



CE EAC

TRANS-MAINS

AUTOMATIC TRANSFER & LOAD SHARE UNIT WITH MAINS

User Manual

EMKO ELEKTRONİK A.Ş.
Demirtaş Org. San. Bolg.
Karanfil Sk. No: 6 TR
16369 Bursa / TURKEY

Phone : +90 224 261 1900
Faks : +90 224 261 1912
Url : www.emkoelektronik.com.tr
E-mail : emko@emkoelektronik.com.tr
exposales@emkoelektronik.com.tr

CONTENTS

1.Introduction.....	Page	4
1.1 General Specifications.....	Page	4
1.2 Warranty.....	Page	4
1.3 Maintenance	Page	4
2.Installation.....	Page	5
2.1 Unit Configuration.....	Page	5
2.2 Panel Mounting.....	Page	5
Figure 2.1 Front View.....	Page	5
Figure 2.2 Panel Cut-Out.....	Page	5
2.3 Electrical Connection.....	Page	6
3.Definition Of Front Panel And Accessing To The Parameters.....	Page	8
3.1 Front Panel Description.....	Page	8
3.2 Changing And Saving Parameter Values	Page	17
4.Operation.....	Page	19
4.1 Stop Mode.....	Page	19
4.2 Manual Mode.....	Page	19
4.2.1 Manual Start.....	Page	19
4.2.2 Manual Stop.....	Page	19
4.3 Auto Mode.....	Page	20
4.3.1 Auto Start Sequence.....	Page	20
4.3.2 Auto Stop Sequence.....	Page	20
4.4 Test Mode.....	Page	20
4.5 Multiple Mains.....	Page	21
5.Parameters.....	Page	22
5.1 Operator Parameters.....	Page	22
5.1.1 Mains.....	Page	22
5.1.2 Generator.....	Page	22
5.2 Technician Parameters.....	Page	23
5.2.1 System.....	Page	23
5.2.2 Mains.....	Page	31
5.2.3 Generator.....	Page	32
5.2.4 Engine.....	Page	33
5.2.5 Inputs.....	Page	35
5.2.6 Outputs.....	Page	39
5.2.7 Timers.....	Page	48
5.2.8 Expansion Modules.....	Page	49
5.2.9 Synchronization.....	Page	50
5.2.10 Logic Controller.....	Page	56
5.2.11 User Adjustment.....	Page	62
6.Logic Controller.....	Page	63
7.Specifications.....	Page	72
8.Other Informations.....	Page	73

EU DECLARATION OF CONFORMITY

Manufacturer's Name : EMKO ELEKTRONIK A.S.
Manufacturer's Address : DOSAB, Karanfil Sk., No:6,
16369 Bursa, TURKEY

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

Product Name : Synchronising & Automatic Transfer Switch
Type Number : TRANS-MAINS
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

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

EN 61000-6-4:2007 EMC Generic Emission Standard for Industrial Environments

EN 61000-6-2:2005 EMC Generic Immunity Standard for Industrial Environments

EN 61010-1:2010 Safety Requirements for electrical equipment for measurement, control and laboratory use

EN 60947-6-1:2005/A1:2014 Low - voltage switchgear and controlgear - Part 6-1: Multiple function equipment - Transfer switching equipment

When and Where Issued

02nd March 2017

BURSA-TURKEY

Authorized Signature

Name : Serpil YAKIN

Position : Quality Manager

1.Introduction

1.1 General Specifications

TRANS-MAINS is a mains control, synchronising and automatic transfer unit.

The unit is designed to synchronise the gensets (controlled by TRAN-SYNCRO units) with mains supplies. The unit controls the change over from mains supply to genset supply or runs gensets in parallel with the mains to provide no-break, peak lopping and peak shaving power solutions.

General Specifications:

- Load sharing with genset (up to 32 gensets)
- Busbar voltages and frequency measurements
- Bus failure detection
- Peak lopping (mains or genset)
- Power export to mains
- Mains de-coupling protection with R.O.C.O.F and vector shift methods
- Volts, frequency and phase matching
- Synchroscope display
- Logic Controller functionality for PLC
- Black or gray theme selection for 4.3" TFT LCD screen

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.

The unit monitors mains & bus 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.

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.

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.

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.

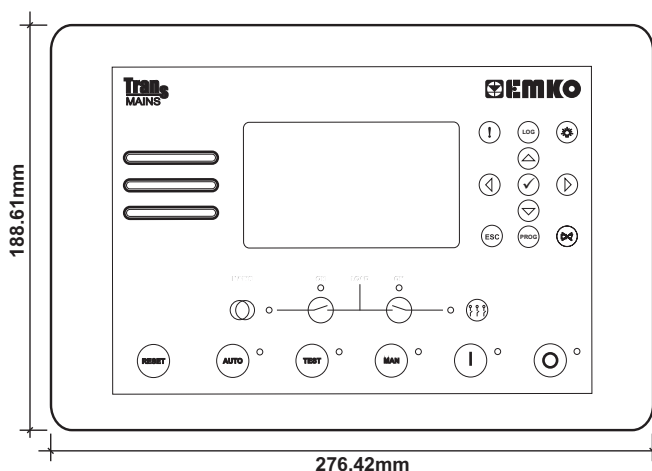


Figure 2.1 Front View

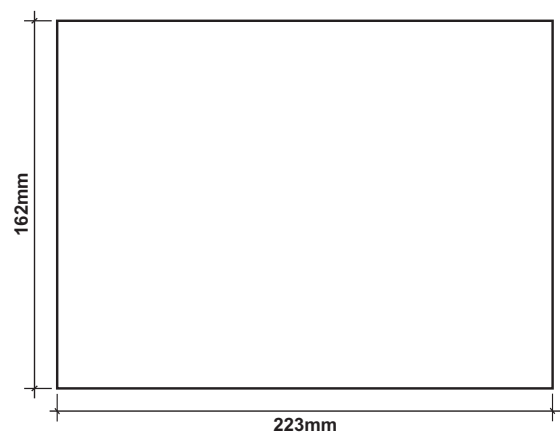
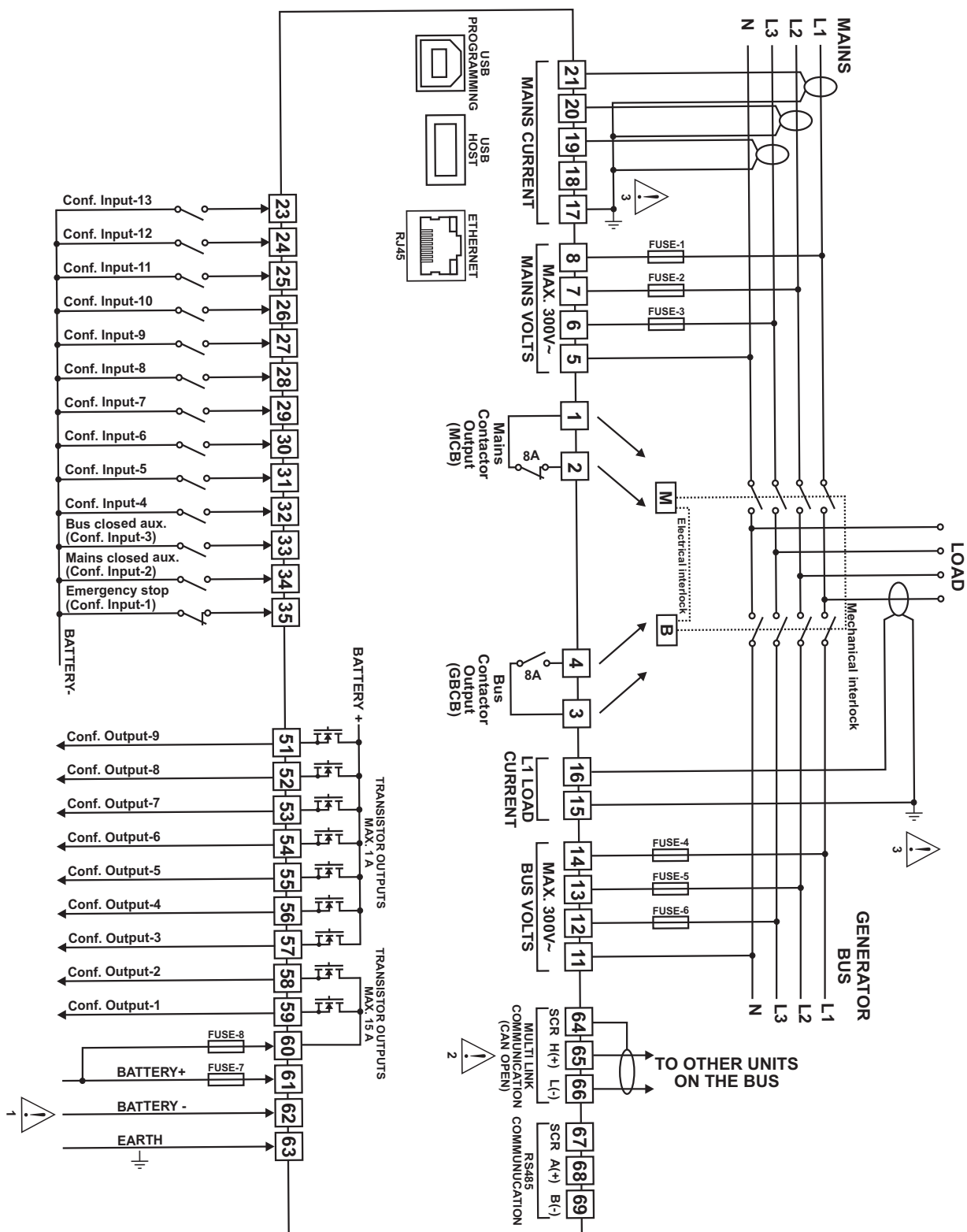


Figure 2.2 Panel Cut-Out

2.3 Electrical Connection

TRANS-MAINS three phase connections schematic



FUSE-1, FUSE-2, FUSE-3, FUSE-4, FUSE-5, FUSE-6: 2A. T

FUSE-7: 10A. T

FUSE-8: 32A. T



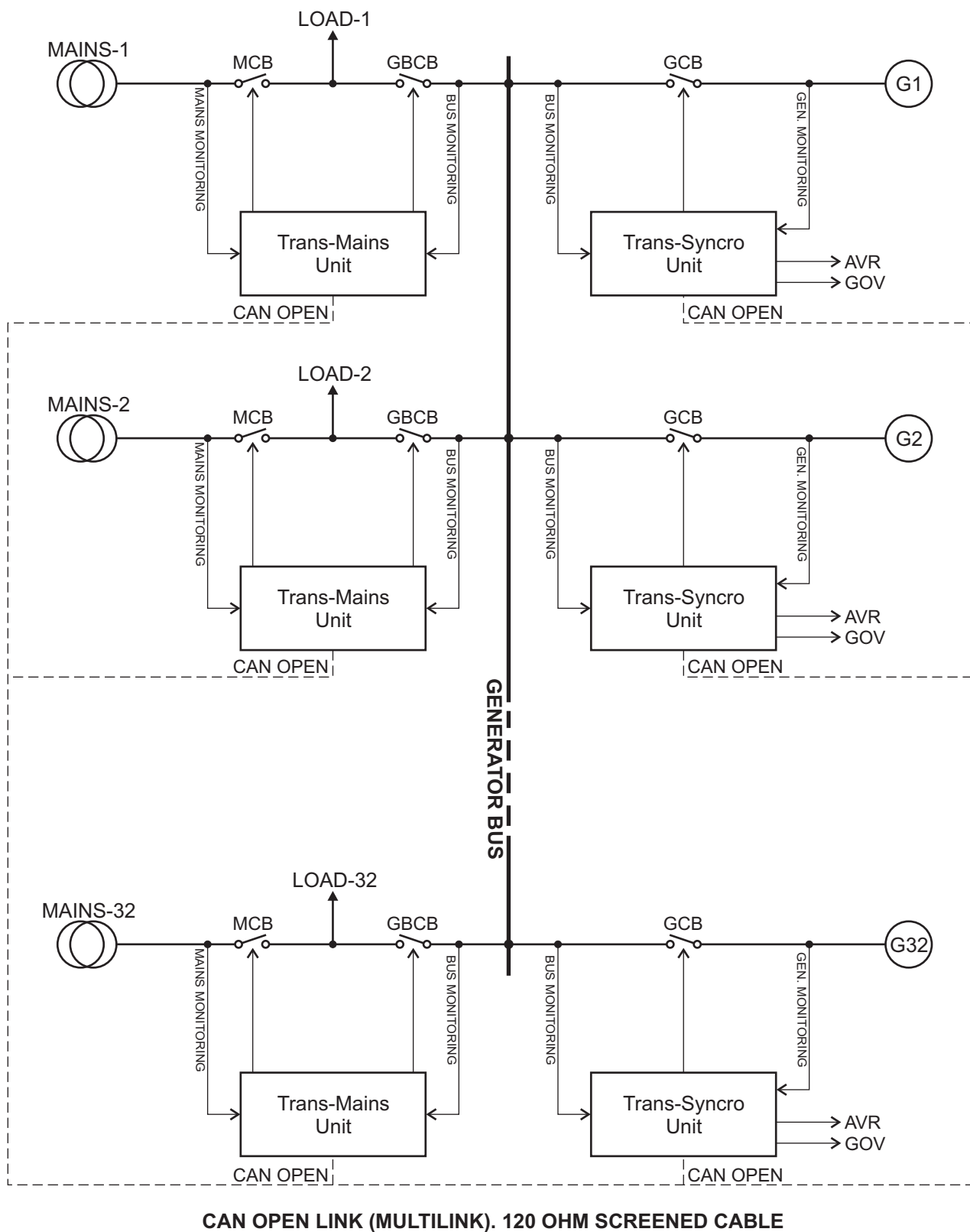
1- Connect the unit as shown in the appropriate diagram. Be sure to connect the battery supply the right way round

2- The first and last units must be fitted with a 120 ohm resistor across H and L.

Screened cable must be used for connecting the communication, The screen is grounded at one end ONLY.

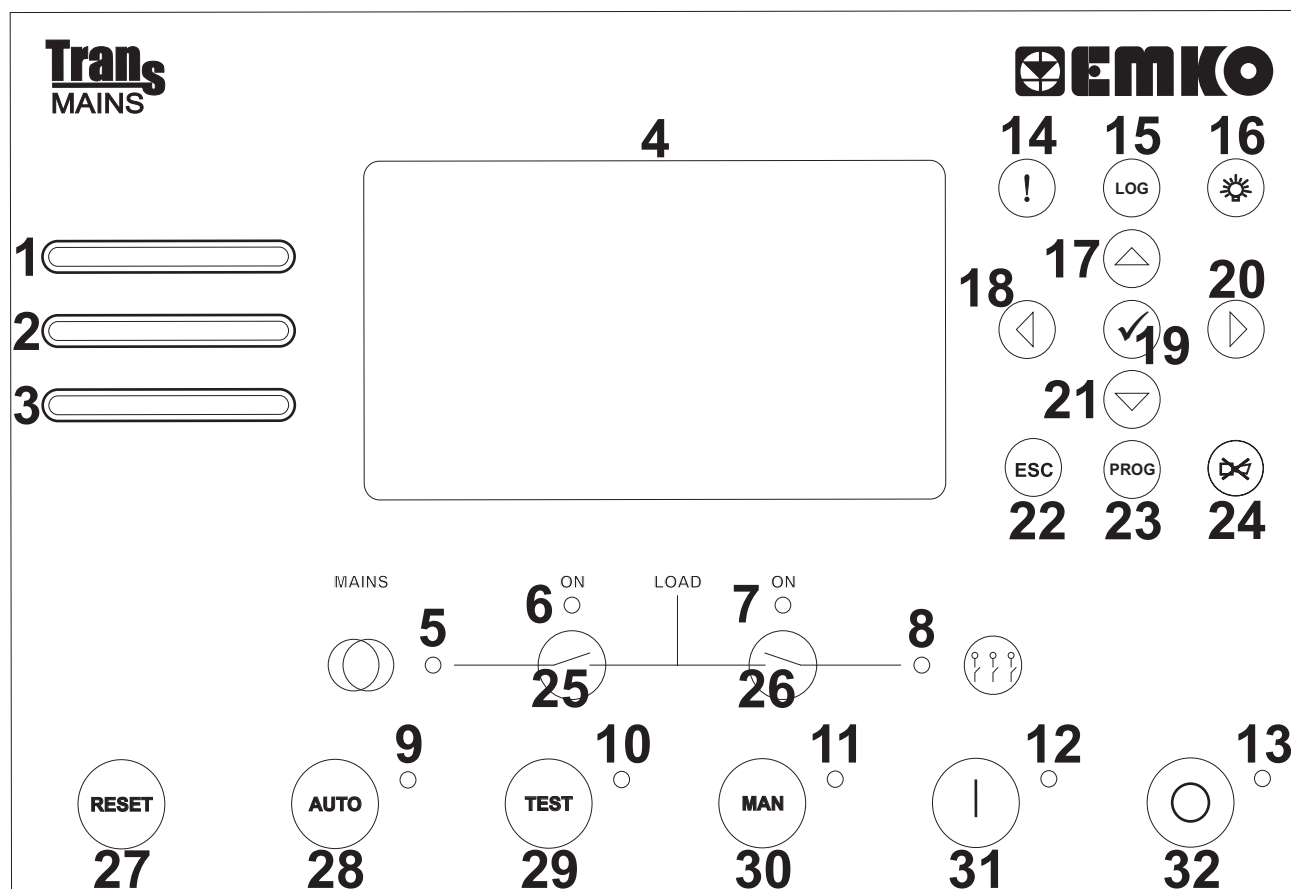
3- Current transformers secondary should be grounded. The CT of 5VA is recommended.

Single line diagram of multi mains & multi genset system



3. Front Panel Description And Accessing To The Parameters

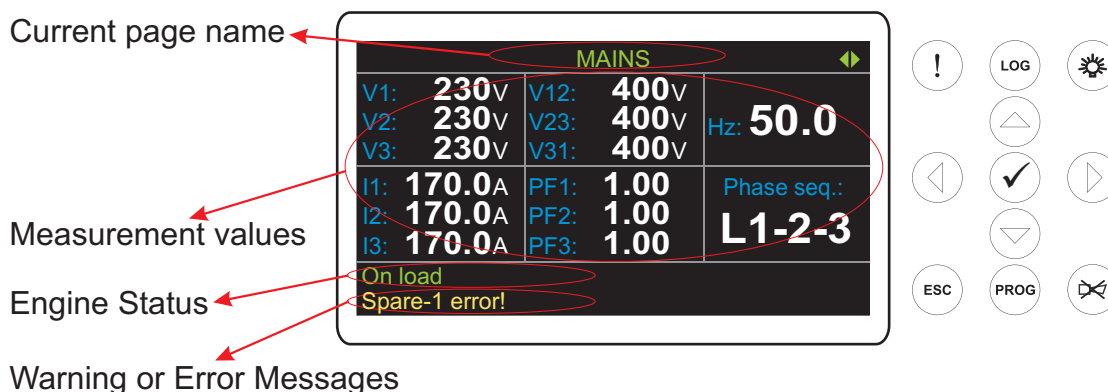
3.1 Front Panel Description



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 was reserved.
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.
6	This LED shows that the load is supplied from the mains.
7	This LED shows that the load is supplied from the busbar.
8	This LED indicates that busbar voltage and frequency is within limits and is ready to take over the load.
9	This LED shows that the unit is in the AUTO mode.
10	This LED shows that the unit is in the TEST mode.
11	This LED shows that the unit is in the MANUAL mode.
12	In the MAN, AUTO and TEST modes, this LED indicates that the engine is starting up or is running.
13	This LED shows that the unit is in the STOP mode.
14	Warning and Alarm messages shortcut button.
15	Event Logs shortcut button.
16	The LAMP TEST button illuminates all LED indicators.

Number	Comment
17	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).
18	This button is used for showing previous page in normal operation. In Programming mode, it operates as an Left button (changing cursor position).
19	This button is used for entering parameter edit section and saving parameter value in programming mode.
20	This button is used for showing next page in normal operation. In Programming mode, it operates as an Right button (changing cursor position).
21	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).
22	The Escape button is used for exit previous section in programming mode.
23	When this button is pressed, the unit goes into its PROGRAMMING Mode.
24	This button will silence the alarm horn after a failure has been detected.
25	This button opens or closes the mains circuit breaker (MCB) on manual mode.
26	This button opens or closes the generator bus circuit breaker (GBCB) on manual mode.
27	This button will reset the controller after a failure has been detected.
28	The AUTO button is used for changing operating mode of the unit to the AUTO Mode.
29	The TEST button is used for changing operating mode of the unit to the TEST Mode.
30	The MAN button is used for changing operating mode of the unit to the MANUAL Mode.
31	The START button is used for starting the engine when the unit is in the Manual Mode.
32	The STOP button is used for changing operating mode of the unit to the STOP Mode. The generator is stopped.

LCD display Description



480x272 pixels 4.3" colored TFT.

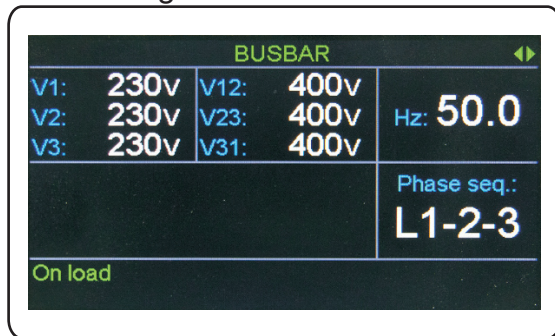
Use the Next and Previous buttons to select which Data display page (screen) is to be displayed.

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.

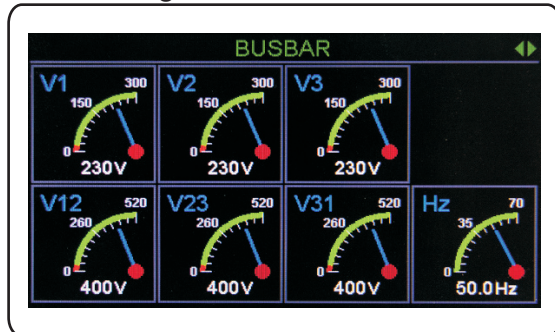
Data display pages on the LCD display;

Busbar Page1:



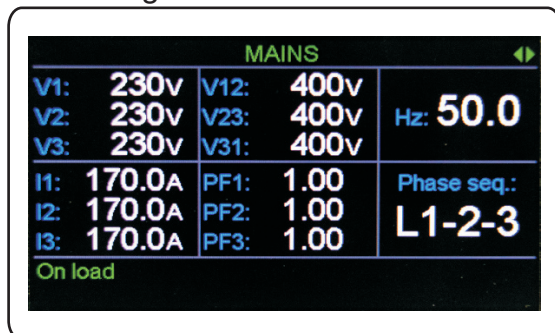
V1: Bus voltage L1-N
V2: Bus voltage L2-N
V3: Bus voltage L3-N
V12: Bus voltage L1-L2
V23: Bus voltage L2-L3
V31: Bus voltage L3-L1
Hz: Bus frequency
Phase seq.: Bus phase sequence

Busbar Page2:



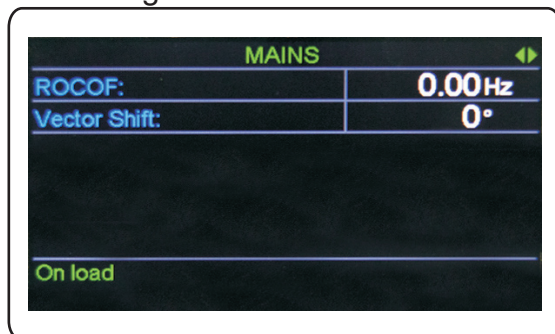
V1: Bus voltage L1-N
V2: Bus voltage L2-N
V3: Bus voltage L3-N
V12: Bus voltage L1-L2
V23: Bus voltage L2-L3
V31: Bus voltage L3-L1
Hz: Bus frequency

Mains Page1:



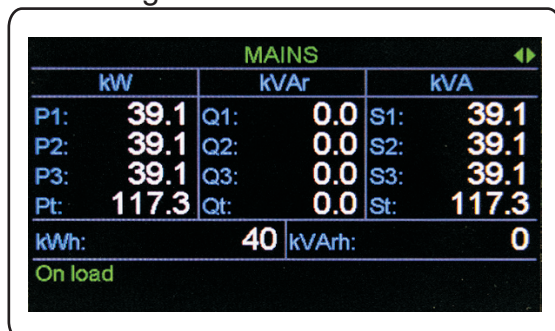
V1: Mains voltage L1-N
V2: Mains voltage L2-N
V3: Mains voltage L3-N
V12: Mains voltage L1-L2
V23: Mains voltage L2-L3
V31: Mains voltage L3-L1
I1, I2, I3: Mains current L1, L2, L3
PF1, PF2, PF3: Mains power factor L1, L2, L3
Hz: Mains frequency
Phase seq.: Mains phase sequence

Mains Page2:



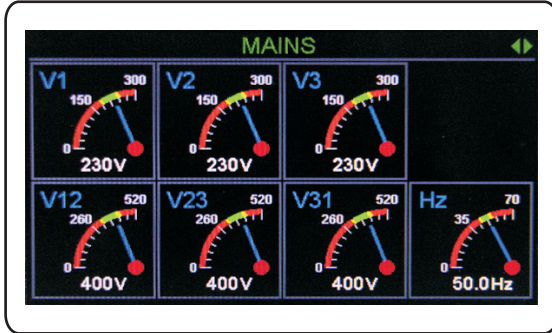
ROCOF: Rate of change of mains frequency
Vector Shift: Vector shift of mains frequency

Mains Page3:



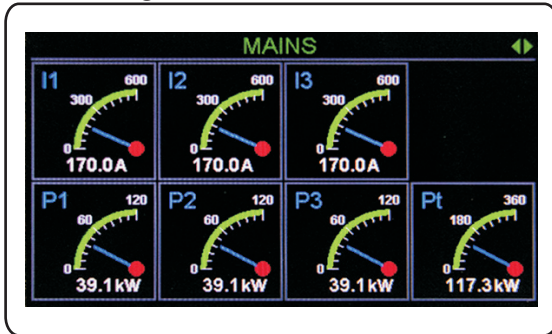
P1, P2, P3: Mains active power L1, L2, L3
Pt: Mains total active power
Q1, Q2, Q3: Mains reactive power L1, L2, L3
Qt: Mains total reactive power
S1, S2, S3: Mains apparent power L1, L2, L3
St: Mains total apparent power
kWh: Mains active energy
kVArh: Mains reactive energy

Mains Page4:



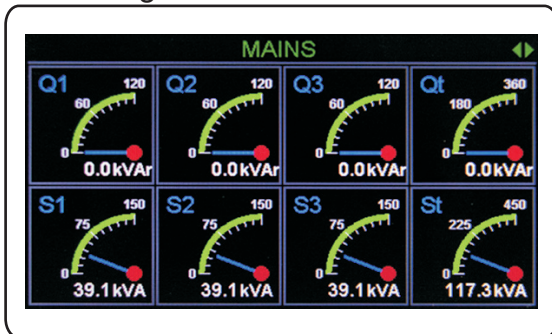
V1: Mains voltage L1-N
V2: Mains voltage L2-N
V3: Mains voltage L3-N
V12: Mains voltage L1-L2
V23: Mains voltage L2-L3
V31: Mains voltage L3-L1
Hz: Mains frequency

Mains Page5:



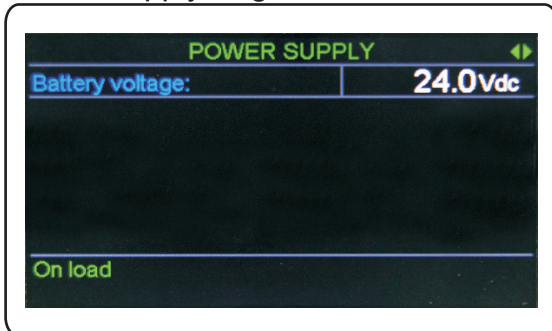
I1, I2, I3: Mains current L1, L2, L3
P1, P2, P3: Mains active power L1, L2, L3
Pt: Mains total active power

Mains Page6:



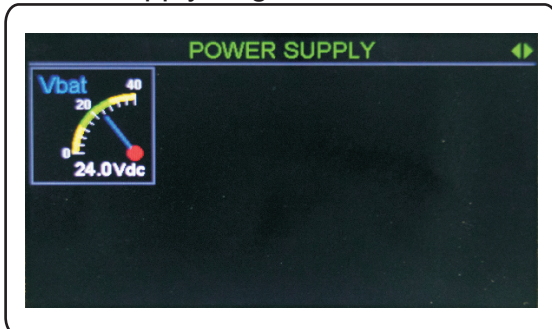
Q1, Q2, Q3: Mains reactive power L1, L2, L3
Qt: Mains total reactive power
S1, S2, S3: Mains apparent power L1, L2, L3
St: Mains total apparent power

Power Supply Page1:



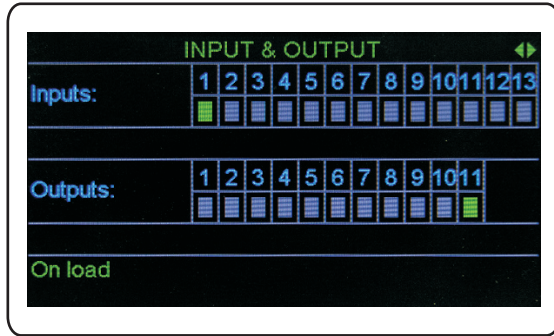
Battery voltage: Battery supply voltage

Power Supply Page2:



Vbat: Battery supply voltage

Input & Output Status Page:



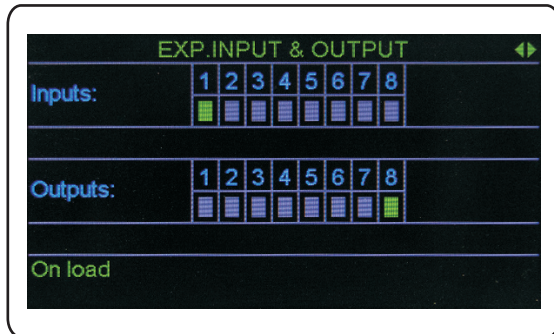
Inputs: Input status information. If an input is active, the related box is displayed as "green", otherwise "gray".

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: Conf. in-8, 9: Conf. in-9,
10: Conf. in-10, 11: Conf. in-11, 12: Conf. in-12,
13: Conf. in-13

Outputs: Output status information. If an output is active, the related box is displayed as "green", otherwise "gray".

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: Conf. out-7, 8: Conf. out-8, 9: Conf. out-9,
10: MCB, 11: GBCB

Exp. Input & Output Status Page:



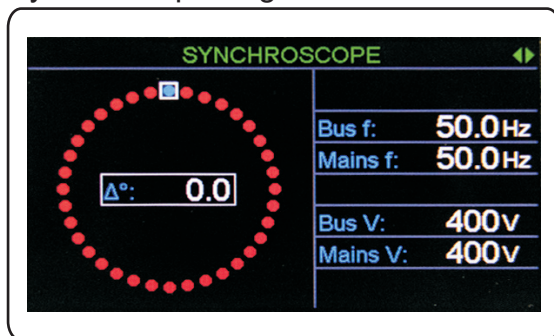
Inputs: Exp. input status information. If an input is active, the related box is displayed as "green", otherwise "gray".

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 box is displayed as "green", otherwise "gray".

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.

Synchroscope Page:



Bus f: Bus frequency

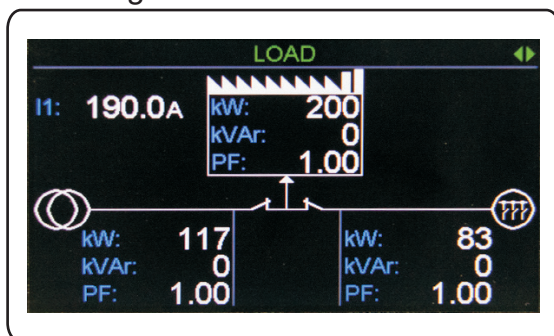
Mains f: Mains frequency

Bus V: Bus voltage

Mains V: Mains voltage

Δ° : The difference between bus phase and mains phase

Load Page:



I1: Load L1 current (if the load CT was fitted)

Load kW: Load total active power

Load kVAr: Load total reactive power

Load PF: Load average power factor

Mains kW: Mains total active power

Mains kVAr: Mains total reactive power

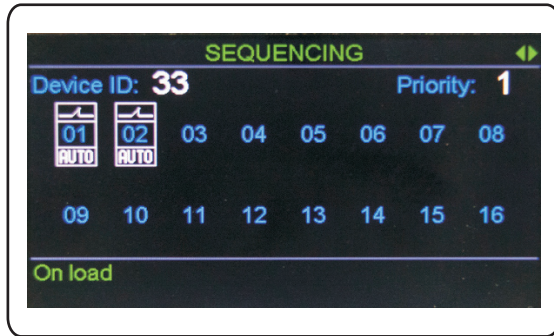
Mains PF: Mains average power factor

Busbar kW: Busbar total active power

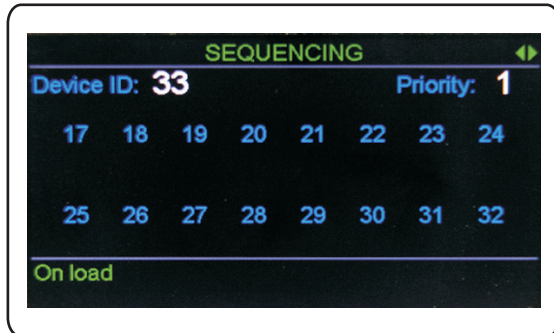
Busbar kVAr: Busbar total reactive power

Busbar PF: Busbar average power factor

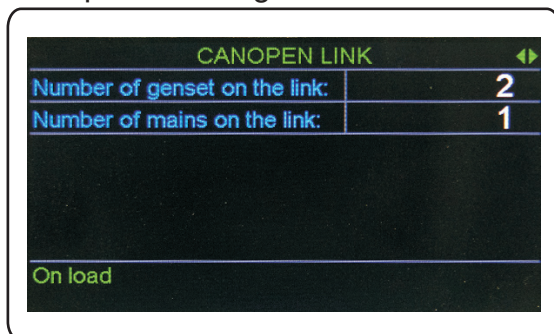
Sequencing Page1:



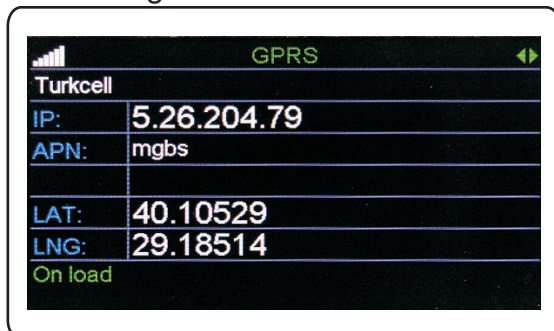
Sequencing Page2:



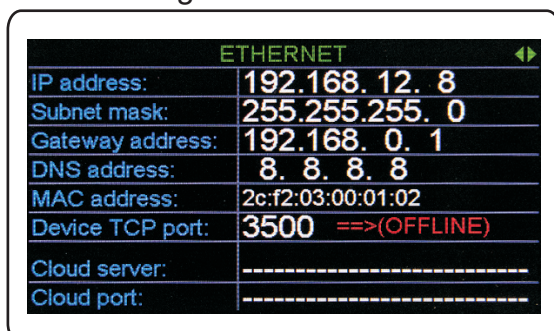
Canopen Link Page:



GPRS Page:



Ethernet Page:



Device ID: Value of "09.04.001.Device number" parameter.

Priority: Value of "09.09.005.Mains priority" parameter.

01: The genset-1 is connected to the "CAN OPEN" link, in auto mode and off load.

02: The genset-2 is connected to the "CAN OPEN" link, in manual mode and off load.

03: The genset-3 is not connected to the "CAN OPEN" link.

16: The genset-16 is not connected to the "CAN OPEN" link.

Device ID: Value of "09.04.001.Device number" parameter.

Priority: Value of "09.09.005.Mains priority" parameter.

17: The genset-17 is not connected to the "CAN OPEN" link.

18: The genset-18 is not connected to the "CAN OPEN" link.

19: The genset-19 is not connected to the "CAN OPEN" link.

32: The genset-16 is not connected to the "CAN OPEN" link.

Number of genset on the link: Number of gensets on the "CAN OPEN" link.

Number of mains on the link: Number of mains on the "CAN OPEN" link.

Signal Quality: Signal Quality level indicator

Operator Name: Operator name

IP: Device IP value

APN: Access point name of the operator

LAT: Latitude value of device's position

LNG: Longitude value of device's position

IP address: Device IP address.

Subnet mask: Subnet mask.

Gateway address: Gateway IP address.

DNS address: DNS address.

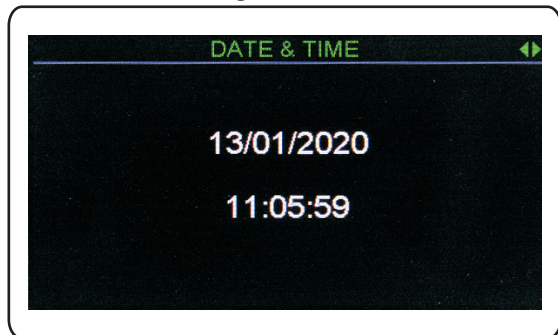
MAC address: Device MAC address.

Device TCP port: Device TCP port number.

Cloud server: Cloud server name.

Cloud port: Cloud port number.

Date & Time Page:

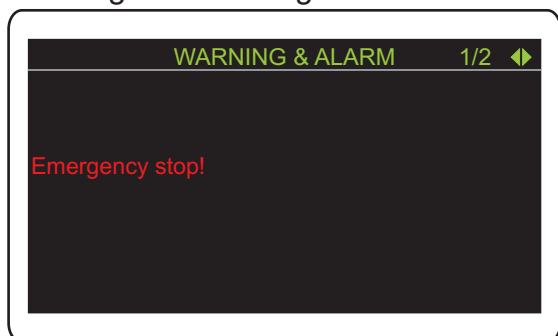


Date: Day, Month, Year.

Time: Hour, minute, second.

Warning & Alarm display pages on the LCD display;

Warning & Alarm Page:

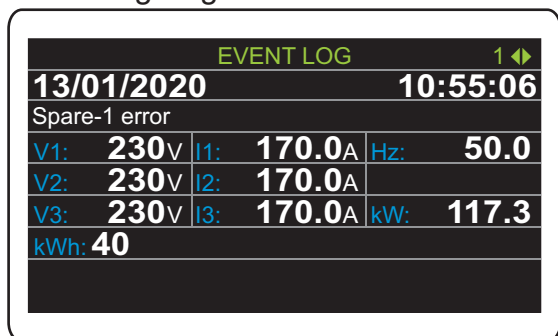


1/2: The first message of current alarms.

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

Event Log display pages on the LCD display;

Event Log Page:



Spare-1 error: This message indicates that a spare-1 alarm has occurred. (Event history: 13/01/2020 date, 10:55:06 time).

V1, V2, V3: Mains voltage L1-N, L2-N, L3-N

I1, I2, I3: Mains current L1, L2, L3

Hz: Mains frequency

kW: Mains total active power

kWh: Mains active energy

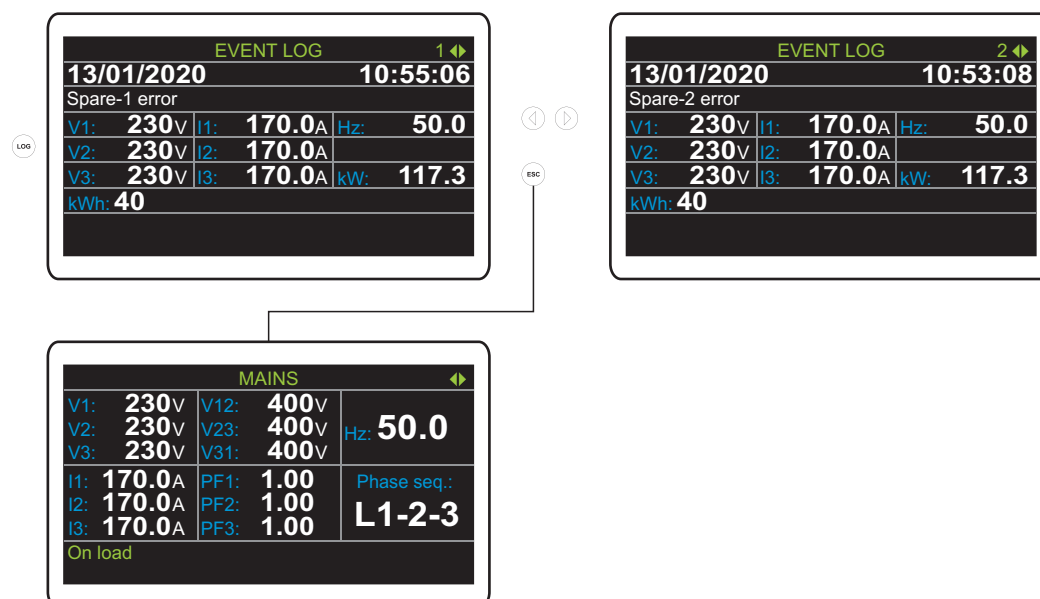
Example-1: Displaying all Data display pages.



Example-2: Displaying all Warning&Alarm display pages




Example-3: Displaying all Event Log display pages



LCD display language selection

English Display

MAINS				
V1:	230V	V12:	400V	Hz: 50.0
V2:	230V	V23:	400V	
V3:	230V	V31:	400V	
I1:	170.0A	PF1:	1.00	Phase seq.: L1-2-3
I2:	170.0A	PF2:	1.00	
I3:	170.0A	PF3:	1.00	
On load				



Press the Enter button.

01.03.LCD DISPLAY	
001.Language	
ENGLISH	
TÜRKÇE	



Press the Up or Down buttons to select the language you wish to change.


01.03.LCD DISPLAY	
001.Language	
ENGLISH	
TÜRKÇE	



Press the Escape button to exit language selection screen.

Press the Enter button to confirm the changed value.

English Display

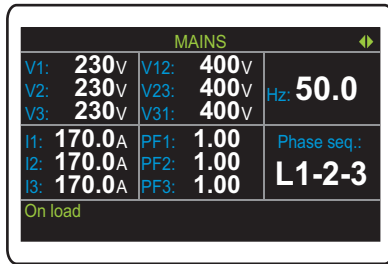
MAINS				
V1:	230V	V12:	400V	Hz: 50.0
V2:	230V	V23:	400V	
V3:	230V	V31:	400V	
I1:	170.0A	PF1:	1.00	Phase seq.: L1-2-3
I2:	170.0A	PF2:	1.00	
I3:	170.0A	PF3:	1.00	
On load				

Turkish Display

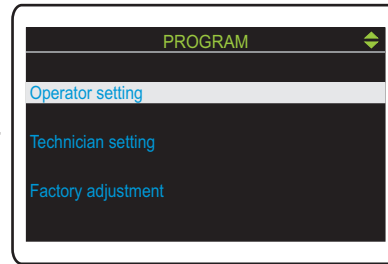
ŞEBEKE				▶▶
V1: 230V	V12: 400V	Hz: 50.0	Faz Sırası: L1-2-3	
V2: 230V	V23: 400V			
V3: 230V	V31: 400V			
I1: 170.0A	PF1: 1.00			
I2: 170.0A	PF2: 1.00			
I3: 170.0A	PF3: 1.00			
Yükte				

3.2 Changing And Saving Parameters Values

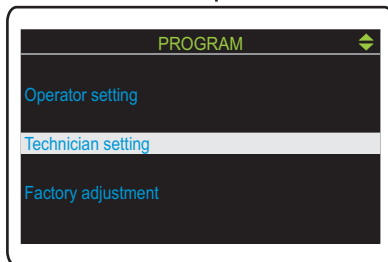
Operation Screen



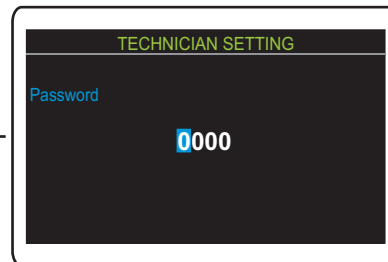
When the Prog button is pressed, the parameters section is asked for accessing to parameters.



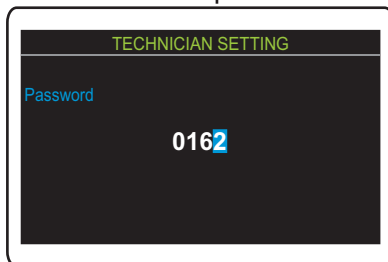
Press the Up or Down buttons to select the section you wish to view/change.



Press the Enter button.

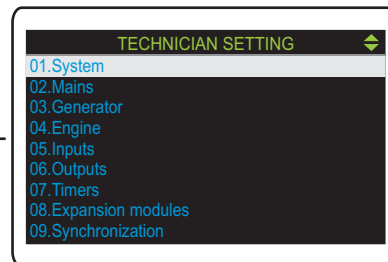


Enter password with cursor (Right, Left, Up and Down) buttons.

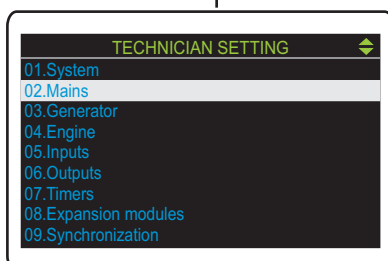


Note1: If Enter button is pressed and the technician password is zero, Password screen is ignored.

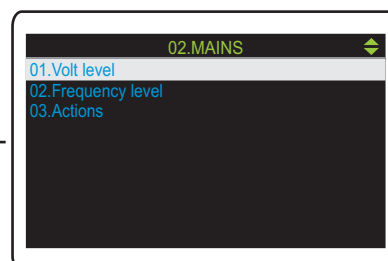
Press the Enter button to confirm password. If the password is incorrect, the unit will drop out of program mode.



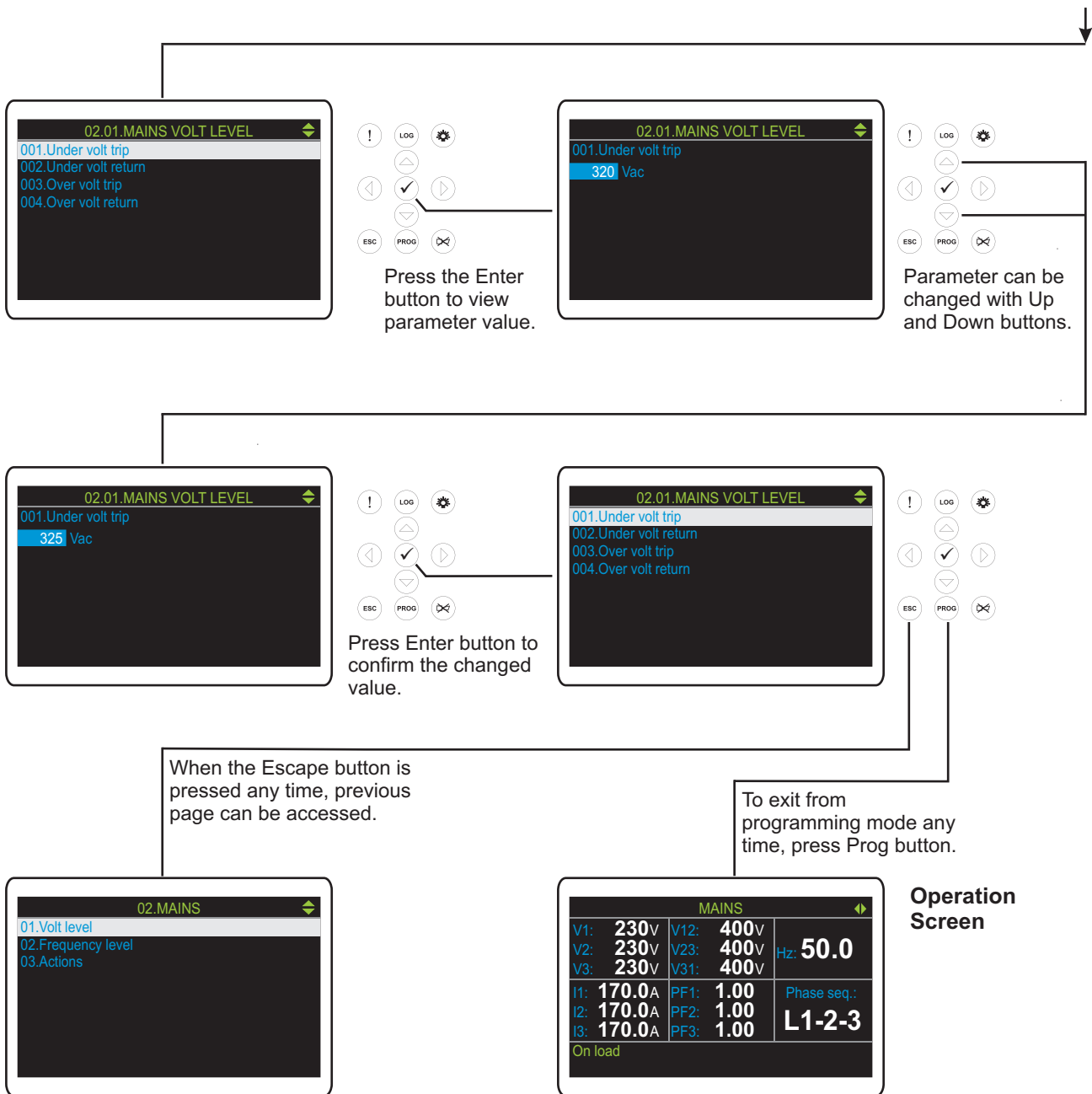
Press the Up or Down buttons to select the main parameter group you wish to view/change.



Press Enter button to access to all parameters page in currently main parameter group.



Press Enter button to access to all parameters in currently parameter page.



4. Operation

Selection of the unit's operating mode is done via the mode buttons on the front panel or via the remote monitoring and control software.

4.1 Stop Mode

The Stop mode is activated by pressing the "Stop" button.

In this mode, the unit will remove the generator bus circuit breaker (GBCB) from load before remove the start request from the gensets.

Any latched alarms that have been cleared are reset when this mode is entered.

The gensets will not be started by the unit when in this mode. If remote start signals are given or the mains supply fails, the start request is not sent to the gensets until the Auto mode is entered.

The mains circuit breaker (MCB) will be energized (if the "02.03.002.Mains failure at stop mode" parameter is selected as "Disable") or will be energized or de-energized according to the mains is OK or not (if the "02.03.002.Mains failure at stop mode" parameter is selected as "Enable").

4.2 Manual Mode

The Manual mode is activated by pressing the "Man" button.

This mode allows the user to start and stop the gensets manually, and change the state of the mains circuit breaker (MCB) and the generator bus circuit breaker (GBCB).

4.2.1 Manual Start

When in manual mode, the gensets will not start automatically.

To begin the genset starting sequence:

- Press the "Start" button.
- The unit will issue a "Remote start" signal to the gensets over the "CAN OPEN" link.
- The gensets will start, synchronize and close to the Busbar.
- The all started gensets will issue the "Busbar ready" signal over the "CAN OPEN" link and the "Busbar Ready" Led on the unit will light on.
- Now, the load may be transferred manually by using the MCB and GBCB buttons.

If the soft transfer mode is active;

Press the GBCB button. The load is ramped to the generator bus, the mains circuit breaker (MCB) is de-energized.

Press the MCB button. The load is ramped to the mains, the generator bus circuit breaker (GBCB) is de-energized.

4.2.2 Manual Stop

To begin the genset stopping sequence:

- Press the "Stop" button.
- The unit will stop issue a "Remote start" signal to the gensets over the "CAN OPEN" link.
- The generator bus circuit breaker (GBCB) will de-energized.
- The all gensets will stop.

Note: The unit decides, whether the Busbar breaker (GBCB) is used or not, according to the configuration of the GBCB feedback input (Bus closed auxiliary input). If no feedback is configured, it is assumed that GBCB is not present in the system.

In manual mode, in such a system only break transfer is supported, no-break transfer, soft transfer and mains parallel operation are not supported.

4.3 Auto Mode

The Auto mode is activated by pressing the “Auto” button.

This mode allows the gensets to be automatically started and stopped and run parallel to the mains without the need for user intervention.

4.3.1 Auto Start Sequence

If the unit is in auto mode and there is a starting request, the start sequence will begin.

The starting requests may be from the following sources:

- Mains supply out of limits.
- High mains load condition (when the “09.10.003.Load control mode” parameter is configured as automatic peak lopping system like that “0-Import Power”).
- When the “09.10.003.Load control mode” parameter is configured as always parallel operation like that “1-Export Power” or “2-Contant Power”.
- Activation of an configurable input that has been configured to “0-Remote start on load” or “1-Remote start off load”.
- Activation of an configurable input that has been configured to “2-Auxiliary mains failure”.
- Activation of the exercise scheduler.
- Activation of the informed mains interruption feature.

If a start request is still present at the end of the start delay timer:

- The unit will issue a “Remote start” signal to the gensets over the “CAN OPEN” link.
- The gensets will start, synchronize and close to the Busbar.
- The all started gensets will issue the “Busbar ready” signal over the “CAN OPEN” link and the “Busbar Ready” Led on the unit will light on.
- Now, the load is transferred automatically. If required, the generator bus is first synchronised with the mains supply over the “CAN OPEN” link. Also, the load ramping occurs when required.
- The unit controls the generator bus to provide the configured power (according to the contents of the “09.10.003.Load control mode” and “09.10.004.Load control set” parameters) to the load or mains supply.

4.3.2 Auto Stop Sequence

If there are no starting requests at the end of the return delay timer:

- The load is transferred back from the generator bus to the mains supply.
- The unit will stop issue a “Remote start” signal to the gensets over the “CAN OPEN” link.
- The all gensets will stop.

4.4 Test Mode

The Test mode is activated by pressing the “Test” button.

This mode allows for testing of the gensets off load. All alarm circuits will operate so that any faults will be reported. If a mains failure occurs while the unit is in this mode, the unit will revert to Auto mode and will transfer the load to the generator bus.

4.5 Multiple Mains

In a multiple mains system, the gensets are controlled by more than one unit and used to provide power to multiple loads.

- If one mains supply has failed, the gensets are started, synchronised and paralleled together. Then the generator bus is closed to feed the related load and the gensets share power equally on a percentage basis.

The gensets are automatically started and stopped according to actual load levels allowing economic use of the available gensets.

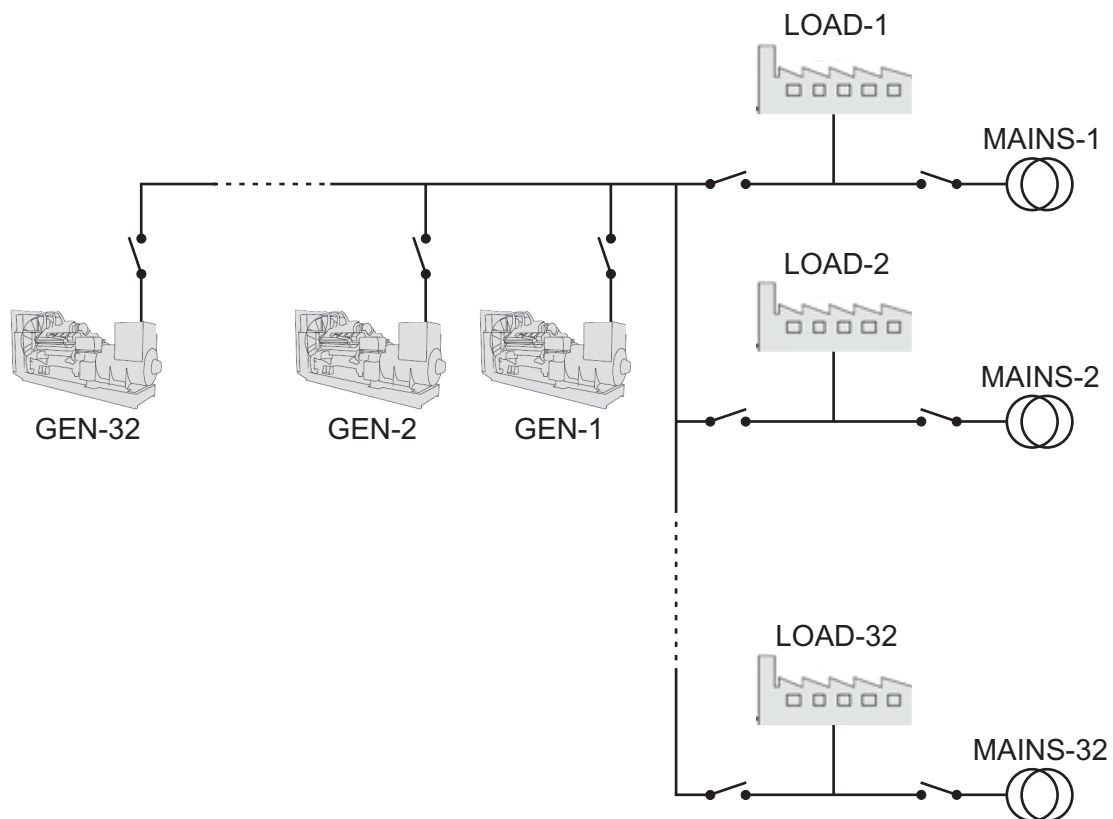
- If more than one mains supply has failed, their related loads are transferred to the gensets in sequence according to the priority order.

- If one mains supply returns, the unit connected to that mains supply will synchronise the gensets with the mains and perform a no-break transition. The gensets continue to supply power to the remaining loads.

- If more than one mains supply returns at the same time, the unit with the highest priority will take control of the gensets and perform a no-break transition to the mains supply. The other units will operate in priority order providing no-break returns back to their related mains supplies.

Note-1: In this system, the gensets are controlled by Trans-Syncro units.

Note-2: The gensets are not paralleled with any mains supply in a multiple mains system. Paralleling with mains supply is only done in a single mains system.



5. Parameters

5.1 Operator Parameters

5.1.1 Mains

02.01.MAINS VOLT LEVEL (<i>Mains->Volt level</i>)		Min	Max	Default	Unit
001.Under volt trip	Mains Under Voltage	60	600	320	V~
002.Under volt return	Mains Under Voltage Return	60	600	340	V~
003.Over volt trip	Mains Over Voltage	60	600	440	V~
004.Over volt return	Mains Over Voltage Return	60	600	420	V~

The unit uses the above parameters to decide whether the mains is okay or fail.

If the mains voltage is above the "Over volt trip" parameter or is below the "Under volt trip" parameter, the "Mains Okay Led" will light off.

If the mains voltage is below the "Over volt return" parameter and is above the "Under volt return" parameter, the "Mains Okay Led" will light on.

In Automatic mode, the unit uses these parameters to switch the load between the mains and gensets.

02.02.MAINS FREQ. LEVEL (<i>Mains->Frequency level</i>)		Min	Max	Default	Unit
001.Under freq trip	Mains Under Frequency	20.0	75.0	45.0	Hz
002.Under freq return	Mains Under Frequency Return	20.0	75.0	48.0	Hz
003.Over freq trip	Mains Over Frequency	20.0	75.0	55.0	Hz
004.Over freq return	Mains Over Frequency Return	20.0	75.0	52.0	Hz

The unit uses the above parameters to decide whether the mains is okay or fail.

If the mains frequency is above the "Over freq trip" parameter or is below the "Under freq trip" parameter, the "Mains Okay Led" will light off.

If the mains frequency is below the "Over freq return" parameter and is above the "Under freq return" parameter, the "Mains Okay Led" will light on.

In Automatic mode, the unit uses these parameters to switch the load between the mains and gensets.

5.1.2 Generator

03.06.GENERATOR GENERAL (<i>Generator->General</i>)		Min	Max	Default	Unit
003.All warning are latch	All Warnings Are Latched En/Dis	ENABL/DISBL		DISBL	

All Warnings Are Latched En/Dis (003.All warning are latch)

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.

5.2 Technician Parameters

5.2.1 System

01.01.SYSTEM NETWORK (System->Network)		Min	Max	Default	Unit
001.Mains CT ratio	Mains Current Transformer Ratio	1	9999	100	
002.Load CT ratio	Load Current Transformer Ratio	0(dis)	9999	0(dis)	
003.PT ratio	Voltage Transformer Ratio	0.1	500.0	1.0	
004.Type of AC system	0- 1 Phase 2 Wire 1- 3 Phase 4 Wire 2- 2 Phase 3 Wire L1-L2 3- 2 Phase 3 Wire L1-L3	0	3	1	
005.Phase sequence	System Phase Sequence	DISBL, L123, L321		L123	
006.Mains kW rating	Mains kW Rating	0	9999	300	kW
007.Mains kVAr rating	Mains kVAr Rating	0	9999	300	kVAr
010.Nominal voltage	System Nominal Voltage	60	600	400	V~
011.Nominal frequency	System Nominal Frequency	30.0	75.0	50.0	Hz

Mains Current Transformer Ratio (001.Mains CT ratio)

Mains current transformer's transfer ratio (Primary current/Secondary current) 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.

Load Current Transformer Ratio (002.Load CT ratio)

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

Note: The load CT is only required in a multiple mains system.

If the load CT fitted, the unit transfers the right amount of load to the mains before disconnecting the gensets. It prevents the gensets being "shock loaded".

Voltage Transformer Ratio (003.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 (004.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.

System Phase Sequence (005.Phase sequence)

DISABLE: the mains and busbar 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 busbar phase sequence is faulty, the "Busbar phase sequence wrong" warning is given.

Mains kW Rating (006.Mains kW rating)

This parameter specifies the mains active power rating, which is used as a reference value for related functions. This parameter is used for many functions including mains power and load share functions.

Mains kVAr Rating (007.Mains kVAr rating)

This parameter specifies the mains reactive power rating, which is used as a reference value for related functions. This parameter is used for many functions including mains power and load share functions.

System Nominal Voltage (010.Nominal voltage)

This parameter specifies the nominal value of mains and busbar voltages. (Phase to phase)

System Nominal Frequency (011.Nominal frequency)

This parameter specifies the nominal value of mains and busbar frequency.

Note: dis = disable

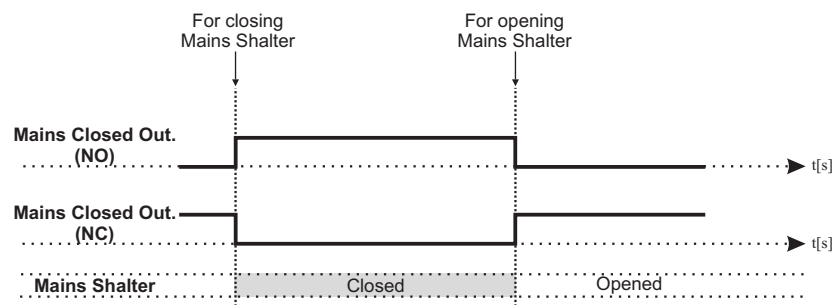
01.02.BREAKERS (System->Breakers)		Min	Max	Default	Unit
001.Type of Breaker	Hardware Breaker Selection	0	3	0	
002.Busbar close breaker cont.type	Bus Close Breaker Contact Type	NO / NC		NO	
003.Busbar close breaker relay typ	Bus Close Breaker Relay Type	NOR / PULS		0	
004.Busbar close timer	Bus Close Timer	1	250	5	Sec
005.Busbar open breaker relay type	Bus Open Breaker Relay Type	NOR / PULS		0	
006.Busbar open timer	Bus Open Timer	1	250	5	Sec
007.Mains close breaker cont.type	Mains Close Breaker Cont. Type	NO / NC		NO	
008.Mains close breaker relay type	Mains Close Breaker Relay Type	NOR / PULS		0	
009.Mains close timer	Mains Close Timer	1	250	5	Sec
010.Mains open breaker relay type	Mains Open Breaker Relay Type	NOR / PULS		0	
011.Mains open timer	Mains Open Timer	1	250	5	Sec
012.Breaker close pulse time	Breaker Close Pulse Time	0.0	10.0	0.5	Sec
013.Breaker open pulse time	Breaker Open Pulse Time	0.0	10.0	0.5	Sec
014.Transfer time	Transfer Time	0	250	2	Sec
015.Spring loading time	Spring Loading Time	0	250	3	Sec
016.Retry number	Retry Number	1	250	5	

Hardware Breaker Selection (001.Type of Breaker)

0- Breakers: Mains and Busbar breakers have only close drives and if close drive off, breaker will open.

Parameters; BUSBAR CLOSE BREAKER CONTACT TYPE, BUSBAR CLOSE TIMER(if busbar closed input selected), BUSBAR OPEN TIMER(if busbar closed input selected), MAINS 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;



1- User Configured: Mains and Busbar 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.

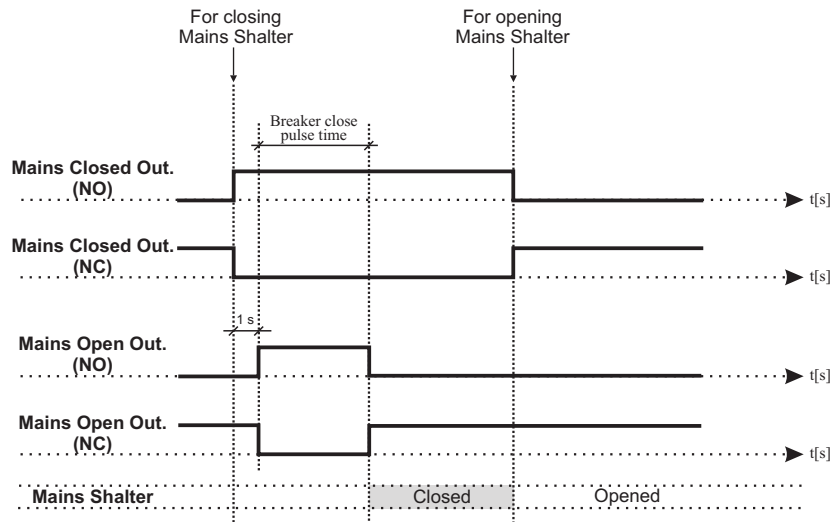
Parameters; BUSBAR CLOSE BREAKER CONTACT TYPE, BUSBAR CLOSE TIMER(if busbar closed input selected), BUSBAR OPEN TIMER(if busbar closed input selected), MAIN CLOSE BREAKER CONTACT TYPE, MAINS CLOSE TIMER(if mains closed input selected), MAINS OPEN TIMER(if mains closed input selected), BREAKER CLOSE PULSE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

Note-1 : NO / NC : Normally Open / Normally Close

2 : NOR / PULS : Normal / Pulse

3 : The unit decides, whether the Busbar breaker (GBCB) is used or not, according to the configuration of the GBCB feedback input (Bus closed auxiliary input). If no feedback is configured, it is assumed that GBCB is not present in the system. In such a system, the related Busbar breaker parameters ("01.02.002", "01.02.003", "01.02.004", "01.02.005" and "01.02.006") are not functional.

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



2- Motorised Breakers (Compact Type): User can select this option for the compact type breakers. Parameters; BUSBAR CLOSE BREAKER CONTACT TYPE, BUSBAR CLOSE BREAKER RELAY TYPE, BUSBAR CLOSE TIMER(if busbar closed input selected), BUSBAR OPEN BREAKER RELAY TYPE, BUSBAR OPEN TIMER(if busbar closed input selected), MAINS CLOSE BREAKER CONTACT TYPE, MAINS CLOSE BREAKER RELAY TYPE, MAINS CLOSE TIMER(if mains closed input selected), MAINS 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: MCB Close Diagram.

If Hardware Breaker Selection parameter is selected as 2 (motorised breakers (compact type)), MAINS CLOSE BREAKER RELAY TYPE parameter is selected as 1 (PULSE) and MAINS OPEN BREAKER RELAY TYPE parameter is selected as 1 (PULSE);

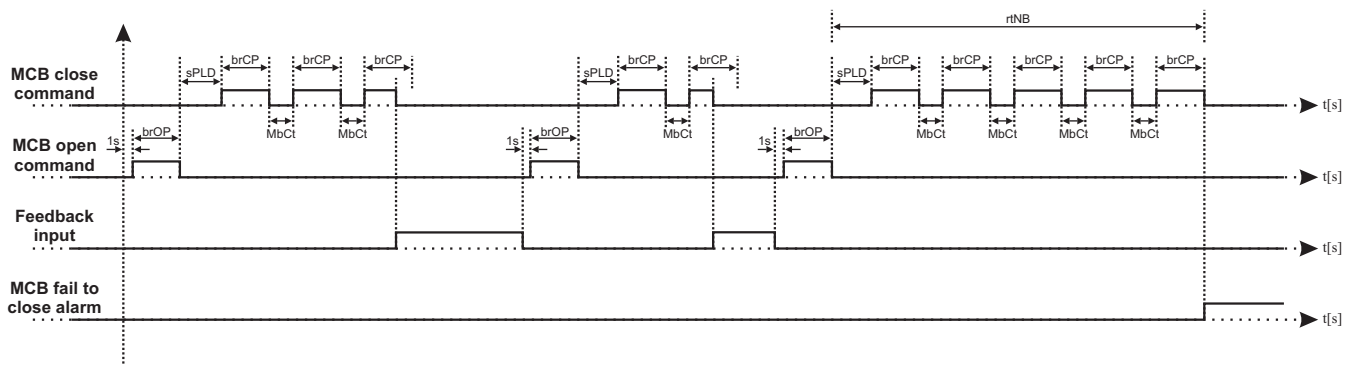
MbCt: Mains close timer

brCP: Breaker close pulse time

brOP: Breaker open pulse time

sPLD: Spring loading time

rtNB: Retry number

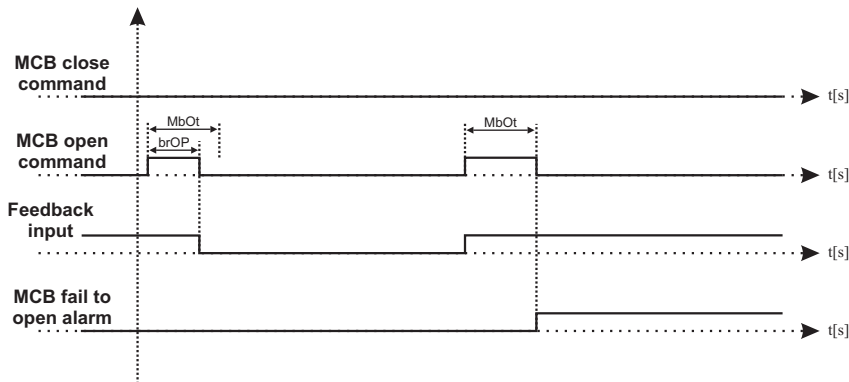


Example-2: MCB Open Diagram.

If Hardware Breaker Selection parameter is selected as 2 (motorised breakers (compact type)), MAINS CLOSE BREAKER RELAY TYPE parameter is selected as 1 (PULSE) and MAINS OPEN BREAKER RELAY TYPE parameter is selected as 1 (PULSE);

MbOt: Mains open timer

brOP: Breaker open pulse time



3- Motorised Breakers (Open Type):

User can select this option for the open type breakers.

Parameters; BUSBAR CLOSE BREAKER CONTACT TYPE, BUSBAR CLOSE BREAKER RELAY TYPE, BUSBAR CLOSE TIMER(if busbar closed input selected), BUSBAR OPEN BREAKER RELAY TYPE, BUSBAR OPEN TIMER(if busbar closed input selected), MAINS CLOSE BREAKER CONTACT TYPE, MAINS CLOSE BREAKER RELAY TYPE, MAINS CLOSE TIMER(if mains closed input selected), MAINS 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: MCB Close Diagram.

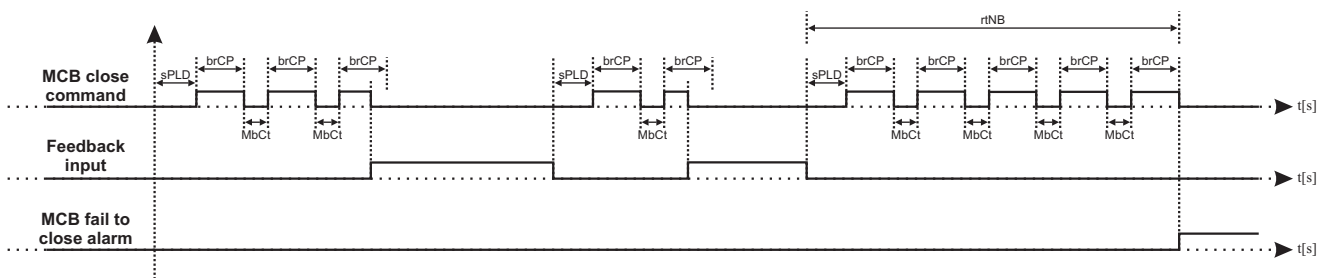
If Hardware Breaker Selection parameter is selected as 3 (motorised breakers (open type)), MAINS CLOSE BREAKER RELAY TYPE parameter is selected as 1 (PULSE) and MAINS OPEN BREAKER RELAY TYPE parameter is selected as 1 (PULSE);

MbCt: Mains close timer

brCP: Breaker close pulse time

sPLD: Spring loading time

rtNB: Retry number

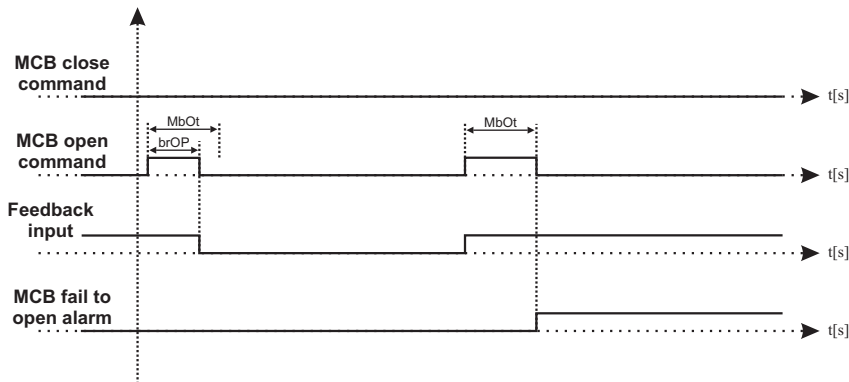


Example-2: MCB Open Diagram.

If Hardware Breaker Selection parameter is selected as 3 (motorised breakers (open type)), MAINS CLOSE BREAKER RELAY TYPE parameter is selected as 1 (PULSE) and MAINS OPEN BREAKER RELAY TYPE parameter is selected as 1 (PULSE);

MbOt: Mains open timer

brOP: Breaker open pulse time



Bus Close Timer (004.Busbar close timer)

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

Bus Open Timer (006.Busbar open timer)

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

Mains Close Timer (009.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 unit will issue a 'mains failed to close' alarm.

Mains Open Timer (011.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 unit will issue a 'mains failed to open' alarm.

Breaker Close Pulse Time (012.Breaker close pulse time)

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

Breaker Open Pulse Time (013.Breaker open pulse time)

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

Transfer Time (014.Transfer time)

This is used to allow for fixed duration transfer breaks when switching from mains to busbar 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 (015.Spring loading time)

When the unit give open command to the (BCB 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 (016.Retry number)

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

01.03.LCD DISPLAY (System->LCD display)		Min	Max	Default	Unit
001.Language	Language Selection	ENGLISH/TURKISH		ENGLISH	
002.Auto scroll time	Auto Scroll Time	0(dis)	250	0	Sec
003.Auto scroll number	Auto Scroll Number	1	23	5	
004.Err. mesg scroll time	Scroll Time For Error Messages	1	250	2	Sec
005.Theme selection	Theme Selection: 0-Black theme, 1-Gray theme	0	1	0	

Language Selection (001.Language)

Language selection: English or Turkish.

Auto Scroll Time (002.Auto scroll time)

The scroll time between all data display pages.

Auto Scroll Number (003.Auto scroll number)

The number of data display pages that will be scrolled.

Scroll Time For Error Messages (004.Err. mesg scroll time)

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.

Theme Selection (005.Theme selection)

The background color of the LCD screen can be selected as black or gray with this parameter.

01.04.SERIAL COMMUNICATION (System->Serial Comm.)		Min	Max	Default	Unit
001.Slave address	Slave Address	1	247	1	
002.Baud rate	Baud Rate: 0 - 1200 baud 1 - 2400 baud 2 - 4800 baud 3 - 9600 baud 4 - 19200 baud 5 - 38400 baud	0	5	3	
005.Timeout	Timeout	0(dis)	999	3	Min

Slave Address (001.Slave address)

This parameter is used for the ModBus Slave ID.

Baud Rate (002.Baud rate)

This parameter is used for the ModBus communication speed. Baud rate adjustable from 1200-38400.

Timeout (005.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.

01.05.RS485 COMMUNICATION (System->RS 485 Comm.)		Min	Max	Default	Unit
001.Slave address	Slave Address	1	247	1	
002.Baud rate	Baud Rate: 0 - 1200 baud 1 - 2400 baud 2 - 4800 baud 3 - 9600 baud 4 - 19200 baud 5 - 38400 baud	0	5	3	
005.ASCII/RTU selection	ModBus ASCII/RTU Selection	ASCII / RTU		ASCII	

Slave Address (001.Slave address)

This parameter is used for the ModBus Slave ID.

Baud Rate (002.Baud rate)

This parameter is used for the ModBus communication speed. Baud rate adjustable from 1200-38400.

ModBus ASCII/RTU Selection (005.ASCII/RTU selection)

This parameter is used for the ModBus communication protocol.

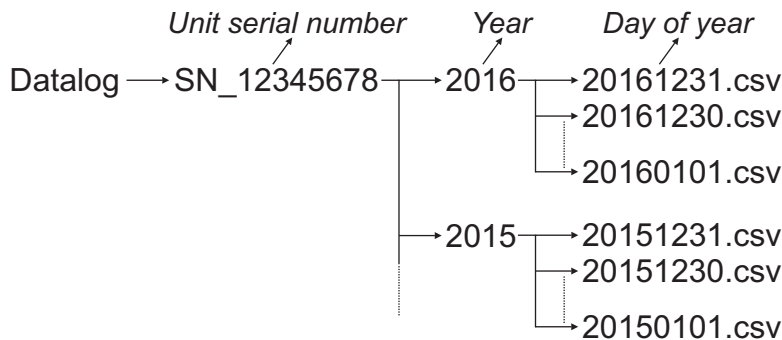
01.06.DATA LOGGING (System->Data logging)		Min	Max	Default	Unit
001.Data log memory	Data Logging Memory	0-Disable 1-Internal memory 2-External USB Host		1	
002.Data log period	Data log Period	0.0(dis)	999.9	1.0	Min

Data logging:

The unit will log data in either an internal memory or an external USB host according to the selection of “Data log memory” parameter.

The logging period is adjustable between “0.1” and “999.9” minutes via the “Data log period” parameter.

The log directory structure is in an external USB host;



The below registers are logged;

- Bus V1, Bus V2, Bus V3 and Bus frequency,
- Mains V1, Mains V2, Mains V3 and Mains frequency,
- Mains I1, Mains I2, Mains I3,
- Mains kWh,
- Battery voltage

01.07.DATE & TIME SET (System->Date & time set)		Min	Max	Default	Unit
001.Year	Year	0	99		
002.Month	Month	1	12		
003.Day	Date	1	31		
004.Week	Day of week	1	7		
005.Hour	Hour	0	23		
006.Minute	Minute	0	59		
007.Second	Second	0	59		

Day of week (004.Week)

1=Monday, 2=Tuesday, 3=Wednesday, 4=Thursday, 5=Friday, 6=Saturday, 7=Sunday.

01.08.DEFAULT SETTINGS (System->Default settings)		Min	Max	Default	Unit
001.Save setting to def.	Save setting to default	YES / NO		NO	
002.Reset default sets	Reset default sets	YES / NO		NO	
003.Reset factory sets	Reset factory sets	YES / NO		NO	

Save setting to default (001.Save setting to def.)

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 (002.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 (003.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”.

01.09.PASSWORD SETTINGS (System->Password settings)		Min	Max	Default	Unit
001.Operator password	Operator Password	0	9999	0	
002.Technician password	Technician Password	0	9999	0	

Operator Password (001.Operator password)

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

Technician Password (002.Technician password)

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

01.10.ETHERNET SETTINGS (System->Ethernet settings)		Min	Max	Default	Unit
001.Tcp client mode	Tcp Client Mode	ENABL/DISBL		DISBL	

Tcp Client Mode (001.Tcp client mode)

DISABLE: Client mode is disabled.

ENABLE: Client mode is enabled. The unit will be send a connection request to the server (PC or Cloud) using the built-in ethernet port.

5.2.2 Mains

02.01.MAINS VOLT LEVEL (<i>Mains->Volt level</i>)		Min	Max	Default	Unit
001.Under volt trip	Mains Under Voltage	60	600	320	V~
002.Under volt return	Mains Under Voltage Return	60	600	340	V~
003.Over volt trip	Mains Over Voltage	60	600	440	V~
004.Over volt return	Mains Over Voltage Return	60	600	420	V~

The unit uses the above parameters to decide whether the mains is okay or fail.

If the mains voltage is above the "Over volt trip" parameter or is below the "Under volt trip" parameter, the "Mains Okay Led" will light off.

If the mains voltage is below the "Over volt return" parameter and is above the "Under volt return" parameter, the "Mains Okay Led" will light on.

In Automatic mode, the unit uses these parameters to switch the load between the mains and gensets.

02.02.MAINS FREQ. LEVEL (<i>Mains->Frequency level</i>)		Min	Max	Default	Unit
001.Under freq trip	Mains Under Frequency	20.0	75.0	45.0	Hz
002.Under freq return	Mains Under Frequency Return	20.0	75.0	48.0	Hz
003.Over freq trip	Mains Over Frequency	20.0	75.0	55.0	Hz
004.Over freq return	Mains Over Frequency Return	20.0	75.0	52.0	Hz

The unit uses the above parameters to decide whether the mains is okay or fail.

If the mains frequency is above the "Over freq trip" parameter or is below the "Under freq trip" parameter, the "Mains Okay Led" will light off.

If the mains frequency is below the "Over freq return" parameter and is above the "Under freq return" parameter, the "Mains Okay Led" will light on.

In Automatic mode, the unit uses these parameters to switch the load between the mains and gensets.

02.03.MAINS ACTIONS (<i>Mains->Actions</i>)		Min	Max	Default	Unit
001.Mains failure detection	Mains Failure Detection En/Dis	ENABL/DISBL		ENABL	
002.Mains failure at stop mode	Look Mains Failure at Stop Mode	ENABL/DISBL		ENABL	
003.Always return delay	Always Look Mains Return Delay	ENABL/DISBL		DISBL	

Mains Failure Detection En/Dis (001.Mains failure detection)

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

DISABLE: The unit will not monitor the mains supply.

Look Mains Failure at Stop Mode En/Dis (002.Mains failure at stop mode)

ENABLE: As soon as the unit detects a mains failure the mains circuit breaker (MCB) 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 busbar is available to go on load. In the event of a busbar failure the unit will default back to the incoming AC mains supply.

Always Look Mains Return Delay (003.Always return delay)

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

DISABLE: The unit will wait the Mains Return Delay parameter while only the busbar is available to go on load before transferring the load back to mains.

5.2.3 Generator

03.05.GEN WORKING CALENDAR (Generator->Working calendar)		Min	Max	Default	Unit
001.Disable/enable select	Calendar Disable or Enable	DISBL/ENABL		DISBL	
002.Start time on Monday	Calendar Start Time on Monday	0.00	23.59	0.00	H.Min
003.Stop time on monday	Calendar Stop Time on Monday	0.00	23.59	0.00	H.Min
004.Start time on tues.	Calendar Start Time on Tuesday	0.00	23.59	0.00	H.Min
005.Stop time on tuesday	Calendar Stop Time on Tuesday	0.00	23.59	0.00	H.Min
006.Start time on wednes.	Calendar Start Time on Wednesday	0.00	23.59	0.00	H.Min
007.Stop time on wednes.	Calendar Stop Time on Wednesday	0.00	23.59	0.00	H.Min
008.Start time on thurs.	Calendar Start Time on Thursday	0.00	23.59	0.00	H.Min
009.Stop time on thursday	Calendar Stop Time on Thursday	0.00	23.59	0.00	H.Min
010.Start time on friday	Calendar Start Time on Friday	0.00	23.59	0.00	H.Min
011.Stop time on friday	Calendar Stop Time on Friday	0.00	23.59	0.00	H.Min
012.Start time on satur.	Calendar Start Time on Saturday	0.00	23.59	0.00	H.Min
013.Stop time on saturday	Calendar Stop Time on Saturday	0.00	23.59	0.00	H.Min
014.Start time on sunday	Calendar Start Time on Sunday	0.00	23.59	0.00	H.Min
015.Stop time on sunday	Calendar Stop Time on Sunday	0.00	23.59	0.00	H.Min

Calendar Disable or Enable (001.Disable/enable select)

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".

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.

03.06.GENERATOR GENERAL (Generator->General)		Min	Max	Default	Unit
003.All warning are latch	All Warnings Are Latched En/Dis	ENABL/DISBL		DISBL	

All Warnings Are Latched En/Dis (003.All warning are latch)

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.

5.2.4 Engine

04.04.ENGINE PLANT BATTERY (<i>Engine->Plant battery</i>)		Min	Max	Default	Unit
001.Under volt	Undervolts Warning	6.0(dis)	30.0	10.0	V ₋₋₋
002.Under volt reset	Undervolts Warning Reset	6.0	30.0	10.5	V ₋₋₋
003.Under volt delay	Undervolts Delay	0.0	9.9	1.0	Sec
004.Over volt	Undervolts Warning	6.0(dis)	30.0	30.0	V ₋₋₋
005.Over volt reset	Overvolts Warning Reset	6.0	30.0	29.5	V ₋₋₋
006.Over volt delay	Overvolts Delay	0.0	9.9	1.0	Sec

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

04.06.CANBUS ERROR SET (<i>Engine->CanBus error set</i>)		Min	Max	Default	Unit
001.CAN fault actions	Can Fault Actions: 0- Disable 1- Warning Non-Latching 2- Warning 3- Electrical Trip 4- Shutdown	0(dis)	4	0	
002.CAN fault activation	Can Fault Activation: 0- Active From Starting 1- Active From Safety On 2- Always Active	0	2	0	
003.CAN fault delay	Can Fault Delay	3	250	10	Sec

The unit communicates with the expansion IO modula via the CanBus peripheral.

The user can adjust the above parameters to see if there is a problem with this communication.

04.08.TEST MODE (<i>Engine->Test mode</i>)		Min	Max	Default	Unit
001.Disable/enable select	Test Mode Selection	DISBL/ENABL		ENABL	

Test Mode Selection (001.Disable/enable select)

DISABLE: Test mode disable.

ENABLE: Test mode enable.

Note: dis = disable

04.09.EXERCISE (Engine->Exercise)		Min	Max	Default	Unit
001.Disable/enable select	Exercise Disable or Enable	DISBL/ENABL		DISBL	
002.Start time on monday	Exercise Start Time on Monday	0.00	23.59	0.00	H.Min
003.Stop time on monday	Exercise Stop Time on Monday	0.00	23.59	0.00	H.Min
004.Start time on tues.	Exercise Start Time on Tuesday	0.00	23.59	0.00	H.Min
005.Stop time on tuesday	Exercise Stop Time on Tuesday	0.00	23.59	0.00	H.Min
006.Start time on wednes.	Exercise Start Time on Wednesday	0.00	23.59	0.00	H.Min
007.Stop time on wednes.	Exercise Stop Time on Wednesday	0.00	23.59	0.00	H.Min
008.Start time on thurs.	Exercise Start Time on Thursday	0.00	23.59	0.00	H.Min
009.Stop time on thursday	Exercise Stop Time on Thursday	0.00	23.59	0.00	H.Min
010.Start time on friday	Exercise Start Time on Friday	0.00	23.59	0.00	H.Min
011.Stop time on friday	Exercise Stop Time on Friday	0.00	23.59	0.00	H.Min
012.Start time on satur.	Exercise Start Time on Saturday	0.00	23.59	0.00	H.Min
013.Stop time on saturday	Exercise Stop Time on Saturday	0.00	23.59	0.00	H.Min
014.Start time on sunday	Exercise Start Time on Sunday	0.00	23.59	0.00	H.Min
015.Stop time on sunday	Exercise Stop Time on Sunday	0.00	23.59	0.00	H.Min

Exercise Disable or Enable (001.Disable/enable select)

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.

5.2.5 Inputs

05.03.CONF. INPUT-X (Inputs->Conf. input-x)		Min	Max	Default	Unit
001.Dis,user conf.or list	0- Disable 1- User Configured 2- Select From List	0(dis)	2	In1,2,3=2 Others=1	
002.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	In1=1 Others=0	
003.Indication	If User Configured 0- Status 1- Warning Non-Latching 2- Warning Latching 3- Electrical Trip 4- Shutdown	0	4	0	
004.Activation	If User Configured 0- Active From Starting 1- Active From Safety On 2- Always Active	0	2	2	
005.Select from list	If Select From List 0-Remote Start On Load 1-Remote Start Off Load 2-Auxiliary Mains Fail 3-Bus Breaker Open/Close 4-Simulate Horn Reset Button 5-Simulate Alarm Reset Button 6-Simulate Auto Button 7-Simulate Test Button 8-Simulate Manual Button 9-Simulate Start Button 10-Simulate Stop Button 11-Bus Closed Auxiliary 12-Bus Load Inhibit 13-Mains Closed Auxiliary 14-Mains Load Inhibit 15-Auto Restore Inhibit 16-Auto Start Inhibit 17-Panel Lock 18-Scheduled Runs(Exercise) Inhibited 19-Top priority 20-Force Break Transfer 21-Force No-break Transfer 22-Force Soft Transfer 23-Force Parallel Operation 24-Mains Breaker Open/Close 25-Emergency Stop (for only input-1) 26-Emergency Stop No-Latching (for only input-1)	0	In1=26 Others=24	In1=25 In2=13 In3=11	
006.Active delay	Input active delay	0	250	0	Sec

Note-1 : x = 1(input-1), 2(input-2), 3(input-3), 4(input-4), 5(input-5), 6(input-6), 7(input-7), 8(input-8), 9(input-9), 10(input-10), 11(input-11), 12(input-12) or 13(input-13).

Note-2 : dis = disable

05.16.CONF. EXP. INPUT-X (Inputs->Conf. exp. input-x)		Min	Max	Default	Unit
001.Dis,user conf.or list	0- Disable 1- User Configured 2- Select From List	0(dis)	2	1	
002.Hardware type	0-> -Ve (Switched To Battery -) 1-> +Ve (Switched To Battery +)	0	1	0	
003.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
004.Indication	If User Configured 0- Status 1- Warning Non-Latching 2- Warning Latching 3- Electrical Trip 4- Shutdown	0	4	0	
005.Activation	If User Configured 0- Active From Starting 1- Active From Safety On 2- Always Active	0	2	2	
006.Select from list	If Select From List 2-Auxiliary Mains Fail 3-Bus Breaker Open/Close 4-Simulate Horn Reset Button 5-Simulate Alarm Reset Button 6-Simulate Auto Button 7-Simulate Test Button 8-Simulate Manual Button 9-Simulate Start Button 10-Simulate Stop Button 11-Bus Closed Auxiliary 12-Bus Load Inhibit 13-Mains Closed Auxiliary 14-Mains Load Inhibit 15-Auto Restore Inhibit 16-Auto Start Inhibit 17-Panel Lock 18-Scheduled Runs(Exercise) Inhibited 19-Top priority 20-Force Break Transfer 21-Force No-break Transfer	2	21	4	
007.Active delay	Input active delay	0	250	5	Sec

Note-1 : x = 1(exp. input-1), 2(exp. input-2), 3(exp. input-3), 4(exp. input-4), 5(exp. Input-5), 6(exp. input-6), 7(exp. Input-7) or 8(exp. Input-8).

Note-2 : dis = disable

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 gensets. 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 gensets. If the input is passive, the unit will perform the stop sequence.

1 REMOTE START OFF LOAD

If this input is active, operation will be similar to the 'Remote Start On Load' function except that the gensets 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 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 gensets will be instructed to start and take load. Removal of the input signal will cause the unit to act if the mains has returned to within limits.

3 BUS BREAKER OPEN/CLOSE

If this input is activated in manual mode, the load will be supply from the gensets.

If this input is passived in manual mode, the load will be disconnected from the gensets.

4 SIMULATE HORN RESET BUTTON

This input mimic's the operation of the 'Horn Reset' button and is used to provide a remotely located Horn Reset push button.

5 SIMULATE ALARM RESET BUTTON

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

7 SIMULATE TEST BUTTON

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

8 SIMULATE MANUAL BUTTON

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

9 SIMULATE START BUTTON

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

10 SIMULATE STOP BUTTON

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

11 BUS 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 bus load switching device auxiliary contact.

Note: The unit decides, whether the Busbar breaker (GBCB) is used or not, according to the configuration of the GBCB feedback input (Bus closed auxiliary input). If no feedback is configured, it is assumed that GBCB is not present in the system. In manual mode, in such a system only break transfer is supported, no-break transfer, soft transfer and mains parallel operation are not supported.

12 BUS LOAD INHIBIT

This input is used to prevent the unit from loading the generator bus. If the bus is already on load, activating this input will cause the unit to unload the generator bus. Removing the input will allow the bus to be loaded again.

Note: This input only operates to control the generator bus switching device if the unit load switching logic is attempting load the gensets. 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.

15 AUTO RESTORE INHIBIT

When module in the AUTO mode. In the event of a remote start or mains failure, the gensets will be instructed to start and take load. On removal of the remote start signal or mains return, the unit will continue to run the gensets on load until this AUTO RESTORE INHIBIT input is removed. Once the input is removed the unit will transfer the load back to the mains supply and follow a normal gensets stop sequence. This input allows the unit 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 gensets 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 gensets. 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 gensets. This function can be used to give an 'AND' function so that a genset will only be called to start if the mains fails and another condition exists which requires the genset 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.

18 SCHEDULED RUNS(EXERCISE) INHIBITED

This input is used to prevent the gensets 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 genset will start and complete any remaining scheduled running time.

19 TOP PRIORITY

When this input is active, the unit gets the highest priority independently on the Priority parameter.

20 FORCE BREAK TRANSFER

This input is used to enable break transfer. When this input is activated, the load is transferred after a short interruption according to the content of "01.02.014.Transfer time" parameter.

21 FORCE NO-BREAK TRANSFER

This input is used to enable no-break transfer. When this input is activated, the load is transferred uninterruptedly. The load is supplied from both the mains and the gensets until the time in "09.10.002.No break transition time" parameter expires.

22 FORCE SOFT TRANSFER

This input is used to enable soft transfer. When this input is activated, the load is transferred with ramp.

23 FORCE PARALLEL OPERATION

This input is used to enable parallel operation. When this input is activated, the load is shared between the mains and the gensets according to the content of "09.10.003.Load control mode" parameter.

24 MAINS BREAKER OPEN/CLOSE

If this input is activated in manual mode, the load will be supply from the mains.

If this input is passived in manual mode, the load will be disconnected from the mains.

25 EMERGENCY STOP (FOR CONFIGURABLE INPUT-1)

This input is used as the emergency stop input.

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

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

5.2.6 Outputs

06.01.CONF. OUTPUT-1 (Outputs->Conf. output-1)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	0-NOT USED 1-RESERVED 2-ALARM RESET 3-AUDIBLE ALARM 4-AUTO START INHIBIT 5-AUXILIARY MAINS FAILURE 6-BATTERY HIGH VOLTAGE 7-BATTERY LOW VOLTAGE 8-CALLING FOR SCHEDULED RUN(EXERCISE) 9-RESERVED 10-RESERVED 11-RESERVED 12-COMMON ALARM 13-COMMON ELECTRICAL TRIP ALARM 14-COMMON SHUTDOWN ALARM 15-COMMON WARNING ALARM 16-RESERVED 17-RESERVED 18-RESERVED 19-RESERVED 20-RESERVED 21-RESERVED 22-DELAYED ALARMS ACTIVE 23-DIGITAL INPUT-1 ALARM 24-DIGITAL INPUT-2 ALARM 25-DIGITAL INPUT-3 ALARM 26-DIGITAL INPUT-4 ALARM 27-DIGITAL INPUT-5 ALARM 28-DIGITAL INPUT-6 ALARM 29-DIGITAL INPUT-7 ALARM 30-DIGITAL INPUT-8 ALARM 31-DIGITAL INPUT-9 ALARM 32-DIGITAL INPUT-10 ALARM 33-DIGITAL INPUT-11 ALARM 34-DIGITAL INPUT-12 ALARM 35-DIGITAL INPUT-13 ALARM 36-EXPANSION INPUT-1 ALARM 37-EXPANSION INPUT-2 ALARM 38-EXPANSION INPUT-3 ALARM 39-EXPANSION INPUT-4 ALARM 40-EXPANSION INPUT-5 ALARM 41-EXPANSION INPUT-6 ALARM 42-EXPANSION INPUT-7 ALARM 43-EXPANSION INPUT-8 ALARM 44-RESERVED 45-EMERGENCY STOP 46-RESERVED 47-RESERVED 48-RESERVED 49-RESERVED 50-RESERVED 51-GENERATOR AT REST 52-GENERATOR AVAILABLE 53-BUS CLOSED AUXILIARY 54-BUS FAILED TO CLOSE 55-BUS FAILED TO OPEN 56-RESERVED 57-RESERVED 58-RESERVED 59-RESERVED 60-BUS LOAD INHIBIT 61-RESERVED 62-RESERVED 63-RESERVED 64-RESERVED 65-GENERATOR STOPPING 66-BUS OPEN BREAKER 67-HORN OUTPUT LATCHED 68-HORN OUTPUT PULSED 69-LAMP TEST 70-RESERVED 71-RESERVED 72-RESERVED 73-RESERVED 74-MAINS CLOSED AUXILIARY 75-MAINS FAILED TO CLOSE 76-MAINS FAILED TO OPEN 77-MAINS FAILURE 78-MAINS HIGH FREQUENCY 79-MAINS HIGH VOLTAGE 80-MAINS LOAD INHIBIT 81-MAINS LOW FREQUENCY 82-MAINS LOW VOLTAGE 83-MAINS OPEN BREAKER 84-NO LOADING COMMAND 85-RESERVED 86-RESERVED 87-RESERVED 88-RESERVED 89-RESERVED 90-RESERVED 91-RESERVED 92-RESERVED 93-RESERVED 94-RESERVED 95-PANEL LOCK 96-RESERVED 97-RESERVED 98-RESERVED 99-RESERVED 100-REMOTE START 101-RESERVED 102-RESERVED 103-RESERVED 104-RESERVED 105-STARTING ALARMS ARMED 106-RESERVED 107-SYSTEM IN AUTO MODE 108-SYSTEM IN MANUAL MODE 109-SYSTEM IN STOP MODE 110-SYSTEM IN TEST MODE 111-RESERVED 112-RESERVED 113-RESERVED 114-RESERVED 115-RESERVED 116-RESERVED 117-WAITING FOR GENERATOR 118-RESERVED 119-LOAD SUPPLY FROM BUS 120-LOAD SUPPLY FROM MAINS 121-RESERVED 122-RESERVED 123-RESERVED 124-RESERVED 125-RESERVED 126-RESERVED 127-RESERVED 128-REMOTE CONTROL ACTIVE 129-RESERVED 130-RESERVED 131-RESERVED 132-RESERVED 133-RESERVED 134-RESERVED 135-REMOTE OUTPUT 136-RESERVED 137-RESERVED 138-BUS NOT ALIVE 139-SYNCHRONIZATION FAIL 140-RESERVED 141-RESERVED 142-RESERVED 143-RESERVED 144-RESERVED 145-RESERVED 146-RESERVED 147-MAINS ROCOF ALARM 148-MAINS VECTOR SHIFT ALARM	0	148	75	

06.02.CONF. OUTPUT-2 (Outputs->Conf. output-2)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	54	

06.03.CONF. OUTPUT-3 (Outputs->Conf. output-3)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	68	

06.04.CONF. OUTPUT-4 (Outputs->Conf. output-4)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	83	

06.05.CONF. OUTPUT-5 (Outputs->Conf. output-5)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	66	

06.06.CONF. OUTPUT-6 (Outputs->Conf. output-6)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

06.07.CONF. OUTPUT-7 (Outputs->Conf. output-7)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

06.08.CONF. OUTPUT-8 (Outputs->Conf. output-8)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

06.09.CONF. OUTPUT-9 (Outputs->Conf. output-9)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

06.11.CONF. EXP. OUTPUT-1 (Outputs->Conf. exp. Output-1)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

06.12.CONF. EXP. OUTPUT-2 (Outputs->Conf. exp. output-2)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

06.13.CONF. EXP. OUTPUT-3 (Outputs->Conf. exp. Output-3)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

06.14.CONF. EXP. OUTPUT-4 (Outputs->Conf. exp. Output-4)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

06.15.CONF. EXP. OUTPUT-5 (Outputs->Conf. exp. Output-5)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

06.16.CONF. EXP. OUTPUT-6 (Outputs->Conf. exp. Output-6)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

06.17.CONF. EXP. OUTPUT-7 (Outputs->Conf. exp. Output-7)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

06.18.CONF. EXP. OUTPUT-8 (Outputs->Conf. exp. output-8)		Min	Max	Default	Unit
001.Polarity	0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
002.Function	The same as Configurable Output-1 options	0	148	12	

CONFIGURABLE OUTPUTS SELECTIONS:

0 NOT USED

Output is not used

1 RESERVED

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 RESERVED

10 RESERVED

11 RESERVED

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 RESERVED

17 RESERVED

18 RESERVED

19 RESERVED

20 RESERVED

21 RESERVED

22 DELAYED ALARMS ACTIVE

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

23 DIGITAL INPUT-1 ALARM

This output indicates that digital input 1 alarm has occurred.

24 DIGITAL INPUT-2 ALARM

This output indicates that digital input 2 alarm has occurred.

25 DIGITAL INPUT-3 ALARM

This output indicates that digital input 3 alarm has occurred.

26 DIGITAL INPUT-4 ALARM

This output indicates that digital input 4 alarm has occurred.

27 DIGITAL INPUT-5 ALARM

This output indicates that digital input 5 alarm has occurred.

28 DIGITAL INPUT-6 ALARM

This output indicates that digital input 6 alarm has occurred.

29 DIGITAL INPUT-7 ALARM

This output indicates that digital input 7 alarm has occurred.

30 DIGITAL INPUT-8 ALARM

This output indicates that digital input 8 alarm has occurred.

31 DIGITAL INPUT-9 ALARM

This output indicates that digital input 9 alarm has occurred.

32 DIGITAL INPUT-10 ALARM

This output indicates that digital input 10 alarm has occurred.

33 DIGITAL INPUT-11 ALARM

This output indicates that digital input 11 alarm has occurred.

34 DIGITAL INPUT-12 ALARM

This output indicates that digital input 12 alarm has occurred.

35 DIGITAL INPUT-13 ALARM

This output indicates that digital input 13 alarm has occurred.

36 EXPANSION CONFIGURABLE INPUT-1 ALARM

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

37 EXPANSION CONFIGURABLE INPUT-2 ALARM

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

38 EXPANSION CONFIGURABLE INPUT-3 ALARM

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

39 EXPANSION CONFIGURABLE INPUT-4 ALARM

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

40 EXPANSION CONFIGURABLE INPUT-5 ALARM

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

41 EXPANSION CONFIGURABLE INPUT-6 ALARM

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

42 EXPANSION CONFIGURABLE INPUT-7 ALARM

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

43 EXPANSION CONFIGURABLE INPUT-8 ALARM

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

44 RESERVED**45 EMERGENCY STOP**

This output indicates that an emergency stop alarm has occurred.

46 RESERVED**47 RESERVED****48 RESERVED****49 RESERVED****50 RESERVED****51 GENERATOR AT REST**

The output indicates that the generator is not running.

52 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.

53 BUS CLOSED AUXILIARY

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

54 BUS FAILED TO CLOSE

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

55 BUS FAILED TO OPEN

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

56 RESERVED**57 RESERVED****58 RESERVED****59 RESERVED**

60 BUS LOAD INHIBIT

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

61 RESERVED**62 RESERVED****63 RESERVED****64 RESERVED****65 GENERATOR STOPPING**

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

66 BUS OPEN BREAKER

This output used to control the generator bus circuit breaker (GBCB). For Details see: "BREAKERS Page" section.

67 HORN OUTPUT LATCHED

This output indicates that the latched horn alarm has occurred.

68 HORN OUTPUT PULSED

This output indicates that the pulsed horn alarm has occurred.

69 LAMP TEST

This output indicates that the module is performing a lamp test. Once the lamp test completed, the output will become inactive again. The output can be used to feed a lamp test on external modules or panel lamps.

70 RESERVED**71 RESERVED****72 RESERVED****73 RESERVED****74 MAINS CLOSED AUXILIARY**

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

75 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.

76 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.

77 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.

78 MAINS HIGH FREQUENCY

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

79 MAINS HIGH VOLTAGE

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

80 MAINS LOAD INHIBIT

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

81 MAINS LOW FREQUENCY

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

82 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.

83 MAINS OPEN BREAKER

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

84 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.

85 RESERVED**86 RESERVED****87 RESERVED****88 RESERVED****89 RESERVED****90 RESERVED****91 RESERVED****92 RESERVED****93 RESERVED****94 RESERVED****95 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.

96 RESERVED**97 RESERVED****98 RESERVED****99 RESERVED****100 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.

101 RESERVED**102 RESERVED****103 RESERVED****104 RESERVED****105 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.

106 RESERVED**107 SYSTEM IN AUTO MODE**

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

108 SYSTEM IN MANUAL MODE

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

109 SYSTEM IN STOP MODE

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

110 SYSTEM IN TEST MODE

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

111 RESERVED**112 RESERVED****113 RESERVED****114 RESERVED****115 RESERVED****116 RESERVED****117 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.

118 RESERVED**119 LOAD SUPPLY FROM BUS**

This output indicates that the load is supplying from generator bus.

120 LOAD SUPPLY FROM MAINS

This output indicates that the load is supplying from mains.

121 RESERVED**122 RESERVED****123 RESERVED****124 RESERVED****125 RESERVED****126 RESERVED****127 RESERVED****128 REMOTE CONTROL ACTIVE**

This output indicates that the engine is being controlled remotely.

129 RESERVED**130 RESERVED****131 RESERVED****132 RESERVED****133 RESERVED****134 RESERVED****135 REMOTE OUTPUT**

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

136 RESERVED

137 RESERVED

138 BUS NOT ALIVE

Active when the busbar ready signal is received from the Trans-Syncro units and the bus is not seen to go live.

139 SYNCHRONIZATION FAIL

Becomes active if the module fails to synchronise after the "Maximum synchronization time".

140 RESERVED

141 RESERVED

142 RESERVED

143 RESERVED

144 RESERVED

145 RESERVED

146 RESERVED

147 MAINS ROCOF ALARM

This output indicates that the R.O.C.O.F. (Rate Of Change Of Frequency) protection has triggered during parallel operation with the mains.

148 MAINS VECTOR SHIFT ALARM

This output indicates that the Vector Shift protection has triggered during parallel operation with the mains.

5.2.7 Timers

07.01.START TIMERS (Timers->Start timers)		Min	Max	Default	Unit
001.Mains transient delay	Mains Transient Delay	0.0	20.0	2.0	Sec
002.Mains fail start delay	Mains Fail Start Delay	0	9999	0	Sec
003.Remote start delay	Remote Start Delay	0	3600	4	Sec
008.Horn duration	Horn Duration	0 (dis)	999	60	Sec

Mains Transient Delay (001.Mains transient delay)

The unit uses this parameter to decide the mains failure.

Mains Fail Start Delay (002.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 genset start. This prevent un-necessary starting on a fluctuating mains supply etc.

Remote Start Delay (003.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 genset start. This prevent un-necessary starting on a fluctuating mains supply etc.

Horn Duration (008.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.

07.02.STOPPING TIMERS (Timers->Stopping timers)		Min	Max	Default	Unit
001.Mains return delay	Mains Return Delay	0	3600	5	Sec
002.Remote stop delay	Remote Stop Delay	0	250	4	Sec

Mains Return Delay (001.Mains return delay)

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

Remote Stop Delay (002.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 genset stop. This prevent un-necessary stopping on a fluctuating mains supply etc.

Note: dis = disable

5.2.8 Expansion Modules

08.01.IO (1-8) MODULE (<i>Expansion modules->IO (1-8)</i>)		Min	Max	Default	Unit
001.Disable/enable select	Exp. I/O Module Selection	ENABL/DISBL		DISBL	

08.02.DIAL-UP(<i>Expansion modules->Dial-up</i>)		Min	Max	Default	Unit
001.Disable/enable select	Exp. Dial-up Module Selection	ENABL/DISBL		ENABL	
002.Call back selection	Call Back Selection	ENABL/DISBL		DISBL	

08.04.GPRS MODULE (<i>Expansion modules->GPRS</i>)		Min	Max	Default	Unit
001.Disable/enable select	Expansion GPRS Module Selection	0-DISABLE 1-GPRS SERVER 2-GPRS CLIENT 3-SMS		1-GPRS SERVER	
002.Call back selection	Call Back Selection	ENABL/DISBL		DISBL	
003.Cell info refresh rate	Cell info refresh rate	0(dis)	999	15	Min
004.Location data	Location data	ENABL/DISBL		DISBL	
005.Location warning	Location warning	1(dis)	999	1(dis)	Km

08.05.GPRS WEB MODULE (<i>Expansion modules->GPRS Web</i>)		Min	Max	Default	Unit
001.Disable/enable select	GPRS-Web Module Selection	ENABL/DISBL		ENABL	

Note: dis = disable

5.2.9 Synchronization

09.03.PF CONTROL (<i>Synchronization->PF control</i>)		Min	Max	Default	Unit
006.PF control set	Power Factor Control Set Value	-1.00	1.00	1.00	

Power Factor Control Set Value (006.PF control set)

The power factor is controlled using a PID controller on the Trans-Syncro units in the system. In mains parallel operation, the reactive load sharing is not performed. So the reactive power of the genset is regulated by the "006.Power factor control set" parameter.

09.04.CANOPEN CONTROL (<i>Synchronization->CANOPEN control</i>)		Min	Max	Default	Unit
001.Device number	Device Number	33	64	33	
002.Baudrate	Baud Rate: 0 - 20 1 - 50 2 - 100 3 - 125 4 - 250 5 - 500 6 - 800 7 - 1000	0	7	4	kBaud
003.Message transmission rate	Message Transmission Rate	0.10	0.30	0.10	Sec
004.Data delay time	Data Delay Time	0.01	99.99	1.00	Sec
005.Can Open fault actions	Can Open fault actions	ENABL/DISBL		ENABL	
006.Check Can Open version	Check Can Open version	ENABL/DISBL		ENABL	

Device Number (001.Device number)

This parameter defines identification number of a controller on the "CAN OPEN" link (Multilink). This device number must be unique and only be used once on the "CAN OPEN" link.

Baud rate (002.Baudrate)

This parameter defines the used baud rate. All controllers on the "CAN OPEN" link (Multilink) must use the same baud rate.

Message Transmission Rate (003.Message transmission rate)

The value of this parameter defines the time delay between two fast CAN messages. If the value of configured here is short given, the bus load will be reduced.

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

Data Delay Time (004.Data delay time)

This parameter is used to decide the "CAN OPEN" link (Multilink) communication failure.

Can Open Fault Actions (005.Can Open fault actions)

DISABLE: The "CAN OPEN" link (Multilink) communication failure will not be checked.

ENABLE: The "CAN OPEN" link (Multilink) communication failure will be checked.

Check Can Open Version (006.Check Can Open version)

DISABLE: The "CAN OPEN" link (Multilink) software version will not be checked.

ENABLE: The "CAN OPEN" link (Multilink) software version will be checked.

In order for the system to work safely, all units ("Trans-Syncro" or "Trans-Mains" units) in the system must to have the same version of Can Open.

If the unit detects the "Trans-Syncro" unit which has a different the Can Open version in the system, the unit will display a "Can Open version error-1" message and stop the genset.

If the unit detects the "Trans-Mains" unit which has a different the Can Open version in the system, the unit will display a "Can Open version error-2" message and stop the genset.

09.06.SYNCHRON CONTROL (Synchronization->Synchron control)		Min	Max	Default	Unit
001.DeadBus voltage set	Dead Busbar Voltage Level	0	50	50	V~
002.Maximum voltage difference	Maximum Voltage Difference	0	50	5	V~
003.Positive frequency difference	Positive Frequency Difference	0.02	0.49	0.20	Hz
004.Negative frequency difference	Negative Frequency Difference	-0.49	0.00	-.18	Hz
005.Maximum positive phase angle	Maximum Positive Phase Angle	0.0	60.0	2.0	°
006.Maximum negative phase angle	Maximum Negative Phase Angle	-60.0	0.0	-5.0	°
007.Relay closing time	Contactors Closing Time	40	300	60	msec
008.Maximum synchronization time	Maximum Synchronization Time	0	999	80	Sec
009.Synchron dwell time	Synchronization Dwell Time	0.0	25.0	0.0	Sec
010.Frequency set value offset	Slip Frequency Set Value Offset	0.00	0.50	0.12	Hz

The above parameters are used for the mains and/or generator bus synchronization.

Dead Busbar Voltage Level (001.DeadBus voltage set)

The bus is measured when the mains is to be loaded. If the measured value of the bus is to be below the parameter's value, the mains breaker can be closed immediately and the bus is assumed to be "dead". If the measured value of the bus is to be above the parameter's value, the mains must be completed its synchronization before the breaker can be closed.

Maximum Voltage Difference (002.Maximum voltage difference)

If the difference between mains and busbar voltage is less than this parameter's value, the close command will be issued for the mains circuit breaker (MCB) or generator bus circuit breaker (GBCB).

Positive Frequency Difference (003.Positive frequency difference)

If the difference between mains and busbar frequency is less than this parameter's value, the close command will be issued for the mains circuit breaker (MCB) or generator bus circuit breaker (GBCB).

Negative Frequency Difference (004.Negative frequency difference)

If the difference between mains and busbar frequency is greater than this parameter's value, the close command will be issued for the mains circuit breaker (MCB) or generator bus circuit breaker (GBCB).

Maximum Positive Phase Angle (005.Maximum positive phase angle)

If the leading phase angle between mains and busbar is less than this parameter's value, the close command will be issued for the mains circuit breaker (MCB) or generator bus circuit breaker (GBCB).

Maximum Negative Phase Angle (006.Maximum negative phase angle)

If the lagging phase angle between mains and busbar is less than this parameter's value, the close command will be issued for the mains circuit breaker (MCB) or generator bus circuit breaker (GBCB).

Contactors Closing Time (007.Relay closing time)

The specific time of the mains circuit breaker (MCB) or generator bus circuit breaker (GBCB) defines to the lead time of the close command.

Maximum Synchronization Time (008.Maximum synchronization time)

If the synchronization is not successful within a time period adjusted by this parameter, the synchronization alarm will be issued and the gensets will be stopped.

Synchronization dwell time (009.Synchron dwell time)

If the synchronization conditions occurs and persists until this time, the close command will be issued for the mains circuit breaker (MCB) or generator bus circuit breaker (GBCB).

Slip Frequency Set Value Offset (010.Frequency set value offset)

This parameter is used for while the generator bus synchronize to the mains. With this offset, the unit synchronizes with a positive slip.

09.09.SYNCHRON GENERAL (Synchronization->General		Min	Max	Default	Unit
002.Number of gensets on system	Number Of Gensetss On System	1	32	2	
003.Minimum genset fault actions	Minimum Genset Fault Actions: 0- Disable 1- Warning 2- Electrical Trip 3- Shutdown	0(dis)	3	0	
004.Number of mains on system	Number Of Mains On System	1	32	1	
005.Mains priority	Mains Priority	1	32	1	

Number Of Gensets On System (002.Number of gensets on system)

The number of gensets on the system should be defined by this parameter.

Minimum Genset Fault Actions (003.Minimum genset fault actions)

This protection is considered if the number of gensets on the system is less than the value defined in the "002.Number of gensets on the system" parameter.

Number Of Mains On System (004.Number of mains on system)

The number of mains on the system should be defined by this parameter.

Mains Priority (005.Mains priority)

This parameter is used for to define the priority of the mains supply in the multiple mains system. The lower number represents higher priority.

If more than one mains supply has failed, the gensets are started and the related loads are transferred to the gensets in sequence according the priority order.

If more than one mains supply returns at the same time, the unit with the highest priority will take control of the gensets and perform a no-break transition to the mains supply.

09.10.BREAKER&LOAD CONT. (<i>Synchronization->Breaker&load cont</i>)		Min	Max	Default	Unit
001.Breaker transition mode	Breaker Transition Mode Selection: 0- Break 1- No break 2- Soft 3- Parallel	0	3	0	
002.No break transition time	No break transition time	0.0	25.0	0.5	Sec
003.Load control mode	Load Control Mode Selection: 0- Import Power 1- Export Power 2- Constant Power	0	2	0	
004.Load control set	Load Control Set	1	9999	100	kW
005.Load control hysteresis	Load Control Hysteresis	0	9999	20	kW
006.Import power start delay	Import Power Start Delay	0	999	5	Sec
007.Import power stop delay	Import Power Stop Delay	0	999	5	Sec
012.Soft transition high limit	Soft Transition High Limit	0	100	90	%
013.Soft transition low limit	Soft Transition Low Limit	0	100	10	%
014.Soft transition timeout	Soft Transition Timeout	0	999	30	Sec

Breaker Transition Mode Selection (001.Breaker transition mode)

0-BREAK: This mode is used to enable break transfer. When this mode is activated, the load is transferred after a short interruption according to the content of “01.02.014.Transfer time” parameter.

1-NO BREAK: This mode is used to enable no-break transfer. When this mode is activated, the load is transferred uninterruptedly. The load is supplied from both the mains and the gensets until the time in “09.10.002.No break transition time” parameter expires.

2-SOFT: This mode is used to enable soft transfer. When this mode is activated, the load is transferred with ramp.

3-PARALLEL: This mode is used to enable parallel operation. When this mode is activated, the load is shared between the mains and the gensets according to the content of “09.10.003.Load control mode” parameter.

No Break Transition Time (002.No break transition time)

If the “09.10.001.Breaker transition mode” parameter is configured as “1-NO BREAK”, the load is supplied from both the mains and the gensets until the time in this parameter expires.

Load Control Mode Selection (003.Load control mode)

If the “09.10.001.Breaker transition mode” parameter is configured as “3-PARALLEL”, the Load control mode must be selected from this parameter. Options are as follows;

0-IMPORT POWER: Peak lopping or peak shaving. The mains shall always supply for the limit value set by parameter “09.10.004.Load control set”. When the customer demand load exceeds the limit value set by parameter “09.10.004.Load control set”, the load above the limit value is supplied by the gensets. It is especially used at times when the power requirement increases, that is, when the mains tariff will endure.

1-EXPORT POWER: Power export to mains. The gensets power export to the mains as much as the value in parameter “09.10.004.Load control set” with constant power factor.
The gensets operate as part of the mains line in this mode.

2-CONSTANT POWER: Base load. The gensets shall always supply for the limit value set by parameter “09.10.004.Load control set”. When the customer demand load exceeds the limit value set by parameter “09.10.004.Load control set”, the load above the limit value is supplied by the mains. If the load falls below the the limit value set by parameter “09.10.004.Load control set”, the excess power of the genset is export to the mains.

Load Control Set (004.Load control set)

This value is the reference for the load controller mode (import, export, constant) or the soft transition mode when performing parallel operation.

Load Control Hysteresis (005.Load control hysteresis)

In parallel operation with the mains (0-Import power mode), this hysteresis value is used to issue stop command to the gensets.

Import Power Start Delay (006.Import power start delay)

In parallel operation with the mains (0-Import power mode), when the customer demand load exceeds the limit value set by parameter “09.10.004.Load control set”, the start command will be issued to the gensets after the delay time of this parameter has expired.

Import Power Stop Delay (007.Import power stop delay)

In parallel operation with the mains (0-Import power mode), when the customer demand load falls below the “09.10.004.Load control set” parameter minus the “09.10.005.Load control hysteresis” parameter, the stop command will be issued to the gensets after the delay time of this parameter has expired.

Soft Transition High Limit (012.Soft transition high limit)

If the mains active power exceeds this limit while soft transferring from the gensets to the mains, the soft transition will be terminated and the generator bus circuit breaker (GBCB) will be de-energized.

Soft Transition Low Limit (013.Soft transition low limit)

If the mains active power falls below this limit while soft transferring from the mains to the gensets, the soft transition will be terminated and the mains circuit breaker (MCB) will be de-energized.

Soft Transition Timeout (014.Soft transition timeout)

If this timer was expired while soft transferring from the gensets to the mains, the soft transition will be terminated and the generator bus circuit breaker (GBCB) will be de-energized.

If this timer was expired while soft transferring from the mains to the gensets, the soft transition will be terminated and the mains circuit breaker (MCB) will be de-energized.

09.11.MAINS DECOUPLING (Synchronization->Mains decoupling)		Min	Max	Default	Unit
001.Vector shift set	Vector Shift Set Value	0(dis)	30	8	°
002.Rocof (df/dt) set	Rocof (df/dt) Set Value	0.4(dis)	9.9	5.0	Hz/s
003.Rocof (df/dt) delay	Rocof (df/dt) Delay	0.0	9.9	0.8	Sec
004.Mains decoupling actions	Mains Decoupling Actions: 0- Warning 1- Electrical Trip 2- Auxiliary Mains Failure	0	2	1	
005.Mains decoupling control delay	Mains Decoupling Control Delay	0.0	999.9	1.0	Sec

Vector Shift Set Value (001.Vector shift set)

Vector shift protection is enabled when the gensets are in parallel with the mains supply.

This parameter specifies the level of vector shift protection.

The unit measures the last 4 periods for any phase of the mains. At the end of each period, the average duration of the last 2 periods and the average duration of the 3th and 4th periods are compared. If the difference is greater than the value defined in this parameter, the unit will detect mains failure and display the "Mains vector shift alarm!" message on the screen.

Rocof (df/dt) Set Value (002.Rocof (df/dt) set)

Rocof means "rate of change of frequency".

Rocof protection is enabled when the gensets are in parallel with the mains supply.

This parameter specifies the level of Rocof protection.

The unit measures the frequency of the mains every period. If the change in the mains frequency value exceeds the value defined in this parameter in the last 4 periods measured and this condition continues for the time specified in the "09.11.003.Rocof (df/dt) delay" parameter, the unit will detect mains failure and display the "Mains rocof alarm!" message on the screen.

Rocof (df/dt) Delay (003.Rocof (df/dt) delay)

If the measured Rocof (df/dt) exceeds the value in the "09.11.002.Rocof (df/dt) set" parameter for the delay time configured here, the unit will detect mains failure and display the "Mains rocof alarm!" message on the screen.

Mains Decoupling Actions (004.Mains decoupling actions)

The mains decoupling protections are "Rocof" and "Vector shift".

When any of these protections ("Rocof" and "Vector shift") is active, the unit decides how to behave according to the selection on this parameter;

0-Warning: The related alarm message is displayed to warn the user. But the generator bus load switch (GBCB), the mains load switch (MCB) or the gensets are not affected by this situation.

1-Electrical Trip: The generator bus load switch (GBCB) is opened and the gensets are stopped after running for as long as the cooling period.

2-Auxiliary Mains Failure: The mains load switch (MCB) is opened and the gensets are allowed to continue providing power to the load.

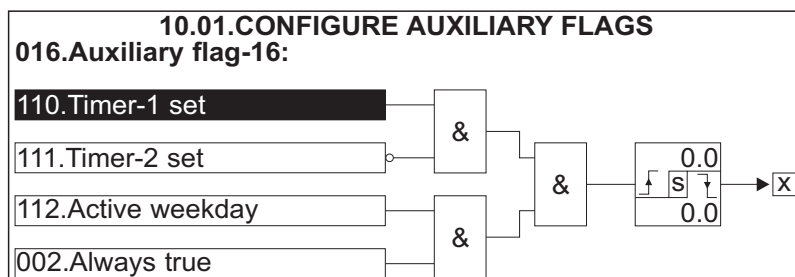
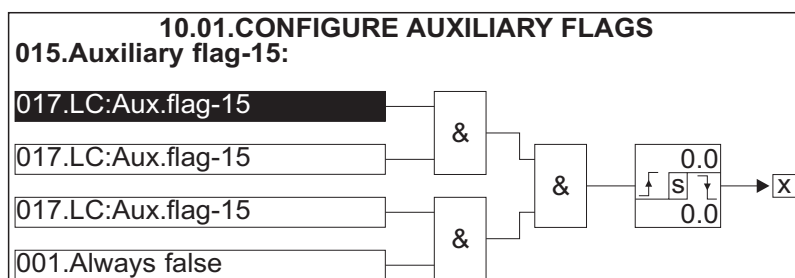
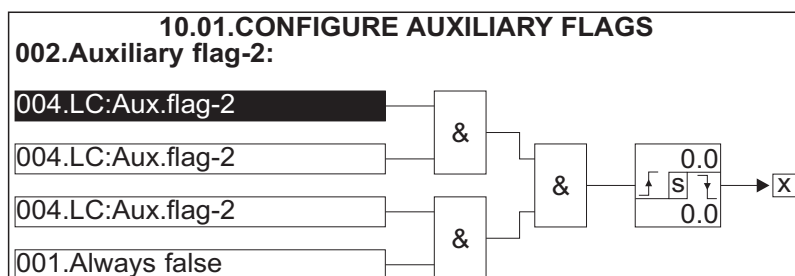
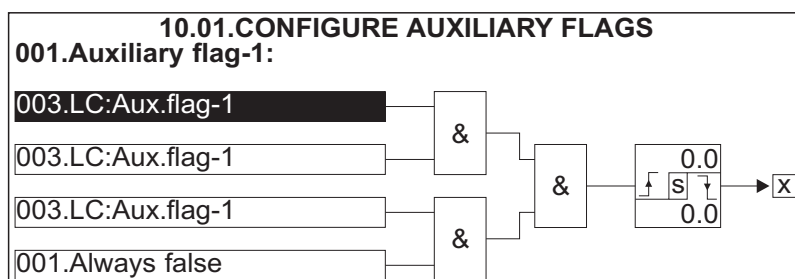
Mains Decoupling Control Delay (005.Mains decoupling control delay)

In parallel operation with the mains, when the mains contactor is switched on, the mains decoupling protections (Rocof and Vector shift) are activated after this time.

5.2.10 Logic Controller

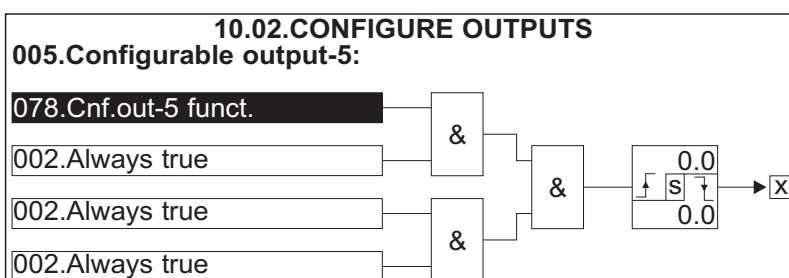
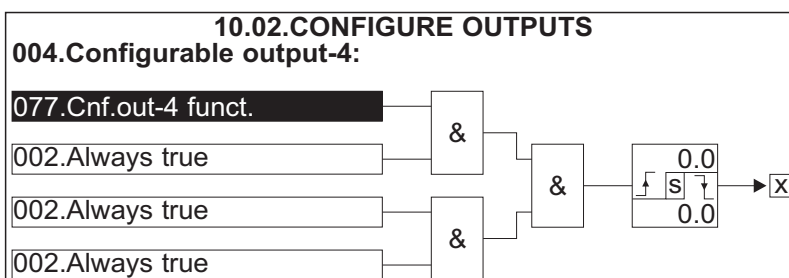
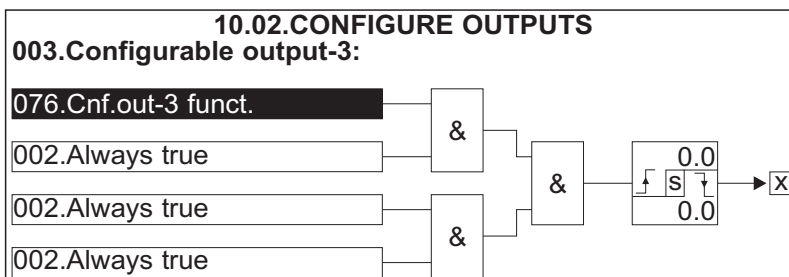
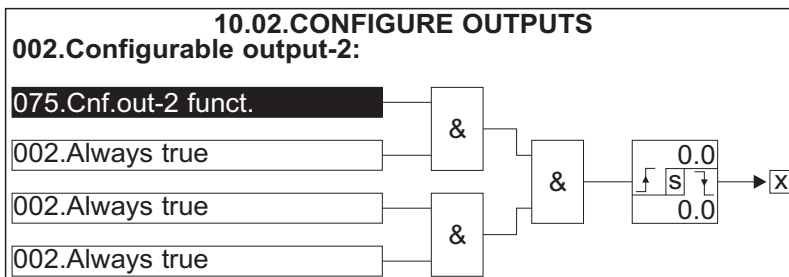
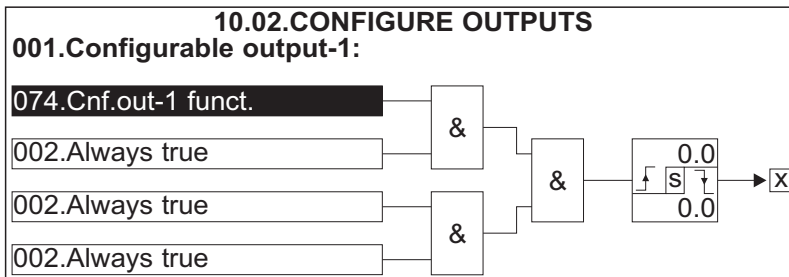
10.01.CONF. AUXILIARY FLAGS (<i>Logic controller->Conf. auxiliary flags</i>)		Min	Max	Default	Unit
001.Auxiliary flag-1:	Auxiliary Flag-1 Configuration	Logic Controller		0	
002.Auxiliary flag-2:	Auxiliary Flag-2 Configuration	Logic Controller		0	
003.Auxiliary flag-3:	Auxiliary Flag-3 Configuration	Logic Controller		0	
004.Auxiliary flag-4:	Auxiliary Flag-4 Configuration	Logic Controller		0	
005.Auxiliary flag-5:	Auxiliary Flag-5 Configuration	Logic Controller		0	
006.Auxiliary flag-6:	Auxiliary Flag-6 Configuration	Logic Controller		0	
007.Auxiliary flag-7:	Auxiliary Flag-7 Configuration	Logic Controller		0	
008.Auxiliary flag-8:	Auxiliary Flag-8 Configuration	Logic Controller		0	
009.Auxiliary flag-9:	Auxiliary Flag-9 Configuration	Logic Controller		0	
010.Auxiliary flag-10:	Auxiliary Flag-10 Configuration	Logic Controller		0	
011.Auxiliary flag-11:	Auxiliary Flag-11 Configuration	Logic Controller		0	
012.Auxiliary flag-12:	Auxiliary Flag-12 Configuration	Logic Controller		0	
013.Auxiliary flag-13:	Auxiliary Flag-13 Configuration	Logic Controller		0	
014.Auxiliary flag-14:	Auxiliary Flag-14 Configuration	Logic Controller		0	
015.Auxiliary flag-15:	Auxiliary Flag-15 Configuration	Logic Controller		0	
016.Auxiliary flag-16:	Auxiliary Flag-16 Configuration	Logic Controller		0	

Factory setting of the above LC parameters:



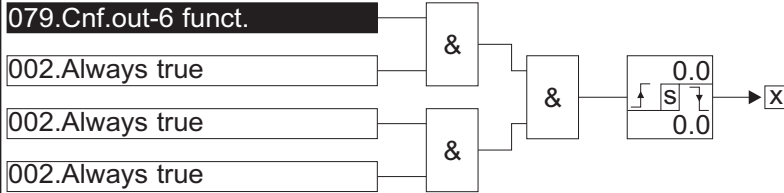
10.02.CONFIGURE OUTPUTS (Logic controller->Configure outputs)		Min	Max	Default	Unit
001.Configurable output-1:	Configurable Output-1 Configuration	Logic Controller		0	
002.Configurable output-2:	Configurable Output-2 Configuration	Logic Controller		0	
003.Configurable output-3:	Configurable Output-3 Configuration	Logic Controller		0	
004.Configurable output-4:	Configurable Output-4 Configuration	Logic Controller		0	
005.Configurable output-5:	Configurable Output-5 Configuration	Logic Controller		0	
006.Configurable output-6:	Configurable Output-6 Configuration	Logic Controller		0	
007.Configurable output-7:	Configurable Output-7 Configuration	Logic Controller		0	
008.Configurable output-8:	Configurable Output-8 Configuration	Logic Controller		0	
009.Configurable output-9:	Configurable Output-9 Configuration	Logic Controller		0	

Factory setting of the above LC parameters:



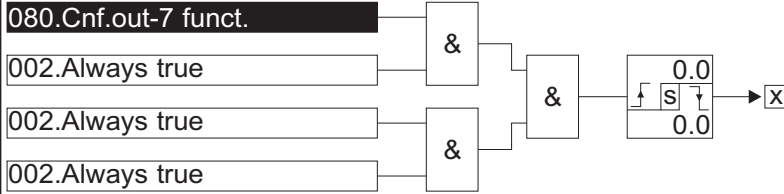
10.02.CONFIGURE OUTPUTS

006.Configurable output-6:



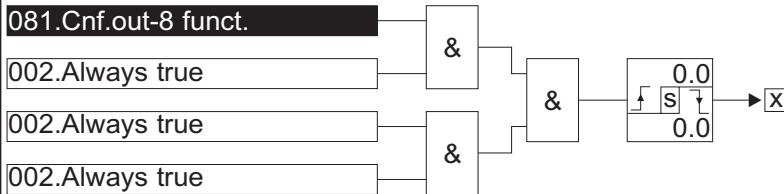
10.02.CONFIGURE OUTPUTS

007.Configurable output-7:



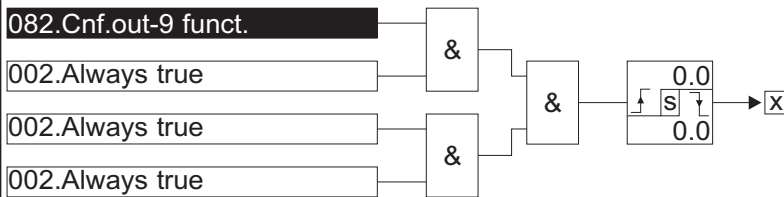
10.02.CONFIGURE OUTPUTS

008.Configurable output-8:



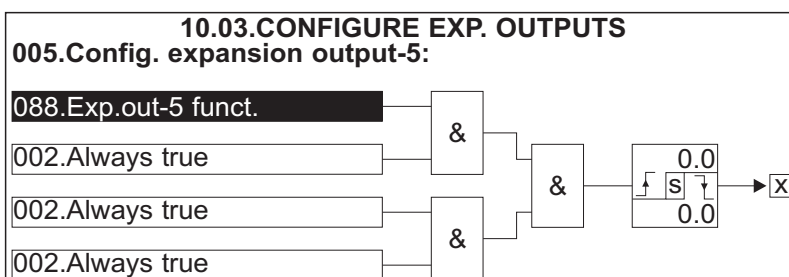
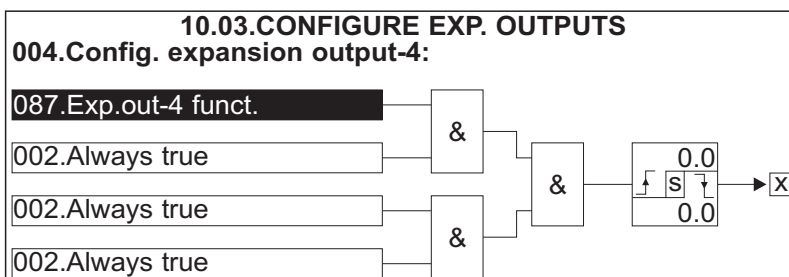
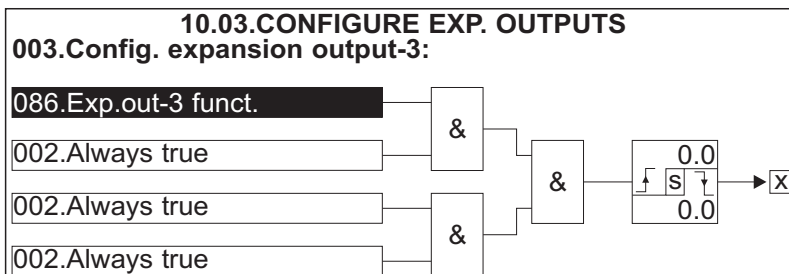
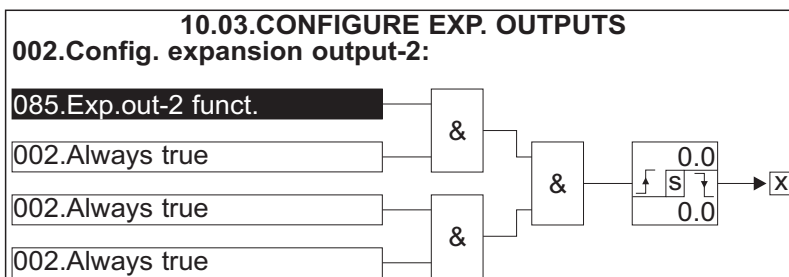
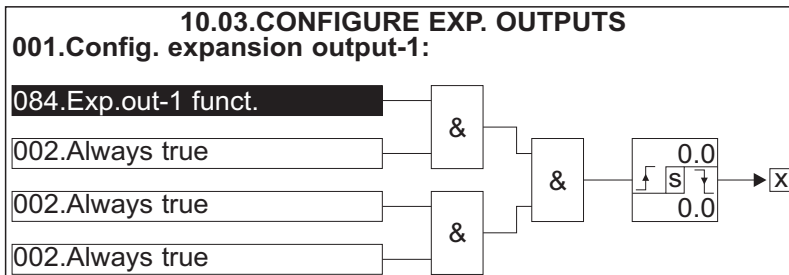
10.02.CONFIGURE OUTPUTS

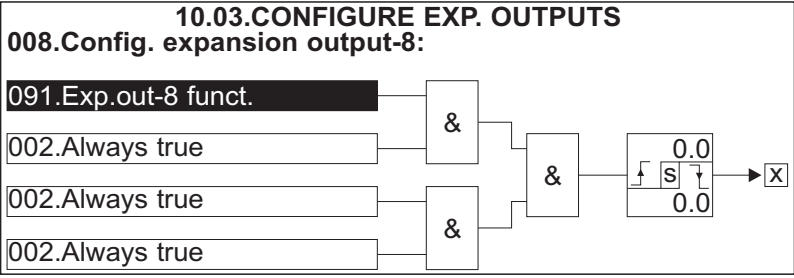
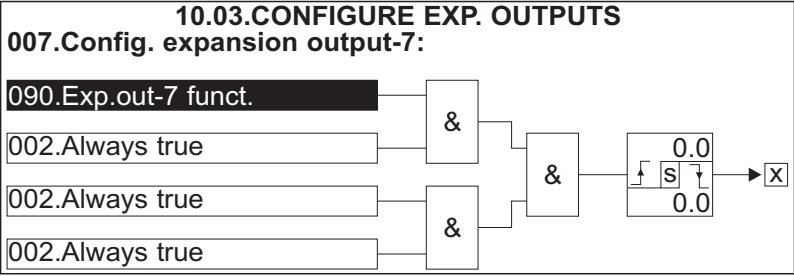
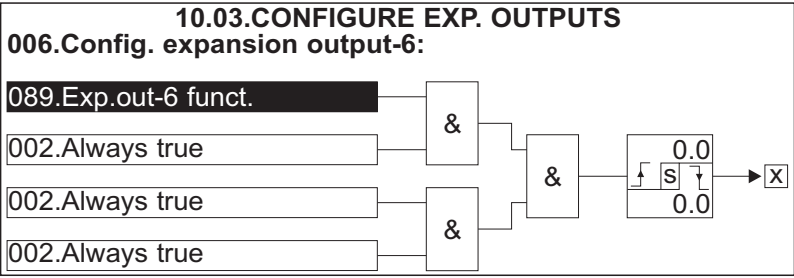
009.Configurable output-9:



10.03.CONFIG. EXP. OUTPUTS (Logic controller->Config. exp. outputs)		Min	Max	Default	Unit
001.Config. expansion output-1:	Config. Exp. Output-1 Configuration	Logic Controller		0	
002.Config. expansion output-2:	Config. Exp. Output-2 Configuration	Logic Controller		0	
003.Config. expansion output-3:	Config. Exp. Output-3 Configuration	Logic Controller		0	
004.Config. expansion output-4:	Config. Exp. Output-4 Configuration	Logic Controller		0	
005.Config. expansion output-5:	Config. Exp. Output-5 Configuration	Logic Controller		0	
006.Config. expansion output-6:	Config. Exp. Output-6 Configuration	Logic Controller		0	
007.Config. expansion output-7:	Config. Exp. Output-7 Configuration	Logic Controller		0	
008.Config. expansion output-8:	Config. Exp. Output-8 Configuration	Logic Controller		0	

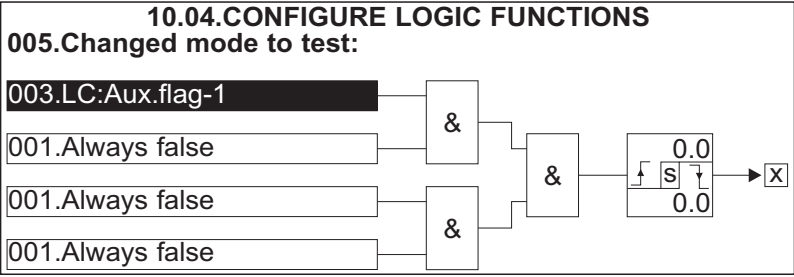
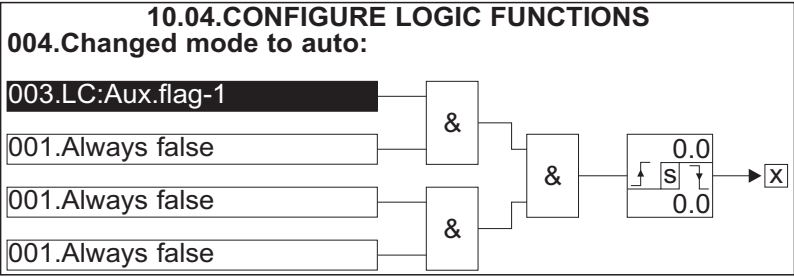
Factory setting of the above LC parameters:

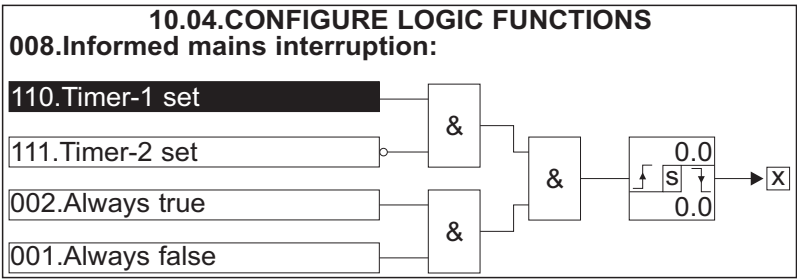
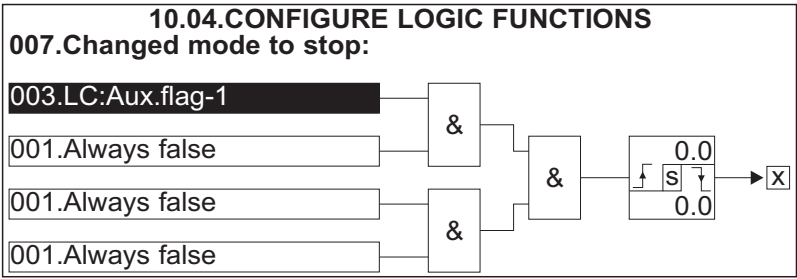
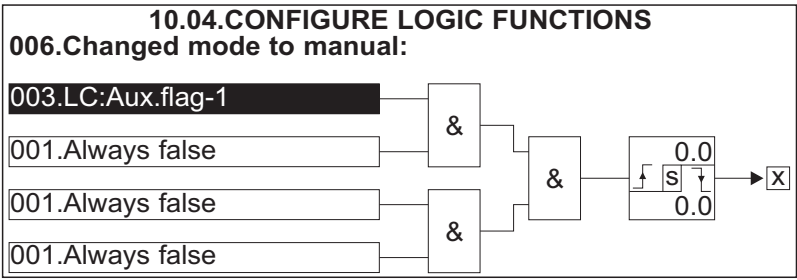




10.04.CONF. LOGIC FUNCTIONS (Logic controller->Conf. logic functions)		Min	Max	Default	Unit
004.Changed mode to auto:	Changed Mode To Auto Configuration	Logic Controller		0	
005.Changed mode to test:	Changed Mode To Test Configuration	Logic Controller		0	
006.Changed mode to manual:	Changed Mode To Man Configuration	Logic Controller		0	
007.Changed mode to stop:	Changed Mode To Stop Configuration	Logic Controller		0	
008.Informed mains interruption:	Informed Mains Interrupt Configuration	Logic Controller		0	

Factory setting of the above LC parameters:





10.05.CONFIGURE TIMERS (Logic controller->Configure timers)		Min	Max	Default	Unit
001.Timer-1 hour	Timer-1 Hour	0	23	8	Hour
002.Timer-1 minute	Timer-1 Minute	0	59	0	Min
003.Timer-1 second	Timer-1 Second	0	59	0	Sec
004.Timer-2 hour	Timer-2 Hour	0	23	17	Hour
005.Timer-2 minute	Timer-2 Minute	0	59	0	Min
006.Timer-2 second	Timer-2 Second	0	59	0	Sec
007.Active day	Active Day	1	31	1	
008.Active hour	Active Hour	0	23	12	Hour
009.Active minute	Active Minute	0	59	0	Min
010.Active second	Active Second	0	59	0	Sec
011.Monday disable/enable	Monday Disable/Enable	ENABL/DISBL		DISBL	
012.Tuesday disable/enable	Tuesday Disable/Enable	ENABL/DISBL		DISBL	
013.Wednesday disable/enable	Wednesday Disable/Enable	ENABL/DISBL		DISBL	
014.Thursday disable/enable	Thursday Disable/Enable	ENABL/DISBL		DISBL	
015.Friday disable/enable	Friday Disable/Enable	ENABL/DISBL		DISBL	
016.Saturday disable/enable	Saturday Disable/Enable	ENABL/DISBL		DISBL	
017.Sunday disable/enable	Sunday Disable/Enable	ENABL/DISBL		DISBL	

The LC parameters in this page are used for establish specific times within various Logic Controller functions.

10.06.LOGIC CONTROLLER GENERAL (Logic controller->General)		Min	Max	Default	Unit
001.Register set-1	Register Set-1 Value	-9999	9999	100	
002.Register set-2	Register Set-2 Value	-9999	9999	100	
003.Register set-3	Register Set-3 Value	-9999	9999	100	
004.Register set-4	Register Set-4 Value	-9999	9999	100	
005.Register set-5	Register Set-5 Value	-9999	9999	100	
006.Register set-6	Register Set-6 Value	-9999	9999	100	
007.Register set-7	Register Set-7 Value	-9999	9999	100	
008.Register set-8	Register Set-8 Value	-9999	9999	100	

The LC parameters in this page are used for control specific register value within various Logic Controller functions.

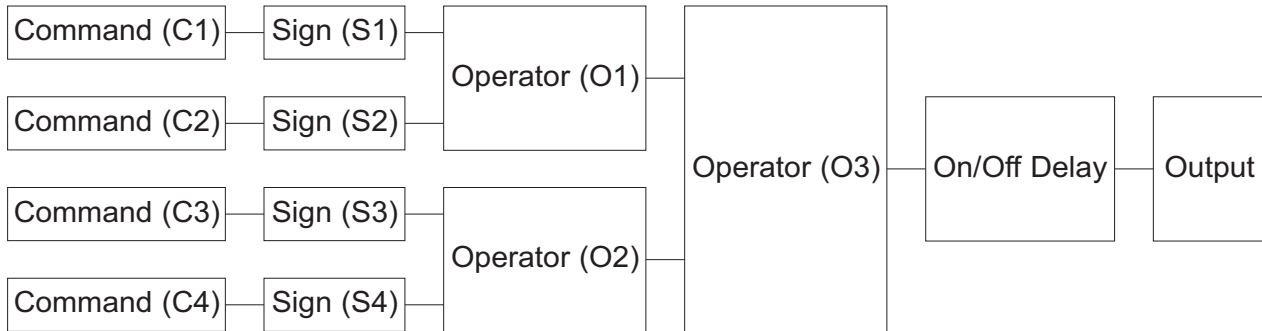
5.2.11 User Adjustment

11.04.BATTERY VOLT OFFSET (User adjustment->Battery volt offset)		Min	Max	Default	Unit
001.Batt.volt offset	Battery Voltage Offset	-5.0	5.0	0	V---

6. Logic Controller

The Logic Controller is used for configure the unit outputs or the gensets start/stop or the unit operation mode. For instance, the engine start can be programmed depending on whether the configurable input is active or a specific time of related day.

Structure of the Logic Controller:



Command (Cx):

Up to 330 functions is provided for the command inputs. These command variables are used for control the output function or relay.

Complete list of all command variables as follows;

- 001.Always false: The command and sign value are ignored and this logic path is always “false”
- 002.Always true: The command and sign value are ignored and this logic path is always “true”
- 003.LC:Aux.flag-1: Auxiliary flag-1
- 004.LC:Aux.flag-2: Auxiliary flag-2
- 005.LC:Aux.flag-3: Auxiliary flag-3
- 006.LC:Aux.flag-4: Auxiliary flag-4
- 007.LC:Aux.flag-5: Auxiliary flag-5
- 008.LC:Aux.flag-6: Auxiliary flag-6
- 009.LC:Aux.flag-7: Auxiliary flag-7
- 010.LC:Aux.flag-8: Auxiliary flag-8
- 011.LC:Aux.flag-9: Auxiliary flag-9
- 012.LC:Aux.flag-10: Auxiliary flag-10
- 013.LC:Aux.flag-11: Auxiliary flag-11
- 014.LC:Aux.flag-12: Auxiliary flag-12
- 015.LC:Aux.flag-13: Auxiliary flag-13
- 016.LC:Aux.flag-14: Auxiliary flag-14
- 017.LC:Aux.flag-15: Auxiliary flag-15
- 018.LC:Aux.flag-16: Auxiliary flag-16
- 019.LC:Conf.out-1: Configurable output-1
- 020.LC:Conf.out-2: Configurable output-2
- 021.LC:Conf.out-3: Configurable output-3
- 022.LC:Conf.out-4: Configurable output-4
- 023.LC:Conf.out-5: Configurable output-5
- 024.LC:Conf.out-6: Configurable output-6
- 025.LC:Conf.out-7: Configurable output-7
- 026.LC:Conf.out-8: Configurable output-8
- 027.LC:Conf.out-9: Configurable output-9
- 028.LC:Reserved
- 029.LC:Cnf.exp.out-1: Configurable expansion output-1
- 030.LC:Cnf.exp.out-2: Configurable expansion output-2
- 031.LC:Cnf.exp.out-3: Configurable expansion output-3
- 032.LC:Cnf.exp.out-4: Configurable expansion output-4
- 033.LC:Cnf.exp.out-5: Configurable expansion output-5
- 034.LC:Cnf.exp.out-6: Configurable expansion output-6
- 035.LC:Cnf.exp.out-7: Configurable expansion output-7
- 036.LC:Cnf.exp.out-8: Configurable expansion output-8

037.LC:Reserved
038.LC:Reserved
039.LC:Reserved
040.LC:Oper.mod.auto: Changed operation mode to auto
041.LC:Oper.mod.test: Changed operation mode to test
042.LC:Oper.mod.man.: Changed operation mode to manual
043.LC:Oper.mod.stop: Changed operation mode to stop
044.LC:Inf.mains.int: Informed mains interruption
045.LC:Reserved
046.LC:Reserved
047.LC:Reserved
048.LC:Reserved
049.LC:Reserved
050.LC:Reserved
051.LC:Reserved
052.LC:Reserved
053.Cnf.in-1 active: Configurable input-1 active
054.Cnf.in-2 active: Configurable input-2 active
055.Cnf.in-3 active: Configurable input-3 active
056.Cnf.in-4 active: Configurable input-4 active
057.Cnf.in-5 active: Configurable input-5 active
058.Cnf.in-6 active: Configurable input-6 active
059.Cnf.in-7 active: Configurable input-7 active
060.Cnf.in-8 active: Configurable input-8 active
061.Cnf.in-9 active: Configurable input-9 active
062.Cnf.in-10 active: Configurable input-10 active
063.Cnf.in-11 active: Configurable input-11 active
064.Cnf.in-12 active: Configurable input-12 active
065.Cnf.in-13 active: Configurable input-13 active
066.Exp.in-1 active: Configurable expansion input-1 active
067.Exp.in-2 active: Configurable expansion input-2 active
068.Exp.in-3 active: Configurable expansion input-3 active
069.Exp.in-4 active: Configurable expansion input-4 active
070.Exp.in-5 active: Configurable expansion input-5 active
071.Exp.in-6 active: Configurable expansion input-6 active
072.Exp.in-7 active: Configurable expansion input-7 active
073.Exp.in-8 active: Configurable expansion input-8 active
074.Cnf.out-1 funct.: Configurable output-1 function
075.Cnf.out-2 funct.: Configurable output-2 function
076.Cnf.out-3 funct.: Configurable output-3 function
077.Cnf.out-4 funct.: Configurable output-4 function
078.Cnf.out-5 funct.: Configurable output-5 function
079.Cnf.out-6 funct.: Configurable output-6 function
080.Cnf.out-7 funct.: Configurable output-7 function
081.Cnf.out-8 funct.: Configurable output-8 function
082.Cnf.out-9 funct.: Configurable output-9 function
083.Reserved
084.Exp.out-1 funct.: Configurable expansion output-1 function
085.Exp.out-2 funct.: Configurable expansion output-2 function
086.Exp.out-3 funct.: Configurable expansion output-3 function
087.Exp.out-4 funct.: Configurable expansion output-4 function
088.Exp.out-5 funct.: Configurable expansion output-5 function
089.Exp.out-6 funct.: Configurable expansion output-6 function
090.Exp.out-7 funct.: Configurable expansion output-7 function
091.Exp.out-8 funct.: Configurable expansion output-8 function
092.GBCB close activ: Generator bus circuit breaker (GBCB) close output active
093.MCB close active: Mains circuit breaker (MCB) close output active
094.Auto mode active: Auto mode active
095.Test mode active: Test mode active
096.Man. mode active: Manual mode active

097.Stop mode active: Stop mode active
098.Reserved
099.Reserved
100.Busbar ready: Busbar ready
101.Load supply bus: Load supply from bus
102.Load suppl.Mains: Load supply from mains
103.Mains okay: Mains okay
104.Reserved
105.Reserved
106.Reserved
107.Reserved
108.Reserved
109.Dead bus: Dead bus detected
110.Timer-1 set: Timer-1 set point exceeded
111.Timer-2 set: Timer-2 set point exceeded
112.Active weekday: Active weekday equal to setting
113.Active day: Active day equal to setting
114.Active hour: Active hour equal to setting
115.Active minute: Active minute equal to setting
116.Active second: Active second equal to setting
117.Reserved
118.Reserved
119.Reserved
120.Red alarm led-1: Red alarm led-1 active
121.Red alarm led-2: Red alarm led-2 active
122.Red alarm led-3: Red alarm led-3 active
123.Red alarm led-4: Red alarm led-4 active
124.Red alarm led-5: Red alarm led-5 active
125.Red alarm led-6: Red alarm led-6 active
126.Yellow alr led-1: Yellow alarm led-1 active
127.Yellow alr led-2: Yellow alarm led-2 active
128.Yellow alr led-3: Yellow alarm led-3 active
129.Servic.alr led-1: Service alarm led-1 active
130.Servic.alr led-2: Service alarm led-2 active
131.Servic.alr led-3: Service alarm led-3 active
132.Servic.alr led-4: Service alarm led-4 active
133.Servic.alr led-5: Service alarm led-5 active
134.Servic.alr led-6: Service alarm led-6 active
135.Input-1 alarm!: Spare 1 error
136.Input-2 alarm!: Spare 2 error
137.Input-3 alarm!: Spare 3 error
138.Input-4 alarm!: Spare 4 error
139.Input-5 alarm!: Spare 5 error
140.Input-6 alarm!: Spare 6 error
141.Input-7 alarm!: Spare 7 error
142.Input-8 alarm!: Spare 8 error
143.Input-9 alarm!: Spare 9 error
144.Input-10 alarm!: Spare 10 error
145.Input-11 alarm!: Spare 11 error
146.Input-12 alarm!: Spare 12 error
147.Input-13 alarm!: Spare 13 error
148.Exp.input-1 alr!: Expansion I/O module spare 1 error
149.Exp.input-2 alr!: Expansion I/O module spare 2 error
150.Exp.input-3 alr!: Expansion I/O module spare 3 error
151.Exp.input-4 alr!: Expansion I/O module spare 4 error
152.Exp.input-5 alr!: Expansion I/O module spare 5 error
153.Exp.input-6 alr!: Expansion I/O module spare 6 error
154.Exp.input-7 alr!: Expansion I/O module spare 7 error
155.Exp.input-8 alr!: Expansion I/O module spare 8 error

156.Emergency stop!: Emergency stop error
157.Reserved
158.Reserved
159.Reserved
160.Reserved
161.Bus ph.seq.wrng!: Busbar phase sequence wrong
162.Reserved
163.Reserved
164.Reserved
165.Batt. low warn!: Battery low error
166.Batt. high warn!: Battery high error
167.Reserved
168.Reserved
169.Reserved
170.Reserved
171.Reserved
172.Reserved
173.Reserved
174.Reserved
175.Bus br.not clos!: Generator bus breaker not closed alarm
176.Bus br.not open!: Generator bus breaker not opened alarm
177.Mains br.not cl!: Mains breaker not closed alarm
178.Mains br.not op!: Mains breaker not opened alarm
179.Reserved
180.Reserved
181.Reserved
182.Reserved
183.Reserved
184.Reserved
185.Reserved
186.Reserved
187.Reserved
188.Reserved
189.Reserved
190.Reserved
191.Reserved
192.Reserved
193.Can bus warning!: Can Bus error
194.Reserved
195.Reserved
196.Reserved
197.Reserved
198.Reserved
199.Reserved
200.Reserved
201.Reserved
202.Mains ph.seq.wr!: Mains phase sequence wrong
203.Reserved
204.Reserved
205.Reserved
206.Reserved
207.Reserved
208.Reserved
209.Reserved
210.Reserved
211.Reserved
212.Reserved
213.Reserved
214.Reserved
215.Reserved

216.Reserved
217.Reserved
218.Reserved
219.Reserved
220.Reserved
221.Reserved
222.Reserved
223.Reserved
224.Reserved
225.Reserved
226.Reserved
227.Reserved
228.Reserved
229.Reserved
230.Reserved
231.Reserved
232.Bus no aliv.err!: Busbar Not alive error
233.Synchroniz. err!: Synchronization error
234.Reserved
235.Reserved
236.Reserved
237.Reserved
238.Reserved
239.Reserved
240.Reserved
241.Reserved
242.Reserved
243.Reserved
244.Reserved
245.Reserved
246.Reserved
247.CanOpen com.err!: Can Open communication failure
248.Mains rocof alr!: Mains rocof alarm
249.Mains vec.shift!: Mains vector shift alarm
250.Min.genset alrm!: Minimum genset alarm
251.Reserved!
252.Reserved!
253.Reserved!
254.Reserved!
255.Reserved!
256.Reserved!
257.Reserved!
258.Reserved!
259.Reserved!
260.Reserved!
261.Reserved!
262.Reserved!
263.Reserved!
264.Reserved!
265.Reserved!
266.Reserved!
267.Reserved!
268.Reserved!
269.Reserved!
270.Reserved!
271.CanOpen ver.er1!: Can Open version error-1
272.CanOpen ver.er2!: Can Open version error-2
273.Sl.Contr.com.er!: Slave controller communication error

274.RC:Register set1: Register set1 parameter value
275.RC:Register set2: Register set2 parameter value
276.RC:Register set3: Register set3 parameter value
277.RC:Register set4: Register set4 parameter value
278.RC:Register set5: Register set5 parameter value
279.RC:Register set6: Register set6 parameter value
280.RC:Register set7: Register set7 parameter value
281.RC:Register set8: Register set8 parameter value
282.RC:Bus V1: Bus V1 active value
283.RC:Bus V2: Bus V2 active value
284.RC:Bus V3: Bus V3 active value
285.RC:Bus V12: Bus V12 active value
286.RC:Bus V23: Bus V23 active value
287.RC:Bus V31: Bus V31 active value
288.RC:Bus frequency: Bus frequency active value
289.RC:Mains V1: Mains V1 active value
290.RC:Mains V2: Mains V2 active value
291.RC:Mains V3: Mains V3 active value
292.RC:Mains V12: Mains V12 active value
293.RC:Mains V23: Mains V23 active value
294.RC:Mains V31: Mains V31 active value
295.RC:Mains freque.: Mains frequency active value
296.RC:Mains I1: Mains I1 active value
297.RC:Mains I2: Mains I2 active value
298.RC:Mains I3: Mains I3 active value
299.RC:Load L1 Curr.: Load L1 current active value
300.RC:Reserved
301.RC:Reserved
302.RC:Reserved
303.RC:Mains P1: Mains P1 active value
304.RC:Mains P2: Mains P2 active value
305.RC:Mains P3: Mains P3 active value
306.RC:Mains P total: Mains P total active value
307.RC:Mains Q1: Mains Q1 active value
308.RC:Mains Q2: Mains Q2 active value
309.RC:Mains Q3: Mains Q3 active value
310.RC:Mains Q total: Mains Q total active value
311.RC:Mains S1: Mains S1 active value
312.RC:Mains S2: Mains S2 active value
313.RC:Mains S3: Mains S3 active value
314.RC:Mains S total: Mains S total active value
315.RC:Mains kWh: Mains kWh active value
316.RC:Mains kVArh: Mains kVArh active value
317.RC:Reserved
318.RC:Reserved
319.RC:Reserved
320.RC:Reserved
321.RC:Reserved
322.RC:Reserved
323.RC:Battery volt: Battery voltage active value
324.RC:Reserved
325.RC:Reserved
326.RC:Reserved
327.RC:Reserved
328.RC:Reserved
329.RC:Reserved
330.RC:Reserved

Sign (Sx):

The sign field can be used for invert the status of the input command. If the sign field is configured to the “Not” state value, the output of the input command variable changes from true to false or vice versa. Complete list of all sign values as follows;

Direct command value:

— The input command value is passed directly to the operator.

Not command value:

○— The input command value is inverted passed to the operator.

Operator (Ox):

The operator field can be used for logic symbols such as AND, NAND, OR, NOR, XOR, NXOR. Additionally the operator field can be used for comparison symbols such as >, <. Complete list of all operator field symbols as follows;

Logic and comparison symbols:

	AND	NAND	OR	NOR	XOR	NXOR	>	<																																																																																										
Symbols	<div><div>a</div><div>b</div><div>&</div><div>x</div></div>	<div><div>a</div><div>b</div><div>&</div><div>o</div><div>x</div></div>	<div><div>a</div><div>b</div><div>>=1</div><div>x</div></div>	<div><div>a</div><div>b</div><div>>=1</div><div>o</div><div>x</div></div>	<div><div>a</div><div>b</div><div>=1</div><div>x</div></div>	<div><div>a</div><div>b</div><div>=</div><div>x</div></div>	<div><div>a</div><div>b</div><div>></div><div>x</div></div>	<div><div>a</div><div>b</div><div><</div><div>x</div></div>																																																																																										
Truth table	<table><tr><td>a</td><td>b</td><td>x</td></tr><tr><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td></tr></table>	a	b	x	0	0	0	0	1	0	1	0	0	1	1	1	<table><tr><td>a</td><td>b</td><td>x</td></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td><td>1</td></tr><tr><td>1</td><td>0</td><td>1</td></tr><tr><td>1</td><td>1</td><td>0</td></tr></table>	a	b	x	0	0	1	0	1	1	1	0	1	1	1	0	<table><tr><td>a</td><td>b</td><td>x</td></tr><tr><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td><td>1</td></tr><tr><td>1</td><td>0</td><td>1</td></tr><tr><td>1</td><td>1</td><td>1</td></tr></table>	a	b	x	0	0	0	0	1	1	1	0	1	1	1	1	<table><tr><td>a</td><td>b</td><td>x</td></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>0</td></tr></table>	a	b	x	0	0	1	0	1	0	1	0	0	1	1	0	<table><tr><td>a</td><td>b</td><td>x</td></tr><tr><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td><td>1</td></tr><tr><td>1</td><td>0</td><td>1</td></tr><tr><td>1</td><td>1</td><td>0</td></tr></table>	a	b	x	0	0	0	0	1	1	1	0	1	1	1	0	<table><tr><td>a</td><td>b</td><td>x</td></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td></tr></table>	a	b	x	0	0	1	0	1	0	1	0	0	1	1	1	if a>b, x=1	if a<b, x=1
a	b	x																																																																																																
0	0	0																																																																																																
0	1	0																																																																																																
1	0	0																																																																																																
1	1	1																																																																																																
a	b	x																																																																																																
0	0	1																																																																																																
0	1	1																																																																																																
1	0	1																																																																																																
1	1	0																																																																																																
a	b	x																																																																																																
0	0	0																																																																																																
0	1	1																																																																																																
1	0	1																																																																																																
1	1	1																																																																																																
a	b	x																																																																																																
0	0	1																																																																																																
0	1	0																																																																																																
1	0	0																																																																																																
1	1	0																																																																																																
a	b	x																																																																																																
0	0	0																																																																																																
0	1	1																																																																																																
1	0	1																																																																																																
1	1	0																																																																																																
a	b	x																																																																																																
0	0	1																																																																																																
0	1	0																																																																																																
1	0	0																																																																																																
1	1	1																																																																																																

On/Off Delay:

The On Delay is the amount of time that the logical output status is delayed before changing to true. The Off Delay is the amount of time that the logical output status is delayed before changing to false.

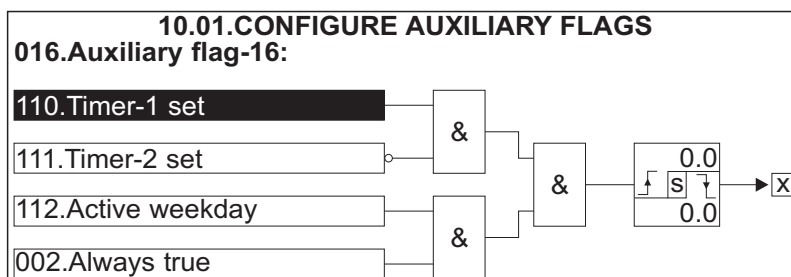
Output:

The Logic Controller outputs can be grouped into three types as “Configurable auxiliary flags”, “Unit configurable outputs” and “Configurable logic functions”.

1-) Configurable auxiliary flags:

These 16 auxiliary logical flags can be programmed to activate or deactivate logical functions. These flags can be used whenever for input commands are not enough or time delayed signals are required.

The “10.01.016.Auxiliary flag-16” logical output can be used like “Timer function” as follows;



2-) Unit configurable outputs:

There are 10 internal configurable outputs and 8 expansion I/O module configurable outputs.

If the “10.02.001.Configurable output-1” logical output becomes true, the unit configurable output-1 will be activated.

If the “10.02.002.Configurable output-2” logical output becomes true, the unit configurable output-2 will be activated.

If the “10.02.003.Configurable output-3” logical output becomes true, the unit configurable output-3 will be activated.

If the “10.02.004.Configurable output-4” logical output becomes true, the unit configurable output-4 will be activated.

If the “10.02.005.Configurable output-5” logical output becomes true, the unit configurable output-5 will be activated.

If the “10.02.006.Configurable output-6” logical output becomes true, the unit configurable output-6 will be activated.

If the “10.02.007.Configurable output-7” logical output becomes true, the unit configurable output-7 will be activated.

If the “10.02.008.Configurable output-8” logical output becomes true, the unit configurable output-8 will be activated.

If the “10.02.009.Configurable output-9” logical output becomes true, the unit configurable output-9 will be activated.

If the “10.03.001.Config. expansion output-1” logical output becomes true, the unit configurable expansion output-1 will be activated.

If the “10.03.002.Config. expansion output-2” logical output becomes true, the unit configurable expansion output-2 will be activated.

If the “10.03.003.Config. expansion output-3” logical output becomes true, the unit configurable expansion output-3 will be activated.

If the “10.03.004.Config. expansion output-4” logical output becomes true, the unit configurable expansion output-4 will be activated.

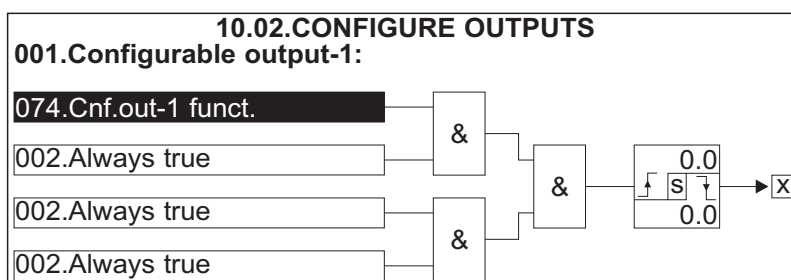
If the “10.03.005.Config. expansion output-5” logical output becomes true, the unit configurable expansion output-5 will be activated.

If the “10.03.006.Config. expansion output-6” logical output becomes true, the unit configurable expansion output-6 will be activated.

If the “10.03.007.Config. expansion output-7” logical output becomes true, the unit configurable expansion output-7 will be activated.

If the “10.03.008.Config. expansion output-8” logical output becomes true, the unit configurable expansion output-8 will be activated.

As factory default, the “10.02.001.Configurable output-1” logical output is programmed as configurable output-1 function (Fuel relay energised) as follows;



3-) Configurable logic functions:

Internal conditions such as “Changed mode to auto”, “Changed mode to test”, “Changed mode to manual”, “Changed mode to stop” and “Informed mains interruption”.

If the “10.04.004.Changed mode to auto” logical function becomes true, the unit operation mode will be changed to auto mode.

If the “10.04.005.Changed mode to test” logical function becomes true, the unit operation mode will be changed to test mode.

If the “10.04.006.Changed mode to manual” logical function becomes true, the unit operation mode will be changed to manual mode.

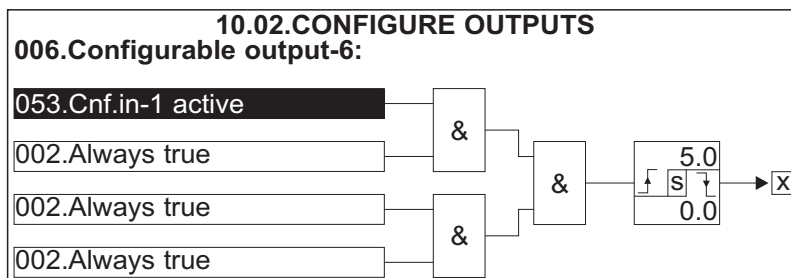
If the “10.04.007.Changed mode to stop” logical function becomes true, the unit operation mode will be changed to stop mode.

If the “10.04.008.Informed mains interruption” logical function becomes true, the gensets are started, synchronised with the mains supply and the load is transferred from the mains to the gensets with soft transferring.

Programming examples:

Example-1: If the configurable input-1 is active and if this situation continues for 5 seconds, the unit configurable output-6 will be active.

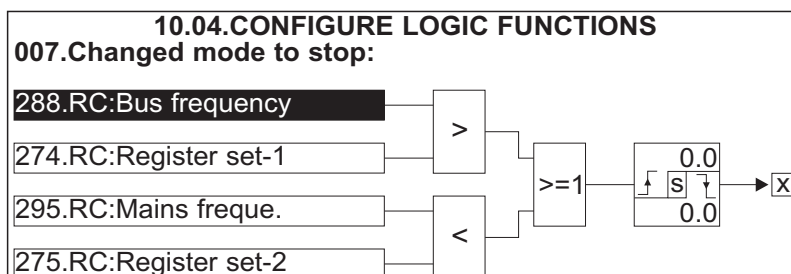
For this, the “10.02.006.Configurable output-6” logical output must be programmed as follows;




Example-2: In auto mode, if the bus frequency active value rises above 52.0Hz or if the mains frequency active value falls below 48.0Hz, the operation mode of the unit will change to stop mode.

For this;

- Set the “Program->Technician setting->10.Logic controller->06.General->001.Register set-1” parameter as “520”
- Set the “Program->Technician setting->10.Logic controller->06.General->002.Register set-2” parameter as “480”
- The “10.04.007.Changed mode to stop” logical function must be programmed as follows;



7. Specifications

Equipment use	: Electrical control equipment for generating sets.
Housing & Mounting	: 276 mm x 189 mm x 45 mm. (including connectors). Plastic housing for panel mounting.
Panel Cut-Out	: 223mm x 162mm.
Protection	: IP65 at front panel.
Weight	: Approximately 0,82 Kg.
Environmental rating	: Standard, indoor at an altitude of less then 2000 meters with non-condensing humidity.
Operating/Storage Temperature	: -20°C to +70°C / -30°C to +80°C
Operating/Storage Humidity	: 90 % max. (non-condensing)
Installation Over Volt. Category	: II Appliances, portable equipment
Pollution Degree	: II, Normal office or workplace, non conductive pollution
Mode of Operation	: Continuous.
DC Battery Supply Voltage	: 8 to 32 V _{DC} (Peak: 36 V _{DC}). Max. operating current is 860 mA.
Cranking Dropouts	: Battery voltage can be "0" VDC for max. 50 ms during cranking (battery voltage should be at least nominal voltage before cranking).
Battery Voltage Measurement	: 8 to 32 V _{DC} , Accuracy: 1 % FS, Resolution: 0,1 V
Busbar Voltage Measurement	: 3 to 300 VAC Ph-N, 5 to 99.9 Hz. Accuracy: 1 % FS, Resolution: 1 V.
Busbar Frequency	: 5 to 99.9Hz (min. 20 VAC Ph-N) Accuracy: 0,25 % FS, Resolution: 0,1 Hz.
Mains Voltage Measurement	: 3 to 300 VAC Ph-N, 5 to 99.9 Hz. Accuracy: 1 % FS, Resolution: 1 V.
Mains Frequency	: 5 to 99.9Hz (min. 20 VAC Ph-N) Accuracy: 0,25 % FS, Resolution: 0,1 Hz.
CT secondary	: 5A.
Communication interface	: USB programming and communication port, CanOpen, Ethernet, RS485.
Optional Expansion I/O Module	: Expansion I/O module including 8 inputs and 8 outputs.
Optional Comm. Modules	: GSM/GPRS and Web Server modules.
Relay Outputs	: Bus contactor relay output 8A at DC supply voltage Mains contactor relay output 8A at DC supply voltage
Transistor Outputs	: Configurable output-1 15A at DC supply voltage Configurable output-2 15A at DC supply voltage Configurable output-3,4,5,6,7,8,9 1A at DC supply voltage
Approvals	: 

8. Other Informations

Manufacturer Information:

Emko Elektronik Sanayi ve Ticaret A.Ş.
Demirtaş Organize Sanayi Bölgesi Karanfil Sk. No:6 16369
BURSA/TURKEY

Phone : +90 224 261 1900
Fax : +90 224 261 1912

Repair and maintenance service information:

Emko Elektronik Sanayi ve Ticaret A.Ş.
Demirtaş Organize Sanayi Bölgesi Karanfil Sk. No:6 16369
BURSA/TURKEY
Phone : +90 224 261 1900
Fax : +90 224 261 1912



Thank you very much for your preference to use Emko Elektronik Products.

www.emkoelektronik.com.tr