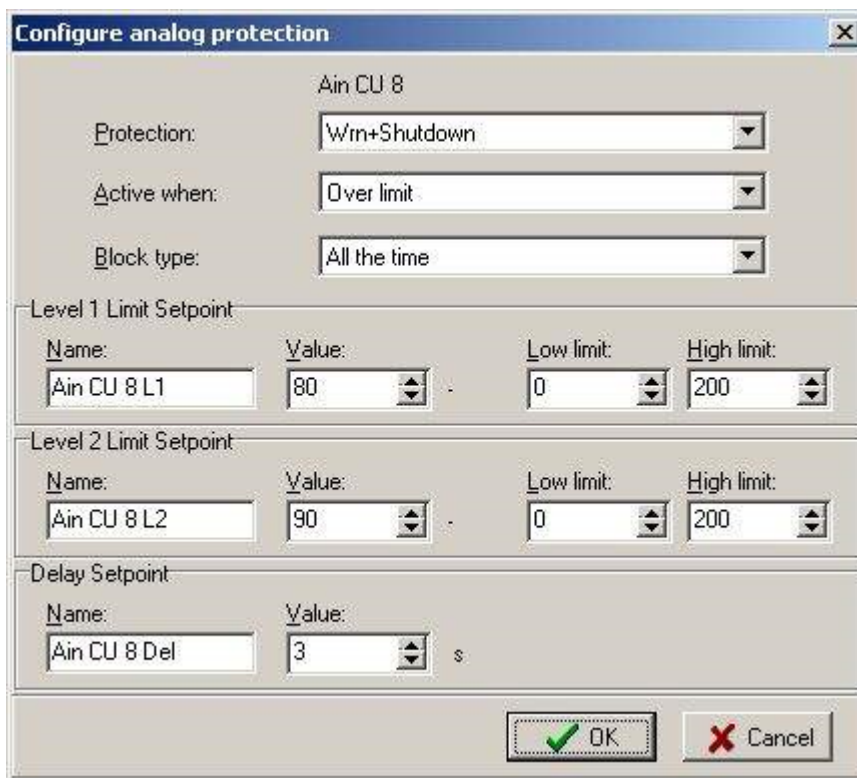


3. Configure standard two level protection

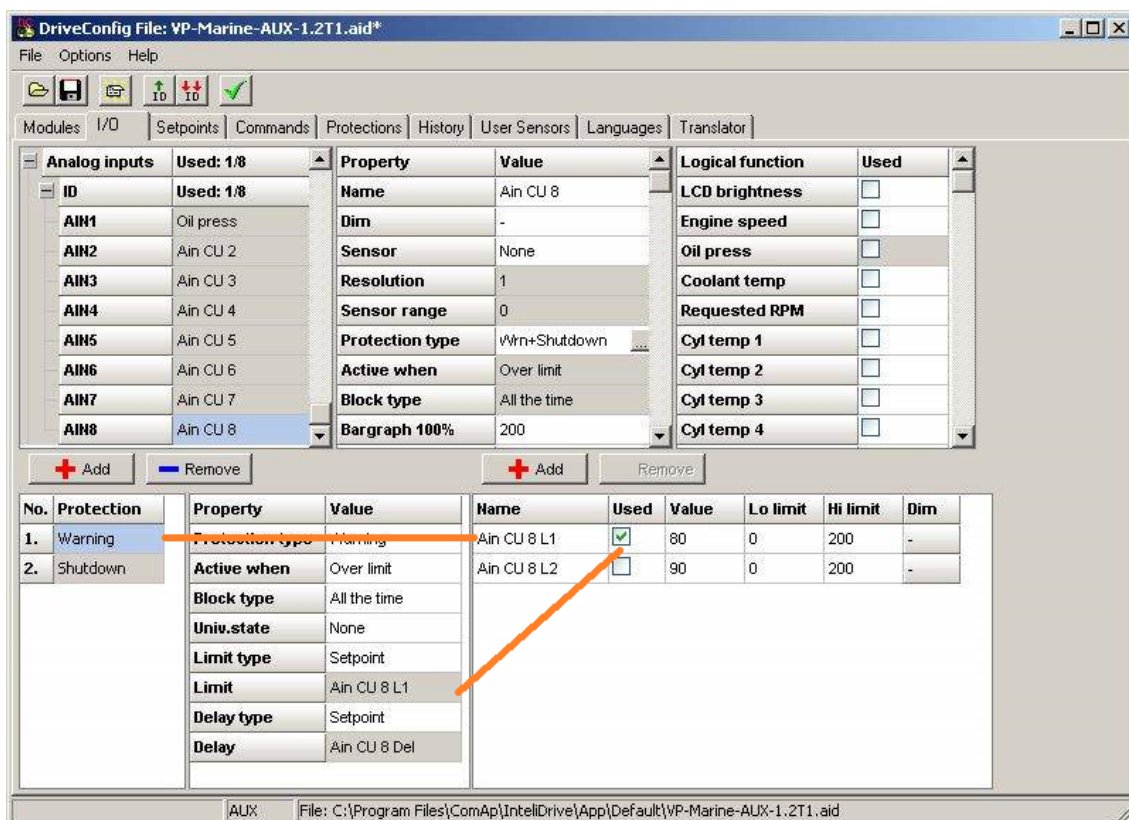


Expert field is now empty. This field is visible in Expert mode only.

Standard two level protection (ID-AIN8) example:

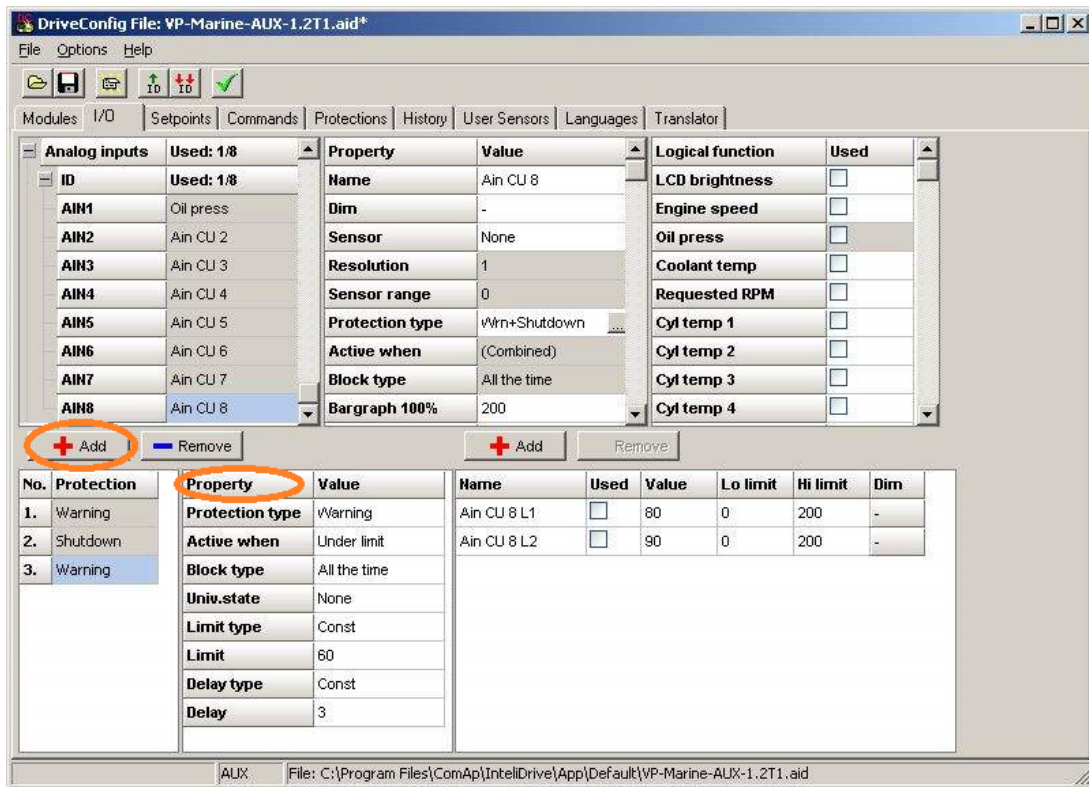


4. Above step configured protection are now visible in Expert field and corresponding limits as well.



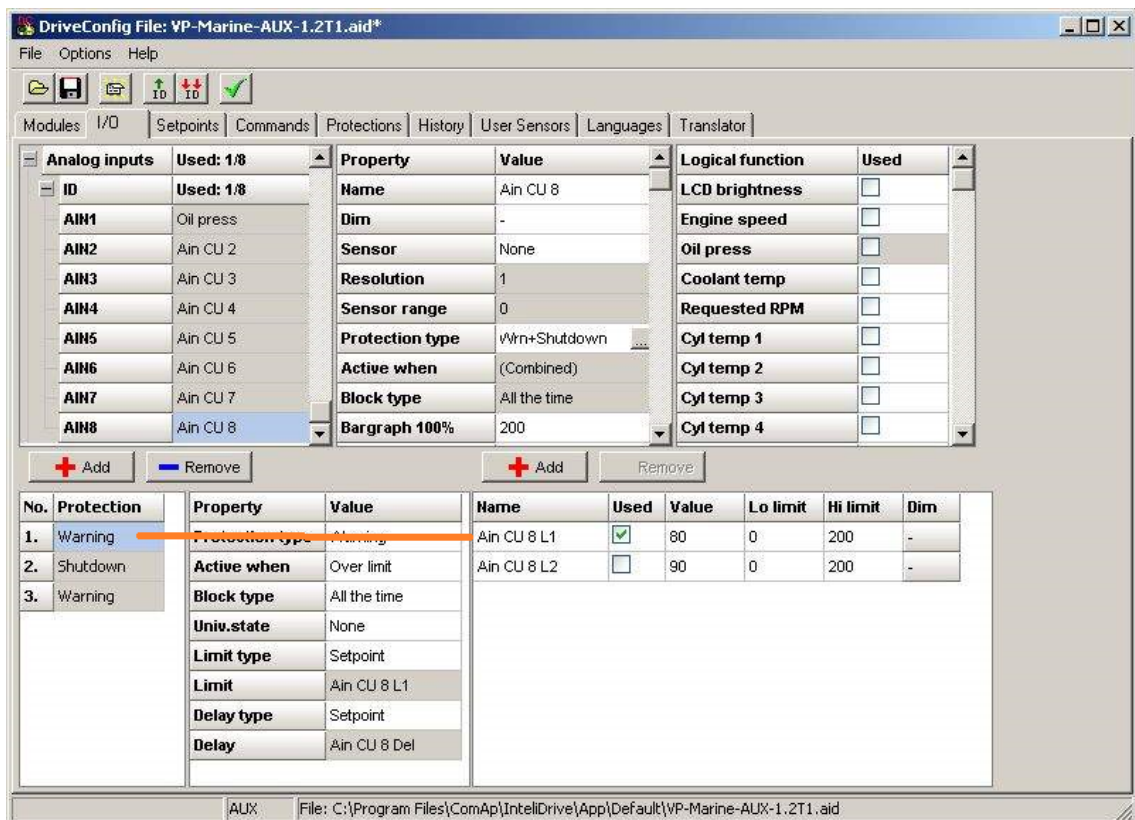
5. Add the third protection: "+" button, and edit Property (e.g. Wrn, Under, ....) Any protection limit/delay can be set to Constant (then value is fixed, specified in line below) and can not be changed by customer (not included in setpoint list) ... or ...





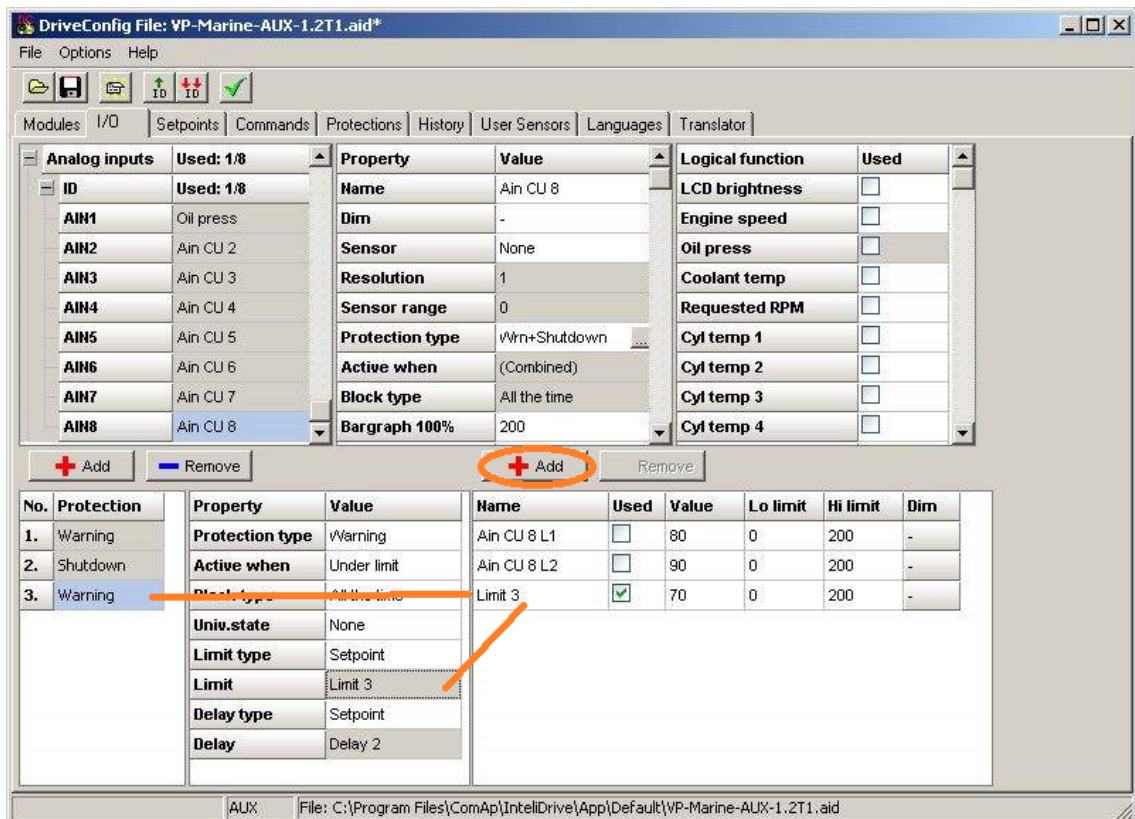
In example above there is Wrm limit type set to Const = 60.

There is visible setpoint corresponding to Wrm, Over protection. It is possible to change limit name, value and limits.

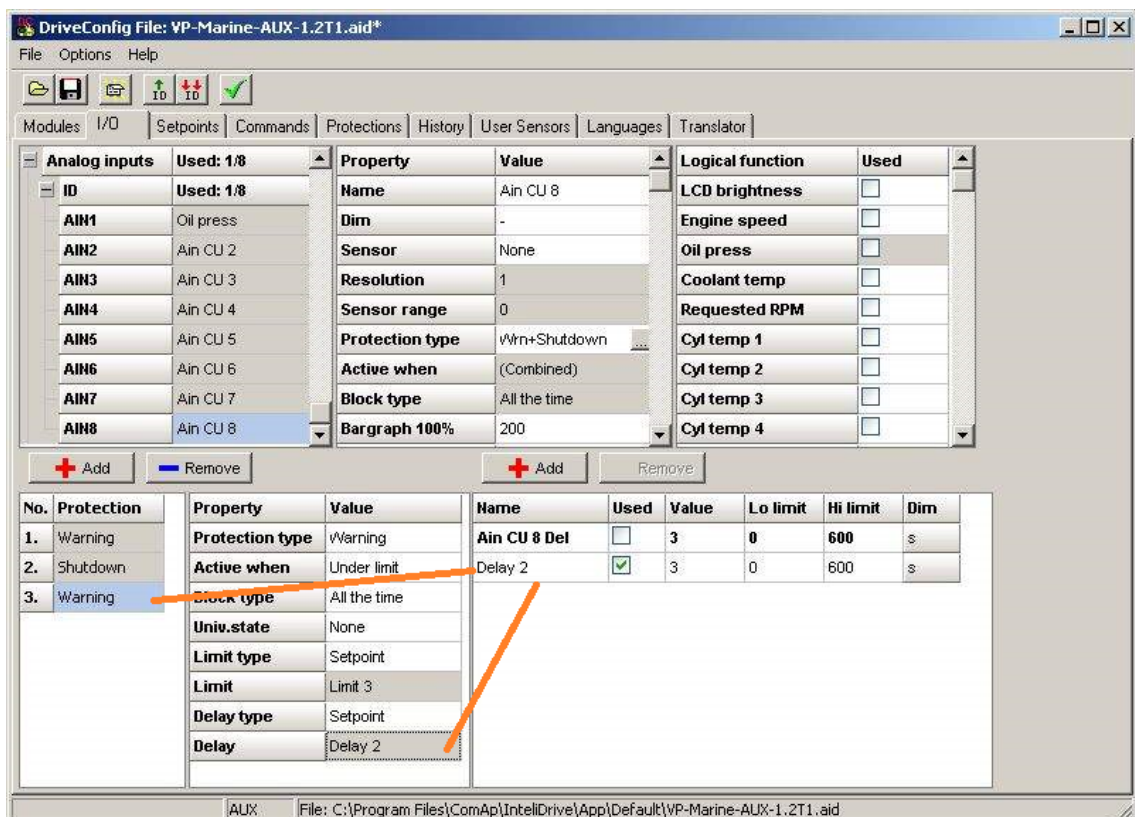




Use “+” button to add new limit for the third (Wrn, Under) protection. Name “Limit3” can be changed. Limit and Delay type must be in this case set to “Setpoint”

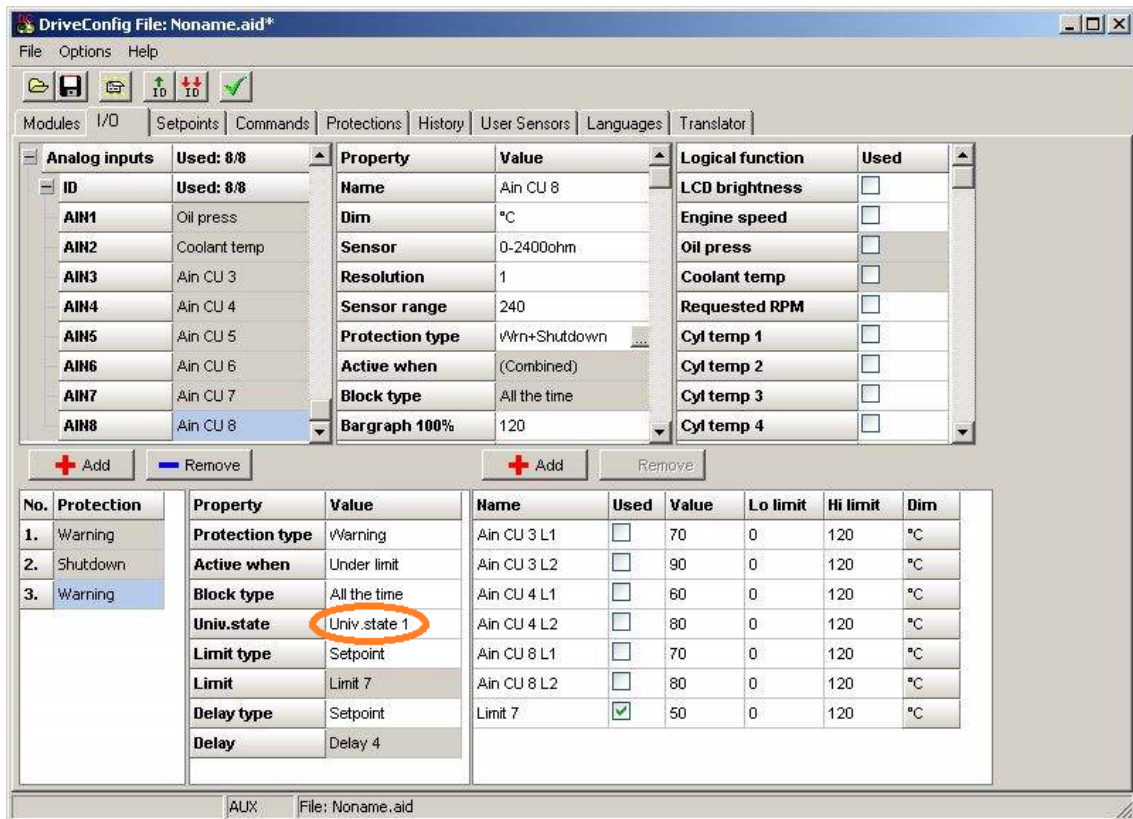


Use “+” button to add Delay setpoint and set/change name value and limits.



## How to indicate AIN8 protection on BO?

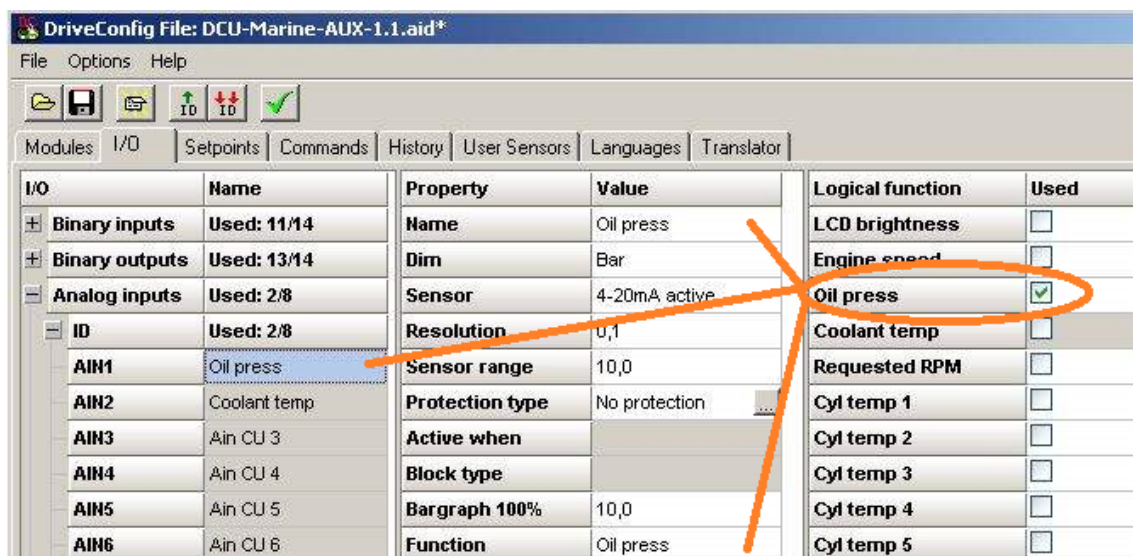
1. Select free universal state for selected protection



**Note:** Configure this UnivState to some Binary output and modify Bin output Name.

## Oil pressure and Water temperature on the first ID controller screen indication

1. Reading from ID-DCU Marine analog inputs





DriveConfig File: DCU-Marine-AUX-1.1.aid\*

File Options Help

Modules I/O Setpoints Commands History User Sensors Languages Translator

I/O	Name	Property	Value	Logical function	Used
Binary inputs	Used: 11/14	Name	Coolant temp	LCD brightness	<input type="checkbox"/>
Binary outputs	Used: 13/14	Dim	°F	Engine speed	<input type="checkbox"/>
Analog inputs	Used: 2/8	Sensor	4-20mA active	Oil press	<input type="checkbox"/>
ID	Used: 2/8	Resolution	1	Coolant temp	<input checked="" type="checkbox"/>
AIN1	Oil press	Sensor range	120	Requested RPM	<input type="checkbox"/>
AIN2	Coolant temp	Protection type	Wrn+Shutdown	Cyl temp 1	<input type="checkbox"/>
AIN3	Ain CU 3	Active when	Over limit	Cyl temp 2	<input type="checkbox"/>
AIN4	Ain CU 4	Block type	All the time	Cyl temp 3	<input type="checkbox"/>
AIN5	Ain CU 5	Bargraph 100%	120	Cyl temp 4	<input type="checkbox"/>
AIN6	Ain CU 6	Function	Coolant temp	Cyl temp 5	<input type="checkbox"/>

## 2. Reading from J1939

DriveConfig File: DCU-Marine-AUX-1.1.aid\*

File Options Help

Modules I/O Setpoints Commands History User Sensors Languages Translator

I/O	Name	Property	Value	J1939 value	Used	Dim
Binary inputs	Used: 20/30	Name	Coolant temp	Engine speed	<input type="checkbox"/>	RPM
Binary outputs	Used: 15/30	Dim	°C	Actual Torque	<input type="checkbox"/>	%
Analog inputs	Used: 10/24	Resolution	1	Demand Torque	<input type="checkbox"/>	%
ID	Used: 2/8	Protection type	No protection	Coolant Temp	<input checked="" type="checkbox"/>	°C
J1939-1	Used: 8/16	Active when		Fuel Temp	<input type="checkbox"/>	°C
1	RPM	Block type		EngineOil Temp	<input type="checkbox"/>	°C
2	Coolant temp	Bargraph 100%	150	Boost Pressure	<input type="checkbox"/>	bar
3	Boost Press	Function	Coolant temp	Intake Manifold Temp	<input type="checkbox"/>	°C
4	Intake Temp	J1939 value	Coolant Temp	Air Intake Pressure	<input type="checkbox"/>	bar

logical function

DriveConfig File: DCU-Marine-AUX-1.1.aid\*

File Options Help

Modules I/O Setpoints Commands History User Sensors Languages Translator

I/O	Name	Property	Value	Logical function	Used
Binary inputs	Used: 20/30	Name	Coolant temp	LCD brightness	<input type="checkbox"/>
Binary outputs	Used: 15/30	Dim	°C	Engine speed	<input type="checkbox"/>
Analog inputs	Used: 10/24	Resolution	1	Oil press	<input type="checkbox"/>
ID	Used: 2/8	Protection type	No protection	Coolant temp	<input checked="" type="checkbox"/>
J1939-1	Used: 8/16	Active when		Requested RPM	<input type="checkbox"/>
1	RPM	Block type		Cyl temp 1	<input type="checkbox"/>
2	Coolant temp	Bargraph 100%	150	Cyl temp 2	<input type="checkbox"/>
3	Boost Press	Function	Coolant temp	Cyl temp 3	<input type="checkbox"/>
4	Intake Temp	J1939 value	Coolant Temp	Cyl temp 4	<input type="checkbox"/>

Please note that Protections can be configured as well.

## Protection types

Warning	Indication only (no engine stop)
Shutdown	Fast engine stop
Cooldown	Engine stop with cooling period
Fail sensor	Measured value is out of sensor characteristics.
Warning+BW	Indication + Broken wire detection
Shutdown+BW	Shut down + Broken wire detection
Warning + Fls	Warning is activated in the case of sensor fail as well
Shutdown + Fls	Shut down is activated in the case of sensor fail as well
Sd override	This protection stays active in the case of Sd override is activated.
Alarm only	Only Alarm list indication, disappear without confirmation
HistRecOnly	History record only

## 8.1.6 Values

### What values are:

Values (or quantities) are analog or binary data objects, measured or computed by the controller, that are intended for reading from the controller screen, PC, MODBUS, etc. Values are organized into groups according to their meaning.

### List of value groups

Basic Settings .....	264
Engine Values .....	265
Analog CU .....	273
Binary CU .....	276
Log Bout .....	277
Info .....	279
Statistics .....	285
Aftertreatment .....	288

For full list of values go to the chapter **List of values (page 263)**.

## List of values

### Group of values: Basic settings

Engine RPM .....	264
EngRPMfiltered .....	264
Mode Loc .....	264

### Group of values: Engine

Speed Request .....	265
SpeedReq RPM .....	267
T Cyl Aver .....	268
T Cyl Max .....	268
T Cyl Min .....	268
Oil Press .....	268
Cool Temp .....	268
Oil Temp .....	269
Fuel Level .....	269
PM Status .....	269
Pri Battery .....	270
Sec Battery .....	270
RQSP Aver .....	270
RQSP Ramp .....	270

### Group of values: Analog CU

Battery Volt .....	273
CPU Temp .....	273
D+ .....	273
Oil Press .....	273
AIN CU 2 .....	273
AIN CU 3 .....	274
AIN CU 4 .....	274
AIN CU 5 .....	274
AIN CU 6 .....	274
AIN CU 7 .....	275
AIN CU 8 .....	275

### Group of values:

#### Binary CU

ID BIN .....	276
ID BOUT .....	276
LogBout 4 .....	277

#### Group of values: Log Bout

LogBout1 .....	277
LogBout 2 .....	277
LogBout 3 .....	277
LogBout 6 .....	278
LogBout 7 .....	278
LogBout 8 .....	278
RemoteControl .....	278

#### Group of values: Info

Engine State .....	279
PasswordDecode .....	279
Build date .....	279
SW version .....	279
Application .....	280
SW Branch .....	280
Mode ID .....	280
Timer Text .....	280
Timer Val .....	280
CAN16 .....	281
CAN32 .....	281
Diag Code .....	281
MID .....	282
ECU Alarms 1 .....	282
ECU Alarms 2 .....	282
ECU Alarms 3 .....	283
ECU Alarms 4 .....	283
RS485 Detected .....	283
Latitude .....	283
Longitude .....	284
GPS Speed .....	284
ECU State .....	284

### Group of values:

#### Statistics

RunHours .....	285
NumSuccStarts .....	285
NumUnscStarts .....	285
Service Time .....	285
DayCons .....	286
TripCons .....	286
Memo1 .....	286
Memo2 .....	287
MomAvgFICon L .....	287

### Group of values:

#### Aftertreatment

DEF Level .....	288
DPF Soot Load .....	288
DPF Ash Load .....	288

[🔍 back to Controller objects](#)

## Basic Settings

### Engine RPM

<b>Value group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [RPM]		
<b>Comm object</b>	10123	<b>Related applications</b>	All
<b>Description</b>			
Current engine speed.			
<i>Note: Limit is defined by the value of the communication object of specified number</i>			

⬅ back to List of values

### EngRPMfiltered

<b>Value group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [RPM]		
<b>Comm object</b>	11401	<b>Related applications</b>	All
<b>Description</b>			
Filtered current engine speed for nice displaying without nozzle oscillations.			
<i>Note: limit is defined by the value of the communication object of specified number</i>			

⬅ back to List of values

### Mode Loc

<b>Value group</b>	Basic settings	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	10135	<b>Related applications</b>	All
<b>Description</b>			
Text string value containing "LOC" or empty text string depending on Activated or Deactivated LOC mode.			

⬅ back to List of values

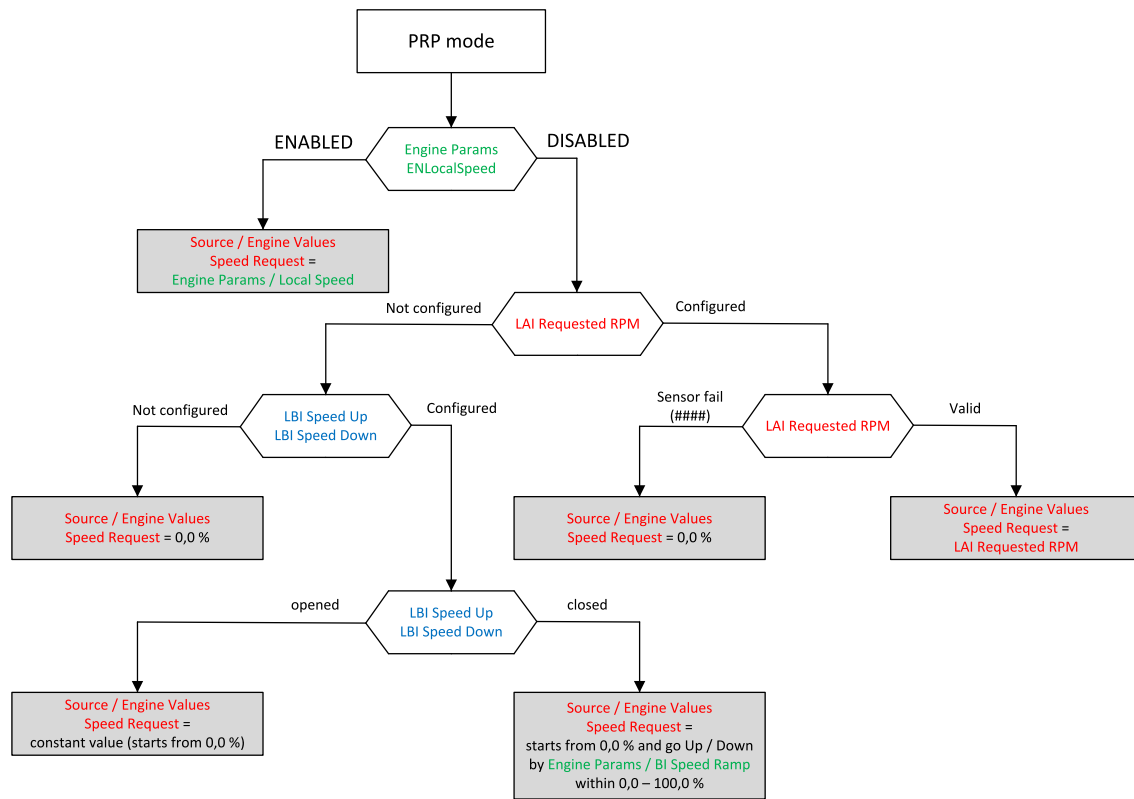
## Engine Values

### Speed Request

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [%]		
<b>Comm object</b>	10137	<b>Related applications</b>	All

## Description

Internal Speed Request value which can be used to control engine speed. See following flow charts how the Speed Request value is generated in case of PRP or AUX/EME/HRB mode.



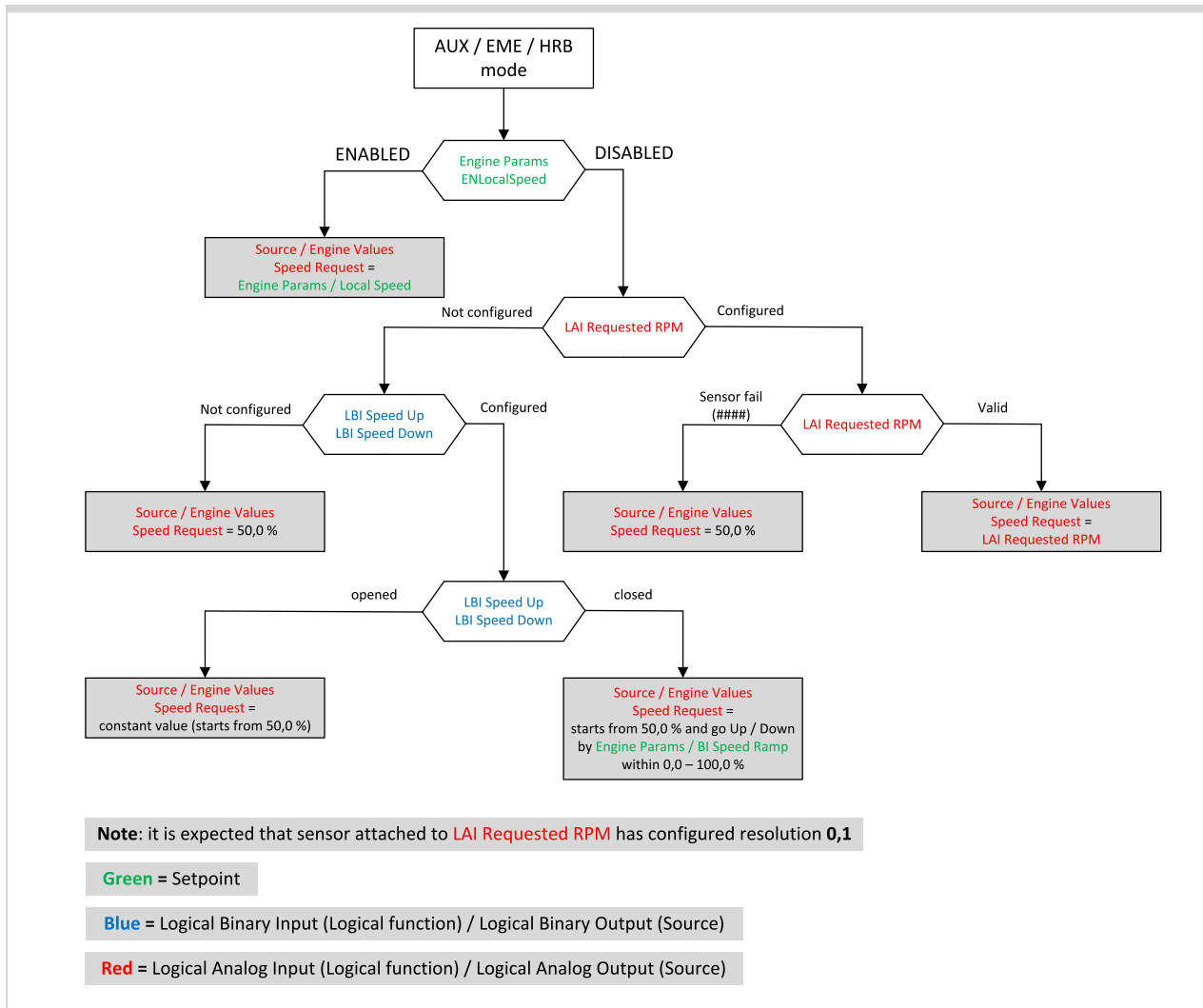
**Note:** it is expected that sensor attached to **LAI Requested RPM** has configured resolution **0,1**

**Green** = Setpoint

**Blue** = Logical Binary Input (Logical function) / Logical Binary Output (Source)

**Red** = Logical Analog Input (Logical function) / Logical Analog Output (Source)





🔍 back to List of values

## SpeedReq RPM

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [RPM]		
<b>Comm object</b>	10006	<b>Related applications</b>	All
<b>Description</b>			
<ul style="list-style-type: none"> <li>▶ Application PROP conversion 0.0 % = 0.3 * NominalRPM, 100.0 % = 1.1 * NominalRPM</li> <li>▶ Application AUX/CMB/EME conversion 0.0 % = 0.9 * NominalRPM, 100.0 % = 1.1 * NominalRPM</li> </ul> <p>In the case of sensor fail (out of range) is Sped request = 0 for PRP and 50 % (=Nominal RPM) for AUX configuration.</p>			

🔍 back to List of values

### T Cyl Aver

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [°C]		
<b>Comm object</b>	9620	<b>Related applications</b>	All
<b>Description</b>			
Calculated Average temperature value from <b>CYL TEMP 1 (PAGE 252)</b> .. <b>CYL TEMP 16 (PAGE 254)</b> .			

[back to List of values](#)

### T Cyl Max

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [°C]		
<b>Comm object</b>	10526	<b>Related applications</b>	All
<b>Description</b>			
Detected maximal temperature value from <b>CYL TEMP 1 (PAGE 252)</b> .. <b>CYL TEMP 16 (PAGE 254)</b> .			

[back to List of values](#)

### T Cyl Min

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [°C]		
<b>Comm object</b>	10527	<b>Related applications</b>	All
<b>Description</b>			
Detected minimal temperature value from <b>CYL TEMP 1 (PAGE 252)</b> .. <b>CYL TEMP 16 (PAGE 254)</b> .			

[back to List of values](#)

### Oil Press

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [Bar]		
<b>Comm object</b>	10268	<b>Related applications</b>	All
<b>Description</b>			
Internal value corresponding to <b>OIL PRESS (PAGE 244)</b> .			

[back to List of values](#)

### Cool Temp

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [°C]		
<b>Comm object</b>	10267	<b>Related applications</b>	All
<b>Description</b>			
Internal value corresponding to <b>COOLANT TEMP (PAGE 245)</b> .			

[back to List of values](#)

## Oil Temp

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [°C]		
<b>Comm object</b>	11569	<b>Related applications</b>	All
<b>Description</b>			
Internal value corresponding to logical input <b>OIL TEMP (PAGE 244)</b> .			

[◀ back to List of values](#)

## Fuel Level

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	0,1 [%]		
<b>Comm object</b>	11570	<b>Related applications</b>	All
<b>Description</b>			
Internal value corresponding to logical input <b>FUEL LEVEL (PAGE 245)</b> .			

[◀ back to List of values](#)

## PM Status

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	16071	<b>Related applications</b>	All
<b>Description</b>			
A value belonging to a particular Volvo Penta device - Power Module. Communication over the J1587 interface.			
<b>Data message PID 150 - PTO Engagement Control Status</b>			
Identifies the current state of the input and output functions used to control the engagement of PTO devices.			
<ul style="list-style-type: none"> <li>▶ PrimBatActive binary status</li> <li>▶ SecBatActive binary status</li> <li>▶ D12ExhTemp binary status</li> <li>▶ D12SeaWatPres binary status</li> <li>▶ EMSSupply10A binary status</li> <li>▶ ExtraSupply7A binary status</li> <li>▶ 30Supply7A binary status</li> </ul>			

[◀ back to List of values](#)

## Pri Battery

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	0,1 [V]		
<b>Comm object</b>	12153	<b>Related applications</b>	All
<b>Description</b>			
A value belonging to a particular Volvo Penta device - Power Module. Communication over the J1587 interface.			
Data message PID 168 <b>Battery Potential (Voltage)</b>			
Measured electrical potential of the primary battery.			

⬅ back to List of values

## Sec Battery

<b>Value group</b>	Engine values	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	0,1 [V]		
<b>Comm object</b>	12154	<b>Related applications</b>	All
<b>Description</b>			
A value belonging to a particular Volvo Penta device - Power Module. Communication over the J1587 interface.			
Data message PID 444 <b>Battery #2 Potential (Voltage)</b>			
Measured electrical of the isolated battery #2.			

⬅ back to List of values

## Loadsharing

### RQSP Aver

<b>Value group</b>	Loadsharing	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [%]		
<b>Comm object</b>	10136	<b>Related applications</b>	PRP, AS
<b>Description</b>			
Average value calculated from all Speed Request values of controllers running in Loadsharing mode together (on the same CAN2 bus). See Load sharing block diagram.			

⬅ back to List of values

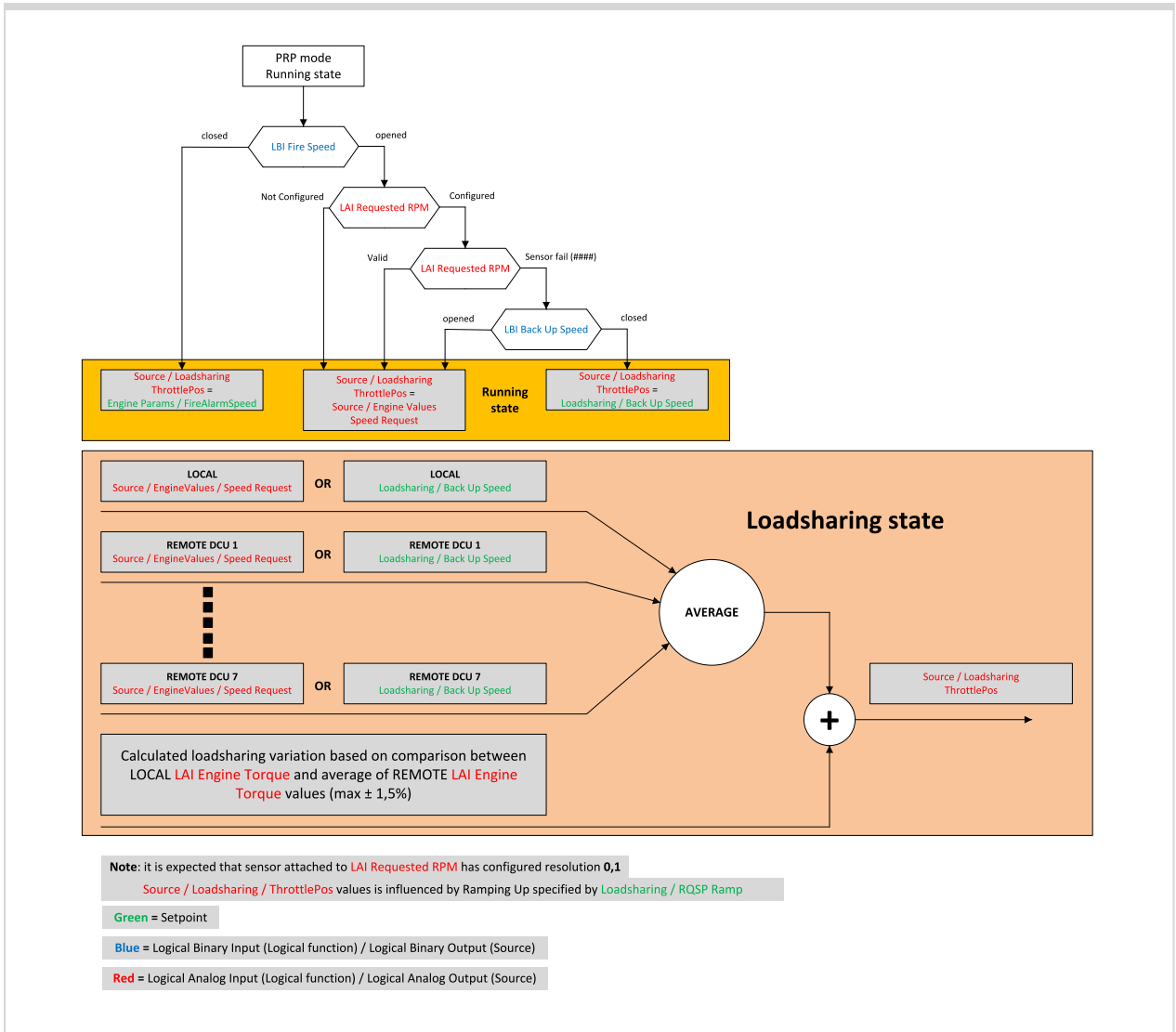
### RQSP Ramp

<b>Value group</b>	Loadsharing	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [%]		
<b>Comm object</b>	10181	<b>Related applications</b>	PRP, AS
<b>Description</b>			
Ramped Loadsharing: RQSP Aver Value (in Loadsharing mode) or ramped Engine Values: Speed Request value (in Running mode). The Ramp speed is specified by setpoint Loadsharing: RQSP Ramp. See Loadsharing block diagram.			

⬅ back to List of values

## ThrottlePos

<b>Related FW</b>	3.4.0	<b>Related applications</b>	PRP
<b>Comm object</b>	10000		
<b>Description</b>			
<p>Output Value of Loadsharing functional block inside ID-DCU Marine controller. It is <b>RQSP Ramp (page 270)</b> influenced by loadsharing variation signal (this signal can increase / decrease the RQSP Ramp value by <math>\pm 1.5\%</math>). The ThrottlePos value is intended to send as required speed to an engine. Load sharing block diagram.</p> <p>See following chart describing ThrottlePos value in Running and Loadsharing state.</p> <p><b>Note:</b> The regulation speed of loadsharing variation signal (max 1.5 %) is given by PI loop parameters <b>Load Gain (page 150)</b> and <b>Load Int (page 150)</b>. The Loadsharing: ThrottlePos value is influenced by ramping specified by Loadsharing: RQSP Ramp setpoint.</p> <p><b>Note:</b> The Loadsharing state can be activated from Running state and if both following conditions are met:</p> <ul style="list-style-type: none"> <li>▶ Actual Engine speed is in range specified by setpoints <b>ClutchMinSpeed (page 151)</b> and <b>ClutchMaxSpeed (page 151)</b></li> <li>▶ <b>REM CLUTCH (PAGE 183)</b> is active (or I/O front panel button is pressed)</li> </ul> <p>There is loadsharing activation delay specified by setpoint Loadsharing: Clutch Del to postpone loadsharing regulation after transient events after engine mechanical connection to gear-box.</p> <p><b>Note:</b> It is essential requirement to configure engine load information (ECU value "actual load", physical analog input reading actuator position feedback or boost pressure etc.) into <b>ENGINE TORQUE (PRP ONLY) (PAGE 245)</b> for loadsharing functionality.</p> <p><b>Note:</b> All ID-DCU Marine controllers working in the same loadsharing group have to be interconnected on CAN2 bus, controllers must have different controller addresses.</p> <p><b>Note:</b> Loadsharing state - the Loadsharing: Back Up Speed value is taken into account instead of <b>Speed Request (page 265)</b> if the <b>REQUESTED RPM (PAGE 245)</b> indicates Sensor Fail (#####) and <b>BACK UP SPEED1 (PAGE 182)</b> is active.</p>			



[back to List of setpoints](#)

## Analog CU

### Battery Volt

<b>Value group</b>	Analog CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [V]		
<b>Comm object</b>	8213	<b>Related applications</b>	All
<b>Description</b>			
Internal Voltage measured on controller board.			

[back to List of values](#)

### CPU Temp

<b>Value group</b>	Analog CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [°C]		
<b>Comm object</b>	10124	<b>Related applications</b>	All
<b>Description</b>			
Internal Temperature measured on controller board.			

[back to List of values](#)

### D+

<b>Value group</b>	Analog CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [V]		
<b>Comm object</b>	10603	<b>Related applications</b>	All
<b>Description</b>			
Engine alternator output voltage detected at D+ controller terminal.			

[back to List of values](#)

### Oil Press

<b>Value group</b>	Analog CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [Bar]		
<b>Comm object</b>	9155	<b>Related applications</b>	All
<b>Description</b>			

[back to List of values](#)

### AIN CU 2

<b>Value group</b>	Analog CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9156	<b>Related applications</b>	All
<b>Description</b>			
Analog input value corresponding to analog input located directly on ID-DCU controller.			
<b>Note:</b> The name "Ain CU 2" is just default value which can be changed in analog input Property: Name.			

[back to List of values](#)

### AIN CU 3

<b>Value group</b>	Analog CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9157	<b>Related applications</b>	All
<b>Description</b>			
Analog input value corresponding to analog input located directly on ID-DCU controller.			
<i>Note: The name "Ain CU 3" is just default value which can be changed in analog input Property: Name.</i>			

[back to List of values](#)

### AIN CU 4

<b>Value group</b>	Analog CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9158	<b>Related applications</b>	All
<b>Description</b>			
Analog input value corresponding to analog input located directly on ID-DCU controller.			
<i>Note: The name "Ain CU 4" is just default value which can be changed in analog input Property: Name.</i>			

[back to List of values](#)

### AIN CU 5

<b>Value group</b>	Analog CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9159	<b>Related applications</b>	All
<b>Description</b>			
Analog input value corresponding to analog input located directly on ID-DCU controller.			
<i>Note: The name "Ain CU 5" is just default value which can be changed in analog input Property: Name.</i>			

[back to List of values](#)

### AIN CU 6

<b>Value group</b>	Analog CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9160	<b>Related applications</b>	All
<b>Description</b>			
Analog input value corresponding to analog input located directly on ID-DCU controller.			
<i>Note: The name "Ain CU 6" is just default value which can be changed in analog input Property: Name.</i>			

[back to List of values](#)



**AIN CU 7**

<b>Value group</b>	Analog CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9161	<b>Related applications</b>	All
<b>Description</b>			
Analog input value corresponding to analog input located directly on ID-DCU controller.			
<b>Note:</b> The name "Ain CU 7" is just default value which can be changed in analog input Property: Name.			

[▲ back to List of values](#)

**AIN CU 8**

<b>Value group</b>	Analog CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9162	<b>Related applications</b>	All
<b>Description</b>			
Analog input value corresponding to analog input located directly on ID-DCU controller.			
<b>Note:</b> The name "Ain CU 8" is just default value which can be changed in analog input Property: Name.			

[▲ back to List of values](#)

## Binary CU

### ID BIN

<b>Value group</b>	Binary CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	8235	<b>Related applications</b>	All
<b>Description</b>			
Controller binary inputs state indication.			

[◀ back to List of values](#)

### ID BOUT

<b>Value group</b>	Binary CU	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	8239	<b>Related applications</b>	All
<b>Description</b>			
Controller binary outputs state indication.			

[◀ back to List of values](#)

## Log Bout

### LogBout1

<b>Value group</b>	Log Bout	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	9143	<b>Related applications</b>	All
<b>Description</b>			
List of logical binary outputs.			

[back to List of values](#)

### LogBout 2

<b>Value group</b>	Log Bout	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	9144	<b>Related applications</b>	All
<b>Description</b>			
List of logical binary outputs.			

[back to List of values](#)

### LogBout 3

<b>Value group</b>	Log Bout	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	9145	<b>Related applications</b>	All
<b>Description</b>			
List of logical binary outputs.			

[back to List of values](#)

### LogBout 4

<b>Value group</b>	Log Bout	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	9146	<b>Related applications</b>	All
<b>Description</b>			
List of logical binary outputs.			

[back to List of values](#)

### LogBout 5

<b>Value group</b>	Log Bout	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	9147	<b>Related applications</b>	All
<b>Description</b>			
List of logical binary outputs.			

[back to List of values](#)

### LogBout 6

<b>Value group</b>	Log Bout	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	9148	<b>Related applications</b>	All
<b>Description</b>			
List of logical binary outputs.			

[◀ back to List of values](#)

### LogBout 7

<b>Value group</b>	Log Bout	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	9149	<b>Related applications</b>	All
<b>Description</b>			
List of logical binary outputs.			

[◀ back to List of values](#)

### LogBout 8

<b>Value group</b>	Log Bout	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	9150	<b>Related applications</b>	All
<b>Description</b>			
List of logical binary outputs.			

[◀ back to List of values](#)

### RemoteControl

<b>Value group</b>	Log Bout	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	10627	<b>Related applications</b>	All
<b>Description</b>			
List of logical binary outputs, which can be closed and opened remotely, e.g. from IntelliMonitor using the "Remote switches" tool or using Modbus communication.			

[◀ back to List of values](#)

## Info

### Engine State

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9244	<b>Related applications</b>	
<b>Description</b>			
Code of the current state of the engine control. The text representation of each code can be obtained following way:			
<ol style="list-style-type: none"> <li>1. Open the archive in DriveConfig and use the function File -&gt; Generate Cfg Image -&gt; Comm. objects to create a list of all communication objects.</li> <li>2. Open the file, find the row containing „Engine State“ value and look for the column "Type". The column "Type" contains reference to a list of codes and their representations located in the bottom part of the file.</li> </ol>			

[back to List of values](#)

### PasswordDecode

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	9090	<b>Related applications</b>	All
<b>Description</b>			
This value contains encrypted serial number of the controller and administrator password and is intended for retrieving of the lost password. Send this number together with controller serial number to your distributor if you need to retrieve your password.			

[back to List of values](#)

### Build date

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	24211	<b>Related applications</b>	All
<b>Description</b>			
Date of controller firmware creation.			

[back to List of values](#)

### SW version

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	24339	<b>Related applications</b>	
<b>Description</b>			
Major and minor firmware version number. E.g. value "2,2" means version 2.2. Release version number is not included.			

[back to List of values](#)

## Application

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	8480	<b>Related applications</b>	All
<b>Description</b>			
Type of application / configuration used with controller.			

[back to List of values](#)

## SW Branch

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	8707	<b>Related applications</b>	
<b>Description</b>			
Firmware branch code. Contains 1 in case of standard branches.			

[back to List of values](#)

## Mode ID

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9887	<b>Related applications</b>	
<b>Description</b>			
This value contains actual controller mode. The controller mode is selected by <b>Mode ID (page 109)</b> but the setpoint can be overridden by <b>REMOTE OFF (PAGE 177)</b> .			

[back to List of values](#)

## Timer Text

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	10040	<b>Related applications</b>	
<b>Description</b>			
Code of the currently running system process timer. The text representation of each code can be obtained by the procedure described at the value Engine state.			

[back to List of values](#)

## Timer Val

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [s]		
<b>Comm object</b>	8955	<b>Related applications</b>	
<b>Description</b>			
The value contains remaining time of the currently running system process timer.			

[back to List of values](#)

## CAN16

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	8546	<b>Related applications</b>	All
<b>Description</b>			
<p>Bits of this value show "1" if the controller receives messages from the controller which has address corresponding with the bit position. Bit 0 represents address 1 etc. This value contains information about controllers with addresses 1-16.</p> <p><b>Note:</b> The bit which corresponds to the own controller is always set to "1".</p>			

⬅ back to List of values

## CAN32

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	8827	<b>Related applications</b>	All
<b>Description</b>			
<p>Bits of this value show "1" if the controller receives messages from the controller which has address corresponding with the bit position. Bit 0 represents address 17 etc. This value contains information about controllers with addresses 17-32.</p> <p><b>Note:</b> The bit which corresponds to the own controller is always set to "1".</p>			

⬅ back to List of values

## Diag Code

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0																				
<b>Resolution [units]</b>	[-]																						
<b>Comm object</b>	9654	<b>Related applications</b>	All																				
<b>Description</b>																							
<p>Displays the source (protocol) of the currently received DTC error message. Diag Code is currently used only for information in History. After writing to History Diag Code is reset back to #####.</p> <p>List of possible values:</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Source / protocol</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>#####</td> </tr> <tr> <td>1</td> <td>J1939-DM1</td> </tr> <tr> <td>2</td> <td>J1939-KWP2000</td> </tr> <tr> <td>3</td> <td>J1587-PID</td> </tr> <tr> <td>4</td> <td>J1587-SID</td> </tr> <tr> <td>5</td> <td>J1587-PPID</td> </tr> <tr> <td>6</td> <td>J1587-PSID</td> </tr> <tr> <td>7</td> <td>MODBUS</td> </tr> <tr> <td>8</td> <td>J1939-MTU</td> </tr> </tbody> </table>				Code	Source / protocol	0	#####	1	J1939-DM1	2	J1939-KWP2000	3	J1587-PID	4	J1587-SID	5	J1587-PPID	6	J1587-PSID	7	MODBUS	8	J1939-MTU
Code	Source / protocol																						
0	#####																						
1	J1939-DM1																						
2	J1939-KWP2000																						
3	J1587-PID																						
4	J1587-SID																						
5	J1587-PPID																						
6	J1587-PSID																						
7	MODBUS																						
8	J1939-MTU																						

⬅ back to List of values

## MID

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0								
<b>Resolution [units]</b>	0 .. 255 [-]										
<b>Comm object</b>	11873	<b>Related applications</b>	All								
<b>Description</b>											
<p>The address of the Electronic control Unit (ECU) from which the DTC error message came. Applies to the J1587 protocol in connection with the Volvo Penta systems.</p> <p>Related to the <b>Diag Code (page 281)</b>.</p> <p>Typical addresses are:</p> <table border="1"> <thead> <tr> <th>Address</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>broadcast</td> </tr> <tr> <td>128</td> <td>Engine ECU</td> </tr> <tr> <td>158</td> <td>Power Module</td> </tr> </tbody> </table>				Address	Unit	0	broadcast	128	Engine ECU	158	Power Module
Address	Unit										
0	broadcast										
128	Engine ECU										
158	Power Module										

⬅ back to List of values

## ECU Alarms 1

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	10916	<b>Related applications</b>	All
<b>Description</b>			
<p>States of predefined ECU alarms, which are available with Modbusreading.</p> <p><b>Note:</b> Alarm linked with a specific bit is defined in ESC (Engine Specific Code) and is not user configurable.</p>			

⬅ back to List of values

## ECU Alarms 2

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	10917	<b>Related applications</b>	All
<b>Description</b>			
<p>States of predefined ECU alarms, which are available with Modbus reading.</p> <p><b>Note:</b> Alarm linked with a specific bit is defined in ESC (Engine Specific Code) and is not user configurable.</p>			

⬅ back to List of values



### ECU Alarms 3

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	10918	<b>Related applications</b>	All
<b>Description</b>			
States of predefined ECU alarms, which are available with Modbus reading.			
<i>Note: Alarm linked with a specific bit is defined in ESC (Engine Specific Code) and is not user configurable.</i>			

[back to List of values](#)

### ECU Alarms 4

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	10919	<b>Related applications</b>	All
<b>Description</b>			
States of predefined ECU alarms, which are available with Modbus reading.			
<i>Note: Alarm linked with a specific bit is defined in ESC (Engine Specific Code) and is not user configurable.</i>			

[back to List of values](#)

### RS485 Detected

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	24118	<b>Related applications</b>	All
<b>Description</b>			
<ul style="list-style-type: none"> <li>▶ Detecting the presence of the ID-COM module with the RS485 interface occurs only when the controller is initialized (when the controller is switched on or during reboot)</li> <li>▶ Only informative data for configuration analysis (use for technical support).</li> </ul>			
<i>Note: Not intended to be used in the PLC or history (specific data structure).</i>			

[back to List of values](#)

### Latitude

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	11678	<b>Related applications</b>	All
<b>Description</b>			
GPS coordinate received from IntelliBridge-NT (IB-NT).			

[back to List of values](#)

## Longitude

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	11679	<b>Related applications</b>	All
<b>Description</b>			
GPS coordinate received from InteliBridge-NT (IB-NT).			

[↶ back to List of values](#)

## GPS Speed

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	0.1 [kts]		
<b>Comm object</b>	12165	<b>Related applications</b>	All
<b>Description</b>			
Speed in knots received from IB-NT (1 knot = 1.852 km/h).			

[↶ back to List of values](#)

## ECU State

<b>Value group</b>	Info	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[-]		
<b>Comm object</b>	10034	<b>Related applications</b>	All
<b>Description</b>			
<p>Diagnostic states of the main ECU (i.e. ECU, which has automatically connected inputs to logical functions).</p> <p>Indicates 4 basic "lamps":</p> <ul style="list-style-type: none"> <li>Yellow Warning Lamp</li> <li>Red Stop Lamp</li> <li>Wait To Start Lamp</li> <li>Malfunction Lamp</li> </ul>			

[↶ back to List of values](#)

## Statistics

### RunHours

<b>Value group</b>	Statistics	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [h]		
<b>Comm object</b>	8206	<b>Related applications</b>	All
<b>Description</b>			
Engine running hours value.			

[back to List of values](#)

### NumSuccStarts

<b>Value group</b>	Statistics	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	8207	<b>Related applications</b>	All
<b>Description</b>			
Successful engine start number counter. The counter is increased by 1 even if the particular start command will take more than one attempt.			
<i>Note: The counter can be readjusted / reset from IntelliMonitor menu Monitor -&gt; Set statistics.</i>			

[back to List of values](#)

### NumUnscStarts

<b>Value group</b>	Statistics	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	10149	<b>Related applications</b>	All
<b>Description</b>			
Unsuccessful starts counter. The counter is incremented always when Start fail alarm is issued.			
<i>Note: The counter can be readjusted / reset from IntelliMonitor menu Monitor -&gt; Set statistics.</i>			

[back to List of values](#)

### Service Time

<b>Value group</b>	Statistics	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9648	<b>Related applications</b>	All
<b>Description</b>			
This is maintenance countdown timer. The timer is located in setpoints group <b>Engine protect</b> as well as in Statistics values. Adjust the timer to the requested maintenance interval. It will be decremented while the engine is running. The alarm WrnServiceTime is issued as soon as the timer counts down to zero.			

[back to List of values](#)

## DayCons

<b>Value group</b>	Statistics	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9040	<b>Related applications</b>	All
<b>Description</b>			
Daily fuel consumption calculated by controller from <b>FUEL CONSACT (PAGE 246)</b> .			

⬅ back to List of values

## TripCons

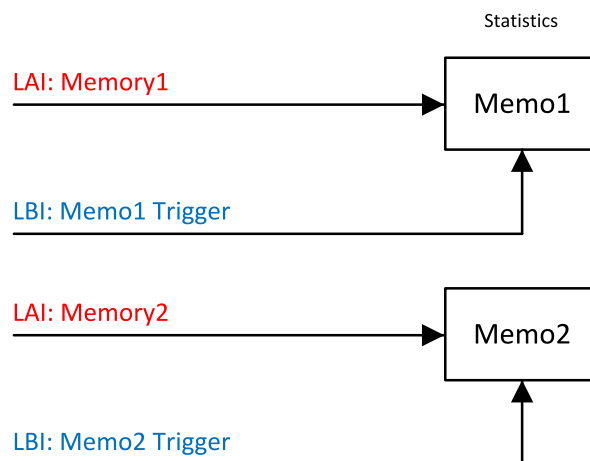
<b>Value group</b>	Statistics	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	9817	<b>Related applications</b>	All
<b>Description</b>			
Trip fuel consumption calculated by controller from <b>FUEL CONSACT (PAGE 246)</b> .			

⬅ back to List of values

## Memo1

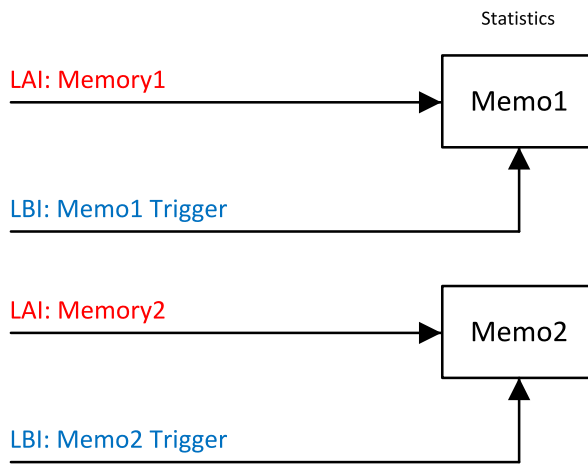
<b>Value group</b>	Statistics	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	8230	<b>Related applications</b>	All
<b>Description</b>			

There are two Statistics registers Memo1 and Memo2. Those statistic values are based on Logical Analog Input Memory1 or Memory2 value in the time of Logical Binary input **Memo1 Trigger** or **Memo2 Trigger** rising edge. Both statistics values is possible to modify in IntelliMonitor – Set Statistics command.



⬅ back to List of values

## Memo2

<b>Value group</b>	Statistics	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [-]		
<b>Comm object</b>	8231	<b>Related applications</b>	All
<b>Description</b>			
<p>There are two Statistics registers Memo1 and Memo2. Those statistic values are based on Logical Analog Input Memory1 or Memory2 value in the time of Logical Binary input <b>Memo1 Trigger</b> or <b>Memo2 Trigger</b> rising edge. Both statistics values is possible to modify in IntelliMonitor – Set Statistics command.</p>			
 <pre> graph TD     subgraph Statistics         Memo1[Memo1]         Memo2[Memo2]     end     LAI1[LAI: Memory1] --&gt; Memo1     LBI1[LBI: Memo1 Trigger] --&gt; Memo1     LAI2[LAI: Memory2] --&gt; Memo2     LBI2[LBI: Memo2 Trigger] --&gt; Memo2     </pre>			

[back to List of values](#)

## MomAvgFICon L

<b>Value group</b>	Statistics	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	0.1 [/nm]		
<b>Comm object</b>	11321	<b>Related applications</b>	All
<b>Description</b>			
<p>Momentary average fuel consumption per nautical mile. It is available, if both <b>FUELCONSUMP</b> (PAGE 246) and <b>BOATSPEED</b> (PAGE 246) are configured.</p>			

[back to List of values](#)

## Aftertreatment

### DEF Level

<b>Value group</b>	Aftertreatment	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	1 [%]		
<b>Comm object</b>	14522	<b>Related applications</b>	All
<b>Description</b>			
Indicates aftertreatment Diesel Exhaust Fluid tank level in percent.			

[↶ back to List of values](#)

### DPF Soot Load

<b>Value group</b>	Aftertreatment	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[%]		
<b>Comm object</b>	15765	<b>Related applications</b>	All
<b>Description</b>			
The rate of soot in DPF (Diesel particulate filter).			

[↶ back to List of values](#)

### DPF Ash Load

<b>Value group</b>	Aftertreatment	<b>Related FW</b>	3.4.0
<b>Resolution [units]</b>	[%]		
<b>Comm object</b>	12483	<b>Related applications</b>	All
<b>Description</b>			
The rate of ash in DPF (Diesel particulate filter).			

[↶ back to List of values](#)

## Analog output (values) configuration

Any of values from the Source list can be configured to any physical or ECU / J1939 (virtual) Analog output.

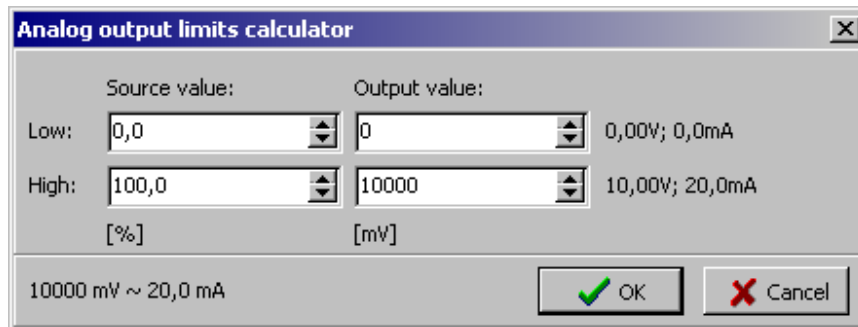
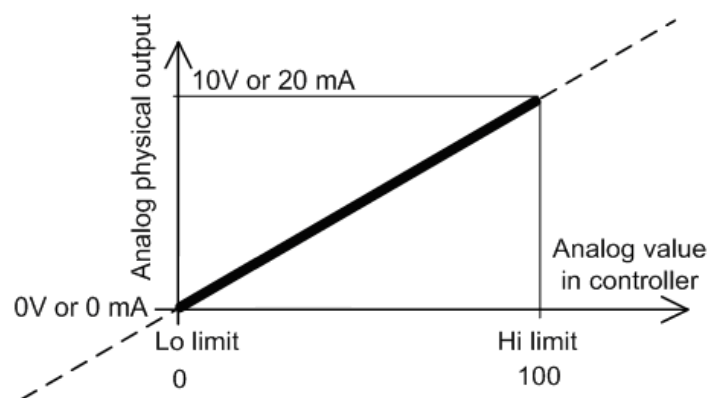
### Analog outputs availability

Module	Number of outputs	Note
ID-SCM	3	10 V or 20 mA or 10 V / 10 kΩ
IGS-PTM	1	10 V or 20 mA
I-AOUT8	8	10 V or 20 mA or pwm
I-IO8/8	2	20 mA (10 V or pwm not supported by ID-DCU Marine 2.2)
ECU (J1939)	4 (virtual)	Format depends on ECU

### Analog output configuration

It is possible to convert Source analog value by linear interpolation (conversion). The conversion is given by definition of two points, Low and High one.

Following is example of transfer characteristics 0 – 100 % to 0 – 20 mA.

Following are examples of transfer characteristics 0 – 100 % to 4 – 20 mA. The first case is transfer characteristics -25 – 100 % to 0 – 20 mA, it contains the needed conversion to 4 – 20 mA.

**Analog output limits calculator**

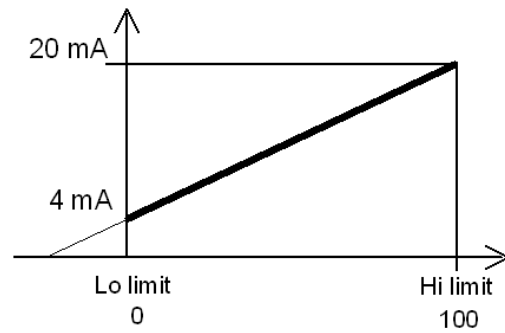
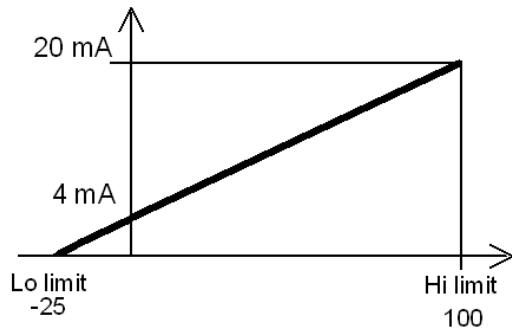
Source value:	Output value:	
Low: -25,0	0	0,00V; 0,0mA
High: 100,0	10000	10,00V; 20,0mA
[%]	[mV]	

10000 mV ~ 20,0 mA

**Analog output limits calculator**

Source value:	Output value:	
Low: 0	2000	2,00V; 4,0mA
High: 100	10000	10,00V; 20,0mA
[%]	[mV]	

10000 mV ~ 20,0 mA



[back to Appendix](#)

[back to Table of contents](#)



## 8.2 Extensional modules

More technical details, wiring and settings about extensional modules can be found in Accessory Modules for IG-NT, IS-NT and ID-DCU.

8.2.1 Intel AIN8 (I-AIN8)	291
8.2.2 Intel AIN8TC	301
8.2.3 Intel IO8/8 (I-IO8/8)	306
8.2.4 IS-BIN16/8	314
8.2.5 Intel AIO9/1 (I-AIO9/1)	321
8.2.6 IS-AIN8	326
8.2.7 IS-AIN8TC	336
8.2.8 IGS-PTM	340
8.2.9 InternetBridge-NT	347
8.2.10 I-CB Communication bridge	348
8.2.11 I-AOUT8	349
8.2.12 ID-COM	354
8.2.13 Theory of binary inputs and outputs	356

[back to Appendix](#)

### 8.2.1 Intel AIN8 (I-AIN8)



#### Description

Intel AIN8 module is extension module equipped with analog inputs and impulse input.

The module can be used for ID-DCU, IntelMains-NT, IntelGen-NT and IntelSys-NT controllers.

This module is compatible with MTU ECU-7 at communication speed 125 kbps when uploaded with firmware 1.2.0 and higher.

The detection of communication speed is indicated by fast flashing of status LED. Once the speed is detected the module remains set for the speed even when the communication is lost. Renewal of communication speed detection is done by reset of the module.

## Available inputs/outputs

### Analog inputs

- ▶ 8 channels
- ▶ Can be configured as
  - Resistor three wire input
  - Current input
  - Voltage input

### Impulse input

- ▶ 1 channel
- ▶ Can be configured as
  - Impulse
  - Impulse/time
  - RPM

All inputs can be configured to any logical function or protection.

It is possible to connect up to 10 modules to the IntelliGen-NT, IntelliSys-NT or IntelliMains-NT controllers or up to 4 modules to the ID-DCU.

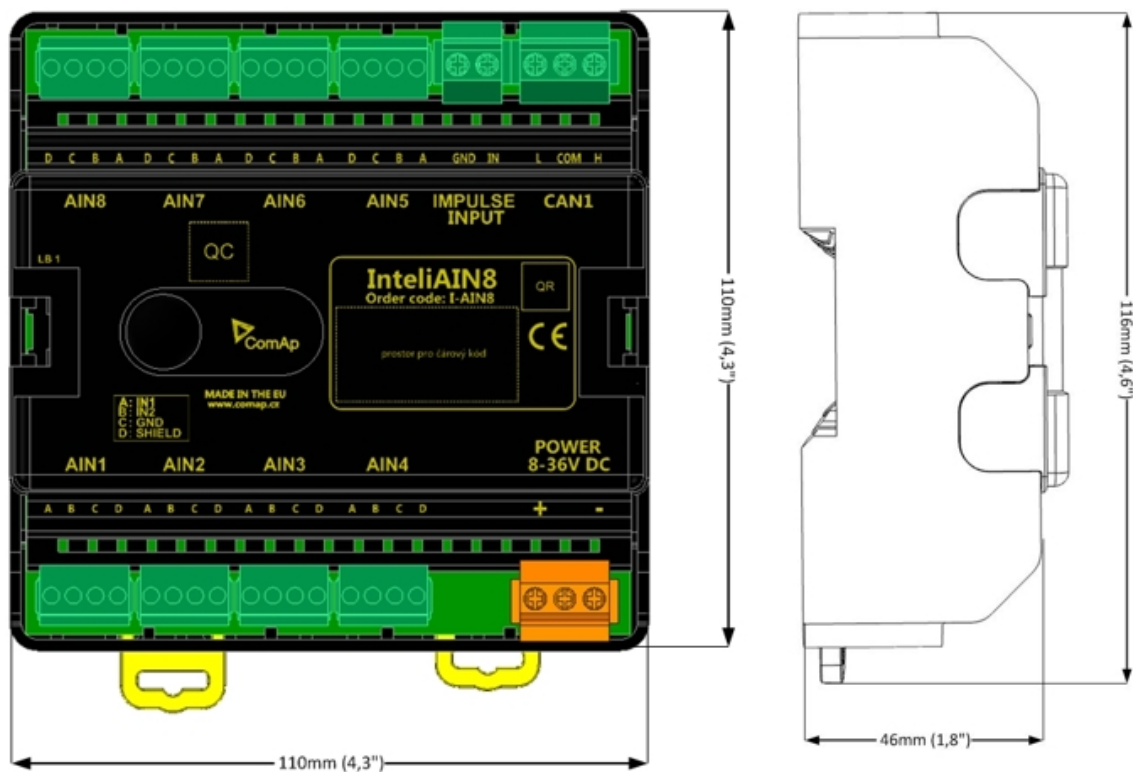
Inteli AIN8 module is connected to controller CAN1 bus.

## Supported sensors

Sensors
User curves
PT100 [°C] (fix)
PT1000 [°C] (fix)
NI100 [°C] (fix)
NI1000 [°C] (fix)
PT100 [°F] (fix)
PT1000 [°F] (fix)
NI100 [°F] (fix)
NI1000 [°F] (fix)
0-250ohm (fix linear)
0-2400ohm (fix linear)
0-10k ohm (fix linear)
+/-1V (fix linear)

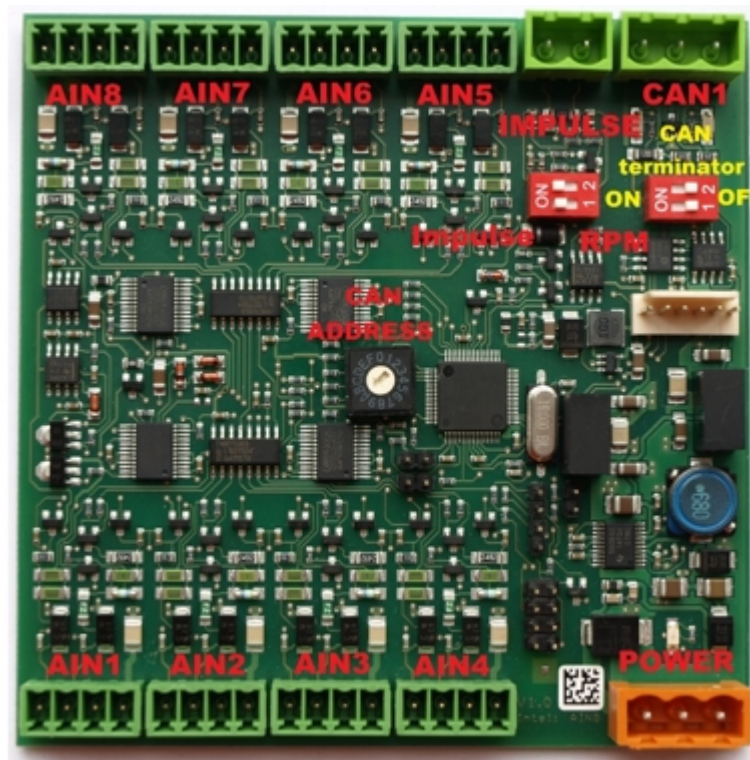
Sensors
0-2.4V (fix linear)
0-5V (fix linear)
0-10V (fix linear)
4-20mA passive (fix linear)
4-20mA active (fix linear)
0-20mA passive (fix linear)
+/-20mA active (fix linear)

## Dimensions



Unit is 35 mm DIN rail mounted.

## Terminals



ANALOG INPUT	8 analog Inputs
IMPULSE INPUT	1 impulse input
CAN	CAN1 line
POWER	Power supply
CAN LED Tx, Rx	Indication transmitted or received data
Status LED	LED indication of correct function
CAN terminator	Terminating CAN resistor (active in position "ON")
TEST jumper	Upgrade of sw
AT-LINK	Connector for AT-LINK

## Address and DIP switch setting

### Address configuration

DIP switch determines CAN address for analog inputs and impulse input too.

### Programming Firmware

Firmware upgrade is via AT-link (TTL). For programming it is necessary to close jumper TEST.

For programming use FlashProg PC tool version 4.2 or higher.

## LED indication

### LED at power connector – status LED

LED status	Description
Dark	Fw in module does not work correctly.
Flashing	Module does not communicate with controller (in case non-zero CAN address)
Fast flashing	Detection of CAN communication speed
Lights	Power supply is in the range and the communication between IntelI AIN8TC and controller works properly. Or power supply is in range and zero CAN address is set. (in case zero CAN address module doesn't communicate with the controller)

## Impulse input configuration

(This input is supported in sw IGS-NT3.0 and higher)

(IntelIGen-NT and IntelISys-NT support 1 impulse input (type Impulse or Impulse/time or Impulse+Impulse/time) and 1 RPM input or 2 RPM inputs)

After adding IntelI AIN8 module to configuration in GenConfig/ card Modules, you choose type of impulse input:

<b>Module type</b>	IntelIAIN8
<b>Module index</b>	IntelIAIN8 (1) ▼
<b>Protection upon module failure</b>	SHUTDOWN (RED) ▼
<b>Module failure prefix</b>	IAIN8(1)
<b>Add screens</b>	Yes ▼
<b>Display data as</b>	Number ▼
<b>Impulse input type</b>	None ▼
	None Impulse Impulse/time Impulse +Impulse/time <b>RPM</b>

After selection you configure input - in card "I/O", group "Impulse input"

### RPM

In this case you can set name of this input and set the number of gear teeth.

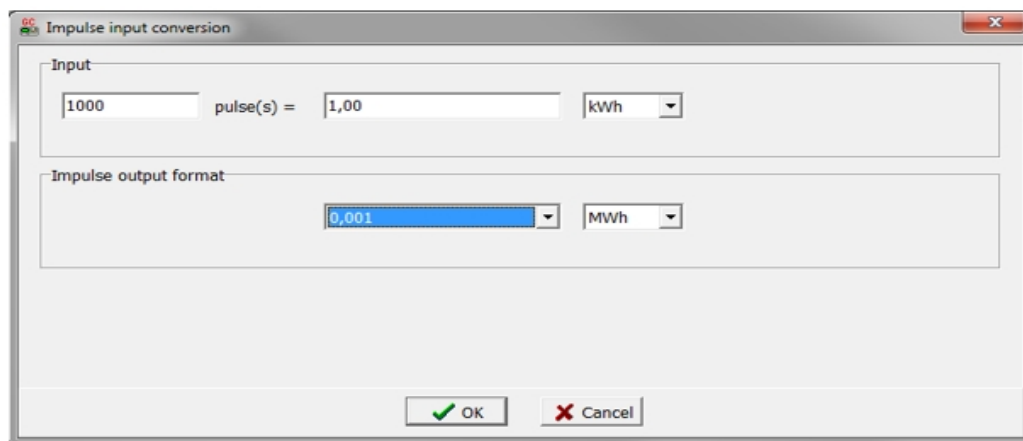
Value of RPM is placed in value group: "RPM & Imp/time"

## Impulse

This setting is designed for reading of pulses from electricity meter or flow meter.

Configuration:

Property	Value
Conversion	1000 pulses = 1 kWh
Impulse input name	Imp 1
Impulse output format	0,001 MWh
Type of pulses	Electric meter
Ton min [ms]	30
Toff min [ms]	30



### Example

We have electric meter, which gives 1000 pulses/ 1kWh.

Value, which is saved to statistic will be calculate to three decimal places and will be in MWh value. In case electricity meter is used, the valid pulse from electricity meter is defined by norm DIN 43864 and norm IEC 62053-31 – for equipment class A. In these norms the valid pulses are defined with these parameters: minimal  $T_{on} \geq 30ms$ , min  $T_{off} \geq 30ms$ .

In case flow meters you can use  $T_{on} \geq 10ms$ , min  $T_{off} \geq 10ms$ , or you can use option “Custom meter” where you can define any  $T_{on}$  and  $T_{off}$ .

Value is placed in value groupe: “Statistic” This type of impulse input is designed for measurement of total electricity consumption – in this case.

## Internal counter for this value

Example:

Property	Value
Conversion	1 pulse = 0,01 kWh
Impulse input name	Imp 1
Impulse output format	0,001 MWh
Type of pulses	Electric meter
Ton min [ms]	30
Toff min [ms]	30

Counter value for counting of value from input is with range **4 294 967 295**.

So, 100 pulses=0.01kWh => range is 4 294 967 2.95 kWh.

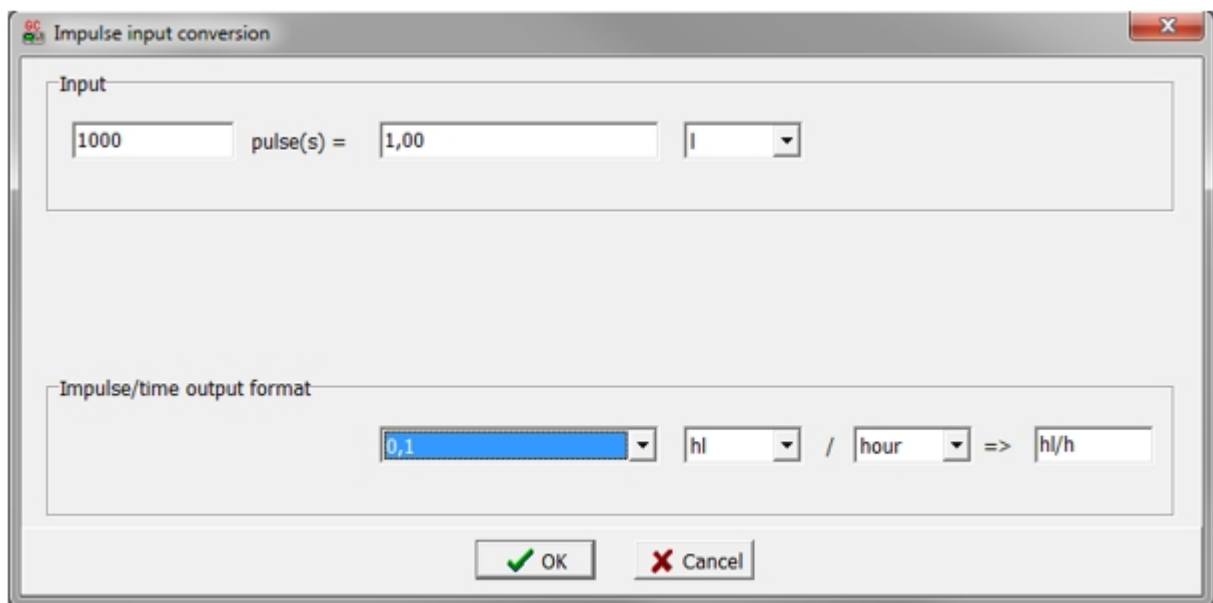
Output value is in MWh, so range is 4 294 9.67 295 MWh. [kWh ->MWh]

If counter value achieves this number (4 294 9.67 295 MWh), then it is cleared and count from 0 value again.

## Impulse/time

This option counts pulses for any period and value says, how many pulses came in last defined period.

Property	Value
Conversion	1000 pulses = 1,00 l
Imp/time input name	Imp/time 1
Imp/time output format	0,1 h/lh
Type of pulses	Flowmeter
Ton min [ms]	10
Toff min [ms]	10



GC Impulse input conversion

Input

1000 pulse(s) = 1,00 l

Impulse/time output format

0,1 hl / hour => hl/h

OK Cancel

## Example

We connected output from the flow meter to the impulse input and we want to measure volume of cooling water.

Flow meter gives 1000 pulses per 1 litre.

Our resulting value will be calculated to one decimal place and will be in hectoliters.

This value is placed in group value "RPM & Imp/time".

The value shows the flow of the cooling water in the last hour. Value is perpetually recounted.

## Impulse+Impulse/time

In this option you can choose the combination of Impuls and Impuls/Time inputs.

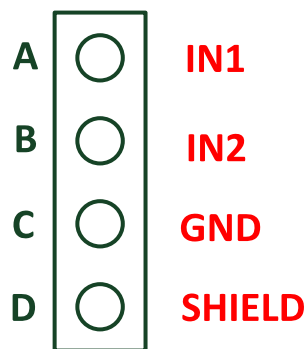
There are two value – total number of "pulses" and number of "pulses" per last period.

Description of both you can see higher.

## Wiring

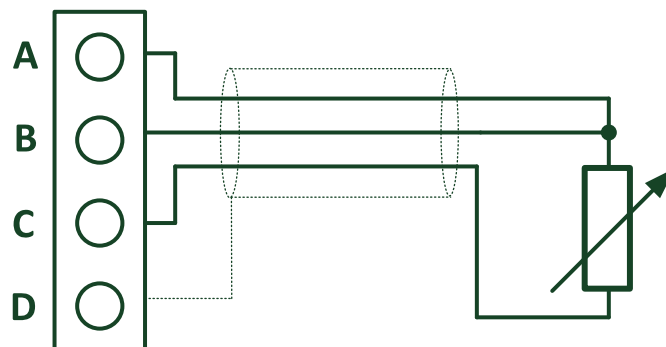
The following diagrams show the correct connection of sensors.

### Terminator



### Measuring resistance

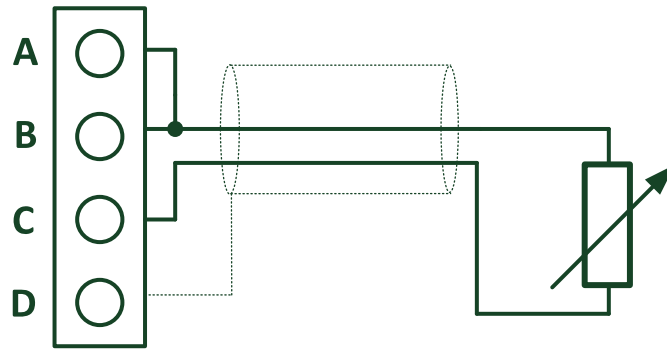
#### ▶ 3 – wire measurement



Ranges: Pt100, Pt1000, Ni100, Ni1000, 0 – 250Ω, 0 – 2400Ω, 0 – 10kΩ

#### ▶ 2 – wire measurement

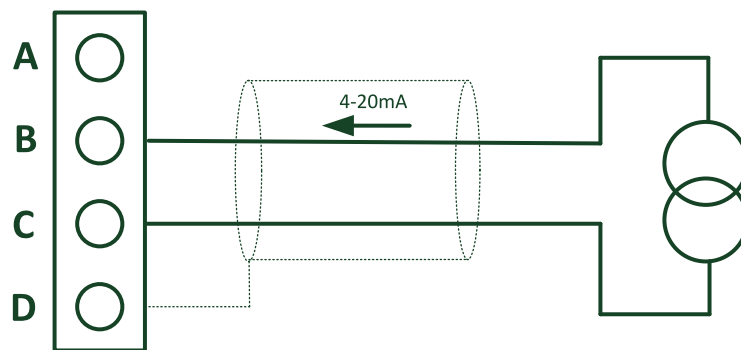




Ranges: Pt100, Pt1000, Ni100, Ni1000, 0 – 250Ω, 0 – 2400Ω, 0 – 10kΩ

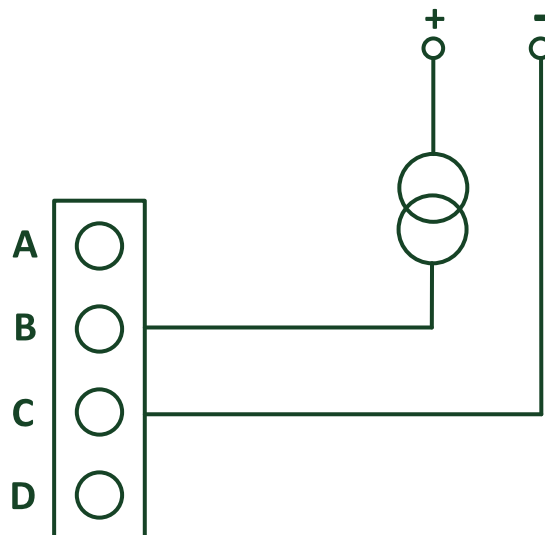
### Measuring current

- ▶ Active sensor



Ranges: ±20mA, 4 – 20mA

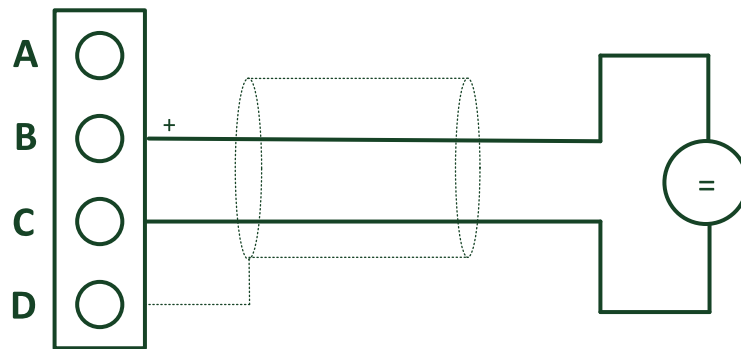
- ▶ Passive sensor



Ranges: 0 – 20mA, 4 – 20mA

**Note:** In case of power supply of sensor from the same source like power supply of Inteli AIN8 module – galvanic separation is lost.

## Measuring voltage



Ranges:  $\pm 1$  V, 0–2,5 V, 0–5 V, 0–10 V

## Impulse input

- ▶ 1 channel
- ▶ Can be configured as
  - Impulse
  - Impulse/time
  - RPM

All inputs can be configured to any logical function or protection.

It is possible to connect up to 10 modules to the IntelliGen-NT, IntelliSys-NT or IntelliMains-NT controllers or up to 4 modules to the ID-DCU.

Inteli AIN8 module is connected to controller CAN1 bus.

## Technical data

<b>Dimension (W × H × D)</b>	110 × 110 × 46 mm (4,3" × 4,3" × 1,8")
<b>Weight</b>	221.5 grams
<b>Interface to controller</b>	CAN1

<b>Analog inputs (not electric separated)</b>		8 channels
<b>*Voltage</b>	Range	0-10 V
	Accuracy	$\pm 0,25$ % of actual value + $\pm 25$ mV
<b>Current</b>	Range	$\pm 20$ mA
	Accuracy	$\pm 0,25$ % of actual value + $\pm 50$ $\mu$ A
<b>Resistance</b>	Range	0- 10 k $\Omega$
	Accuracy	$\pm 0,5$ % of actual value + $\pm 2$ $\Omega$
	Resistance	Pt100, Pt1000, Ni100, Ni1000 $\pm 2,5$ °C

<b>Impulse input</b>		
<b>*RPM</b>	Level of signal	2 Vpk-pk ÷ 70 Vpk-pk
	Frequency range	4 Hz ÷ 10 kHz

<b>Impulse</b>	Measurement of pulses by norm DIN 43864 and norm IEC 62053-31– equipment class A. For flow meter pulses: UH=30V, I <sub>max</sub> =30mA, T <sub>on min</sub> =10ms, T <sub>off min</sub> = 10ms , OC
----------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<b>Galvanic separation</b>	CAN bus is galvanic separated from the measurement and power supply. All analog inputs are galvanic separated from power supply. Analog inputs are not galvanic separated between channels
----------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<b>Power supply</b>	8 to 36 V DC
<b>Protection</b>	IP20
<b>Current consumption</b>	35 mA at 24 V ÷ 100 mA at 8 V
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C
<b>Heat radiation</b>	3 W

\*RPM input – required level of signal for correct sensing

- ▶ Minimum input voltage 2 V<sub>pk-pk</sub> (from 4 Hz to 4 kHz)
- ▶ Minimum input voltage 6 V<sub>pk-pk</sub> (from 4 kHz to 10 kHz)

\*Voltage measurement circuit was designed for lambda probe, for measurement thermocouples please use Inteli AIN8TC.

*The product is fully supported in fw IGS-NT 3.0 or higher and in IGS-NT-branches based on this fw.*

🔍 back to Extensional modules

## 8.2.2 Inteli AIN8TC

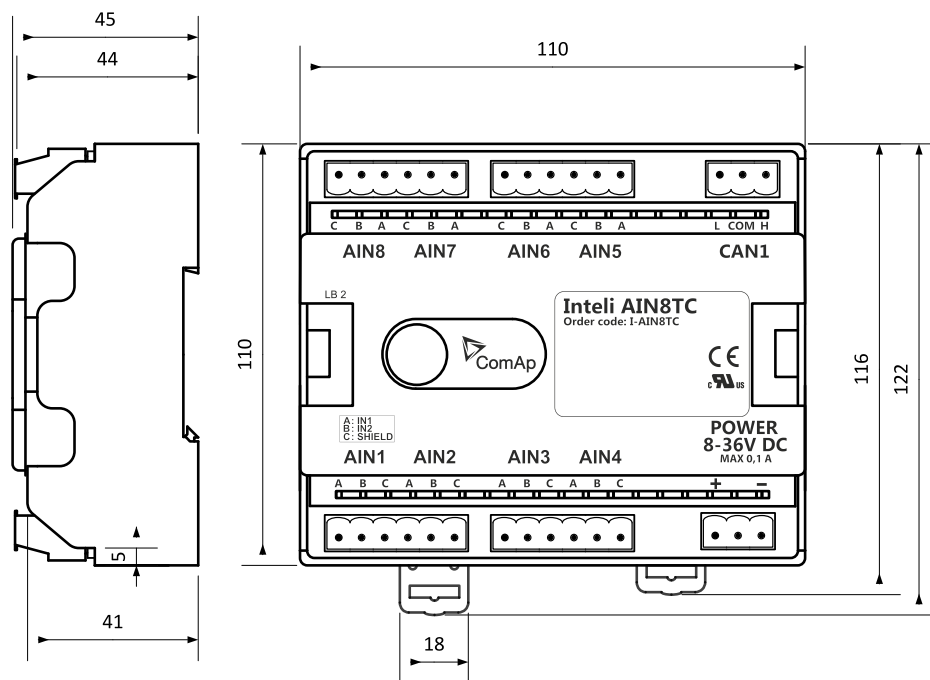


Image 8.3 Dimensions of Inteli AIN8TC

Inteli AIN8TC unit can be mounted on **DIN rail (35 mm)**.

All dimensions are in mm.

## Available inputs

### Analog inputs

- ▶ 8 channels
- ▶ can be configured as thermocouple sensors only

All inputs can be configured to any logical function or protection.

It is possible to connect up to 10 modules to the IntelliGen-NT, IntelliSys-NT or IntelliMains-NT controllers or up to 4 modules to the ID-DCU.

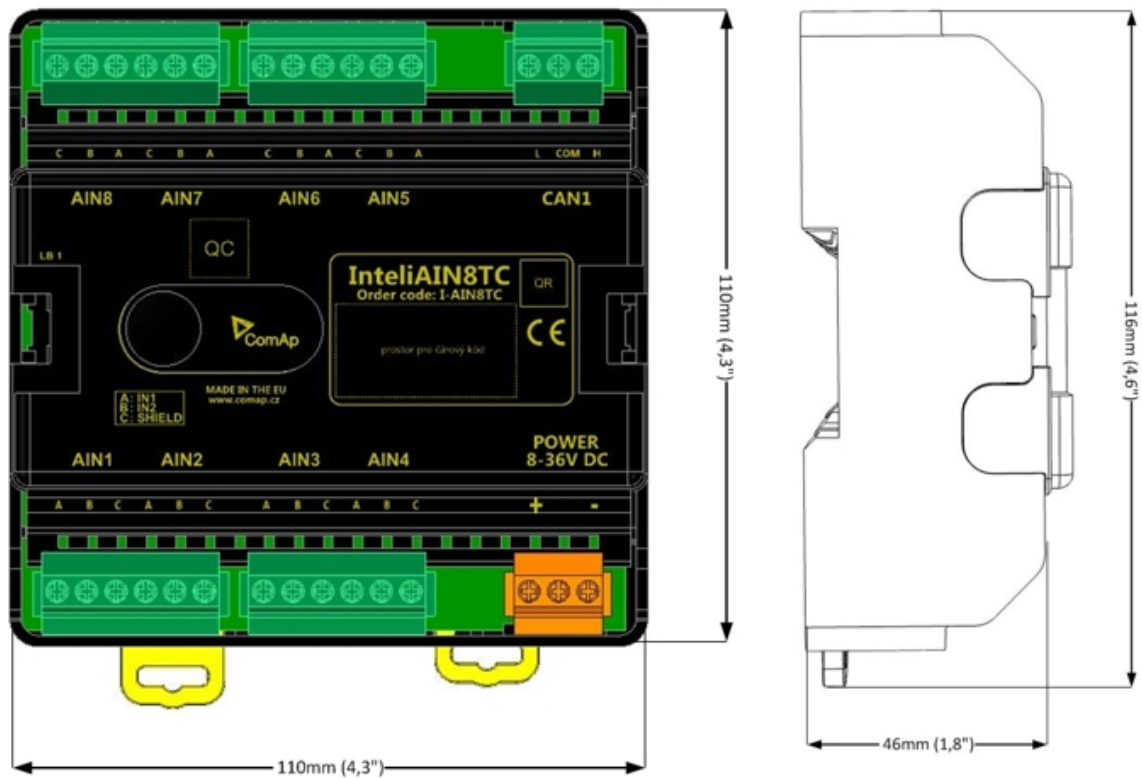
Inteli AIN8TC module is connected to controller CAN1 bus.

## Supported sensors

Sensors
Thermocpl J [°C] (fix)
Thermocpl K [°C] (fix)
Thermocpl L [°C] (fix)
Thermocpl J [°F] (fix)
Thermocpl K [°F] (fix)
Thermocpl L [°F] (fix)
Thermocpl (nc) J [°C] (fix)
Thermocpl (nc) K [°C] (fix)
Thermocpl (nc) L [°C] (fix)
Thermocpl (nc) J [°F] (fix)
Thermocpl (nc) K [°F] (fix)
Thermocpl (nc) L [°F] (fix)

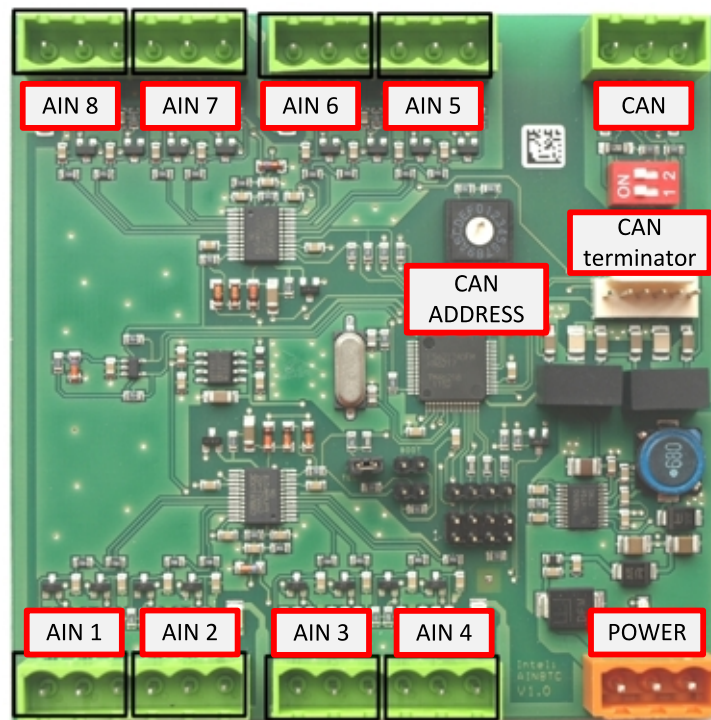
**Note:** “nc” means “not cold junction compensation (by external sensor). In this case is used internal temperature sensor on the PCB

## Dimensions



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

## Terminals



<b>ANALOG INPUT</b>	8 analog Inputs
<b>CAN</b>	CAN1 line
<b>POWER</b>	Power supply
<b>CAN LED Tx, Rx</b>	Indication transmitted or received data
<b>Status LED</b>	LED indication of correct function
<b>CAN terminator</b>	Terminating CAN resistor (active in position "ON")
<b>TEST jumper</b>	Upgrade of sw
<b>AT-LINK</b>	Connector for AT-LINK

## Address and DIP switch setting

### Address configuration

DIP switch determinates CAN address for analog inputs.

### Programming firmware

Firmware is upgraded via AT-link (TTL). For programming it is necessary to close jumper TEST.

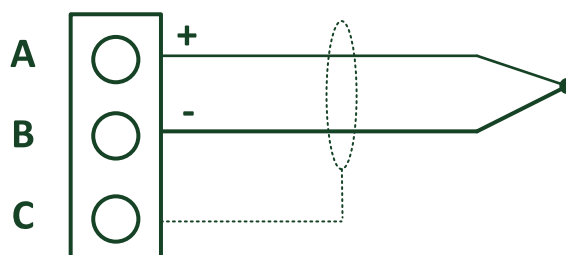
For programming FlashProg PC tool version 4.2 or higher must be used.

## LED indication

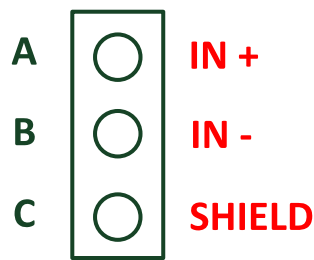
### LED at power connector – status LED

LED status	Description
Dark	Fw in module does not work correctly.
Flashing	Module does not communicate with controller (in case non-zero CAN address)
Fast flashing	Detection of CAN communication speed
Lights	Power supply is in the range and the communication between Inteli AIN8TC and controller works properly. Or power supply is in range and zero CAN address is set. (in case zero CAN address module doesn't communicate with the controller)

## Wiring



## Terminator



## Cold Junction Compensation (CJC) settings

Please have a look at Cold junction compensation in **Cold Junction Compensation (CJC)** (page 332) chapter.

## Technical data

Dimension (W × H × D)	110 × 110 × 46 mm (4.3" × 4.3" × 1.8")
Weight	237.5 grams
Interface to controller	CAN1

Analog inputs (not electric separated)	8, no galvanic separated
Measuring Accuracy	±100 mV ± 0.1 % of actual value + ± 100 µV (± 3 °C)
Internal sensor for measuring cold junction - Accuracy	±1 °C in temperature range -20 °C ÷ +70 °C
Galvanic separation	CANbus is galvanic separated from the measurement and power supply. All analog inputs are galvanic separated from power supply. Analog inputs are not galvanic separated between channels

Power supply	8 to 36 V DC
Protection	IP20
Current consumption	35 mA at 24 V ÷ 100 mA at 8 V
Storage temperature	- 40 °C to + 80 °C
Operating temperature	- 30 °C to + 70 °C
Heat radiation	2 W

Thermocouples galvanically separated and galvanically non-separated are supported.

[🔍 back to Extensional modules](#)

## 8.2.3 IntelI IO8/8 (I-IO8/8)



### Description

IntelI IO8/8 module is an extension module equipped with binary inputs, binary outputs and analog outputs. The module can be used for ID-DCU, IntelIMains-NT, IntelIGen-NT and IntelISys-NT controllers.

“IntelI IO8/8” is the name of the module, but it is possible to configure the module (by internal switch) to two configurations:

- ▶ IntelI IO8/8 (8 binary inputs, 8 binary outputs and 2 analog outputs)
- ▶ IntelI IO16/0 (16 binary inputs, 0 binary outputs and 2 analog outputs)

This module is compatible with MTU ECU-7 at communication speed 125 kbps when uploaded with firmware 1.1.0 and higher.

The detection of communication speed is indicated by fast flashing of status LED. Once the speed is detected the module remains set for the speed even when the communication is lost. Renewal of communication speed detection is done by reset of the module.

### Available inputs/outputs

#### Binary inputs

- ▶ 8 channels
- ▶ Can be configured as:
  - Pull up
  - Pull down

All 8 inputs are configured to one type together.



## Binary outputs

- ▶ 8 channels
- ▶ Can be configured as:
  - High side switch
  - Low side switch

Always all 8 inputs are configured to one type (HSS/LSS) together.

All 8 outputs can be modified to inputs by switch on the PCB (IO 8/8 to IO 16/0).

New function “output state check” can be switched on for all 8 binary outputs.

**Note:** *Theory of binary inputs and outputs (page 356) (Pull Up, Pull Down, High side switch, Low side switch)*

“**Output state check**” function evaluates in real time the state of binary outputs and adjusted (required) state. In case of failure (different state of required state and real state) history record and alarm are issued (type of the alarm is set by “Protection upon module failure” - (no alarm/warning/SD)).

This function is designed for short-circuit or other failure, which causes change of set state of binary output.

Module type	IntelIO8/8
Module index	IntelIO8/8(1)
Protection upon module failure	SHUTDOWN (RED)
Module failure prefix	II08/8(1)
Add screens	Yes
Output type	High side
Output state check	Activated
Input type	Pull up

## Analog outputs

- ▶ 2 channels
- ▶ Can be configured as:
  - Voltage 0-10V
  - Current 0-20mA
  - PWM (level 5V, with adjustable frequency from 200Hz to 2400Hz, with step 1Hz)

All inputs/outputs can be configured to any logical function or protection.

It is possible to connect up to 12 modules (in configuration 8inputs/8outputs) to the IntelliGen-NT, IntelliSys-NT or IntelliMains-NT controllers or up to 4 modules to the ID-DCU.

Intel IO8/8 module is connected to controller CAN1 bus.

## Default configuration of module

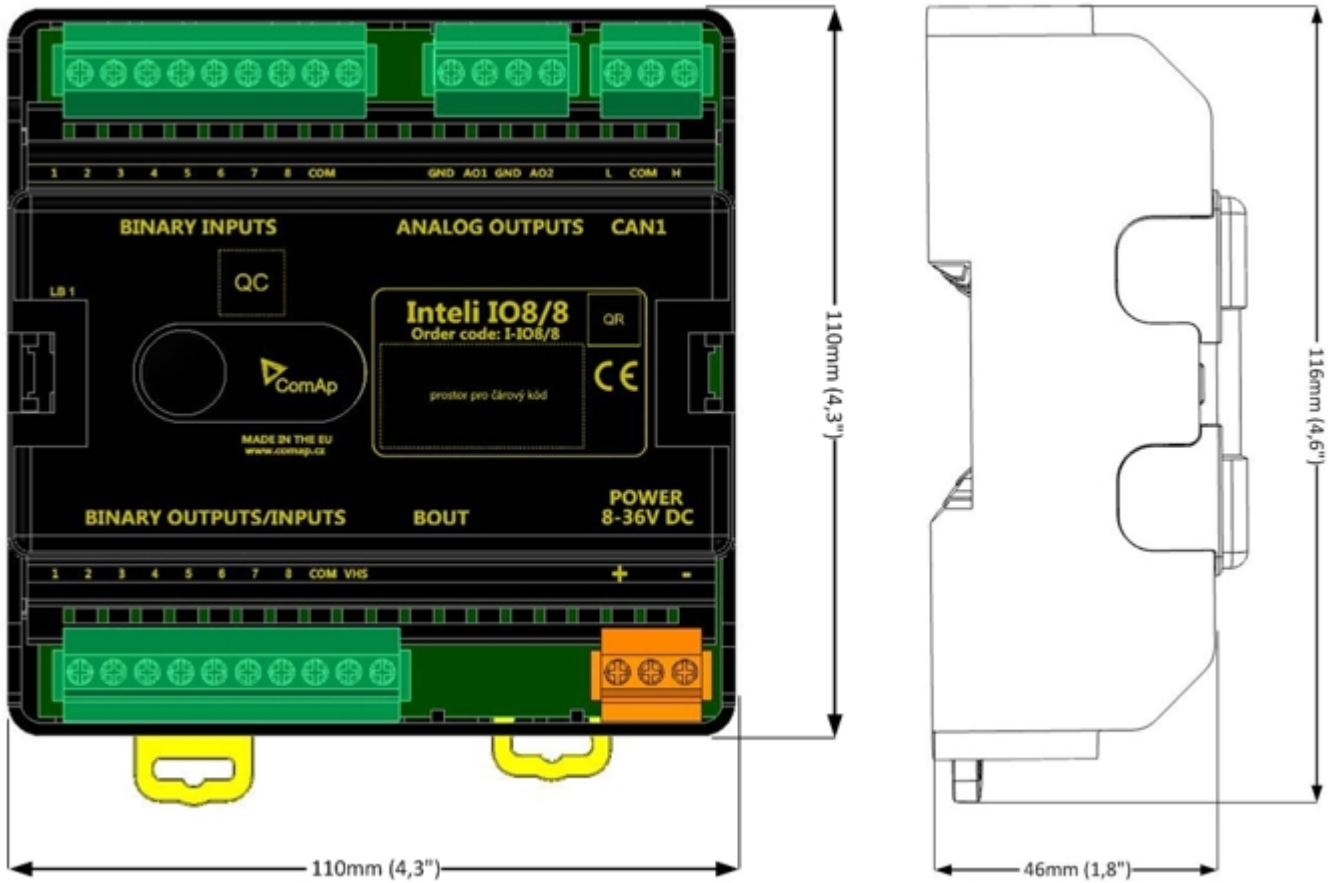
If the software of the controller supports this module, then you can configure inputs/output to all options.

In case that the software of the controller doesn't support this module, you can add this module to the configuration by generic extension (as group of 8 signals).

In this case you cannot define the type of Inputs/outputs, all inputs/outputs are configured as:

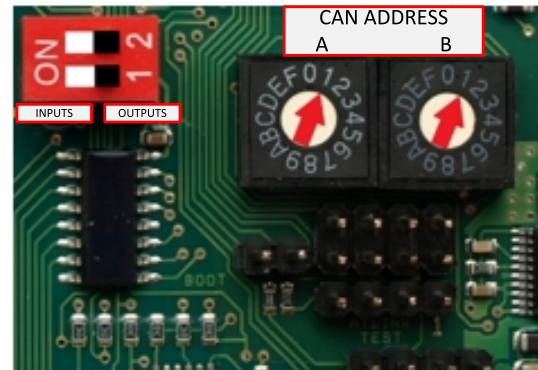
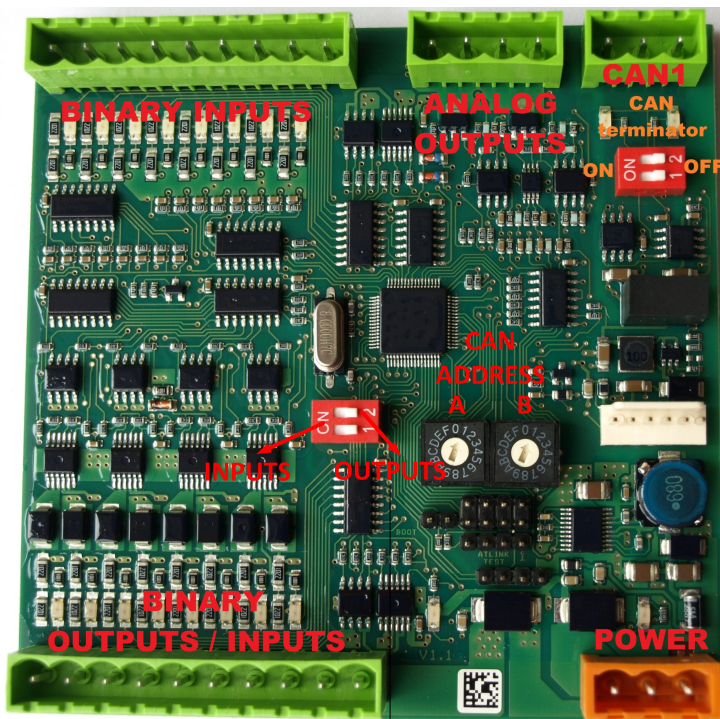
- ▶ Binary inputs - pull up
- ▶ Binary outputs - low side
- ▶ Analog output – current, range 0-20mA

## Dimensions



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

## Terminals



<b>BINARY INPUTS</b>	8 binary inputs
<b>BINARY OUTPUT</b>	8 binary outputs (8 binary inputs)
<b>ANALOG OUTPUT</b>	2 analog outputs
<b>CAN</b>	CAN1 line
<b>POWER</b>	Power supply
<b>BINARY INPUTS LED</b>	8 LEDs for binary input indication
<b>BINARY OUTPUT LED</b>	8 LEDs for binary output indication
<b>CAN LED Tx, Rx</b>	Indication transmitted or received data
<b>Status LED</b>	LED indication of correct function
<b>Bout LED</b>	Indicate binary outputs active (non-active = 16 binary inputs are active)
<b>CAN terminator</b>	Terminating CAN resistor (active in position "ON")
<b>TEST jumper Upgrade of sw</b>	Upgrade of sw
<b>AT-LINK</b>	Connector for AT-LINK

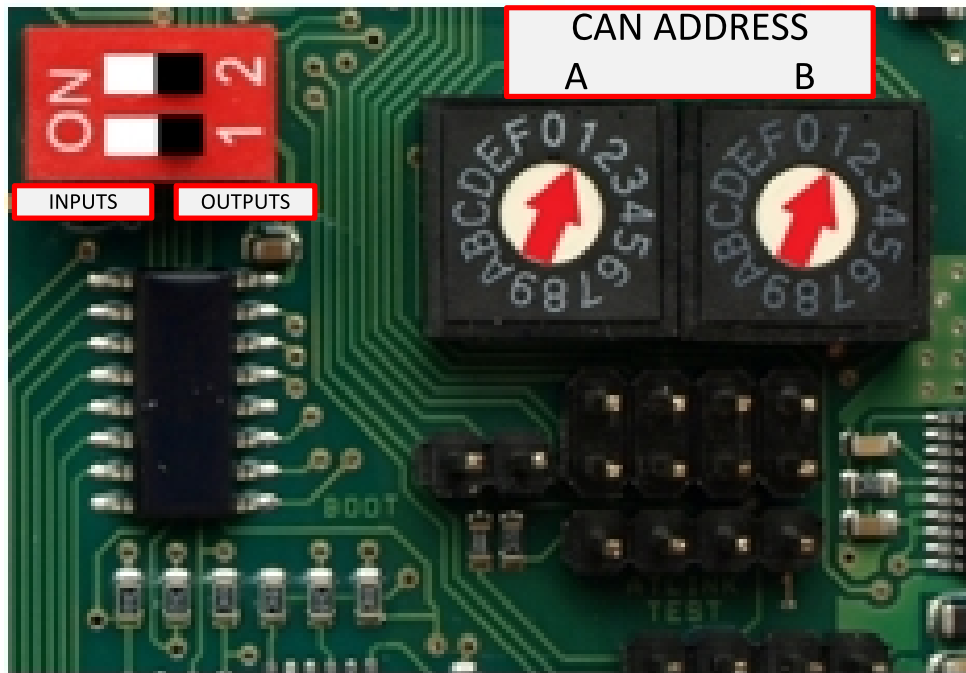
## Address and DIP switches setting

### Configuration as Intel IO8/8

CAN address for binary inputs is determined by DIP switch A, CAN address for binary output and analog outputs is determined by DIP switch B.

### Configuration as Intel IO16/0

CAN address for binary inputs is determined by DIP switch A, first group of 8 input has address A, second group of 8 inputs has address A+1. CAN address of analog outputs is set by DIP switch B.



In case of setting the CAN address to zero, the appropriate group of signals is deactivated.

### Programming Firmware

Firmware upgrade is via AT-link (TTL). For programming is necessary to close jumper TEST.

For programming FlashProg PC tool version 4.2 or higher must be used.

### LED indication

#### Binary input

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

#### Binary output

Each binary output has LED which indicates output signal. Binary output LED is shining when binary output is set.

#### Binary output status LED

When this LED is shining, then module is configured as 8 binary inputs and 8 binary outputs.

When this LED is dark, then the module is configured as 16 binary inputs.

### LED at power connector – status LED

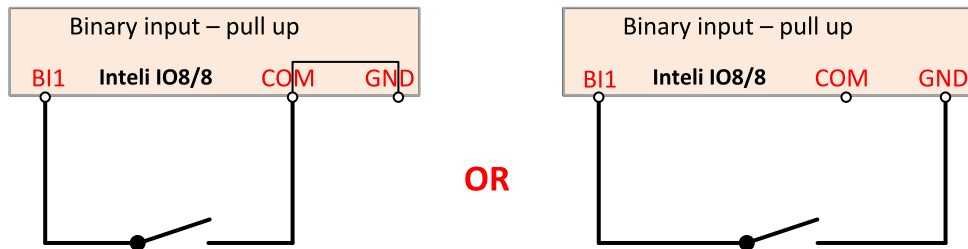
Led status	Description
Dark	Fw in module does not work correctly.
Flashing	At least one “group of signals” (binary inputs, binary outputs, analog outputs) with a non-zero address does not communicated.
Fast flashing	Detection of CAN communication speed
Lights	Power supply is in the range and communication between Inteli IO8/8 and controller properly works.

## Wiring

### Binary inputs

► Pull up

Two options of wiring

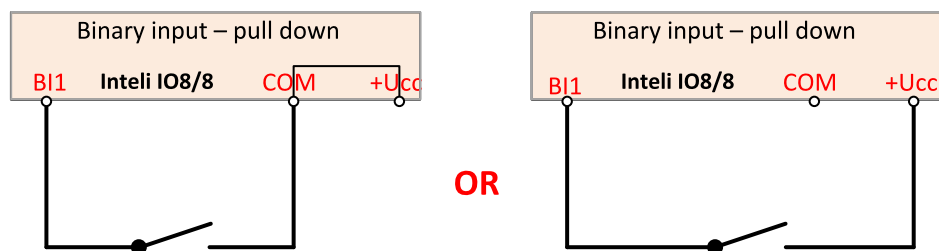


There are two options of wiring. On left side you can see case when binary input is connected between pins BI1 and COM (COM is connected internally to the GND).

On right side is case of wiring between pins BI1 and GND. Both ways are correct.

► Pull down

Two options of wiring



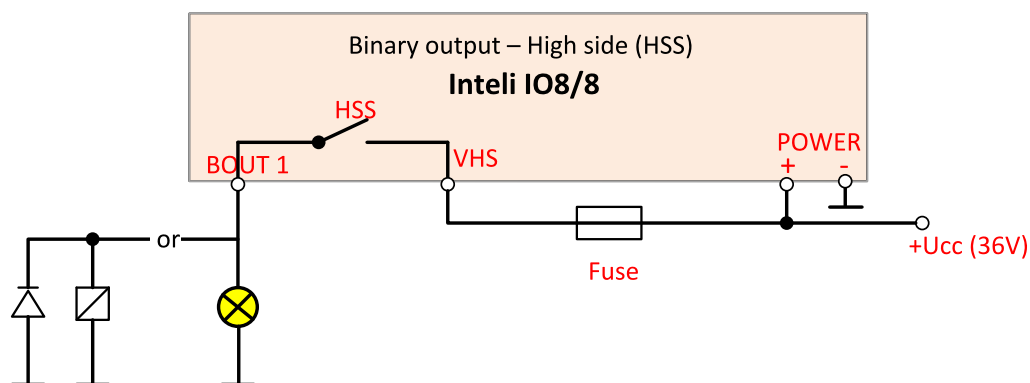
There are two options of wiring. On left side you can see case when binary input is connected between pins BI1 and COM (COM is connected internally to the +Ucc).

On right side is case of wiring between pins BI1 and +Ucc. Both ways are correct.

**IMPORTANT: Do not connect COM pin to power (GND or Ucc). Otherwise the module will be damaged.**

### Binary outputs

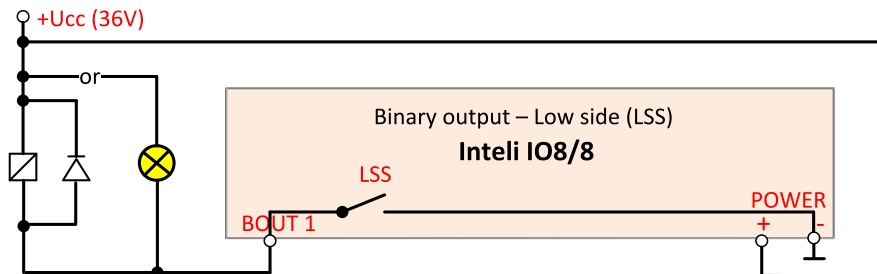
► High side



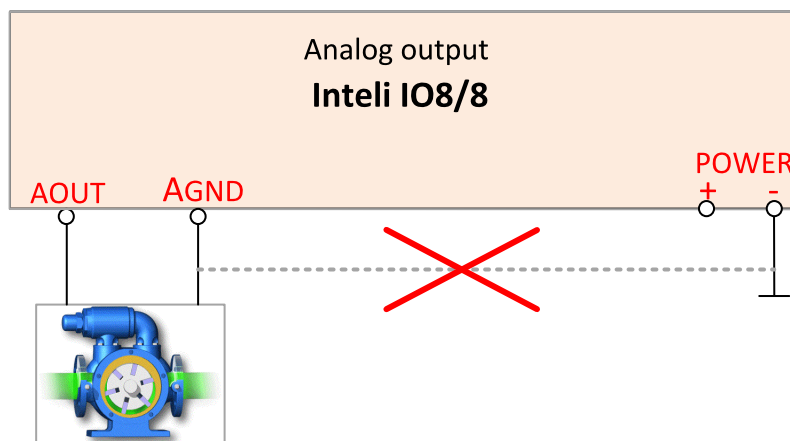
When High side setting of outputs is chosen - binary output must be connected to the plus potential (+ U<sub>cc</sub>) of power supply connect directly to terminal VHS (voltage High side). Maximal current of each binary output is 500mA.

Size of fuse depends on load.

► Low side



### Analog outputs



Terminator for analog output has special analog ground (AGND), which must not be connected to the GND. Limit of analog ground (AGND) is 100mA.

### Technical data

Dimension (W × H × D)	110 × 110 × 46 mm (4.3" × 4.3" × 1.8")
Weight	240 grams
Interface to controller	CAN1

<b>Binary inputs</b>	
Input resistance	4400 Ω
Input range	0 to 36V DC
Switching voltage level for open contact indication	0 to 2 V
Max voltage level for close contact indication	6 to 36 V

<b>Binary output (Open collector output)</b>	
<b>Max current</b>	500 mA
<b>Max switching voltage</b>	36V DC

<b>Analog output (not electric separated)</b>		
<b>Current</b>	Range	0 - 20 mA
	Accuracy	$\pm 100 \mu\text{A} + \pm 0.5 \%$ of actual value (Rmax 500 $\Omega$ )
<b>Voltage</b>	Range	0 – 10 V
	Accuracy	$\pm 20 \text{ mV} + \pm 0.5 \%$ of actual value (Imax 5mA)
<b>PWM</b>	Level 5V, adjustable freq 200÷2400Hz (Imax 20 mA) (minimal step of pulse is 2 $\mu\text{s}$ )	
<b>Max current of AGND</b>		100 mA

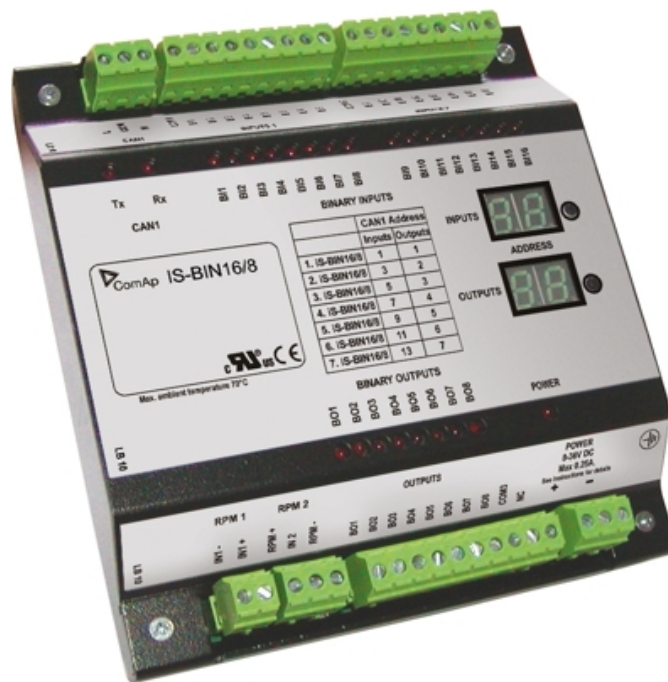
<b>Galvanic separation</b>	CAN bus is galvanic separated from the measurement and power supply. All Inputs/outputs are not galvanic separated from power supply
----------------------------	--------------------------------------------------------------------------------------------------------------------------------------

<b>Power supply</b>	8 to 36 V DC
<b>Protection</b>	IP20
<b>Current consumption</b>	35 mA at 24V ÷ 100 mA at 8 V
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C
<b>Heat radiation</b>	4 W

The product is fully supported in fw IGS-NT 3.0 or higher and in IGS-NT-branches based on this fw.

[🔍 back to Extensional modules](#)

## 8.2.4 IS-BIN16/8



### Description

IS-BIN16/8 is an extension module with 16 binary inputs (galvanic separated) and 8 binary output (galvanic separated), 2 pulse inputs (frequency measurement or pulse counting). All I/O can be configured to any logical function or protection. It is possible to connect up to 6 IS-BIN16/8 external units to one controller. External modules IS-BIN16/8 is connected to controller CAN1 bus. To operate external modules:

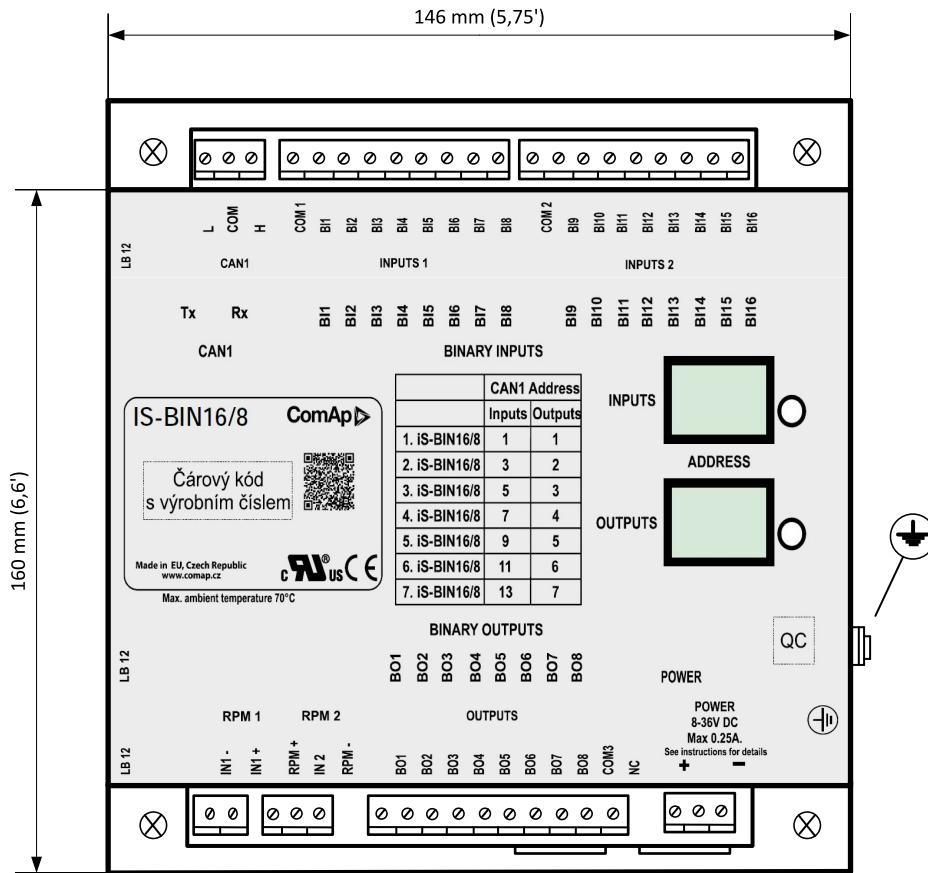
- ▶ Connect all external modules to CAN1 bus line
- ▶ On each module adjust I/O CAN1 address in the range of 1 to 7 for IS-BIN16/8 output, 1,3,5,7,9,11,13 for IS-BIN18/8 inputs
- ▶ In case of use generic module in configuration you can set CAN address from 1 – 12
- ▶ In case of set 0 CAN address - inputs/ outputs are deactivated
- ▶ Input output address is displayed on the front panel LCD's
- ▶ Use PC configuration tool to configure controller according external modules setting

IS-BIN16/8 module has two separate CAN1 addresses for binary inputs Group 1, Group 2 and binary output Group (total three addresses). The CAN1 address for BI Group 1 and for BO Group 2 can be adjusted on the IS-BIN16/8. The address for BI Group 2 is set automatically to the address following BI Group 1.

**Note:** CAN address 0 disables corresponding CAN message (Group data are not send).

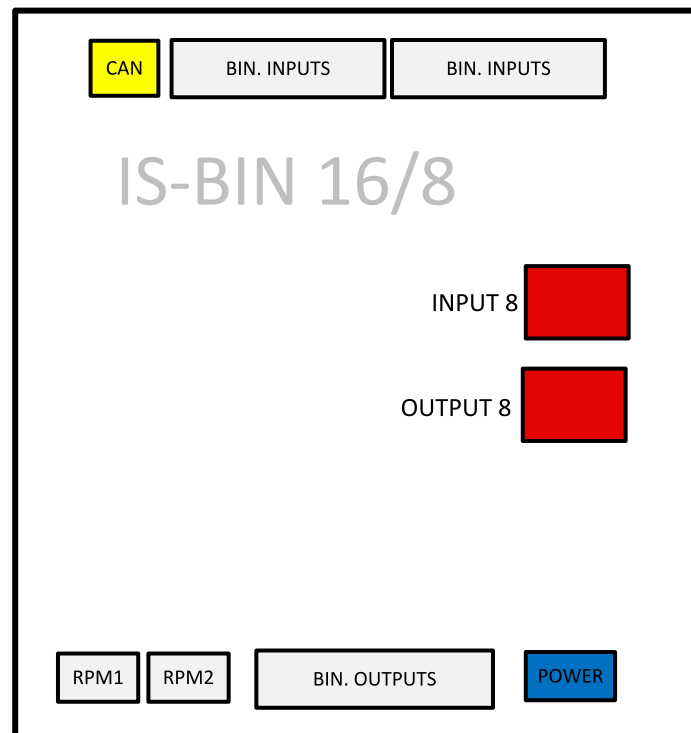


## Dimensions



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

## Connectors



<b>CAN</b>	CAN1 line
<b>BINARY INPUTS</b>	16 binary inputs
<b>BINARY OUTPUT</b>	8 binary output
<b>RPM1, RPM2</b>	2 frequency inputs
<b>POWER</b>	Power supply
<b>INPUTS</b>	LDD CAN address
<b>OUTPUT</b>	LDD CAN address

### Address and jumpers settings

CAN 1 address is setting by following procedure:

- ▶ Press Address buttons (for INPUTS address and OUTPUT address) during IS-BIN8 power supply on to switch to addressing mode.
- ▶ Then repeatedly press or keep pressed address button to adjust required address according to CONTROLLER configuration.
- ▶ After setting requested address, release the buttons and wait until the digits blink – it indicates write the changed address to EEPROM memory.

	CAN 1 Address	
	Inputs	Output
1. IS-BIN16/8	1	1
2. IS-BIN16/8	3	2
3. IS-BIN16/8	5	3
4. IS-BIN16/8	7	4

5. IS-BIN16/8	9	5
6. IS-BIN16/8	11	6
7. IS-BIN16/8	16	7

Table 8.3 Table of recommended CAN1 address setting

### SW version check

Let suppose IS-AIN8 of SW version 1.4. Shortly press address button. Following sequence appears on the display: number “1”, one second pause, number “4”, two second pause, number “1”, one second pause, number “4”, two second pause and finally IS-AIN8 actual address.

Error message (e.g. SD BOUT2) appears on Controller screen when Binary input or output Address x is configured but corresponding unit is not recognized (no message is received from CAN bus). Check IS configuration and corresponding external IS-AIN, IS-BIN unit address setting.

### LED indication

Tx			Rx		
Dark	Blink	Light	Dark	Blink	Light
Any data are transmitted on the CAN1 line	Data are transmitted on the CAN1 line		Any data are received on the CAN1 line	Data are received on the CAN1 line	

Table 8.4 Tx / Rx LED status

### Wiring

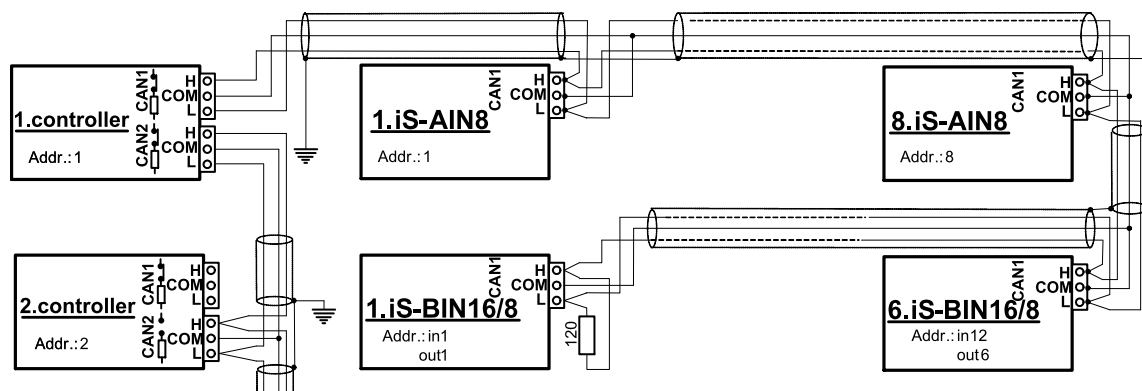


Image 8.4 CAN bus line has to be terminated by 120 ohm resistors on the both ends.

**Note:** CAN bus line has to be terminated by 120 ohm resistors on the both ends.

For longer distances is recommended to connect CAN COM terminals between all controllers and cable shielding to the **ground in one point!**

Recommended CAN bus data cables see in Chapter Technical data.

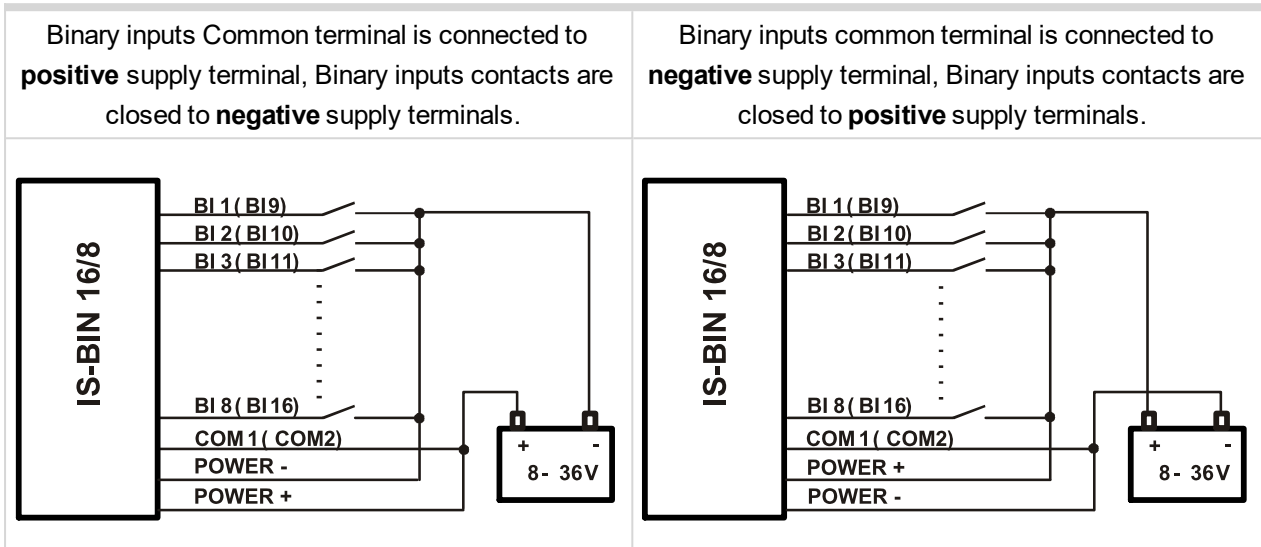
External units can be connected on the CAN bus line in any order, but line arrangement (no tails no star) is necessary-

Recommended CAN bus data cables see in Chapter Technical data.

## Binary inputs

There are two groups of eight Binary inputs BI1 to BI8 and BI9 to BI16. Each group has a separate Common terminal COM1 and COM2. The Common terminal can be connected to positive or negative pole – see following drawing. Binary inputs are galvanically separated from IS-BIN16/8 power supply.

**Note: Theory of binary inputs and outputs (page 356) (Pull Up, Pull Down, High side switch, Low side switch)**



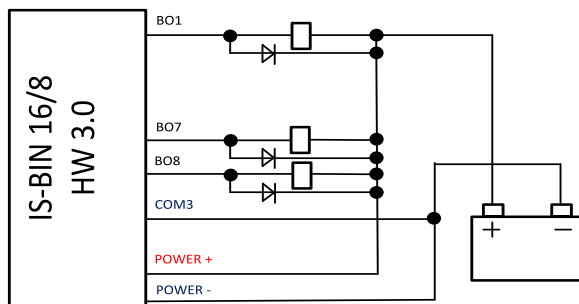
Input voltage range for opened contact is from 8 VDC to Power supply VDC. Input voltage range for closed contact is from 0 to 2 VDC. Voltage level is defined between Binary input and Binary input COM terminal and does not depend on “positive” or “negative” connection.

Impulse inputs do not work with IGS-NT controller.

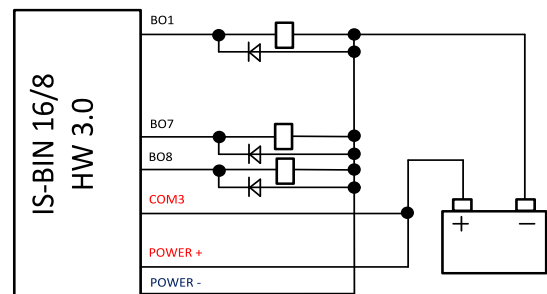
## Binary output

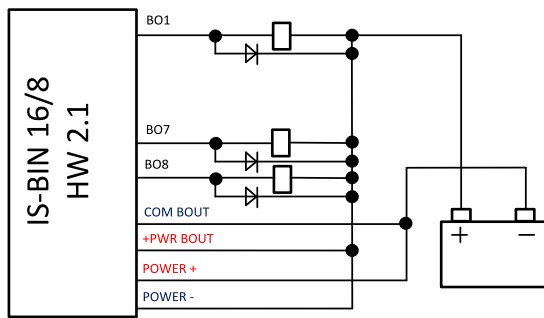
The Common terminal can be connected to positive or negative pole (HW3.0 only) – see following drawing. Binary outputs are galvanic separated from IS-BIN16/8 power supply (have a look at technical data). The maximum load values are 0.5 A / 36V for one output.

Binary output common terminal is connected to **negative** supply terminal, Binary output contacts are closed to **positive** supply terminals.



Binary output common terminal is connected to **positive** supply terminal, Binary output contacts are closed to **negative** supply terminals.





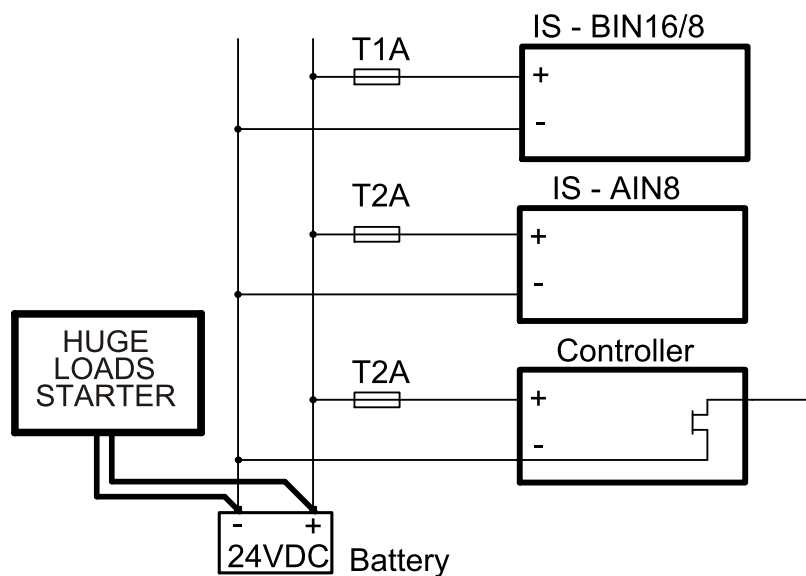
## Power supply fusing

A (2) respectively (1) amp fuse should be connected in-line with the power to the controller and modules, these items should never be connected directly to the starting battery.

Take care for proper controller, extension units and relays power supply fusing. Fuse value and type depends on number of connected devices and wire length.

Controller or unit	Fuse
Controller	T1A or T2A
IS-AIN8	T2A
IS-BIN16/8	T1A

Table 8.5 Recommended fuse (not fast) types



For more extension units use separate fusing according to the table above.

Controller power supply should never be connected to starter terminals.

## Technical data

Dimension (W × H × D)	146 × 160 × 46 mm (5.79' × 6.6' × 1.83')
Interface to controller	CAN1

**Relays inputs (galvanic separated)**
*Voltage level is defined between binary input and binary input COM terminal*

Number of inputs	8 + 8
Input resistance	3000 Ω
Input voltage range	0-36 VDC
Input voltage level for open contact	8 to Power supply VDC
Input voltage level for close contact	0 to 2 VDC

**Frequency inputs\* (for IS-CU only)**
**RPM1**

Type of sensor	Magnetic pick-up
Minimum input voltage	2 Vpk-pk (from 4 Hz to 4 kHz)
Maximum input voltage	50 Veff
Maximum measured frequency	8 kHz (min. input voltage 6Vpk-pk), frequency mode

**RPM2**

Type of sensor	Contact or Active sensor
Minimal pulse width	10 ms, integration mode
Maximum measured frequency	60 Hz, integration mode

**Relays outputs (galvanic separated) only HW 3.0 (non galvanic separated) HW 2.1**

Number of output	8
Maximum current	0.5A DC
Maximum switching voltage	36 VDC

Power supply	8 to 36 V DC
Protection front panel	IP20
Current consumption	250 mA** at 24 V
Humidity	95% without condensation
Storage temperature	- 40 °C to + 80 °C
Operating temperature	- 30 °C to + 70 °C
Heat radiation	2 W

**Standard conformity**

Number of output	8
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

\*RPM1, RPM2 are available in IS-CU only

\*\*During powering up current can be up to 1.5A

 [back to Extensional modules](#)

## 8.2.5 IntelI AIO9/1 (I-AIO9/1)



### Description

IntelI AIO9/1 module is extension module equipped with analog inputs and outputs – designed for DC measurement.

The module can be used for ID-DCU, IntelIMains-NT, IntelIGen-NT and IntelISys-NT controllers.

This module is compatible with MTU ECU-7 at communication speed 125 kbps when uploaded with firmware 1.2.0 and higher.

The detection of communication speed is indicated by fast flashing of status LED. Once the speed is detected the module remains set for the speed even when the communication is lost. Renewal of communication speed detection is done by reset of the module.

### Available inputs/outputs

#### Analog inputs

- ▶ 4 channels AIN1 – AIN4 can be configured as:
  - Sensor  $\pm 65V$  (it is determined for measurement of battery voltage)
- ▶ 4 channels AIN5 – AIN8 can be configured as:
  - Thermocouples – type J, K or L (in  $^{\circ}C$  or  $^{\circ}F$ )
  - Sensor  $\pm 75mV$  DC – (for connecting current shunts)
- ▶ 1 channel AIN9 can be configured as:
  - RTD (Pt1000, Ni1000)
  - Common resistance 0-2400 $\Omega$

## Analog outputs

▶ 1 channel AOUT1. Type of output:

- 0-10V DC
- 0-20mA
- PWM (5V, freq 2,4Hz  $\pm$ 2,4kHz)

▶ Analog output has 4-pins connector – GND and one pin for each type of output.

All analog inputs can be configured to any logical function or protection.

It is possible to connect up to 5 modules to the IntelliGen-NT, IntelliSys-NT or IntelliMains-NT controllers.

In case of connection Intelli AIO9/1 module to ID-DCU controller – number of module depends on using fw.

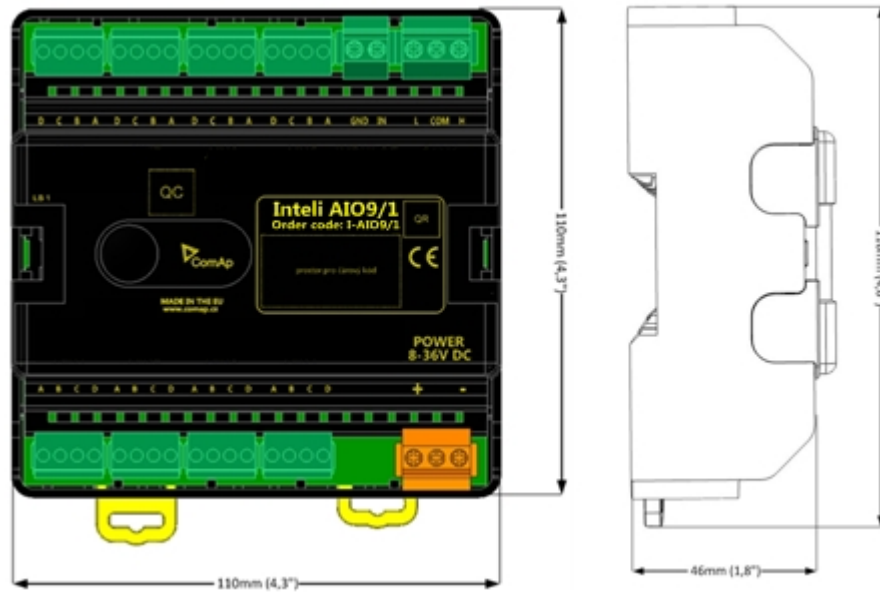
Intelli AIO9/1 module is designed for connecting to controller CAN1 bus.

## Supported sensors

Sensors
User curves
PT1000 [°C] (fix)
NI1000 [°C] (fix)
0-2400Ω (fix linear)
± 65 V DC (fix linear)
+/-75mV (fix linear)
Thermocpl J [°C] (fix)
Thermocpl K [°C] (fix)
Thermocpl L [°C] (fix)
Thermocpl (nc) J [°C] (fix)
Thermocpl (nc) K [°C] (fix)
Thermocpl (nc) L [°C] (fix)
Thermocpl (nc) J [°F] (fix)
Thermocpl (nc) K [°F] (fix)
Thermocpl (nc) L [°F] (fix)

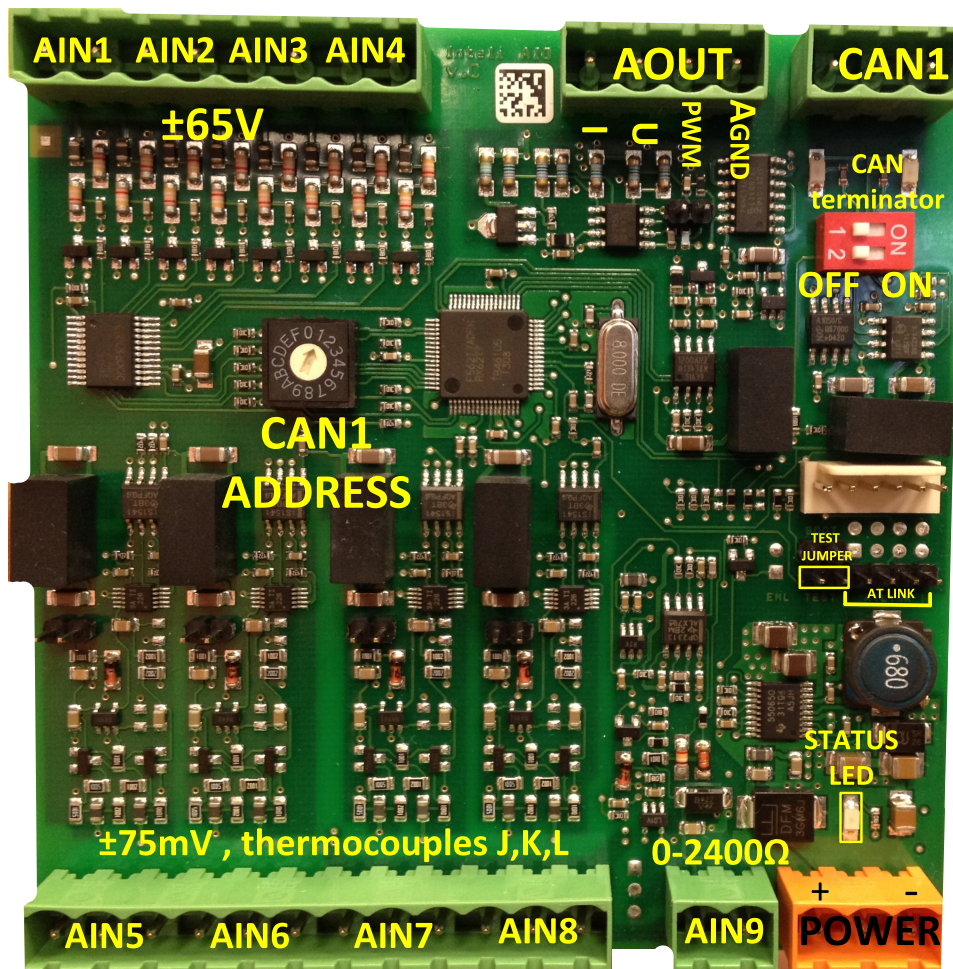


**Dimensions**



Unit is 35 mm DIN rail mounted.

**Terminals**



ANALOG INPUT	9 channels
ANALOG OUTPUTS	1 channel
CAN	CAN1 line
POWER	Power supply
CAN LED Tx, Rx	Indication transmitted or received data
Status LED	LED indication of correct function
CAN terminator	Terminating CAN resistor (active in position "ON")
TEST jumper	Upgrade of sw
AT-LINK	Connector for AT-LINK (Upgrade of sw)

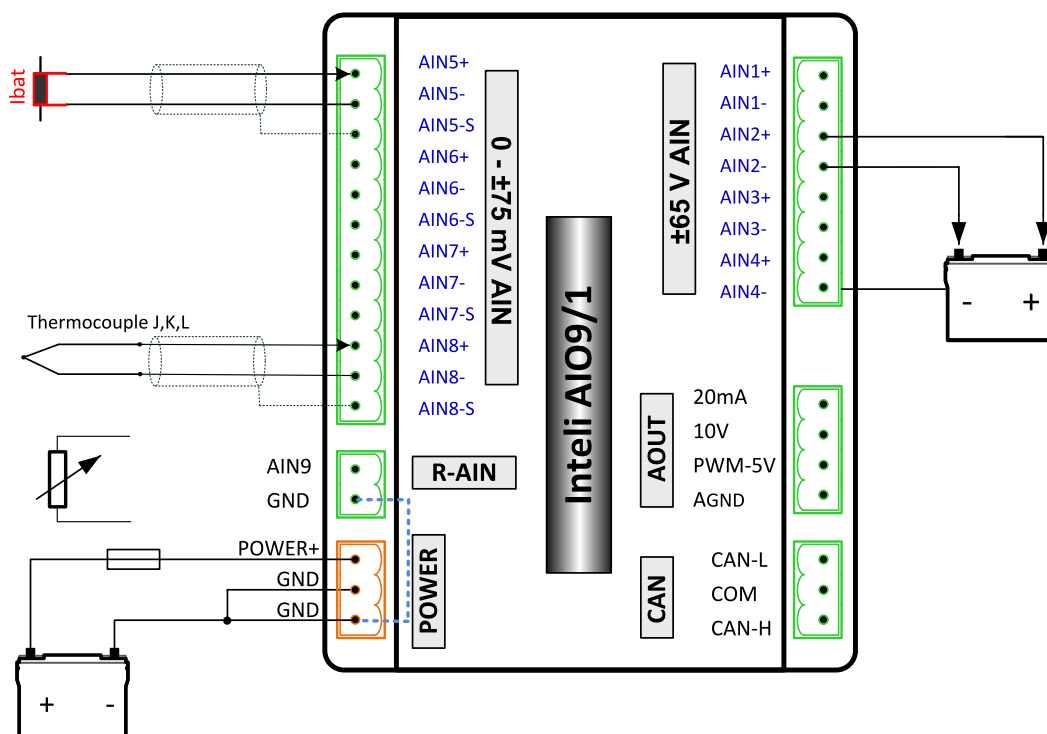
## LED indication

### LED at power connector – status LED

LED status	Description
Dark	Fw in module does not work correctly.
Flashing	Module does not communicate with controller (in case non-zero CAN address)
Fast flashing	Detection of CAN communication speed
Lights	Power supply is in the range and the communication between Inteli AIN8TC and controller works properly. Or power supply is in range and zero CAN address is set. (in case zero CAN address module doesn't communicate with the controller)

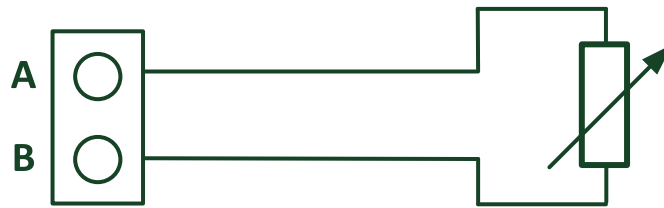
## Wiring

The following diagrams show the correct connection of sensors.



## Measuring resistance – AIN9

- ▶ 2 – wire measurement



Ranges: Pt1000, Ni1000, 0 – 2400  $\Omega$ .

Analog input 9 is determined for measuring resistance only.

## Technical data

<b>Dimension (W × H × D)</b>	110 × 110 × 46 mm (4.3" × 4.3" × 1.8")
<b>Weight</b>	248 grams
<b>Interface to controller</b>	CAN1 – galvanic separated from power supply and measurement,

<b>Analog inputs (not electric separated)</b>		9 channels
<b>AIN1-AIN4 – Voltage inputs</b>	<b>Range</b>	0-65 V $\pm$ 0.25 % of actual value + $\pm$ 120 mV Measurement is not galvanic separated from power supply, but IN- is not interconnected with GND – there is floating measurement.
	<b>Accuracy of measurement</b>	$\pm$ 0,1 % of actual value + $\pm$ 100 $\mu$ V ( $\pm$ 3 $^{\circ}$ C)
<b>AIN5-AIN8 – Voltage inputs</b>	<b>Range</b>	$\pm$ 75 mV (nominal) (measurement up to $\pm$ 80 mV)
	<b>Accuracy of measurement</b>	$\pm$ 0.1 % of actual value + $\pm$ 75 $\mu$ V Galvanic separated from power supply
<b>AIN9 resistance input</b>	<b>Range</b>	0- 2400 $\Omega$
	<b>Accuracy of measurement</b>	$\pm$ 0.5 % of actual value + $\pm$ 4 $\Omega$ Pt1000, Ni1000 $\pm$ 2,5 $^{\circ}$ C It is not galvanic separated from power supply.

<b>Analog output</b>	
I	0-20mA /500Rmax. $\pm$ 1 % of actual value + $\pm$ 200 $\mu$ A
U	0-10V $\pm$ 0.5 % of actual value + $\pm$ 50 mV
PWM	– 5 V, 200 Hz-2.4kHz 15 mA max.
Galvanic separated from power supply	

<b>Galvanic separation</b>	CAN bus is galvanic separated from the measurement and power supply
----------------------------	---------------------------------------------------------------------

<b>Power supply</b>	8 to 36 V DC
<b>Protection</b>	IP20
<b>Current consumption</b>	150 mA at 24 V ÷ 400 mA at 8 V
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 80 °C

The product is fully supported in fw IGS-NT 3.1.1 or higher.

Information about support this module in IGS-NT fw branches and ID-DCU – please read New Feature Lists.

🔍 back to Extensional modules

## 8.2.6 IS-AIN8



### Description

IS-AIN8 is input extension module equipped with 8 analog inputs. The module can be used for ID, IGS-NT controller. IS-AIN8 can be configured to:

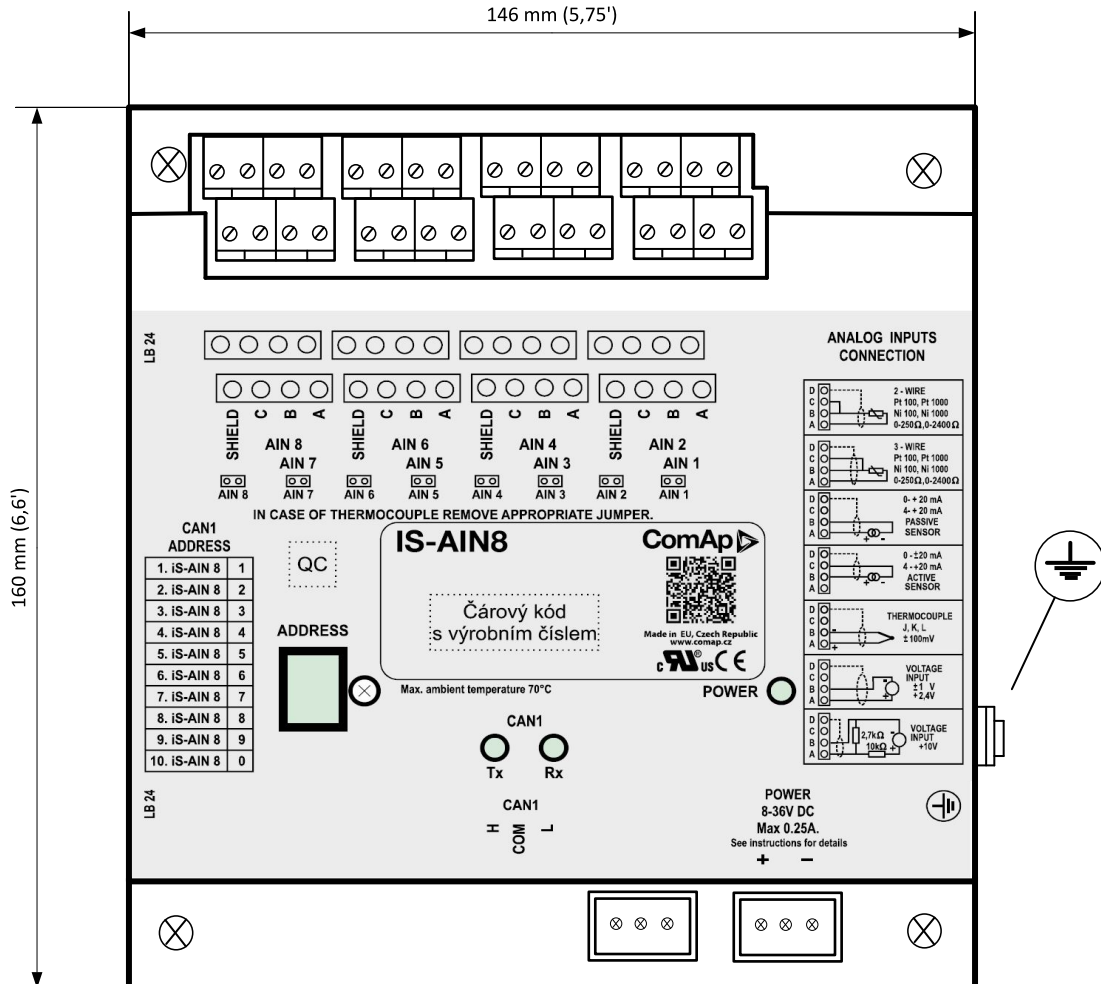
- ▶ Resistor two wire input
- ▶ Resistor three wire input
- ▶ Current input
- ▶ Thermocouple input
- ▶ Voltage input

All inputs can be configured to any logical function or protection. It is possible to connect up to 10 IS-AIN8 (with IGS-NT) or up to 4 (with ID) external units to one controller. IS-AIN8 is connected to controller CAN1 bus.

This module is compatible with MTU ECU-7 at communication speed 125 kbps when uploaded with firmware 1.2.0 and higher.

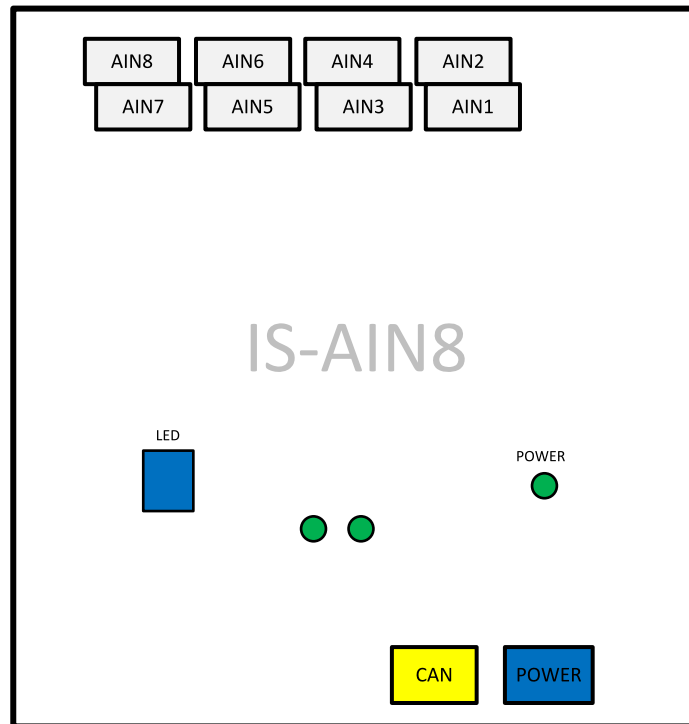
The detection of communication speed is indicated by fast flashing of status LED. Once the speed is detected the module remains set for the speed even when the communication is lost. Renewal of communication speed detection is done by reset of the module.

## Dimensions



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

## Connectors



AIN1 – AIN8	8 analog inputs
CAN	CAN1 line
POWER	Power supply
POWER	State indication
Rx, Tx	Data transmitted and received on CAN1 line
LDD	CAN1 adress

### Address and jumper settings

CAN 1 address is set by following procedure:

1. Press Address button during IS-AIN8 power supply on to switch to addressing mode.
2. Then repeatedly press or keep pressed address button to adjust required address according to controller configuration.
3. After setting requested address, release the buttons and wait until the digits blink – it indicates writing of the change address to EEPROM memory.

	CAN 1 Address
1. IS-AIN8	1
2. IS-AIN8	2
3. IS-AIN8	3
4. IS-AIN8	4
5. IS-AIN8	5
6. IS-AIN8	6

7. IS-AIN8	7
8. IS-AIN8	8
9. IS-AIN8	9
10. IS-AIN8	0

Table 8.6 Table of recommended CAN1 address setting

### SW version check

Let suppose IS-AIN8 of SW version 1.4. Shortly press address button. Following sequence appears on the display: number “1”, one second pause, number “4”, two second pause, number “1”, one second pause, number “4”, two second pause and finally IS-AIN8 actual address. Error message (e.g. SD BOUT2) appears on Controller screen when Binary input or output Address x is configured but corresponding unit is not recognized (no message is received from CAN bus). Check IS configuration and corresponding external IS-AIN8, IS-BIN8/16 unit address setting.

### LED indication

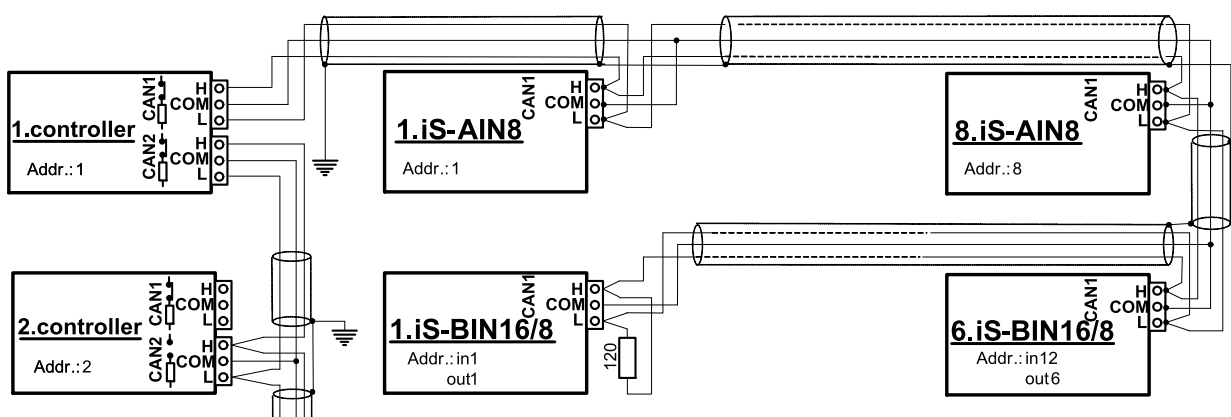
Power LED		Address LDD	
Lighting	Blink	Lighting	Blink
Power supply and CAN address are with no problems	CAN1 address is adjusted different in IS-AIN8 and in controller	Displaying current CAN1 address	Displaying current SW version

Table 8.7 LED / LDD status

Tx		Rx	
Lighting	Blink	Lighting	Blink
Any data are transmitted on the CAN1 line	Data are transmitted on the CAN1 line	Any data are received on the CAN1 line	Data are received on the CAN1 line

Table 8.8 Tx/Rx LED status

### Wiring





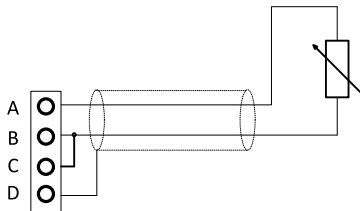
**Note:** CAN bus line has to be terminated by 120 Ω resistors on the both ends.

For longer distances is recommended to connect CAN COM terminals between all controllers and cable shielding to the **ground in one point!** External units can be connected on the CAN bus line in any order, but line arrangement (no tails no star) is necessary.

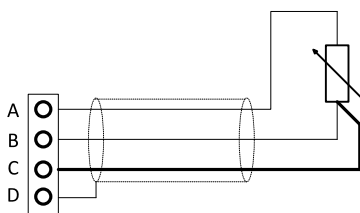
Recommended CAN bus data cables see in Chapter Technical data.

IG-MU and IG-IB units are connected to CONTROLLER CAN2 bus.

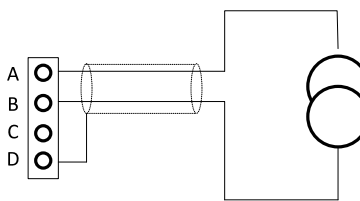
Select sensor characteristic from the list or define user sensor characteristic in PC configuration tool.



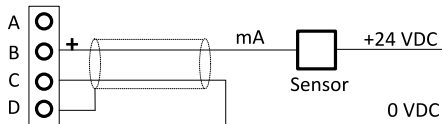
- ▶ Resistor sensor input – two wire connection.
- ▶ Range 0 to 2400 Ω.
- ▶ Pt100, Pt1000, Ni100, Ni1000
- ▶ D terminal is shielding



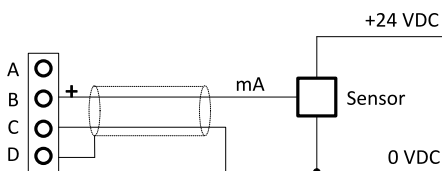
- ▶ Resistor sensor input – three wire connection.
- ▶ Range 0 to 2400 Ω.
- ▶ Pt100, Pt1000, Ni100, Ni1000 – recommended.
- ▶ D terminal is shielding



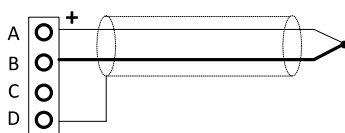
- ▶ Passive current sensor (current source is in IS-AIN8)
- ▶ Range 0 to +20 mA or 4 to + 0 mA
- ▶ D terminal is shielding



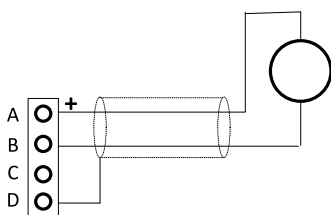
- ▶ Active current sensor (current source is in sensor)
- ▶ Range -20mA to +20 mA or 4 to +20 mA



- ▶ D terminal is shielding

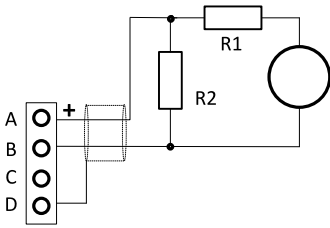


- ▶ Thermocouple J, K, L D terminal is shielding
- ▶ From IS-AIN8 hardware version 5.1 can be B terminal grounded to frame



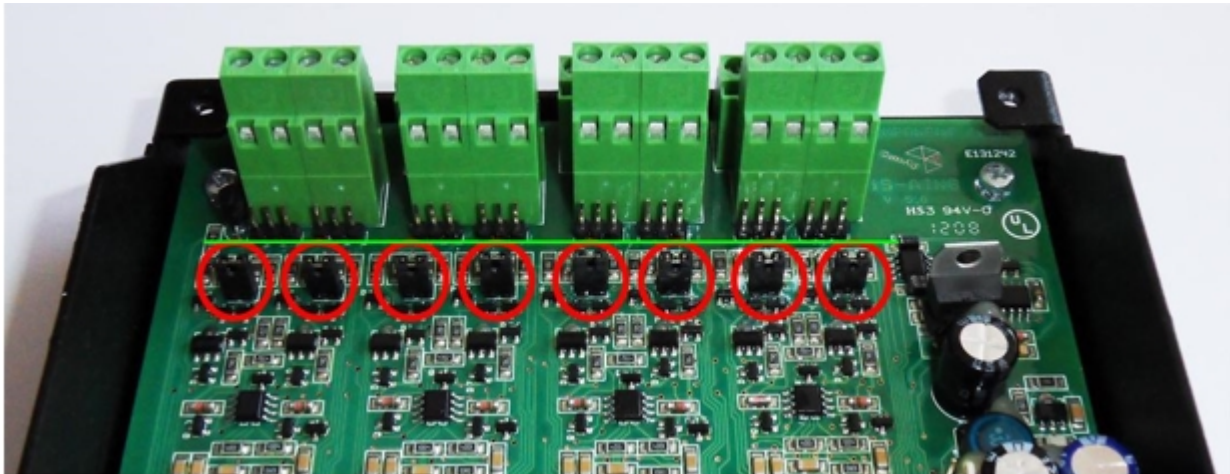
- ▶ Voltage input
- ▶ Range 0 to + 2500 mV.
- ▶ Voltage range is 0 to ±1000 mV.
- ▶ D terminal is shielding







- ▶ For 10 V input voltage range connects external resistors R1, R2 and select sensor characteristic 10 V
- ▶ R1=10 k $\Omega$ , R2=2.7 k $\Omega$ .
- ▶ D terminal is shielding

**Note:** If the thermocouples are connected to IS-AIN8, appropriate jumpers must be removed (see rear sticker). (jumpers are placed under the cover)



Sensor IS-AIN8	None	
	I-CB analog	Value is received from I-CB
	Pt100/°C	 Use  button to create new sensor characteristic.
	Pt1000/°C	
	Ni100/°C	
	Ni1000/°C	
	Thermocouple J/°C	
	Thermocouple K/°C	
	Thermocouple L/°C	Adjust Range = maximal measured value
	4 to 20 mA passive	Adjust Range
	4 to 20 mA active	Adjust Range
	0 to 20 mA passive	Adjust Range
	0 ± 20 mA active	Adjust Range
	0-250 ohm	Adjust Range
	0-2400 ohm	Adjust Range
	0 – 2.4 V	
	±1 V	
	0 - 10 V	
	0 - 100mV	
	Pt100/°F	
	Pt1000/°F	
	Ni100/°F	
	Ni1000/°F	
	Thermocouple J/°F	
	Thermocouple K/°F	
	Thermocouple L/°F	

## Cold Junction Compensation (CJC)

Cold junction compensation is also called reference junction compensation. When measuring temperature using thermocouples, the reference terminal may not be held at 0°C, but at the surrounding temperature of T1°C instead. Without any compensation, the thermocouple output will be changed (reduced) by T1°C. This is compensated by adding potential difference to the IS-AIN8 corresponding to T1°C.

1		✓
2		✓
3		✗
4		✗

- ▶ **Example 1** shows the correct temperature measurement. The 3rd metal (the cable between IS-AIN8 and thermocouple) is connected in cold bath which temperature is 0°C. This is very difficult to provide in real application.
- ▶ **Example 2** shows the correct temperature measurement. The 3rd metal (the cable between IS-AIN8 and thermocouple) is connected in ambient environment which temperature is not 0°C, but T1°C. Resultant temperature is correct, because is compensated by internal IS-AIN8 temperature sensor. The temperature of IS-AIN8 and junction is the same  $T-T_1+T_1$  (reduced and compensated by T1).
- ▶ **Example 3** shows the incorrect temperature measurement. The 3rd metal (the cable between IS-AIN8 and thermocouple) is connected in ambient environment which temperature is not 0°C, but T1°C. Resultant temperature is  $T-T_1$  (reduced by T1). Internal IS-AIN8 compensation should not be used because measures T2 temperature, not T1!
- ▶ **Example 4** shows the correct temperature measurement. The 3rd metal (the cable between IS-AIN8 and thermocouple) is connected in ambient environment which temperature is not 0°C, but T1°C. Resultant temperature is correct, because is compensated by external temperature sensor,  $T+T_1$  (reduced and compensated by T1).

## Cold Junction Compensation (CJC) settings

- ▶ **Example 1** is not a practical in regard of ice bath. In this case should any of not compensated (nc) sensors for analog input be selected base on used thermocouple.

Property	Value
Function	<input type="checkbox"/>
Protection	<input type="checkbox"/>
Name	AIN-1 1
Dim	-
Sensor	None
Resolution	Thermocpl L/°F
Sensor range	Thermo(nc) J/°C
Bargraph 0%	Thermo(nc) K/°C
Bargraph 100%	Thermo(nc) L/°C
Offset	Thermo(nc) J/°F
	Thermo(nc) K/°F
	Thermo(nc) L/°F
	4-20mA passive

- ▶ **Example 2** is a standard wiring between thermocouple sensor and IS-AIN8. IS-AIN8 is placed in the same ambient temperature as thermocouple terminal; it means IS-AIN8's internal temperature sensor measures the same temperature as is on thermocouple terminal. In this case, could junction compensation is done by IS-AIN8 itself. Any of standard (compensated) sensors should be selected.

Function	<input type="checkbox"/>
Protection	<input type="checkbox"/>
Name	AIN-1 1
Dim	-
Sensor	None
Resolution	NH1000/°F
Sensor range	Thermocpl J/°C
Bargraph 0%	Thermocpl K/°C
Bargraph 100%	Thermocpl L/°C
Offset	Thermocpl J/°F
	Thermocpl K/°F
	Thermocpl L/°F
	Thermo(nc) J/°C

- ▶ **Example 3** is a standard wiring between thermocouple sensor and IS-AIN8. Regardless selected type of sensor the resultant temperature will be incorrect
  - Not compensated sensor – temperature T1 is not calculated
  - Compensated sensor – IS-AIN8 measures different T2 temperature, not T1
- ▶ **Example 4** External temperature T1 sensor is included. Resultant temperature is correct if
  - Any of **not compensated sensors** (nc) is selected
  - External sensor **has a function Cold Temp 1**

Property	Value	Logical function	Used
Function	<input checked="" type="checkbox"/>	Cold Temp 1	<input checked="" type="checkbox"/>
Protection	<input type="checkbox"/>	Cold Temp 2	<input type="checkbox"/>
Name	CJC of IS-AIN8	Cold Temp 3	<input type="checkbox"/>
Dim	°C	Cold Temp 4	<input type="checkbox"/>
Sensor	PT100,°C		
Resolution	0,1		
Sensor range	0,0		
Bargraph 0%	0,0		
Bargraph 100%	100,0		
Function	Cold Temp 1		
Offset	0,0		

**Note:** LAI (logical analog input) Cold Temp 1 compensates every of 8 thermocouples inputs of IS-AIN8 on address 1 IS-AIN8 on address 2 – 10 is not compensated by this LAI Cold Temp1.

- ▶ Any of non thermocouple configured input is not compensated anyway
- ▶ Any of non thermocouple input with sensor adjusted as compensated is not compensated by external compensation (IS-AIN8 compensates it itself)
- ▶ IS-AIN8 on address 2 – 10 is not compensated by this LAI Cold Temp1.

LAI Cold Temp 2 compensates every of 8 thermocouples inputs of IS-AIN8 on address 2, etc.

Up to 32 (Cold Temp 1-4 times 8 analog input of IS-AIN8) may be compensated by external sensor.

Even only one external sensor may be configured for more than one LAI Cold Temp.

🔍 back to Extensional modules

## Technical data

Dimension (W × H × D)	146 × 160 × 46 mm (5.79' × 6.6' × 1.83')
Interface to Controller	CAN1
Analog inputs	8, galvanic separated from power supply, 16 bit *
Power supply	8 to 36 V DC
Current consumption	250 mA at 24 V
Protection front panel	IP20
Humidity	95% without condensation
Storage temperature	- 40 °C to + 80 °C
Operating temperature	- 30 °C to + 70 °C
Heat radiation	2 W

\* each analog input can be software configured to:

		Measuring range		Accuracy
		From	To	
Resistance		0 Ω	2400 Ω	± 0.5 %
		0 Ω	250 Ω	± 1.0 %
Current	Passive	0/4 mA	20 mA	± 0.5 %
	Active	4 mA	20 mA	± 0.5 %
	Active	0 mA	± 20 mA	± 0.5 %
Voltage	Thermocouples J, K, L type			± 0.2 %
		0 mV	100 mV	± 0.2 %
		- 1000 mV	+ 1000 mV	± 0.5 %
		0 mA	2500 mV	± 0.5 %

### Standard conformity

**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

⬅ back to Extensional modules

## 8.2.7 IS-AIN8TC



IM-NT



IG-NT/IS-NT



ID



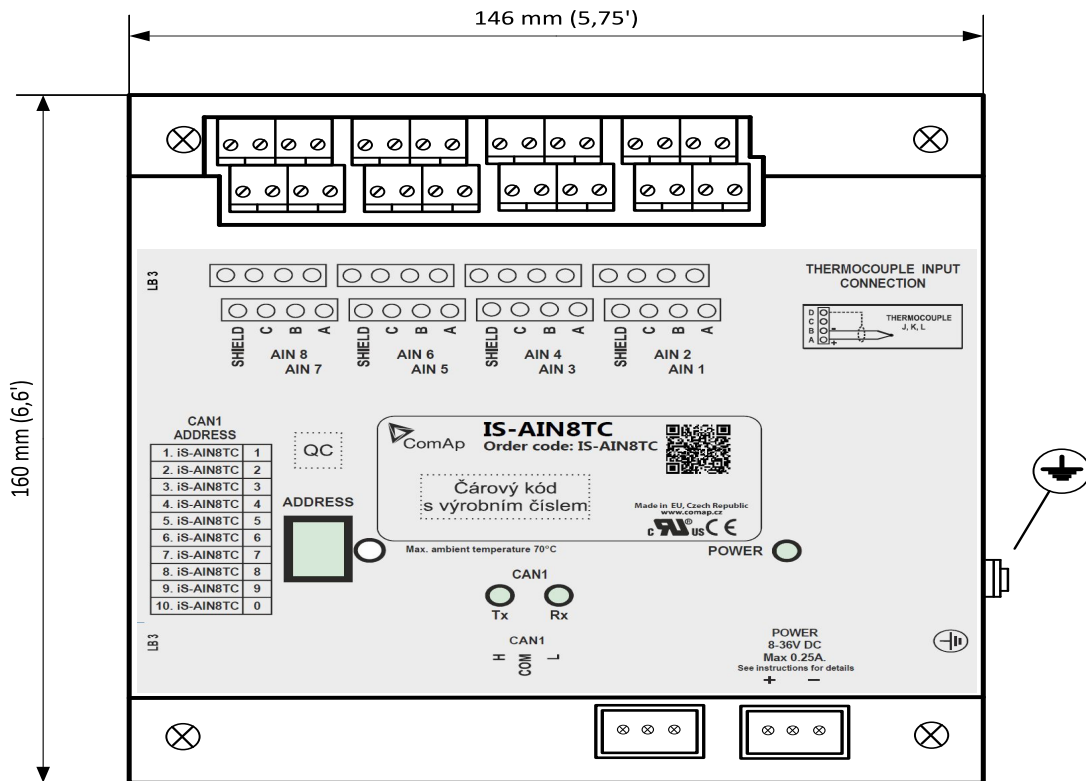
### Description

IS-AIN8 is input extension module equipped with 8 analog inputs dedicated for thermocouple sensors only. The module can be used for ID, IGS-NT controller. IS-AIN8TC can be configured to:

► Thermocouple input

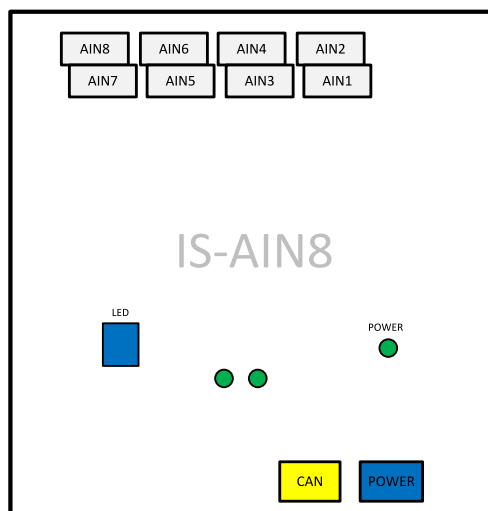
All inputs can be configured to any logical function or protection. It is possible to connect up to 10 IS-AIN8TC (with IGS-NT) or up to 4 (with ID) external units to one controller. IS-AIN8TC is connected to controller CAN1 bus.

## Dimensions



Unit is 35 mm DIN rail mounted.

## Connectors



AIN1 – AIN8	8 analog inputs
CAN	CAN1 line
POWER	Power supply
POWER	State indication
Rx, Tx	Data transmitted and received on CAN1 line
LDD	CAN1 address

## Address and jumper settings

CAN1 address is set by following procedure:

1. Press Address button during IS-AIN8TC power supply on to switch to addressing mode.
2. Then repeatedly press or keep pressed address button to adjust required address according to controller configuration.
3. After setting requested address, release the buttons and wait until the digits blink – it indicates writing of the change address to EEPROM memory.

	CAN11 Address
1. IS-AIN8TC	1
2. IS-AIN8TC	2
3. IS-AIN8TC	3
4. IS-AIN8TC	4
5. IS-AIN8TC	5
6. IS-AIN8TC	6
7. IS-AIN8TC	7
8. IS-AIN8TC	8
9. IS-AIN8TC	9
10. IS-AIN8TC	0

Table 8.9 Table of recommended CAN1 address setting

## SW version check

Shortly press address button. Following sequence appears on the display: number “1”, one second pause, number “4”, two second pause, number “1”, one second pause, number “4”, two second pause and finally IS-AIN8TC actual address.

Error message (e.g. SD BOUT2) appears on Controller screen when Binary input or output Address x is configured but corresponding unit is not recognized (no message is received from CAN bus). Check IS configuration and corresponding external IS-AIN8TC, IS-BIN8/16 unit address setting.

## LED indication

Power LED		Address LDD	
Lighting	Blink	Lighting	Blink
Power supply and CAN address are with no problems	CAN1 address is adjusted different in IS-AIN8TC and in controller	Displaying current CAN1 address	Displaying current SW version

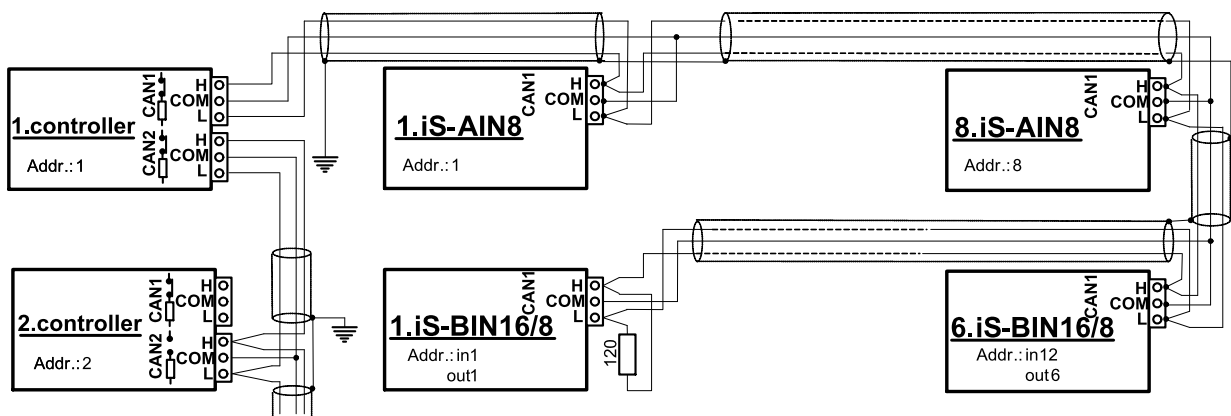


Table 8.10 LED/LDD status

Tx		Rx	
Dark	Blink	Dark	Blink
Any data are transmitted on the CAN1 line	Data are transmitted on the CAN1 line	Any data are received on the CAN1 line	Data are received on the CAN1 line

Table 8.11 Tx/Rx LED status

## Wiring



**Note:** CAN bus line has to be terminated by 120 ohm resistors on the both ends.  
 For longer distances is recommended to connect CAN COM terminals between all controllers and cable shielding to the **ground in one point!**  
 External units can be connected on the CAN bus line in any order, but line arrangement (no tails no star) is necessary.  
 Recommended CAN bus data cables see in Chapter Technical data.  
 IG-MU and IG-IB units are connected to CONTROLLER CAN2 bus.

Select sensor characteristic from the list or define user sensor characteristic in PC configuration tool.

	Thermocouple J, K, L, D terminal is shielding
--	-----------------------------------------------

## Cold Junction Compensation (CJC) settings

Please have a look at **Cold Junction Compensation (CJC)** (page 332) IS-AIN8 chapter.

## Technical data

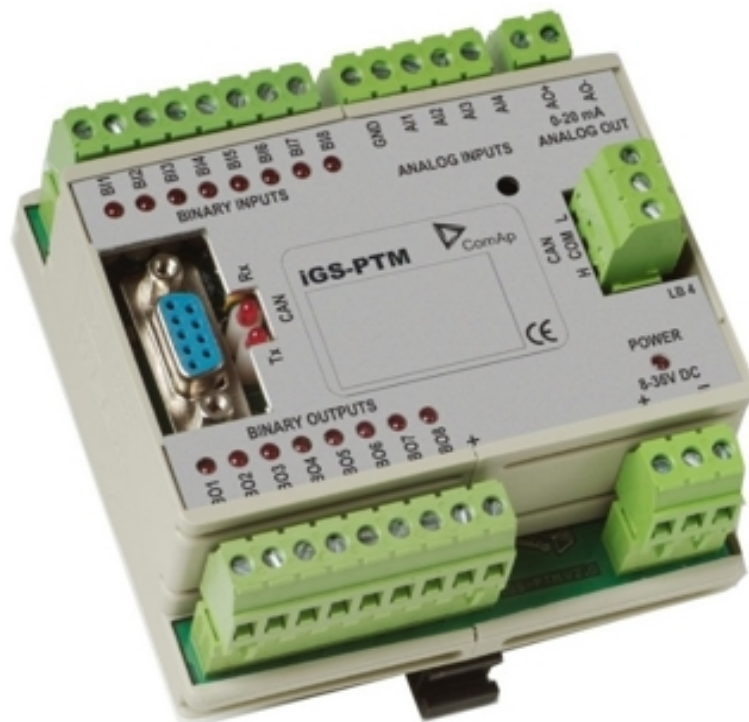
Dimension (W × H × D)	110 × 110 × 46 mm (4.3" × 4.3" × 1.8")
Weight	237.5 grams
Interface to controller	CAN1

Analog inputs (not electric separated)	8, no galvanic separated
Measuring	$\pm 100$ mV
Accuracy	$\pm 0.1$ % of actual value + $\pm 100$ $\mu$ V ( $\pm 3$ $^{\circ}$ C)
Internal sensor for measuring cold junction - Accuracy	$\pm 1$ $^{\circ}$ C in temperature range $-20$ $^{\circ}$ C $\div$ $+70$ $^{\circ}$ C
Galvanic separation	CANbus is galvanic separated from the measurement and power supply. All analog inputs are galvanic separated from power supply. Analog inputs are not galvanic separated between channels

Power supply	8 to 36 V DC
Protection	IP20
Current consumption	35 mA at 24 V $\div$ 100 mA at 8 V
Storage temperature	$-40$ $^{\circ}$ C to $+80$ $^{\circ}$ C
Operating temperature	$-30$ $^{\circ}$ C to $+70$ $^{\circ}$ C
Heat radiation	2 W

[back to Modules](#)

## 8.2.8 IGS-PTM



### Description

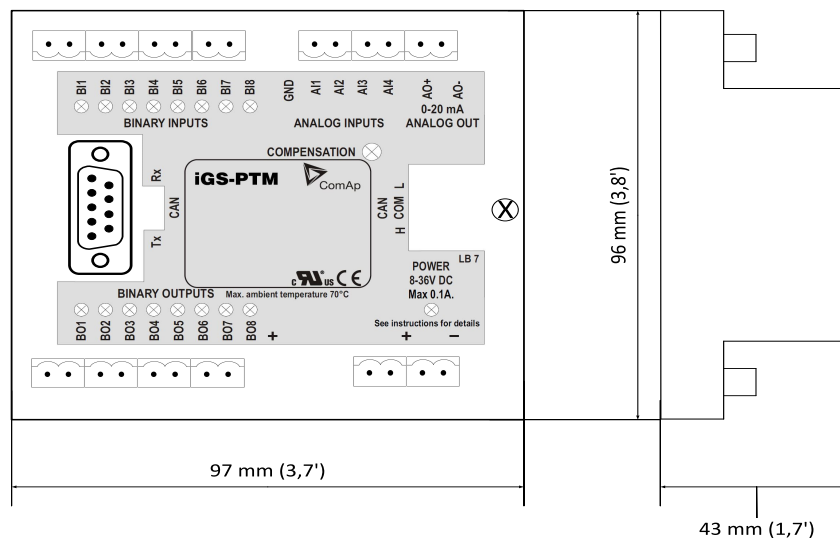
IGS-PTM is modification of standard IG-IOM module with four analog inputs, which can be configured for range:

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

This module is compatible with MTU ECU-7 at communication speed 125 kbps when uploaded with firmware 11.0.0 and higher.

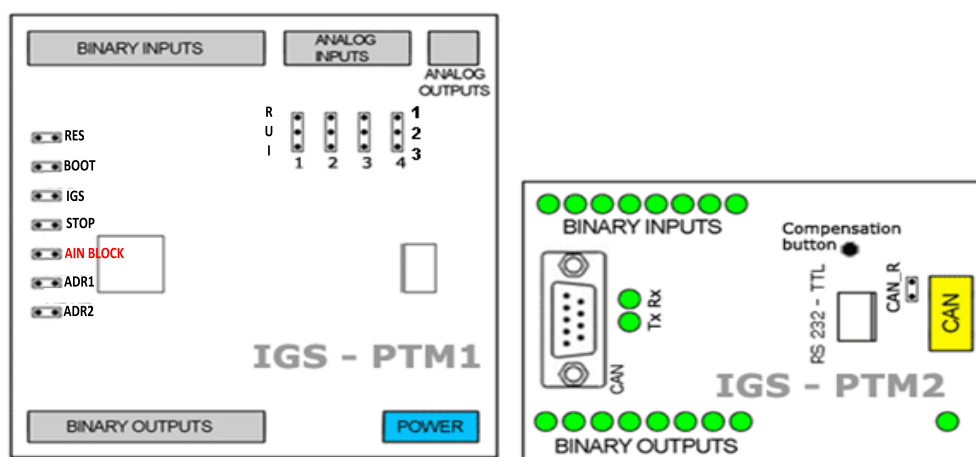
The detection of communication speed is indicated by fast flashing of status LED. Once the speed is detected the module remains set for the speed even when the communication is lost. Renewal of communication speed detection is done by reset of the module.

## Dimensions



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

## Terminals



BINARY INPUTS	8 binary input
ANALOG INPUTS	4 analog input
ANALOG OUTPUT	1 analog output

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

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

## Address and jumpers setting

### Controller type selection

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

IGS jumper	Controller type
OPEN	IL-NT, IC-NT, ID (FLX)
CLOSE	IG-NT, IS-NT, IM-NT, ID-DCU, ID-Mobile, IL

Table 8.12 IGS jumper description

### Address configuration

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

ADR1	ADR2	BIN module	BOUT module	AOUT module	AIN module
Open	Open	1	1	1	1
Close	Open	2	2	2	2
Open	Close	3	3	3	3
Close	Close	4	4	4	4

Table 8.13 CAN address settings

## Analog inputs hardware configuration

Analog inputs can be configured for:

- ▶ Resistance measurement
- ▶ Current measurement
- ▶ Voltage measurement

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

RUI	Analog input configuration
1 - 2	Resistance measuring
2 - 3	Current measuring
NO jumper	Voltage measuring

Table 8.14 Analog input settings

## Programming firmware

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

## LED indication

### Binary inputs

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

### Binary output

Binary output LED shining when binary output is set.

## Power

LED status	Description
Dark	No required power connected
One flash and pause	Compensation fail
Three flashes and pause	Compensation successful
Flashing	there is no communication between IGS-PTM and the controller.
Fast flashing	Detection of CAN communication speed
Lights	Power supply is in the range and communication between IGS-PTM and controller properly works.

## Wiring

### Analog inputs connection

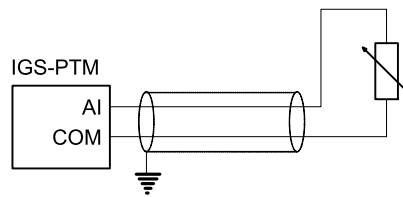


Image 8.5 Two wire resistor sensor

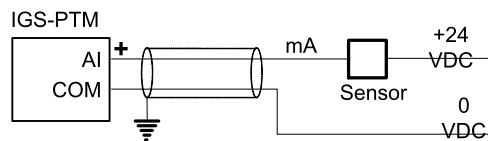


Image 8.6 Two wire current sensor.

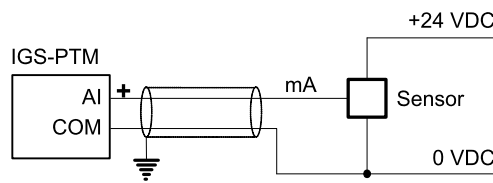


Image 8.7 Three wire current sensor.

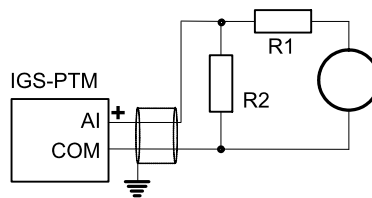


Image 8.8 Extension of voltage measuring range.

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

### Long wires resistance compensation

Process of compensation:

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

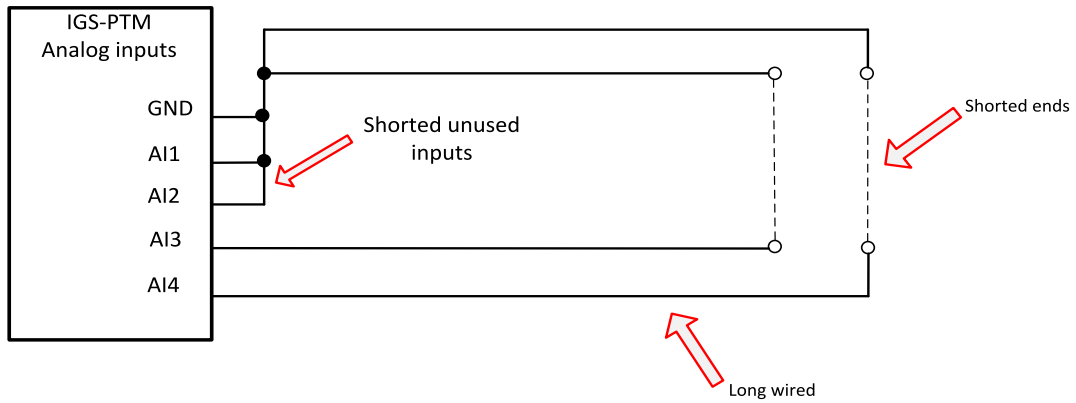


Image 8.9 Long wires resistance compensation

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

Analog inputs connection

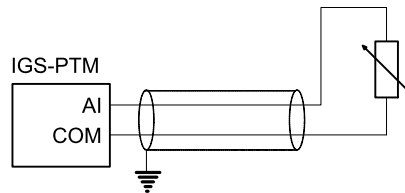


Image 8.10 Two wire resistor sensor

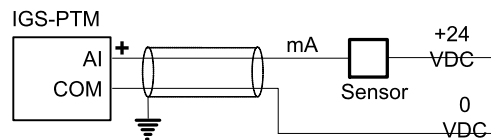


Image 8.11 Two wire current sensor.

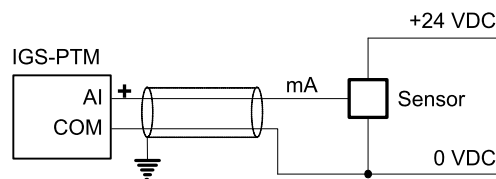


Image 8.12 Three wire current sensor.

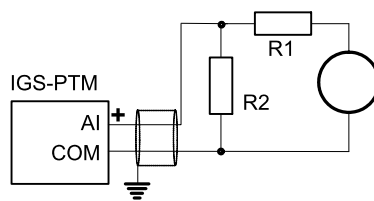


Image 8.13 Extension of voltage measuring range.

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

## Technical data

<b>Dimension (W × H × D)</b>	95 × 96 × 43 mm (3.7' × 3.8' × 1.7')
<b>Interface to controller</b>	CAN1

Binary inputs	
<b>Input resistance</b>	4700 Ω
<b>Input range</b>	0 to 36V DC
<b>Type</b>	Pull Up
<b>Switching voltage level for open contact indication</b>	0 to 2 V
<b>Max voltage level for open contact indication</b>	8 to 36 V

Binary output (Open collector output)	
<b>Type</b>	Low side switch (LSS)
<b>Max current</b>	500 mA
<b>Max switching voltage</b>	36V DC

Analog inputs (Not electric separated)	
<b>Resolution</b>	10 bits
<b>Sensor resistance range</b>	0 to 250 Ω
<b>Maximal voltage range</b>	0 to 100 mV
<b>Maximal current range</b>	0 to 20 mA
<b>Resistance measurement tolerance</b>	1 % ± 2 Ω out of measured value
<b>Voltage measurement tolerance</b>	1.5 % ± 1 mV out of measured value
<b>Current measurement tolerance</b>	2.5 % ± 0.5 Ω out of measured value
<b>Input impedance for measuring current</b>	3.9 Ω
<b>Input impedance for measuring voltage</b>	100 kΩ

Analog output (not electric separated)	
<b>Output current</b>	0 to 20 mA ± 0.33 mA
<b>Resolution</b>	10 bit

<b>Power supply</b>	8 to 36 V DC
<b>Protection</b>	IP20
<b>Current consumption</b>	100 mA at 24V ÷ 500 mA
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 80 °C
<b>Heat radiation</b>	8 W

[↶ back to Extensional modules](#)



## 8.2.9 InternetBridge-NT

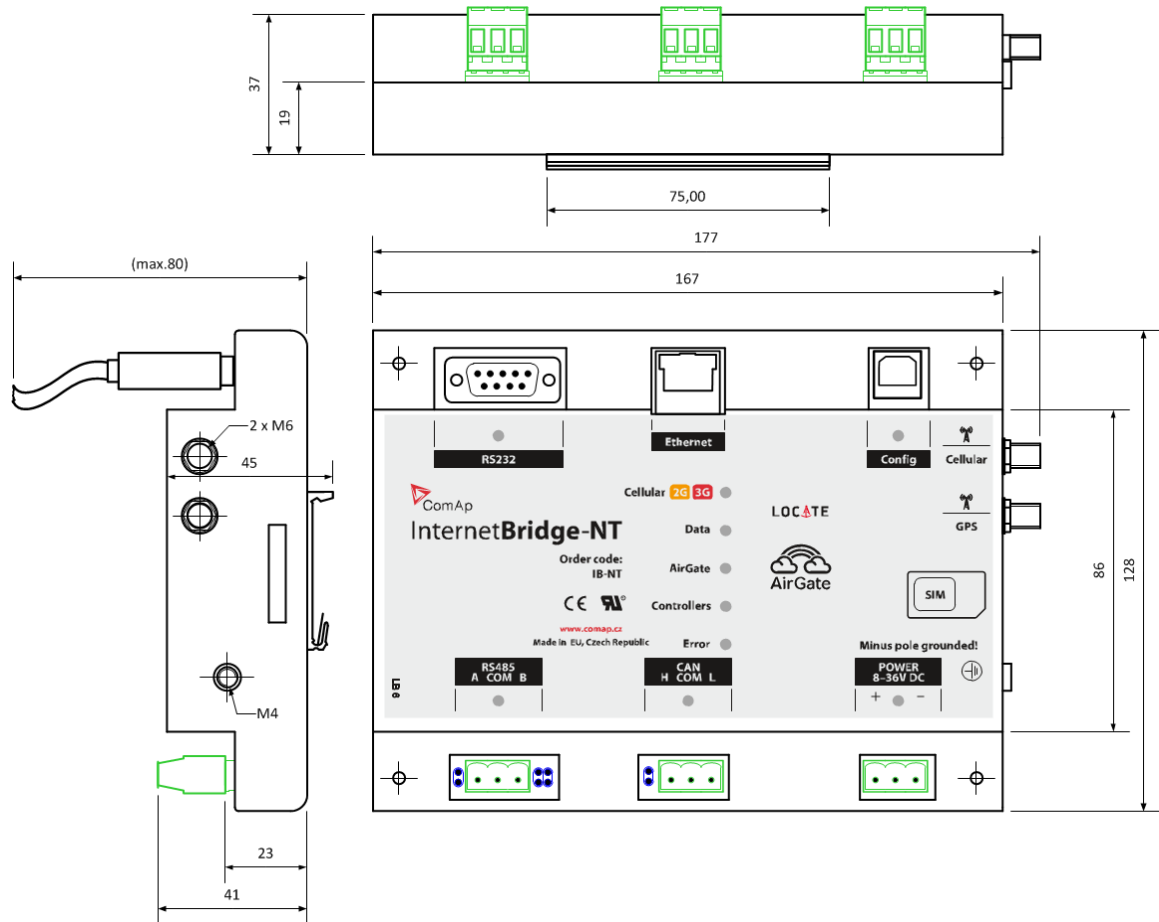


Image 8.14 Dimensions of IB-NT

For more information about IB-NT, please see [InternetBridge-NT Global Guide](#)

**Note:** Connect ID DCU HW 2.0 and newer + ID-COM with RS485 connected to IB-NT over RS485 works fine. But: only one couple of balancing resistors has to be added on the whole RS485 line, and setpoint in ID-DCU CommSet called RS485 TermCSpd (page 121) has to be set to 57600 bps.

## 8.2.10 I-CB Communication bridge

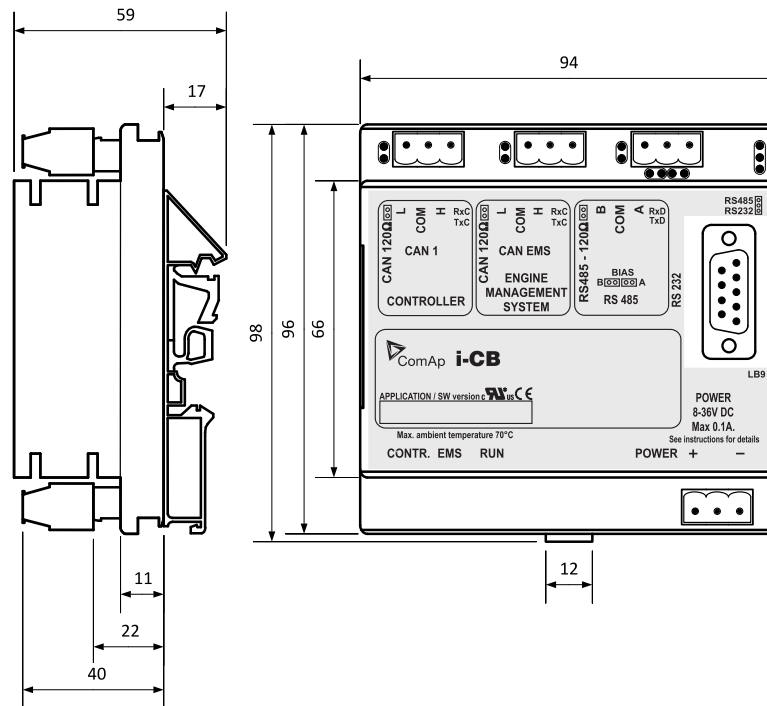


Image 8.15 Dimensions of I-CB

All dimensions are in mm.

I-CB unit can be mounted on DIN rail (35 mm).

I-CB (Communication bridge) is CAN bus interface between Controller and Engine Control Unit (ECU) that has not standard J1939 communication (MTU, CAT etc.). Engine values (RPM, Oil pressure and other) are received from ECU via CAN and corresponding sensors are not needed on controller. Use ICBEEdit software for I-CB configuration (included in installation package).

### I-CB wiring and configuration

1. Configure I-CB using I-CBEEdit software. Configured I-CB behaves like fictive IS-AIN and IS-BIN units. I-CB configuration associates selected values (from ECU database) received from Engine Control Unit to selected CAN addressees (fictive IS-AIN, IS-BIN inputs and outputs).
2. Configure corresponding controller CAN addresses and tick in PC configuration tool.
3. Configure separate inputs and outputs in corresponding Analog, Binary inputs, outputs in PC configuration tool.

## 8.2.11 I-AOUT8



### Description

I-AOUT8 is an extension unit with 8 analog outputs. Each analog output can be switched to

- ▶ 0 to 20 mA DC
- ▶ 0 to 10 V DC
- ▶ PWM (Pulse With Modulation on 1,2 kHz)

I-AOUT8 module is connected on IGS-NT or ID CAN1 (peripheral) bus. The corresponding module Address 1 to 4 (default 1) must be set on module (by ADR.1 and ADR.2 jumpers) and in controller configuration. Communication fail is indicated in controller Alarm list and by binary output. Use GenConfig PC tool for controller configuration.

It is possible to connect up to four I-AOUT8 units to one controller. CAN1 terminating 120 ohm resistor jumper is connected as default. AGND terminals are on the same potential.

### General Description

I-AOUT8 is an extension unit with 8 Analog outputs. Each analog output can be switched by jumper for.

- ▶ 0 to 20 mA
- ▶ 0 to 10 VDC
- ▶ PWM (Pulse With Modulation on 1,2 kHz)

I-AOUT8 modules is connected on CAN 1 (peripheral) bus. The corresponding module Address 1 to 4 (default 1) must be set on module (by ADR.1 and ADR.2 jumpers) and in controller configuration. Communication fail is indicated in controller Alarm list and by binary output. Use GenConfig PC tool for controller configuration.

It is possible to connect up to four I-AOUT8 units to one controller.

I-AOUT8 unit can be mounted on DIN rail (35 mm).

CAN 1 terminating 120  $\Omega$  resistor jumper is connected in default. AGND terminals are on the same potential.

Number of analog outputs	8, no galvanic separation	
Type of analog outputs (jumper selectable)	U	0 to 10VDC $\pm$ 1% , max 5 mA
	I	0 to 20 mA $\pm$ 1% , max 500 $\Omega$
	p	pwm 1200 Hz, 5V level, max 10 mA
Power supply	8 to 36 VDC	
Current consumption	100 $\div$ 300 mA at 24 VDC	
Communication interface	CAN1, with jumper selectable address 1 to 4 Jumper selectable terminating resistor 120 $\Omega$	
RS232 interface	TTL, firmware upgrade via AT-link.	
Operating temperature range	-40°C to +70°C	
Analog outputs refreshment	Max. 300 ms	

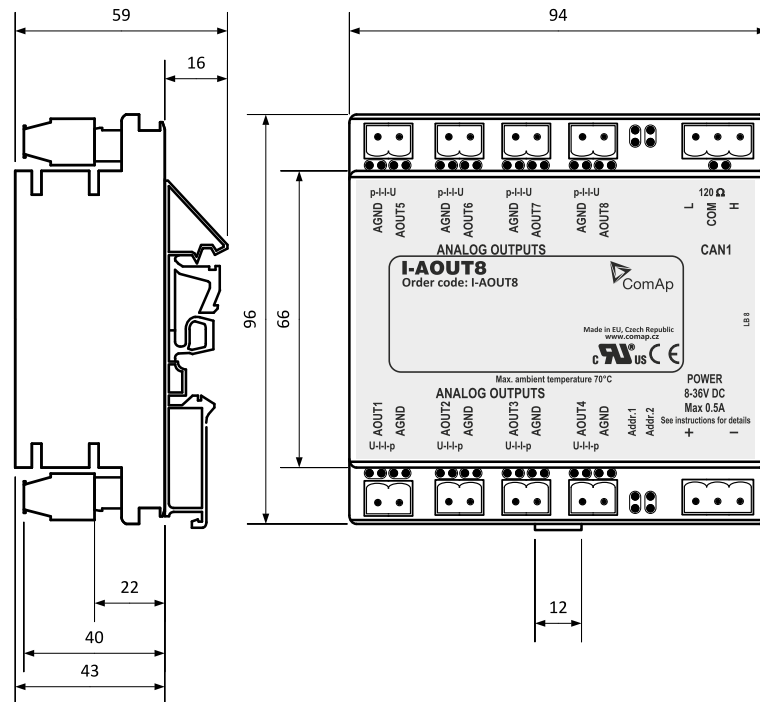
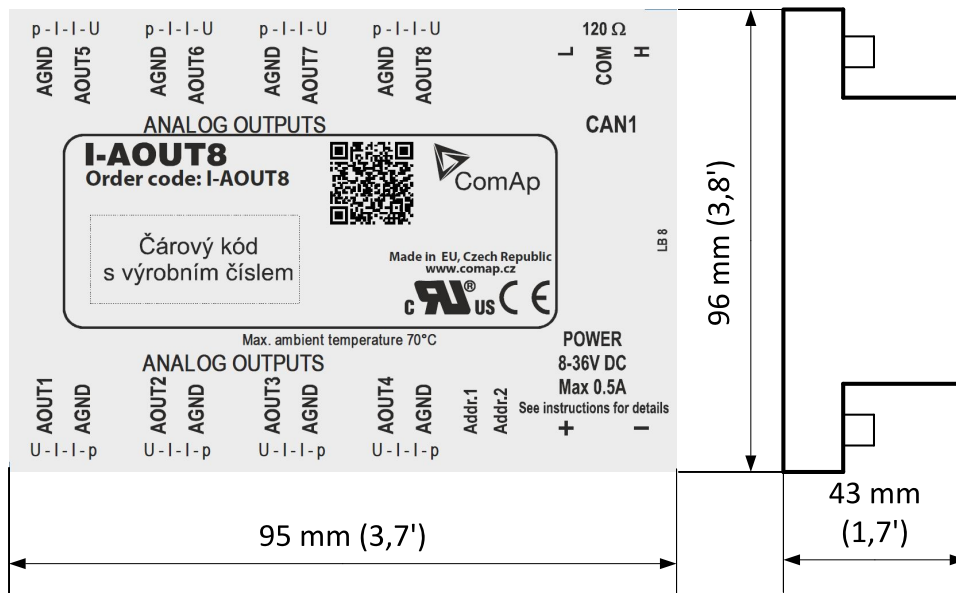


Image 8.16 Dimensions of I-AOUT8

All dimensions are in mm.

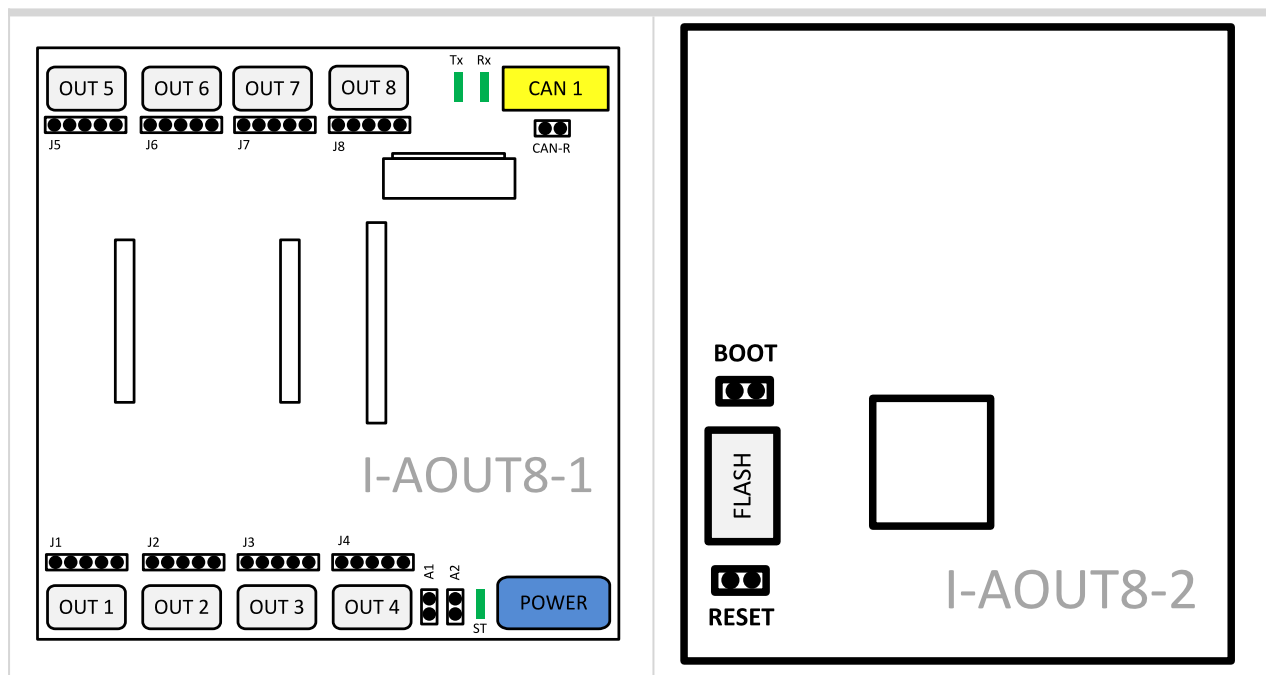
I-AOUT8 unit can be mounted on DIN rail (35 mm).

## Dimensions



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

## Connectors



POWER	Power supply
CAN 1	CAN1 line
OUT1 - OUT8	Analog output
FLASH	AT-link
J1 – J8	Output mode
A1, A2	CAN 1 address
CAN-R	Terminating resistor

BOOT	Programming
RESET	Programming / reset
Tx, Rx	CAN 1data
ST	Power/module state

## Address and jumpers setting

### CAN Address

The module CAN address is set by jumpers A1 and A2. Set module CAN address correspondingly to configuration according table below.

CAN Address	A1	A2
1	Open	Open
2	Close	Open
3	Open	Close
4	Close	Close

Table 8.15 Setting CAN address

### Output mode

Follow the p – I – U symbols on the module sticker. There are two equivalent positions for current output.




AOUT	Symbol	Function
	p	PWM Pulse-Width-Modulation
	I	0 to 20 mA DC
	U	0 to 10 V DC

Table 8.16 Setting output mode

### Programming firmware

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

### CAN1 termination

I-AOUT8 has own CAN terminating resistor (120 ohm). Close jumper CAN-R to connect terminating resistor to CAN bus, open jumper CAN-R disconnecting terminating resistor.

## Wiring

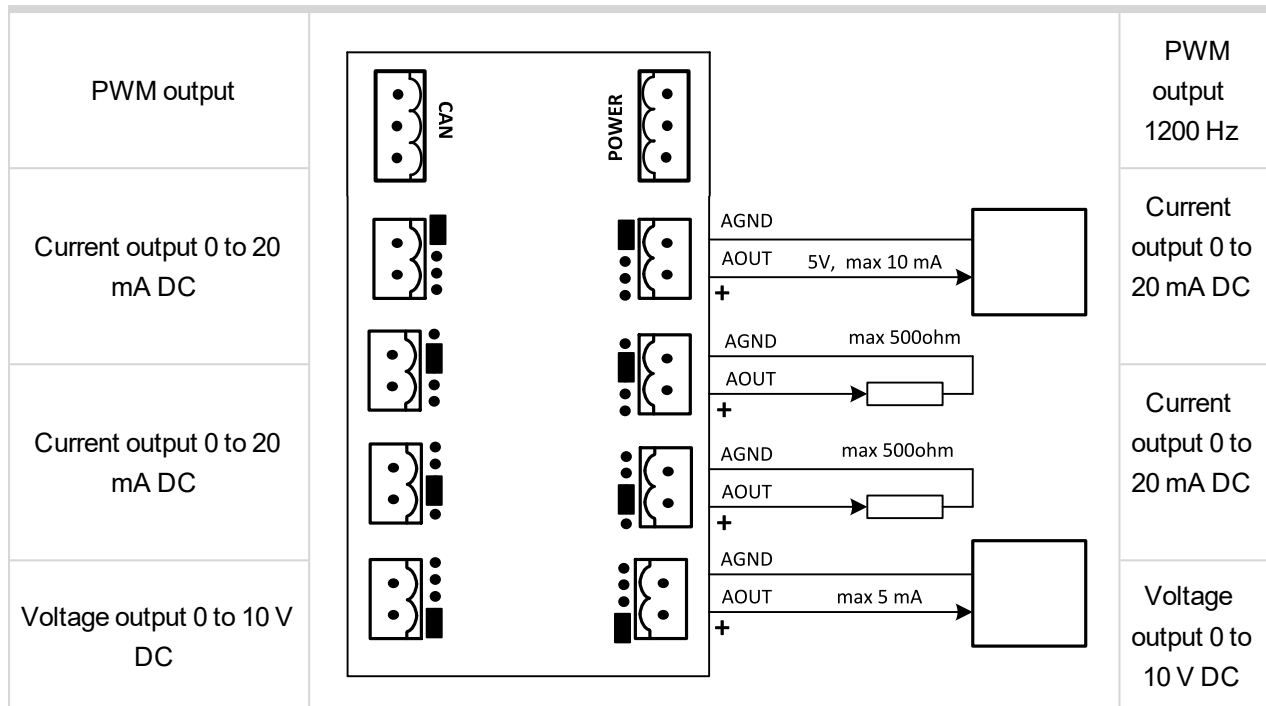


Image 8.17 Possible output modes

## Technical data

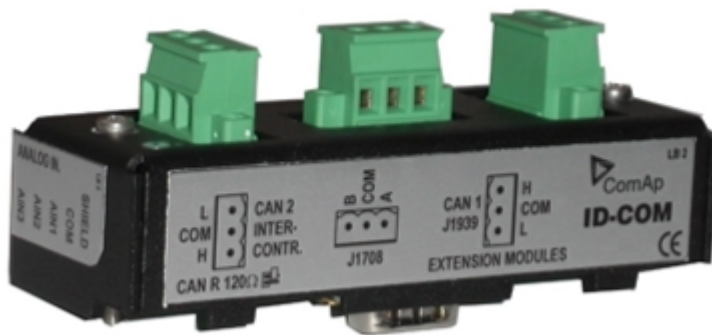
<b>Dimension (W × H × D)</b>	95 × 96 × 43 mm (3.7' × 3.8' × 1.7')
<b>Interface to controller</b>	CAN
<b>Output</b>	8 analog, no galvanic separation

<b>Type of analog output</b>	
0 to 10V DC ± 1 % , max 5 mA DC	
0 to 20 mA DC ± 1 % , max 500 Ω	
PWM 1200 Hz, 5V DC level, max 10 mA DC	

<b>Power supply</b>	8 to 36 V DC
<b>Analog output refreshment</b>	320 ms
<b>Current consumption</b>	max 300 mA (100 mA at 24 V)
<b>RS232 interface</b>	TTL, firmware upgrade via AT-link.
<b>Storage temperature</b>	- 40 °C to + 80 °C
<b>Operating temperature</b>	- 30 °C to + 70 °C
<b>Heat radiation</b>	2.5 W

[🔍 back to Extensional modules](#)

## 8.2.12 ID-COM



ID



### Description

InteliDrive Communication interface for proprietary and/or remote communication. The CAN1 line is used for J1939 (ECU) bus connection or extension modules. The CAN2 line is used for inter-controller communication and remote displays. There are 2 variants of the ID-COM module that differ in the interface in the middle of the module. The standard version includes the RS485 interface for Modbus connection or remote display connection. The special variant then offers the J1708/J1587 for a redundant communication link, especially in conjunction with Volvo Penta engines. ID-COM is mounted directly to ID-DCU box. Heat radiation of this module is 2 W.

### Dimensions

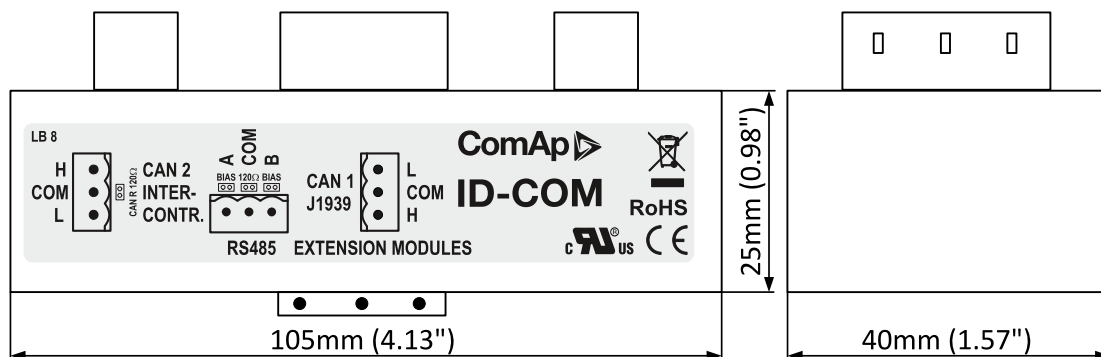


Image 8.18 Dimensions of ID-COM

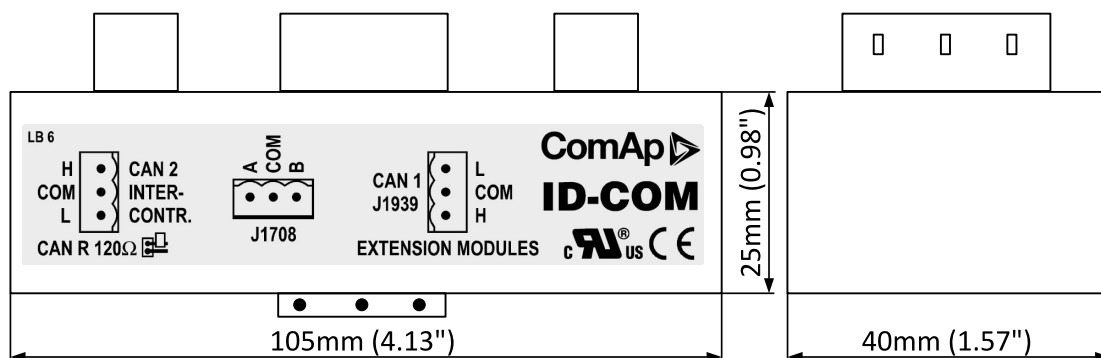
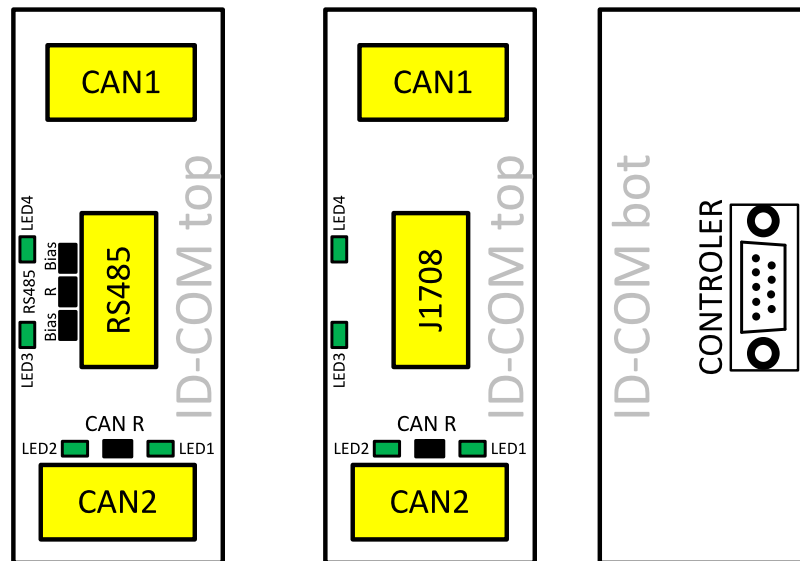


Image 8.19 Dimensions of ID-COM J1708



## Connectors



CAN1	CAN1 line
CAN2	CAN2 line
RS485	Serial line RS485
J1708	SAE J1708 line
Controller	Connection to controller
LED1, LED2	Communication on CAN2 (Tx, Rx)
LED3, LED4	Communication on RS485 or J1708 (Rx, Tx)

**Note:** Maximal torque to tight main screw is 0.25 Nm.

## Address and jumper settings

### CAN1 termination

CAN1 has its own terminating resistor (120 ohm) directly on controllers board (PCB). Close jumper CAN R connecting terminating resistor to CAN bus, open jumper CAN R disconnecting terminating resistor.

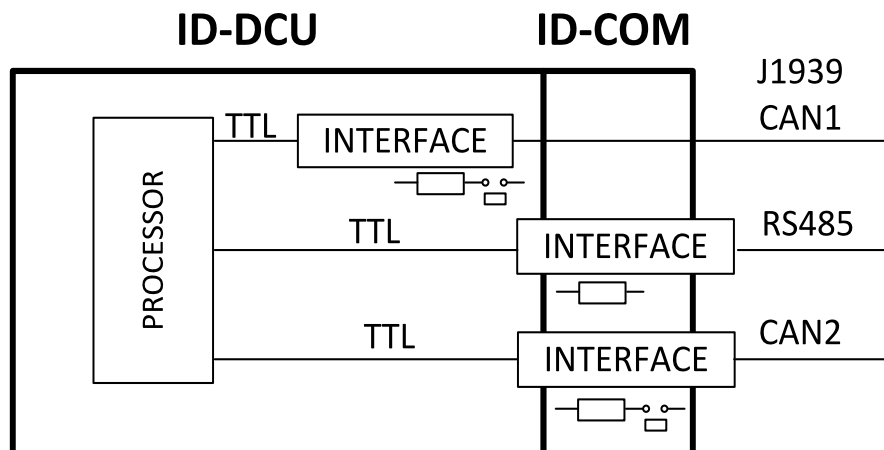
### RS485 termination

When point-to-point is connected (eg with display), keep both Bias and termination resistors closed - default jumper settings.

## LED indication

LED	Description
LED1, LED2	Blink when data are transmitted / received on the CAN2 line
LED3, LED4	Blink when data are transmitted / received on the RS485 or J1708 line

## Wiring



[back to Extensional modules](#)

## Technical data

<b>Dimension (W × H × D)</b>	105 × 40 × 25 mm (4.13' × 1.57' × 0.98')
<b>Interface to controller</b>	Sudect mounted (ID-COM family port)

<b>Binary inputs and outputs</b>	-
<b>Analog input and outputs</b>	-
<b>Nominal power supply</b>	Directly from ID-DCU consumption
<b>Power supply range</b>	
<b>Current consumption</b>	0.1A
<b>Operating temperature</b>	-30 °C to +70 °C

[back to Extensional modules](#)

## 8.2.13 Theory of binary inputs and outputs

[back to Extensional modules](#)

### Binary inputs

#### Pull Up

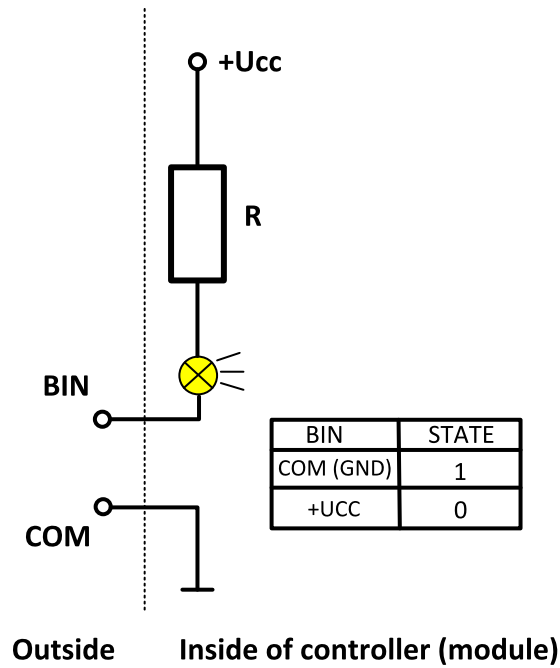
Principle of internal connection is showed on picture below.

The bulb presents internal state of binary input.

In case of connection terminal "BIN" with terminal "COM" (GND) then the internal state is logical 1.

In case of connection +Ucc polarity to the "BIN" terminal is internal state logical 0.

### Binary input : Pull Up



### Pull Down

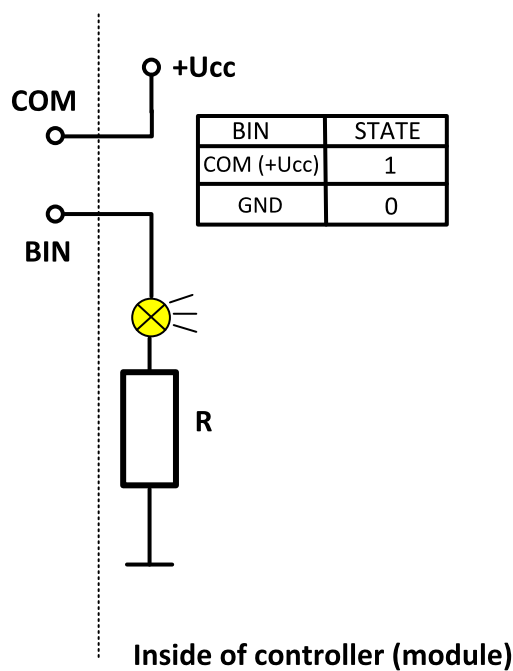
Principle of internal connection is showed on picture below.

The bulb presents internal state of binary input.

In case of connection terminal "BIN" with terminal "COM" (+Ucc) then the internal state is logical 1.

In case of connection GND to the "BIN" terminal is internal state logical 0.

### Binary input : Pull Down



[back to Theory of binary inputs and outputs](#)

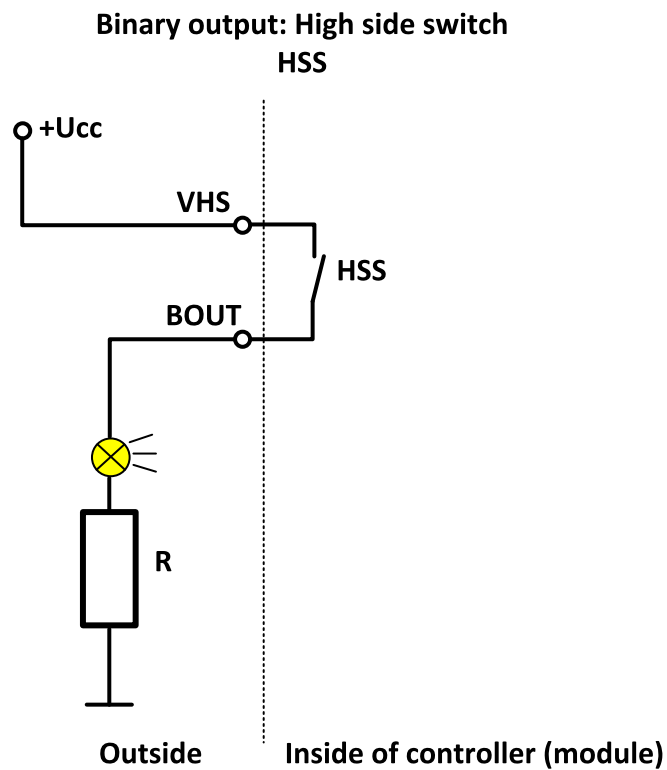
## Binary outputs

### High side switch - HSS

Principle of internal connection is showed on picture below.

High side switch connection is for case, where load is permanently connected to the ground (GND).

By activating of Binary output (Bout=1) is closed switch which causes connection of load to the VHS (Voltage High side) and +Ucc.



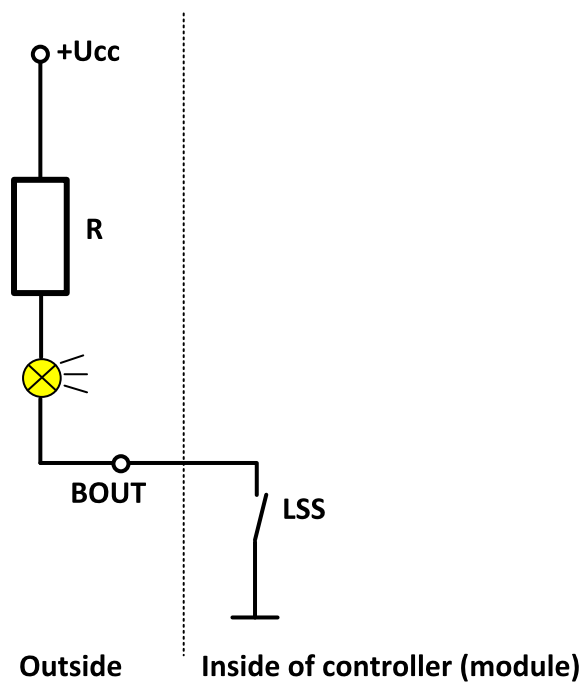
### Low side switch - LSS

Principle of internal connection is showed on picture below.

Low side switch connection is for case, where load is permanently connected to the voltage (+Ucc).

By activating of Binary output (Bout=1) is closed switch which causes connection of load to the ground (GND).

Binary output: Low side switch  
LSS



[back to Theory of binary inputs and outputs](#)