



**TRANS-AMF**  
AUTOMATIC MAINS FAILURE UNIT  
FOR GAS/DIESEL/GASOLINE GENERATORS  
WITH J1939 ECUs  
User Manual

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## EU DECLARATION OF CONFORMITY

**Manufacturer's Name** : EMKO ELEKTRONIK A.S.  
**Manufacturer's Address** : Bursa Organize Sanayi Bölgesi ,  
Ali Osman Sönmez Bulvarı 2.Sokak No:3  
16215 Bursa, TÜRKİYE

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This declaration is issued under the sole responsibility of the manufacturer.

**Product Name** : Automatic Mains Failure Unit

**Type Number** : TRANS-AMF

**Product Category** : Electrical equipment for measurement, control and laboratory use

The product(s) that are stated above are fully in conformity with the essential requirements of Council Directives:

2014 / 35 / EU The Low Voltage Directive

2014 / 30 / EU The Electromagnetic Compatibility Directive

2011 / 65 / EU The Restriction of Hazardous Substances (RoHS 2) Directive

2015 / 863 / EU Amendment to Annex II of Directive 2011/65/EU

2017 / 2102 / EU Amendment to Annex II of Directive 2011/65/EU

This declaration is based on the full compliance of the products with the following European standards:

EN 61010-1:2010 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use

EN 61326-1:2013 Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements

EN 60947-6-1:2005/A1:2014 Low - Voltage Switchgear and Controlgear - Part 6-1: Multiple Function Equipment - Transfer Switching Equipment

EN 50581:2012 Technical Documentation for The Assessment of Electrical and Electronic Products With Respect to The Restriction of Hazardous Substances

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### When and Where Issued

22<sup>Nd</sup> October 2021

BURSA-TÜRKİYE

### Authorized Signature

Name : Arzu ATAN

Position : Quality Manager

## 1.Introduction

### 1.1 General Specifications

The unit provides for automatic transfer of a load from mains to generator in the event of a mains failure. Intended for unattended operation, it is able to detect failure of any phase of the mains and to start and switch over to a generator if the mains voltage goes outside pre-set limits. Both automatic and manual control is possible. A test mode is also available which allows the generator to be run without taking the load.

The unit has Dual Working feature. In the event of a mains failure, group with high priority starts and takes the load. If both groups has no priority, the group with less working hour will start and take the load. To use Dual Working feature Dual Set expansion module must be used.

The unit calculates engine RPM from Magnetic Pickup sensor input (MPU) and/or generator voltage signal.

The unit monitors J1939 ECU messages and provides remote start/stop control via J1939 protocol (supported ECUs: Volvo EMS2, Volvo EDC4, Perkins, Scania S6, MAN MFR and standard messages).

The unit is extensively programmable through the front panel, with password protection on two levels. Operational parameters can also be monitored and controlled from a PC via a built-in USB communication port.

In the event that the engine fails to start on the first attempt, the attempt will be repeated a programmed number of times or until successful.

The unit monitors generator operation and gives warning of any faults that are detected. If a fault is detected, the unit shuts down the engine and shows the failure message on the LCD display and activates the internal sounder.

The configurable input-3 can be used as the water level sensing input.  
The configurable input-7 can be used as the cabin temperature analog input.

The unit has got the "Event Log" that will record last 500 events.

### 1.2 Warranty

EMKO Elektronik warrants that the equipment delivered is free from defects in material and workmanship. This warranty is provided for a period of two years. The warranty period starts from the delivery date. This warranty is in force if duty and responsibilities which are determined in warranty document and instruction manual performs by the customer completely.

### 1.3 Maintenance

Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts.

Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

### 1.4 Order Information

**Trans-AMF:** Automatic mains failure unit with USB communication

**Trans-AMF.RS485:** Automatic mains failure unit with USB and RS-485 communication

## 2. Installation



**Before beginning installation of this product, please read the instruction manual and warnings below carefully.**

A visual inspection of this product for possible damage occurred during shipment is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.

If there is danger of serious accident resulting from a failure or defect in this unit, power off the system and separate the electrical connection of the device from the system.

Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.

To reduce the effect of electrical noise on device, Low voltage line (especially sensor input cable) wiring must be separated from high current and voltage line.

If possible, use shielded cable and shield must be connected to ground only one side.

Before commissioning the device, parameters must be set in accordance with desired use. Incomplete or incorrect configuration can cause dangerous situations.

### 2.1 Unit Configuration

The unit can be programmed using the buttons and LCD display on the front panel or PC Software.

### 2.2 Panel Mounting

The unit is designed for panel mounting. Fixing is by two screw fixings.

**1-** Insert the unit in the panel cut-out from the front.

**2-** Insert the fixings in the slotted at the corners of the unit and tighten the fixing screws to secure the unit against the panel.



**During the equipment is putted in hole on the metal panel while mechanical installation some metal burrs can cause injury on hands, you must be careful.**

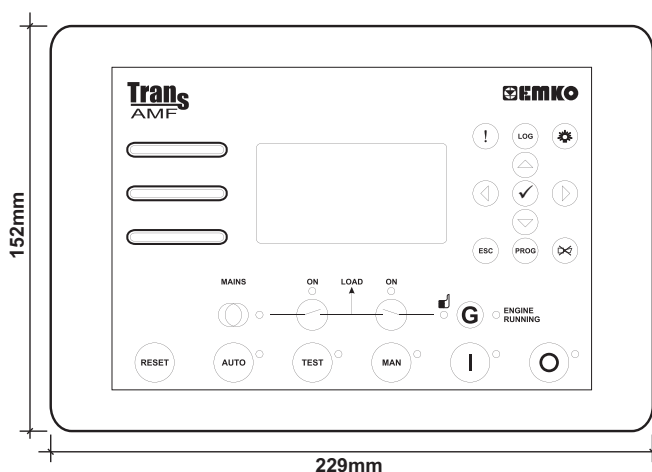


Figure 2.1 Front View

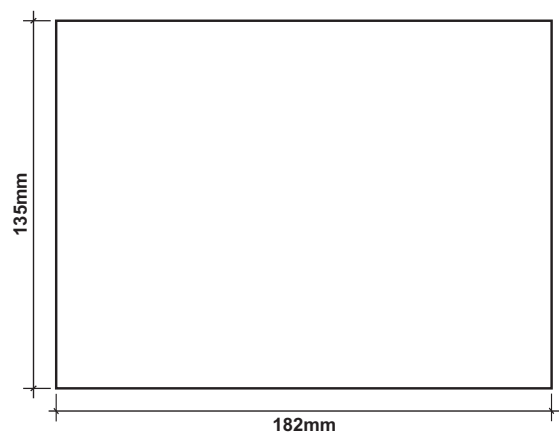
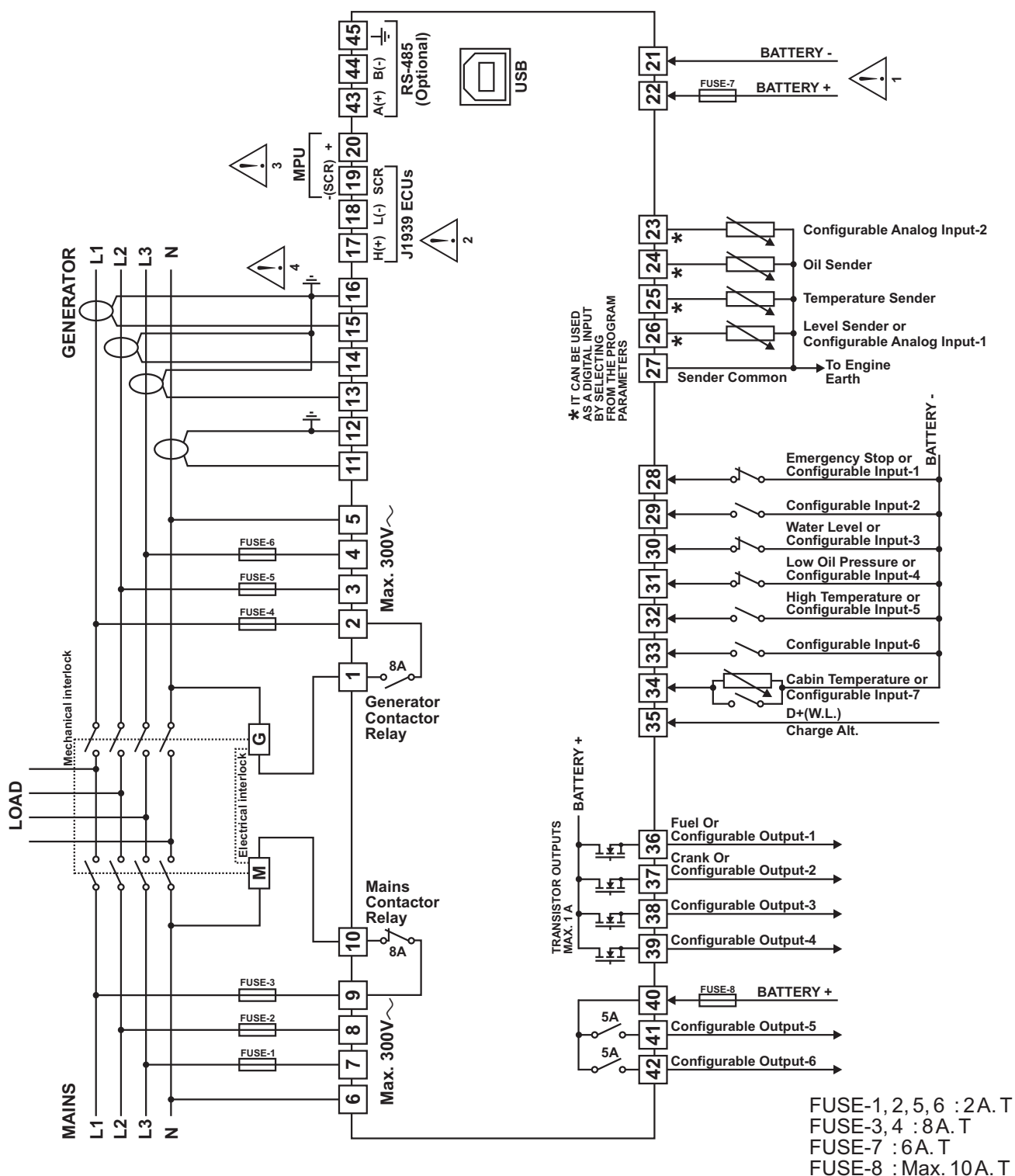


Figure 2.2 Panel Cut-Out

## 2.3 Electrical Connection

### TRANS-AMF three phase connections schematic



1- Connect the unit as shown in the appropriate diagram. Be sure to connect the battery supply the right way round. External fuse is recommended. Stranded cable cross section: 1,5mm<sup>2</sup>, Solid cable cross section: 2,5mm<sup>2</sup>, The stripping length is 7 to 9 mm. Supply cables must comply with the requirements of IEC 60277 or IEC 60245.



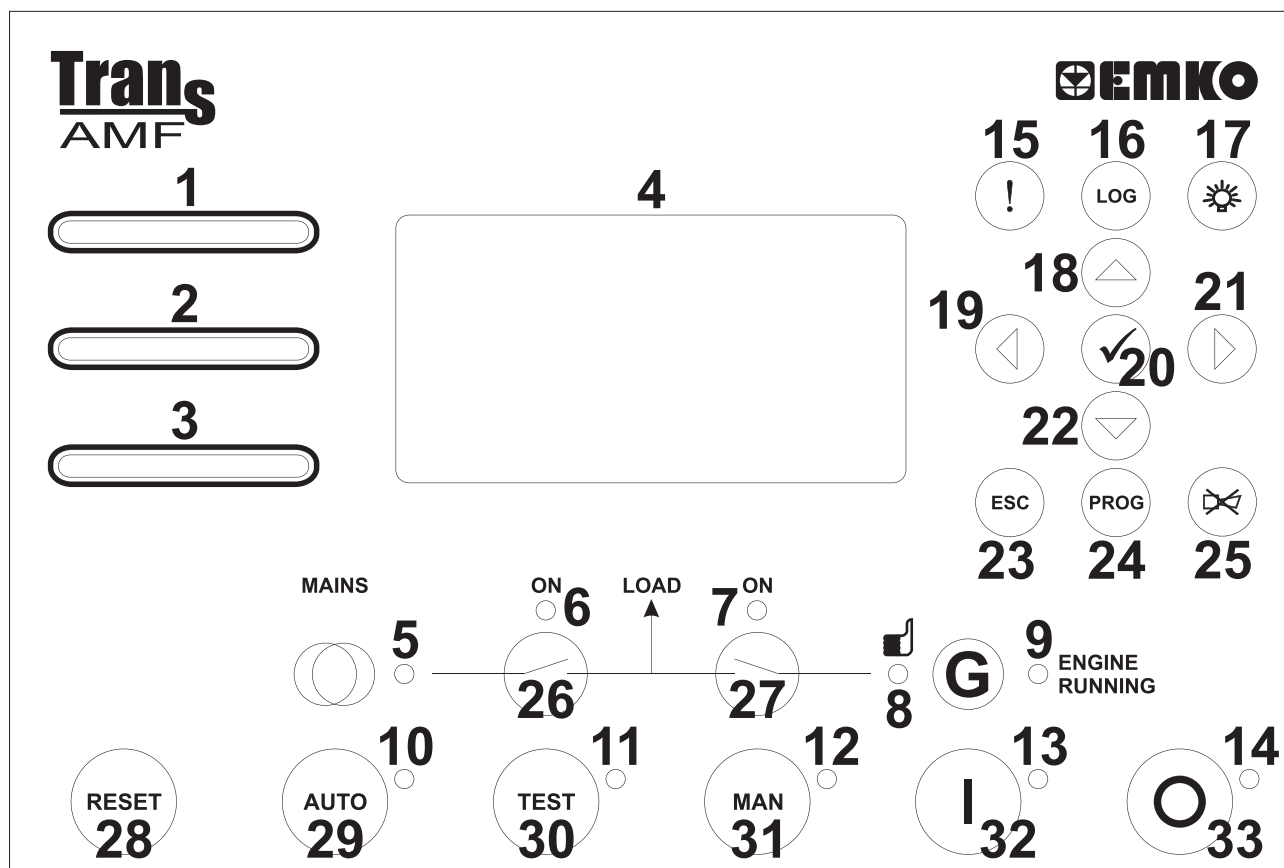
2- The CAN interface requires that a 120 Ohms terminator is fitted to each end of the communications link. This termination resistor is fitted internally into the unit. So it is not required externally. Screened cable must be used for connecting the CAN, ensuring that the screen is grounded at one end ONLY.

3- Screened cable must be used for connecting the Magnetic Pickup, ensuring that the screen is grounded at one end ONLY.

4- Current transformers secondary should be grounded. The CT of 5VA is recommended. The unit has a burden of 0.5VA on the CT.

### 3. Front Panel Description And Accessing To The Parameters

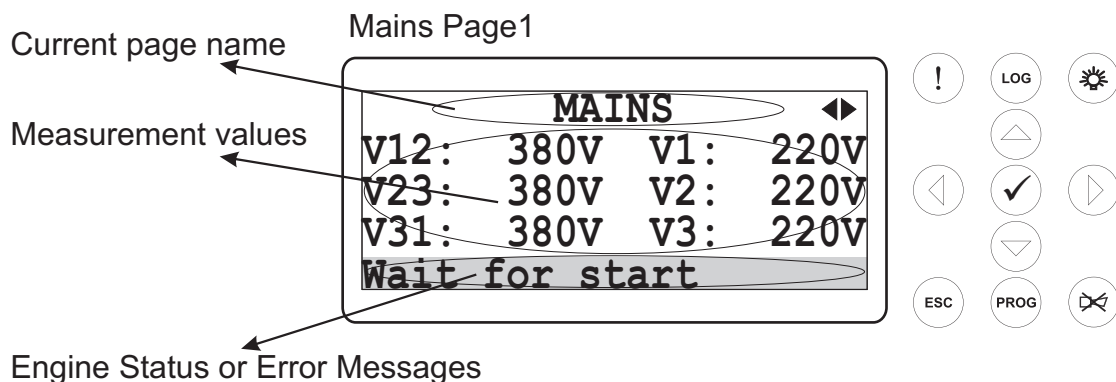
#### 3.1 Front Panel Description



| Number | Comment                                                                                                                                                     |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | This LED indicates that a "Shutdown" alarm was detected.                                                                                                    |
| 2      | This LED indicates that a "Warning" alarm was detected                                                                                                      |
| 3      | This LED indicates that a "Maintenance" alarm was detected                                                                                                  |
| 4      | This LCD display is used for displaying the electrical measurements during normal operation, and editing/inspecting programming parameters in program mode. |
| 5      | This LED indicates that Mains voltage and frequency is within limits and is ready to take over the load.                                                    |
| 6      | This LED shows that the load is supplied from the mains.                                                                                                    |
| 7      | This LED shows that the load is supplied from the generator.                                                                                                |
| 8      | This LED indicates that Generator voltage and frequency is within limits and is ready to take over the load.                                                |
| 9      | This LED indicates that the engine has started and is running.                                                                                              |
| 10     | This LED shows that the unit is in the AUTO mode.                                                                                                           |
| 11     | This LED shows that the unit is in the TEST mode.                                                                                                           |
| 12     | This LED shows that the unit is in the MANUAL mode.                                                                                                         |
| 13     | In the MAN, AUTO and TEST modes, this LED indicates that the engine is starting up or is running.                                                           |
| 14     | This LED shows that the unit is in the STOP mode.                                                                                                           |

| Number | Comment                                                                                                                                                                                                                             |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15     | Warning and Alarm messages shortcut button.                                                                                                                                                                                         |
| 16     | Event Logs shortcut button.                                                                                                                                                                                                         |
| 17     | The LAMP TEST button illuminates all LED indicators.                                                                                                                                                                                |
| 18     | This button is used for showing previous parameters on the currently selected page in normal operation. In Programming mode, it operates as an Up button (changing cursor position) or Increment button (increase parameter value). |
| 19     | This button is used for showing previous page in normal operation. In Programming mode, it operates as an Left button (changing cursor position).                                                                                   |
| 20     | This button is used for entering parameter edit section and saving parameter value in programming mode.                                                                                                                             |
| 21     | This button is used for showing next page in normal operation. In Programming mode, it operates as an Right button (changing cursor position).                                                                                      |
| 22     | This button is used for showing next parameters on the currently selected page in normal operation. In Programming mode, it operates as an Down button (changing cursor position) or Decrement button (decrease parameter value).   |
| 23     | The Escape button is used for exit previous section in programming mode.                                                                                                                                                            |
| 24     | When this button is pressed, the unit goes into its PROGRAMMING Mode.                                                                                                                                                               |
| 25     | This button will silence the alarm horn after a failure has been detected.                                                                                                                                                          |
| 26     | This button opens or closes the mains contactor, only operative when manual mode is selected.                                                                                                                                       |
| 27     | This button opens or closes the gen. contactor, only operative when manual mode is selected.                                                                                                                                        |
| 28     | This button will reset the controller after a failure has been detected.                                                                                                                                                            |
| 29     | The AUTO button is used for changing operating mode of the unit to the AUTO Mode.                                                                                                                                                   |
| 30     | The TEST button is used for changing operating mode of the unit to the TEST Mode.                                                                                                                                                   |
| 31     | The MAN button is used for changing operating mode of the unit to the MANUAL Mode.                                                                                                                                                  |
| 32     | The START button is used for starting the engine when the unit is in the Manual Mode.                                                                                                                                               |
| 33     | The STOP button is used for changing operating mode of the unit to the STOP Mode. The generator is stopped.                                                                                                                         |

## LCD display Description



128x64 Dot-matrix LCD display.

Use the Next and Previous buttons to select which Data display page (screen) is to be displayed.

When the Alarm (!) shortcut button is pressed, the Warning & Alarm display page is displayed.

When the Event log (LOG) shortcut button is pressed, the Event Log display page is displayed.

Data display pages on the LCD display;

#### Mains Page1:

| MAINS          |      |     |      |
|----------------|------|-----|------|
| V12:           | 380V | V1: | 220V |
| V23:           | 380V | V2: | 220V |
| V31:           | 380V | V3: | 220V |
| Wait for start |      |     |      |

V12: Mains voltage L1-L2

V23: Mains voltage L2-L3

V31: Mains voltage L3-L1

V1: Mains voltage L1-N

V2: Mains voltage L2-N

V3: Mains voltage L3-N

#### Mains Page2:

| MAINS          |        |    |    |
|----------------|--------|----|----|
| Fq:            | 50.0Hz |    |    |
| Phase seq.:    | L1     | L2 | L3 |
| Wait for start |        |    |    |

Fq: Mains frequency

Phase Seq.: Mains phase sequence

#### Generator Page1:

| GENERATOR |      |     |      |
|-----------|------|-----|------|
| V12:      | 380V | V1: | 220V |
| V23:      | 380V | V2: | 220V |
| V31:      | 380V | V3: | 220V |
| On load   |      |     |      |

V12: Generator voltage L1-L2

V23: Generator voltage L2-L3

V31: Generator voltage L3-L1

V1: Generator voltage L1-N

V2: Generator voltage L2-N

V3: Generator voltage L3-N

#### Generator Page2:

| GENERATOR |     |      |      |
|-----------|-----|------|------|
| I1:       | 26A | PF1: | 0.80 |
| I2:       | 23A | PF2: | 0.80 |
| I3:       | 25A | PF3: | 0.80 |
| On load   |     |      |      |

I1: Load Current L1

I2: Load Current L2

I3: Load Current L3

PF1: Generator power factor L1

PF2: Generator power factor L2

PF3: Generator power factor L3

#### Generator Page3:

| GENERATOR   |        |     |    |
|-------------|--------|-----|----|
| Fq:         | 50.0Hz | Ie: | 0A |
| Phase seq.: | L1     | L2  | L3 |
| On load     |        |     |    |

Fq: Generator frequency

Ie: Earth Current

Phase Seq.: Generator phase sequence

#### Generator Page4:

| GENERATOR |       |  |     |
|-----------|-------|--|-----|
| P1:       | 168kW |  | 63% |
| P2:       | 168kW |  | 63% |
| P3:       | 168kW |  | 63% |
| On load   |       |  |     |

P1: Generator active power L1

P2: Generator active power L2

P3: Generator active power L3

#### Generator Page5:

| GENERATOR |         |     | ◀▶ |
|-----------|---------|-----|----|
| Q1:       | 126kVAr | 63% |    |
| Q2:       | 126kVAr | 63% |    |
| Q3:       | 126kVAr | 63% |    |
| On load   |         |     |    |

Q1: Generator reactive power L1  
Q2: Generator reactive power L2  
Q3: Generator reactive power L3

#### Generator Page6:

| GENERATOR |        |     | ◀▶ |
|-----------|--------|-----|----|
| S1:       | 210kVA | 63% |    |
| S2:       | 210kVA | 63% |    |
| S3:       | 210kVA | 63% |    |
| On load   |        |     |    |

S1: Generator apparent power L1  
S2: Generator apparent power L2  
S3: Generator apparent power L3

#### Generator Page7:

| GENERATOR    |         |     | ◀▶ |
|--------------|---------|-----|----|
| $\Sigma P$ : | 504kW   | 63% |    |
| $\Sigma Q$ : | 378kVAr | 63% |    |
| $\Sigma S$ : | 630kVA  | 63% |    |
| On load      |         |     |    |

$\Sigma P$ : Generator total active power  
 $\Sigma Q$ : Generator total reactive power  
 $\Sigma S$ : Generator total apparent power

#### Generator Page8:

| GENERATOR |       |  | ◀▶ |
|-----------|-------|--|----|
| kWh :     | 30600 |  |    |
| kVArh:    | 7200  |  |    |
| On load   |       |  |    |

kWh: Generator active energy  
kVArh: Generator reactive energy

#### Engine Page1:

| ENGINE        |         |  | ◀▶ |
|---------------|---------|--|----|
| Oil Pressure: | 4.3bar  |  |    |
| Temperature : | 30°C    |  |    |
| Speed :       | 1500rpm |  |    |
| On load       |         |  |    |

Oil pressure: Oil pressure sender input value  
Temperature: Coolant temperature sender input value  
Speed: Engine speed

#### Engine Page2:

| ENGINE        |         |  | ◀▶ |
|---------------|---------|--|----|
| Conf.AI1 :    | 96%     |  |    |
| Conf.AI2 :    | 40°C    |  |    |
| Battery volt: | 12.0Vdc |  |    |
| On load       |         |  |    |

Conf. AI1: Configurable Analog Input-1 value  
Conf. AI2: Configurable Analog Input-2 value  
Battery volt: Battery supply voltage

### Engine Page3:

```
ENGINE ◀▶
Gen.chg.volt: 11.8Vdc
Run times   :    7
Crank times :   11
On load
```

**Gen.chg.volt:** Charge generator voltage  
**Run times:** Number of generator runs  
**Crank times:** Number of generator starts

### Engine Page4:

```
ENGINE ◀▶
W.Hour Min:    2 57
Cabin temp:   26°C
Lt/Hours:    30/2
On load
```

**W.Hour\_Min:** Engine running time (Hour and Minute)  
**Cabin temp:** Cabin temperature  
**Lt/Hours:** Fuel consumption

### Engine Maintenance Page:

```
ENGINE MAINTENANCE ◀▶
Next hours : 5000
Next days  :  180
Last date: 15/02/2011
On load
```

**Next hours:** The remaining hour for maintenance  
**Next days:** The remaining day for maintenance  
**Last date:** The last maintenance date

### J1939 Values Page1:

```
J1939 VALUES ◀▶
Engine speed: 1500rpm
Oil pressure:  4.0bar
Coolant temp:  27°C
On load
```

**Engine speed:** Engine speed via J1939  
**Oil pressure:** Oil pressure via J1939  
**Coolant temp:** Coolant temperature via J1939

### J1939 Values Page2:

```
J1939 VALUES ◀▶
Fuel rate:   12.50L/h
Fuel tot.:   176L
Oil level:   97.2%
On load
```

**Fuel rate:** Fuel rate via J1939  
**Fuel tot.:** Fuel total used via J1939  
**Oil level:** Oil level via J1939

### J1939 Values Page3:

```
J1939 VALUES ◀▶
Coolant level: 87.6%
Load at cur.spd: 25%
Fuel temper.:  13°C
On load
```

**Coolant level:** Coolant level via J1939  
**Load at cur.spd:** Load at current speed via J1939  
**Fuel temper.:** Fuel temperature via J1939

#### J1939 Values Page4:

```

J1939 VALUES ◀▶
Oil temper.: 82.00°C
Act.engine torq: 75%
Boost press.: 2.8bar
On load
  
```

**Oil temper.:** Oil temperature via J1939

**Act.engine torq:** Actual engine torque via J1939

**Boost press.:** Boost pressure via J1939

#### J1939 Values Page5:

```

J1939 VALUES ◀▶
Int.man.temp.: 45°C
Pedal position: 50.0%
W.Hour_Min: 2 57
On load
  
```

**Int.man.temp.:** Intake manifold temperature via J1939

**Pedal position:** Accelerator pedal position via J1939

**W.Hour\_Min:** Working hour and minute via J1939

#### J1939 DM1 (Active) Faults Page:

```

J1939 DM1 FAULTS1 ◀▶
Spn:110
Fmi:0          Oc:1
Coolant Temper.sensor
Value too high
  
```

**Spn:** Suspect parameter number (e.g. SPN = 110 corresponds to coolant temperature sensor)

**Fmi:** Failure mode identifier (e.g. FMI = 0 means value too high)

**Oc:** Occurrence count (if OC = 0, no alarm is present)

The first 10 active alarm messages (Active Diagnostic Trouble Codes - DM1) with SPN, FMI, and OC are displayed). If more than one active fault condition is present, all of them is displayed sequentially by pressing Next and Previous buttons.

#### Input & Output Status Page:

```

INPUT & OUTPUT ◀▶
           1  4  5  8
Inputs :   0000 000X
Outputs:   0000 0000
On load
  
```

**Inputs:** Input status information. If an input is active, related digit is displayed as "1" else it is displayed as "0".

1: Conf. in-1, 2: Conf. in-2, 3: Conf. in-3, 4: Conf. in-4,  
5: Conf. in-5, 6: Conf. in-6, 7: Conf. in-7, 8: Not available.

**Outputs:** Output status information. If an output is active, related digit is displayed as "1" else it is displayed as "0".

1: Conf. out-1, 2: Conf. out-2, 3: Conf. out-3, 4: Conf. out-4,  
5: Conf. out-5, 6: Conf. out-6, 7: Generator contactor,  
8: Mains contactor.

#### Exp. Input & Output Status Page:

```

EXP. INPUT & OUTPUT ◀▶
           1  4  5  8
Inputs :   0000 0000
Outputs:   0000 0000
On load
  
```

**Inputs:** Exp. input status information. If an input is active, related digit is displayed as "1" else it is displayed as "0".

1: Exp. conf. in-1, 2: Exp. conf. in-2, 3: Exp. conf. in-3,  
4: Exp. conf. in-4, 5: Exp. conf. in-5, 6: Exp. conf. in-6,  
7: Exp. conf. in-7, 8: Exp. conf. in-8.

**Outputs:** Exp. output status information. If an output is active, related digit is displayed as "1" else it is displayed as "0".

1: Exp. conf. out-1, 2: Exp. conf. out-2, 3: Exp. conf. out-3,  
4: Exp. conf. out-4, 5: Exp. conf. out-5, 6: Exp. conf. out-6,  
7: Exp. conf. out-7, 8: Exp. conf. out-8.

#### GPRS Page:

```

■■■■■ GPRS ◀▶
Operator Name
IP :0.0.0.0
APN:mgbs
  
```

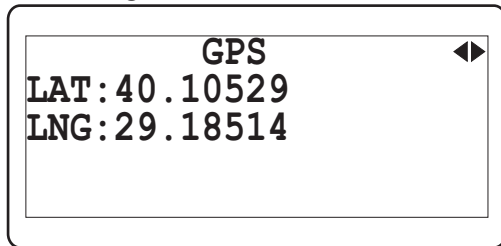
**Signal Quality:** Signal Quality level indicator

**Operator Name:** Operator name

**IP:** Device IP value

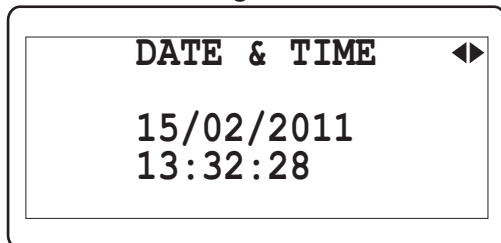
**APN:** Access point name of the operator

### GPS Page:



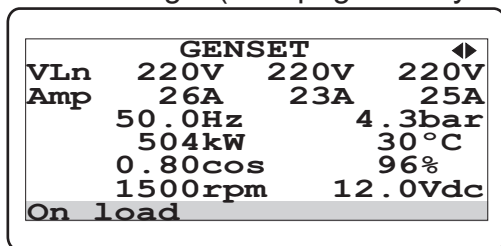
**LAT:** Latitude value of device's position  
**LNG:** Longitude value of device's position

### Date & Time Page:



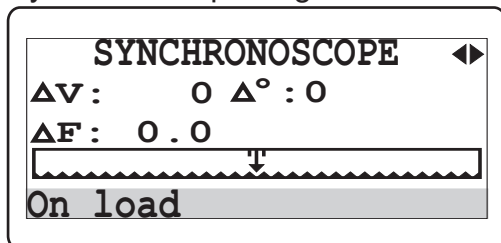
**Date:** Day, Month, Year.  
**Time:** Hour, minute, second.

### GenSet Page: (This page is only available at TRANS-AMF.TR device)



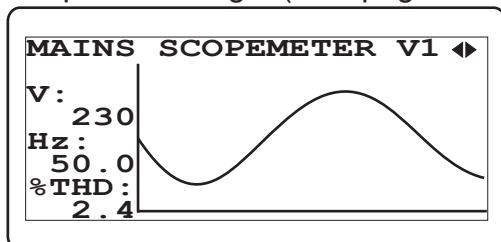
**VLn:** Generator voltage L1-N, L2-N and L3-N  
**Amp:** Generator current L1, L2 and L3  
**Hz:** Generator frequency  
**bar:** Oil pressure sender input value  
**kW:** Generator total active power  
**°C:** Coolant temperature sender input value  
**cos:** Generator power factor average  
**%:** Configurable Analog Input-1 value  
**rpm:** Engine speed  
**Vdc:** Battery supply voltage

### Synchronoscope Page:



This page is for observing level differences between generator and mains voltage, frequency and phase angle. When an uninterrupted transfer is in progress, synchronoscope page will be shown automatically.

### Scopemeter Page: (This page is not available at TRANS-AMF.CN device)



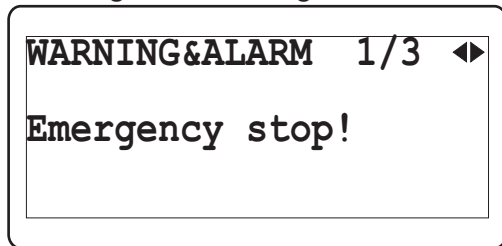
**V:** Amplitude of selected channel  
**Hz:** Frequency of selected channel  
**%THD:** Total Harmonic Distortion of selected channel

On this page, a total of 12 channels are displayed including mains voltages (Ph-N and Ph-Ph) and generator voltages (Ph-N and Ph-Ph). These channels may be scrolled with Increment  and  buttons.

The waveform of selected channel is updated twice per second. The waveform display memory is 97 samples length and 13 bit resolution. The sampling rate is 4166 samples/second. Thus, one cycle of the 50Hz signal is represented by 83 points.

Warning & Alarm display pages on the LCD display;

Warning & Alarm Page:

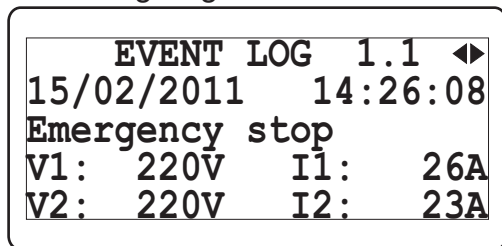


**1/3:** The first message of current alarms.

**Emergency stop!:** This message indicates that an emergency stop alarm has occurred.

Event Log display pages on the LCD display;

Event Log Page1:



**1.1:** The first page of related event log

**Emergency stop:** This message indicates that an emergency stop alarm has occurred. (Event history: 15/02/2011 date, 14:26:08 time).

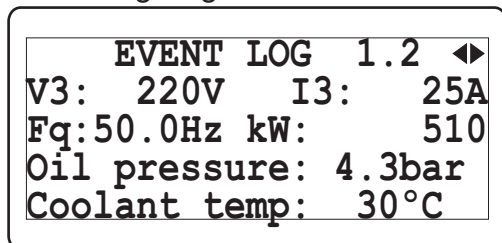
**V1:** Generator voltage L1-N

**I1:** Load Current L1

**V2:** Generator voltage L2-N

**I2:** Load Current L2

Event Log Page2:



**1.2:** The second page of related event log

**V3:** Generator voltage L3-N

**I3:** Load Current L3

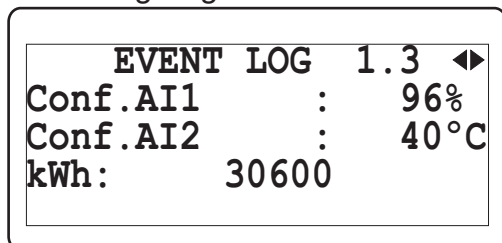
**Fq:** Generator frequency

**kW:** Generator total active power

**Oil oressure:** Oil pressure sender input value

**Coolant temp:** Coolant temperature sender input value

Event Log Page3:



**1.3:** The last page of related event log

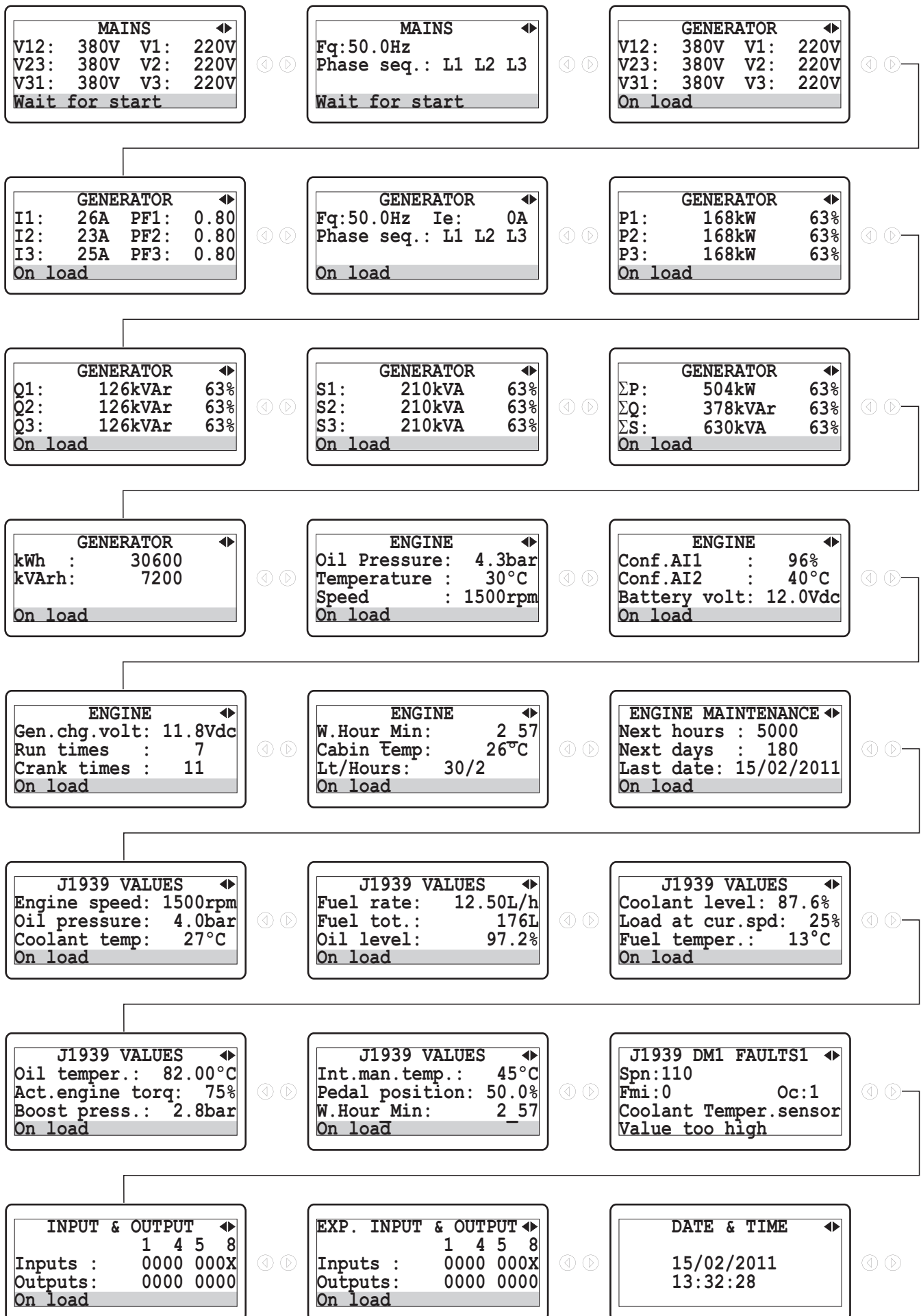
**Conf. AI1:** Configurable Analog Input-1 value

**Conf. AI2:** Configurable Analog Input-2 value

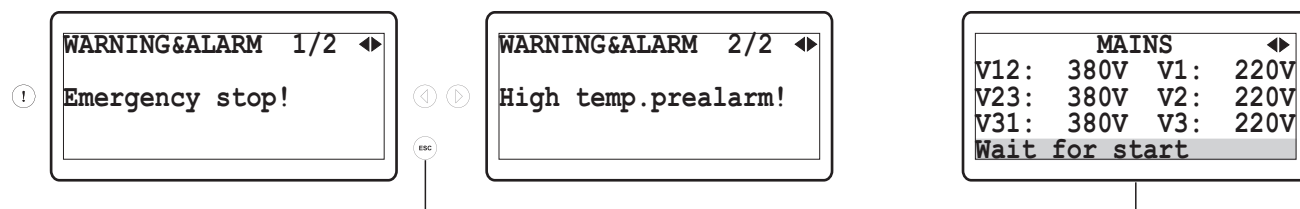
**kWh:** Generator active energy

Events (from 1 to 500) can be displayed sequentially with the Next and Previous buttons.

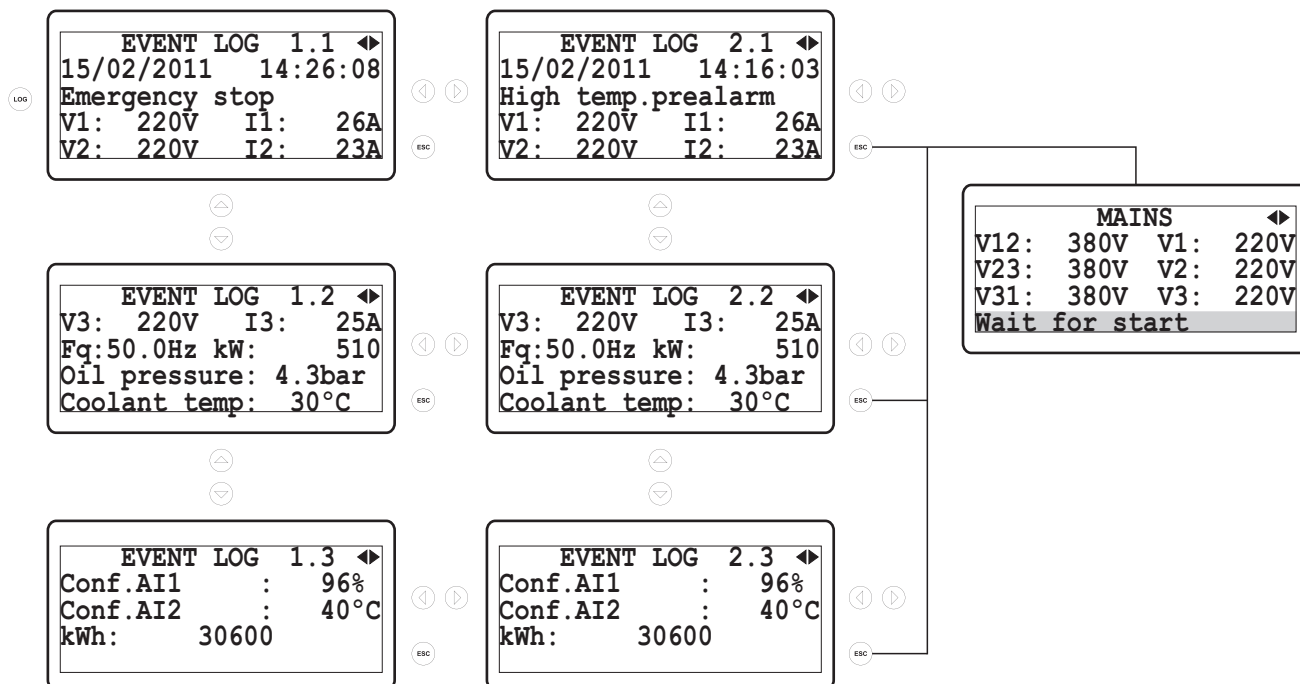
**Example-1:** Displaying all Data display pages.



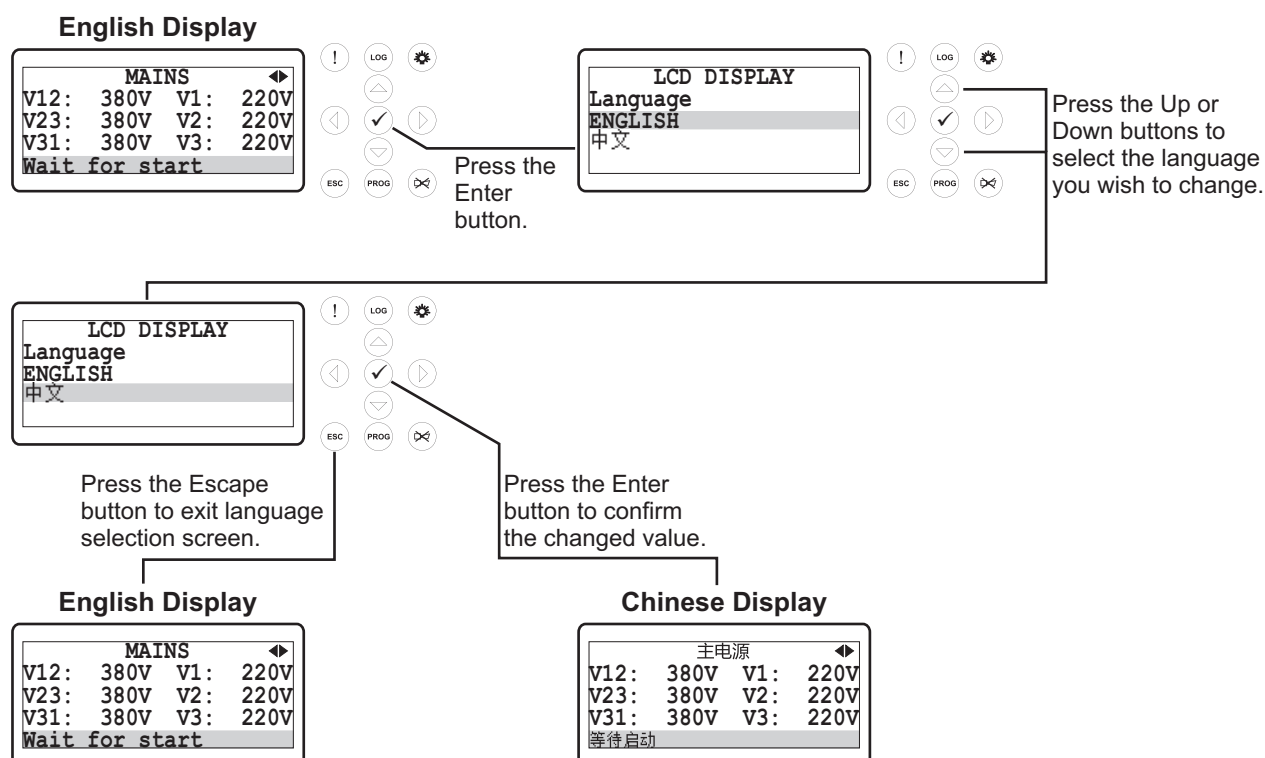
## Example-2: Displaying all Warning&Alarm display pages



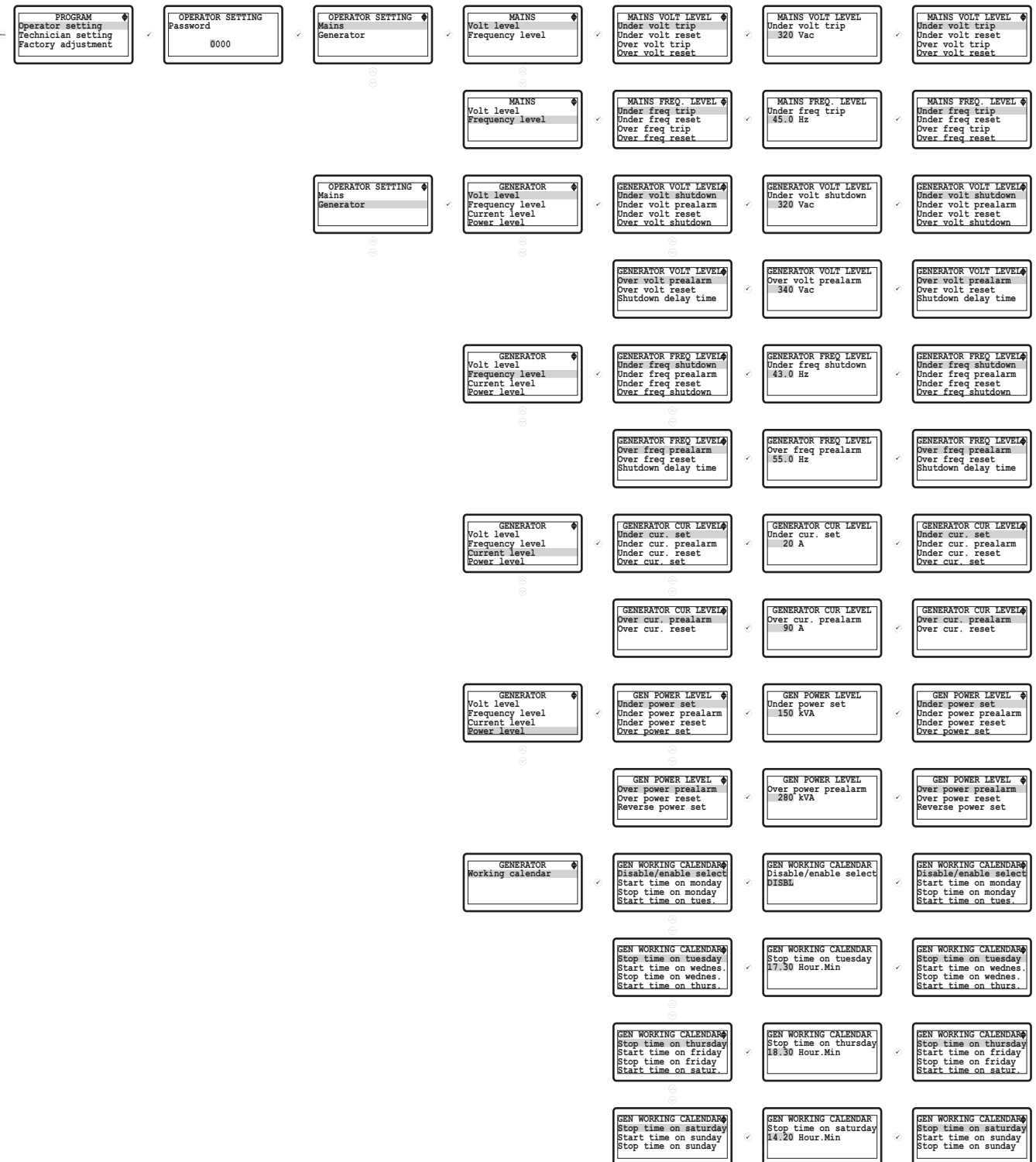
## Example-3: Displaying all Event Log display pages



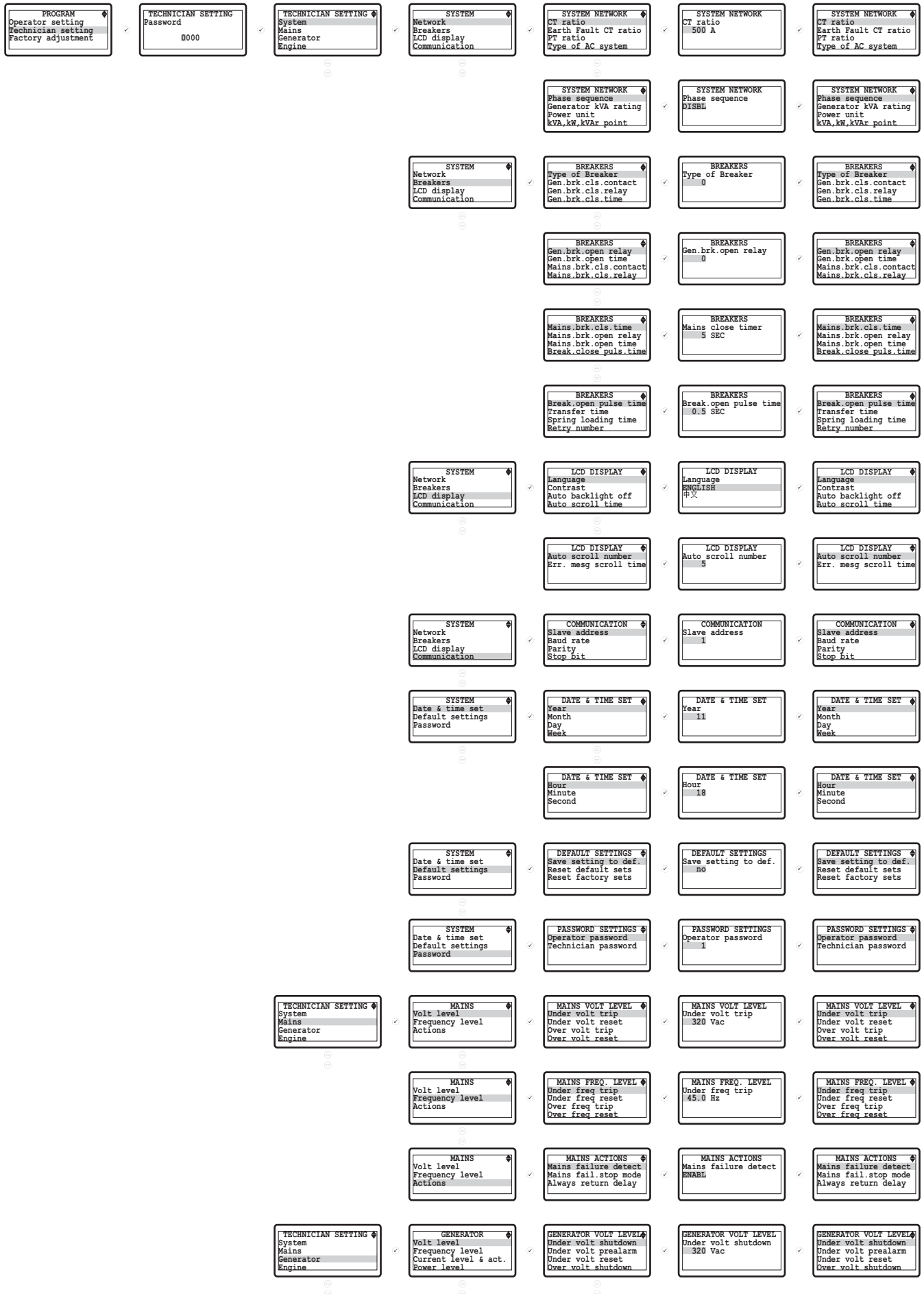
## LCD display language selection



## 3.2 Accessing To The Operator Parameters



### 3.3 Accessing To The Technician Parameters



|                                                                                   |   |                                                                                                                       |   |                                                                 |   |                                                                                                                                                                         |
|-----------------------------------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                   |   | GENERATOR VOLT LEVEL<br>Over volt prealarm<br>Over volt reset<br>Shutdown delay time                                  | ✓ | GENERATOR VOLT LEVEL<br>Over volt prealarm<br>340 Vac           | ✓ | GENERATOR VOLT LEVEL<br>Over volt prealarm<br>Over volt reset<br>Shutdown delay time                                                                                    |
| GENERATOR<br>Volt level<br>Frequency level<br>Current level & act.<br>Power level | ✓ | GENERATOR FREQ LEVEL<br>Nominal frequency<br>Under freq shutdown<br>Under freq prealarm<br>Under freq reset           | ✓ | GENERATOR FREQ LEVEL<br>Nominal frequency<br>50.0 Hz            | ✓ | GENERATOR FREQ LEVEL<br>Nominal frequency<br>Under freq shutdown<br>Under freq prealarm<br>Under freq reset                                                             |
|                                                                                   |   | GENERATOR FREQ LEVEL<br>Over freq shutdown<br>Over freq prealarm<br>Over freq reset<br>Shutdown delay time            | ✓ | GENERATOR FREQ LEVEL<br>Over freq shutdown<br>58.0 Hz           | ✓ | GENERATOR FREQ LEVEL<br>Over freq shutdown<br>Over freq prealarm<br>Over freq reset<br>Shutdown delay time                                                              |
| GENERATOR<br>Volt level<br>Frequency level<br>Current level & act.<br>Power level | ✓ | GEN CUR LEVEL & ACT<br>Under cur. set<br>Under cur. prealarm<br>Under cur. reset<br>Under cur. act.                   | ✓ | GEN CUR LEVEL & ACT<br>Under cur. set<br>20 A                   | ✓ | GEN CUR LEVEL & ACT<br>Under cur. set<br>Under cur. prealarm<br>Under cur. reset<br>Under cur. act.                                                                     |
|                                                                                   |   | GEN CUR LEVEL & ACT<br>Under act. delay time<br>Over cur. set<br>Over cur. prealarm<br>Over cur. reset                | ✓ | GEN CUR LEVEL & ACT<br>Under act. delay time<br>2 SEC           | ✓ | GEN CUR LEVEL & ACT<br>Under act. delay time<br>Over cur. set<br>Over cur. prealarm<br>Over cur. reset                                                                  |
|                                                                                   |   | GEN CUR LEVEL & ACT<br>Over cur. act.<br>Over act. delay time<br>Short circuit cur.<br>Earth fault cur.               | ✓ | GEN CUR LEVEL & ACT<br>Over cur. act.<br>DISBL                  | ✓ | GEN CUR LEVEL & ACT<br>Over cur. act.<br>Over act. delay time<br>Short circuit cur.<br>Earth fault cur.                                                                 |
|                                                                                   |   | GEN CUR LEVEL & ACT<br>Earth fault cur. act.<br>E.F. act. delay time<br>Unbalance load set<br>Unbalance load act.     | ✓ | GEN CUR LEVEL & ACT<br>Earth fault cur. act.<br>DISBL           | ✓ | GEN CUR LEVEL & ACT<br>Earth fault cur. act.<br>E.F. act. delay time<br>Unbalance load set<br>Unbalance load act.                                                       |
|                                                                                   |   | GEN CUR LEVEL & ACT<br>Unbalance act. delay                                                                           | ✓ | GEN CUR LEVEL & ACT<br>Unbalance act. delay<br>2 SEC            | ✓ | GEN CUR LEVEL & ACT<br>Unbalance act. delay                                                                                                                             |
| GENERATOR<br>Volt level<br>Frequency level<br>Current level & act.<br>Power level | ✓ | GEN POWER LEVEL<br>Under power set<br>Under power prealarm<br>Under power reset<br>Under power act.                   | ✓ | GEN POWER LEVEL<br>Under power shutdown<br>150 kVA              | ✓ | GEN POWER LEVEL<br>Under power set<br>Under power prealarm<br>Under power reset<br>Under power act.                                                                     |
|                                                                                   |   | GEN POWER LEVEL<br>Under act. delay time<br>Over power set<br>Over power prealarm<br>Over power reset                 | ✓ | GEN POWER LEVEL<br>Under act. delay time<br>2 SEC               | ✓ | GEN POWER LEVEL<br>Under act. delay time<br>Over power set<br>Over power prealarm<br>Over power reset                                                                   |
|                                                                                   |   | GEN POWER LEVEL<br>Over power act.<br>Over act. delay time<br>Reverse power set<br>Reverse power act.                 | ✓ | GEN POWER LEVEL<br>Over power act.<br>DISBL                     | ✓ | GEN POWER LEVEL<br>Over power act.<br>Over act. delay time<br>Reverse power set<br>Reverse power act.                                                                   |
|                                                                                   |   | GEN POWER LEVEL<br>Rv.pow.act.delay time                                                                              | ✓ | GEN POWER LEVEL<br>Rv.pow.act.delay time<br>2 SEC               | ✓ | GEN POWER LEVEL<br>Rv.pow.act.delay time                                                                                                                                |
| GENERATOR<br>Working calendar<br>General                                          | ✓ | GEN WORKING CALENDAR<br>Disable/enable select<br>Start time on monday<br>Stop time on monday<br>Start time on tues.   | ✓ | GEN WORKING CALENDAR<br>Disable/enable select<br>DISBL          | ✓ | GEN WORKING CALENDAR<br>Disable/enable select<br>Start time on tuesday<br>Stop time on tuesday<br>Start time on wednes.<br>Stop time on wednes.<br>Start time on thurs. |
|                                                                                   |   | GEN WORKING CALENDAR<br>Stop time on tuesday<br>Start time on wednes.<br>Stop time on wednes.<br>Start time on thurs. | ✓ | GEN WORKING CALENDAR<br>Stop time on tuesday<br>17.30 Hour.Min  | ✓ | GEN WORKING CALENDAR<br>Stop time on tuesday<br>Start time on wednes.<br>Stop time on wednes.<br>Start time on thurs.                                                   |
|                                                                                   |   | GEN WORKING CALENDAR<br>Stop time on thursday<br>Start time on friday<br>Stop time on friday<br>Start time on satur.  | ✓ | GEN WORKING CALENDAR<br>Stop time on thursday<br>18.30 Hour.Min | ✓ | GEN WORKING CALENDAR<br>Stop time on thursday<br>Start time on friday<br>Stop time on friday<br>Start time on satur.                                                    |
|                                                                                   |   | GEN WORKING CALENDAR<br>Stop time on saturday<br>Start time on sunday<br>Stop time on sunday                          | ✓ | GEN WORKING CALENDAR<br>Stop time on saturday<br>14.20 Hour.Min | ✓ | GEN WORKING CALENDAR<br>Stop time on saturday<br>Start time on sunday<br>Stop time on Sunday                                                                            |
| GENERATOR<br>Working calendar<br>General                                          | ✓ | GENERATOR GENERAL<br>Sens.option gen.freq<br>Sens.opt.pickup&flywh<br>All warning are latch                           | ✓ | GENERATOR GENERAL<br>Sens.option gen.freq<br>DISBL              | ✓ | GENERATOR GENERAL<br>Sens.option gen.freq<br>Sens.opt.pickup&flywh<br>All warning are latch                                                                             |
| TECHNICIAN SETTING<br>System<br>Mains<br>Generator<br>Engine                      | ✓ | ENGINE<br>Starting options<br>Crank disconnect<br>Speed settings<br>Plant battery                                     | ✓ | ENGINE START OPTIONS<br>Horn prior start<br>DISBL               | ✓ | ENGINE START OPTIONS<br>Horn prior start<br>No. of start attempt<br>Cranking time<br>Crank rest time                                                                    |

|                                                                                   |   |                                                                                                                       |   |                                                          |   |                                                                                                                       |
|-----------------------------------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------|---|----------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------|
|                                                                                   |   | ENGINE START OPTIONS<br>Pickup fail delay                                                                             | ✓ | ENGINE START OPTIONS<br>Pickup fail delay<br>1.0 sec     | ✓ | ENGINE START OPTIONS<br>Pickup fail delay                                                                             |
| ENGINE<br>Starting options<br>Crank disconnect<br>Speed settings<br>Plant battery | ✓ | ENG. CRANK DISCONNECT<br>Generator frequency<br>Engine speed<br>Generator volt<br>Alt. Charge volt                    | ✓ | ENG. CRANK DISCONNECT<br>Generator frequency<br>30.0 Hz  | ✓ | ENG. CRANK DISCONNECT<br>Generator frequency<br>Engine speed<br>Generator volt<br>Alt. Charge volt                    |
|                                                                                   |   | ENG. CRANK DISCONNECT<br>Oil pressure                                                                                 | ✓ | ENG. CRANK DISCONNECT<br>Oil pressure<br>DISBL           | ✓ | ENG. CRANK DISCONNECT<br>Oil pressure                                                                                 |
| ENGINE<br>Starting options<br>Crank disconnect<br>Speed settings<br>Plant battery | ✓ | ENGINE SPEED SETS<br>Nominal speed<br>Under speed shutdown<br>Under speed prealarm<br>Under speed reset               | ✓ | ENGINE SPEED SETS<br>Nominal speed<br>1500 RPM           | ✓ | ENGINE SPEED SETS<br>Nominal speed<br>Under speed shutdown<br>Under speed prealarm<br>Under speed reset               |
|                                                                                   |   | ENGINE SPEED SETS<br>Over speed shutdown<br>Over speed prealarm<br>Over speed reset<br>Shutdown delay time            | ✓ | ENGINE SPEED SETS<br>Over speed shutdown<br>DISBL        | ✓ | ENGINE SPEED SETS<br>Over speed shutdown<br>Over speed prealarm<br>Over speed reset<br>Shutdown delay time            |
| ENGINE<br>Starting options<br>Crank disconnect<br>Speed settings<br>Plant battery | ✓ | ENGINE PLANT BATTERY<br>Under volt<br>Under volt reset<br>Under volt delay<br>Over volt                               | ✓ | ENGINE PLANT BATTERY<br>Under volt<br>10.0 Vdc           | ✓ | ENGINE PLANT BATTERY<br>Under volt<br>Under volt reset<br>Under volt delay<br>Over volt                               |
|                                                                                   |   | ENGINE PLANT BATTERY<br>Over volt reset<br>Over volt delay<br>Alt. chg. warning                                       | ✓ | ENGINE PLANT BATTERY<br>Over volt reset<br>29.5 Vdc      | ✓ | ENGINE PLANT BATTERY<br>Over volt reset<br>Over volt delay<br>Alt. chg. warning                                       |
| ENGINE<br>CanBus ECU<br>CanBus error set<br>Maintenance<br>Load test              | ✓ | CANBUS ECU<br>Baud rate<br>J1939 ECU type<br>Device address<br>Engine cont. address                                   | ✓ | CANBUS ECU<br>Baud rate<br>4                             | ✓ | CANBUS ECU<br>Baud rate<br>J1939 ECU type<br>Device address<br>Engine cont. address                                   |
|                                                                                   |   | CANBUS ECU<br>ECU remote control<br>Speed control enable<br>Oil Pres cont. enab<br>Temp. control enable               | ✓ | CANBUS ECU<br>ECU remote control<br>DISBL                | ✓ | CANBUS ECU<br>ECU remote control<br>Speed control enable<br>Oil Pres cont. enab<br>Temp. control enable               |
|                                                                                   |   | CANBUS ECU<br>Speed set point<br>Speed correction                                                                     | ✓ | CANBUS ECU<br>Speed set point<br>1500 RPM                | ✓ | CANBUS ECU<br>Speed set point<br>Speed correction                                                                     |
| ENGINE<br>CanBus ECU<br>CanBus error set<br>Maintenance<br>Load test              | ✓ | CANBUS ERROR SET<br>CAN fault actions<br>CAN fault activation<br>CAN fault delay<br>Amber warn.actions                | ✓ | CANBUS ERROR SET<br>CAN fault actions<br>DISBL           | ✓ | CANBUS ERROR SET<br>CAN fault actions<br>CAN fault activation<br>CAN fault delay<br>Amber warn.actions                |
|                                                                                   |   | CANBUS ERROR SET<br>Amber warn.activation<br>Amber warn.delay<br>Red stop actions<br>Red stop activation              | ✓ | CANBUS ERROR SET<br>Amber warn.activation<br>2           | ✓ | CANBUS ERROR SET<br>Amber warn.activation<br>Amber warn.delay<br>Red stop actions<br>Red stop activation              |
|                                                                                   |   | CANBUS ERROR SET<br>Red stop delay                                                                                    | ✓ | CANBUS ERROR SET<br>Red stop delay<br>2 SEC              | ✓ | CANBUS ERROR SET<br>Red stop delay                                                                                    |
| ENGINE<br>CanBus ECU<br>CanBus error set<br>Maintenance<br>Load test              | ✓ | ENGINE MAINTENANCE<br>Running hour interval<br>Maint. date interval<br>Eng. stop when maint<br>Eng.running hour (lsb) | ✓ | ENGINE MAINTENANCE<br>Running hour interval<br>5000 HOUR | ✓ | ENGINE MAINTENANCE<br>Running hour interval<br>Maint. date interval<br>Eng. stop when maint<br>Eng.running hour (lsb) |
|                                                                                   |   | ENGINE MAINTENANCE<br>Eng.running hour<br>Eng.running hour (msb)<br>Maintenance okay                                  | ✓ | ENGINE MAINTENANCE<br>Eng.running hour<br>0              | ✓ | ENGINE MAINTENANCE<br>Eng.running hour<br>Eng.running hour (msb)<br>Maintenance okay                                  |
| ENGINE<br>CanBus ECU<br>CanBus error set<br>Maintenance<br>Load test              | ✓ | LOAD TEST<br>Disable/enable select                                                                                    | ✓ | LOAD TEST<br>Disable/enable select<br>DISBL              | ✓ | LOAD TEST<br>Disable/enable select                                                                                    |
| ENGINE<br>Exercise<br>General                                                     | ✓ | EXERCISE<br>Disable/enable select<br>Start time on monday<br>Stop time on monday<br>Start time on tues.               | ✓ | EXERCISE<br>Disable/enable select<br>DISBL               | ✓ | EXERCISE<br>Disable/enable select<br>Start time on monday<br>Stop time on monday<br>Start time on tues.               |
|                                                                                   |   | EXERCISE<br>Stop time on Tuesday<br>Start time on wednes.<br>Stop time on wednes.<br>Start time on thurs.             | ✓ | EXERCISE<br>Stop time on Tuesday<br>0.00 Hour.Min        | ✓ | EXERCISE<br>Stop time on Tuesday<br>Start time on wednes.<br>Stop time on wednes.<br>Start time on thurs.             |

|                                                                                    |                                                                                                                                                                                                                                                                                 |                                                                                                             |                                                                                                                     |                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                    |                                                                                                                                                                                                                                                                                 | EXERCISE<br>Stop time on Thursday<br>Start time on Friday<br>Start time on Saturday<br>Start time on Sunday | EXERCISE<br>Stop time on Thursday<br>0.00 Hour.Min                                                                  | EXERCISE<br>Stop time on Thursday<br>Start time on Friday<br>Start time on Saturday<br>Start time on Sunday                                                                                                                                                                     |
|                                                                                    |                                                                                                                                                                                                                                                                                 | EXERCISE<br>Stop time on Saturday<br>Start time on Sunday<br>Stop time on Sunday                            | EXERCISE<br>Stop time on Saturday<br>0.00 Hour.Min                                                                  | EXERCISE<br>Stop time on Saturday<br>Start time on Sunday<br>Stop time on Sunday                                                                                                                                                                                                |
| ENGINE<br>Exercise<br>General                                                      | ENGINE GENERAL<br>Fuel selection<br>Stop solenoid time<br>Ignition delay<br>Gas valve delay                                                                                                                                                                                     | ENGINE GENERAL<br>Fuel selection<br>1-DIESEL                                                                | ENGINE GENERAL<br>Fuel selection<br>1-DIESEL                                                                        | ENGINE GENERAL<br>Fuel selection<br>Stop solenoid time<br>Ignition delay<br>Gas valve delay                                                                                                                                                                                     |
|                                                                                    | ENGINE GENERAL<br>Min.of ignition speed<br>Choke time                                                                                                                                                                                                                           | ENGINE GENERAL<br>Min.of ignition speed<br>200 RPM                                                          | ENGINE GENERAL<br>Min.of ignition speed<br>Choke time                                                               | ENGINE GENERAL<br>Min.of ignition speed<br>Choke time                                                                                                                                                                                                                           |
| TECHNICIAN SETTING<br>Inputs<br>Outputs<br>Timers<br>Expansion modules             | INPUTS<br>Sender inputs<br>Sender linearisations<br>Conf. input-1<br>Conf. input-2                                                                                                                                                                                              | SENDER INPUTS<br>Oil pressure unit<br>Oil press. input type<br>Oil pressure prealarm<br>Oil pressure reset  | SENDER INPUTS<br>Oil pressure unit<br>Bar                                                                           | SENDER INPUTS<br>Oil pressure unit<br>Oil press. input type<br>Oil pressure prealarm<br>Oil pressure reset                                                                                                                                                                      |
|                                                                                    | SENDER INPUTS<br>Oil pressure shutdown<br>Temperature unit<br>Temp. input type<br>High temp. prealarm                                                                                                                                                                           | SENDER INPUTS<br>Oil press. shutdown<br>1.0 Bar                                                             | SENDER INPUTS<br>Oil pressure shutdown<br>Temperature unit<br>Temp. input type<br>High temp. prealarm               | SENDER INPUTS<br>Oil pressure shutdown<br>Temperature unit<br>Temp. input type<br>High temp. prealarm                                                                                                                                                                           |
|                                                                                    | SENDER INPUTS<br>High temp. reset<br>High temp. shutdown<br>Low temp. Warning<br>Heater control ON                                                                                                                                                                              | SENDER INPUTS<br>High temp. reset<br>88 °C                                                                  | SENDER INPUTS<br>High temp. reset<br>High temp. shutdown<br>Low temp. Warning<br>Heater control ON                  | SENDER INPUTS<br>High temp. reset<br>High temp. shutdown<br>Low temp. Warning<br>Heater control ON                                                                                                                                                                              |
|                                                                                    | SENDER INPUTS<br>Heater control OFF<br>Water pump on time<br>Water pump off time<br>Conf. AI1 unit                                                                                                                                                                              | SENDER INPUTS<br>Heater control OFF<br>45 °C                                                                | SENDER INPUTS<br>Heater control OFF<br>Water pump on time<br>Water pump off time<br>Conf. AI1 unit                  | SENDER INPUTS<br>Heater control OFF<br>Water pump on time<br>Water pump off time<br>Conf. AI1 unit                                                                                                                                                                              |
|                                                                                    | SENDER INPUTS<br>Conf. AI1 type<br>Conf. AI1 low prealarm<br>Conf. AI1 low reset<br>Conf. AI1 low shutdown                                                                                                                                                                      | SENDER INPUTS<br>Conf. AI1 type<br>0-NOT USED                                                               | SENDER INPUTS<br>Conf. AI1 type<br>Conf. AI1 low prealarm<br>Conf. AI1 low reset<br>Conf. AI1 low shutdown          | SENDER INPUTS<br>Conf. AI1 type<br>Conf. AI1 low prealarm<br>Conf. AI1 low reset<br>Conf. AI1 low shutdown                                                                                                                                                                      |
|                                                                                    | SENDER INPUTS<br>Conf. AI1 high prealarm<br>Conf. AI1 high reset<br>Conf. AI1 high shutdown<br>Conf. AI1 control ON                                                                                                                                                             | SENDER INPUTS<br>Conf. AI1 high prealarm<br>DISEL                                                           | SENDER INPUTS<br>Conf. AI1 high prealarm<br>Conf. AI1 high reset<br>Conf. AI1 high shutdown<br>Conf. AI1 control ON | SENDER INPUTS<br>Conf. AI1 high prealarm<br>Conf. AI1 high reset<br>Conf. AI1 high shutdown<br>Conf. AI1 control ON                                                                                                                                                             |
|                                                                                    | SENDER INPUTS<br>Conf. AI1 control OFF<br>Conf. AI2 unit<br>Conf. AI2 type<br>Conf. AI2 low prealarm                                                                                                                                                                            | SENDER INPUTS<br>Conf. AI1 control OFF<br>75 %                                                              | SENDER INPUTS<br>Conf. AI1 control OFF<br>Conf. AI2 unit<br>Conf. AI2 type<br>Conf. AI2 low prealarm                | SENDER INPUTS<br>Conf. AI1 control OFF<br>Conf. AI2 unit<br>Conf. AI2 type<br>Conf. AI2 low prealarm                                                                                                                                                                            |
|                                                                                    | SENDER INPUTS<br>Conf. AI2 low reset<br>Conf. AI2 low shutdown<br>Conf. AI2 high prealarm<br>Conf. AI2 high reset                                                                                                                                                               | SENDER INPUTS<br>Conf. AI2 low reset<br>60 °C                                                               | SENDER INPUTS<br>Conf. AI2 low reset<br>Conf. AI2 high prealarm<br>Conf. AI2 high reset                             | SENDER INPUTS<br>Conf. AI2 low reset<br>Conf. AI2 low shutdown<br>Conf. AI2 high prealarm<br>Conf. AI2 high reset                                                                                                                                                               |
|                                                                                    | SENDER INPUTS<br>Conf. AI2 high shutdown<br>Conf. AI2 control ON<br>Conf. AI2 control OFF                                                                                                                                                                                       | SENDER INPUTS<br>Conf. AI2 high shutdown<br>DISEL                                                           | SENDER INPUTS<br>Conf. AI2 high shutdown<br>Conf. AI2 control ON<br>Conf. AI2 control OFF                           | SENDER INPUTS<br>Conf. AI2 high shutdown<br>Conf. AI2 control ON<br>Conf. AI2 control OFF                                                                                                                                                                                       |
| INPUTS<br>Sender inputs<br>Sender linearisations<br>Conf. input-1<br>Conf. input-2 | SENDER LINEARISATION<br>Oil pressure sender 1<br>Oil pressure sender 2<br>Oil pressure sender 3<br>Oil pressure sender 4<br>Oil pressure sender 5<br>Oil pressure sender 6<br>Oil pressure sender 7<br>Oil pressure sender 8<br>Oil pressure sender 9<br>Oil pressure sender 10 | SENDER LINEARISATION<br>Oil pressure sender 1<br>10 R                                                       | SENDER LINEARISATION<br>Oil pressure sender 3<br>62 R                                                               | SENDER LINEARISATION<br>Oil pressure sender 1<br>Oil pressure sender 2<br>Oil pressure sender 3<br>Oil pressure sender 4<br>Oil pressure sender 5<br>Oil pressure sender 6<br>Oil pressure sender 7<br>Oil pressure sender 8<br>Oil pressure sender 9<br>Oil pressure sender 10 |
|                                                                                    | SENDER LINEARISATION<br>Oil pressure sender 3<br>Oil pressure sender 4<br>Oil pressure sender 5<br>Oil pressure sender 6<br>Oil pressure sender 7<br>Oil pressure sender 8<br>Oil pressure sender 9<br>Oil pressure sender 10                                                   | SENDER LINEARISATION<br>Oil pressure sender 5<br>111 R                                                      | SENDER LINEARISATION<br>Oil pressure sender 7<br>156 R                                                              | SENDER LINEARISATION<br>Oil pressure sender 5<br>Oil pressure sender 6<br>Oil pressure sender 7<br>Oil pressure sender 8<br>Oil pressure sender 9<br>Oil pressure sender 10                                                                                                     |
|                                                                                    | SENDER LINEARISATION<br>Oil pressure sender 7<br>Oil pressure sender 8<br>Oil pressure sender 9<br>Oil pressure sender 10                                                                                                                                                       | SENDER LINEARISATION<br>Oil pressure sender 9<br>205 R                                                      | SENDER LINEARISATION<br>Oil pressure sender 9<br>Oil pressure sender 10                                             | SENDER LINEARISATION<br>Oil pressure sender 9<br>Oil pressure sender 10<br>Oil pressure sender 10                                                                                                                                                                               |

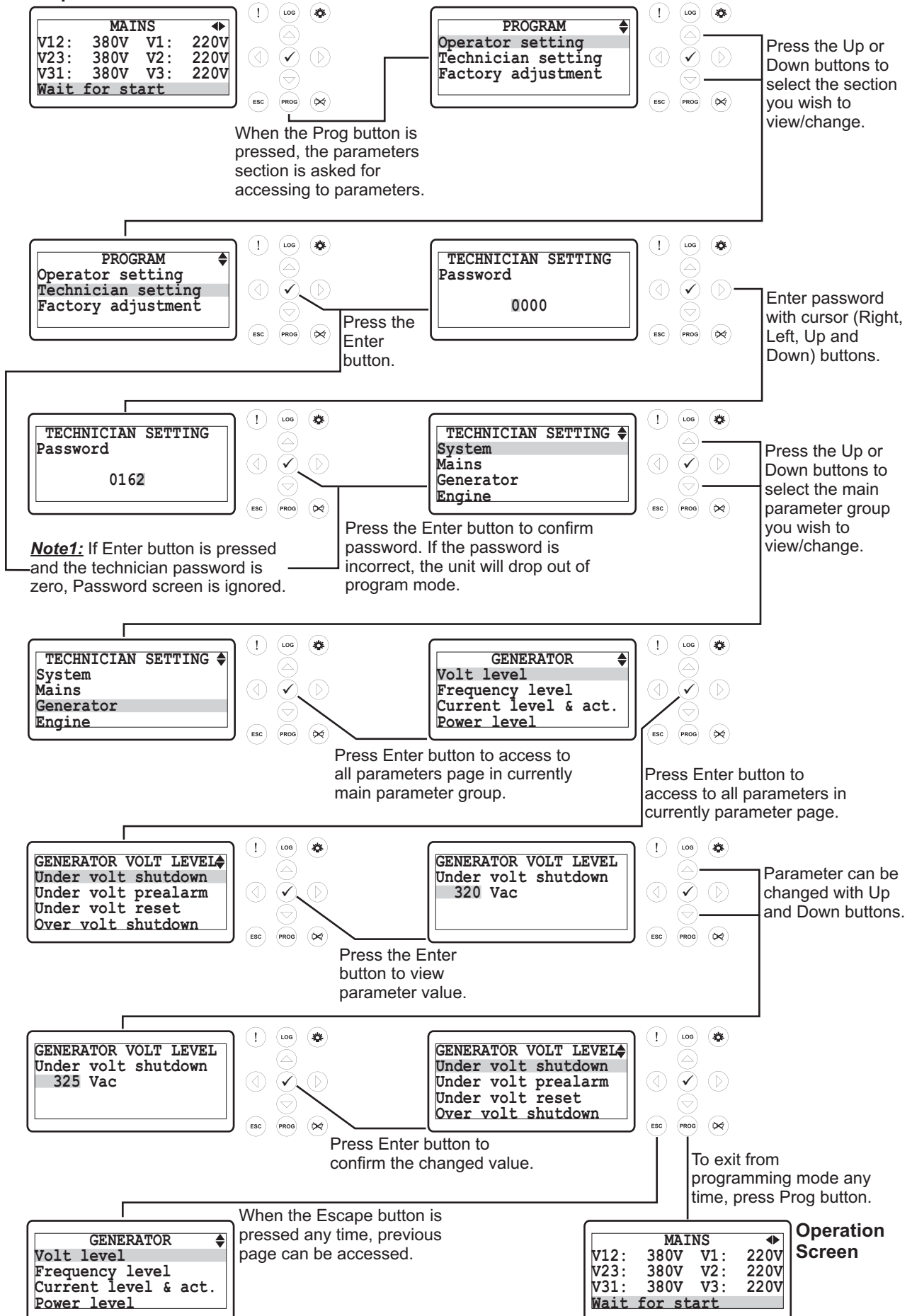
|                                                                                                              |   |                                                                                |   |                                                                                                              |
|--------------------------------------------------------------------------------------------------------------|---|--------------------------------------------------------------------------------|---|--------------------------------------------------------------------------------------------------------------|
| SENDER LINEARISATION<br>Temperature sender 1<br>Temperature 1<br>Temperature sender 2<br>Temperature 2       | ✓ | SENDER LINEARISATION<br>Temperature sender 1<br>350 R                          | ✓ | SENDER LINEARISATION<br>Temperature sender 1<br>Temperature 1<br>Temperature sender 2<br>Temperature 2       |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Temperature sender 3<br>Temperature 3<br>Temperature sender 4<br>Temperature 4       | ✓ | SENDER LINEARISATION<br>Temperature sender 3<br>145 R                          | ✓ | SENDER LINEARISATION<br>Temperature sender 3<br>Temperature 3<br>Temperature sender 4<br>Temperature 4       |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Temperature sender 5<br>Temperature 5<br>Temperature sender 6<br>Temperature 6       | ✓ | SENDER LINEARISATION<br>Temperature sender 5<br>50 R                           | ✓ | SENDER LINEARISATION<br>Temperature sender 5<br>Temperature 5<br>Temperature sender 6<br>Temperature 6       |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Temperature sender 7<br>Temperature 7<br>Temperature sender 8<br>Temperature 8       | ✓ | SENDER LINEARISATION<br>Temperature sender 7<br>43 R                           | ✓ | SENDER LINEARISATION<br>Temperature sender 7<br>Temperature 7<br>Temperature sender 8<br>Temperature 8       |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Temperature sender 9<br>Temperature 9<br>Temperature sender 10<br>Temperature 10     | ✓ | SENDER LINEARISATION<br>Temperature sender 9<br>10 R                           | ✓ | SENDER LINEARISATION<br>Temperature sender 9<br>Temperature 9<br>Temperature sender 10<br>Temperature 10     |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Conf. A11 sender 1<br>Conf. A11 value 1<br>Conf. A11 sender 2<br>Conf. A11 value 2   | ✓ | SENDER LINEARISATION<br>Conf. A11 sender 1<br>10 R                             | ✓ | SENDER LINEARISATION<br>Conf. A11 sender 1<br>Conf. A11 value 1<br>Conf. A11 sender 2<br>Conf. A11 value 2   |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Conf. A11 sender 3<br>Conf. A11 value 3<br>Conf. A11 sender 4<br>Conf. A11 value 4   | ✓ | SENDER LINEARISATION<br>Conf. A11 sender 3<br>50 R                             | ✓ | SENDER LINEARISATION<br>Conf. A11 sender 3<br>Conf. A11 value 3<br>Conf. A11 sender 4<br>Conf. A11 value 4   |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Conf. A11 sender 5<br>Conf. A11 value 5<br>Conf. A11 sender 6<br>Conf. A11 value 6   | ✓ | SENDER LINEARISATION<br>Conf. A11 sender 5<br>90 R                             | ✓ | SENDER LINEARISATION<br>Conf. A11 sender 5<br>Conf. A11 value 5<br>Conf. A11 sender 6<br>Conf. A11 value 6   |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Conf. A11 sender 7<br>Conf. A11 value 7<br>Conf. A11 sender 8<br>Conf. A11 value 8   | ✓ | SENDER LINEARISATION<br>Conf. A11 sender 7<br>130 R                            | ✓ | SENDER LINEARISATION<br>Conf. A11 sender 7<br>Conf. A11 value 7<br>Conf. A11 sender 8<br>Conf. A11 value 8   |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Conf. A11 sender 9<br>Conf. A11 value 9<br>Conf. A11 sender 10<br>Conf. A11 value 10 | ✓ | SENDER LINEARISATION<br>Conf. A11 sender 9<br>170 R                            | ✓ | SENDER LINEARISATION<br>Conf. A11 sender 9<br>Conf. A11 value 9<br>Conf. A11 sender 10<br>Conf. A11 value 10 |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Conf. A12 sender 1<br>Conf. A12 value 1<br>Conf. A12 sender 2<br>Conf. A12 value 2   | ✓ | SENDER LINEARISATION<br>Conf. A12 sender 1<br>579 R                            | ✓ | SENDER LINEARISATION<br>Conf. A12 sender 1<br>Conf. A12 value 1<br>Conf. A12 sender 2<br>Conf. A12 value 2   |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Conf. A12 sender 3<br>Conf. A12 value 3<br>Conf. A12 sender 4<br>Conf. A12 value 4   | ✓ | SENDER LINEARISATION<br>Conf. A12 sender 3<br>342 R                            | ✓ | SENDER LINEARISATION<br>Conf. A12 sender 3<br>Conf. A12 value 3<br>Conf. A12 sender 4<br>Conf. A12 value 4   |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Conf. A12 sender 5<br>Conf. A12 value 5<br>Conf. A12 sender 6<br>Conf. A12 value 6   | ✓ | SENDER LINEARISATION<br>Conf. A12 sender 5<br>179 R                            | ✓ | SENDER LINEARISATION<br>Conf. A12 sender 5<br>Conf. A12 value 5<br>Conf. A12 sender 6<br>Conf. A12 value 6   |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Conf. A12 sender 7<br>Conf. A12 value 7<br>Conf. A12 sender 8<br>Conf. A12 value 8   | ✓ | SENDER LINEARISATION<br>Conf. A12 sender 7<br>103 R                            | ✓ | SENDER LINEARISATION<br>Conf. A12 sender 7<br>Conf. A12 value 7<br>Conf. A12 sender 8<br>Conf. A12 value 8   |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| SENDER LINEARISATION<br>Conf. A12 sender 9<br>Conf. A12 value 9<br>Conf. A12 sender 10<br>Conf. A12 value 10 | ✓ | SENDER LINEARISATION<br>Conf. A12 sender 9<br>67 R                             | ✓ | SENDER LINEARISATION<br>Conf. A12 sender 9<br>Conf. A12 value 9<br>Conf. A12 sender 10<br>Conf. A12 value 10 |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| INPUTS<br>Sender inputs<br>Sender linearisations<br>Conf. input-1<br>Conf. input-2                           | ✓ | CONF. INPUT-1<br>Dis.user conf.or list<br>Polarity<br>Indication<br>Activation | ✓ | CONF. INPUT-1<br>Dis.user conf.or list<br>Polarity<br>Indication<br>Activation                               |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
| ⊖                                                                                                            |   |                                                                                |   |                                                                                                              |
|                                                                                                              | ✓ | CONF. INPUT-1<br>Select from list<br>Active delay                              | ✓ | CONF. INPUT-1<br>Select from list<br>2-AUX. MAINS FAIL<br>Active delay                                       |
|                                                                                                              |   |                                                                                |   |                                                                                                              |

|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------|
| <div> <div>INPUTS</div> <div> Sender inputs<br/> Sender linearisations<br/> Conf. input-1<br/> Conf. input-2 </div> </div>                  | ✓ | <div> <div>CONF. INPUT-2</div> <div> Dis,user conf.or list<br/> Polarity<br/> Indication<br/> Activation </div> </div>                   | ✓ | <div> <div>CONF. INPUT-2</div> <div> Dis,user conf.or list<br/> 1 </div> </div>                                                           | ✓ | <div> <div>CONF. INPUT-2</div> <div> Dis,user conf.or list<br/> Polarity<br/> Indication<br/> Activation </div> </div>                   |
|                                                                                                                                             |   | <div> <div>CONF. INPUT-2</div> <div> Select from list<br/> Active delay </div> </div>                                                    |   | <div> <div>CONF. INPUT-2</div> <div> Select from list<br/> 3-SIM.LAMP TEST BUT </div> </div>                                              |   | <div> <div>CONF. INPUT-2</div> <div> Select from list<br/> Active delay </div> </div>                                                    |
|                                                                                                                                             |   | <div> <div>CONF. INPUT-3</div> <div> Dis,user conf.or list<br/> Polarity<br/> Indication<br/> Activation </div> </div>                   |   | <div> <div>CONF. INPUT-3</div> <div> Dis,user conf.or list<br/> 1 </div> </div>                                                           |   | <div> <div>CONF. INPUT-3</div> <div> Dis,user conf.or list<br/> Polarity<br/> Indication<br/> Activation </div> </div>                   |
|                                                                                                                                             |   | <div> <div>CONF. INPUT-3</div> <div> Select from list<br/> Active delay </div> </div>                                                    |   | <div> <div>CONF. INPUT-3</div> <div> Select from list<br/> 4-SIM.HORN REST BUT </div> </div>                                              |   | <div> <div>CONF. INPUT-3</div> <div> Select from list<br/> Active delay </div> </div>                                                    |
| <div> <div>INPUTS</div> <div> Conf. input-3<br/> Conf. input-4<br/> Conf. input-5<br/> Conf. input-6 </div> </div>                          | ✓ | <div> <div>CONF. INPUT-7</div> <div> Input type<br/> Polarity<br/> Indication<br/> Activation </div> </div>                              | ✓ | <div> <div>CONF. INPUT-7</div> <div> Input type<br/> 3 </div> </div>                                                                      | ✓ | <div> <div>CONF. INPUT-7</div> <div> Input type<br/> Polarity<br/> Indication<br/> Activation </div> </div>                              |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
| <div> <div>INPUTS</div> <div> Conf. Exp. input-1<br/> Conf. Exp. input-2<br/> Conf. Exp. input-3 </div> </div>                              | ✓ | <div> <div>CONF. INPUT-7</div> <div> Select from list<br/> Active delay </div> </div>                                                    | ✓ | <div> <div>CONF. INPUT-7</div> <div> Select from list<br/> 8-SIMULATE MAN. BUT </div> </div>                                              | ✓ | <div> <div>CONF. INPUT-7</div> <div> Select from list<br/> Active delay </div> </div>                                                    |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
| <div> <div>INPUTS</div> <div> Conf. Exp. input-4<br/> Conf. Exp. input-5<br/> Conf. Exp. input-6<br/> Conf. Exp. input-7 </div> </div>      | ✓ | <div> <div>CONF. EXP. INPUT-4</div> <div> Dis,user conf.or list<br/> Hardware type<br/> Polarity<br/> Indication </div> </div>           | ✓ | <div> <div>CONF. EXP. INPUT-4</div> <div> Dis,user conf.or list<br/> 1 </div> </div>                                                      | ✓ | <div> <div>CONF. EXP. INPUT-4</div> <div> Dis,user conf.or list<br/> Hardware type<br/> Polarity<br/> Indication </div> </div>           |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
| <div> <div>INPUTS</div> <div> Conf. Exp. input-8 </div> </div>                                                                              | ✓ | <div> <div>CONF. EXP. INPUT-4</div> <div> Activation<br/> Select from list<br/> Active delay </div> </div>                               | ✓ | <div> <div>CONF. EXP. INPUT-4</div> <div> Activation<br/> 2 </div> </div>                                                                 | ✓ | <div> <div>CONF. EXP. INPUT-4</div> <div> Activation<br/> Select from list<br/> Active delay </div> </div>                               |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
| <div> <div>INPUTS</div> <div> Conf. Exp. input-8 </div> </div>                                                                              | ✓ | <div> <div>CONF. EXP. INPUT-8</div> <div> Dis,user conf.or list<br/> Hardware type<br/> Polarity<br/> Indication </div> </div>           | ✓ | <div> <div>CONF. EXP. INPUT-8</div> <div> Dis,user conf.or list<br/> 1 </div> </div>                                                      | ✓ | <div> <div>CONF. EXP. INPUT-8</div> <div> Dis,user conf.or list<br/> Hardware type<br/> Polarity<br/> Indication </div> </div>           |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
| <div> <div>INPUTS</div> <div> Conf. Exp. input-8 </div> </div>                                                                              | ✓ | <div> <div>CONF. EXP. INPUT-8</div> <div> Activation<br/> Select from list<br/> Active delay </div> </div>                               | ✓ | <div> <div>CONF. EXP. INPUT-8</div> <div> Activation<br/> 2 </div> </div>                                                                 | ✓ | <div> <div>CONF. EXP. INPUT-8</div> <div> Activation<br/> Select from list<br/> Active delay </div> </div>                               |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
| <div> <div>TECHNICIAN SETTING</div> <div> Inputs<br/> Outputs<br/> Timers<br/> Expansion modules </div> </div>                              | ✓ | <div> <div>OUTPUTS</div> <div> Conf. output-1<br/> Conf. output-2<br/> Conf. output-3<br/> Conf. output-4 </div> </div>                  | ✓ | <div> <div>CONF. OUTPUT-1</div> <div> Polarity<br/> Function </div> </div>                                                                | ✓ | <div> <div>CONF. OUTPUT-1</div> <div> Polarity<br/> NO<br/> Function </div> </div>                                                       |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
| <div> <div>OUTPUTS</div> <div> Conf. output-5<br/> Conf. output-6<br/> Conf. Exp. output-1<br/> Conf. Exp. output-2 </div> </div>           | ✓ | <div> <div>CONF. OUTPUT-5</div> <div> Polarity<br/> Function </div> </div>                                                               | ✓ | <div> <div>CONF. OUTPUT-5</div> <div> Polarity<br/> NO<br/> Function </div> </div>                                                        | ✓ | <div> <div>CONF. OUTPUT-5</div> <div> Polarity<br/> Function </div> </div>                                                               |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
| <div> <div>OUTPUTS</div> <div> Conf. Exp. output-3<br/> Conf. Exp. output-4<br/> Conf. Exp. output-5<br/> Conf. Exp. output-6 </div> </div> | ✓ | <div> <div>CONF. EXP. OUTPUT-3</div> <div> Polarity<br/> Function </div> </div>                                                          | ✓ | <div> <div>CONF. EXP. OUTPUT-3</div> <div> Polarity<br/> NO<br/> Function </div> </div>                                                   | ✓ | <div> <div>CONF. EXP. OUTPUT-3</div> <div> Polarity<br/> Function </div> </div>                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
| <div> <div>OUTPUTS</div> <div> Conf. Exp. output-5<br/> Conf. Exp. output-6<br/> Conf. Exp. output-7<br/> Conf. Exp. output-8 </div> </div> | ✓ | <div> <div>CONF. EXP. OUTPUT-5</div> <div> Polarity<br/> Function </div> </div>                                                          | ✓ | <div> <div>CONF. EXP. OUTPUT-5</div> <div> Polarity<br/> NO<br/> Function </div> </div>                                                   | ✓ | <div> <div>CONF. EXP. OUTPUT-5</div> <div> Polarity<br/> Function </div> </div>                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
| <div> <div>TECHNICIAN SETTING</div> <div> Inputs<br/> Outputs<br/> Timers<br/> Expansion modules </div> </div>                              | ✓ | <div> <div>TIMERS</div> <div> Start timers<br/> Stopping timers </div> </div>                                                            | ✓ | <div> <div>START TIMERS</div> <div> Mains transient delay<br/> Mains fail start delay<br/> Remote start delay<br/> Pre-heat </div> </div> | ✓ | <div> <div>START TIMERS</div> <div> Mains transient delay<br/> 2.0 SEC<br/> Pre-heat bypass<br/> 0 MIN </div> </div>                     |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
| <div> <div>TIMERS</div> <div> Start timers<br/> Stopping timers </div> </div>                                                               | ✓ | <div> <div>STOPPING TIMERS</div> <div> Mains return delay<br/> Remote stop delay<br/> Cooling time<br/> Fail to stop delay </div> </div> | ✓ | <div> <div>STOPPING TIMERS</div> <div> Mains return delay<br/> 5 SEC </div> </div>                                                        | ✓ | <div> <div>STOPPING TIMERS</div> <div> Mains return delay<br/> Remote stop delay<br/> Cooling time<br/> Fail to stop delay </div> </div> |
|                                                                                                                                             |   |                                                                                                                                          |   |                                                                                                                                           |   |                                                                                                                                          |
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|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>TECHNICIAN SETTING</b><br>Inputs<br>Outputs<br>Timers<br>Expansion modules | <b>EXPANSION MODULES</b><br>IO (1-8)<br>Dial-up & Ethernet<br>GPRS<br>Dual set                                  | <b>IO (1-8) MODULE</b><br>Disable/enable select                                                                  | <b>IO (1-8) MODULE</b><br>Disable/enable select<br>DISBL        | <b>IO (1-8) MODULE</b><br>Disable/enable select                                                                  |
|                                                                               | <b>EXPANSION MODULES</b><br>IO (1-8)<br>Dial-up & Ethernet<br>GPRS<br>Dual set                                  | <b>DIAL-UP &amp; ETHERNET</b><br>Disable/enable select<br>Call back selection                                    | <b>DIAL-UP &amp; ETHERNET</b><br>Disable/enable select<br>DISBL | <b>DIAL-UP &amp; ETHERNET</b><br>Disable/enable select<br>Call back selection                                    |
|                                                                               | <b>EXPANSION MODULES</b><br>IO (1-8)<br>Dial-up & Ethernet<br>GPRS<br>Dual set                                  | <b>GPRS MODULE</b><br>Disable/enable select<br>Call back selection<br>Cell inf refresh rate<br>Location data     | <b>GPRS MODULE</b><br>Disable/enable select<br>1-GPRS SERVER    | <b>GPRS MODULE</b><br>Disable/enable select<br>Call back selection<br>Cell inf refresh rate<br>Location data     |
|                                                                               | <b>EXPANSION MODULES</b><br>IO (1-8)<br>Dial-up & Ethernet<br>GPRS<br>Dual set                                  | <b>DUAL SET MODULE</b><br>Disable/enable select<br>Node ID<br>Working period<br>Early start time                 | <b>DUAL SET MODULE</b><br>Disable/enable select<br>DISBL        | <b>DUAL SET MODULE</b><br>Disable/enable select<br>Node ID<br>Working period<br>Early start time                 |
|                                                                               |                                                                                                                 | <b>DUAL SET MODULE</b><br>Remote priority select                                                                 | <b>DUAL SET MODULE</b><br>Remote priority select<br>DISBL       | <b>DUAL SET MODULE</b><br>Remote priority select                                                                 |
|                                                                               | <b>EXPANSION MODULES</b><br>Web Server<br>GPRS Web                                                              | <b>WEB SERVER MODULE</b><br>Disable/enable select                                                                | <b>WEB SERVER MODULE</b><br>Disable/enable select<br>DISBL      | <b>WEB SERVER MODULE</b><br>Disable/enable select                                                                |
| <b>TECHNICIAN SETTING</b><br>User adjustment                                  | <b>EXPANSION MODULES</b><br>Web Server<br>GPRS Web                                                              | <b>GPRS WEB MODULE</b><br>Disable/enable select                                                                  | <b>GPRS WEB MODULE</b><br>Disable/enable select<br>DISBL        | <b>GPRS WEB MODULE</b><br>Disable/enable select                                                                  |
|                                                                               | <b>USER ADJUSTMENT</b><br>Mains voltage offset<br>Gen. voltage offset<br>Current offset<br>Battery&chrg.gen.vol | <b>MAINS VOLTAGE OFFSET</b><br>Mains V1 offset<br>Mains V2 offset<br>Mains V3 offset                             | <b>MAINS VOLTAGE OFFSET</b><br>Mains V1 offset<br>0 Vac         | <b>MAINS VOLTAGE OFFSET</b><br>Mains V1 offset<br>Mains V2 offset<br>Mains V3 offset                             |
|                                                                               | <b>USER ADJUSTMENT</b><br>Mains voltage offset<br>Gen. voltage offset<br>Current offset<br>Battery&chrg.gen.vol | <b>GEN. VOLTAGE OFFSET</b><br>Gen. V1 offset<br>Gen. V2 offset<br>Gen. V3 offset                                 | <b>GEN. VOLTAGE OFFSET</b><br>Gen. V1 offset<br>0 Vac           | <b>GEN. VOLTAGE OFFSET</b><br>Gen. V1 offset<br>Gen. V2 offset<br>Gen. V3 offset                                 |
|                                                                               | <b>USER ADJUSTMENT</b><br>Mains voltage offset<br>Gen. voltage offset<br>Current offset<br>Battery&chrg.gen.vol | <b>CURRENT OFFSET</b><br>Current I1 offset<br>Current I2 offset<br>Current I3 offset<br>E/F Current offset       | <b>CURRENT OFFSET</b><br>Current I1 offset<br>0 A               | <b>CURRENT OFFSET</b><br>Current I1 offset<br>Current I2 offset<br>Current I3 offset<br>E/F Current offset       |
|                                                                               | <b>USER ADJUSTMENT</b><br>Mains voltage offset<br>Gen. voltage offset<br>Current offset<br>Battery&chrg.gen.vol | <b>BATTERY&amp;CHRG GEN.VOL</b><br>Batt.volt offset<br>Gen.chg.volt offset                                       | <b>BATTERY&amp;CHRG GEN.VOL</b><br>Batt.volt offset<br>0.0 Vdc  | <b>BATTERY&amp;CHRG GEN.VOL</b><br>Batt.volt offset<br>Gen.chg.volt offset                                       |
|                                                                               | <b>USER ADJUSTMENT</b><br>Sender inputs offset                                                                  | <b>SENDER INPUTS OFFSET</b><br>Oil pressure offset<br>Temperature offset<br>Conf. A11 offset<br>Conf. A12 offset | <b>SENDER INPUTS OFFSET</b><br>Oil pressure offset<br>0.0 Bar   | <b>SENDER INPUTS OFFSET</b><br>Oil pressure offset<br>Temperature offset<br>Conf. A11 offset<br>Conf. A12 offset |

### 3.4 Changing And Saving Parameters Values

#### Operation Screen



## 4. Parameters

### 4.1 Operator Parameters

#### 4.1.1 Mains

| MAINS VOLT LEVEL ( <i>Mains-&gt;Volt level</i> ) |                           | Min | Max | Default | Unit     |
|--------------------------------------------------|---------------------------|-----|-----|---------|----------|
| Under volt trip                                  | Mains Under Voltage       | 60  | 600 | 320     | V $\sim$ |
| Under volt reset                                 | Mains Under Voltage Reset | 60  | 600 | 340     | V $\sim$ |
| Over volt trip                                   | Mains Over Voltage        | 60  | 600 | 440     | V $\sim$ |
| Over volt reset                                  | Mains Over Voltage Reset  | 60  | 600 | 420     | V $\sim$ |

| MAINS FREQ. LEVEL ( <i>Mains-&gt;Frequency level</i> ) |                             | Min  | Max  | Default | Unit |
|--------------------------------------------------------|-----------------------------|------|------|---------|------|
| Under freq trip                                        | Mains Under Frequency       | 20.0 | 75.0 | 45.0    | Hz   |
| Under freq reset                                       | Mains Under Frequency Reset | 20.0 | 75.0 | 48.0    | Hz   |
| Over freq trip                                         | Mains Over Frequency        | 20.0 | 75.0 | 55.0    | Hz   |
| Over freq reset                                        | Mains Over Frequency Reset  | 20.0 | 75.0 | 52.0    | Hz   |

#### 4.1.2 Generator

| GENERATOR VOLT LEVEL ( <i>Generator-&gt;Volt level</i> ) |                                         | Min     | Max  | Default | Unit     |
|----------------------------------------------------------|-----------------------------------------|---------|------|---------|----------|
| Under volt shutdown                                      | Generator Under Voltage Shutdown        | 60(dis) | 600  | 320     | V $\sim$ |
| Under volt prealarm                                      | Generator Under Voltage Pre-Alarm       | 60(dis) | 600  | 340     | V $\sim$ |
| Under volt reset                                         | Generator Under Voltage Pre-Alarm Reset | 60      | 600  | 350     | V $\sim$ |
| Over volt shutdown                                       | Generator Over Voltage Shutdown         | 60      | 600  | 440     | V $\sim$ |
| Over volt prealarm                                       | Generator Over Voltage Pre-Alarm        | 60(dis) | 600  | 420     | V $\sim$ |
| Over volt reset                                          | Generator Over Voltage Pre-Alarm Reset  | 60      | 600  | 400     | V $\sim$ |
| Shutdown delay time                                      | Generator Voltage Shutdown Delay Time   | 0.0     | 10.0 | 1.0     | Sec      |

| GENERATOR FREQ LEVEL ( <i>Generator-&gt;Frequency level</i> ) |                                           | Min       | Max  | Default | Unit |
|---------------------------------------------------------------|-------------------------------------------|-----------|------|---------|------|
| Nominal frequency                                             | Nominal Alternator Frequency              | 30.0      | 75.0 | 50.0    | Hz   |
| Under freq shutdown                                           | Generator Under Frequency Shutdown        | 30.0(dis) | 75.0 | 43.0    | Hz   |
| Under freq prealarm                                           | Generator Under Frequency Pre-Alarm       | 30.0(dis) | 75.0 | 45.0    | Hz   |
| Under freq reset                                              | Generator Under Frequency Pre-Alarm Reset | 30.0      | 75.0 | 46.0    | Hz   |
| Over freq shutdown                                            | Generator Over Frequency Shutdown         | 30.0(dis) | 75.0 | 58.0    | Hz   |
| Over freq prealarm                                            | Generator Over Frequency Pre-Alarm        | 30.0(dis) | 75.0 | 55.0    | Hz   |
| Over freq reset                                               | Generator Over Frequency Pre-Alarm Reset  | 30.0      | 75.0 | 54.0    | Hz   |
| Shutdown delay time                                           | Generator Frequency Shutdown Delay Time   | 0.0       | 10.0 | 1.0     | Sec  |

| GENERATOR CUR LEVEL ( <i>Generator-&gt;Current level</i> ) |                                         | Min         | Max  | Default | Unit     |
|------------------------------------------------------------|-----------------------------------------|-------------|------|---------|----------|
| Under cur. set                                             | Generator Under Current Set             | 0           | 9999 | 1       | A $\sim$ |
| Under cur. prealarm                                        | Generator Under Current Pre-Alarm       | 0(dis)      | 9999 | dis     | A $\sim$ |
| Under cur. reset                                           | Generator Under Current Pre-Alarm Reset | 0           | 9999 | 5       | A $\sim$ |
| Over cur. IDMT alarm                                       | Generator Over Current IDMT Alarm       | ENABL/DISBL |      | DISBL   |          |
| Over cur. set                                              | Generator Over Current Set              | 0           | 9999 | 9999    | A $\sim$ |
| Over cur. prealarm                                         | Generator Over Current Pre-Alarm        | 0(dis)      | 9999 | 9990    | A $\sim$ |
| Over cur. reset                                            | Generator Over Current Pre-Alarm Reset  | 0           | 9999 | 9980    | A $\sim$ |

**Note:** dis = disable

| <b>GEN POWER LEVEL (<i>Generator-&gt;Power level</i>)</b> |                                       | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-----------------------------------------------------------|---------------------------------------|-------------|------------|----------------|-------------|
| <b>Under power set</b>                                    | Generator Under Power Set             | 0           | 9999       | 0              | kVA         |
| <b>Under power prealarm</b>                               | Generator Under Power Pre-Alarm       | 0(dis)      | 9999       | dis            | kVA         |
| <b>Under power reset</b>                                  | Generator Under Power Pre-Alarm Reset | 0           | 9999       | 5              | kVA         |
| <b>Over power IDMT alarm</b>                              | Generator Over Power IDMT Alarm       | ENABL/DISBL |            | DISBL          |             |
| <b>Over power set</b>                                     | Generator Over Power Set              | 0           | 9999       | 0              | kVA         |
| <b>Over power prealarm</b>                                | Generator Over Power Pre-Alarm        | 0(dis)      | 9999       | dis            | kVA         |
| <b>Over power reset</b>                                   | Generator Over Power Pre-Alarm Reset  | 0           | 9999       | 0              | kVA         |
| <b>Over load step 1</b>                                   | Generator Over Load Step 1            | 0           | 9999       | 9999           | KVA         |
| <b>Over load step 1 rest</b>                              | Generator Over Load Step 1 Reset      | 0           | 9999       | 9999           | KVA         |
| <b>Over load step 2</b>                                   | Generator Over Load Step 2            | 0           | 9999       | 9999           | KVA         |
| <b>Over load step 2 rest</b>                              | Generator Over Load Step 2 Reset      | 0           | 9999       | 9999           | KVA         |
| <b>Reverse power set</b>                                  | Reverse Power Set                     | -9999       | 0          | 0              | kW          |

| <b>GEN WORKING CALENDAR (<i>Generator-&gt;Working calendar</i>)</b> |                                               | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|---------------------------------------------------------------------|-----------------------------------------------|-------------|------------|----------------|-------------|
| <b>Disable/enable select</b>                                        | Working Calendar Disable or Enable            | DISBL/ENABL |            | DISBL          |             |
| <b>Start time on monday</b>                                         | Working Calendar Work Start Time on Monday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time on monday</b>                                          | Working Calendar Work Stop Time on Monday     | 0.00        | 23.59      | 23.59          | H.Min       |
| <b>Start time on tues.</b>                                          | Working Calendar Work Start Time on Tuesday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time on tuesday</b>                                         | Working Calendar Work Stop Time on Tuesday    | 0.00        | 23.59      | 23.59          | H.Min       |
| <b>Start time on wednes.</b>                                        | Working Calendar Work Start Time on Wednesday | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time on wednes.</b>                                         | Working Calendar Work Stop Time on Wednesday  | 0.00        | 23.59      | 23.59          | H.Min       |
| <b>Start time on thurs.</b>                                         | Working Calendar Work Start Time on Thursday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time on thursday</b>                                        | Working Calendar Work Stop Time on Thursday   | 0.00        | 23.59      | 23.59          | H.Min       |
| <b>Start time on friday</b>                                         | Working Calendar Work Start Time on Friday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time on friday</b>                                          | Working Calendar Work Stop Time on Friday     | 0.00        | 23.59      | 23.59          | H.Min       |
| <b>Start time on satur.</b>                                         | Working Calendar Work Start Time on Saturday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time on saturday</b>                                        | Working Calendar Work Stop Time on Saturday   | 0.00        | 23.59      | 23.59          | H.Min       |
| <b>Start time on sunday</b>                                         | Working Calendar Work Start Time on Sunday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time on sunday</b>                                          | Working Calendar Work Stop Time on Sunday     | 0.00        | 23.59      | 23.59          | H.Min       |

#### **Calendar Disable or Enable**

**DISABLE:** The unit will not monitor the working calendar parameters. If the mains supply go out side of limits, the unit will initiate automatic mains failure sequence.

**ENABLE:** The unit will monitor the working calendar parameters. If the mains supply go out side of limits, the unit will initiate automatic mains failure sequence only within the set “Start and Stop time parameters”. Otherwise, the unit will not initiate automatic mains failure sequence and the “Auto” led will blink.

**Note-1:** If the “Start time parameter” of any day is set to "0.00" and the “Stop time parameter” is set to "23.59", the unit will initiate automatic mains failure sequence when the mains supply go out side of limits within that day.

**Note-2:** If the “Start and Stop time parameters” of any day are set the same, the unit will not initiate automatic mains failure sequence when the mains supply go out side of limits within that day.

## 4.2 Technician Parameters

### 4.2.1 System

| SYSTEM NETWORK (System->Network) |                                                                                                                | Min                                                                       | Max  | Default     | Unit |
|----------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|------|-------------|------|
| CT ratio                         | Current Transformer Ratio                                                                                      | 1                                                                         | 9999 | 100         |      |
| Earth fault CT ratio             | Earth Fault Current Transformer Ratio                                                                          | 1                                                                         | 9999 | 100         |      |
| PT ratio                         | Voltage Transformer Ratio                                                                                      | 1                                                                         | 100  | 1           |      |
| Type of AC system                | Select AC system; 0- 1 Phase 2 Wire<br>1- 3 Phase 4 Wire<br>2- 2 Phase 3 Wire L1-L2<br>3- 2 Phase 3 Wire L1-L3 | 0                                                                         | 3    | 1           |      |
| Phase sequence                   | Generator Phase Sequence (dis, L123 or L321)                                                                   | DISBL, L123, L321                                                         |      | DISBL       |      |
| Generator kVA rating             | Generator kVA rating set                                                                                       | 0                                                                         | 9999 | 300         | kVA  |
| Power unit                       | Power unit                                                                                                     | kVA/kW                                                                    |      | kVA         |      |
| kVA,kW,kVAR point                | kVA, kW, kVAR point position; 0-> 0<br>1-> 0.0<br>2-> 0.00<br>3-> 0.000                                        | 0                                                                         | 3    | 0           |      |
| CT location                      | Current Transformer Location; 0-> Generator<br>1-> Load                                                        | 0                                                                         | 1    | 0           |      |
| Power on mode                    | Power On Mode Selection                                                                                        | 0-LAST MODE<br>1-AUTO MODE<br>2-TEST MODE<br>3-MANUAL MODE<br>4-STOP MODE |      | 0-LAST MODE |      |
| Nominal Cos Phi                  | Nominal Cos Phi                                                                                                | 0.70                                                                      | 1.00 | 0.80        |      |

#### CT ratio

Load current transformer's transfer ratio(Primary/Secondary) value must be entered to this parameter.

Example:

If Current Transformer Primary=500A and Current Transformer Secondary=5A, Current Transformer Ratio should be entered CT Primary/CT Secondary=100.

#### Earth fault CT ratio

Earth current transformer's transfer ratio value must be entered to this parameter.

#### PT ratio

Defines the scaling factor applied to voltage readout and associated fault conditions.

This PT ratio is for additional voltage transformers mounted the unit.

#### Type of AC System

This parameter is used to detail the type of AC system to which the unit is connected:

1 phase 2 wire, 3 phase 4 wire, 2 phase 3 wire L1-L2, 2 phase 3 wire L1-L3.

#### Phase Sequence

DISABLE: the mains and generator phase sequence checking disabled.

L123 or L321: if the mains phase sequence is faulty, the "Mains phase sequence wrong" warning is given and the mains contactor is deenergized. If the generator phase sequence is faulty, the "Generator phase sequence wrong" warning is given and the generator is stopped.

#### Generator kVA Rating Set

This parameter specifies the generator apparent power rating, which is used as a reference value for the power protection functions.

#### CT location

0-Generator: The CTs are located to the generator side, so will show only generator load.

1-Load: The CTs are located to the load side, so will show generator or mains load provided by supply.

#### Nominal Cos Phi

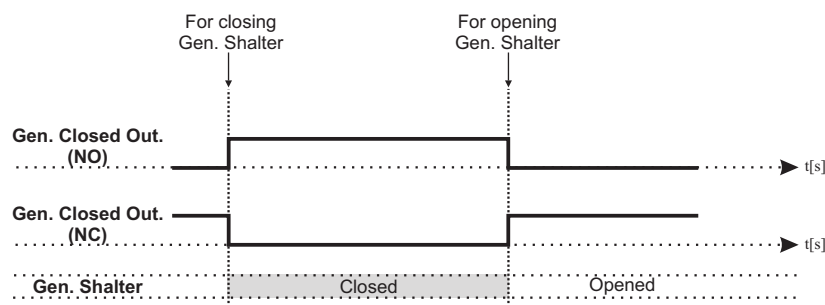
This parameter specifies the generator power factor rating, which is used as a reference value for the % load display.

| <b>BREAKERS (System-&gt;Breakers)</b> |                                  | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|---------------------------------------|----------------------------------|------------|------------|----------------|-------------|
| <b>Type of Breaker</b>                | Hardware Breaker Selection       | 0          | 2          | 0              |             |
| <b>Gen.brk.cls.contact</b>            | Gen Close Breaker Contact Type   | NO / NC    |            | 0              |             |
| <b>Gen.brk.cls.relay</b>              | Gen Close Breaker Relay Type     | NOR / PULS |            | 0              |             |
| <b>Gen.brk.cls.time</b>               | Gen Close Timer                  | 1          | 250        | 5              | Sec         |
| <b>Gen.brk.open relay</b>             | Gen Open Breaker Relay Type      | NOR / PULS |            | 0              |             |
| <b>Gen.brk.open time</b>              | Gen Open Timer                   | 1          | 250        | 5              | Sec         |
| <b>Mains.brk.cls.contact</b>          | Mains Close Breaker Contact Type | NO / NC    |            | 0              |             |
| <b>Mains.brk.cls.relay</b>            | Mains Close Breaker Relay Type   | NOR / PULS |            | 0              |             |
| <b>Mains.brk.cls.time</b>             | Mains Close Timer                | 1          | 250        | 5              | Sec         |
| <b>Mains.brk.open relay</b>           | Mains Open Breaker Relay Type    | NOR / PULS |            | 0              |             |
| <b>Mains.brk.open time</b>            | Mains Open Timer                 | 1          | 250        | 5              | Sec         |
| <b>Break.close puls.time</b>          | Breaker Close Pulse Time         | 0.0        | 10.0       | 0.5            | Sec         |
| <b>Break.open pulse time</b>          | Breaker Open Pulse Time          | 0.0        | 10.0       | 0.5            | Sec         |
| <b>Transfer time</b>                  | Transfer Time                    | 0          | 250        | 2              | Sec         |
| <b>Spring loading time</b>            | Spring Loading Time              | 1          | 250        | 3              | Sec         |
| <b>Retry number</b>                   | Retry Number                     | 1          | 250        | 5              |             |

### Hardware Breaker Selection (Type of Breaker)

**0- Breakers:** Mains and Gen breakers have only close drives and if close drive off breaker will open. Parameters; GEN CLOSE BREAKER CONTACT TYPE, GEN CLOSE TIMER(if gen closed input selected), GEN OPEN TIMER(if gen closed input selected), MAIN CLOSE BREAKER CONTACT TYPE, MAINS CLOSE TIMER(if mains closed input selected), MAINS OPEN TIMER(if mains closed input selected), TRANSFER TIME.

**Example:** If Hardware Breaker Selection parameter is selected as 0;

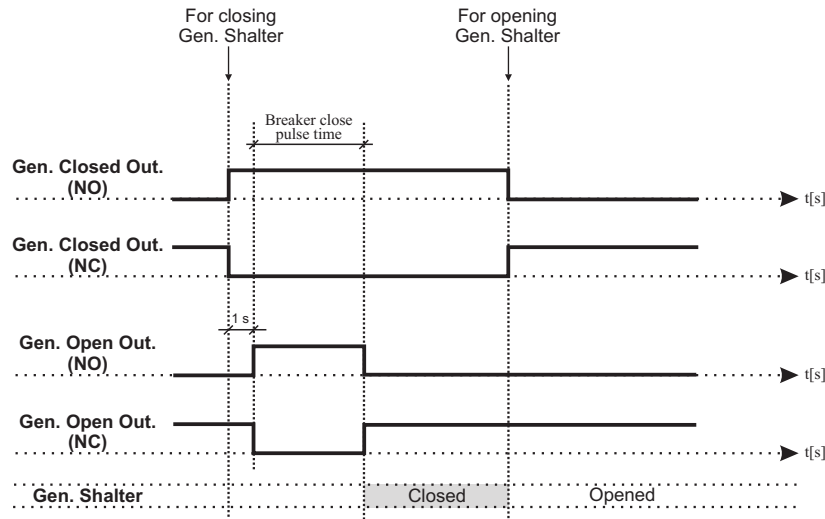


**Note-1 :** NO / NC : Normally Open / Normally Close  
**2 :** NOR / PULS : Normal / Pulse

**1- User Configured:** Mains and Gen breakers have only close drives, when want to breaker close, close breaker output on and after 1 sec. open breaker output on and after breaker close pulse time open breaker output will off. When want to breaker open close breaker output and open breaker output will off.

Parameters; GEN CLOSE BREAKER CONTACT TYPE, GEN CLOSE TIMER(if gen closed input selected), GEN OPEN TIMER(if gen closed input selected), MAIN CLOSE BREAKER CONTACT TYPE, MAINS CLOSE TIMER(if mains closed input selected), MAINS OPEN TIMER(if mains closed input selected),BREAKER CLOSE PULSE TIME, TRANSFER TIME.

**Example:** If Hardware Breaker Selection parameter is selected as 1;



**2- Motorised Breakers:** User can select all the breaker types.

Parameters; GEN CLOSE BREAKER CONTACT TYPE, GEN CLOSE BREAKER RELAY TYPE, GEN CLOSE TIMER(if gen closed input selected), GEN OPEN BREAKER RELAY TYPE, GEN OPEN TIMER(if gen closed input selected), MAIN CLOSE BREAKER CONTACT TYPE, MAIN CLOSE BREAKER RELAY TYPE, MAINS CLOSE TIMER(if mains closed input selected), MAIN OPEN BREAKER RELAY TYPE, MAINS OPEN TIMER(if mains closed input selected), BREAKER CLOSE PULSE TIME(if Gen Close Breaker Relay Type or Main Close Breaker Relay Type parameter is selected as 1), BREAKER OPEN PULSE TIME(if Gen Open Breaker Relay Type or Main Open Breaker Relay Type parameter is selected as 1), TRANSFER TIME, SPRING LOADING TIME, RETRY NUMBER.

**Example-1: GCB Close Diagram.**

If Hardware Breaker Selection parameter is selected as 2 (motorised breakers), Gen. Close Breaker Relay Type parameter is selected as 1 (PULSE) and Gen. Open Breaker Relay Type parameter is selected as 1 (PULSE);

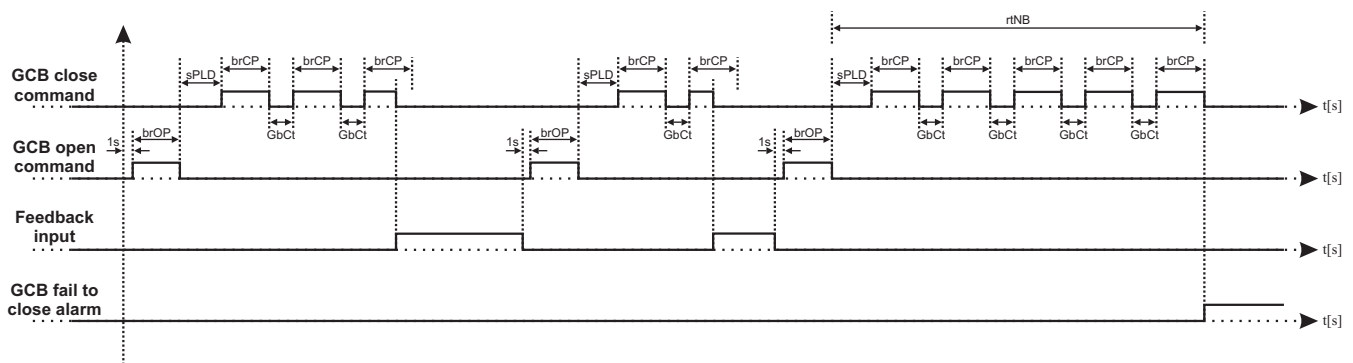
**GbCt:** Gen close timer

**brCP:** Breaker close pulse time

**brOP:** Breaker open pulse time

**sPLD:** Spring loading time

**rtNB:** Retry number

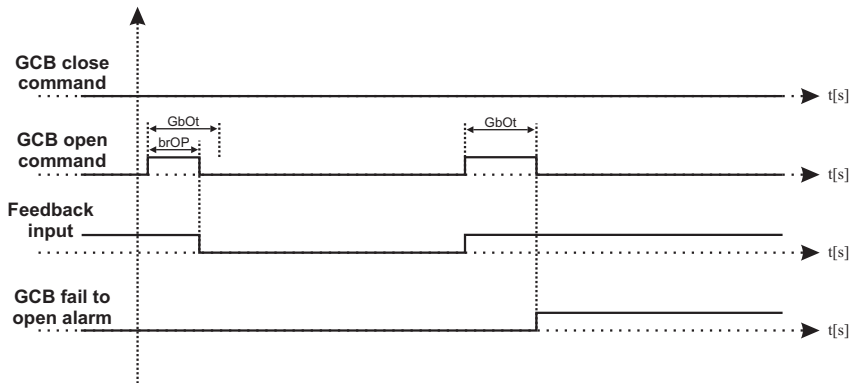


### Example-2: GCB Open Diagram.

If Hardware Breaker Selection parameter is selected as 2 (motorised breakers), Gen. Close Breaker Relay Type parameter is selected as 1 (PULSE) and Gen. Open Breaker Relay Type parameter is selected as 1 (PULSE);

**GbOt:** Gen open timer

**brOP:** Breaker open pulse time



### Gen Close Timer

This is used to monitor the closure of the generator contactor or breaker. It will only operate if an auxiliary input is configured as 'Generator Closed Auxiliary' and connected to the auxiliary on the generator contactor or breaker. Once a generator closed signal is issued the 'gen close timer' is initiated. Should the 'Generator Closed Auxiliary' input become active the timer the 'gen close timer' is cancelled. If the timer expires and the 'Generator Closed Auxiliary' has not become active the module will issue a 'generator failed to close' alarm.

### Gen Open Timer

This is used to monitor the opening of the generator contactor or breaker. It will only operate if an auxiliary input is configured as 'Generator Closed Auxiliary' and connected to the auxiliary on the generator contactor or breaker. Once a generator open signal is issued the 'gen open timer' is initiated. Should the 'Generator Closed Auxiliary' input become in-active the timer 'gen open timer' is cancelled. If the timer expires and the 'Generator Closed Auxiliary' has not become in-active the module will issue a 'generator failed to open' alarm.

### Mains Close Timer

This is used to monitor the closure of the mains contactor or breaker. It will only operate if an auxiliary input is configured as 'Mains Closed Auxiliary' and connected to the auxiliary on the mains contactor or breaker. Once a mains closed signal is issued the 'mains close timer' is initiated. Should the 'Mains Closed Auxiliary' input become active the timer the 'mains close timer' is cancelled. If the timer expires and the 'Mains Closed Auxiliary' has not become active the module will issue a 'mains failed to close' alarm.

### Mains Open Timer

This is used to monitor the opening of the mains contactor or breaker. It will only operate if an auxiliary input is configured as 'Mains Closed Auxiliary' and connected to the auxiliary on the mains contactor or breaker. Once a mains open signal is issued the 'mains open timer' is initiated. Should the 'Mains Closed Auxiliary' input become in-active the timer the 'mains open timer' is cancelled. If the timer expires and the 'Mains closed auxiliary' has not become in-active the module will issue a 'mains failed to open' alarm.

### Breaker Close Pulse Time

This is used to determine the duration of the Mains and Generator close signals. This timer is only used if Pulsed outputs are configured to be used.

### Breaker Open Pulse Time

This is used to determine the duration of the Mains and Generator close signals. This timer is only used if Pulsed outputs are configured to be used.

### Transfer Time

This is used to allow for fixed duration transfer breaks when switching from mains to generator and back. It can be used to ensure that the supply is removed from the load for fixed period of time to allow pumps/motors to come to rest etc.

### Spring Loading Time

When the unit give open command to the (GCB or MCB) breaker and after that the unit want to give close command the same breaker, this time for between open and close commands, because if there is no delay between open and close commands can be problem the motorized switches.

### Retry Number

The unit try to close (GCB or MCB) breaker number of this parameter. If each try there is no close feedback, after last try the alarm will be activated.

| LCD DISPLAY ( <i>System-&gt;LCD display</i> ) |                                                                                          | Min             | Max | Default | Unit |
|-----------------------------------------------|------------------------------------------------------------------------------------------|-----------------|-----|---------|------|
| Language                                      | Language Selection                                                                       | ENGLISH/CHINESE |     | ENGLISH |      |
| Contrast                                      | Contrast Setting                                                                         | 4               | 9   | 5       |      |
| Auto backlight off                            | Auto Backlight Off<br>0-DISABLE<br>1-ENABLE<br>2-ENABLE(only when engine is not running) | 0               | 2   | 0       |      |
| Auto scroll time                              | Auto Scroll Time                                                                         | 0 (dis)         | 250 | 0       | Sec  |
| Auto scroll number                            | Auto Scroll Number                                                                       | 1               | 26  | 5       |      |
| Err. mesg scroll time                         | Scroll Time For Error Messages                                                           | 1               | 250 | 2       | Sec  |
| Back to genset screen                         | Back To Genset Screen                                                                    | 0 (dis)         | 250 | 0 (dis) | Sec  |

### Language Selection

Language selection: English or Chinese.

### Digital Contrast

It is used to change contrast of LCD Display.

### Auto Backlight Off

2- ENABLE: If any button is not pressed during 60 secs, LCD backlight is automatically changed power saving mode. If the engine is running, backlight is on continuously.

1- ENABLE: If any button is not pressed during 60 secs, LCD backlight is automatically changed power saving mode.

0- DISABLE: LCD backlight is on continuously.

### Auto Scroll Time

The scroll time between all data display pages.

### Auto Scroll Number

The number of data display pages that will be scrolled.

### Scroll Time For Error Messages

Error messages are displayed the last line of LCD Display. If more than one error condition is present, each of them is displayed during time defined by Auto Scroll Timer parameter.

### Back To Genset Screen

If any button is not pressed during the time defined in this parameter, LCD screen will automatically changed to the Genset page. **Note:** This parameter is only available at TRANS-AMF.TR device.

**Note:** dis = disable

| <b>COMMUNICATION (System-&gt;Communication)</b> |                                                                                                                 | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------|------------|----------------|-------------|
| <b>Slave address</b>                            | Slave Address                                                                                                   | 1           | 247        | 1              |             |
| <b>Baud rate</b>                                | Baud Rate: 0 - 1200 baud<br>1 - 2400 baud<br>2 - 4800 baud<br>3 - 9600 baud<br>4 - 19200 baud<br>5 - 38400 baud | 0           | 5          | 3              |             |
| <b>Parity</b>                                   | Parity: 0-> None, 1-> Odd, 2-> Even                                                                             | 0           | 2          | 0              |             |
| <b>Stop bit</b>                                 | Stop Bit (0-> 1 stop bit, 1-> 2 stop bit)                                                                       | 0           | 1          | 0              |             |
| <b>Datalog period</b>                           | Datalog Period                                                                                                  | 0.0(dis)    | 999.9      | 1.0            | Min         |
| <b>Timeout</b>                                  | Timeout                                                                                                         | 0(dis)      | 999        | 3              | Min         |
| <b>ASCII/RTU selection</b>                      | ModBus ASCII/RTU Selection                                                                                      | ASCII / RTU |            | ASCII          |             |

#### Timeout

This parameter is used for the modem hardware reset. If the data communication is interrupted and this situation continues as this parameter, the modem hardware reset is performed.

#### ModBus ASCII/RTU Selection

This parameter is only functional for the USB, RS-232, RS-485 or RS-422 communication.

| <b>DATE &amp; TIME SET (System-&gt;Date &amp; time set)</b> |             | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------------------|-------------|------------|------------|----------------|-------------|
| <b>Year</b>                                                 | Year        | 0          | 99         |                |             |
| <b>Month</b>                                                | Month       | 1          | 12         |                |             |
| <b>Day</b>                                                  | Date        | 1          | 31         |                |             |
| <b>Week</b>                                                 | Day of week | 1          | 7          |                |             |
| <b>Hour</b>                                                 | Hour        | 0          | 23         |                |             |
| <b>Minute</b>                                               | Minute      | 0          | 59         |                |             |
| <b>Second</b>                                               | Second      | 0          | 59         |                |             |

**Day of week** 1=Monday,2=Tuesday,3=Wednesday,4=Thursday,5=Friday,6=Saturday,7=Sunday

| <b>DEFAULT SETTINGS (System-&gt;Default settings)</b> |                         | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------------|-------------------------|------------|------------|----------------|-------------|
| <b>Save setting to def.</b>                           | Save setting to default | YES / NO   |            | NO             |             |
| <b>Reset default sets</b>                             | Reset default sets      | YES / NO   |            | NO             |             |
| <b>Reset factory sets</b>                             | Reset factory sets      | YES / NO   |            | NO             |             |

#### Save setting to default

If this parameter is selected as "Yes", the unit's currently parameters save as default sets. After this parameter is reset automatically to "No".

#### Reset default sets

If this parameter is selected as "Yes", the unit's parameters back to default sets. After this parameter is reset automatically to "No".

#### Reset factory sets

If this parameter is selected as "Yes", the unit's parameters back to factory sets. After this parameter is reset automatically to "No".

| <b>PASSWORD SETTINGS (System-&gt;Password settings)</b> |                     | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|---------------------------------------------------------|---------------------|------------|------------|----------------|-------------|
| <b>Operator password</b>                                | Operator Password   | 0          | 9999       | 0              |             |
| <b>Technician password</b>                              | Technician Password | 0          | 9999       | 0              |             |

#### Operator Password

Use this option to change the Operator password. This password allows access to operator parameters section.

#### Technician Password

Use this option to change the Technician password. It allows access to both operator and technician parameters section.

**Note:** dis = disable

## 4.2.2 Mains

| <b>MAINS VOLT LEVEL (<i>Mains-&gt;Volt level</i>)</b> |                           | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------------|---------------------------|------------|------------|----------------|-------------|
| <b>Under volt trip</b>                                | Mains Under Voltage       | 60         | 600        | 320            | V~          |
| <b>Under volt reset</b>                               | Mains Under Voltage Reset | 60         | 600        | 340            | V~          |
| <b>Over volt trip</b>                                 | Mains Over Voltage        | 60         | 600        | 440            | V~          |
| <b>Over volt reset</b>                                | Mains Over Voltage Reset  | 60         | 600        | 420            | V~          |

| <b>MAINS FREQ. LEVEL (<i>Mains-&gt;Frequency level</i>)</b> |                             | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------------------|-----------------------------|------------|------------|----------------|-------------|
| <b>Under freq trip</b>                                      | Mains Under Frequency       | 20.0       | 75.0       | 45.0           | Hz          |
| <b>Under freq reset</b>                                     | Mains Under Frequency Reset | 20.0       | 75.0       | 48.0           | Hz          |
| <b>Over freq trip</b>                                       | Mains Over Frequency        | 20.0       | 75.0       | 55.0           | Hz          |
| <b>Over freq reset</b>                                      | Mains Over Frequency Reset  | 20.0       | 75.0       | 52.0           | Hz          |

| <b>MAINS ACTIONS (<i>Mains-&gt;Actions</i>)</b> |                                                                                | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------|--------------------------------------------------------------------------------|-------------|------------|----------------|-------------|
| <b>Mains failure detect</b>                     | Mains Failure Detection En/Dis:<br>0-DISABLE<br>1-ENABLE<br>2-ENABLE ON REMOTE | 0           | 2          | 1              |             |
| <b>Mains fail.stop mode</b>                     | Look Mains Failure at Stop Mode En/Dis                                         | ENABL/DISBL |            | ENABL          |             |
| <b>Always return delay</b>                      | Always Look Mains Return Delay                                                 | ENABL/DISBL |            | DISBL          |             |

### Mains Failure Detection En/Dis

0-DISABLE: The module will not monitor the mains supply.

1-ENABLE: The module will monitor the mains supply. If the mains supply go out side of limits, the module will initiate its automatic mains failure sequence. (If no inputs is selected as a remote start)

2-ENABLE ON REMOTE: The module will monitor the mains supply. If the mains supply go out side of limits, the module will initiate its automatic mains failure sequence. (Even if one of the inputs is selected as a remote start)

### Look Mains Failure at Stop Mode En/Dis

ENABLE: As soon as the module detects a mains failure the mains contactor or breaker relay will be opened to remove the supply from the load. This is to prevent damage to the load in case of single-phase failure.

DISABLE: In the event of a mains failure the unit will attempt to maintain the supply to the load for the incoming AC mains supply until the generator is available to go on load. In the event of a generator failure the module will default back to the incoming AC mains supply.

### Always Look Mains Return Delay

ENABLE: The module will always wait the Mains Return Delay parameter before transferring the load back to mains.

DISABLE: The module will wait the Mains Return Delay parameter while only the engine is running and the generator is available to go on load before transferring the load back to mains.

## 4.2.3 Generator

| <b>GENERATOR VOLT LEVEL (<i>Generator-&gt;Volt level</i>)</b> |                                         | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|---------------------------------------------------------------|-----------------------------------------|------------|------------|----------------|-------------|
| <b>Under volt shutdown</b>                                    | Generator Under Voltage Shutdown        | 60(dis)    | 600        | 320            | V~          |
| <b>Under volt prealarm</b>                                    | Generator Under Voltage Pre-Alarm       | 60(dis)    | 600        | 340            | V~          |
| <b>Under volt reset</b>                                       | Generator Under Voltage Pre-Alarm Reset | 60         | 600        | 350            | V~          |
| <b>Over volt shutdown</b>                                     | Generator Over Voltage Shutdown         | 60         | 600        | 440            | V~          |
| <b>Over volt prealarm</b>                                     | Generator Over Voltage Pre-Alarm        | 60(dis)    | 600        | 420            | V~          |
| <b>Over volt reset</b>                                        | Generator Over Voltage Pre-Alarm Reset  | 60         | 600        | 400            | V~          |
| <b>Shutdown delay time</b>                                    | Generator Voltage Shutdown Delay Time   | 0.0        | 10.0       | 1.0            | Sec         |

| <b>GENERATOR FREQ LEVEL (<i>Generator-&gt;Frequency level</i>)</b> |                                           | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------------------|-------------------------------------------|------------|------------|----------------|-------------|
| <b>Nominal frequency</b>                                           | Nominal Alternator Frequency              | 30.0       | 75.0       | 50.0           | Hz          |
| <b>Under freq shutdown</b>                                         | Generator Under Frequency Shutdown        | 30.0(dis)  | 75.0       | 43.0           | Hz          |
| <b>Under freq prealarm</b>                                         | Generator Under Frequency Pre-Alarm       | 30.0(dis)  | 75.0       | 45.0           | Hz          |
| <b>Under freq reset</b>                                            | Generator Under Frequency Pre-Alarm Reset | 30.0       | 75.0       | 46.0           | Hz          |
| <b>Over freq shutdown</b>                                          | Generator Over Frequency Shutdown         | 30.0(dis)  | 75.0       | 58.0           | Hz          |
| <b>Over freq prealarm</b>                                          | Generator Over Frequency Pre-Alarm        | 30.0(dis)  | 75.0       | 55.0           | Hz          |
| <b>Over freq reset</b>                                             | Generator Over Frequency Pre-Alarm Reset  | 30.0       | 75.0       | 54.0           | Hz          |
| <b>Shutdown delay time</b>                                         | Generator Frequency Shutdown Delay Time   | 0.0        | 10.0       | 1.0            | Sec         |

| <b>GEN CUR LEVEL &amp; ACT (<i>Generator-&gt;Current level &amp; act.</i>)</b> |                                                                                                                                                                                                                         | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|----------------|-------------|
| <b>Under cur. set</b>                                                          | Generator Under Current Set                                                                                                                                                                                             | 0           | 9999       | 1              | A~          |
| <b>Under cur. prealarm</b>                                                     | Generator Under Current Pre-Alarm                                                                                                                                                                                       | 0(dis)      | 9999       | dis            | A~          |
| <b>Under cur. reset</b>                                                        | Generator Under Current Pre-Alarm Reset                                                                                                                                                                                 | 0           | 9999       | 5              | A~          |
| <b>Under cur. act.</b>                                                         | Generator Under Current Actions<br>0 - Disable<br>1 - Warning (Alarm Only, No Shutdown)<br>2 - Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling)<br>3 - Shutdown (Alarm And Shutdown)       | 0(dis)      | 3          | dis            |             |
| <b>Under act. delay time</b>                                                   | Generator Under Current Actions Delay Time                                                                                                                                                                              | 0           | 99         | 2              | Sec         |
| <b>Over cur. IDMT alarm</b>                                                    | Generator Over Current IDMT Alarm                                                                                                                                                                                       | ENABL/DISBL |            | DISBL          |             |
| <b>Over cur. set</b>                                                           | Generator Over Current Set                                                                                                                                                                                              | 0           | 9999       | 9999           | A~          |
| <b>Over cur. prealarm</b>                                                      | Generator Over Current Pre-Alarm                                                                                                                                                                                        | 0(dis)      | 9999       | 9990           | A~          |
| <b>Over cur. reset</b>                                                         | Generator Over Current Pre-Alarm Reset                                                                                                                                                                                  | 0           | 9999       | 9980           | A~          |
| <b>Over cur. act.</b>                                                          | Generator Over Current Actions<br>0 - Disable<br>1 - Warning (Alarm Only, No Shutdown)<br>2 - Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling)<br>3 - Shutdown (Alarm And Shutdown)        | 0(dis)      | 3          | dis            |             |
| <b>Over act. delay time</b>                                                    | Generator Over Current Actions Delay Time                                                                                                                                                                               | 0           | 99         | 2              | Sec         |
| <b>Short circuit cur.</b>                                                      | Generator Short Circuit Current Set                                                                                                                                                                                     | 0           | 9999       | 9999           | A~          |
| <b>Earth fault cur.</b>                                                        | Generator Earth Fault Current Set                                                                                                                                                                                       | 0           | 9999       | 100            | A~          |
| <b>Earth fault cur. act.</b>                                                   | Generator Earth Fault Current Actions<br>0 - Disable<br>1 - Warning (Alarm Only, No Shutdown)<br>2 - Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling)<br>3 - Shutdown (Alarm And Shutdown) | 0(dis)      | 3          | dis            |             |
| <b>E.F. act. delay time</b>                                                    | Generator Earth Fault Current Actions Delay Time                                                                                                                                                                        | 0           | 99         | 2              | Sec         |
| <b>Unbalance load set</b>                                                      | Unbalance Load Set                                                                                                                                                                                                      | 0           | 9999       | 0              | A~          |
| <b>Unbalance load act.</b>                                                     | Unbalance Load Actions<br>0 - Disable<br>1 - Warning (Alarm Only, No Shutdown)<br>2 - Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling)<br>3 - Shutdown (Alarm And Shutdown)                | 0(dis)      | 3          | dis            |             |
| <b>Unbalance act. delay</b>                                                    | Unbalance Load Actions Delay Time                                                                                                                                                                                       | 0           | 99         | 2              | Sec         |

#### Over cur. IDMT alarm

DISABLE: If the measurement value of current more than “Over cur. set” parameter and this condition is go on more than “Over act. delay time” parameter, the unit will give a “Over current” alarm.

ENABLE: If the measurement value of current more than “Over cur. set” parameter and this condition is go on more than “**Tripping time**”, the unit will give a “Over current” alarm.

$$\text{Tripping time} = \frac{(\text{“Over act. delay time” parameter}) \times (\text{“Over cur. set” parameter})}{(\text{Measured current}) - (\text{“Over cur. set” parameter})}$$

| <b>GEN POWER LEVEL (Generator-&gt;Power level)</b> |                                                                                                                                                                                                                 | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|----------------|-------------|
| <b>Under power set</b>                             | Generator Under Power Set                                                                                                                                                                                       | 0           | 9999       | 0              | kVA         |
| <b>Under power prealarm</b>                        | Generator Under Power Pre-Alarm                                                                                                                                                                                 | 0(dis)      | 9999       | dis            | kVA         |
| <b>Under power reset</b>                           | Generator Under Power Pre-Alarm Reset                                                                                                                                                                           | 0           | 9999       | 5              | kVA         |
| <b>Under power act.</b>                            | Generator Under Power Actions<br>0 - Disable<br>1 - Warning (Alarm Only, No Shutdown)<br>2 - Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling)<br>3 - Shutdown (Alarm And Shutdown) | 0(dis)      | 3          | 0(dis)         |             |
| <b>Under act. delay time</b>                       | Generator Under Power Action Delay Time                                                                                                                                                                         | 0           | 99         | 2              | Sec         |
| <b>Over power IDMT alarm</b>                       | Generator Over Power IDMT Alarm                                                                                                                                                                                 | ENABL/DISBL |            | DISBL          |             |
| <b>Over power set</b>                              | Generator Over Power Set                                                                                                                                                                                        | 0           | 9999       | 0              | kVA         |
| <b>Over power prealarm</b>                         | Generator Over Power Pre-Alarm                                                                                                                                                                                  | 0(dis)      | 9999       | dis            | kVA         |
| <b>Over power reset</b>                            | Generator Over Power Pre-Alarm Reset                                                                                                                                                                            | 0           | 9999       | 0              | kVA         |
| <b>Over power act.</b>                             | Generator Over Power Actions<br>0 - Disable<br>1 - Warning (Alarm Only, No Shutdown)<br>2 - Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling)<br>3 - Shutdown (Alarm And Shutdown)  | 0(dis)      | 3          | 0(dis)         |             |
| <b>Over act. delay time</b>                        | Generator Over Power Action Delay Time                                                                                                                                                                          | 0           | 99         | 2              | Sec         |
| <b>Over load step 1</b>                            | Generator Over Load Step 1                                                                                                                                                                                      | 0           | 9999       | 9999           | KVA         |
| <b>Over load step 1 rest</b>                       | Generator Over Load Step 1 Reset                                                                                                                                                                                | 0           | 9999       | 9999           | KVA         |
| <b>Over load step 1 act.</b>                       | Generator Over Load Step 1 Actions<br>0 - Disable<br>1 - Status<br>2 - Warning Non-Latching<br>3 - Warning Latching                                                                                             | 0(dis)      | 3          | 0(dis)         |             |
| <b>Over load step 1 dly.</b>                       | Generator Over Load Step 1 Action Delay Time                                                                                                                                                                    | 0           | 999.9      | 30.0           | Sec         |
| <b>Over load step 2</b>                            | Generator Over Load Step 2                                                                                                                                                                                      | 0           | 9999       | 9999           | KVA         |
| <b>Over load step 2 rest</b>                       | Generator Over Load Step 2 Reset                                                                                                                                                                                | 0           | 9999       | 9999           | KVA         |
| <b>Over load step 2 act.</b>                       | Generator Over Load Step 2 Actions<br>0 - Disable<br>1 - Status<br>2 - Warning Non-Latching<br>3 - Warning Latching                                                                                             | 0(dis)      | 3          | 0(dis)         |             |
| <b>Over load step 2 dly.</b>                       | Generator Over Load Step 2 Action Delay Time                                                                                                                                                                    | 0           | 999.9      | 30.0           | Sec         |
| <b>Reverse power set</b>                           | Reverse Power Set                                                                                                                                                                                               | -9999       | 0          | 0              | kW          |
| <b>Reverse power act.</b>                          | Reverse Power Actions<br>0 - Disable<br>1 - Warning (Alarm Only, No Shutdown)<br>2 - Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling)<br>3 - Shutdown (Alarm And Shutdown)         | 0(dis)      | 3          | 0(dis)         |             |
| <b>Rv.pow.act.delay time</b>                       | Reverse Power Action Delay Time                                                                                                                                                                                 | 0           | 99         | 2              | Sec         |

#### Over power IDMT alarm

DISABLE: If the measurement value of power more than “Over power set” parameter and this condition is go on more than “Over act. delay time” parameter, the unit will give a “Over power” alarm.

ENABLE: If the measurement value of power more than “Over power set” parameter and this condition is go on more than “**Tripping time**”, the unit will give a “Over power” alarm.

$$\text{Tripping time} = \frac{(\text{“Over act. delay time” parameter}) \times (\text{“Over power set” parameter})}{(\text{Measured power}) - (\text{“Over power set” parameter})}$$

| GEN WORKING CALENDAR ( <i>Generator-&gt;Working calendar</i> ) |                                               | Min         | Max   | Default | Unit  |
|----------------------------------------------------------------|-----------------------------------------------|-------------|-------|---------|-------|
| <b>Disable/enable select</b>                                   | Working Calendar Disable or Enable            | DISBL/ENABL |       | DISBL   |       |
| <b>Start time on monday</b>                                    | Working Calendar Work Start Time on Monday    | 0.00        | 23.59 | 0.00    | H.Min |
| <b>Stop time on monday</b>                                     | Working Calendar Work Stop Time on Monday     | 0.00        | 23.59 | 23.59   | H.Min |
| <b>Start time on tues.</b>                                     | Working Calendar Work Start Time on Tuesday   | 0.00        | 23.59 | 0.00    | H.Min |
| <b>Stop time on tuesday</b>                                    | Working Calendar Work Stop Time on Tuesday    | 0.00        | 23.59 | 23.59   | H.Min |
| <b>Start time on wednes.</b>                                   | Working Calendar Work Start Time on Wednesday | 0.00        | 23.59 | 0.00    | H.Min |
| <b>Stop time on wednes.</b>                                    | Working Calendar Work Stop Time on Wednesday  | 0.00        | 23.59 | 23.59   | H.Min |
| <b>Start time on thurs.</b>                                    | Working Calendar Work Start Time on Thursday  | 0.00        | 23.59 | 0.00    | H.Min |
| <b>Stop time on thursday</b>                                   | Working Calendar Work Stop Time on Thursday   | 0.00        | 23.59 | 23.59   | H.Min |
| <b>Start time on friday</b>                                    | Working Calendar Work Start Time on Friday    | 0.00        | 23.59 | 0.00    | H.Min |
| <b>Stop time on friday</b>                                     | Working Calendar Work Stop Time on Friday     | 0.00        | 23.59 | 23.59   | H.Min |
| <b>Start time on satur.</b>                                    | Working Calendar Work Start Time on Saturday  | 0.00        | 23.59 | 0.00    | H.Min |
| <b>Stop time on saturday</b>                                   | Working Calendar Work Stop Time on Saturday   | 0.00        | 23.59 | 23.59   | H.Min |
| <b>Start time on sunday</b>                                    | Working Calendar Work Start Time on Sunday    | 0.00        | 23.59 | 0.00    | H.Min |
| <b>Stop time on sunday</b>                                     | Working Calendar Work Stop Time on Sunday     | 0.00        | 23.59 | 23.59   | H.Min |

### Calendar Disable or Enable

**DISABLE:** The unit will not monitor the working calendar parameters. If the mains supply go out side of limits, the unit will initiate automatic mains failure sequence.

**ENABLE:** The unit will monitor the working calendar parameters. If the mains supply go out side of limits, the unit will initiate automatic mains failure sequence only within the set "Start and Stop time parameters". Otherwise, the unit will not initiate automatic mains failure sequence and the "Auto" led will blink.

**Note-1:** If the "Start time parameter" of any day is set to "0.00" and the "Stop time parameter" is set to "23.59", the unit will initiate automatic mains failure sequence when the mains supply go out side of limits within that day.

**Note-2:** If the "Start and Stop time parameters" of any day are set the same, the unit will not initiate automatic mains failure sequence when the mains supply go out side of limits within that day.

| <b>GENERATOR GENERAL (<i>Generator-&gt;General</i>)</b> |                                       | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|---------------------------------------------------------|---------------------------------------|-------------|------------|----------------|-------------|
| <b>Sens.option gen.freq</b>                             | Sensing Options Generator Frq En/Dis  | ENABL/DISBL |            | ENABL          |             |
| <b>Sens.opt.pickup&amp;flywh</b>                        | Sensing Opt Pickup En/Dis & Flywheel  | 0(dis)      | 1000       | DISBL          |             |
| <b>All warning are latch</b>                            | All Warnings Are Latched En/Dis       | ENABL/DISBL |            | DISBL          |             |
| <b>Stop mode on shutdown</b>                            | Changed To Stop Mode On Shutdown Fail | ENABL/DISBL |            | DISBL          |             |

#### **Sensing Options Generator Frq En/Dis**

ENABLE: Speed sensing will be derived from the generator output frequency.

DISABLE: Speed sensing not will be derived from the generator output frequency.

#### **Sensing Options Pickup En/Dis & Flywheel**

DISABLE: Speed sensing will not be derived from the magnetic pickup.

1-1000: Speed sensing will be derived from the magnetic pickup and the number is flywheel teeth on the engine.

#### **All Warnings Are Latched En/Dis**

ENABLE: Warnings and pre-alarms will latched when triggered. To reset the alarm either an external reset must be applied to one of the inputs or the 'Reset' pushbutton operated, once the triggering condition has cleared.

DISABLE: Normal operation, the warnings and pre-alarms (except spare inputs, because they have their latching or non-latching selections) will automatically reset once the triggering condition has cleared.

#### **Changed To Stop Mode On Shutdown Fail**

ENABLE: When the shutdown alarm received in automatic or test mode, the unit will change the operation mode to "STOP" mode.

DISABLE: When the shutdown alarm received in automatic or test mode, the unit will remain at the current operating mode.

### **4.2.4 Engine**

| <b>ENGINE START OPTIONS (<i>Engine-&gt;Starting options</i>)</b> |                                        | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|------------------------------------------------------------------|----------------------------------------|-------------|------------|----------------|-------------|
| <b>Horn prior start</b>                                          | Audible Alarm Prior To Starting En/Dis | ENABL/DISBL |            | DISBL          |             |
| <b>No. of crank attemp</b>                                       | Number Of Start Attempts               | 1           | 10         | 3              |             |
| <b>Cranking time</b>                                             | Cranking Time                          | 1           | 99         | 5              | Sec         |
| <b>Crank rest time</b>                                           | Crank Rest Time                        | 5           | 99         | 10             | Sec         |
| <b>Pickup fail dely</b>                                          | Pickup Sensor Fail Delay               | 0.1         | 10.0       | 1.0            | Sec         |

#### **Audible Alarm Prior To Starting En/Dis**

ENABLE: The audible alarm will sound before the engine starts. The sounder will become active once the start delay is initialised, it will remain active until either the engine reaches crank disconnect speed or pre-heat timers are cancelled.

#### **Number Of Start Attempts**

This value is the number of times the module will attempt to start the generator. Should the generator start the module will not attempt further starts. If the generator does not start after the final attempt, the module will give a 'Fail to start' alarm.

#### **Cranking Time**

This is the maximum amount of time that the module will energise the starter motor for during starting attempts once the starter has engaged.

#### **Crank Rest Time**

This is the amount of time the module will wait for between start attempts. This is to allow the starter motor to cool and the starter batteries to recover.

**Note:** dis = disable

| <b>ENG. CRANK DISCONNECT (<i>Engine-&gt;Crank disconnect</i>)</b> |                                         | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------------------------|-----------------------------------------|-------------|------------|----------------|-------------|
| <b>Generator frequency</b>                                        | Crank Disconnect On Gen. Frequency      | 10.0        | 75.0       | 30.0           | Hz          |
| <b>Engine speed</b>                                               | Crank Disconnect On Engine RPM          | 100         | 6000       | 500            | RPM         |
| <b>Generator volt</b>                                             | Crank Disconnect On Gen. Voltage        | 60 (dis)    | 600        | 300            | V~          |
| <b>Charge alt. volt</b>                                           | Crank Disconnect On Charge Alt. Voltage | 6.0 (dis)   | 30.0       | dis            | V---        |
| <b>Oil pres. enab./dis.</b>                                       | Crank Disconnect On Oil Pressure En/Dis | ENABL/DISBL |            | DISBL          |             |
| <b>Oil pressure value</b>                                         | Oil Pressure Value                      | 1.0         | 30.0       | 1.0            | BAR         |
| <b>Check oil befor.start</b>                                      | Check Oil Pressure Before Start         | ENABL/DISBL |            | ENABL          |             |

The parameters in this page are used for engine started signals. If any of the selected signals appears, the unit assumes that the engine has started.

#### **Crank Disconnect On Gen. Frequency**

If the generator frequency over than 30.0 Hz, the unit assumes that the engine has started and the unit stop cranking.

#### **Crank Disconnect On Engine RPM**

If the generator speed over than 500 Rpm, the unit assumes that the engine has started and the unit stop cranking.

#### **Crank Disconnect On Gen. Voltage**

If the generator voltage over than 300 Vac, the unit assumes that the engine has started and the unit stop cranking.

#### **Crank Disconnect On Charge Alt. Voltage**

If the charge alternator voltage over than 6.1 Vdc, the unit assumes that the engine has started and the unit stop cranking. **Note:** If the charge generator input (terminal #35) is disconnect, this parameter selected as disabled (6.0 Vdc).

#### **Crank Disconnect On Oil Pressure En/Dis**

This parameter is used for to activate of the crank disconnect on oil pressure feature.

#### **Oil Pressure Value**

If the oil pressure sender over than this value, the unit assumes that the engine has started and the unit stop cranking.

#### **Check Oil Pressure Before Start**

If this parameter is enabled, the unit will not be allowed to crank if the oil pressure isn't seen as being low.

| <b>ENGINE SPEED SETS (<i>Engine-&gt;Speed settings</i>)</b> |                                   | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------------------|-----------------------------------|------------|------------|----------------|-------------|
| <b>Nominal speed</b>                                        | Nominal Speed                     | 500        | 5000       | 1500           | RPM         |
| <b>Under speed shutdown</b>                                 | Engine Under Speed Shutdown       | 500(dis)   | 5000       | dis            | RPM         |
| <b>Under speed prealarm</b>                                 | Engine Under Speed Prealarm       | 500(dis)   | 5000       | dis            | RPM         |
| <b>Under speed reset</b>                                    | Engine Under Speed Prealarm Reset | 500        | 5000       | 500            | RPM         |
| <b>Over speed shutdown</b>                                  | Engine Over Speed Shutdown        | 500(dis)   | 5000       | dis            | RPM         |
| <b>Over speed prealarm</b>                                  | Engine Over Speed Prealarm        | 500(dis)   | 5000       | dis            | RPM         |
| <b>Over speed reset</b>                                     | Engine Over Speed Prealarm Reset  | 500        | 5000       | 500            | RPM         |
| <b>Shutdown delay time</b>                                  | Engine Speed Shutdown Delay Time  | 0.0        | 10.0       | 1.0            | Sec         |

The parameters in this page are used for the generator speed low and high alarms.

**Note:** dis = disable

| <b>ENGINE PLANT BATTERY (<i>Engine-&gt;Plant battery</i>)</b> |                                  | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b>      |
|---------------------------------------------------------------|----------------------------------|------------|------------|----------------|------------------|
| <b>Under volt shutdown</b>                                    | Battery Undervolts Shutdown      | 6.0(dis)   | 30.0       | dis            | V <sub>---</sub> |
| <b>Under volt warning</b>                                     | Battery Undervolts Warning       | 6.0(dis)   | 30.0       | 11.0           | V <sub>---</sub> |
| <b>Under volt reset</b>                                       | Battery Undervolts Warning Reset | 6.0        | 30.0       | 11.5           | V <sub>---</sub> |
| <b>Under volt delay</b>                                       | Battery Undervolts Volts Delay   | 0.0        | 120.0      | 1.0            | Sec              |
| <b>Over volt shutdown</b>                                     | Battery Overvolts Shutdown       | 6.0(dis)   | 30.0       | dis            | V <sub>---</sub> |
| <b>Over volt warning</b>                                      | Battery Overvolts Warning        | 6.0(dis)   | 30.0       | 29.0           | V <sub>---</sub> |
| <b>Over volt reset</b>                                        | Battery Overvolts Warning Reset  | 6.0        | 30.0       | 28.5           | V <sub>---</sub> |
| <b>Over volt delay</b>                                        | Battery Overvolts Delay          | 0.0        | 120.0      | 1.0            | Sec              |
| <b>Alt. chg. warning</b>                                      | Charge Alternator Warning        | 6.0(dis)   | 30.0       | dis            | V <sub>---</sub> |

The parameters in this page are used for the battery voltage low and high alarms and the charge alternator voltage warning.

| <b>CANBUS ECU (<i>Engine-&gt;CanBus ECU</i>)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|----------------|-------------|
| <b>Baud rate</b>                                 | Baud Rate:<br>0: 20, 1: 50, 2: 100, 3: 125,<br>4: 250, 5: 500, 6: 800, 7: 1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0           | 7          | 4              | kBaud       |
| <b>J1939 ECU type</b>                            | J1939 ECU Type Selection:<br>0 - Disable<br>1 - Standard<br>2 - Volvo EMS1<br>3 - Volvo EMS2<br>4 - Volvo EMS2b<br>5 - Volvo EDC3<br>6 - Volvo EDC4<br>7 - Deutz EMR2<br>8 - Deutz EMR3<br>9 - Perkins 1300<br>10 - Perkins ADEM3<br>11 - Perkins ADEM4<br>12 - Scania S6<br>13 - MAN MFR<br>14 - Cummins ISB<br>15 - Cummins CM570<br>16 - Cummins CM850<br>17 - Cummins CM2150E<br>18 - Cummins CM2250<br>19 - Detroit DDEC<br>20 - John Deere<br>21 - MTU ADEC<br>22 - MTU ECU8<br>23 - MTU ECU8 SAM<br>24 - Yuchai<br>25 - Kubota<br>26 - Baudouin WISE10B<br>27 - Baudouin WISE15<br>28 - Perkins 1600<br>29 - Perkins A4E2<br>30 - Perkins A5E2<br>31 - Perkins A5E2v2 | 0(dis)      | 31         | 0              |             |
| <b>Device address</b>                            | Device Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0           | 255        | 17             |             |
| <b>SPN version</b>                               | SPN version                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1           | 3          | 1              |             |
| <b>ECU remote control</b>                        | ECU Remote Control via J1939                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ENABL/DISBL |            | ENABL          |             |
| <b>Speed control enable</b>                      | Speed Control via J1939                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ENABL/DISBL |            | ENABL          |             |
| <b>Oil pres cont. enab</b>                       | Oil Pressure Control via J1939                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ENABL/DISBL |            | DISBL          |             |
| <b>Temp. control enable</b>                      | Coolant Temperature Control via J1939                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ENABL/DISBL |            | DISBL          |             |
| <b>Speed set point</b>                           | Speed Set Point Selection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1500 / 1800 |            | 1500           | RPM         |
| <b>Speed correction</b>                          | Speed Correction Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0           | 100        | 50             | %           |

### Baud Rate

It defines the used Baud rate.

**Note:** All participants on the CAN bus must use the same Baud rate.

### J1939 ECU Type Selection

The J1939 interface of this unit can be operated with different ECUs. This parameter determines the operating mode of the used ECUs. If this parameter is selected as “disable”, No messages will be sent or received.

**Note:** Volvo EMS2 engine types: TAD734, TAD940, TAD941, TAD1640, TAD1641, TAD1642.

Volvo EDC3 engine types: TAD1240, TAD1241, TAD1242.

Volvo EDC4 engine types: TD520, TAD520, TD720, TAD720, TAD721, TAD722.

Perkins ADEM3 / ADEM4 engine types: 2306, 2506, 1106, 2806.

Scania S6 engine types: DC 9, DC 12, DC 16.

MAN MFR ECU type: EDC7.

Cummins ISB engine type: QSM11.

Cummins CM570 engine type: QSX15.

Cummins CM850, Cummins CM2150E, Cummins CM2250 engine types: QSB5, QSB7, QSL9, QSK50, QSK60, QSK19, QSK38.

MTU ADEC engine types: Series 2000, 4000.

MTU UCU8 engine types: Series 1600.

### ECU Device Address

The unit sends J1939 request and control messages with this ID. It must be changed for different ECU types according to the following table. The ECU listens only to control messages, if they are sent to the correct address.

|                                              |                                                                    |                                                   |                                                                                                                                     |                  |                |
|----------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|
| <i>Baudouin WISE10B,<br/>Baudouin WISE15</i> | <i>Volvo EMS1,<br/>Volvo EMS2,<br/>Volvo EMS2b,<br/>Volvo EDC3</i> | <i>Volvo EDC4,<br/>Deutz EMR2,<br/>Deutz EMR3</i> | <i>Perkins 1300,<br/>Perkins ADEM3,<br/>Perkins ADEM4,<br/>Perkins 1600,<br/>Perkins A4E2,<br/>Perkins A5E2,<br/>Perkins A5E2v2</i> | <i>Scania S6</i> | <i>MAN MFR</i> |
| 33                                           | 17                                                                 | 3                                                 | 17                                                                                                                                  | 39               | 253            |

|                                                                                                   |                     |                   |                                   |                 |               |               |
|---------------------------------------------------------------------------------------------------|---------------------|-------------------|-----------------------------------|-----------------|---------------|---------------|
| <i>Cummins ISB,<br/>Cummins CM570,<br/>Cummins CM850,<br/>Cummins CM2150E,<br/>Cummins CM2250</i> | <i>Detroit DDEC</i> | <i>John Deere</i> | <i>MTU ADEC,<br/>MTU ECU8 SAM</i> | <i>MTU ECU8</i> | <i>Yuchai</i> | <i>Kubota</i> |
| 220                                                                                               | 231                 | 3                 | 1                                 | 234             | 3             | 228           |

### SPN Version

There are 4 different Suspect Parameter Number versions with J1939 protocol. The device has ability to detecting version 4 automatically. Therefore, this parameter is important to show alarm messages correctly except version 4.

**Note:** Changing above mentioned parameter becomes only effective after restarting the unit.

### ECU Remote Control Via J1939

If this parameter is selected as “Enable”, The unit sends remote control messages to the ECU if the selected ECU type is supporting the J1939 Remote control Messages. Available messages are engine start-stop, 50/60 Hz selection or Idle mode. For some ECUs;

| Parameter          | Baudouin WISE10B<br>Baudouin WISE15 | Volvo EMS1,<br>Volvo EMS2,<br>Volvo EMS2b,<br>Volvo EDC3 | Volvo EDC4,<br>Deutz EMR2,<br>Deutz EMR3 | Perkins 1300,<br>Perkins ADEM3,<br>Perkins ADEM4,<br>Perkins 1600,<br>Perkins A4E2,<br>Perkins A5E2,<br>Perkins A5E2v2 | Scania S6 | MAN MFR | Standard |
|--------------------|-------------------------------------|----------------------------------------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------|---------|----------|
| Remote Start       | No                                  | Yes                                                      | No                                       | No                                                                                                                     | Yes       | Yes     | No       |
| Remote Stop        | No                                  | Yes                                                      | No                                       | No                                                                                                                     | Yes       | Yes     | No       |
| 50/60 Hz Selection | No                                  | Yes                                                      | No                                       | No                                                                                                                     | Yes       | No      | No       |
| Idle Mode          | No                                  | Yes                                                      | No                                       | No                                                                                                                     | Yes       | Yes     | No       |

| Parameter          | Cummins ISB,<br>Cummins CM570,<br>Cummins CM850,<br>Cummins CM2250 | Cummins CM2150E | Detroit DDEC | John Deere | MTU ADEC,<br>MTU ECU8,<br>MTU ECU8 SAM | Yuchai | Kubota |
|--------------------|--------------------------------------------------------------------|-----------------|--------------|------------|----------------------------------------|--------|--------|
| Remote Start       | Yes                                                                | No              | No           | No         | Yes                                    | No     | No     |
| Remote Stop        | Yes                                                                | No              | No           | No         | Yes                                    | No     | Yes    |
| 50/60 Hz Selection | Yes                                                                | Yes             | No           | No         | Yes                                    | No     | No     |
| Idle Mode          | Yes                                                                | Yes             | No           | No         | No                                     | No     | No     |

If this parameter is selected as “Disable”, The ECU remote control via the J1939 protocol will be disabled.

### Speed Control via J1939

If this parameter is selected as “Enable”, The speed sensing from J1939 ECU will be used for the speed (Rpm) failures.

### Oil Pressure Control via J1939

If this parameter is selected as “Enable”, The oil pressure sensing from J1939 ECU will be used for the oil pressure failures and the engine started signal.

### Coolant Temperature Control via J1939

If this parameter is selected as “Enable”, The coolant temperature sensing from J1939 ECU will be used for the coolant temperature failures.

### Speed Set Point Selection (50/60 Hz)

This parameter used for to select the requested engine speed as 1500Rpm (50Hz) or 1800Rpm (60Hz). **Note:** The scenario; first change the parameter, next wait at least 5 seconds, and then start the engine.

### Speed Correction Value

This parameter can be changed between 0 and 100%. The engine should change the speed as follows:

0% = rated speed – speed deviation ECU e.g. 1500 – 120 = 1380rpm

50% = rated speed e.g. = 1500rpm

100% = rated speed + speed deviation ECU e.g. 1500 + 120 = 1620rpm

| <b>CANBUS ERROR SET (<i>Engine-&gt;CanBus error set</i>)</b> |                                                                                                                                                                                                                                            | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>CAN fault actions</b>                                     | Can Fault Actions:<br>0- Disable<br>1- Warning Non-Latching<br>2- Warning (Alarm Only, No Shutdown)<br>3- Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling)<br>4- Shutdown (Alarm And Shutdown)                | 0(dis)     | 4          | 0              |             |
| <b>CAN fault activation</b>                                  | Can Fault Activation:<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                                                                                                                                           | 0          | 2          | 0              |             |
| <b>CAN fault delay</b>                                       | Can Fault Delay                                                                                                                                                                                                                            | 2          | 250        | 10             | Sec         |
| <b>Amber warn.actions</b>                                    | J1939 Amber Warning Lamp Actions:<br>0- Disable<br>1- Warning Non-Latching<br>2- Warning (Alarm Only, No Shutdown)<br>3- Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling)<br>4- Shutdown (Alarm And Shutdown) | 0(dis)     | 4          | 0              |             |
| <b>Amber warn.activation</b>                                 | J1939 Amber Warning Lamp Activation:<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                                                                                                                            | 0          | 2          | 2              |             |
| <b>Amber warn.delay</b>                                      | J1939 Amber Warning Lamp Delay                                                                                                                                                                                                             | 0          | 250        | 2              | Sec         |
| <b>Red stop actions</b>                                      | J1939 Red Stop Lamp Actions:<br>0- Disable<br>1- Warning Non-Latching<br>2- Warning (Alarm Only, No Shutdown)<br>3- Electrical Trip (Alarm/Off Load Generator Followed By Shutdown After Cooling)<br>4- Shutdown (Alarm And Shutdown)      | 0(dis)     | 4          | 0              |             |
| <b>Red stop activation</b>                                   | J1939 Red Stop Lamp Activation:<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                                                                                                                                 | 0          | 2          | 2              |             |
| <b>Red stop delay</b>                                        | J1939 Red Stop Lamp Delay                                                                                                                                                                                                                  | 0          | 250        | 2              | Sec         |

**Note:** dis = disable

| <b>ENGINE MAINTENANCE (<i>Engine-&gt;Maintenance</i>)</b> |                                               | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-----------------------------------------------------------|-----------------------------------------------|-------------|------------|----------------|-------------|
| <b>Running hour interval</b>                              | Running Hours Interval                        | 0(dis)      | 9999       | 5000           | Hour        |
| <b>Maint. date interval</b>                               | Maintenance Date Interval                     | 0(dis)      | 12         | 6              | Month       |
| <b>Eng. stop when maint</b>                               | Force Engine Shutdown When Maintenance Is Due | ENABL/DISBL |            | DISBL          |             |
| <b>Engine running hour</b>                                | Engine Running Hour                           | 0           | 30000      | 0              |             |
| <b>Maintenance okay</b>                                   | Maintenance Okay                              | YES/NO      |            | NO             |             |

**Engine Running Hour:** The user can change the engine running hours value by using this parameter.

| <b>LOAD TEST (<i>Engine-&gt;Load test</i>)</b> |                                       | <b>Min</b>                          | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|------------------------------------------------|---------------------------------------|-------------------------------------|------------|----------------|-------------|
| <b>Disable/enable select</b>                   | Disable, No Load or On Load Selection | 0-DISABLE<br>1-NO LOAD<br>2-ON LOAD |            | 1-NO LOAD      |             |

**Disable, No Load or On Load Selection**

DISABLE: Test mode disable.

NO LOAD: The generator will be running without taking the load in test mode.

ON LOAD: The generator will be running with load in test mode.

**Note:** dis = disable

| <b>EXERCISE (<i>Engine-&gt;Exercise</i>)</b> |                                    | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|----------------------------------------------|------------------------------------|-------------|------------|----------------|-------------|
| <b>Disable/enable select</b>                 | Exercise Disable or Enable         | DISBL/ENABL |            | DISBL          |             |
| <b>Start time1 on monday</b>                 | Exercise Start Time 1 on Monday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time1 on monday</b>                  | Exercise Stop Time 1 on Monday     | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time2 on monday</b>                 | Exercise Start Time 2 on Monday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time2 on monday</b>                  | Exercise Stop Time 2 on Monday     | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time3 on monday</b>                 | Exercise Start Time 3 on Monday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time3 on monday</b>                  | Exercise Stop Time 3 on Monday     | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time4 on monday</b>                 | Exercise Start Time 4 on Monday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time4 on monday</b>                  | Exercise Stop Time 4 on Monday     | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time1 on tues.</b>                  | Exercise Start Time 1 on Tuesday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time1 on tuesday</b>                 | Exercise Stop Time 1 on Tuesday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time2 on tues.</b>                  | Exercise Start Time 2 on Tuesday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time2 on tuesday</b>                 | Exercise Stop Time 2 on Tuesday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time3 on tues.</b>                  | Exercise Start Time 3 on Tuesday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time3 on tuesday</b>                 | Exercise Stop Time 3 on Tuesday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time4 on tues.</b>                  | Exercise Start Time 4 on Tuesday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time4 on tuesday</b>                 | Exercise Stop Time 4 on Tuesday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time1 on wednes</b>                 | Exercise Start Time 1 on Wednesday | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time1 on wednes.</b>                 | Exercise Stop Time 1 on Wednesday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time2 on wednes</b>                 | Exercise Start Time 2 on Wednesday | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time2 on wednes.</b>                 | Exercise Stop Time 2 on Wednesday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time3 on wednes</b>                 | Exercise Start Time 3 on Wednesday | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time3 on wednes.</b>                 | Exercise Stop Time 3 on Wednesday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time4 on wednes</b>                 | Exercise Start Time 4 on Wednesday | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time4 on wednes.</b>                 | Exercise Stop Time 4 on Wednesday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time1 on thurs.</b>                 | Exercise Start Time 1 on Thursday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time1 on thurs.</b>                  | Exercise Stop Time 1 on Thursday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time2 on thurs.</b>                 | Exercise Start Time 2 on Thursday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time2 on thurs.</b>                  | Exercise Stop Time 2 on Thursday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time3 on thurs.</b>                 | Exercise Start Time 3 on Thursday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time3 on thurs.</b>                  | Exercise Stop Time 3 on Thursday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time4 on thurs.</b>                 | Exercise Start Time 4 on Thursday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time4 on thurs.</b>                  | Exercise Stop Time 4 on Thursday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time1 on friday</b>                 | Exercise Start Time 1 on Friday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time1 on friday</b>                  | Exercise Stop Time 1 on Friday     | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time2 on friday</b>                 | Exercise Start Time 2 on Friday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time2 on friday</b>                  | Exercise Stop Time 2 on Friday     | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time3 on friday</b>                 | Exercise Start Time 3 on Friday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time3 on friday</b>                  | Exercise Stop Time 3 on Friday     | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time4 on friday</b>                 | Exercise Start Time 4 on Friday    | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time4 on friday</b>                  | Exercise Stop Time 4 on Friday     | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time1 on satur.</b>                 | Exercise Start Time 1 on Saturday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time1 on satur.</b>                  | Exercise Stop Time 1 on Saturday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time2 on satur.</b>                 | Exercise Start Time 2 on Saturday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time2 on satur.</b>                  | Exercise Stop Time 2 on Saturday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time3 on satur.</b>                 | Exercise Start Time 3 on Saturday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time3 on satur.</b>                  | Exercise Stop Time 3 on Saturday   | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Start time4 on satur.</b>                 | Exercise Start Time 4 on Saturday  | 0.00        | 23.59      | 0.00           | H.Min       |
| <b>Stop time4 on satur.</b>                  | Exercise Stop Time 4 on Saturday   | 0.00        | 23.59      | 0.00           | H.Min       |

**Note:** dis = disable

|                              |                                 |      |       |      |       |   |
|------------------------------|---------------------------------|------|-------|------|-------|---|
| ↓                            | ↓                               | ↓    | ↓     | ↓    | ↓     | ↓ |
| <b>Start time1 on sunday</b> | Exercise Start Time 1 on Sunday | 0.00 | 23.59 | 0.00 | H.Min |   |
| <b>Stop time1 on sunday</b>  | Exercise Stop Time 1 on Sunday  | 0.00 | 23.59 | 0.00 | H.Min |   |
| <b>Start time2 on sunday</b> | Exercise Start Time 2 on Sunday | 0.00 | 23.59 | 0.00 | H.Min |   |
| <b>Stop time2 on sunday</b>  | Exercise Stop Time 2 on Sunday  | 0.00 | 23.59 | 0.00 | H.Min |   |
| <b>Start time3 on sunday</b> | Exercise Start Time 3 on Sunday | 0.00 | 23.59 | 0.00 | H.Min |   |
| <b>Stop time3 on sunday</b>  | Exercise Stop Time 3 on Sunday  | 0.00 | 23.59 | 0.00 | H.Min |   |
| <b>Start time4 on sunday</b> | Exercise Start Time 4 on Sunday | 0.00 | 23.59 | 0.00 | H.Min |   |
| <b>Stop time4 on sunday</b>  | Exercise Stop Time 4 on Sunday  | 0.00 | 23.59 | 0.00 | H.Min |   |

### Exercise Disable or Enable

*DISABLE:* The exercise function is disabled. The unit will not monitor the exercise parameters.

*ENABLE:* The unit will monitor the exercise parameters.

When the start time of any day is reached, the unit will start the generator.

When the stop time of the same day is reached, the unit will stop the generator.

**Note-1:** If the “Start and Stop time parameters” of any day are set the same, the exercise function for that day will be passive.

**Note-2:** If the “Start time parameter” of any day is set larger than the “Stop time parameter”, the exercise function for that day will be passive.

| <b>ENGINE GENERAL (<i>Engine-&gt;General</i>)</b> |                        | <b>Min</b>                      | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|---------------------------------------------------|------------------------|---------------------------------|------------|----------------|-------------|
| <b>Fuel selection</b>                             | Engine Fuel Selection  | 0-GAS<br>1-DIESEL<br>2-GASOLINE |            | 1-DIESEL       |             |
| <b>Stop solenoid time</b>                         | Stop Solenoid Time     | 1                               | 99         | 20             | Sec         |
| <b>Ignition delay</b>                             | Ignition Delay         | 1                               | 99         | 5              | Sec         |
| <b>Gas valve delay</b>                            | Gas Valve Delay        | 1                               | 99         | 5              | Sec         |
| <b>Min. of ignition speed</b>                     | Minimum Ignition Speed | 10                              | 1500       | 200            | RPM         |
| <b>Choke time</b>                                 | Choke Time             | 0.0                             | 30.0       | 0.8            | Sec         |

### **Engine Fuel (Gas/ Diesel/Gasoline) Selection**

Gas, Diesel or Gasoline engines can be selected.

### **Stop Solenoid Time**

This timer is used if the unit is configured to operate an Energise to stop engine. It dictates the duration that the Stop Solenoid output will remain active after the module has detected the engine has come to rest. If the Stop Solenoid output is not configured, this timer will still operate, preventing an immediate restart.

### **Ignition Delay**

With gas engines often a purging operation is desired before starting. With the engaging of the starter the ignition delay is started. If the 'min ignition speed' is reached after expiry of this time, the configurable relay output 'ignition' is set.

### **Gas Valve Delay**

By setting the ignition relay the gas valve delay is started. After the expiry of the set time as long as the number of revolutions is higher than the minimum ignition speed, the gas valve is set. When the necessary engine shutdown process, gas valve is de-energised.

### **Minimum Ignition Speed**

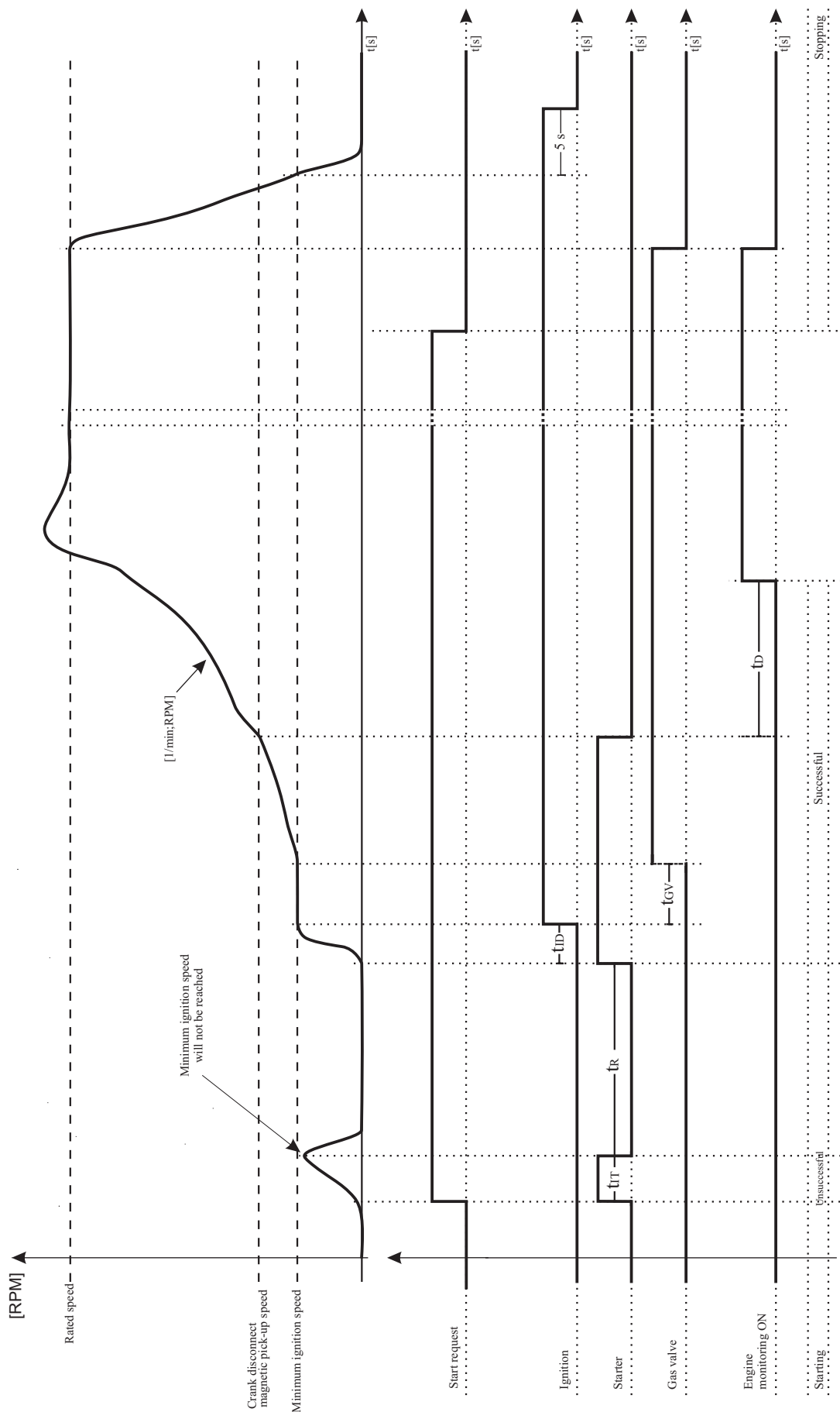
After expiry of the ignition delay the number of revolutions set must be reached, so that the configurable relay output 'ignition' will be set.

### **Choke Time**

This timer dictates that how long choke output will be active in gasoline engines.

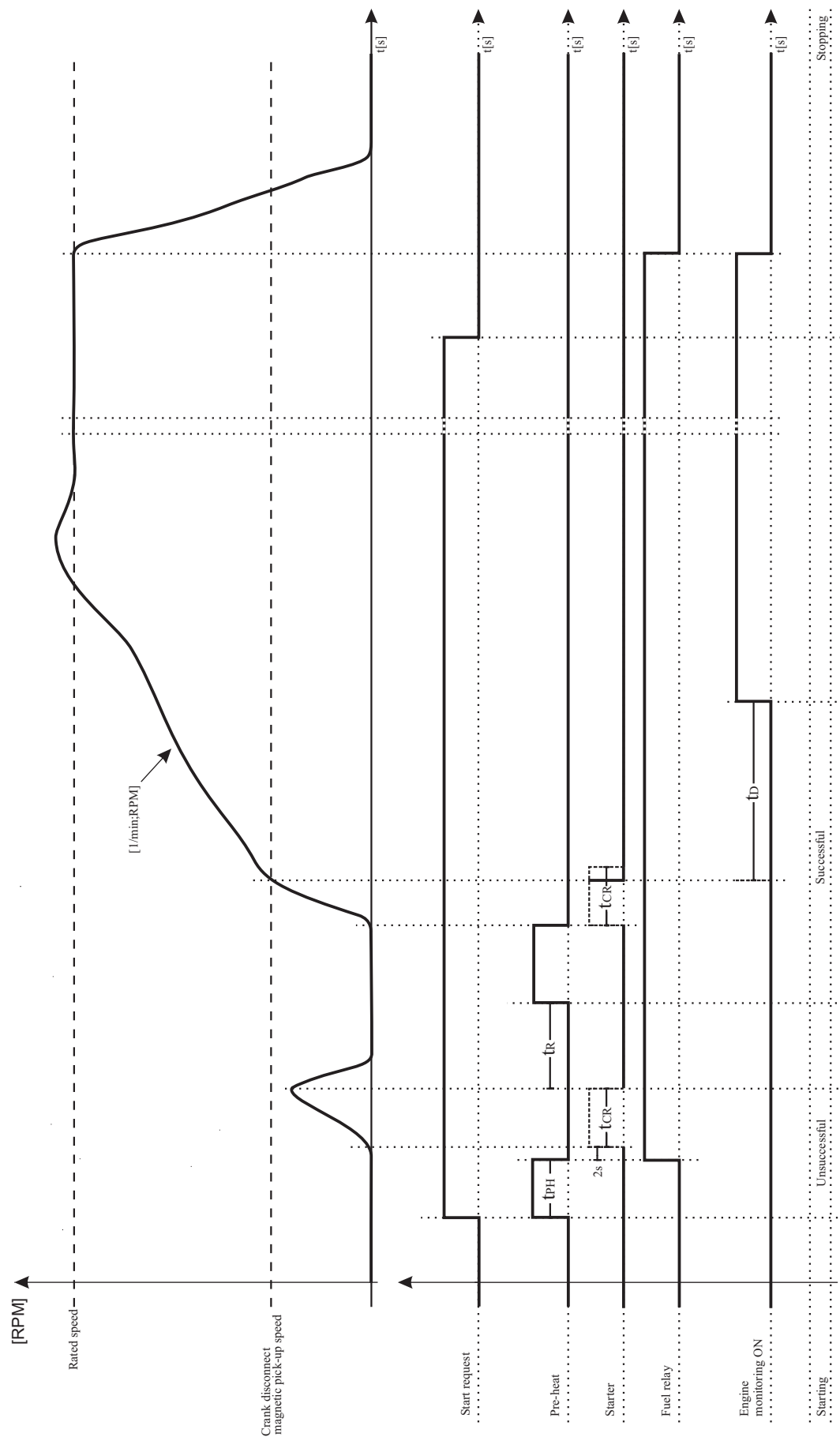
[s]  
[s]  
[s]  
[s]

$t_R$  Interval between 2 start attempts  
 $t_{ID}$  Ignition delay  
 $t_{GV}$  Gas valve delay  
 $t_D$  Engine delayed monitoring



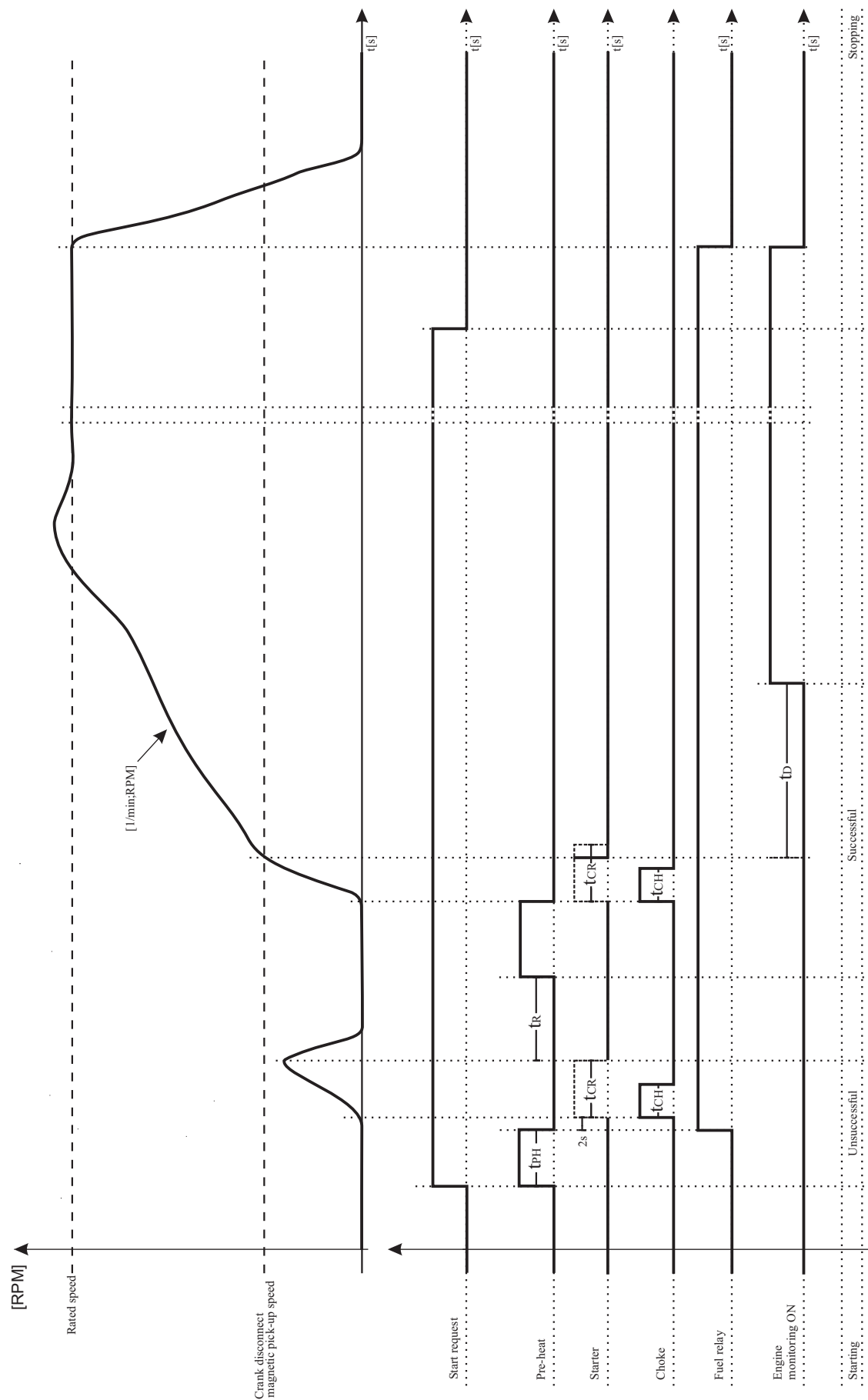
## Start/Stop Diagram for GAS ENGINE

$t_{PH}$  Preheating time [s]  
 $t_{CR}$  Engagement time [s]  
 $t_R$  Interval between 2 start attempts [s]  
 $t_D$  Engine delayed monitoring [s]



Start/Stop Diagram for DIESEL ENGINE

$t_{PH}$  Preheating time [s]  
 $t_{CR}$  Engagement time [s]  
 $t_R$  Interval between 2 start attempts [s]  
 $t_D$  Engine delayed monitoring [s]  
 $t_{CH}$  Choke time [s]



Start/Stop Diagram for GASOLINE ENGINE

## 4.2.5 Inputs

| SENDER INPUTS ( <i>Inputs-&gt;Sender inputs</i> ) |                                  | Min                                                                                                                                                                                                                                                                                                                                                | Max  | Default | Unit |
|---------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------|------|
| Oil pressure unit                                 | Oil Pressure Unit                | BAR/PSI/KPA                                                                                                                                                                                                                                                                                                                                        |      | BAR     |      |
| Oil press. input type                             | Oil Pressure Input Type          | 0 - Not Used (Disable)<br>1 - Digital NC<br>2 - Digital NO<br>3 - VDO 5 BAR<br>4 - VDO 7 BAR<br>5 - VDO 10 BAR<br>6 - DATCON 5 BAR<br>7 - DATCON 7 BAR<br>8 - MURPHY 7 BAR<br>9 - User Configured                                                                                                                                                  |      | 0 (dis) |      |
| Oil pressure prealarm                             | Oil Pressure Pre-Alarm           | 0.0 (dis)                                                                                                                                                                                                                                                                                                                                          | 30.0 | 1.2     | BAR  |
| Oil pressure reset                                | Oil Pressure Pre-Alarm Reset     | 0.0                                                                                                                                                                                                                                                                                                                                                | 30.0 | 1.4     | BAR  |
| Oil pressure shutdown                             | Oil Pressure Shutdown            | 0.0                                                                                                                                                                                                                                                                                                                                                | 30.0 | 1.0     | BAR  |
| Temperature unit                                  | Coolant Temperature Unit         | °C/°F                                                                                                                                                                                                                                                                                                                                              |      | °C      |      |
| Temp. input type                                  | Coolant Temperature Input Type   | 0 - Not Used (Disable)<br>1 - Digital NC<br>2 - Digital NO<br>3 - VDO 120 °C<br>4 - VDO 150 °C<br>5 - DATCON<br>6 - MURPHY<br>7 - PT100<br>8 - User Configured                                                                                                                                                                                     |      | 0 (dis) |      |
| Temp. sensor break                                | Temperature Sensor Break         | 0 - Disable<br>1 - Enable From Safety On (3min. delayed)<br>2 - Always Enable                                                                                                                                                                                                                                                                      |      | 0 (dis) |      |
| High temp. prealarm                               | High Temperature Pre-Alarm       | 0 (dis)                                                                                                                                                                                                                                                                                                                                            | 300  | 90      | °C   |
| High temp. reset                                  | High Temp. Pre-Alarm Reset       | 0                                                                                                                                                                                                                                                                                                                                                  | 300  | 88      | °C   |
| High temp. shutdown                               | High Temperature Shutdown        | 0                                                                                                                                                                                                                                                                                                                                                  | 300  | 95      | °C   |
| Low temp. warning                                 | Low Temperature Warning          | 0 (dis)                                                                                                                                                                                                                                                                                                                                            | 70   | 0 (dis) | °C   |
| Heater control ON                                 | Coolant Heater Control On        | 0 (dis)                                                                                                                                                                                                                                                                                                                                            | 300  | 0 (dis) | °C   |
| Heater control OFF                                | Coolant Heater Control Off       | 0                                                                                                                                                                                                                                                                                                                                                  | 300  | 45      | °C   |
| Water pump on time                                | Water Pump On Time               | 0                                                                                                                                                                                                                                                                                                                                                  | 9999 | 5       | Sec  |
| Water pump off time                               | Water Pump Off Time              | 0                                                                                                                                                                                                                                                                                                                                                  | 9999 | 5       | Sec  |
| Conf. AI1 unit                                    | Configurable Analog Input-1 Unit | BAR/PSI/KPA/°C/°F/%/Lt                                                                                                                                                                                                                                                                                                                             |      | %       |      |
| Conf. AI1 type                                    | Configurable Analog Input-1 Type | 0- Not Used (Disable)<br>1- Digital NC<br>2- Digital NO<br>3- VDO OHM (10-180)<br>4- VDO TUBE (90-0)<br>5- US OHM (240-33)<br>6- ELS11 OHM (0-190)<br>7- FORD (73-10)<br>8- ELS13 OHM (0-190)<br>9- ELS30 OHM (0-190)<br>10- DAVITEQ (RS485)*1<br>11- KUS CLS2 (RS485)*1<br>12- MSL 790 (RS485)*1<br>13- CSFL 790 (RS485)*1<br>14- User Configured |      | 0 (dis) |      |

**Note\*1:** These sensor types can only be used in the Trans-AMF.RS485 units.

The USB communication interface can not be used when one of these sensor types is selected.

|                              |                                                                                                                                    |                                                                                                                                                                |       |         |     |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|-----|
| <b>Conf. AI1 indication</b>  | If Conf. AI1 type is "Digital"<br>0- Status<br>1- Warning Non-Latching<br>2- Warning Latching<br>3- Electrical Trip<br>4- Shutdown | 0                                                                                                                                                              | 4     | 0       |     |
| <b>Conf. AI1 activation</b>  | If Conf. AI1 type is "Digital"<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                          | 0                                                                                                                                                              | 2     | 2       |     |
| <b>Conf. AI1 active dely</b> | Configurable Analog Input-1 Active Delay (If Conf. AI1 type is "Digital")                                                          | 0                                                                                                                                                              | 250   | 0       | Sec |
| <b>Conf. AI1 low prealm</b>  | Config. Analog Input-1 Low Pre-Alarm                                                                                               | 0 (dis)                                                                                                                                                        | 3000  | 0 (dis) | %   |
| <b>Conf. AI1 low reset</b>   | Config. Analog Input-1 Low Reset                                                                                                   | 0                                                                                                                                                              | 3000  | 60      | %   |
| <b>Conf. AI1 low shutdwn</b> | Config. Analog Input-1 Low Shutdown                                                                                                | 0 (dis)                                                                                                                                                        | 3000  | 0 (dis) | %   |
| <b>Conf. AI1 high prealr</b> | Config. Analog Input-1 High Pre-Alarm                                                                                              | 0 (dis)                                                                                                                                                        | 3000  | 0 (dis) | %   |
| <b>Conf. AI1 high reset</b>  | Config. Analog Input-1 High Reset                                                                                                  | 0                                                                                                                                                              | 3000  | 90      | %   |
| <b>Conf. AI1 high shutd.</b> | Config. Analog Input-1 High Shutdown                                                                                               | 0 (dis)                                                                                                                                                        | 3000  | 0 (dis) | %   |
| <b>Conf. AI1 control ON</b>  | Config. Analog Input-1 control ON                                                                                                  | 0 (dis)                                                                                                                                                        | 3000  | 0 (dis) | %   |
| <b>Conf. AI1 control OFF</b> | Config. Analog Input-1 control OFF                                                                                                 | 0                                                                                                                                                              | 3000  | 75      | %   |
| <b>Fuel filling max.time</b> | Fuel Filling Maximum Time                                                                                                          | 0 (dis)                                                                                                                                                        | 30000 | 0 (dis) | Sec |
| <b>Fuel fill.alarm reset</b> | Fuel Filling Alarm Reset                                                                                                           | YES/NO                                                                                                                                                         |       | NO      |     |
| <b>Fuel consumpt. reset</b>  | Fuel Consumption Reset                                                                                                             | YES/NO                                                                                                                                                         |       | NO      |     |
| <b>Fuel tank capacity</b>    | Fuel Tank Capacity                                                                                                                 | 0                                                                                                                                                              | 30000 | 100     | Lt  |
| <b>Leak fuel alarm</b>       | Leak Fuel Alarm Set                                                                                                                | 0 (dis)                                                                                                                                                        | 100   | 0 (dis) | %   |
| <b>Conf. AI2 unit</b>        | Configurable Analog Input-2 Unit                                                                                                   | BAR/PSI/KPA/°C/°F/%/Lt                                                                                                                                         |       | °C      |     |
| <b>Conf. AI2 type</b>        | Configurable Analog Input-2 Type                                                                                                   | 0 - Not Used (Disable)<br>1 - Digital NC<br>2 - Digital NO<br>3 - VDO 120 °C<br>4 - VDO 150 °C<br>5 - DATCON<br>6 - MURPHY<br>7 - PT100<br>8 - User Configured |       | 0 (dis) |     |
| <b>Conf. AI2 indication</b>  | If Conf. AI2 type is "Digital"<br>0- Status<br>1- Warning Non-Latching<br>2- Warning Latching<br>3- Electrical Trip<br>4- Shutdown | 0                                                                                                                                                              | 4     | 0       |     |
| <b>Conf. AI2 activation</b>  | If Conf. AI2 type is "Digital"<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                          | 0                                                                                                                                                              | 2     | 2       |     |
| <b>Conf. AI2 active dely</b> | Configurable Analog Input-2 Active Delay (If Conf. AI2 type is "Digital")                                                          | 0                                                                                                                                                              | 250   | 0       | Sec |
| <b>Conf. AI2 low prealm</b>  | Config. Analog Input-2 Low Pre-Alarm                                                                                               | 0 (dis)                                                                                                                                                        | 300   | 0 (dis) | °C  |
| <b>Conf. AI2 low reset</b>   | Config. Analog Input-2 Low Reset                                                                                                   | 0                                                                                                                                                              | 300   | 60      | °C  |
| <b>Conf. AI2 low shutdwn</b> | Config. Analog Input-2 Low Shutdown                                                                                                | 0 (dis)                                                                                                                                                        | 300   | 0 (dis) | °C  |
| <b>Conf. AI2 high prealr</b> | Config. Analog Input-2 High Pre-Alarm                                                                                              | 0 (dis)                                                                                                                                                        | 300   | 0 (dis) | °C  |
| <b>Conf. AI2 high reset</b>  | Config. Analog Input-2 High Reset                                                                                                  | 0                                                                                                                                                              | 300   | 90      | °C  |
| <b>Conf. AI2 high shutd.</b> | Config. Analog Input-2 High Shutdown                                                                                               | 0 (dis)                                                                                                                                                        | 300   | 0 (dis) | °C  |
| <b>Conf. AI2 control ON</b>  | Config. Analog Input-2 Control ON                                                                                                  | 0 (dis)                                                                                                                                                        | 300   | 0 (dis) | °C  |
| <b>Conf. AI2 control OFF</b> | Config. Analog Input-2 Control OFF                                                                                                 | 0                                                                                                                                                              | 300   | 75      | °C  |

### Oil Pressure Input Type

This section is used to configure the Oil Pressure sender input.

**0-NOT USED:** The Oil Pressure input will not be monitored.

**1-DIGITAL NC:** The Oil pressure input is fed from an engine mounted digital pressure switch. This switch returns a closed signal during low oil pressure conditions (and engine at rest), once oil pressure is established the switch will open.

**2-DIGITAL NO:** The Oil pressure input is fed from an engine mounted digital pressure switch. This switch returns an open signal during low oil pressure conditions (and engine at rest), once oil pressure is established the switch will close.

**3, 4, 5, 6, 7, 8 and 9:** Oil pressure input is connected to a resistive type engine mounted oil pressure transducer. If this parameter selected as "**9-USER CONFIGURED**", the user can input the data manually according to the sensor curve.

### Temperature Input Type

This section is used to configure the Coolant Temperature sender input.

**0-NOT USED:** The Coolant Temperature input will not be monitored.

**1-DIGITAL NC:** The Coolant Temperature input is fed from an engine mounted digital temperature switch. This switch returns a closed signal during low temperature, should the temperature rise above the switch manufacturers trip point the switch contact will open.

**2-DIGITAL NO:** The Coolant Temperature input is fed from an engine mounted digital temperature switch. This switch returns an open signal during low temperature, should the temperature rise above the switch manufacturers trip point the switch contact will close.

**3, 4, 5, 6, 7 and 8:** The Coolant Temperature input is connected to a resistive type engine mounted temperature transducer. If this parameter selected as "**8-USER CONFIGURED**", the user can input the data manually according to the sensor curve.

### Temperature Sensor Break

**Disable:** The Coolant Temperature sensor break will not be monitored.

**Enable From Safety On (3min. delayed):** The Coolant Temperature sensor break will be monitored if the engine runs at least 3 minutes.

**Always Enable:** The Coolant Temperature sensor break always will be monitored.

### Configurable Analog Input-1 Type

This section is used to configure the Configurable Analog Input-1 sender input.

**0-NOT USED:** The Configurable Analog Input-1 will not be monitored.

**1-DIGITAL NC:** open for low Configurable Analog Input-1.

**2-DIGITAL NO:** close for low Configurable Analog Input-1.

**3, 4, 5, 6, 7, 8, 9 and 12:** The Configurable Analog Input-1 is connected to a resistive type engine mounted level/temperature/pressure transducer. If this parameter selected as "**12-USER CONFIGURED**", the user can input the data manually according to the sensor curve.

**10-DAVITEQ (RS485), 11-KUS CLS2 (RS485), 12-MSLL 790 (RS485) and 13-CSFL 790 (RS485):**

Since these sensors have RS485 communication feature, they are connected to the RS485 port of the device. **Note:** The Configurable Analog Input-1 is not used.

### Configurable Analog Input-2 Type

This section is used to configure the Configurable Analog Input-2 sender input.

**0-NOT USED:** The Configurable Analog Input-2 will not be monitored.

**1-DIGITAL NC:** open for low Configurable Analog Input-2.

**2-DIGITAL NO:** close for low Configurable Analog Input-2.

**3, 4, 5, 6, 7, 8, 9 and 12:** The Configurable Analog Input-2 is connected to a resistive type engine mounted level/temperature/pressure transducer. If this parameter selected as "**12-USER CONFIGURED**", the user can input the data manually according to the sensor curve.

**10-DAVITEQ (RS485), 11-KUS CLS2 (RS485), 12-MSLL 790 (RS485) and 13-CSFL 790 (RS485):**

Since these sensors have RS485 communication feature, they are connected to the RS485 port of the device. **Note:** The Configurable Analog Input-2 is not used.

#### DAVITEQ (RS485) Sensor Connection:

*Brown cable (+24VDC):* To battery positive.  
*White cable (A+):* To terminal-43 of Trans-AMF.  
*Black cable (B-):* To terminal-44 of Trans-AMF.  
*Blue cable (GND):* To battery negative.

#### KUS CLS2 (RS485) Sensor Connection:

*Red cable (VCC):* To battery positive.  
*Black cable (GND):* To battery negative.  
*Blue cable (B):* To terminal-44 of Trans-AMF.  
*Yellow cable (A):* To terminal-43 of Trans-AMF.

**MSLL 790 (RS485) Sensor Connection:**

Red cable (VCC): To battery positive.  
 Black cable (GND): To battery negative.  
 Green cable (A): To terminal-43 of Trans-AMF.  
 White cable (B): To terminal-44 of Trans-AMF.

**CSFL 790 (RS485) Sensor Connection:**

Red cable (5VDC): To battery positive.  
 Black cable (GND): To battery negative.  
 Blue cable (A): To terminal-43 of Trans-AMF.  
 White cable (B): To terminal-44 of Trans-AMF.

| <b>SENDER LINEARISATION (Inputs-&gt;Sender linearisation)</b> |                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|---------------------------------------------------------------|------------------------------|------------|------------|----------------|-------------|
| <b>Oil pressure sender 1</b>                                  | Oil Pressure Sender Point-1  | 0          | 1300       | 15             | R           |
| <b>Oil pressure 1</b>                                         | Oil Pressure Point-1         | 0.0        | 30.0       | 0.0            | BAR         |
| <b>Oil pressure sender 2</b>                                  | Oil Pressure Sender Point-2  | 0          | 1300       | 31             | R           |
| <b>Oil pressure 2</b>                                         | Oil Pressure Point-2         | 0.0        | 30.0       | 1.0            | BAR         |
| <b>Oil pressure sender 3</b>                                  | Oil Pressure Sender Point-3  | 0          | 1300       | 49             | R           |
| <b>Oil pressure 3</b>                                         | Oil Pressure Point-3         | 0.0        | 30.0       | 2.0            | BAR         |
| <b>Oil pressure sender 4</b>                                  | Oil Pressure Sender Point-4  | 0          | 1300       | 66             | R           |
| <b>Oil pressure 4</b>                                         | Oil Pressure Point-4         | 0.0        | 30.0       | 3.0            | BAR         |
| <b>Oil pressure sender 5</b>                                  | Oil Pressure Sender Point-5  | 0          | 1300       | 85             | R           |
| <b>Oil pressure 5</b>                                         | Oil Pressure Point-5         | 0.0        | 30.0       | 4.0            | BAR         |
| <b>Oil pressure sender 6</b>                                  | Oil Pressure Sender Point-6  | 0          | 1300       | 101            | R           |
| <b>Oil pressure 6</b>                                         | Oil Pressure Point-6         | 0.0        | 30.0       | 5.0            | BAR         |
| <b>Oil pressure sender 7</b>                                  | Oil Pressure Sender Point-7  | 0          | 1300       | 117            | R           |
| <b>Oil pressure 7</b>                                         | Oil Pressure Point-7         | 0.0        | 30.0       | 6.0            | BAR         |
| <b>Oil pressure sender 8</b>                                  | Oil Pressure Sender Point-8  | 0          | 1300       | 132            | R           |
| <b>Oil pressure 8</b>                                         | Oil Pressure Point-8         | 0.0        | 30.0       | 7.0            | BAR         |
| <b>Oil pressure sender 9</b>                                  | Oil Pressure Sender Point-9  | 0          | 1300       | 149            | R           |
| <b>Oil pressure 9</b>                                         | Oil Pressure Point-9         | 0.0        | 30.0       | 8.0            | BAR         |
| <b>Oil pressure sender 10</b>                                 | Oil Pressure Sender Point-10 | 0          | 1300       | 178            | R           |
| <b>Oil pressure 10</b>                                        | Oil Pressure Point-10        | 0.0        | 30.0       | 10.0           | BAR         |
| <b>Temperature sender 1</b>                                   | Temperature Sender Point-1   | 0          | 1300       | 579            | R           |
| <b>Temperature 1</b>                                          | Temperature Point-1          | 0          | 300        | 28             | °C          |
| <b>Temperature sender 2</b>                                   | Temperature Sender Point-2   | 0          | 1300       | 404            | R           |
| <b>Temperature 2</b>                                          | Temperature Point-2          | 0          | 300        | 35             | °C          |
| <b>Temperature sender 3</b>                                   | Temperature Sender Point-3   | 0          | 1300       | 342            | R           |
| <b>Temperature 3</b>                                          | Temperature Point-3          | 0          | 300        | 40             | °C          |
| <b>Temperature sender 4</b>                                   | Temperature Sender Point-4   | 0          | 1300       | 250            | R           |
| <b>Temperature 4</b>                                          | Temperature Point-4          | 0          | 300        | 50             | °C          |
| <b>Temperature sender 5</b>                                   | Temperature Sender Point-5   | 0          | 1300       | 179            | R           |
| <b>Temperature 5</b>                                          | Temperature Point-5          | 0          | 300        | 60             | °C          |
| <b>Temperature sender 6</b>                                   | Temperature Sender Point-6   | 0          | 1300       | 136            | R           |
| <b>Temperature 6</b>                                          | Temperature Point-6          | 0          | 300        | 70             | °C          |
| <b>Temperature sender 7</b>                                   | Temperature Sender Point-7   | 0          | 1300       | 103            | R           |
| <b>Temperature 7</b>                                          | Temperature Point-7          | 0          | 300        | 80             | °C          |
| <b>Temperature sender 8</b>                                   | Temperature Sender Point-8   | 0          | 1300       | 77             | R           |
| <b>Temperature 8</b>                                          | Temperature Point-8          | 0          | 300        | 90             | °C          |
| <b>Temperature sender 9</b>                                   | Temperature Sender Point-9   | 0          | 1300       | 67             | R           |
| <b>Temperature 9</b>                                          | Temperature Point-9          | 0          | 300        | 95             | °C          |
| <b>Temperature sender 10</b>                                  | Temperature Sender Point-10  | 0          | 1300       | 63             | R           |
| <b>Temperature 10</b>                                         | Temperature Point-10         | 0          | 300        | 98             | °C          |

|                     |                                             |   |      |     |    |   |
|---------------------|---------------------------------------------|---|------|-----|----|---|
| ↓                   | ↓                                           | ↓ | ↓    | ↓   | ↓  | ↓ |
| Conf. AI1 sender 1  | Configurable Analog Input-1 Sender Point-1  | 0 | 1300 | 10  | R  |   |
| Conf. AI1 value 1   | Configurable Analog Input-1 Point-1         | 0 | 3000 | 0   | %  |   |
| Conf. AI1 sender 2  | Configurable Analog Input-1 Sender Point-2  | 0 | 1300 | 30  | R  |   |
| Conf. AI1 value 2   | Configurable Analog Input-1 Point-2         | 0 | 3000 | 11  | %  |   |
| Conf. AI1 sender 3  | Configurable Analog Input-1 Sender Point-3  | 0 | 1300 | 50  | R  |   |
| Conf. AI1 value 3   | Configurable Analog Input-1 Point-3         | 0 | 3000 | 22  | %  |   |
| Conf. AI1 sender 4  | Configurable Analog Input-1 Sender Point-4  | 0 | 1300 | 70  | R  |   |
| Conf. AI1 value 4   | Configurable Analog Input-1 Point-4         | 0 | 3000 | 33  | %  |   |
| Conf. AI1 sender 5  | Configurable Analog Input-1 Sender Point-5  | 0 | 1300 | 90  | R  |   |
| Conf. AI1 value 5   | Configurable Analog Input-1 Point-5         | 0 | 3000 | 44  | %  |   |
| Conf. AI1 sender 6  | Configurable Analog Input-1 Sender Point-6  | 0 | 1300 | 110 | R  |   |
| Conf. AI1 value 6   | Configurable Analog Input-1 Point-6         | 0 | 3000 | 55  | %  |   |
| Conf. AI1 sender 7  | Configurable Analog Input-1 Sender Point-7  | 0 | 1300 | 130 | R  |   |
| Conf. AI1 value 7   | Configurable Analog Input-1 Point-7         | 0 | 3000 | 66  | %  |   |
| Conf. AI1 sender 8  | Configurable Analog Input-1 Sender Point-8  | 0 | 1300 | 150 | R  |   |
| Conf. AI1 value 8   | Configurable Analog Input-1 Point-8         | 0 | 3000 | 77  | %  |   |
| Conf. AI1 sender 9  | Configurable Analog Input-1 Sender Point-9  | 0 | 1300 | 170 | R  |   |
| Conf. AI1 value 9   | Configurable Analog Input-1 Point-9         | 0 | 3000 | 88  | %  |   |
| Conf. AI1 sender 10 | Configurable Analog Input-1 Sender Point-10 | 0 | 1300 | 190 | R  |   |
| Conf. AI1 value 10  | Configurable Analog Input-1 Point-10        | 0 | 3000 | 100 | %  |   |
| Conf. AI2 sender 1  | Configurable Analog Input-2 Sender Point-1  | 0 | 1300 | 579 | R  |   |
| Conf. AI2 value 1   | Configurable Analog Input-2 Point-1         | 0 | 300  | 28  | °C |   |
| Conf. AI2 sender 2  | Configurable Analog Input-2 Sender Point-2  | 0 | 1300 | 404 | R  |   |
| Conf. AI2 value 2   | Configurable Analog Input-2 Point-2         | 0 | 300  | 35  | °C |   |
| Conf. AI2 sender 3  | Configurable Analog Input-2 Sender Point-3  | 0 | 1300 | 342 | R  |   |
| Conf. AI2 value 3   | Configurable Analog Input-2 Point-3         | 0 | 300  | 40  | °C |   |
| Conf. AI2 sender 4  | Configurable Analog Input-2 Sender Point-4  | 0 | 1300 | 250 | R  |   |
| Conf. AI2 value 4   | Configurable Analog Input-2 Point-4         | 0 | 300  | 50  | °C |   |
| Conf. AI2 sender 5  | Configurable Analog Input-2 Sender Point-5  | 0 | 1300 | 179 | R  |   |
| Conf. AI2 value 5   | Configurable Analog Input-2 Point-5         | 0 | 300  | 60  | °C |   |
| Conf. AI2 sender 6  | Configurable Analog Input-2 Sender Point-6  | 0 | 1300 | 136 | R  |   |
| Conf. AI2 value 6   | Configurable Analog Input-2 Point-6         | 0 | 300  | 70  | °C |   |
| Conf. AI2 sender 7  | Configurable Analog Input-2 Sender Point-7  | 0 | 1300 | 103 | R  |   |
| Conf. AI2 value 7   | Configurable Analog Input-2 Point-7         | 0 | 300  | 80  | °C |   |
| Conf. AI2 sender 8  | Configurable Analog Input-2 Sender Point-8  | 0 | 1300 | 77  | R  |   |
| Conf. AI2 value 8   | Configurable Analog Input-2 Point-8         | 0 | 300  | 90  | °C |   |
| Conf. AI2 sender 9  | Configurable Analog Input-2 Sender Point-9  | 0 | 1300 | 67  | R  |   |
| Conf. AI2 value 9   | Configurable Analog Input-2 Point-9         | 0 | 300  | 95  | °C |   |
| Conf. AI2 sender 10 | Configurable Analog Input-2 Sender Point-10 | 0 | 1300 | 63  | R  |   |
| Conf. AI2 value 10  | Configurable Analog Input-2 Point-10        | 0 | 300  | 98  | °C |   |

| <b>CONF. INPUT-1 (<i>Inputs-&gt;Conf. input-1</i>)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                           | 0- Disable<br>1- User Configured<br>2- Select From List                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0(dis)     | 2          | 2              |             |
| <b>Polarity</b>                                        | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0          | 1          | 1              |             |
| <b>Indication</b>                                      | If User Configured<br>0- Status<br>1- Warning Non-Latching<br>2- Warning Latching<br>3- Electrical Trip<br>4- Shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0          | 4          | 0              |             |
| <b>Activation</b>                                      | If User Configured<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0          | 2          | 2              |             |
| <b>Select from list</b>                                | If Select From List<br>0-Remote Start On Load<br>1-Remote Start Off Load<br>2-Auxiliary Mains Fail<br>3-Working Calendar Active<br>4-Master Auto Ready<br>5-Simulate Alarm Reset Button<br>6-Simulate Auto Button<br>7-Simulate Test Button<br>8-Simulate Manual Button<br>9-Simulate Start Button<br>10-Simulate Stop Button<br>11-Generator Closed Auxiliary<br>12-Generator Load Inhibit<br>13-Mains Closed Auxiliary<br>14-Mains Load Inhibit<br>15-Auto Restore Inhibit<br>16-Auto Start Inhibit<br>17-Panel Lock<br>18-Scheduled Runs(Exercise) Inhibited<br>19-Priority Select<br>20-Transfer To Generator/Open Mains<br>21-Transfer To Mains/Open Generator<br>22-Remote Inhibit<br>23-Being Found Alive<br>24-Low Battery<br>25-Emergency Stop<br>26-Emergency Stop No-Latching | 0          | 26         | 25             |             |
| <b>Active delay</b>                                    | Input active delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0          | 250        | 0              | Sec         |

**Note:** dis = disable

| <b>CONF. INPUT-2 (Inputs-&gt;Conf. Input-2)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                    | 0- Disable<br>1- User Configured<br>2- Select From List                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0(dis)     | 2          | 1              |             |
| <b>Polarity</b>                                 | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0          | 1          | 0              |             |
| <b>Indication</b>                               | If User Configured<br>0- Status<br>1- Warning Non-Latching<br>2- Warning Latching<br>3- Electrical Trip<br>4- Shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0          | 4          | 0              |             |
| <b>Activation</b>                               | If User Configured<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0          | 2          | 2              |             |
| <b>Select from list</b>                         | If Select From List<br>0-Remote Start On Load<br>1-Remote Start Off Load<br>2-Auxiliary Mains Fail<br>3-Working Calendar Active<br>4-Master Auto Ready<br>5-Simulate Alarm Reset Button<br>6-Simulate Auto Button<br>7-Simulate Test Button<br>8-Simulate Manual Button<br>9-Simulate Start Button<br>10-Simulate Stop Button<br>11-Generator Closed Auxiliary<br>12-Generator Load Inhibit<br>13-Mains Closed Auxiliary<br>14-Mains Load Inhibit<br>15-Auto Restore Inhibit<br>16-Auto Start Inhibit<br>17-Panel Lock<br>18-Scheduled Runs(Exercise) Inhibited<br>19-Priority Select<br>20-Transfer To Generator/Open Mains<br>21-Transfer To Mains/Open Generator<br>22-Remote Inhibit<br>23-Being Found Alive<br>24-Low Battery<br>25-Sprinkler Mode On Load<br>26-Sprinkler Mode Off Load | 0          | 26         | 3              |             |
| <b>Active delay</b>                             | Input active delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0          | 250        | 5              | Sec         |

**Note:** dis = disable

| <b>CONF. INPUT-3 (<i>Inputs-&gt;Conf. Input-3</i>)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                           | 0- Disable<br>1- User Configured<br>2- Select From List                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0(dis)     | 2          | 1              |             |
| <b>Polarity</b>                                        | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0          | 1          | 1              |             |
| <b>Indication</b>                                      | If User Configured<br>0- Status<br>1- Warning Non-Latching<br>2- Warning Latching<br>3- Electrical Trip<br>4- Shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0          | 4          | 4              |             |
| <b>Activation</b>                                      | If User Configured<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0          | 2          | 2              |             |
| <b>Select from list</b>                                | If Select From List<br>0-Remote Start On Load<br>1-Remote Start Off Load<br>2-Auxiliary Mains Fail<br>3-Working Calendar Active<br>4-Master Auto Ready<br>5-Simulate Alarm Reset Button<br>6-Simulate Auto Button<br>7-Simulate Test Button<br>8-Simulate Manual Button<br>9-Simulate Start Button<br>10-Simulate Stop Button<br>11-Generator Closed Auxiliary<br>12-Generator Load Inhibit<br>13-Mains Closed Auxiliary<br>14-Mains Load Inhibit<br>15-Auto Restore Inhibit<br>16-Auto Start Inhibit<br>17-Panel Lock<br>18-Scheduled Runs(Exercise) Inhibited<br>19-Priority Select<br>20-Transfer To Generator/Open Mains<br>21-Transfer To Mains/Open Generator<br>22-Remote Inhibit<br>23-Being Found Alive<br>24-Low Battery<br>25-Sprinkler Mode On Load<br>26-Sprinkler Mode Off Load | 0          | 26         | 4              |             |
| <b>Active delay</b>                                    | Input active delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0          | 250        | 5              | Sec         |

**Note:** dis = disable

| <b>CONF. INPUT-4 (Inputs-&gt;Conf. input-4)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                    | 0- Disable<br>1- User Configured<br>2- Select From List                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0(dis)     | 2          | 2              |             |
| <b>Polarity</b>                                 | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0          | 1          | 0              |             |
| <b>Indication</b>                               | If User Configured<br>0- Status<br>1- Warning Non-Latching<br>2- Warning Latching<br>3- Electrical Trip<br>4- Shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0          | 4          | 0              |             |
| <b>Activation</b>                               | If User Configured<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0          | 2          | 2              |             |
| <b>Select from list</b>                         | If Select From List<br>0-Remote Start On Load<br>1-Remote Start Off Load<br>2-Auxiliary Mains Fail<br>3-Working Calendar Active<br>4-Master Auto Ready<br>5-Simulate Alarm Reset Button<br>6-Simulate Auto Button<br>7-Simulate Test Button<br>8-Simulate Manual Button<br>9-Simulate Start Button<br>10-Simulate Stop Button<br>11-Generator Closed Auxiliary<br>12-Generator Load Inhibit<br>13-Mains Closed Auxiliary<br>14-Mains Load Inhibit<br>15-Auto Restore Inhibit<br>16-Auto Start Inhibit<br>17-Panel Lock<br>18-Scheduled Runs(Exercise) Inhibited<br>19-Priority Select<br>20-Transfer To Generator/Open Mains<br>21-Transfer To Mains/Open Generator<br>22-Remote Inhibit<br>23-Being Found Alive<br>24-Low Battery<br>25-Low Oil Pressure<br>26-Low Oil Level | 0          | 26         | 25             |             |
| <b>Active delay</b>                             | Input active delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0          | 250        | 0              | Sec         |

**Note:** dis = disable

| <b>CONF. INPUT-5 (<i>Inputs-&gt;Conf. input-5</i>)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                           | 0- Disable<br>1- User Configured<br>2- Select From List                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0(dis)     | 2          | 2              |             |
| <b>Polarity</b>                                        | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0          | 1          | 0              |             |
| <b>Indication</b>                                      | If User Configured<br>0- Status<br>1- Warning Non-Latching<br>2- Warning Latching<br>3- Electrical Trip<br>4- Shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0          | 4          | 0              |             |
| <b>Activation</b>                                      | If User Configured<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0          | 2          | 2              |             |
| <b>Select from list</b>                                | If Select From List<br>0-Remote Start On Load<br>1-Remote Start Off Load<br>2-Auxiliary Mains Fail<br>3-Working Calendar Active<br>4-Master Auto Ready<br>5-Simulate Alarm Reset Button<br>6-Simulate Auto Button<br>7-Simulate Test Button<br>8-Simulate Manual Button<br>9-Simulate Start Button<br>10-Simulate Stop Button<br>11-Generator Closed Auxiliary<br>12-Generator Load Inhibit<br>13-Mains Closed Auxiliary<br>14-Mains Load Inhibit<br>15-Auto Restore Inhibit<br>16-Auto Start Inhibit<br>17-Panel Lock<br>18-Scheduled Runs(Exercise) Inhibited<br>19-Priority Select<br>20-Transfer To Generator/Open Mains<br>21-Transfer To Mains/Open Generator<br>22-Remote Inhibit<br>23-Being Found Alive<br>24-Low Battery<br>25-High Temperature | 0          | 25         | 25             |             |
| <b>Active delay</b>                                    | Input active delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0          | 250        | 0              | Sec         |

**Note:** dis = disable

| <b>CONF. INPUT-6 (Inputs-&gt;Conf. Input-6)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                    | 0- Disable<br>1- User Configured<br>2- Select From List                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0(dis)     | 2          | 1              |             |
| <b>Polarity</b>                                 | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0          | 1          | 0              |             |
| <b>Indication</b>                               | If User Configured<br>0- Status<br>1- Warning Non-Latching<br>2- Warning Latching<br>3- Electrical Trip<br>4- Shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0          | 4          | 0              |             |
| <b>Activation</b>                               | If User Configured<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0          | 2          | 2              |             |
| <b>Select from list</b>                         | If Select From List<br>0-Remote Start On Load<br>1-Remote Start Off Load<br>2-Auxiliary Mains Fail<br>3-Working Calendar Active<br>4-Master Auto Ready<br>5-Simulate Alarm Reset Button<br>6-Simulate Auto Button<br>7-Simulate Test Button<br>8-Simulate Manual Button<br>9-Simulate Start Button<br>10-Simulate Stop Button<br>11-Generator Closed Auxiliary<br>12-Generator Load Inhibit<br>13-Mains Closed Auxiliary<br>14-Mains Load Inhibit<br>15-Auto Restore Inhibit<br>16-Auto Start Inhibit<br>17-Panel Lock<br>18-Scheduled Runs(Exercise) Inhibited<br>19-Priority Select<br>20-Transfer To Generator/Open Mains<br>21-Transfer To Mains/Open Generator<br>22-Remote Inhibit<br>23-Being Found Alive<br>24-Low Battery<br>25-Sprinkler Mode On Load<br>26-Sprinkler Mode Off Load | 0          | 26         | 7              |             |
| <b>Active delay</b>                             | Input active delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0          | 250        | 5              | Sec         |

**Note:** dis = disable

| <b>CONF. INPUT-7 (Inputs-&gt;Conf. input-7)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Input type</b>                               | 0- Disable<br>1- User Configured (Digital)<br>2- Select From List (Digital)<br>3- Cabin Temperature (Analog)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0(dis)     | 3          | 3              |             |
| <b>Polarity</b>                                 | If Input Type is Digital<br>0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0          | 1          | 0              |             |
| <b>Indication</b>                               | If Input Type is User Configured<br>0- Status<br>1- Warning Non-Latching<br>2- Warning Latching<br>3- Electrical Trip<br>4- Shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0          | 4          | 0              |             |
| <b>Activation</b>                               | If Input Type is User Configured<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0          | 2          | 2              |             |
| <b>Select from list</b>                         | If Input Type is Select From List<br>0-Remote Start On Load<br>1-Remote Start Off Load<br>2-Auxiliary Mains Fail<br>3-Working Calendar Active<br>4-Master Auto Ready<br>5-Simulate Alarm Reset Button<br>6-Simulate Auto Button<br>7-Simulate Test Button<br>8-Simulate Manual Button<br>9-Simulate Start Button<br>10-Simulate Stop Button<br>11-Generator Closed Auxiliary<br>12-Generator Load Inhibit<br>13-Mains Closed Auxiliary<br>14-Mains Load Inhibit<br>15-Auto Restore Inhibit<br>16-Auto Start Inhibit<br>17-Panel Lock<br>18-Scheduled Runs(Exercise) Inhibited<br>19-Priority Select<br>20-Transfer To Generator/Open Mains<br>21-Transfer To Mains/Open Generator<br>22-Remote Inhibit<br>23-Being Found Alive<br>24-Low Battery<br>25-Sprinkler Mode On Load<br>26-Sprinkler Mode Off Load | 0          | 26         | 8              |             |
| <b>Active delay</b>                             | Input active delay (If Input Type is Digital)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0          | 250        | 5              | Sec         |
| <b>Cabin temp.low prealr</b>                    | Cabin temperature low prealarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -50(dis)   | 100        | dis            | °C          |
| <b>Cabin temp.low reset</b>                     | Cabin temperature low prealarm reset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -50        | 100        | 0              | °C          |
| <b>Cabin temp.low shutd.</b>                    | Cabin temperature low shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -50(dis)   | 100        | dis            | °C          |
| <b>Cabin temp.high preal</b>                    | Cabin temperature high prealarm reset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -50(dis)   | 100        | dis            | °C          |
| <b>Cabin temp.high reset</b>                    | Cabin temperature high prealarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -50        | 100        | 0              | °C          |
| <b>Cabin temp.high shutd</b>                    | Cabin temperature high shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -50(dis)   | 100        | dis            | °C          |

**Note:** dis = disable

| <b>CONF. EXP. INPUT-1 (Inputs-&gt;Conf. exp. input-1)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                              | 0- Disable<br>1- User Configured<br>2- Select From List                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0(dis)     | 2          | 1              |             |
| <b>Hardware type</b>                                      | 0-> -Ve (Switched To Battery -)<br>1-> +Ve (Switched To Battery +)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0          | 1          | 0              |             |
| <b>Polarity</b>                                           | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0          | 1          | 0              |             |
| <b>Indication</b>                                         | If User Configured<br>0- Status<br>1- Warning Non-Latching<br>2- Warning Latching<br>3- Electrical Trip<br>4- Shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0          | 4          | 0              |             |
| <b>Activation</b>                                         | If User Configured<br>0- Active From Starting<br>1- Active From Safety On<br>2- Always Active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0          | 2          | 2              |             |
| <b>Select from list</b>                                   | If Select From List<br>2-Auxiliary Mains Fail<br>3-Working Calendar Active<br>4-Master Auto Ready<br>5-Simulate Alarm Reset Button<br>6-Simulate Auto Button<br>7-Simulate Test Button<br>8-Simulate Manual Button<br>9-Simulate Start Button<br>10-Simulate Stop Button<br>11-Generator Closed Auxiliary<br>12-Generator Load Inhibit<br>13-Mains Closed Auxiliary<br>14-Mains Load Inhibit<br>15-Auto Restore Inhibit<br>16-Auto Start Inhibit<br>17-Panel Lock<br>18-Scheduled Runs(Exercise) Inhibited<br>19-Priority Select<br>20-Transfer To Generator/Open Mains<br>21-Transfer To Mains/Open Generator | 2          | 21         | 2              |             |
| <b>Active delay</b>                                       | Input active delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0          | 250        | 5              | Sec         |

| <b>CONF. EXP. INPUT-2 (Inputs-&gt;Conf. exp. input-2)</b> |                                               | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-----------------------------------------------------------|-----------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                              | The same as Expansion Config. Input-1 options | 0(dis)     | 2          | 1              |             |
| <b>Hardware type</b>                                      | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Polarity</b>                                           | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Indication</b>                                         | The same as Expansion Config. Input-1 options | 0          | 4          | 0              |             |
| <b>Activation</b>                                         | The same as Expansion Config. Input-1 options | 0          | 2          | 2              |             |
| <b>Select from list</b>                                   | The same as Expansion Config. Input-1 options | 2          | 21         | 2              |             |
| <b>Active delay</b>                                       | Input active delay                            | 0          | 250        | 5              | Sec         |

| <b>CONF. EXP. INPUT-3 (Inputs-&gt;Conf. exp. input-3)</b> |                                               | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|-----------------------------------------------------------|-----------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                              | The same as Expansion Config. Input-1 options | 0(dis)     | 2          | 1              |             |
| <b>Hardware type</b>                                      | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Polarity</b>                                           | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Indication</b>                                         | The same as Expansion Config. Input-1 options | 0          | 4          | 0              |             |
| <b>Activation</b>                                         | The same as Expansion Config. Input-1 options | 0          | 2          | 2              |             |
| <b>Select from list</b>                                   | The same as Expansion Config. Input-1 options | 2          | 21         | 2              |             |
| <b>Active delay</b>                                       | Input active delay                            | 0          | 250        | 5              | Sec         |

| <b>CONF. EXP. INPUT-4 (<i>Inputs-&gt;Conf. exp. input-4</i>)</b> |                                               | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|------------------------------------------------------------------|-----------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                                     | The same as Expansion Config. Input-1 options | 0(dis)     | 2          | 1              |             |
| <b>Hardware type</b>                                             | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Polarity</b>                                                  | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Indication</b>                                                | The same as Expansion Config. Input-1 options | 0          | 4          | 0              |             |
| <b>Activation</b>                                                | The same as Expansion Config. Input-1 options | 0          | 2          | 2              |             |
| <b>Select from list</b>                                          | The same as Expansion Config. Input-1 options | 2          | 21         | 2              |             |
| <b>Active delay</b>                                              | Input active delay                            | 0          | 250        | 5              | Sec         |

| <b>CONF. EXP. INPUT-5 (<i>Inputs-&gt;Conf. exp. input-5</i>)</b> |                                               | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|------------------------------------------------------------------|-----------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                                     | The same as Expansion Config. Input-1 options | 0(dis)     | 2          | 1              |             |
| <b>Hardware type</b>                                             | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Polarity</b>                                                  | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Indication</b>                                                | The same as Expansion Config. Input-1 options | 0          | 4          | 0              |             |
| <b>Activation</b>                                                | The same as Expansion Config. Input-1 options | 0          | 2          | 2              |             |
| <b>Select from list</b>                                          | The same as Expansion Config. Input-1 options | 2          | 21         | 2              |             |
| <b>Active delay</b>                                              | Input active delay                            | 0          | 250        | 5              | Sec         |

| <b>CONF. EXP. INPUT-6 (<i>Inputs-&gt;Conf. exp. input-6</i>)</b> |                                               | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|------------------------------------------------------------------|-----------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                                     | The same as Expansion Config. Input-1 options | 0(dis)     | 2          | 1              |             |
| <b>Hardware type</b>                                             | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Polarity</b>                                                  | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Indication</b>                                                | The same as Expansion Config. Input-1 options | 0          | 4          | 0              |             |
| <b>Activation</b>                                                | The same as Expansion Config. Input-1 options | 0          | 2          | 2              |             |
| <b>Select from list</b>                                          | The same as Expansion Config. Input-1 options | 2          | 21         | 2              |             |
| <b>Active delay</b>                                              | Input active delay                            | 0          | 250        | 5              | Sec         |

| <b>CONF. EXP. INPUT-7 (<i>Inputs-&gt;Conf. exp. input-7</i>)</b> |                                               | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|------------------------------------------------------------------|-----------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                                     | The same as Expansion Config. Input-1 options | 0(dis)     | 2          | 1              |             |
| <b>Hardware type</b>                                             | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Polarity</b>                                                  | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Indication</b>                                                | The same as Expansion Config. Input-1 options | 0          | 4          | 0              |             |
| <b>Activation</b>                                                | The same as Expansion Config. Input-1 options | 0          | 2          | 2              |             |
| <b>Select from list</b>                                          | The same as Expansion Config. Input-1 options | 2          | 21         | 2              |             |
| <b>Active delay</b>                                              | Input active delay                            | 0          | 250        | 5              | Sec         |

| <b>CONF. EXP. INPUT-8 (<i>Inputs-&gt;Conf. exp. input-8</i>)</b> |                                               | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|------------------------------------------------------------------|-----------------------------------------------|------------|------------|----------------|-------------|
| <b>Dis,user conf.or list</b>                                     | The same as Expansion Config. Input-1 options | 0(dis)     | 2          | 1              |             |
| <b>Hardware type</b>                                             | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Polarity</b>                                                  | The same as Expansion Config. Input-1 options | 0          | 1          | 0              |             |
| <b>Indication</b>                                                | The same as Expansion Config. Input-1 options | 0          | 4          | 0              |             |
| <b>Activation</b>                                                | The same as Expansion Config. Input-1 options | 0          | 2          | 2              |             |
| <b>Select from list</b>                                          | The same as Expansion Config. Input-1 options | 2          | 21         | 2              |             |
| <b>Active delay</b>                                              | Input active delay                            | 0          | 250        | 5              | Sec         |

## CONFIGURABLE INPUTS SELECTIONS

### 0 REMOTE START ON LOAD

In AUTO mode, if one of the configurable inputs are selected as 0 (Remote Start On Load), the unit doesn't perform the mains failure control in order to start the generator. In AUTO mode, if one of the configurable inputs are selected as 0 (Remote Start On Load) and this input is active, then the unit will perform the start sequence and transfer load to the generator. If the input is passive, the unit will perform the stop sequence.

**Note:** dis = disable

### **1 REMOTE START OFF LOAD**

If this input is active, operation will be similar to the 'Remote Start On Load' function except that the generator will not be instructed to take the load. This function can be used where an engine only run is required e.g. for exercise.

### **2 AUXILIARY MAINS FAIL**

The unit will not monitor the incoming single or three phase supply for Over Voltage, Under Voltage, Over Frequency or Under Frequency. It may be required to monitor a different mains supply or some aspect of the incoming mains not monitored by the unit. If the devices providing this additional monitoring are connected to operate this input, the unit will operate as if the incoming mains supply has fallen outside of limits, the generator will be instructed to start and take load. Removal of the input signal will cause the unit to act as if the mains has returned to within limits. **Note:** This input only operates if the "Mains->Actions->Mains failure detect" parameter is set to "0-Disable".

### **3 WORKING CALENDAR ACTIVE**

If this input is active, the unit will monitor the working calendar parameters. If this input is passive, the unit will not monitor the working calendar parameters.

### **4 MASTER AUTO READY**

This input indicates that the master group is in the automatic ready state in dual operation.

### **5 SIMULATE ALARM RESET BUTTON**

This input mimics the operation of the 'Alarm Reset' button and is used to provide a remotely located Alarm Reset push button.

### **6 SIMULATE AUTO BUTTON**

This input mimics the operation of the 'Auto' button and is used to provide a remotely located Auto mode push button.

### **7 SIMULATE TEST BUTTON**

This input mimics the operation of the 'Test' button and is used to provide a remotely located Test mode push button.

### **8 SIMULATE MANUAL BUTTON**

This input mimics the operation of the 'Manual' button and is used to provide a remotely located Manual mode push button.

### **9 SIMULATE START BUTTON**

This input mimics the operation of the 'Start' button and is used to provide a remotely located start push button.

### **10 SIMULATE STOP BUTTON**

This input mimics the operation of the 'Stop' button and is used to provide a remotely located Stop push button.

### **11 GENERATOR CLOSED AUXILIARY**

This input is used to provide feedback to allow the unit to give true indication of the contactor or circuit breaker switching status. It should be connected to the generator load switching device auxiliary contact.

### **12 GENERATOR LOAD INHIBIT**

This input is used to prevent the unit from loading the generator. If the generator is already on load, activating this input will cause the unit to unload the generator. Removing the input will allow the generator to be loaded again. **Note:** This input only operates to control the generator-switching device if the unit load switching logic is attempting to load the generator. It will not control the generator-switching device when the mains is on load.

### **13 MAINS CLOSED AUXILIARY**

This input is used to provide feedback to allow the unit to give true indication of the contactor or circuit breaker switching status. It should be connected to the generator load switching device auxiliary contact.

### **14 MAINS LOAD INHIBIT**

This input is used to prevent the unit from loading the mains supply. If the mains supply is already on load, activating this input will cause the unit to unload the mains supply. Removing the input will allow the mains to be loaded again. **Note:** This input only operates to control the mains-switching device if the unit load switching logic is attempting to load the mains. It will not control the mains-switching device when the generator is on load.

### **15 AUTO RESTORE INHIBIT**

When module in the AUTO mode. In the event of a remote start or mains failure, the generator will be instructed to start and take load. On removal of the remote start signal or mains return, the module will continue to run the generator on load until this input is removed. Once the input is removed the unit will transfer the load back to the mains supply and follow a normal generator stop sequence. This input allows the module to be fitted as part of a system where the manual restoration to mains is controlled remotely or by an automated system.

## **16 AUTO START INHIBIT**

This input is used to provide an over-ride function to prevent the unit from starting the generator in the event of a remote start or mains out of limits condition occurring. If this input is active and a remote start signal or mains failure occurs the unit will not give a start command to the generator. If this input signal is then removed, the unit will operate as if a remote start or mains failure has occurred, starting and loading the generator. This function can be used to give an 'AND' function so that a generator will only be called to start if the mains fails and another condition exists which requires the generator to run. If the 'Auto Start Inhibit' signal become active once more it will be ignored until the unit has returned the mains supply on load and shutdown.

## **17 PANEL LOCK**

This input is used to provide security to the installation. If the panel lock input is active, the unit will not respond to operation of the mode select or start buttons. This allows the unit to be placed into a specific mode (such as Auto) and then secured. The operation of the unit is not affected and the operator will still be able to view the various instrumentation pages etc. **Note:** External control sources (i.e. Simulate Start Button) are not affected by the panel lock input and will continue to operate normally.

## **18 SCHEDULED RUNS(EXERCISE) INHIBITED**

This input is used to prevent the generator for starting in the event of a programmed scheduled (exercise) run occurring. While the input is active no scheduled runs will occur. If the input is active when a schedule run is called for, and is removed during the running period the gen-set will start and complete any remaining scheduled running time.

## **19 PRIORITY SELECT**

This input is used to determine the generator that is working at dual set application.

## **20 TRANSFER TO GENERATOR/OPEN MAINS**

This input is used to transfer the load to the generator when running in Manual mode.

## **21 TRANSFER TO MAINS/OPEN GENERATOR**

This input is used to transfer the load to the mains supply when running in Manual mode.

## **22 REMOTE INHIBIT**

In AUTO mode, if one of the configurable inputs are selected as 22 (Remote Inhibit) and this input is active, the module will inhibit the generator for starting. In the other hand, if this input is active while the generator was starting, the module will stop the generator.

## **23 BEING FOUND ALIVE**

When this input is active, controlling the engine remotely is not possible.

## **24 LOW BATTERY**

If this input is active when the unit is in AUTO mode and if mains is not okay, the unit will perform the start sequence and transfer load to the generator.

## **25 EMERGENCY STOP (FOR CONFIGURABLE INPUT-1)**

This input is used as the emergency stop input.

## **25 SPRINKLER MODE ON LOAD (FOR CONFIGURABLE INPUT-2,3,6,7)**

This input is used as the sprinkler mode input. When this input is active, all alarms will change to warnings, except overspeed and emergency stop.

## **25 LOW OIL PRESSURE (FOR CONFIGURABLE INPUT-4)**

This input is used as the oil pressure failure input. It will be checked while starting or stopping attempts.

## **25 HIGH TEMPERATURE (FOR CONFIGURABLE INPUT-5)**

This input is used as the temperature failure input.

## **26-LOW OIL LEVEL (FOR CONFIGURABLE INPUT-4)**

This input is used as the oil pressure failure input. It won't be checked while starting or stopping attempts.

## **26 EMERGENCY STOP NO-LATCHING (FOR CONFIGURABLE INPUT-1)**

This input is used as the non-latching emergency stop input.

## **26 SPRINKLER MODE OFF LOAD (FOR CONFIGURABLE INPUT-2,3,6,7)**

This input is used as the sprinkler mode input. When this input is active, all alarms will change to warnings, except overspeed and emergency stop. Also when this input is active, the generator breaker will not be active.

## 4.2.6 Outputs

| CONF. OUTPUT-1 ( <i>Outputs-&gt;Conf. output-1</i> ) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Min | Max | Default | Unit |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|---------|------|
| <b>Polarity</b>                                      | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0   | 1   | 0       |      |
| <b>Function</b>                                      | 0-NOT USED<br>1-AIR FLAP CONTROL<br>2-ALARM RESET<br>3-AUDIBLE ALARM<br>4-AUTO START INHIBIT<br>5-AUXILIARY MAINS FAILURE<br>6-BATTERY HIGH VOLTAGE<br>7-BATTERY LOW VOLTAGE<br>8-CALLING FOR SCHEDULED RUN(EXERCISE)<br>9-CAN ECU POWER<br>10-CAN ECU STOP<br>11-CHARGE ALTERNATOR FAILURE<br>12-COMMON ALARM<br>13-COMMON ELECTRICAL TRIP ALARM<br>14-COMMON SHUTDOWN ALARM<br>15-COMMON WARNING ALARM<br>16-COOLING FAN AFTER START<br>17-COOLING FAN AFTER STOP<br>18-COOLANT TEMPERATURE HIGH PRE-ALARM<br>19-COOLANT TEMPERATURE HIGH SHUTDOWN<br>20-COOLING DOWN TIMER IN PROGRESS<br>21-CRANK RELAY ENERGISED<br>22-DELAYED ALARMS ACTIVE<br>23-DIGITAL INPUT1 ALARM<br>24-DIGITAL INPUT2 ALARM<br>25-DIGITAL INPUT3 ALARM<br>26-DIGITAL INPUT4 ALARM<br>27-DIGITAL INPUT5 ALARM<br>28-DIGITAL INPUT6 ALARM<br>29-DIGITAL INPUT7 ALARM<br>30-EXPANSION INPUT1 ALARM<br>31-EXPANSION INPUT2 ALARM<br>32-EXPANSION INPUT3 ALARM<br>33-EXPANSION INPUT4 ALARM<br>34-EXPANSION INPUT5 ALARM<br>35-EXPANSION INPUT6 ALARM<br>36-EXPANSION INPUT7 ALARM<br>37-EXPANSION INPUT8 ALARM<br>38-EARTH FAULT<br>39-EMERGENCY STOP<br>40-FAIL TO START ALARM<br>41-FAIL TO STOP ALARM<br>42-CONF.A11 CONTROL<br>43-FUEL RELAY ENERGISED<br>44-GAS ENGINE IGNITION OUTPUT<br>45-GENERATOR AT REST<br>46-GENERATOR AVAILABLE<br>47-GENERATOR CLOSED AUXILIARY<br>48-GENERATOR FAILED TO CLOSE<br>49-GENERATOR FAILED TO OPEN<br>50-GENERATOR HIGH FREQUENCY PRE-ALARM<br>51-GENERATOR HIGH FREQUENCY SHUTDOWN<br>52-GENERATOR HIGH VOLTAGE PRE-ALARM<br>53-GENERATOR HIGH VOLTAGE SHUTDOWN<br>54-GENERATOR LOAD INHIBIT<br>55-GENERATOR LOW FREQUENCY PRE-ALARM<br>56-GENERATOR LOW FREQUENCY SHUTDOWN<br>57-GENERATOR LOW VOLTAGE PRE-ALARM<br>58-GENERATOR LOW VOLTAGE SHUTDOWN<br>59-GENERATOR STOPPING<br>60-GENERATOR OPEN BREAKER<br>61-HORN OUTPUT LATCHED<br>62-HORN OUTPUT PULSED<br>63-MASTER AUTO READY<br>64-CONF.A12 CONTROL<br>65-LOSS OF MAGNETIC PICK-UP SPEED SIGNAL<br>66-LOW TEMPERATURE<br>67-MAINTENANCE DUE ALARM<br>68-MAINS CLOSED AUXILIARY<br>69-MAINS FAILED TO CLOSE<br>70-MAINS FAILED TO OPEN<br>71-MAINS FAILURE<br>72-MAINS HIGH FREQUENCY<br>73-MAINS HIGH VOLTAGE<br>74-MAINS LOAD INHIBIT<br>75-MAINS LOW FREQUENCY<br>76-MAINS LOW VOLTAGE<br>77-MAINS OPEN BREAKER<br>78-NO LOADING COMMAND<br>79-OIL PRESSURE LOW PRE-ALARM<br>80-OIL PRESSURE LOW SHUTDOWN<br>81-CONF.A11 HIGH PREA<br>82-CONF.A11 HIGH SHUT<br>83-OVER CURRENT PRE-ALARM<br>84-OVER CURRENT<br>85-OVER POWER PRE-ALARM<br>86-OVER POWER SHUTDOWN<br>87-OVERSPED PRE-ALARM<br>88-OVERSPED SHUTDOWN<br>89-PANEL LOCK<br>90-PRE-HEAT(during preheat timer)<br>91-PRE-HEAT(until end of cranking)<br>92-PRE-HEAT(until end of warming)<br>93-PRE-HEAT(until end safety on)<br>94-REMOTE START PRESENT<br>95-REMOTE STOP DELAY IN PROGRESS<br>96-SHORT CIRCUIT<br>97-SMOKE LIMITING<br>98-STARTING ALARM<br>99-STARTING ALARMS ARMED<br>100-STOP RELAY ENERGISED<br>101-SYSTEM IN AUTO MODE<br>102-SYSTEM IN MANUAL MODE<br>103-SYSTEM IN STOP MODE<br>104-SYSTEM IN TEST MODE<br>105-UNDER CURRENT PRE-ALARM<br>106-UNDER CURRENT<br>107-UNDER POWER PRE-ALARM<br>108-UNDER POWER SHUTDOWN<br>109-UNDERSPEED PRE-ALARM<br>110-UNDERSPEED SHUTDOWN<br>111-WAITING FOR GENERATOR<br>112-DUAL COMMUNICATION ERROR<br>113-LOAD SUPPLY FROM GENERATOR<br>114-LOAD SUPPLY FROM MAINS<br>115-CONFIGURABLE ANALOG INPUT 1 LOW PRE-ALARM<br>116-CONFIGURABLE ANALOG INPUT 1 LOW SHUTDOWN<br>117-CONFIGURABLE ANALOG INPUT 2 LOW PRE-ALARM<br>118-CONFIGURABLE ANALOG INPUT 2 LOW SHUTDOWN<br>119-CONFIGURABLE ANALOG INPUT 2 HIGH PRE-ALARM<br>120-CONFIGURABLE ANALOG INPUT 2 HIGH SHUTDOWN<br>121-CHOKE ACTIVE<br>122-REMOTE CONTROL ACTIVE<br>123-REVERSE POWER<br>124-CABIN TEMPERATURE LOW PRE-ALARM<br>125-CABIN TEMPERATURE LOW SHUTDOWN<br>126-CABIN TEMPERATURE HIGH PRE-ALARM<br>127-CABIN TEMPERATURE HIGH SHUTDOWN<br>128-HEATER CONTROL<br>129-REMOTE OUTPUT<br>130-UNBALANCE LOAD<br>131-WATER PUMP<br>132-RESERVED<br>133-RESERVED<br>134-RESERVED<br>135-RESERVED<br>136-SYNCHRON POSITION<br>137-OVER LOAD STEP 1<br>138-OVER LOAD STEP 2 | 0   | 138 | 43      |      |

| <b>CONF. OUTPUT-2 (Outputs-&gt;Conf. output-2)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|----------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                    | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                    | The same as Configurable Output-1 options                                    | 0          | 138        | 21             |             |

| <b>CONF. OUTPUT-3 (Outputs-&gt;Conf. output-3)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|----------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                    | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                    | The same as Configurable Output-1 options                                    | 0          | 138        | 62             |             |

| <b>CONF. OUTPUT-4 (Outputs-&gt;Conf. output-4)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|----------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                    | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                    | The same as Configurable Output-1 options                                    | 0          | 138        | 9              |             |

| <b>CONF. OUTPUT-5 (Outputs-&gt;Conf. output-5)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|----------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                    | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                    | The same as Configurable Output-1 options                                    | 0          | 138        | 10             |             |

| <b>CONF. OUTPUT-6 (Outputs-&gt;Conf. output-6)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|----------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                    | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                    | The same as Configurable Output-1 options                                    | 0          | 138        | 12             |             |

| <b>CONF. EXP. OUTPUT-1 (Outputs-&gt;Conf. exp. output-1)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                              | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                              | The same as Configurable Output-1 options                                    | 0          | 138        | 12             |             |

| <b>CONF. EXP. OUTPUT-2 (Outputs-&gt;Conf. exp. output-2)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                              | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                              | The same as Configurable Output-1 options                                    | 0          | 138        | 12             |             |

| <b>CONF. EXP. OUTPUT-3 (Outputs-&gt;Conf. exp. output-3)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                              | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                              | The same as Configurable Output-1 options                                    | 0          | 138        | 12             |             |

| <b>CONF. EXP. OUTPUT-4 (Outputs-&gt;Conf. exp. output-4)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                              | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                              | The same as Configurable Output-1 options                                    | 0          | 138        | 12             |             |

| <b>CONF. EXP. OUTPUT-5 (Outputs-&gt;Conf. exp. output-5)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                              | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                              | The same as Configurable Output-1 options                                    | 0          | 138        | 12             |             |

| <b>CONF. EXP. OUTPUT-6 (Outputs-&gt;Conf. exp. output-6)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                              | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                              | The same as Configurable Output-1 options                                    | 0          | 138        | 12             |             |

| <b>CONF. EXP. OUTPUT-7 (Outputs-&gt;Conf. exp. output-7)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                              | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                              | The same as Configurable Output-1 options                                    | 0          | 138        | 12             |             |

| <b>CONF. EXP. OUTPUT-8 (Outputs-&gt;Conf. exp. output-8)</b> |                                                                              | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------------|------------------------------------------------------------------------------|------------|------------|----------------|-------------|
| <b>Polarity</b>                                              | 0- Normally Open (Close To Activate)<br>1- Normally Close (Open To Activate) | 0          | 1          | 0              |             |
| <b>Function</b>                                              | The same as Configurable Output-1 options                                    | 0          | 138        | 12             |             |

## CONFIGURABLE OUTPUTS SELECTIONS

### 0 NOT USED

Output is not used

### 1 AIR FLAP CONTROL

Normally used to control an air flap, this output becomes active upon an Engine shutdown failure situation. Inactive when the set has come to rest.

### 2 ALARM RESET

The output indicates that an alarm reset being performed. Once the alarm reset has been completed, the output become inactive again. The output could be used to give an external reset signal to external systems.

### 3 AUDIBLE ALARM

The output indicates that the internal sounder is operating. It may be use for external sounder.

### 4 AUTO START INHIBIT

This output indicates that a digital input that has been configured as 'auto start inhibit' is active.

### 5 AUXILIARY MAINS FAILURE

This output indicates that a digital input that has been configured as 'auxiliary mains failure' is active.

### 6 BATTERY HIGH VOLTAGE

This output indicates that a battery high voltage alarm has occurred.

### 7 BATTERY LOW VOLTAGE

This output indicates that a battery low voltage alarm has occurred.

### 8 CALLING FOR SCHEDULED RUN(EXERCISE)

This output indicates that a scheduled run(exercise) has been called for. If the unit is in the 'auto' and mains okay, the unit will change mode to 'test' and the generator will run if no shutdown alarms are present.

### 9 CAN ECU POWER

This output normally used to turn on the ECU (sometimes via an external slave relay). Some engine ECUs are permanently powered in which case the ECU Power output is used to give input to a Run (or similarly named) input on the ECU.

### 10 CAN ECU STOP

This output used to give input to a Stop (or similarly named) input on the ECU. This is used as a backup stop system should the ECU Data link fail. In this instance, it is not possible to stop the engine using a data command as the link is not operative. As a backup, the STOP signal is given to the engine via a separate hardwired connection.

### 11 CHARGE ALTERNATOR FAILURE

This output indicates that a charging alternator failure has occurred.

### 12 COMMON ALARM

This output indicates that a warning, electrical trip or shutdown alarm has been activated.

### 13 COMMON ELECTRICAL TRIP ALARM

This output indicates that an electrical trip alarm has been activated. This output can only be reset by removal of the fault and by then pressing the RESET button.

### 14 COMMON SHUTDOWN ALARM

This output indicates that a shutdown alarm has been activated. This output can only be reset by removal of the fault and by then pressing the RESET button or by using an external 'alarm reset' input.

### **15 COMMON WARNING ALARM**

This output indicates that a warning alarm has been activated. This output is normally self-resetting on removal of the fault.

### **16 COOLING FAN AFTER START**

This output should energise as soon as engine has started so the fan should be running when the engine is running. This output should continue to operate for Cooling Fan Time parameter after engine has stopped.

### **17 COOLING FAN AFTER STOP**

This output indicates that can be made to energise for Cooling Fan Time parameter after the engine shuts down (to run an electric cooling fan on the radiator).

### **18 COOLANT TEMPERATURE HIGH PRE-ALARM**

This output indicates that a high engine coolant temperature warning (pre-alarm) has occurred.

### **19 COOLANT TEMPERATURE HIGH SHUTDOWN**

This output indicates that a high engine coolant temperature shutdown has occurred.

### **20 COOLING DOWN TIMER IN PROGRESS**

This output source will be active when the cooling off-load timer is running.

### **21 CRANK RELAY ENERGISED**

The output mimics the operation of the crank relay. Can be used to control external logic circuitry.

### **22 DELAYED ALARMS ACTIVE**

The output indicates that the delayed alarms now enabled. Can be used to control external logic circuitry.

### **23 DIGITAL INPUT1 ALARM**

This output indicates that digital input 1 alarm has occurred.

### **24 DIGITAL INPUT2 ALARM**

This output indicates that digital input 2 alarm has occurred.

### **25 DIGITAL INPUT3 ALARM**

This output indicates that digital input 3 alarm has occurred.

### **26 DIGITAL INPUT4 ALARM**

This output indicates that digital input 4 alarm has occurred.

### **27 DIGITAL INPUT5 ALARM**

This output indicates that digital input 5 alarm has occurred.

### **28 DIGITAL INPUT6 ALARM**

This output indicates that digital input 6 alarm has occurred.

### **29 DIGITAL INPUT7 ALARM**

This output indicates that digital input 7 alarm has occurred.

### **30 EXPANSION CONFIGURABLE INPUT1 ALARM**

This output indicates that expansion configurable input 1 alarm has occurred.

### **31 EXPANSION CONFIGURABLE INPUT2 ALARM**

This output indicates that expansion configurable input 2 alarm has occurred.

### **32 EXPANSION CONFIGURABLE INPUT3 ALARM**

This output indicates that expansion configurable input 3 alarm has occurred.

### **33 EXPANSION CONFIGURABLE INPUT4 ALARM**

This output indicates that expansion configurable input 4 alarm has occurred.

### **34 EXPANSION CONFIGURABLE INPUT5 ALARM**

This output indicates that expansion configurable input 5 alarm has occurred.

### **35 EXPANSION CONFIGURABLE INPUT6 ALARM**

This output indicates that expansion configurable input 6 alarm has occurred.

### **36 EXPANSION CONFIGURABLE INPUT7 ALARM**

This output indicates that expansion configurable input 7 alarm has occurred.

### **37 EXPANSION CONFIGURABLE INPUT8 ALARM**

This output indicates that expansion configurable input 8 alarm has occurred.

### **38 EARTH FAULT**

This output indicates that the unit has detected that an earth fault exists on the generator output.

### **39 EMERGENCY STOP**

This output indicates that an emergency stop alarm has occurred.

### **40 FAIL TO START ALARM**

This output indicates that the engine has not started after the specified number of attempts.

### **41 FAIL TO STOP ALARM**

This output indicates that the generator has failed to stop within the selected time

### **42 CONFIGURABLE ANALOG INPUT-1 CONTROL**

Becomes active when the Analog Input-1 falls below the "ANALOG INPUT-1 ON" setting. If the output is already active it will become inactive when the Analog Input-1 is above the "ANALOG INPUT-1 OFF" setting.

### **43 FUEL RELAY ENERGISED**

The output mimics the operation of the fuel relay. It can be used to control external logic circuitry.

### **44 GAS ENGINE IGNITION OUTPUT**

With the engaging of the starter the ignition delay is started. If the 'minimum ignition speed' is reached after expiry of this time, the configurable relay output 'ignition' is set. When the necessary engine shutdown process, firstly gas valve is de-energised. Then ignition output is de-energised that after 5 seconds when the engine speed become lower than 'minimum ignition speed'

### **45 GENERATOR AT REST**

The output indicates that the generator is not running.

### **46 GENERATOR AVAILABLE**

This output indicates when the generator is ready to accept load, i.e. after safety on and warm up timers have timed out.

### **47 GENERATOR CLOSED AUXILIARY**

This output indicates that a digital input that has been configured as 'generator closed auxiliary' is active.

### **48 GENERATOR FAILED TO CLOSE**

This output source has intended to be used to indicate a failure of the generator contactor or breaker. It can only be used if the unit is configured to use 'generator closed auxiliary' feedback.

### **49 GENERATOR FAILED TO OPEN**

This output source has intended to be used to indicate a failure of the generator contactor or breaker. It can only be used if the unit is configured to use 'generator closed auxiliary' feedback.

### **50 GENERATOR HIGH FREQUENCY PRE-ALARM**

This output indicates that a generator high frequency warning (pre-alarm) has occurred.

### **51 GENERATOR HIGH FREQUENCY SHUTDOWN**

This output indicates that a generator high frequency shutdown has occurred.

### **52 GENERATOR HIGH VOLTAGE PRE-ALARM**

This output indicates that a generator high voltage warning (pre-alarm) has occurred.

### **53 GENERATOR HIGH VOLTAGE SHUTDOWN**

This output indicates that a generator high voltage shutdown has occurred.

### **54 GENERATOR LOAD INHIBIT**

This output indicates that a digital input has been configured as 'generator load inhibit' is active.

### **55 GENERATOR LOW FREQUENCY PRE-ALARM**

This output indicates that a generator low frequency warning (pre-alarm) has occurred.

### **56 GENERATOR LOW FREQUENCY SHUTDOWN**

This output indicates that a generator low frequency shutdown has occurred.

### **57 GENERATOR LOW VOLTAGE PRE-ALARM**

This output indicates that a generator low voltage warning (pre-alarm) has occurred.

## **58 GENERATOR LOW VOLTAGE SHUTDOWN**

This output indicates that a generator low voltage shutdown has occurred.

## **59 GENERATOR STOPPING**

This output indicates that the engine has been instructed to stop but has not come to rest.

## **60 GENERATOR OPEN BREAKER**

This output used to control the load switching device. For Details see: "BREAKERS Page" section.

## **61 HORN OUTPUT LATCHED**

This output indicates that the latched horn alarm has occurred.

## **62 HORN OUTPUT PULSED**

This output indicates that the pulsed horn alarm has occurred.

## **63 MASTER AUTO READY**

In dual operation, this output is active when the master group is in automatic mode and the master group does not have a shutdown alarm.

## **64 CONFIGURABLE ANALOG INPUT-2 CONTROL**

Becomes active when the Analog Input-2 falls below the "ANALOG INPUT-2 ON" setting. If the output is already active it will become inactive when the Analog Input-2 is above the "ANALOG INPUT-2 OFF" setting.

## **65 LOSS OF MAGNETIC PICK-UP SPEED SIGNAL**

This output indicates that the magnetic pick up signal is not sufficient to be used by the unit for speed monitoring. The alarm can only operate if the speed signal fails to appear during cranking. It is disabled if 'multiple attempts to engage' is selected. If the MPU fails during engine running this would result in an under speed alarm.

## **66 LOW TEMPERATURE**

This output indicates that a low temperature warning has occurred.

## **67 MAINTENANCE DUE ALARM**

This output indicates that the generator is now due for maintenance either because it has used all the available running hours or the periodic maintenance time has expired. To clear the output a maintenance reset must be performed.

## **68 MAINS CLOSED AUXILIARY**

This output indicates that a digital input that has been configured as 'mains closed auxiliary' is active.

## **69 MAINS FAILED TO CLOSE**

This output source has intended to be used to indicate a failure of the mains contactor or breaker. It can only be used if the unit is configured to use 'mains closed auxiliary' feedback.

## **70 MAINS FAILED TO OPEN**

This output source has intended to be used to indicate a failure of the mains contactor or breaker. It can only be used if the unit is configured to use 'mains closed auxiliary' feedback.

## **71 MAINS FAILURE**

This output indicates that the unit has sensed that a failure of the incoming AC mains supply. This output will become active whenever the mains voltage or frequency goes out of limits, or if the auxiliary mains failure input active (if used) and the mains transient timer has expired.

## **72 MAINS HIGH FREQUENCY**

This output indicates that the unit has sensed that the incoming AC mains supply frequency has exceeded the frequency limit setting.

## **73 MAINS HIGH VOLTAGE**

This output indicates that the unit has sensed that the incoming AC mains supply voltage has exceeded the voltage limit setting.

## **74 MAINS LOAD INHIBIT**

This output indicates that a digital input has been configured as 'mains load inhibit' is active.

## **75 MAINS LOW FREQUENCY**

This output indicates that the unit has sensed that the incoming AC mains supply frequency has fallen below the frequency setting.

## **76 MAINS LOW VOLTAGE**

This output indicates that the unit has sensed that the incoming AC mains supply voltage has fallen below the voltage limit setting.

**77 MAINS OPEN BREAKER**

This output used to control the load switching device. For Details see: "BREAKERS Page" section.

**78 NO LOADING COMMAND**

This output indicates that the unit is not calling of the generator contactor or breaker to be closed. Should the unit close the generator contactor this output will become inactive.

**79 OIL PRESSURE LOW PRE-ALARM**

This output indicates that a low oil pressure warning (pre-alarm) has occurred.

**80 OIL PRESSURE LOW SHUTDOWN**

This output indicates that a low oil pressure shutdown has occurred.

**81 CONFIGURABLE ANALOG INPUT-1 HIGH PRE-ALARM**

This output indicates that a high analog input-1 warning (pre-alarm) has occurred.

**82 CONFIGURABLE ANALOG INPUT-1 HIGH SHUTDOWN**

This output indicates that a high analog input-1 shutdown has occurred.

**83 OVER CURRENT PRE-ALARM**

This output indicates that the over current pre-alarm has been reached.

**84 OVER CURRENT ALARM**

This output indicates that the over current trip level has been reached.

**85 OVER POWER PRE-ALARM**

This output indicates that the over power pre-alarm has been reached.

**86 OVER POWER SHUTDOWN**

This output indicates that the over power shutdown has been reached.

**87 OVER SPEED PRE-ALARM**

This output indicates that the over speed warning (pre-alarm) has occurred.

**88 OVER SPEED SHUTDOWN**

This output indicates that the over speed shutdown has occurred.

**89 PANEL LOCK**

This output indicates that the unit 'panel lock' is active. If the panel lock input is active, the unit will not respond to operation of the Mode select or start buttons. This allows the unit to be placed into a specific mode (such as auto) and then secured.

**90 PRE-HEAT(during preheat timer)**

The output controls the pre-heater. Pre-heat output is available for the duration of pre-heat timer, which terminates prior to cranking.

**91 PRE-HEAT(until end of cranking)**

The output controls the pre-heater. As 'Pre-heat (during pre-heat timer)' mode but pre-heat is also available during cranking.

**92 PRE-HEAT(until end of warming)**

The output controls the pre-heater. As 'Pre-heat (until safety on)' but pre-heat continues to be available until the warm-up timer has elapsed.

**93 PRE-HEAT(until end safety on)**

The output controls the pre-heater. As 'Pre-heat (until end of cranking)' but pre-heat is also available while waiting for the delayed alarms to become active.

**94 REMOTE START PRESENT**

This output indicates that a digital input that has been configured as 'remote start' is active. This output could be used to pass the remote start signal on to else where in the control system.

**95 REMOTE STOP DELAY IN PROGRESS**

This output source will be active to indicate that the return timer is running.

**96 SHORT CIRCUIT**

This output indicates that the module has detected a short circuit on the generator output.

## **97 SMOKE LIMITING**

This output is used to supply a smoke-limiting signal to an Electronic Governor to limit smoke emissions on start-up. It is used in conjunction with the Smoke limit timer (Idle mode timer) settings. Once the timer has expired, the Smoke limit output will cease to operate allowing the engine to accelerate to normal running speed.

## **98 STARTING ALARM**

This output is used to supply an external sounder with a signal that the engine is about to start. The output will be active during the start delay and pre-heat timer (if used).

## **99 STARTING ALARMS ARMED**

The output indicates that the starting alarms are now enabled. It can be used to control external logic circuitry. Starting alarms are armed as soon as the unit commences starting of the engine and remain armed until the engine at rest.

## **100 STOP RELAY ENERGISED**

The output mimics the operation of the stop relay. Can be used to control external logic circuitry.

## **101 SYSTEM IN AUTO MODE**

The output indicates that the unit is in the Auto mode.

## **102 SYSTEM IN MANUAL MODE**

The output indicates that the unit is in the Manual mode.

## **103 SYSTEM IN STOP MODE**

The output indicates that the unit is in the Stop mode.

## **104 SYSTEM IN TEST MODE**

The output indicates that the unit is in the Test mode.

## **105 UNDER CURRENT PRE-ALARM**

This output indicates that the under current pre-alarm has been reached.

## **106 UNDER CURRENT ALARM**

This output indicates that the under current trip level has been reached.

## **107 UNDER POWER PRE-ALARM**

This output indicates that the under power pre-alarm has been reached.

## **108 UNDER POWER SHUTDOWN**

This output indicates that the under power shutdown has been reached.

## **109 UNDER SPEED PRE-ALARM**

This output indicates that an under speed warning (pre-alarm) has occurred.

## **110 UNDER SPEED SHUTDOWN**

This output indicates that an under speed shutdown has occurred.

## **111 WAITING FOR GENERATOR**

This output indicates that the engine has been instructed to start but has not yet become available. Once the generator becomes available this output will be in-active.

## **112 DUAL COMMUNICATION ERROR**

This output indicates that an dual communication alarm has occurred.

## **113 LOAD SUPPLY FROM GENERATOR**

This output indicates that the load is supplying from generator.

## **114 LOAD SUPPLY FROM MAINS**

This output indicates that the load is supplying from mains.

## **115 CONFIGURABLE ANALOG INPUT-1 LOW PRE-ALARM**

This output indicates that a low configurable analog input-1 warning (pre-alarm) has occurred.

## **116 CONFIGURABLE ANALOG INPUT-1 LOW SHUTDOWN**

This output indicates that a low analog input-1 shutdown has occurred.

## **117 CONFIGURABLE ANALOG INPUT-2 LOW PRE-ALARM**

This output indicates that a low configurable analog input-1 warning (pre-alarm) has occurred.

## **118 CONFIGURABLE ANALOG INPUT-2 LOW SHUTDOWN**

This output indicates that a low analog input-2 shutdown has occurred.

**119 CONFIGURABLE ANALOG INPUT-2 HIGH PRE-ALARM**

This output indicates that a high analog input-2 warning (pre-alarm) has occurred.

**120 CONFIGURABLE ANALOG INPUT-2 HIGH SHUTDOWN**

This output indicates that a high analog input-2 shutdown has occurred.

**121 CHOKE ACTIVE**

This output becomes active everytime generator cranks and stays active until the choke time expires.

**122 REMOTE CONTROL ACTIVE**

This output indicates that the engine is being controlled remotely.

**123 REVERSE POWER**

This output becomes active when generator's active power drops below the Reverse Power Set value.

**124 CABIN TEMPERATURE LOW PRE-ALARM**

This output indicates that a low cabin temperature warning (pre-alarm) has occurred.

**125 CABIN TEMPERATURE LOW SHUTDOWN**

This output indicates that a low cabin temperature shutdown has occurred.

**126 CABIN TEMPERATURE HIGH PRE-ALARM**

This output indicates that a high cabin temperature warning (pre-alarm) has occurred.

**127 CABIN TEMPERATURE HIGH SHUTDOWN**

This output indicates that a high cabin temperature shutdown has occurred.

**128 HEATER CONTROL**

Becomes active when the Coolant Temperature falls below the "Heater control ON" setting. If the output is already active it will become inactive when the Coolant Temperature is above the "Heater control OFF" setting.

**129 REMOTE OUTPUT**

This output indicates that the output can be energised or de-energised remotely.

**130 UNBALANCE LOAD**

This output indicates "out of balance" current loading of the generator. Sometimes also called Negative Sequence Current or Symmetry Fault.

**131 WATER PUMP**

This output becomes active for the "Water pump on time" parameter and passive for the "Water pump off time" parameter while the "Heater control output" was active.

**132 RESERVED****133 RESERVED****134 RESERVED****135 RESERVED****136 SYNCHRON POSITION**

This output will be active active when the synchronization process starts.  
This output will be passive when the synchronous operation ends.

**137 OVER LOAD STEP 1**

This output indicates that the over load step 1 level has been reached.

**138 OVER LOAD STEP 2**

This output indicates that the over load step 2 level has been reached.

## 4.2.7 Timers

| <b>START TIMERS (<i>Timers-&gt;Start timers</i>)</b> |                                         | <b>Min</b> | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|------------------------------------------------------|-----------------------------------------|------------|------------|----------------|-------------|
| <b>Mains transient delay</b>                         | Mains Transient Delay                   | 0.0        | 20.0       | 2.0            | Sec         |
| <b>Mains fail start delay</b>                        | Mains Fail Start Delay                  | 0          | 9999       | 0              | Sec         |
| <b>Remote start delay</b>                            | Remote Start Delay                      | 0          | 3600       | 4              | Sec         |
| <b>Pre-heat</b>                                      | Pre-Heat                                | 0          | 250        | 3              | Sec         |
| <b>Pre-heat bypass</b>                               | Pre-Heat Bypass                         | 0          | 250        | 0              | Min         |
| <b>Safety on delay</b>                               | Safety On Delay                         | 0          | 99         | 5              | Sec         |
| <b>Warming up time</b>                               | Warmup Time                             | 0          | 250        | 3              | Sec         |
| <b>Horn duration</b>                                 | Horn Duration                           | 0 (dis)    | 999        | 60             | Sec         |
| <b>Chg. excitation time</b>                          | Charge Excitation Time                  | 0          | 99(cont)   | 15             | Sec         |
| <b>Cooling fan time</b>                              | Cooling Fan Time                        | 0          | 250        | 180            | Sec         |
| <b>Idle mode time</b>                                | Idle Mode Time (Smoke Limiting)         | 0 (dis)    | 3600       | dis            | Sec         |
| <b>Idle mode time off</b>                            | Idle Mode Time Off (Smoke Limiting Off) | 0          | 250        | 5              | Sec         |

### Mains Transient Delay

The unit uses this parameter to decide the mains fail.

### Mains Fail Start Delay

This timer dictates how long the unit will wait after it has received a mains failure signal before it will attempt to start. This prevent un-necessary starting on a fluctuating mains supply etc.

### Remote Start Delay

This timer dictates how long the unit will wait after it has received a remote start signal before it will attempt to start. This prevent un-necessary starting on a fluctuating mains supply etc.

### Pre-Heat

This timer dictates the duration that the pre-heat output will be active before an attempt is made to start the engine. Once this timer is expired cranking will commence.

### Pre-Heat Bypass

This feature allows the unit to start a hot engine without performing an un-necessary pre-heat delay. The bypass timer is triggered by the generator starting and actually being loaded. If the generator started but does not achieve loading then the timer will not be triggered. The bypass timer is initiated once the engine has come to rest. If any attempts to start are requested within the duration of the bypass timer the start sequence will bypass the pre-heat timer.

### Safety On Delay

This timer dictates how long the unit will ignore the Low Oil Pressure, High Engine Temperature, Underspeed, Undervolts and any other inputs configured as active from safety on. It allows the values such as oil pressure to rise to their operating values on starting without triggering an alarm. Once the timer has expired all alarm conditions are monitored again. If configured to use 'fast loading', should all the monitored conditions, such as oil pressure, come to expected state prior to the end of the safety on timer, the timer will be terminated prematurely ensuring maximum protection as soon as possible.

### Warmup Time

This timer is initiated once the engine is up and running. It delays loading the generator until it has stabilised. Once this timer is expired the 'Close generator' signal will be given and the generator is available to be loaded.

### Horn Duration

This timer dictates how long the external horn and the internal sounder will work after the last error detected. Once after this timer ended unit will do the external horn and the internal sounder reset.

### Charge Excitation Time

Charge excitation was selectable as momentary / continuous operation. This timer dictates how long the Charge excitation will active.

**Note:** dis = disable                      cont = continuous

### Cooling Fan Time

This timer dictates how long the Cooling Fan will continue to operate.

### Idle Mode Time (Smoke Limiting)

This is the amount of time that the smoke limiting output will remain active for once the engine has started. While the smoke limiting output is active the engine will be held at a reduced speed to minimise smoke emissions on start-up. (Only if fitted with an appropriate Electronic Control Module). Once the timer has expired the engine will be allowed to accelerate up to its normal operating speed.

### Idle Mode Time Off (Smoke Limiting Off)

This timer is started after the Idle mode timer (smoke limit timer) was expired. This is to allow the engine to accelerate to its normal running speed without triggering an underspeed alarm, etc.

| STOPPING TIMERS ( <i>Timers-&gt;Stopping timers</i> ) |                       | Min     | Max  | Default | Unit |
|-------------------------------------------------------|-----------------------|---------|------|---------|------|
| Mains return delay                                    | Mains Return Delay    | 0       | 3600 | 5       | Sec  |
| Remote stop delay                                     | Remote Stop Delay     | 0       | 250  | 4       | Sec  |
| Cooling time                                          | Cooling Time          | 0 (dis) | 3600 | 60      | Sec  |
| Fail to stop delay                                    | Fail To Stop Time     | 15      | 999  | 30      | Sec  |
| Battery charging time                                 | Battery Charging Time | 1       | 9999 | 5       | Min  |
| Idle stop time                                        | Idle Stop Time        | 0 (dis) | 3600 | dis     | Sec  |

### Mains Return Delay

This timer dictates how long the unit will wait before it will un-load the generator (back to the mains supply if AMF) and initialise it's run-on and shutdown cycle. This is ensure that the mains supply has stabilised before transferring the load back to mains.

### Remote Stop Delay

This timer dictates how long the unit will wait after it has received a remote stop signal before it will attempt to stop. This prevent un-necessary stopping on a fluctuating mains supply etc.

### Cooling Timer

This is the time the generator is to run off-load once the load transfer signal has ceased. This gives the engine time to cool down before shutdown.

### Fail To Stop Time

Once the unit has given a shutdown signal to the engine it expects the engine to come to rest. It monitors the Oil pressure and speed sensing sources and if they still indicate engine movement when this timer expires a 'Fail To Stop' alarm signal is generated.

### Battery Charging Time

In AUTO mode and no mains, if one of the configurable inputs are selected as "24-Low Battery" and this input is active, the unit will perform the start sequence. When the mains back or "Battery Charging Time" parameter is expired, the unit will perform the stop sequence.

### Idle Stop Time

This parameter specifies the duration of the motor to run at idle before it stops.

## 4.2.8 Expansion Modules

| IO (1-8) MODULE ( <i>Expansion modules-&gt;IO (1-8)</i> ) |                                | Min         | Max | Default | Unit |
|-----------------------------------------------------------|--------------------------------|-------------|-----|---------|------|
| Disable/enable select                                     | Expansion I/O Module Selection | ENABL/DISBL |     | DISBL   |      |

| DIAL-UP & ETHERNET ( <i>Expansion modules-&gt;Dial-up &amp; Ethernet</i> ) |                                            | Min         | Max | Default | Unit |
|----------------------------------------------------------------------------|--------------------------------------------|-------------|-----|---------|------|
| Disable/enable select                                                      | Expansion Dal-up&Ethernet Module Selection | ENABL/DISBL |     | ENABL   |      |
| Call back selection                                                        | Call Back Selection                        | ENABL/DISBL |     | DISBL   |      |

**Note:** dis = disable

| <b>GPRS MODULE (<i>Expansion modules-&gt;GPRS</i>)</b> |                                 | <b>Min</b>                                           | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|--------------------------------------------------------|---------------------------------|------------------------------------------------------|------------|----------------|-------------|
| <b>Disable/enable select</b>                           | Expansion GPRS Module Selection | 0-DISABLE<br>1-GPRS SERVER<br>2-GPRS CLIENT<br>3-SMS |            | 2-GPRS CLIENT  |             |
| <b>Call back selection</b>                             | Call Back Selection             | ENABL/DISBL                                          |            | DISBL          |             |
| <b>Cell inf refresh rate</b>                           | Cell info refresh rate          | 0(dis)                                               | 999        | 15             | Min         |
| <b>Location data</b>                                   | Location data                   | ENABL/DISBL                                          |            | DISBL          |             |
| <b>Location warning</b>                                | Location warning                | 1(dis)                                               | 999        | 1(dis)         | Km          |

| <b>DUAL SET MODULE (<i>Expansion modules-&gt;Dual set</i>)</b> |                                                                         | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|----------------------------------------------------------------|-------------------------------------------------------------------------|-------------|------------|----------------|-------------|
| <b>Disable/enable select*<sup>1</sup></b>                      | Expansion Dual Set Module Selection                                     | ENABL/DISBL |            | ENABL          |             |
| <b>Node ID*<sup>2</sup></b>                                    | Node Address                                                            | 1           | 2          | 1              |             |
| <b>Working period</b>                                          | Dual Working Period                                                     | 0:00        | 98:59      | 1:00           | H.Min       |
| <b>Early start time</b>                                        | Early Start Time                                                        | 0           | 250        | 15             | Sec         |
| <b>Remote priority select</b>                                  | Remote Priority Selection:<br>0- Disable, 1- Priority, 2- None Priority | 0(dis)      | 2          | dis            |             |

| <b>GPRS WEB MODULE (<i>Expansion modules-&gt;GPRS Web</i>)</b> |                           | <b>Min</b>  | <b>Max</b> | <b>Default</b> | <b>Unit</b> |
|----------------------------------------------------------------|---------------------------|-------------|------------|----------------|-------------|
| <b>Disable/enable select</b>                                   | GPRS-Web Module Selection | ENABL/DISBL |            | ENABL          |             |

## 4.2.9 Synchronization

| <b>SYNCH CHECK (<i>Synchronization-&gt;Synch Check</i>)</b> |                                      | <b>Min</b>       | <b>Max</b> | <b>Default</b> | <b>Unit</b>    |
|-------------------------------------------------------------|--------------------------------------|------------------|------------|----------------|----------------|
| <b>Synchronization check</b>                                | Synchronization check enable/disable | ENABL/DISBL      |            | DISBL          |                |
| <b>Synced working time</b>                                  | Synced working time                  | 0.0              | 25.0       | 0.5            | Sec            |
| <b>Synch. fail time</b>                                     | Synchronization fail time            | 0                | 250        | 30             | Sec            |
| <b>Max voltage diff.</b>                                    | Max voltage difference               | 0                | 20         | 5              | V <sub>~</sub> |
| <b>Voltage type</b>                                         | Voltage type                         | 0=Ph-N / 1=Ph-Ph |            | 0=Ph-N         |                |
| <b>Max frequency diff.</b>                                  | Max frequency difference             | 0.0              | 2.0        | 0.5            | Hz             |
| <b>Max angle difference</b>                                 | Max angle difference                 | 0                | 20         | 10             | °              |
| <b>Angle offset</b>                                         | Angle offset                         | -150             | +150       | 0              | °              |
| <b>Show synch fail</b>                                      | Show synchronization fail            | ENABL/DISBL      |            | ENABL          |                |

### Synchronization check enable/disable

The user can be enable or disable the uninterrupted load transfer with this parameter.

### Synced working time

During this timer, both contactors will be active.

### Synchronization fail time

When this timer is expired, if the Generator L1 and Mains L1 voltages are still not synchronized; the unit gives synchronization error and performs interrupted load transfer.

### Maximum voltage difference

During synchronization process, difference between average Generator voltage and average Mains voltage must be in this limit.

### Voltage type

The user can select voltage difference type to be calculated with this parameter;

### Maximum frequency difference

During synchronization process, frequency difference between Gen. and Mains must be in this limit.

**Note:** \*<sup>1</sup> = Changing this parameter becomes only effective after restarting the unit.

\*<sup>2</sup> = Changing this parameter becomes only effective after restarting the unit.  
dis = disable.

### Maximum angle difference

During synchronization process, angle difference between Gen. L1 and Mains L1 must be in this limit.

### Angle offset

The user can give an offset to angle difference between Gen. L1 and Mains L1 with this parameter.

### Show synchronization fail

**DISABLE:** When the “Synchronization fail” is occurred, the unit will not display related alarm message and activate horn output. The unit only will log this event.

**ENABLE:** When the “Synchronization fail” is occurred, the unit will display related alarm message, activate horn output and log this event.

## 4.2.10 User Adjustment

| MAINS VOLTAGE OFFSET ( <i>User adjustment-&gt;Mains voltage offset</i> ) |                 | Min | Max | Default | Unit     |
|--------------------------------------------------------------------------|-----------------|-----|-----|---------|----------|
| Mains V1 offset                                                          | Mains V1 Offset | -20 | 20  | 0       | V $\sim$ |
| Mains V2 offset                                                          | Mains V2 Offset | -20 | 20  | 0       | V $\sim$ |
| Mains V3 offset                                                          | Mains V3 Offset | -20 | 20  | 0       | V $\sim$ |

| GEN. VOLTAGE OFFSET ( <i>User adjustment-&gt;Gen. voltage offset</i> ) |                     | Min | Max | Default | Unit     |
|------------------------------------------------------------------------|---------------------|-----|-----|---------|----------|
| Gen. V1 offset                                                         | Generator V1 Offset | -20 | 20  | 0       | V $\sim$ |
| Gen. V2 offset                                                         | Generator V2 Offset | -20 | 20  | 0       | V $\sim$ |
| Gen. V3 offset                                                         | Generator V3 Offset | -20 | 20  | 0       | V $\sim$ |

| CURRENT OFFSET ( <i>User adjustment-&gt;Current offset</i> ) |                         | Min | Max | Default | Unit     |
|--------------------------------------------------------------|-------------------------|-----|-----|---------|----------|
| Current I1 offset                                            | Current I1 Offset       | -20 | 20  | 0       | A $\sim$ |
| Current I2 offset                                            | Current I2 Offset       | -20 | 20  | 0       | A $\sim$ |
| Current I3 offset                                            | Current I3 Offset       | -20 | 20  | 0       | A $\sim$ |
| E/F. Current offset                                          | Earth current I3 Offset | -20 | 20  | 0       | A $\sim$ |

| BATTERY&CHRG GEN.VOL ( <i>User adjustment-&gt;Battery&amp;chrg gen.vol</i> ) |                                 | Min  | Max | Default | Unit       |
|------------------------------------------------------------------------------|---------------------------------|------|-----|---------|------------|
| Batt.volt offset                                                             | Battery Voltage Offset          | -5.0 | 5.0 | 0       | V $\equiv$ |
| Gen.chg.volt offset                                                          | Charge Generator Voltage Offset | -5.0 | 5.0 | 0       | V $\equiv$ |

| SENDER INPUTS OFFSET ( <i>User adjustment-&gt;Sender inputs offset</i> ) |                                    | Min  | Max | Default | Unit |
|--------------------------------------------------------------------------|------------------------------------|------|-----|---------|------|
| Oil Pressure offset                                                      | Oil Pressure Offset                | -2.0 | 2.0 | 0.0     | BAR  |
| Temperature offset                                                       | Coolant Temperature Offset         | -20  | 20  | 0       | °C   |
| Conf. AI1 offset                                                         | Configurable Analog Input-1 Offset | -200 | 200 | 0       | %    |
| Conf. AI2 offset                                                         | Configurable Analog Input-2 Offset | -20  | 20  | 0       | °C   |

## Error Messages And Explanations:

Battery high error! : Battery high error  
Battery low error! : Battery low error  
Battery high warning! : Battery high error  
Battery low warning! : Battery low error  
Cab temp.high error! : Cabin temperature high error  
Cab temp.high prealr! : Cabin temperature high pre-alarm  
Cab temp.low error! : Cabin temperature low error  
Cab temp.low prealr! : Cabin temperature low pre-alarm  
Can bus warning! : Can bus error  
Charge alterntr fail! : Charge alternator fail  
Conf. AI1 high error! : Configurable analogue input-1 high error  
Conf. AI1 high preal! : Configurable analogue input-1 high pre-alarm  
Conf. AI1 low error! : Configurable analogue input-1 low error  
Conf. AI1 low prealr! : Configurable analogue input-1 low pre-alarm  
Conf. AI1 sensor err! : Configurable analogue input-1 sensor break  
Conf. AI2 high error! : Configurable analogue input-2 high error  
Conf. AI2 high preal! : Configurable analogue input-2 high pre-alarm  
Conf. AI2 low error! : Configurable analogue input-2 low error  
Conf. AI2 low prealr! : Configurable analogue input-2 low pre-alarm  
Conf. AI2 sensor err! : Configurable analogue input-2 sensor break  
Dual communicat. err! : Dual communication error  
E/F. instant trip! : Earth fault error  
E/F. warning! : Earth fault warning  
E/F.trip with cool.! : Earth fault electrical trip  
Emergency stop! : Emergency stop error  
Exp.spare-1 alarm! : Expansion module spare 1 error  
Exp.spare-2 alarm! : Expansion module spare 2 error  
Exp.spare-3 alarm! : Expansion module spare 3 error  
Exp.spare-4 alarm! : Expansion module spare 4 error  
Exp.spare-5 alarm! : Expansion module spare 5 error  
Exp.spare-6 alarm! : Expansion module spare 6 error  
Exp.spare-7 alarm! : Expansion module spare 7 error  
Exp.spare-8 alarm! : Expansion module spare 8 error  
Fail to start alarm! : Fail to start alarm  
Fuel filling alarm! : Fuel filling alarm  
Gen break.close fail! : Generator breaker not closed alarm  
Gen break.open fail! : Generator breaker not opened alarm  
Gen over frq.prealr! : Generator over frequency pre-alarm  
Gen over frq.shutdwn! : Generator over frequency shutdown  
Gen over vol.shutdwn! : Generator over voltage shutdown  
Gen over volt.prealr! : Generator over voltage prealarm  
Gen phase seq.wrong! : Generator phase sequence wrong  
Gen stop fail! : Generator stop error  
Gen under frq.prealr! : Generator under frequency pre-alarm  
Gen under frq.shtdwn! : Generator under frequency shutdown  
Gen under vol.shtdwn! : Generator under voltage shutdown  
Gen under volt.preal! : Generator under voltage pre-alarm  
High temp.prealarm! : Temp pre-alarm  
High temp.shutdown! : High temp. shutdown  
J1939 ECU warning! : Amber warning lamp error  
Leak fuel alarm! : Leak fuel alarm  
Low temperature! : Low temperature  
Mains break.cls fail! : Mains breaker not closed alarm  
Mains break.opn fail! : Mains breaker not opened alarm  
Mains phase seq. err! : Mains phase sequence error  
Maintenance alarm! : Maintenance error  
Oil press.shutdown! : Pressure shutdown  
Over curr.trip cool.! : Over current electrical trip  
Over current prealr! : Over current pre-alarm  
Over current trip! : Over current error  
Over current warnng! : Over current warning  
Over load step 1 alr! : Over load step 1 alarm  
Over load step 2 alr! : Over load step 2 alarm  
Over power alarm! : Over power error  
Over power prealarm! : Over power pre-alarm  
Over power trip cool! : Over power electrical trip

### **Error Messages And Explanations:**

Over power warning! : Over power warning  
Over speed alarm! : Over speed error  
Over speed prealarm! : Over speed pre-alarm  
Pressure prealarm! : Pressure prealarm  
Pressure sensor err! : Oil pressure sensor break  
Red stop lamp! : Red stop lamp error  
Reverse power warnng! : Reverse power Warning  
Rev.power trip cool.! : Reverse power Electrical Trip  
Reverse power trip! : Reverse power Error  
Short circuit trip! : Short circuit error  
Spare-1 alarm! : Spare 1 error  
Spare-2 alarm! : Spare 2 error  
Spare-3 alarm! : Spare 3 error  
Spare-4 alarm! : Spare 4 error  
Spare-5 alarm! : Spare 5 error  
Spare-6 alarm! : Spare 6 error  
Spare-7 alarm! : Spare 7 error  
Speed loss alarm! : Speed loss error  
Synchronization alarm! : Synchronization alarm  
Temperat. sensor err! : Temperature sensor break  
Unbalance load trip! : Unbalance load error  
Unbal.load trip cool! : Unbalance load electrical trip  
Unbalance load warn.! : Unbalance load warning  
Under curr.trip cool! : Under current electrical trip  
Under current prealr! : Under current pre-alarm  
Under current trip! : Under Current error  
Under current warnng! : Under Current Warning  
Under power prealarm! : Under power prealarm  
Under power trip! : Under power error  
Under pow.trip cool! : Under power electrical trip  
Under power warning! : Under power warning  
Under speed prealarm! : Under speed prealarm  
Under speed trip! : Under speed error

### **Event Messages And Explanations:**

Battery high alarm : Battery high error  
Battery low alarm : Battery low error  
Cab temp.high error : Cabin temperature high error  
Cab temp.high prealr : Cabin temperature high pre-alarm  
Cab temp.low error : Cabin temperature low error  
Cab temp.low prealr : Cabin temperature low pre-alarm  
Can bus warning : Can bus error  
Changed mode to auto : Changed mode to auto  
Changed mode to man : Changed mode to manual  
Changed mode to stop : Changed mode to off  
Changed mode to test : Changed mode to test  
Charge alterntr fail : Charge alternator fail  
Conf. AI1 high error : Configurable analogue input-1 high error  
Conf. AI1 high preal : Configurable analogue input-1 high pre-alarm  
Conf. AI1 low error : Configurable analogue input-1 low error  
Conf. AI1 low prealr : Configurable analogue input-1 low pre-alarm  
Conf. AI1 sensor err : Configurable analogue input-1 sensor break  
Conf. AI2 high error : Configurable analogue input-2 high error  
Conf. AI2 high preal : Configurable analogue input-2 high pre-alarm  
Conf. AI2 low error : Configurable analogue input-2 low error  
Conf. AI2 low prealr : Configurable analogue input-2 low pre-alarm  
Conf. AI2 sensor err : Configurable analogue input-2 sensor break  
Dual communicat. err : Dual communication error  
E/F. alarm : Earth fault alarm  
Emergency stop : Emergency stop error  
Engine started : Engine started  
Engine stopped : Engine stopped  
Exp.spare-1 alarm : Expansion module spare 1 error  
Exp.spare-2 alarm : Expansion module spare 2 error  
Exp.spare-3 alarm : Expansion module spare 3 error

## Event Messages And Explanations:

Exp.spare-4 alarm : Expansion module spare 4 error  
Exp.spare-5 alarm : Expansion module spare 5 error  
Exp.spare-6 alarm : Expansion module spare 6 error  
Exp.spare-7 alarm : Expansion module spare 7 error  
Exp.spare-8 alarm : Expansion module spare 8 error  
Fail to start alarm : Fail to start alarm  
Fuel filling alarm : Fuel filling alarm  
Gen break.close fail : Generator breaker not closed alarm  
Gen break.open fail : Generator breaker not opened alarm  
Gen over frq.prealr : Generator over frequency pre-alarm  
Gen over frq.shutdwn : Generator over frequency shutdown  
Gen over vol.prealr : Generator over voltage pre-alarm  
Gen over vol.shutdwn : Generator over voltage shutdown  
Gen phase seq.wrong : Generator phase sequence wrong  
Gen stop fail : Generator stop error  
Gen under frq.preal : Generator under frequency pre-alarm  
Gen under frq.shutdwn : Generator under frequency shutdown  
Gen under vol.preal : Generator under voltage pre-alarm  
Gen under vol.shutdwn : Generator under voltage shutdown  
GPRS IP not found : Gprs no IP alarm  
GPRS reset fail : Gprs reset fail  
High temp.prealarm : High temp. pre-alarm  
High temp.shutdown : High temp. shutdown  
J1939 ECU warning : Amber warning lamp error  
Leak fuel alarm : Leak fuel alarm  
Low temperature : Low temperature  
Mains break.cls fail : Mains breaker not closed alarm  
Mains break.opn fail : Mains breaker not opened alarm  
Mains phase seq. err : Mains phase sequence error  
Maintenance alarm : Maintenance error  
Maintenance warning : Maintenance warning  
Modem response: error : Gprs error response alarm  
No respons.from modem : Gprs no response alarm  
Oil press.shutdown : Pressure shutdown  
Over current alarm : Over current alarm  
Over current prealr : Over current pre-alarm  
Over load step 1 alr : Over load step 1 alarm  
Over load step 2 alr : Over load step 2 alarm  
Over power alarm : Under power error  
Over power prealarm : Under power pre-alarm  
Over speed prealarm : Over speed pre-alarm  
Over speed shutdown : Over speed shutdown  
Pressure prealarm : Pressure prealarm  
Pressure sensor err : Oil pressure sensor break  
Red stop lamp : Red stop lamp error  
Reverse power alarm : Reverse power alarm  
Short circuit alarm : Short circuit alarm  
SMS was not sent : Sms wasn't sent  
SMS was sent : Sms was successfully sent  
Spare-1 alarm : Spare 1 error  
Spare-2 alarm : Spare 2 error  
Spare-3 alarm : Spare 3 error  
Spare-4 alarm : Spare 4 error  
Spare-5 alarm : Spare 5 error  
Spare-6 alarm : Spare 6 error  
Spare-7 alarm : Spare 7 error  
Speed loss alarm : Magnetic pickup loss of speed error  
Synchronization alarm : Synchronization alarm  
Temperat. sensor err : Temperature sensor break  
Unbalance load alarm : Unbalance load alarm  
Under current alarm : Under current error  
Under current prealr : Under current pre-alarm  
Under power alarm : Under power error  
Under power prealarm : Under power pre-alarm  
Under speed prealarm : Under speed pre-alarm  
Under speed shutdown : Under speed shutdown

## 5. Specifications

|                                         |                                                                                                                                       |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Equipment use</b>                    | : Electrical control equipment for generating sets.                                                                                   |
| <b>Housing &amp; Mounting</b>           | : 229 mm x 152 mm x 41 mm. (including connectors). Plastic housing for panel mounting.                                                |
| <b>Panel Cut-Out</b>                    | : 182mm x 135mm.                                                                                                                      |
| <b>Protection Against Mech. Impacts</b> | : 1Joule (IK06).                                                                                                                      |
| <b>Protection Class</b>                 | : IP65 at front panel.                                                                                                                |
| <b>Weight</b>                           | : Approximately 0,53 Kg.                                                                                                              |
| <b>Environmental rating</b>             | : Standard, indoor at an altitude of less then 2000 meters with non-condensing humidity.                                              |
| <b>Operating/Storage Temperature</b>    | : -20°C to +70°C / -30°C to +80°C                                                                                                     |
| <b>Operating/Storage Humidity</b>       | : 95 % max. (non-condensing)                                                                                                          |
| <b>Vibration</b>                        | : EN 60068-2-6<br>Ten sweeps in each of three major axes<br>5Hz to 8Hz @ +/-7.5mm, 8Hz to 500Hz @ 2gn.                                |
| <b>Shock</b>                            | : EN 60068-2-27<br>Three shocks in each of three major axes<br>15gn in 11mS.                                                          |
| <b>Installation Over Volt. Category</b> | : II Appliances, portable equipment                                                                                                   |
| <b>Pollution Degree</b>                 | : II, Normal office or workplace, non conductive pollution                                                                            |
| <b>Mode of Operation</b>                | : Continuous.                                                                                                                         |
| <b>Supply Voltage and Power</b>         | : 8 to 32 V <sub>DC</sub> (Peak: 36 V <sub>DC</sub> ) - 3.2W                                                                          |
| <b>Cranking Dropouts</b>                | : Battery voltage can be "0" VDC for max. 50 ms during cranking (battery voltage should be at least nominal voltage before cranking). |
| <b>Battery Voltage Measurement</b>      | : 8 to 32 V <sub>DC</sub> , accuracy: 1 % FS, resolution: 0,1 V                                                                       |
| <b>Mains Voltage Measurement</b>        | : 10 to 300 VAC Ph-N, 5 to 99.9 Hz. Accuracy: 1 % FS, Resolution: 1 V, Harmonic analysis: Up to 31 <sup>st</sup> .                    |
| <b>Mains Frequency</b>                  | : 5 to 99.9Hz (min. 20 VAC Ph-N) Accuracy: 0,25 % FS, Resolution: 0,1 Hz.                                                             |
| <b>Generator Voltage Measurement</b>    | : 10 to 300 VAC Ph-N, 5 to 99.9 Hz. Accuracy: 1 % FS, Resolution: 1 V, Harmonic analysis: Up to 31 <sup>st</sup> .                    |
| <b>Generator Frequency</b>              | : 5 to 99.9Hz (min. 20 VAC Ph-N) Accuracy: 0,25 % FS, Resolution: 0,1 Hz.                                                             |
| <b>Magnetic Pickup Input</b>            | : 35 to 10000 Hz (1 to 35 volts peak continuously). Accuracy: 0,25 % FS.                                                              |
| <b>CT secondary</b>                     | : 5A.                                                                                                                                 |
| <b>Charge Generator Excitation</b>      | : 210mA @12V, 105mA @24V. Nominal 2.5W.                                                                                               |
| <b>Charge Gen. Vol. Measurement</b>     | : 8 to 32 V <sub>DC</sub> , accuracy: 1 % FS, resolution: 0,1 V.                                                                      |
| <b>Sender Measurement</b>               | : 0 to 1300 ohm, accuracy: 1 % FS, resolution: 1 ohm.                                                                                 |
| <b>Canbin Temp. Measurement</b>         | : -50 to +100 °C, accuracy: 1 % FS, resolution: 1 °C.                                                                                 |
| <b>Communication interface</b>          | : USB programming and communication port, RS-485 (optional), CanBus communication with 1939 ECU.                                      |
| <b>Optional Expansion I/O Module</b>    | : Expansion I/O module including 8 inputs and 8 outputs.                                                                              |
| <b>Optional Comm. Modules</b>           | : Ethernet/Dial-up, GSM/GPRS, RS-232/485/422, Dual Set, Web Server and GPRS-Web modules.                                              |

**Relay Outputs**

: Generator contactor relay output 8A@250V~  
Mains contactor relay output 8A@250V~  
Configurable output-5 5A@250V~  
Configurable output-6 5A@250V~

**Transistor Outputs**

: Fuel or Configurable output-1 1A at DC supply voltage  
Crank or Configurable output-2 1A at DC supply voltage  
Configurable output-3 1A at DC supply voltage  
Configurable output-4 1A at DC supply voltage  
All transistor outputs supplied from DC supply terminal 22

**Approvals**

: CE, UK, EAC

**6. Other Informations****Manufacturer Information:**

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