USER GUIDE

Compact Controller for
Single Operating Gen-sets

InteliLite®
Modular Controller

iL-MRS 15
DCU Diesel Control Unit
for engine driven pump or fan

Software version 1.0, October 2002

Prague, Czech Republic

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General guidelines

What describes this manual?

This manual describes „IL-DCU“ software, which is designed for single engine driven applications like pump or fan (no generator).
IL-DCU software is based on standard InteliLite MRS 15 application, where all electric generator setpoints, inputs, outputs, protections and measuring are removed.

What is the purpose of the manual?
This manual provides general information how to install and operate InteliLite DCU controller.
This manual is dedicated for

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

!! Warnings !!

Remote control

InteliLite controller can be remotely controlled. In case of the work on the engine-set check, that nobody can remotely start the engine.
To be sure:

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

or

- Disconnect output STARTER

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

Text

PAGE	(Capital letters in the frame) buttons on the front panel
Break Return	(Italic) set points
Generator protections	(Bold) Set point group
REMOTE START/STOP	(Capital letters) binary inputs and outputs

Note:
ComAp believes that all information provided herein is correct and reliable and reserves the right to update at any time. ComAp does not assume any responsibility for its use unless otherwise expressly undertaken.

!!! CAUTION !!!

Adjust set points

All parameters are preadjusted to their typical values. But the set points in the "**Basic settings**" settings group **!!must!!** be adjusted before the first startup of the gen-set.

!!! WRONG ADJUSTMENT OF BASIC PARAMETERS CAN DESTROY THE GEN-SET !!!

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

General description

Description of the controller system (with all options)

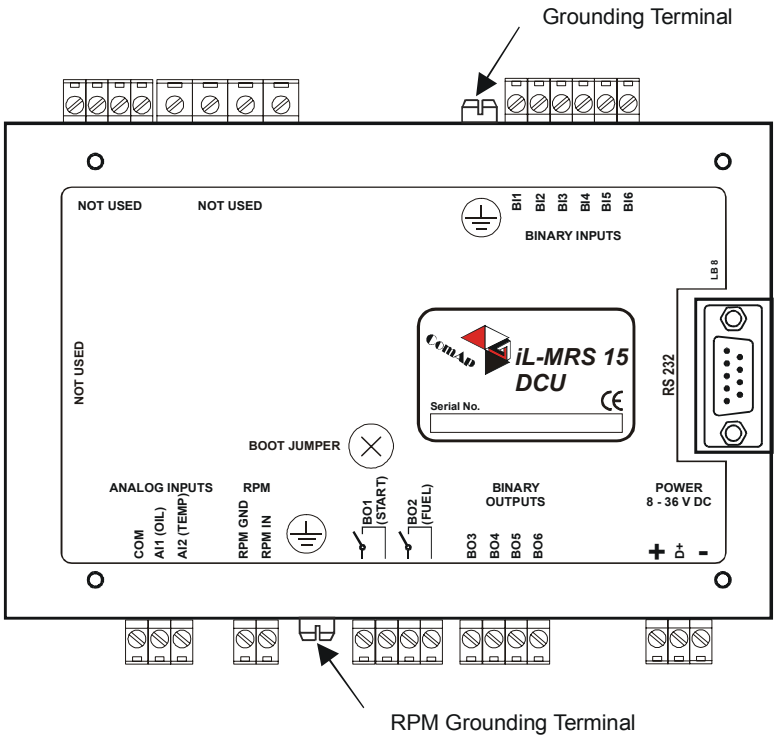
InteliLite iL-DCU is a comprehensive controller for single engine sets.
InteliLite DCU controllers are equipped with a powerful graphic display showing icons, symbols and bar-graphs for intuitive operation, which sets, together with high functionality, new standards in Engine-set controls.
InteliLite DCU automatically starts, stops the engine on external signal or by pressing push buttons.
InteliLite DCU automatically checks engine conditions and protects against out limit operation.
The key feature of InteliLite is its easy-to-use operation and installation. Predefined configurations for typical applications are available as well as user-defined configurations for special applications.

What is in the package?

Accessories	Description	Optional / Obligatory
IL DCU	InteliLite central unit	Obligatory

Terminals and dimensions

IL-DCU Terminals

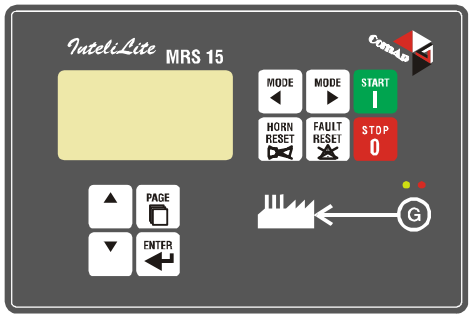


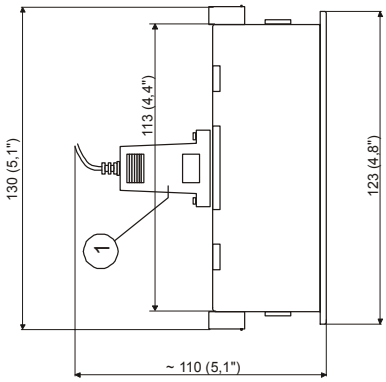
Hint:

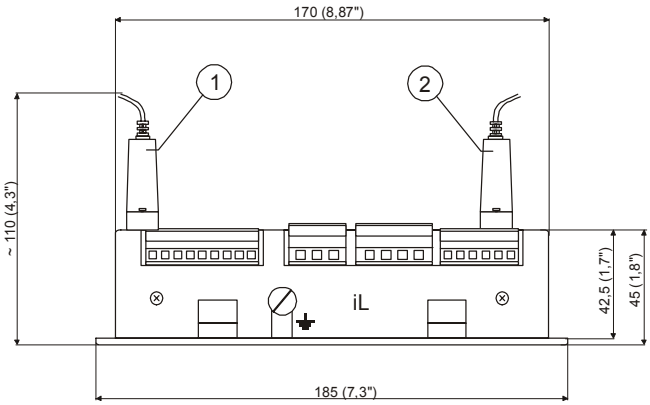
IL-DCU hardware is based on IL-MRS15 controller. There can be small differences in front panel design and back label.

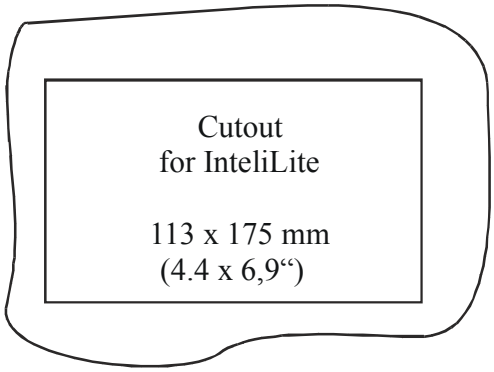
Dimensions

IL-DCU





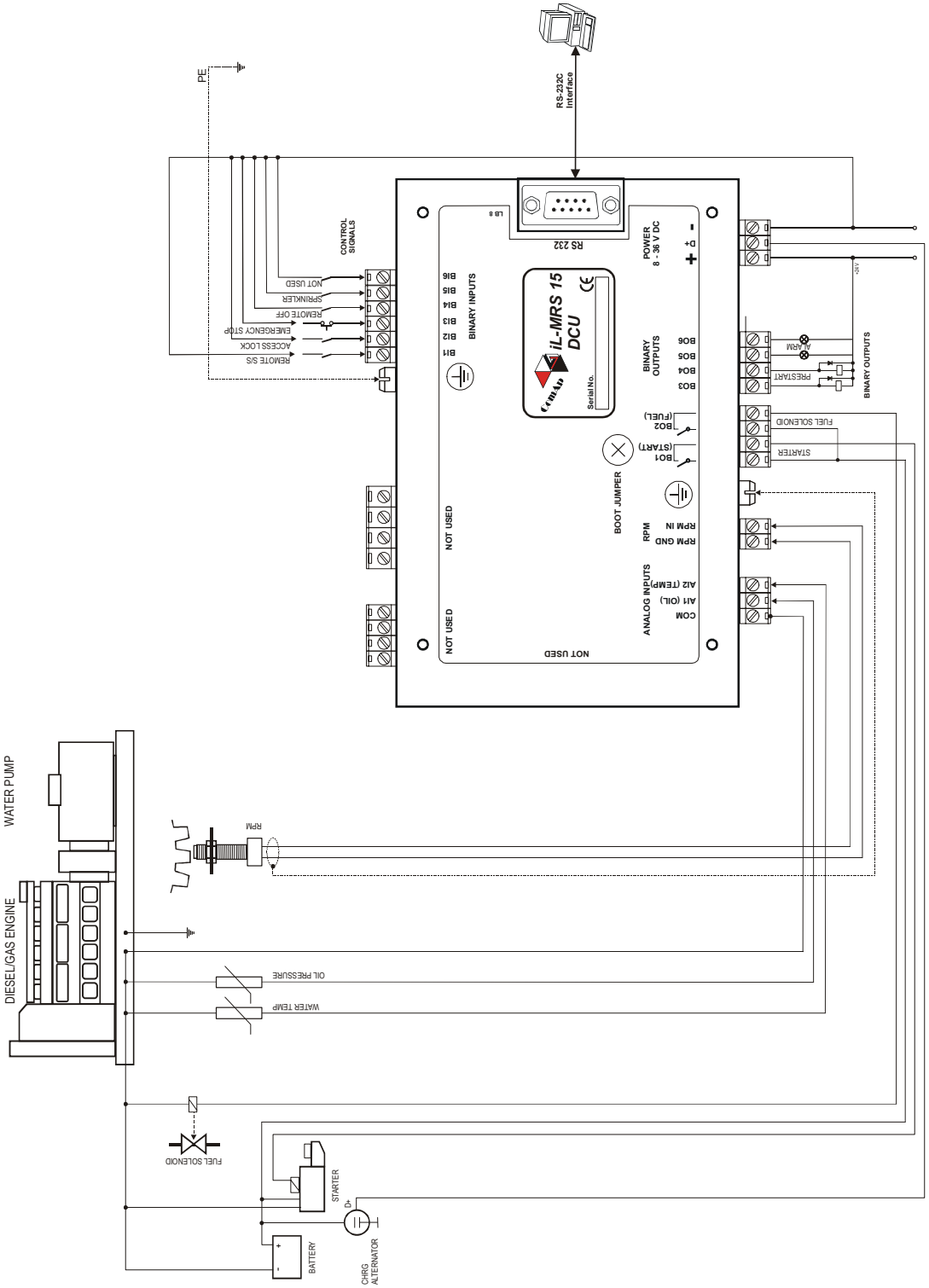




1 RS 232 Cable

Recommended wiring

IL–DCU Wiring Diagram



Getting started

How to install

General

To ensure proper function:

Use grounding terminals.
Cables for binary inputs and analog inputs must not be placed along power cables.
Analog and binary inputs should use shielded cables, especially when length >3m.

Power supply

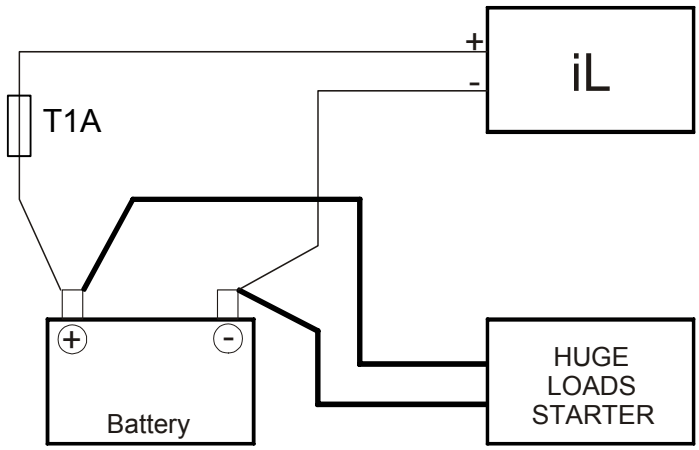
To ensure proper function:

Use min. power supply cable 1,5mm^2

Hint:

Max current of power “minus” terminal is 4A and it depends on binary outputs load.

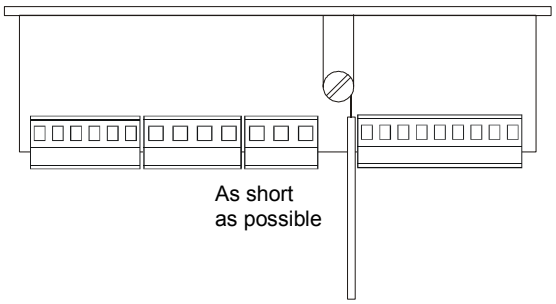
For 12VDC power supply, connect external capacitor and separating diode to support controller supplying during cranking.



Grounding

To ensure proper function:

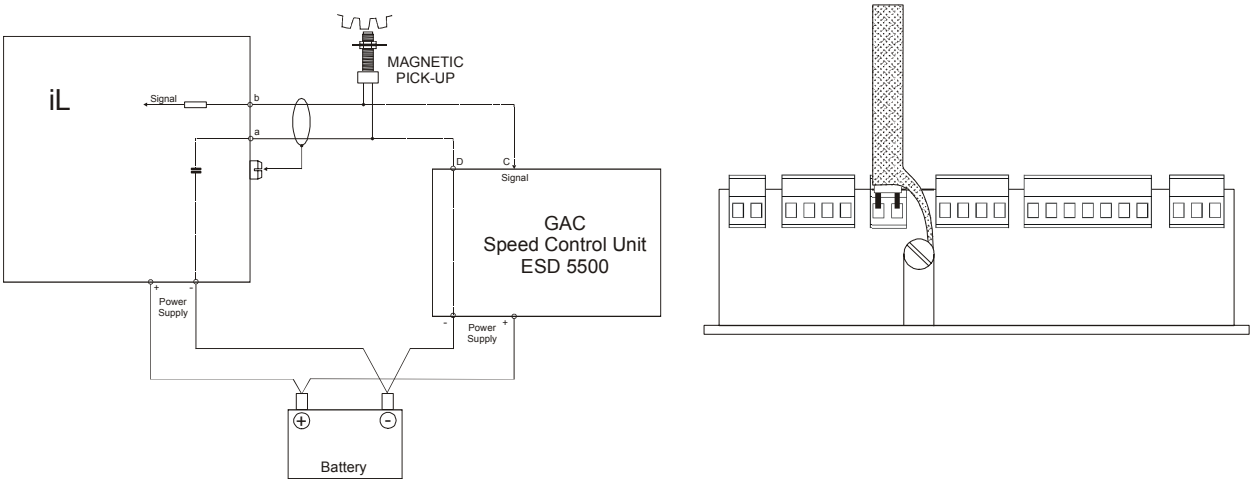
Use as short as possible cable to the grounding point on the switchboard
Use cable min. 2,5mm^2
The “-“ terminal of the battery has to be properly grounded



Magnetic pick-up

To ensure proper function:

Use a shielded cable



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Hint:

Switchboard flash protection according standard regulation is expected !!!

Analog inputs

Two analog inputs Oil Press and Water Temp are available on the IL-CU

Configuration

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

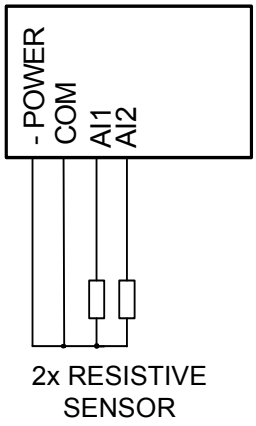
Analog input item	LiteEdit		Possibility
Type	Type	Not used Alarm	Analog input isn't used
Config of input	Config	Analog Binary Tri-state	Analog measuring in specified range. Binary: open/close - threshold 750 Ω. Three-state: open/close - threshold 750 Ω, Failure <10 Ω or > 2400 Ω
Physical dimension	Dim	bar,%,°C, …	Up to 3 ASCII characters (Valid only for analog inputs)
Polarity	Contact type	NC NO	Valid only for binary and three-state inputs Valid only for binary and three-state inputs
Sensor characteristic	Sensor	Curve A Curve B Curve C PT 1000 NI 1000 VDO Temp	User curve A User curve B User curve C IEC 751, range -20 to 120 °C DIN 43760, range -20 to 120 °C See chapter sensor specification

		VDO Press VDO Level 4-20mA/100 4-20mA/ 60	 external R=120 Ω external R=120 Ω
Decimal points	Dec	0, 1, 2	Number of decimal points (Valid only for analog inputs)

User Curve A, B, C are adjustable in LiteEdit.
Each Analog input has separate set points for two level alarm setting. Analog input alarm levels and delay adjust in **Protection** or **Engine protection** group.

Hardware connection

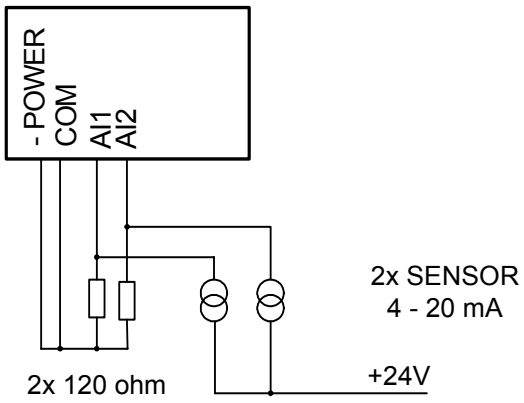
Connection of IL-CU analog inputs



2x RESISTIVE SENSOR

Standard connection of two resistive sensors to analog inputs Oil Press and Water Temp.

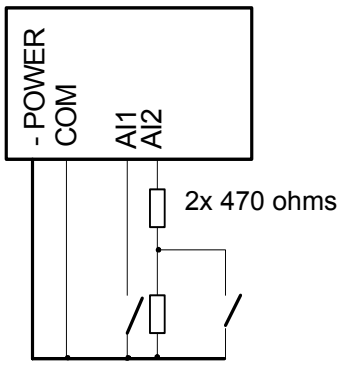
Common point of resistive sensors is connected to COM terminal for accurate measuring.



Three current output sensors connection to InteliLite.

External resistors 120 ohms each are connected between minus power supply terminal of IL-CU and analog inputs.

Current sensor connecting reduces the analog input resolution by less than 50% against resistive sensor.
Analog input common terminal COM has to be connected to IL minus Power supply terminal.



AI1 BINARY INPUT
AI2 THREE STATE INPUT

Mixed connection of InteliLite analog inputs:

Oil Press – binary input
Water Temp – three state input

Common point of IL-CU analog inputs is connected to COM terminal.

Analog inputs are designed for resistive sensors with resistance in range of 0Ω to 2,4kΩ.
To ensure a proper function use shielded cables, especially for length over >3m.

Current output sensors connection

To connect the current output sensor, external parallel resistor 120 Ω has to be added.
The input sensor characteristic has to be configured to 4-20mA/100 or 4-20mA/60 sensor.
This method reduces the input resolution by less than 50%.

Current output transducers

IL-CU analog inputs are mainly designed for resistor sensors.
In special case transducers to 4-20mA output can be used for various measuring.

Some types of transducers are not suitable for connection to InteliLite analog inputs because of influencing by InteliLite analog input. In this case change default 4-20mA/60 or 4-20mA/100 sensor characteristic to get proper reading.

Binary input

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

Three state input

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

Unused analog inputs

Configure Type = Not used

Example of analog input configuration

Configure Oil press input for measuring in Bar, VDO oil pressure sensor, range 0 to 10.0 bars. Alarm protection level set to 3.5 bars, shut down level 1.2 bars.
Start LiteEdit and select – Controller - Configuration – Modify – Oil Press.
Set configuration for Oil Press analog input:

Type: selection between Not used and Alarm
“Not used” – analog input isn’t used
”Alarm” – analog input is used
Set to: Alarm

Config: selection between Analog, Binary Tri-state input.
“Analog” – resistor sensor is connected to Analog input.
“Binary” – open/close contact is connected between Analog input and COM terminal of Analog inputs. Analog input detects only open/close state.
“Tri-state” – open/close contact is connected parallel to one of two serial resistors between Analog input and COM terminal of Analog inputs.
Set to: Analog

Dim: Physical dimension of measured value (°C, %, Bar, ..) Maximal dimension length is three characters.
Set to: Bar

Contact type: selection of polarity only when analog input is configured as Binary or Tri-state. When is analog input configured as analog this setting has no sense.
„NC“ – polarity of binary or tri-state input
„NO“ – polarity of binary or tri-state input

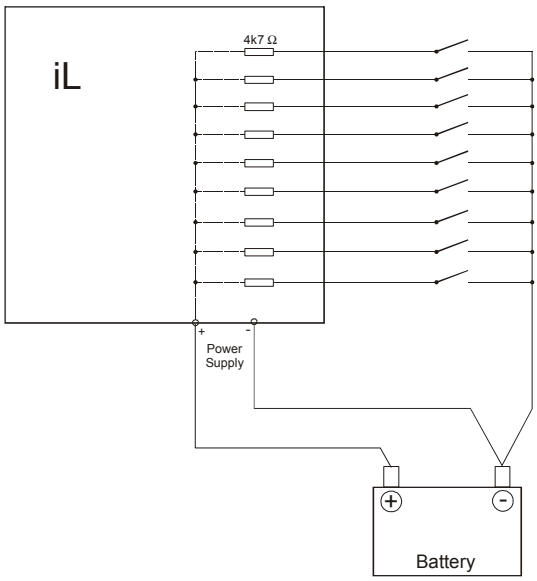
Sensor: selection of sensor characteristic
„Unused input“ - when Analog input is not used. On the InteliLite screen is displayed „####“ value, no alarm is detected.
„Curve A“ – User curve A is defined in LiteEdit (default VDO temperature sensor)
„Curve B“ – User curve B is defined in LiteEdit (default VDO pressure sensor)
„Curve C“ – User curve C is defined in LiteEdit (default VDO fuel level sensor)

„Pt1000“ – PT1000 sensor characteristic according to IEC 751
„Ni1000“ – Ni1000 sensor characteristic according to DIN 43 760
„VDO temp“ – VDO temperature sensor
„VDO press“ – VDO pressure sensor
„VDO level“ – VDO level sensor
„4-20mA/60“ – current output sensor characteristic – requires external resistor 120 ohms between Analog input and COM terminal of Analog inputs
„4-20mA/100“ – current output sensor characteristic – requires external resistor 120 ohms between Analog input and COM terminal of Analog inputs
Set to: VDO press

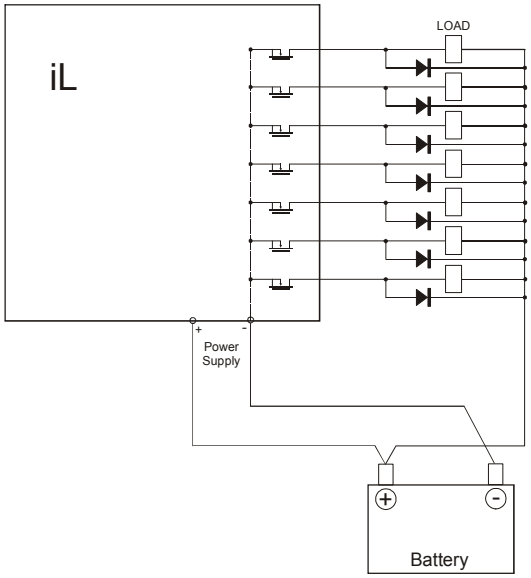
Decimals: setting of number of decimal points of measured value.
„0“ - e.g. 360 kPa, 100%, 50 °C
„1“ – e.g. 3.6 Bar
„2“- e.g. 0.36 MPa
„3“ - e.g. 0.366 MPa
Set to: 1

When Analog input configuration is finished set the setpoints *Wrn Oil press, Sd Oil press, Oil press del* in **Engine protection** group.
Each Analog input has separate triplet of setpoints: *Wrn level*, *Sd level*, *Anl Inp del*. Names of these setpoints are fix defined
Number of decimal points of *Wrn level1* and *Sd level* is the same as the configured number of decimal points of measured value.

Binary inputs



Binary outputs



Inputs and outputs

Hint:
Any Binary input or output can be configured to any IL-CU controller terminal or changed to different function by LiteEdit software. There is fix 1 sec delay when any binary input is configured as protection.

Binary inputs IL-CU - default

BI1 Remote Start/stop

BI2 Access lock

BI3 Emergency stop

BI4 Remote OFF

BI5 Sprinkler

BI6 Not used

Binary inputs – list

Not used

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

Alarm

If the input is closed (or opened) selected alarm is activated.
Binary Alarm configuration items

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

Emergency stop

If the input is opened, shut down is immediately activated. Input is inverted (normally closed).

Sprinkler

If the input is closed all alarms are disabled except the binary input EMERGENCY STOP and "engine overspeed protection".

- all IL alarms are detected,
- IL front panel gen-set RED LED blinks or lights,
- alarm is recorded on the IL alarm list screen,
- BUT gen-set remains running.

Access lock

If the input is closed, no setpoints can be adjusted from controller front panel and gen-set mode (OFF-MAN-AUT-TEST) cannot be changed.
Hint:
Access lock does not protect setpoints and mode changing from LiteEdit. To avoid unqualified changes the selected setpoints can be password protected.

Rem start/stop

External request for engine run. AUT mode only.

Remote OFF

If closed, iL is switched to OFF mode (there are four modes OFF-MAN-AUT-TEST). When opens controller is switched back to previous mode.
Hints
This binary input should be connected to schedule timer switch, to avoid start of engine.

StartButton

Binary input has the same function as Start button on the InteliLite front panel. It is active in MAN mode only.

StopButton

Binary input has the same function as Stop button on the InteliLite front panel. It is active in MAN mode only.

FaultResButton

Binary input has the same function as Fault reset button on the InteliLite front panel.

HornResButton

Binary input has the same function as Horn reset button on the InteliLite front panel.

Binary outputs IL-CU - default

BO1 **Starter (relay output)**

BO2 **Fuel solenoid (relay output)**

BO3 **Prestart**

BO4 **Alarm**

BO5 **Horn**

BO6 **Not used**

Binary outputs - list

Not used

Output has no function.

Starter

The closed relay energizes the starter motor.
The relay opens if:

- the “firing” speed is reached or

- maximum time of cranking is exceeded or
- request to stop comes up

Fuel solenoid

Closed output opens the fuel solenoid and enables the engine start.
The output opens if:

Emergency stop comes or
Cooled gen-set is stopped or
in pause between repeated starts

Prestart

The output closes prior to the engine start (*Prestart*) and opens when START RPM speed is reached. During repeated crank attempts the output is closed too.
The output could be used for pre-glow, pre-heat or prelubrication.

Alarm

The output closes if :

- any alarm comes up or
- the gen-set malfunctions

The output opens if

- FAULT RESET is pressed

The output closes again if a new fault comes up.

Horn

The output closes if:

- any alarm comes up or
- the gen-set malfunctions

The output opens if:

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

The output closes again if a new fault comes up.

Ready

The output is closed if following conditions are fulfilled:

- Gen-set is not running and
- No Shut down or Slow stop alarm is active
- Controller is not in OFF mode

Stop solenoid

The closed output energized stop solenoid to stop the engine.
The output opens again if RPM = 0 with delay 10s and min time (40s) elapsed.

ChrgAlternFail

Output closes if gen-set is running and D+ input not energized.
The output opens, if

- alarm is not active and
- FAULT RESET is pressed

Hint:
Treshhold level for D+ input is 80% supply voltage.

Stop failed

Output closes when the engine have to be stopped, but speed or frequency or voltage or oil pressure is detected. This protection goes active 60s after stop command. With start goes this protection inactive.
The output opens, if

- alarm is not active and
- FAULT RESET is pressed

Overspeed

Output closes if the gen-set overspeed alarm activates.
The output opens, if

- alarm is not active and
- FAULT RESET is pressed

Underspeed

Output closes if the gen-set underspeed alarm activates.
The output opens, if

- alarm is not active and
- FAULT RESET is pressed

Start failed

Output closes after the gen-set start-up fails.
The output opens, if

- alarm is not active and
- FAULT RESET is pressed

Battery flat

Output closes when iL preforms reset during start procedure (probably due to weak battery).
The output opens, if

- alarm is not active and
- FAULT RESET is pressed

V batt failed

Output closes when battery over/under voltage warning appears.
The output opens, if

- alarm is not active and
- FAULT RESET is pressed

Common Wrn

Output closes when any warning alarm appears.
The output opens, if

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

Common Sd

Output closes when any shut-down alarm appears.
The output opens, if

- No sd alarm is active and
- FAULT RESET is pressed

Oil Press

Output closes if the oil pressure shutdown alarm activates.
The output opens, if

- alarm is not active and
- FAULT RESET is pressed

Oil Press Wrn

Output closes if the oil pressure warning alarm activates.
The output opens, if

- alarm is not active and

- FAULT RESET is pressed

Water Temp

Output closes if the water temperature shutdown alarm activates.
The output opens, if

- alarm is not active and
- FAULT RESET is pressed

Water Temp Wrn

Output closes if the water temperature warning alarm activates.
The output opens, if

- alarm is not active and
- FAULT RESET is pressed

OFF mode

The output is closed, if OFF mode is selected.

MAN mode

The output is closed, if MAN mode is selected.

AUT mode

The output is closed, if AUT mode is selected.

Running

Output closes if the engine is in Running state.

ServiceTime

Output closes if the ServiceTime alarm activates.
The output opens, if

- alarm is not active and
- FAULT RESET is pressed

Analog inputs

Two analog inputs for resistive sensor 0 to 2400 Ω measuring. Each analog input can be adjusted to convert resistor measured value to displayed value in bar, °C or %. Warning and shut-down limits are adjusted in **Engine protection** group.

Oil press

Oil pressure analog input. Default range 0 to 10.0 bars.

Water temp

Water temperature analog input. Default range 0 to 100 °C.

Setpoints

Password

EnterPassword

Password is a four-digit number. Password enables change of relevant protected set points Use ⇑ or ⇓ keys to set and ENTER key to enter the password.

ChangePassword

Use ⇑ or ⇓ keys to set and ENTER key to change the password.
Hint:
At first the Password has to be entered before the new Password can be changed.

Basic settings

Gen-set name

User defined name, used for InteliLite identification at remote phone or mobile connection.
Gen-set name is max 14 characters long and have to be entered using LiteEdit software.

Gear teeth [-]

Number of teeth on the engine gear for the pick-up.
Step: 1
Range: 1 – 500

Nominal RPM [RPM]

Nominal engine speed.
Step: 1RPM
Range: 100 – 4000 RPM

Mode IL [OFF, MAN, AUT]

Equivalent to Controller mode changes by MODE→ or ←MODE buttons.
Hint:
Controller Mode change can be separately password protected.

Num rings AA [-]

Number of rings prior to open modem connection.
Step: 1
Range: 1 – 30
Hint:
NumberRings AA change is not activated immedatelly. It is activated after controller is switched on or when modem is connected to controller.

Engine params

Starting RPM [%]

"Firing" speed when iL controller stops cranking (starter goes OFF).
Step: 1% of nominal RPM
Range: 5 – 50 %

Starting POil [Bar]

When reached controller stops cranking (starter goes OFF).
Step: 0,1 bar
Range: -100 – 10000
Hint:
There are three conditions for stop cranking: Starting RPM, StartingPOil and D+ (when enabled). Starter goes off when any of these conditions is vaid.

Prestart time [s]

Time of closing of the PRE-START output prior to the engine start.
Set to zero if you want to leave the output PRE-START open.
Step: 1s
Range: 0 – 600 s

MaxCrank time [s]

Maximum time limit of cranking.
Step: 1s
Range: 1 – 60 s

CrnkFail pause [s]

Pause between crank attempts.
Step: 1s
Range: 5 – 60 s

Crank attemps [-]

Max number of crank attempts.
Step: 1
Range: 1 – 10

MinStpValvTime [s]

Binary output Stop solenoid closes when stop sequence begins and closes at least for *MinStpValvTime*.
Example MinStpValvTime = 20 sec.

a) When engine stops (RPM=0) in 10 seconds, Binary output Stop solenoid still stays closed for 10 sec.
b) When engine stops in 30 seconds, Binary output Stop solenoid opens 10 seconds after RPM=0 and Oil pressure < StartingPOil. Those 10 sec is fix time for safe stop.

Step: 1s
Range: 0 – 180 s
Hint:
Stop of engine is detected when all following conditions are met: RPM =0, Oil pressure < *StartingPOil*.

Cooling time [s]

Runtime of the unloaded gen-set to cool the engine before stop.
Step: 1s
Range: 0 – 3600 s

D+ function [ENABLED/DISABLED]

Enable or disable D+ function.

Engine protect

Eng prot del [s]

During the start of the gen-set, some engine protections have to be blocked (e.g. Oil pressure).
The protections are unblocked after the *Protection del* time. The time starts after reaching *Start RPM*.

Step: 1s
Range: 0 – 300 s

Horn timeout [s]

Max time limit of horn sounding. Set to zero if you want to leave the output HORN open.
Step: 1s
Range: 0 – 600 s

Overspeed [%]

Threshold for over speed protection
Step: 1% of nominal RPM
Range: 100 – 150%

Wrn Oil press [Bar]

Warning threshold level for ANALOG INPUT 1
Step: 0,1 bar
Range: Sd Oil press – 10000

Sd Oil press [Bar]

Shutdown threshold level for ANALOG INPUT 1
Step: 0,1 bar
Range: -100 – Wrn Oil press

Oil press del [s]

Delay for ANALOG INPUT 1
Step: 1 s
Range: 0 – 180 s

Wrn Water temp [°C]

Warning threshold level for ANALOG INPUT 2
Step: 1 °C
Range: -100 – Sd Water temp

Sd Water temp [°C]

Shutdown threshold level for ANALOG INPUT 2
Step: 1 °C
Range: Wrn Water temp – 10000

Water temp del [s]

Delay for ANALOG INPUT 2 alarm.
Step: 1 s
Range: 0 – 180 s

Batt undervolt [V]

Warning threshold for low battery voltage.
Step: 0,1 V
Range: 8V – Batt overvolt

Batt overvolt [V]

Warning threshold for high battery voltage.
Step: 0,1 V
Range: Batt undervolt – 40 V

Batt volt del [s]

Delay for low battery voltage alarm.
Step: 1s

Range: 0 – 600 s

NextServTime [h]

Counts down when engine running. If reaches zero, an alarm appears.
Step: 1h
Range: 0 – 65535h

Sensor spec

Calibr AI1,AI2 […]

Calibrating constant to adjust the measured value of IL analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.
Step: 1
Range: -1000 – +1000
Hints:
Calibration constants have to be adjusted when measured value is near the alarm level.
User curves A, B, C can be defined by LiteEdit software.

Sensor specification

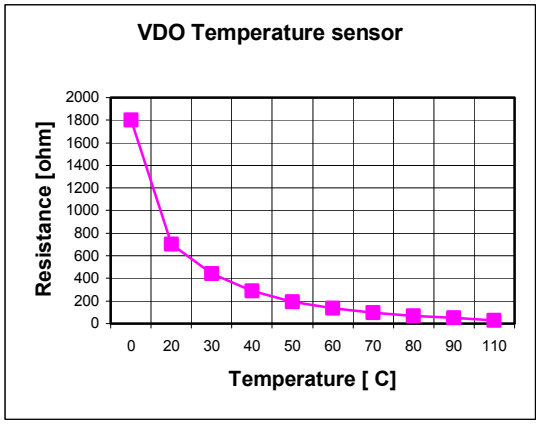
To correct measuring error of each analog input (pressure, temperature, level) calibrating constants within 10 % of measure range should be set. Three calibrating constants are set in physical units - bar, °C, % . From these constants are counted equivalent calibrating resistance which are internally (in software) add to sensor resistance.
At the moment of calibration (ENTER pressing) is calculated (and in memory saved) calibrating resistance (in Ω). This value is added to measured sensor resistance before calculation of the AI1 (AI2) value.
Example: iL-CU display Temperature 70 °C and real value is 73 °C.

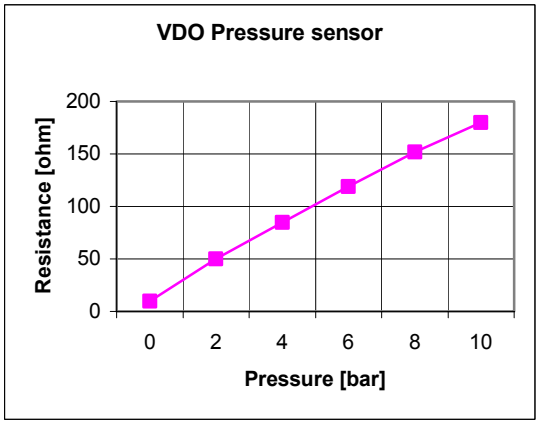
After setting *Calibr AI1* to +3 °C (and pressing ENTER) InteliLite calculates corresponding resistance (e.g.5Ω) and saves this value into the memory. The resistance is then added to all calculations (e.g. instead of 70°C -> 73°C, or e.g. instead of 5°C -> 6°C).

Default sensor settings

Analog input 1: 10 points VDO characteristic, pressure measuring in bar
Analog input 2: 6 points VDO characteristic, temperature measuring in °C

For VDO sensor characteristic see chapter Value and set points codes.





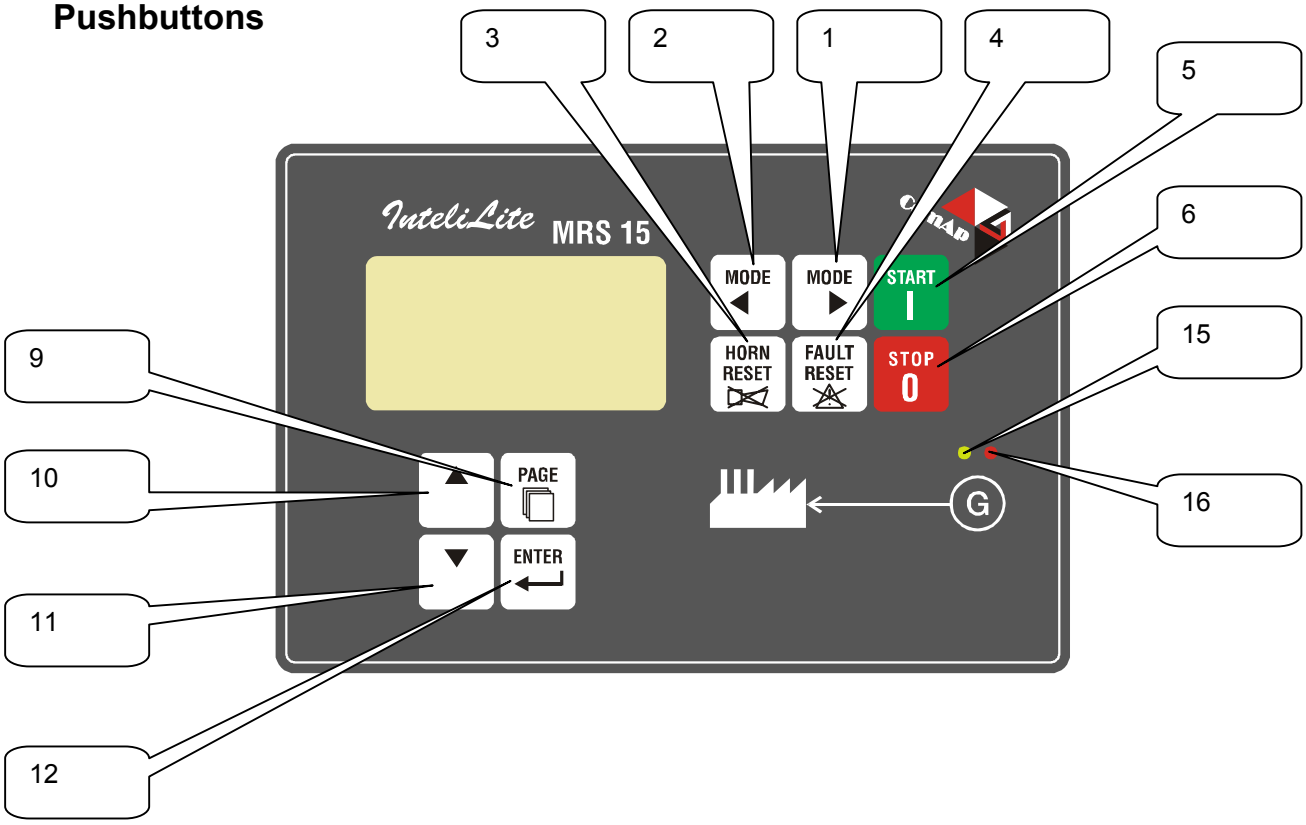
Temperature °C	Pt 1000 ohm		Ni 1000 ohm	
-20	922		893	
-10	961		946	
0	1000		1000	
30	1117		1171	
60	1232		1353	
80	1309		1483	
90	1347		1549	
100	1385		1618	
110	1423		1688	
120	1461		1760	
0	-1		-1	

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

Operator interface

Pushbuttons and LEDs

Pushbuttons



1. MODE→ Cyclic forward selection the gen-set operation mode (OFF -> MAN -> AUT)
2. ←MODE Cyclic backward selection the gen-set operation mode (AUT -> MAN ->OFF)
3. HORN RESET Deactivates the HORN
4. FAULT RESET Acknowledges faults and alarms
5. START Start of the gen-set
6. STOP Stop of the gen-set
7. not used
8. not used
9. PAGE Cyclic selection of the display mode(MEASUREMENT->ADJUSTEMENT->HISTORY)
10. Select the set point, select the screen or increase set point value
11. Select the set point, select the screen or decrease set point value
12. ENTER Confirm set point value

LEDs

13. not used
14. not used
15. ENGINE RUNNING, NO ALARM: GREEN LED is on
16. ENGINE FAILURE: RED LED starts flashing when gen-set failure occurs. After FAULT RESET button is pressed, goes to steady light (if an alarm is still active) or is off (if no alarm is active)
17. not used
18. not used

How to select the gen-set mode ?

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

Display menus

There are 2 display menus available: MEASUREMENT and ADJUSTMENT
Each menu consists of several screens. Press repeatedly PAGE button to select requested menu.

How to view measured data?

1. Use repeatedly PAGE button to select the MEASUREMENT menu.
2. Use ⇑ and ⇓ to select the screen with requested data.

How to view and edit set points?

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

How to change the display contrast ?

Press ENTER and ⇑ or ⇓ at the same time to adjust the best display contrast
Hints
Only in MEASUREMENT menu

How to check the serial number and software revision?

Press ENTER and then PAGE. On the display you can see InteliLite INFO screen for 10 seconds.
InteliLite INFO screen contains :

1) *Controller name* (see **Basic setting** group)
2) InteliLite serial number (8 character number)
3) SW version: the first is the firmware version number, the second is configuration table number.
4) Application: MRS16
5) Branch: Standard

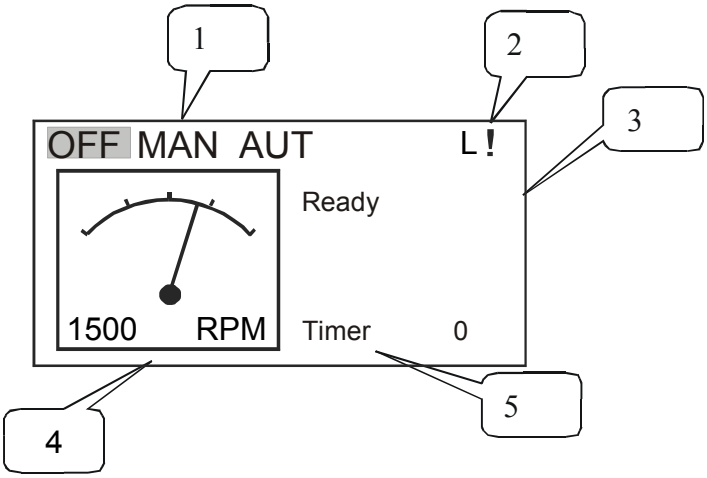
Hints
Only in MEASUREMENT menu.

How to find active alarms ?

Active alarm list is the last screen in the MEASUREMENT menu.
Select MEASUREMENT menu. Press ⇑ You will see the list of all active alarms with the number of alarms at the top-right corner. Inverted alarms are still active. Non-inverted alarms are not active, but not yet confirmed.
Press FAULT RESET accepts all alarms. Non-active alarms immediately disappear from the list.
Active alarm list appears on the screen when a new alarm comes up and Main MEASUREMENT screen is active.
Hints
Alarm list does not activate when you are reviewing the values, parameters or history.

MEASUREMENT screens description

Main measure screen



1. Operation mode of the gen-set
2. Indication of active access lock, Remote OFF or Remote TEST
   ! symbol means some records in Alarm list
   L symbol means Binary input Access lock is active
3. Status of the engine-set
4. RPM of the engine
5. Timer - event s counting time (e.g. prestart, cooling, etc.)

IL-CU Analog inputs screen

Oil pressure	(single bargraph)
Water temperature	(single bargraph)
Battery voltage	(single bargraph)

IL-CU binary inputs

BI1 to BI6

IL-CU binary outputs

BO1 to BO6

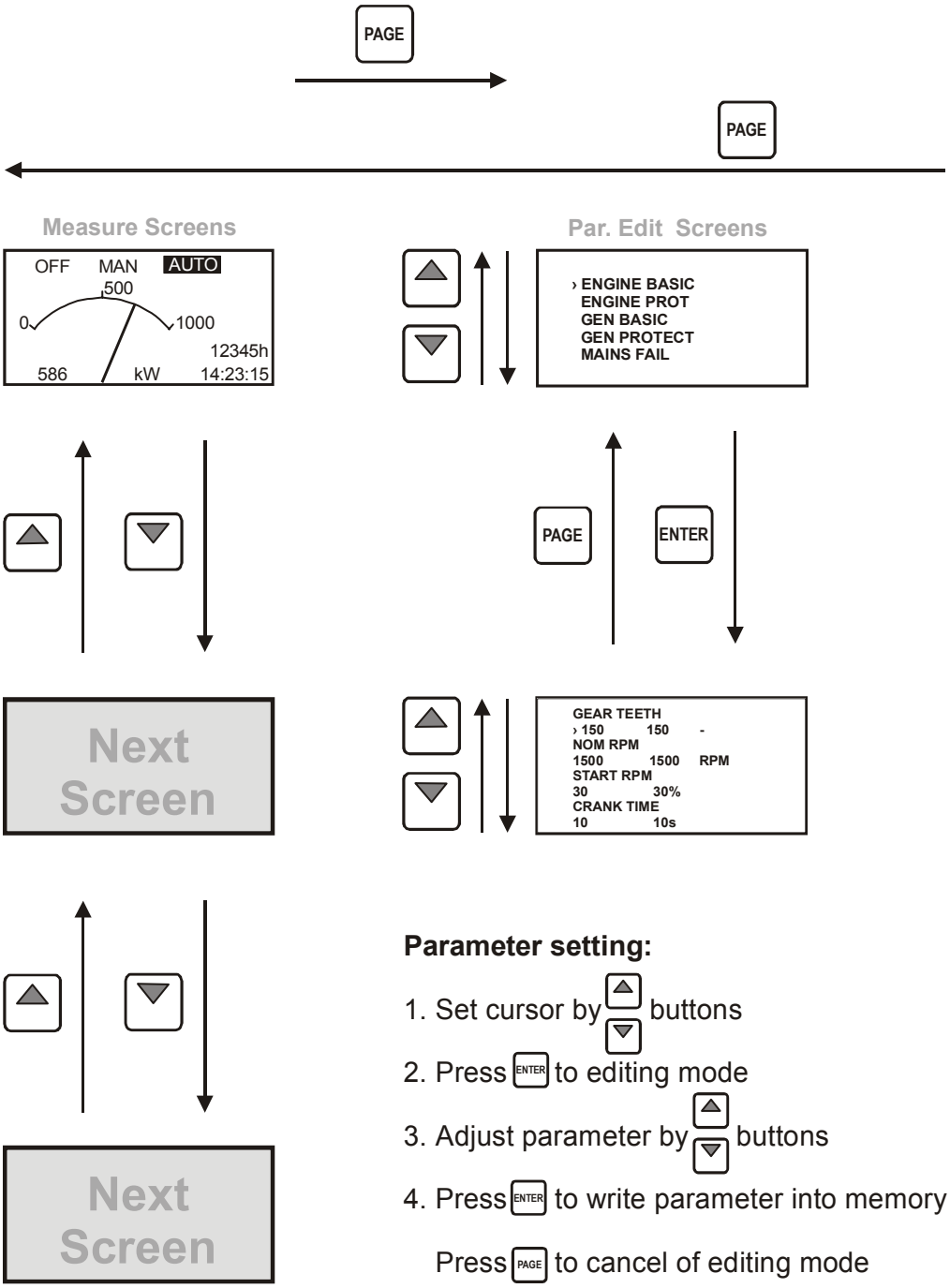
Statistic

Run hours
Number of starts

NextServTime

Alarm list

Chart guide to menus and pushbutton's operation



Parameter setting:

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

   Press PAGE to cancel of editing mode

Function description

OFF mode

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

MAN mode

START. - starts the gen-set.

STOP stops the gen-set.

Hints
The engine can run without load unlimited time.
The controller does not automatically stop the running gen-set in MAN mode.
The controller does not start the gen-set when binary input REM START/STOP is closed

Start-stop sequence (simplified)

MODE = MAN (Engine start/stop request is given by pressing buttons START and STOP)
MODE = AUT (Engine start/stop request is given by binary input REM START/STOP)

State	Condition of the transition	Action	Next state
Ready	Start request	PRESTART on *Prestart time* counter started	*Prestart*
	RPM > 2 or Oil pressure > StartingPOil		*Stop (Stop fail)*
	OFF mode selected or Shut down alarm active		*Not Ready*
Not Ready	RPM < 2, Oil pressure < StartingPOil, no shutdown alarm active, other than OFF mode selected		*Ready*
Prestart [3]	Prestart time *elapsed*	*STARTER on* *FUEL SOLENOID on* *MaxCrank time* counter started	*Cranking*
Cranking [3]	*RPM*> Start RPM	*STARTER off* *PRESTART off*	*Starting*
	D+ input activated or oil pressure detected or Gen voltage > 25% Vgnom	*STARTER off* *PRESTART off*	*Cranking*
	MaxCrank time *elapsed, 1st attempt*	*STARTER off* *FUEL SOLENOID off* *STOP SOLENOID on* *CrankFail pause* timer started	*Crank pause*
	MaxCrank time *elapsed, last attempt*	*STARTER off* *PRESTART off*	*Shutdown (Start fail)*
Crank pause [3]	CrankFail pause *elapsed*	*STARTER on* *FUEL SOLENOID on* *STOP SOLENOID off* *MaxCrank time* counter started	*Cranking*

State	Condition of the transition	Action	Next state
Starting [3]	*80%* Nominal speed *reached*	*READY TO LOAD on* [1] *Min, MaxStabTime* counter started	*Running*
	RPM = 0 or any other shutdown condition	*FUEL SOLENOID off* *STOP SOLENOID on*	*Shutdown*
	60 sec. *Elapsed*	*FUEL SOLENOID off* *STOP SOLENOID on*	*Shutdown (Start fail)*
Running	Stop request	READY TO LOAD off *Cooling time* timer started	*Cooling*
	RPM = 0 or any other shutdown condition	*READY TO LOAD off* [2] *FUEL SOLENOID off*	*Shutdown*
Cooling	Cooling time *elapsed*	*FUEL SOLENOID off* *STOP SOLENOID on*	*Stop*
	RPM = 0 or any other shutdown condition	*FUEL SOLENOID off* *STOP SOLENOID on*	*Shutdown*
	Start request	*READY TO LOAD on* [1]	*Running*
Stop	*RPM = 0,* Oil pressure < StartingPOil,		*Ready*
	60 sec. *Elapsed*		*Stop (Stop fail)*

Hint:
Treshhold level for D+ input is 80% supply voltage.

AUT mode

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

Alarm management

Following alarms are available:
- Warning
- Shut down

Warning (WRN)

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

Possible warnings:

See List of possible events

Shut down (SD)

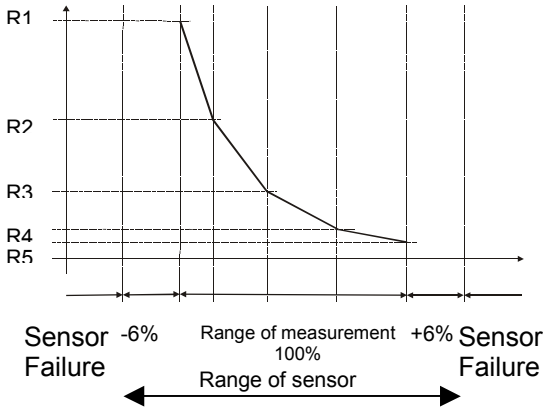
When the shut-down alarm comes up, InteliLite opens outputs FUEL SOLENOID, STARTER and PRESTART to stop the engine immediately. Alarm outputs and common shutdown output are closed. Active or not reset protection disables start.

Possible shut-down alarms:

See List of possible events

Sensor fail detection

Sensor fail Fls is detected when measured value is 6,2 percent out of range. Controller screen displays in this case string #### instead measured value.



Gen-set operation states

Engine state machine

Init	Autotest during controller power on
Not ready	Engine is not ready to start
Prestart	Prestart sequence in process, Prestart output is closed
Cranking	Engine is cranking
Pause	Pause between start attempts
Starting	Starting speed is reached and 80% Nominal RPM not reached
Running	Engine is running at nominal speed
Stop	Stop
Shutdown	Shut-down alarm activated
Ready	Engine is ready to run
Cooling	Engine is cooling before stop

List of possible alarms

Events specification	Protection type	Information on binary output available (See list of Binary outputs)
Wrn Oil press	WRN	YES
Sd Oil press	SD	YES
Wrn Water temp	WRN	YES
Sd Water temp	SD	YES
Binary input	Configurable	YES
Battery voltage <, >	WRN	YES
Battery flat	SD	YES
Start fail	SD	YES
ParamFail	NONE	NO
RPM over	SD	YES
RPM under	SD	YES
TotalStop	SD	NO
PickupFault	SD	NO
Stop fail	SD	YES
WrnServiceTime	WRN	NO
ChrgAlternFail	WRN	YES

Remote control and data logging

Direct connection to the PC

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

PC software - LiteEdit

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

- read the quantities
- adjust all set points
- control the engine
- configure the controller
- select software configuration
- modify alarm inputs and outputs
- modify password, commands protections

Technical data

Power supply

Voltage supply	8-36V DC
Consumption	0,5-0,1A depend on supply voltage
Battery voltage measurement tolerance	2 % at 24V

Operating conditions

Operating temperature	-20..+70°C
Storage temperature	-30..+80°C
Protection front panel	IP65
Humidity	85%
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
Vibration	5 - 25 Hz, ±1,6mm 25 - 100 Hz, a = 4 g
Shocks	a = 200 m/s^2

Dimensions and weight

Dimensions	180x120x50mm
Weight	800g

Binary inputs and outputs

Binary inputs

Number of inputs	6
Input resistance	4,7 kΩ
Input range	0-36 VDC
Switching voltage level for close contact indication	0-2 V
Max voltage level for open contact indication	8-36 V

Contact relay outputs

Number of outputs	2
Electric life cycle	min 100.000 switching cycles
Maximum current	12 A DC resistive load 4 A DC inductive load
Maximum switching voltage	36 VDC
Minimum load	24 V / 0,1 A
Insulation voltage	500 Veff

Binary open collector outputs

Number of outputs	4
Maximum current	0,5 A
Maximum switching voltage	36 VDC

Analog inputs

Not electrically separated	
Resolution	10 bits
Sensor resistance range	0 Ω-2,4 kΩ
Resistance measurement tolerance	4 % ± 2 Ω out of measured value

Speed pick-up input

Type of sensor	magnetic pick-up (connection by shielded cable is recommended)
Minimum input voltage	2 Vpk-pk (from 4 Hz to 4 kHz)
Maximum input voltage	50 Veff
Minimum measured frequency	4 Hz
Maximum measured frequency	10 kHz (min. input voltage 6Vpk-pk)
Frequency measurement tolerance	1,5 %

RS232 interface

Maximal distance	10m
Speed	19.2kBd

Recommend external converter:
ADVANTECH – ADAM 4520: RS232 to RS422/485 converter, DIN rail, automatic RS485 bus supervision, no external data flow control signals, galvanic isolated.

Recommended internal converter:
ADVANTECH – PCL-745B or PCL745S : Dual port RS422/485 Interface card, automatic RS485 bus supervision, no external data flow control signals, galvanic isolated