



TRANS-AMF.SYNCRO

AUTOMATIC GEN-SET CONTROLLER WITH TRANSFER SWITCHING & LOAD SHARING

1. Introduction

1.1 General Specifications

TRANS-AMF.SYNCRO is a synchronising & automatic mains failure unit for diesel, gas or gasoline generators.

The unit is designed to synchronise the one genset with the one mains supply. The unit controls the change over from mains supply to genset supply or runs genset in parallel with the mains to provide no-break, peak lopping and peak shaving power solutions.

General Specifications:

- Mains voltages and frequency measurements
- Generator voltages and frequency measurements
- Peak lopping (mains or genset)
- Power export to mains
- Mains de-coupling protection with R.O.C.O.F and vector shift methods
- Manual voltage/frequency adjustment
- Direct/Reverse Governor and AVR control
- Auto adjust feature for Governor and AVR
- Volts, frequency and phase matching
- Synchroscope display
- Logic Controller functionality for PLC
- Black or gray theme selection for 4.3" TFT LCD screen

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.

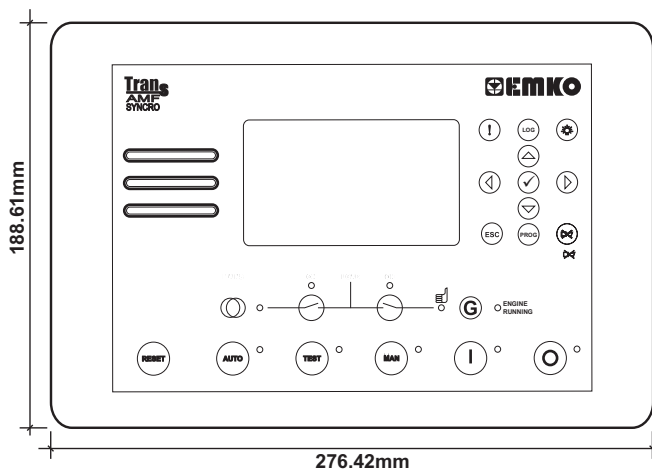


Figure 2.1 Front View

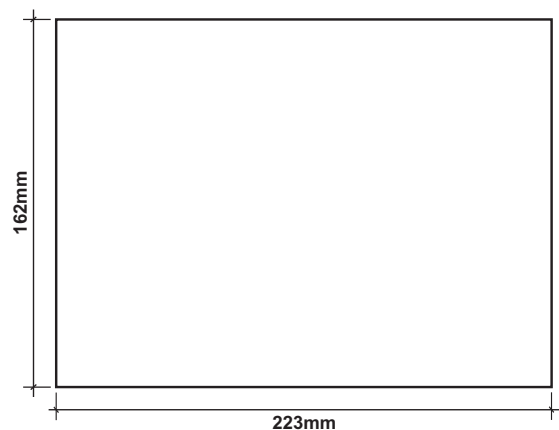
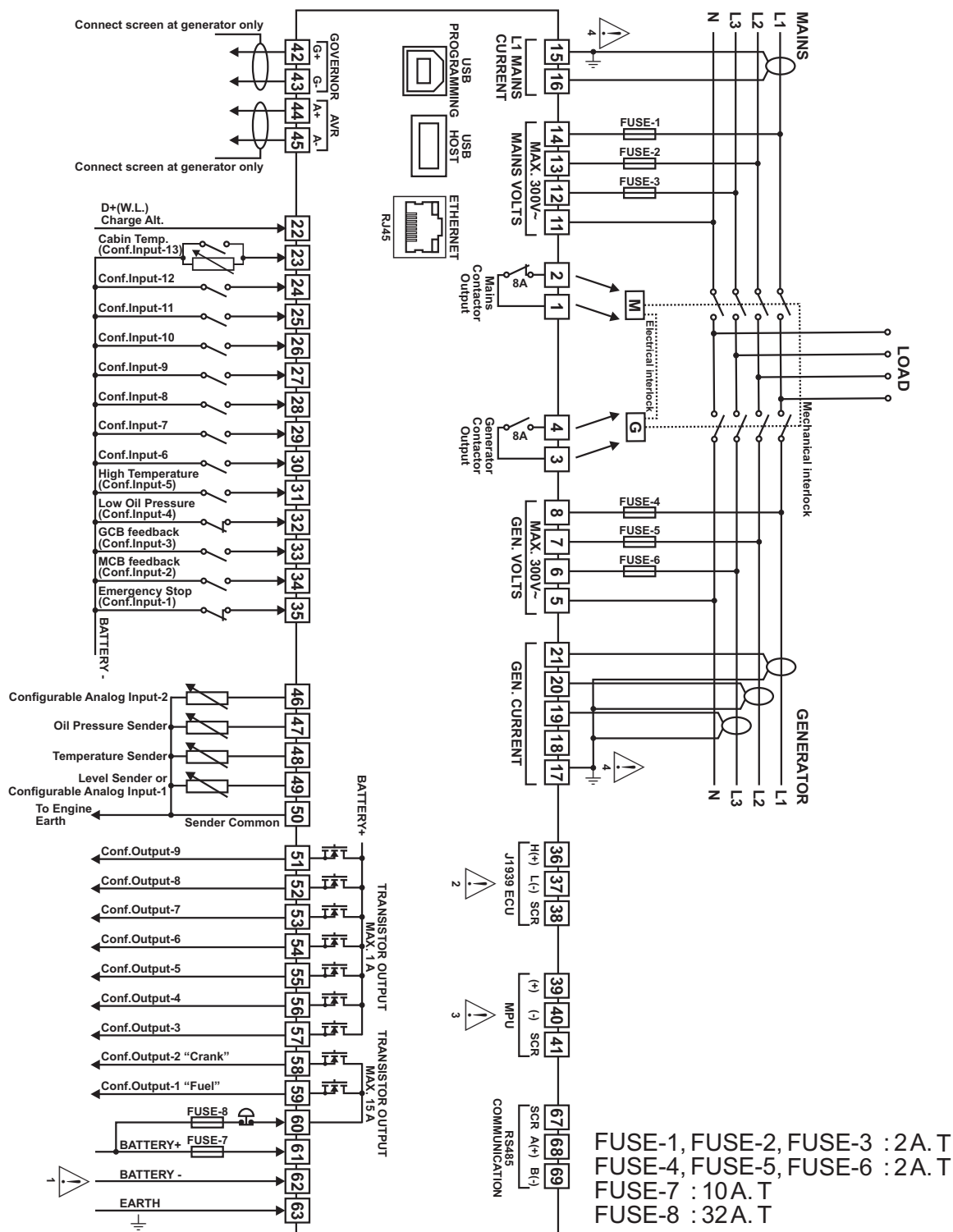


Figure 2.2 Panel Cut-Out

2.3 Electrical Connection

TRANS-AMF.SYNCRO three phase connections schematic



1- Connect the unit as shown in the appropriate diagram. Be sure to connect the battery supply the right way round. External fuse is recommended. Stranded cable cross section: 1,5mm², Solid cable cross section: 2,5mm², The stripping length is 7 to 9 mm. Supply cables must comply with the requirements of IEC 60277 or IEC 60245.

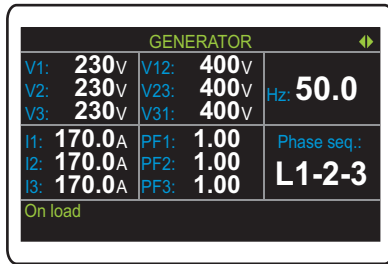
2- The CAN interface requires that a 120 Ohms terminator is fitted to each end of the communications link. This termination resistor is fitted internally into the unit. So it is not required externally. Screened cable must be used for connecting the CAN, ensuring that the screen is grounded at one end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

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

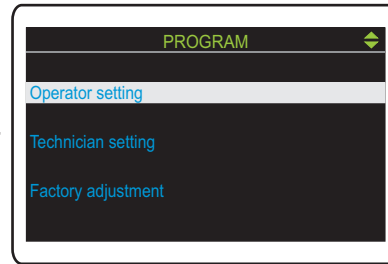
4- Current transformers secondary should be grounded. The CT of 5VA is recommended. The unit has a burden of 0.5VA on the CT.

3. Changing And Saving Parameters Values

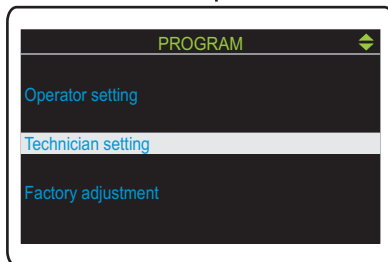
Operation Screen



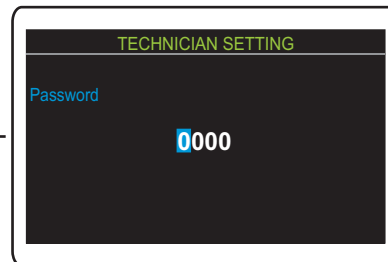
When the Prog button is pressed, the parameters section is asked for accessing to parameters.



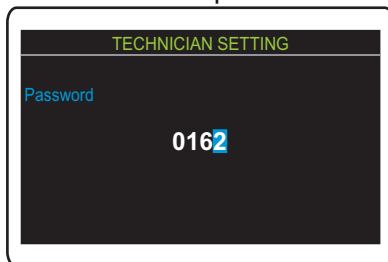
Press the Up or Down buttons to select the section you wish to view/change.



Press the Enter button.

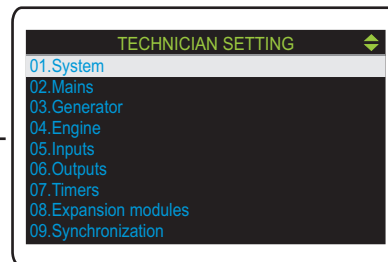


Enter password with cursor (Right, Left, Up and Down) buttons.

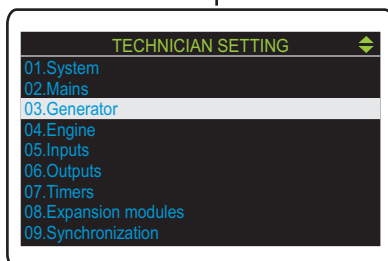


Note1: If Enter button is pressed and the technician password is zero, Password screen is ignored.

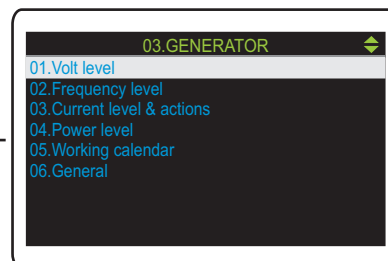
Press the Enter button to confirm password. If the password is incorrect, the unit will drop out of program mode.



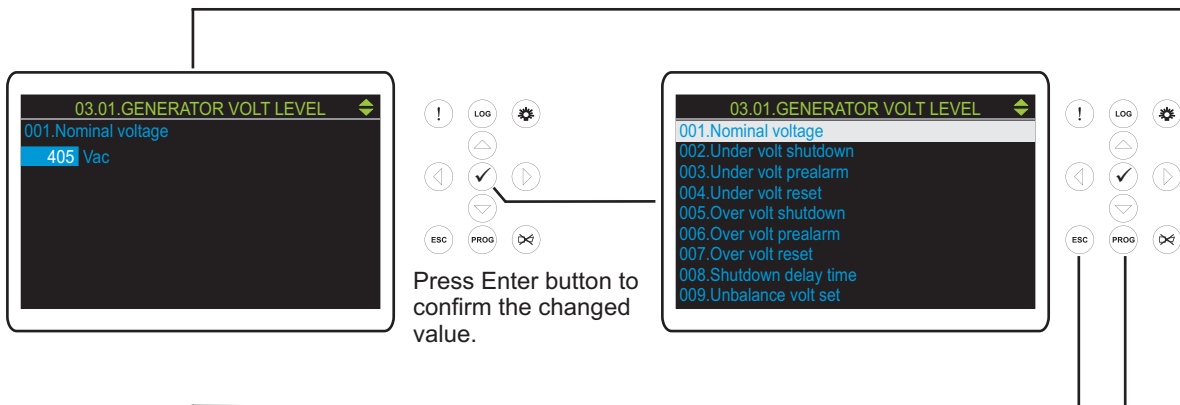
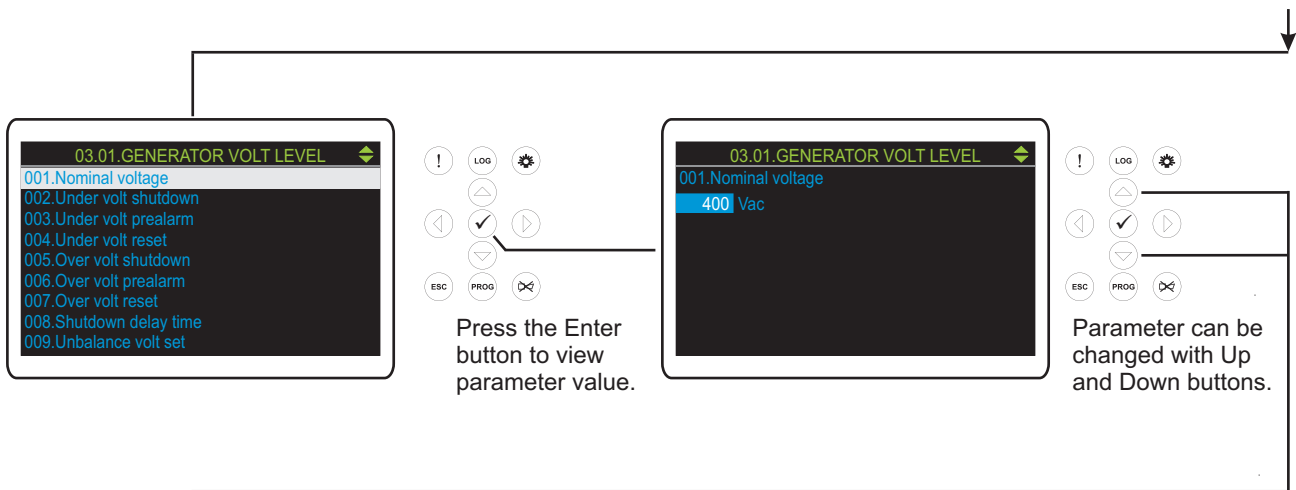
Press the Up or Down buttons to select the main parameter group you wish to view/change.



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

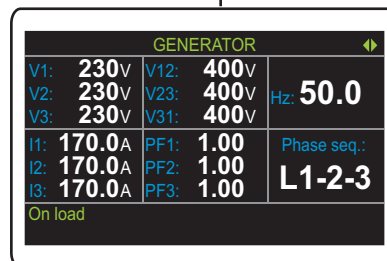
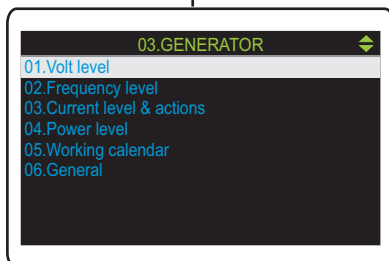


Press Enter button to access to all parameters in currently parameter page.



When the Escape button is pressed any time, previous page can be accessed.

To exit from programming mode any time, press Prog button.



Operation Screen

4. Parameters

4.1 Operator Parameters

4.1.1 Mains

02.01.MAIN S 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~

02.02.MAIN S 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

4.1.2 Generator

03.01.GENERATOR VOLT LEVEL (<i>Generator->Volt level</i>)		Min	Max	Default	Unit
001.Nominal voltage	Nominal Voltage	60	600	400	V~
002.Under volt shutdown	Under Voltage Shutdown	60(dis)	600	320	V~
003.Under volt prealarm	Under Voltage Pre-Alarm	60(dis)	600	340	V~
004.Under volt reset	Under Voltage Pre-Alarm Reset	60	600	350	V~
005.Over volt shutdown	Over Voltage Shutdown	60	600	470	V~
006.Over volt prealarm	Over Voltage Pre-Alarm	60(dis)	600	450	V~
007.Over volt reset	Over Voltage Pre-Alarm Reset	60	600	430	V~
008.Shutdown delay time	Voltage Shutdown Delay Time	0.0	10.0	2.0	Sec
009.Unbalance volt set	Unbalance Volt Set	0	230	20	V~

03.02.GENERATOR FREQ LEVEL (<i>Generator->Frequency level</i>)		Min	Max	Default	Unit
001.Nominal frequency	Nominal Alternator Frequency	30.0	75.0	50.0	Hz
002.Under freq shutdown	Under Frequency Shutdown	30.0(dis)	75.0	43.0	Hz
003.Under freq prealarm	Under Frequency Pre-Alarm	30.0(dis)	75.0	45.0	Hz
004.Under freq reset	Under Frequency Pre-Alarm Reset	30.0	75.0	46.0	Hz
005.Over freq shutdown	Over Frequency Shutdown	30.0(dis)	75.0	58.0	Hz
006.Over freq prealarm	Over Frequency Pre-Alarm	30.0(dis)	75.0	55.0	Hz
007.Over freq reset	Over Frequency Pre-Alarm Reset	30.0	75.0	54.0	Hz
008.Shutdown delay time	Frequency Shutdown Delay Time	0.0	10.0	2.0	Sec

03.03.GENERATOR CUR LEVEL (<i>Generator->Current level</i>)		Min	Max	Default	Unit
001.Under current set	Under Current Set	0	9999	1	A~
002.Under current prealarm	Under Current Pre-Alarm	0(dis)	9999	dis	A~
003.Under current prealarm reset	Under Current Pre-Alarm Reset	0	9999	5	A~
006.Over current set	Over Current Set	0	9999	9999	A~
007.Over current prealarm	Over Current Pre-Alarm	0(dis)	9999	dis	A~
008.Over current prealarm reset	Over Current Pre-Alarm Reset	0	9999	0	A~
012.Earth fault current set	Earth Fault Current Set	0	9999	100	A~
015.Unbalance load set	Unbalance Load Set	0	9999	0	A~

03.04.GEN POWER LEVEL (Generator->Power level)		Min	Max	Default	Unit
001.Under power set	Under Power Set	0	9999	0	kVA
002.Under power prealarm	Under Power Pre-Alarm	0(dis)	9999	dis	kVA
003.Under power reset	Under Power Pre-Alarm Reset	0	9999	5	kVA
006.Over power set	Over Power Set	0	9999	0	kVA
007.Over power prealarm	Over Power Pre-Alarm	0(dis)	9999	dis	kVA
008.Over power reset	Over Power Pre-Alarm Reset	0	9999	0	kVA
011.Reverse power set	Reverse Power Set	-9999	0	-30	kW
014.Excitation loss set	Excitation Loss Set	-9999	0	-100	KVAr

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	23.59	H.Min
004.Start time on Tuesday	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	23.59	H.Min
006.Start time on Wednesday	Calendar Start Time on Wednesday	0.00	23.59	0.00	H.Min
007.Stop time on Wednesday	Calendar Stop Time on Wednesday	0.00	23.59	23.59	H.Min
008.Start time on Thursday	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	23.59	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	23.59	H.Min
012.Start time on Saturday	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	23.59	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	23.59	H.Min

Note: dis = disable

4.2 Technician Parameters

4.2.1 System

01.01.SYSTEM NETWORK (System->Network)		Min	Max	Default	Unit
001.Mains CT ratio	Mains Current Transformer Ratio	1	9999	100	
002.Generator CT ratio	Gen. Current Transformer Ratio	1	9999	100	
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.Generator kVA rating	Generator kVA rating	0	9999	150	kVA
007.Power unit	Power unit	kVA/kW		kVA	
008.Mains kW rating	Mains kW Rating	0	9999	300	kW
009.Mains current input	0- Mains current 1- Earth current	0	1	0	

01.02.BREAKERS (System->Breakers)		Min	Max	Default	Unit
001.Type of Breaker	Hardware Breaker Selection: 0-Breakers 1-User Configured 2-Motorised Breakers (Compact Type) 3-Motorised Breakers (Open Type)	0	3	0	
002.Gen.close breaker cont.type	Gen. Close Breaker Contact Type	NO / NC		NO	
003.Gen.close breaker relay type	Gen. Close Breaker Relay Type	NOR / PULS		0	
004.Generator close timer	Generator Close Timer	1	250	5	Sec
005.Gen.open breaker relay type	Gen. Open Breaker Relay Type	NOR / PULS		0	
006.Generator open timer	Generator 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	

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	30	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	1	

Notes: NO / NC : Normally Open / Normally Close
 NOR / PULS : Normal / Pulse
 dis = disable

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

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	

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	0.1	999.9	1.0	Min

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		

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	

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	

Note: dis = disable

01.10.ETHERNET SETTINGS (System->Ethernet settings)		Min	Max	Default	Unit
001.Tcp client mode	Tcp Client Mode	ENABL/DISBL		DISBL	
002.ModBus protocol	ModBus Protocol Selection	ASCII, RTU, TCP		ASCII	
003.IP address byte1	IP Address Byte1	0	255	192	
004.IP address byte2	IP Address Byte2	0	255	168	
005.IP address byte3	IP Address Byte3	0	255	12	
006.IP address byte4	IP Address Byte4	0	255	8	
007.Subnet mask byte1	Subnet Mask Byte1	0	255	255	
008.Subnet mask byte2	Subnet Mask Byte2	0	255	255	
009.Subnet mask byte3	Subnet Mask Byte3	0	255	255	
010.Subnet mask byte4	Subnet Mask Byte4	0	255	0	
011.Gateway address byte1	Gateway Address Byte1	0	255	192	
012.Gateway address byte2	Gateway Address Byte2	0	255	168	
013.Gateway address byte3	Gateway Address Byte3	0	255	0	
014.Gateway address byte4	Gateway Address Byte4	0	255	1	
015.DNS address byte1	DNS Address Byte1	0	255	8	
016.DNS address byte2	DNS Address Byte2	0	255	8	
017.DNS address byte3	DNS Address Byte3	0	255	8	
018.DNS address byte4	DNS Address Byte4	0	255	8	
019.Device TCP port	Device TCP Port	1	65535	3500	
020.SNMP enable	SNMP Enable Selection	ENABL/DISBL		DISBL	
021.SNMP port	SNMP Port	1	65535	161	
022.SNMP trap port	SNMP Trap Port	1	65535	162	
023.SNMP trap server address byte1	SNMP Trap Server Addr. Byte1	0	255	192	
024.SNMP trap server address byte2	SNMP Trap Server Addr. Byte2	0	255	168	
025.SNMP trap server address byte3	SNMP Trap Server Addr. Byte3	0	255	12	
026.SNMP trap server address byte4	SNMP Trap Server Addr. Byte4	0	255	1	

4.2.2 Mains

02.01.MAINS VOLT LEVEL (Mains->Volt level)		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~

02.02.MAINS FREQ. LEVEL (Mains->Frequency level)		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

02.03.MAINS ACTIONS (Mains->Actions)		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	

Note: dis = disable

4.2.3 Generator

03.01.GENERATOR VOLT LEVEL (<i>Generator->Volt level</i>)		Min	Max	Default	Unit
001.Nominal voltage	Nominal Voltage	60	600	400	V~
002.Under volt shutdown	Under Voltage Shutdown	60(dis)	600	320	V~
003.Under volt prealarm	Under Voltage Pre-Alarm	60(dis)	600	340	V~
004.Under volt reset	Under Voltage Pre-Alarm Reset	60	600	350	V~
005.Over volt shutdown	Over Voltage Shutdown	60	600	470	V~
006.Over volt prealarm	Over Voltage Pre-Alarm	60(dis)	600	450	V~
007.Over volt reset	Over Voltage Pre-Alarm Reset	60	600	430	V~
008.Shutdown delay time	Voltage Shutdown Delay Time	0.0	10.0	2.0	Sec
009.Unbalance volt set	Unbalance Volt Set	0	230	20	V~
010.Unbalance volt actions	Unbalance Volt Actions: 0- Disable, 1- Warning, 2- Electrical Trip, 3- Shutdown.	0(dis)	3	dis	
011.Unbalance volt actions delay	Unbalance Volt Actions Delay Time	0	99	2	Sec

03.02.GENERATOR FREQ LEVEL (<i>Generator->Frequency level</i>)		Min	Max	Default	Unit
001.Nominal frequency	Nominal Alternator Frequency	30.0	75.0	50.0	Hz
002.Under freq shutdown	Under Frequency Shutdown	30.0(dis)	75.0	43.0	Hz
003.Under freq prealarm	Under Frequency Pre-Alarm	30.0(dis)	75.0	45.0	Hz
004.Under freq reset	Under Frequency Pre-Alarm Reset	30.0	75.0	46.0	Hz
005.Over freq shutdown	Over Frequency Shutdown	30.0(dis)	75.0	58.0	Hz
006.Over freq prealarm	Over Frequency Pre-Alarm	30.0(dis)	75.0	55.0	Hz
007.Over freq reset	Over Frequency Pre-Alarm Reset	30.0	75.0	54.0	Hz
008.Shutdown delay time	Frequency Shutdown Delay Time	0.0	10.0	2.0	Sec

Note: dis = disable

03.03.GEN CUR LEVEL & ACT (Generator->Current level & act.)		Min	Max	Default	Unit
001.Under current set	Under Current Set	0	9999	1	A~
004.Under current actions	Under Current Actions 0 - Disable 1 - Warning 2 - Electrical Trip 3 - Shutdown	0(dis)	3	dis	
005.Under current actions delay	Under Current Actions Delay Time	0	99	2	Sec
002.Under current prealarm	Under Current Pre-Alarm	0(dis)	9999	dis	A~
003.Under current prealarm reset	Under Current Pre-Alarm Reset	0	9999	5	A~
018.Under current prealarm delay	Under Current Pre-Alarm Delay Time	0	99	2	Sec
019.Over current IDMT alarm	Over Current IDMT Alarm	ENABL/DISBL		DISBL	
006.Over current set	Over Current Set	0	9999	9999	A~
009.Over current actions	Over Current Actions 0 - Disable 1 - Warning 2 - Electrical Trip 3 - Shutdown	0(dis)	3	2	
010.Over current actions delay	Over Current Actions Delay Time	0	99	5	Sec
020.Over current 51VR alarm	Over Current 51VR Alarm	ENABL/DISBL		DISBL	
021.Over current 51VR volt start	Over Current 51VR Volt Start	5.0	100.0	95.0	%
022.Over current 51VR volt stop	Over Current 51VR Volt Stop	5.0	100.0	25.0	%
023.Over current 51VR min. factor	Over Current 51VR Minimum Factor	5.0	100.0	25.0	%
007.Over current prealarm	Over Current Pre-Alarm	0(dis)	9999	dis	A~
008.Over current prealarm reset	Over Current Pre-Alarm Reset	0	9999	0	A~
024.Over current prealarm delay	Over Current Pre-Alarm Delay Time	0	99	5	Sec
011.Short circuit current	Short Circuit Current Set	0	9999	9999	A~
025.Earth fault current IDMT alarm	Earth Fault Current IDMT Alarm	ENABL/DISBL		DISBL	
012.Earth fault current set	Earth Fault Current Set	0	9999	100	A~
013.Earth fault current actions	Earth Fault Current Actions 0 - Disable 1 - Warning 2 - Electrical Trip 3 - Shutdown	0(dis)	3	dis	
014.E.F. current actions delay	Earth Fault Current Actions Delay Time	0	99	2	Sec
015.Unbalance load set	Unbalance Load Set	0	9999	0	A~
016.Unbalance load actions	Unbalance Load Actions 0 - Disable 1 - Warning 2 - Electrical Trip 3 - Shutdown	0(dis)	3	dis	
017.Unbalance load actions delay	Unbalance Load Actions Delay Time	0	99	2	Sec

Note: dis = disable

03.04.GEN POWER LEVEL (Generator->Power level)		Min	Max	Default	Unit
001.Under power set	Under Power Set	0	9999	0	kVA
002.Under power prealarm	Under Power Pre-Alarm	0(dis)	9999	dis	kVA
003.Under power reset	Under Power Pre-Alarm Reset	0	9999	5	kVA
004.Under power actions	Under Power Actions 0 - Disable 1 - Warning 2 - Electrical Trip 3 - Shutdown	0(dis)	3	0(dis)	
005.Under actions delay time	Under Power Action Delay Time	0	99	2	Sec
006.Over power set	Over Power Set	0	9999	0	kVA
007.Over power prealarm	Over Power Pre-Alarm	0(dis)	9999	dis	kVA
008.Over power reset	Over Power Pre-Alarm Reset	0	9999	0	kVA
009.Over power actions	Over Power Actions 0 - Disable 1 - Warning 2 - Electrical Trip 3 - Shutdown	0(dis)	3	0(dis)	
010.Over actions delay time	Over Power Action Delay Time	0	99	2	Sec
011.Reverse power set	Reverse Power Set	-9999	0	-30	kW
012.Reverse power actions	Reverse Power Actions 0 - Disable 1 - Warning 2 - Electrical Trip 3 - Shutdown	0(dis)	3	2	
013.Reverse power act.delay time	Reverse Power Action Delay Time	0	99	6	Sec
014.Excitation loss set	Excitation Loss Set	-9999	0	-100	KVAr
015.Excitation loss actions	Excitation Loss Actions 0 - Disable 1 - Warning 2 - Electrical Trip 3 - Shutdown	0(dis)	3	0(dis)	
016.Excitation loss act.delay time	Excitation Loss Action Delay Time	0	99	2	Sec

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	23.59	H.Min
004.Start time on Tuesday	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	23.59	H.Min
006.Start time on Wednesday	Calendar Start Time on Wednesday	0.00	23.59	0.00	H.Min
007.Stop time on Wednesday	Calendar Stop Time on Wednesday	0.00	23.59	23.59	H.Min
008.Start time on Thursday	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	23.59	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	23.59	H.Min
012.Start time on Saturday	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	23.59	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	23.59	H.Min

03.06.GENERATOR GENERAL (Generator->General)		Min	Max	Default	Unit
001.Sensing option gen.frequency	Sensing Opt Generator Frq En/Dis	ENABL/DISBL		ENABL	
002.Sensing option pickup&flywheel	Sensing Opt Pickup En/Dis&Flywheel	0(dis)	1000	DISBL	
003.All warning are latch	All Warnings Are Latched En/Dis	ENABL/DISBL		DISBL	

Note: dis = disable

4.2.4 Engine

04.01.ENGINE START OPTIONS (<i>Engine->Starting options</i>)		Min	Max	Default	Unit
001.Horn prior to start	Audible Alarm Prior To Starting	ENABL/DISBL		DISBL	
002.Number of start attempts	Number Of Start Attempts	1	10	3	
003.Cranking time	Cranking Time	1	99	5	Sec
004.Crank rest time	Crank Rest Time	5	99	10	Sec
005.Pickup fail delay	Pickup Sensor Fail Delay	0.1	10.0	3.0	Sec

04.02.ENG.CRANK DISCONNECT(<i>Engine->Crank disconnect</i>)		Min	Max	Default	Unit
001.Generator frequency	Generator Frequency	10.0	75.0	30.0	Hz
002.Engine speed	Engine RPM	100	6000	500	RPM
003.Generator volt	Generator Voltage	60 (dis)	600	300	V~
004.Alternator charge volt	Charge Alternator Voltage	6.0 (dis)	30.0	dis	V---
005.Oil pressure enable/disable	Oil Pressure Enable/Disable	ENABL/DISBL		DISBL	
006.Oil pressure value	Oil Pressure Value	1.0	30.0	1.0	BAR
007.Check oil press. before start	Check Oil Pressure Before Start	ENABL/DISBL		ENABL	

04.03.ENGINE SPEED SETS (<i>Engine->Speed settings</i>)		Min	Max	Default	Unit
001.Nominal speed	Nominal Speed	500	5000	1500	RPM
002.Under speed shutdown	Under Speed Shutdown	500(dis)	5000	dis	RPM
003.Under speed prealarm	Under Speed Prealarm	500(dis)	5000	dis	RPM
004.Under speed reset	Under Speed Prealarm Reset	500	5000	500	RPM
005.Over speed shutdown	Over Speed Shutdown	500(dis)	5000	dis	RPM
006.Over speed prealarm	Over Speed Prealarm	500(dis)	5000	dis	RPM
007.Over speed reset	Over Speed Prealarm Reset	500	5000	500	RPM
008.Shutdown delay time	Speed Shutdown Delay Time	0.0	10.0	2.0	Sec

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	2.0	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	2.0	Sec
007.Alternator charge warning	Charge Alternator Warning	6.0(dis)	30.0	dis	V---

Note: dis = disable

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

Note: dis = disable

04.06.CANBUS ERROR SET (Engine->CanBus error set)		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
004.Amber warning actions	J1939 Amber Warning Lamp Actions: 0- Disable 1- Warning Non-Latching 2- Warning 3- Electrical Trip 4- Shutdown	0(dis)	4	0	
005.Amber warning activation	J1939 Amber Warning Lamp Activation: 0- Active From Starting 1- Active From Safety On 2- Always Active	0	2	2	
006.Amber warning delay	J1939 Amber Warning Lamp Delay	0	250	2	Sec
007.Red stop actions	J1939 Red Stop Lamp Actions: 0- Disable 1- Warning Non-Latching 2- Warning 3- Electrical Trip 4- Shutdown	0(dis)	4	0	
008.Red stop activation	J1939 Red Stop Lamp Activation: 0- Active From Starting 1- Active From Safety On 2- Always Active	0	2	2	
009.Red stop delay	J1939 Red Stop Lamp Delay	0	250	2	Sec

Note: dis = disable

04.07.ENGINE MAINTENANCE (Engine->Maintenance)		Min	Max	Default	Unit
001.Running hours interval	Running Hours Interval	0(dis)	9999	5000	Hour
002.Maintenance date interval	Maintenance Date Interval	0(dis)	12	6	Month
003.Engine stop when maintenance	Shutdown When Maintenance Is Due	ENABL/DISBL		DISBL	
004.Engine running hour	Engine Running Hour	0	30000	0	
007.Maintenance okay	Maintenance Okay	YES/NO		NO	

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

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 tuesday	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 wednesday	Exercise Start Time on Wednesday	0.00	23.59	0.00	H.Min
007.Stop time on wednesday	Exercise Stop Time on Wednesday	0.00	23.59	0.00	H.Min
008.Start time on thursday	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 saturday	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

04.10.ENGINE GENERAL (Engine->General)		Min	Max	Default	Unit
001.Fuel selection	Engine Fuel Selection	0-GAS 1-DIESEL 2-GASOLINE		1-DIESEL	
002.Stop solenoid time	Stop Solenoid Time	1	99	20	Sec
003.Ignition delay	Ignition Delay	1	99	5	Sec
004.Gas valve delay	Gas Valve Delay	1	99	5	Sec
005.Minimum ignition speed	Minimum Ignition Speed	10	1500	200	RPM
006.Choke time	Choke Time	0.0	30.0	0.8	Sec

Note: dis = disable

4.2.5 Inputs

05.01.SENDER INPUTS (Inputs->Sender inputs)		Min	Max	Default	Unit
001.Oil pressure unit	Oil Pressure Unit	BAR/PSI/KPA		BAR	
002.Oil pressure input type	Oil Pressure Input Type	0 - Not Used (Disable) 1 - Digital NC 2 - Digital NO 3 - VDO 5 BAR 4 - VDO 7 BAR 5 - VDO 10 BAR 6 - DATCON 5 BAR 7 - DATCON 7 BAR 8 - MURPHY 7 BAR 9 - User Configured		0 (dis)	
003.Oil pressure prealarm	Oil Pressure Pre-Alarm	0.0 (dis)	30.0	1.2	BAR
004.Oil pressure reset	Oil Pressure Pre-Alarm Reset	0.0	30.0	1.4	BAR
005.Oil pressure shutdown	Oil Pressure Shutdown	0.0	30.0	1.0	BAR
006.Temperature unit	Coolant Temp. Unit	°C/°F		°C	
007.Temperature input type	Coolant Temperature Input Type	0 - Not Used (Disable) 1 - Digital NC 2 - Digital NO 3 - VDO 120 °C 4 - VDO 150 °C 5 - DATCON 6 - MURPHY 7 - PT100 8 - User Configured		0 (dis)	
008.Temperature sensor break	Temp. Sensor Break	0 - Disable 1 - Enable From Safety On (3min. delayed) 2 - Always Enable		0 (dis)	
009.High temperature prealarm	High Temp. Pre-Alarm	0 (dis)	300	90	°C
010.High temperature reset	High Temperature Pre-Alarm Reset	0	300	88	°C
011.High temperature shutdown	High Temp. Shutdown	0	300	95	°C
012.Low temperature warning	Low Temp. Warning	0 (dis)	70	0 (dis)	°C
013.Heater control ON	Coolant Heater Control On	0 (dis)	300	0 (dis)	°C
014.Heater control OFF	Coolant Heater Control Off	0	300	45	°C
015.Water pump on time	Water Pump On Time	0	9999	5	Sec
016.Water pump off time	Water Pump Off Time	0	9999	5	Sec
017.Conf. AI1 unit	Conf. Analog Input-1 Unit	BAR/PSI/KPA/°C/°F/%/Lt		%	
018.Conf. AI1 type	Configurable Analog Input-1 Type	0 - Not Used (Disable) 1 - Digital NC 2 - Digital NO 3 - VDO OHM (10-180) 4 - VDO TUBE (90-0) 5 - US OHM (240-33) 6 - EMS OHM (0-190) 7 - FORD (73-10) 8 - User Configured		0 (dis)	
019.Conf. AI1 low prealarm	Configurable Analog Input-1 Low Pre-Alarm	0 (dis)	3000	0 (dis)	%

020.Conf. AI1 low reset	Configurable Analog Input-1 Low Reset	0	3000	60	%
021.Conf. AI1 low shutdown	Configurable Analog Input-1 Low Shutdown	0 (dis)	3000	0 (dis)	%
022.Conf. AI1 high prealarm	Configurable Analog Input-1 High Pre-Alarm	0 (dis)	3000	0 (dis)	%
023.Conf. AI1 high reset	Configurable Analog Input-1 High Reset	0	3000	90	%
024.Conf. AI1 high shutdown	Configurable Analog Input-1 High Shutdown	0 (dis)	3000	0 (dis)	%
025.Conf. AI1 control ON	Configurable Analog Input-1 control ON	0 (dis)	3000	0 (dis)	%
026.Conf. AI1 control OFF	Configurable Analog Input-1 control OFF	0	3000	75	%
027.Conf. AI2 unit	Conf. Analog Input-2 Unit	BAR/PSI/KPA/°C/°F/%/Lt			°C
028.Conf. AI2 type	Configurable Analog Input-2 Type	0 - Not Used (Disable) 1 - Digital NC 2 - Digital NO 3 - VDO 120 °C 4 - VDO 150 °C 5 - DATCON 6 - MURPHY 7 - PT100 8 - User Configured			0 (dis)
029.Conf. AI2 low prealarm	Configurable Analog Input-2 Low Pre-Alarm	0 (dis)	300	0 (dis)	°C
030.Conf. AI2 low reset	Configurable Analog Input-2 Low Reset	0	300	60	°C
031.Conf. AI2 low shutdown	Configurable Analog Input-2 Low Shutdown	0 (dis)	300	0 (dis)	°C
032.Conf. AI2 high prealarm	Configurable Analog Input-2 High Pre-Alarm	0 (dis)	300	0 (dis)	°C
033.Conf. AI2 high reset	Configurable Analog Input-2 High Reset	0	300	90	°C
034.Conf. AI2 high shutdown	Configurable Analog Input-2 High Shutdown	0 (dis)	300	0 (dis)	°C
035.Conf. AI2 control ON	Configurable Analog Input-2 control ON	0 (dis)	300	0 (dis)	°C
036.Conf. AI2 control OFF	Configurable Analog Input-2 control OFF	0	300	75	°C

Note: dis = disable

05.02.SENDER LINEARISATION (<i>Inputs->Sender linearisation</i>)		Min	Max	Default	Unit
001.Oil pressure sender 1	Oil Pressure Sender Point-1	0	1300	15	R
002.Oil pressure 1	Oil Pressure Point-1	0.0	30.0	0.0	BAR
003.Oil pressure sender 2	Oil Pressure Sender Point-2	0	1300	31	R
004.Oil pressure 2	Oil Pressure Point-2	0.0	30.0	1.0	BAR
005.Oil pressure sender 3	Oil Pressure Sender Point-3	0	1300	49	R
006.Oil pressure 3	Oil Pressure Point-3	0.0	30.0	2.0	BAR
007.Oil pressure sender 4	Oil Pressure Sender Point-4	0	1300	66	R
008.Oil pressure 4	Oil Pressure Point-4	0.0	30.0	3.0	BAR
009.Oil pressure sender 5	Oil Pressure Sender Point-5	0	1300	85	R
010.Oil pressure 5	Oil Pressure Point-5	0.0	30.0	4.0	BAR
011.Oil pressure sender 6	Oil Pressure Sender Point-6	0	1300	101	R
012.Oil pressure 6	Oil Pressure Point-6	0.0	30.0	5.0	BAR
013.Oil pressure sender 7	Oil Pressure Sender Point-7	0	1300	117	R
014.Oil pressure 7	Oil Pressure Point-7	0.0	30.0	6.0	BAR
015.Oil pressure sender 8	Oil Pressure Sender Point-8	0	1300	132	R
016.Oil pressure 8	Oil Pressure Point-8	0.0	30.0	7.0	BAR
017.Oil pressure sender 9	Oil Pressure Sender Point-9	0	1300	149	R
018.Oil pressure 9	Oil Pressure Point-9	0.0	30.0	8.0	BAR
019.Oil pressure sender 10	Oil Pressure Sender Point-10	0	1300	178	R
020.Oil pressure 10	Oil Pressure Point-10	0.0	30.0	10.0	BAR
021.Temperature sender 1	Temperature Sender Point-1	0	1300	579	R
022.Temperature 1	Temperature Point-1	0	300	28	°C
023.Temperature sender 2	Temperature Sender Point-2	0	1300	404	R
024.Temperature 2	Temperature Point-2	0	300	35	°C
025.Temperature sender 3	Temperature Sender Point-3	0	1300	342	R
026.Temperature 3	Temperature Point-3	0	300	40	°C
027.Temperature sender 4	Temperature Sender Point-4	0	1300	250	R
028.Temperature 4	Temperature Point-4	0	300	50	°C
029.Temperature sender 5	Temperature Sender Point-5	0	1300	179	R
030.Temperature 5	Temperature Point-5	0	300	60	°C
031.Temperature sender 6	Temperature Sender Point-6	0	1300	136	R
032.Temperature 6	Temperature Point-6	0	300	70	°C
033.Temperature sender 7	Temperature Sender Point-7	0	1300	103	R
034.Temperature 7	Temperature Point-7	0	300	80	°C
035.Temperature sender 8	Temperature Sender Point-8	0	1300	77	R
036.Temperature 8	Temperature Point-8	0	300	90	°C
037.Temperature sender 9	Temperature Sender Point-9	0	1300	67	R
038.Temperature 9	Temperature Point-9	0	300	95	°C
039.Temperature sender 10	Temperature Sender Point-10	0	1300	63	R
040.Temperature 10	Temperature Point-10	0	300	98	°C
041.Conf. AI1 sender 1	Conf. Analog Input-1 Sender Point-1	0	1300	10	R
042.Conf. AI1 value 1	Conf. Analog Input-1 Point-1	0	3000	0	%
043.Conf. AI1 sender 2	Conf. Analog Input-1 Sender Point-2	0	1300	30	R
044.Conf. AI1 value 2	Conf. Analog Input-1 Point-2	0	3000	11	%
045.Conf. AI1 sender 3	Conf. Analog Input-1 Sender Point-3	0	1300	50	R
046.Conf. AI1 value 3	Conf. Analog Input-1 Point-3	0	3000	22	%
047.Conf. AI1 sender 4	Conf. Analog Input-1 Sender Point-4	0	1300	70	R
048.Conf. AI1 value 4	Conf. Analog Input-1 Point-4	0	3000	33	%
049.Conf. AI1 sender 5	Conf. Analog Input-1 Sender Point-5	0	1300	90	R
050.Conf. AI1 value 5	Conf. Analog Input-1 Point-5	0	3000	44	%

051.Conf. AI1 sender 6	Conf. Analog Input-1 Sender Point-6	0	1300	110	R
052.Conf. AI1 value 6	Conf. Analog Input-1 Point-6	0	3000	55	%
053.Conf. AI1 sender 7	Conf. Analog Input-1 Sender Point-7	0	1300	130	R
054.Conf. AI1 value 7	Conf. Analog Input-1 Point-7	0	3000	66	%
055.Conf. AI1 sender 8	Conf. Analog Input-1 Sender Point-8	0	1300	150	R
056.Conf. AI1 value 8	Conf. Analog Input-1 Point-8	0	3000	77	%
057.Conf. AI1 sender 9	Conf. Analog Input-1 Sender Point-9	0	1300	170	R
058.Conf. AI1 value 9	Conf. Analog Input-1 Point-9	0	3000	88	%
059.Conf. AI1 sender 10	Conf. Analog Input-1 Sender Point-10	0	1300	190	R
060.Conf. AI1 value 10	Conf. Analog Input-1 Point-10	0	3000	100	%
061.Conf. AI2 sender 1	Conf. Analog Input-2 Sender Point-1	0	1300	579	R
062.Conf. AI2 value 1	Conf. Analog Input-2 Point-1	0	300	28	°C
063.Conf. AI2 sender 2	Conf. Analog Input-2 Sender Point-2	0	1300	404	R
064.Conf. AI2 value 2	Conf. Analog Input-2 Point-2	0	300	35	°C
065.Conf. AI2 sender 3	Conf. Analog Input-2 Sender Point-3	0	1300	342	R
066.Conf. AI2 value 3	Conf. Analog Input-2 Point-3	0	300	40	°C
067.Conf. AI2 sender 4	Conf. Analog Input-2 Sender Point-4	0	1300	250	R
068.Conf. AI2 value 4	Conf. Analog Input-2 Point-4	0	300	50	°C
069.Conf. AI2 sender 5	Conf. Analog Input-2 Sender Point-5	0	1300	179	R
070.Conf. AI2 value 5	Conf. Analog Input-2 Point-5	0	300	60	°C
071.Conf. AI2 sender 6	Conf. Analog Input-2 Sender Point-6	0	1300	136	R
072.Conf. AI2 value 6	Conf. Analog Input-2 Point-6	0	300	70	°C
073.Conf. AI2 sender 7	Conf. Analog Input-2 Sender Point-7	0	1300	103	R
074.Conf. AI2 value 7	Conf. Analog Input-2 Point-7	0	300	80	°C
075.Conf. AI2 sender 8	Conf. Analog Input-2 Sender Point-8	0	1300	77	R
076.Conf. AI2 value 8	Conf. Analog Input-2 Point-8	0	300	90	°C
077.Conf. AI2 sender 9	Conf. Analog Input-2 Sender Point-9	0	1300	67	R
078.Conf. AI2 value 9	Conf. Analog Input-2 Point-9	0	300	95	°C
079.Conf. AI2 sender 10	Conf. Analog Input-2 Sender Point-10	0	1300	63	R
080.Conf. AI2 value 10	Conf. Analog Input-2 Point-10	0	300	98	°C

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 In4,5=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-Generator 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-Generator Closed Auxiliary 12-Generator 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-Remote Inhibit 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) 25-Low Oil Pressure (for only input-4) 25-High Temperature (for only input-5) 26-Low Oil Level (for only input-4) 26-Emergency Stop No-Latching (for only input-1)	0	In1,4=26 In5=25 Others=24	In1=25 In2=13 In3=11 In4=25 In5=25	
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), or 12(input-12)

Note-2 : dis = disable

05.15.CONF. INPUT-13 (Inputs->Conf. input-13)		Min	Max	Default	Unit
001.Input type	0- Disable 1- User Configured (Digital) 2- Select From List (Digital) 3- Cabin Temperature (Anolog)	0(dis)	3	1	
002.Polarity	If Input Type is Digital 0- Normally Open (Close To Activate) 1- Normally Close (Open To Activate)	0	1	0	
003.Indication	If Input Type is User Configured 0- Status 1- Warning Non-Latching 2- Warning Latching 3- Electrical Trip 4- Shutdown	0	4	0	
004.Activation	If Input Type is 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-Generator 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-Generator Closed Auxiliary 12-Generator 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-Remote Inhibit 20-Force Break Transfer 21-Force No-break Transfer 22-Force Soft Transfer 23-Force Parallel Operation 24-Mains Breaker Open/Close	0	24	18	
006.Active delay	Input active delay (If Input Type is Digital)	0	250	5	Sec
007.Cabin temp.low prealarm	Cabin temperature low prealarm	-50(dis)	100	dis	°C
008.Cabin temp.low reset	Cabin temperature low prealarm reset	-50	100	0	°C
009.Cabin temp.low shutdown	Cabin temperature low shutdown	-50(dis)	100	dis	°C
010.Cabin temp.high prealarm	Cabin temperature high prealarm	-50(dis)	100	dis	°C
011.Cabin temp.high reset	Cabin temperature high prealarm reset	-50	100	0	°C
012.Cabin temp.high shutdown	Cabin temperature high shutdown	-50(dis)	100	dis	°C

Note: 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-Generator 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-Generator Closed Auxiliary 12-Generator 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-Remote Inhibit 20-Force Break Transfer 21-Force No-break Transfer	2	21	2	
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

4.2.6 Outputs

06.01.CONF. OUTPUT-1 (<i>Outputs->Conf. output-1</i>)		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-AIR FLAP CONTROL 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-CAN ECU POWER 10-CAN STOP 11-CHARGE ALTERNATOR FAILURE 12-COMMON ALARM 13-COMMON ELECTRICAL TRIP ALARM 14-COMMON SHUTDOWN ALARM 15-COMMON WARNING ALARM 16-COOLING FAN AFTER START 17-COOLING FAN AFTER STOP 18-COOLANT TEMPERATURE HIGH PRE-ALARM 19-COOLANT TEMPERATURE HIGH SHUTDOWN 20-COOLING DOWN TIMER IN PROGRESS 21-CRANK RELAY ENERGISED 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-EARTH FAULT 45-EMERGENCY STOP 46-FAIL TO START ALARM 47-FAIL TO STOP ALARM 48-CONF. A11 CONTROL 49-FUEL RELAY ENERGISED 50-GAS ENGINE IGNITION OUTPUT 51-GENERATOR AT REST 52-GENERATOR AVAILABLE 53-GENERATOR CLOSED AUXILIARY 54-GENERATOR FAILED TO CLOSE 55-GENERATOR FAILED TO OPEN 56-GENERATOR HIGH FREQUENCY PRE-ALARM 57-GENERATOR HIGH FREQUENCY SHUTDOWN 58-GENERATOR HIGH VOLTAGE PRE-ALARM 59-GENERATOR HIGH VOLTAGE SHUTDOWN 60-GENERATOR LOAD INHIBIT 61-GENERATOR LOW FREQUENCY PRE-ALARM 62-GENERATOR LOW FREQUENCY SHUTDOWN 63-GENERATOR LOW VOLTAGE PRE-ALARM 64-GENERATOR LOW VOLTAGE SHUTDOWN 65-GENERATOR STOPPING 66-GENERATOR OPEN BREAKER 67-HORN OUTPUT LATCHED 68-HORN OUTPUT PULSED 69-LAMP TEST 70-CONF. A12 CONTROL 71-LOSS OF MAGNETIC PICK-UP SPEED SIGNAL 72-LOW TEMPERATURE 73-MAINTENANCE DUE ALARM 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-OIL PRESSURE LOW PRE-ALARM 86-OIL PRESSURE LOW SHUTDOWN 87-CONF A11 HIGH PRE-ALARM 88-CONF A11 HIGH SHUTDOWN 89-OVER CURRENT PRE-ALARM 90-OVER CURRENT 91-OVER POWER PRE-ALARM 92-OVER POWER SHUTDOWN 93-OVERSPED PRE-ALARM 94-OVERSPED SHUTDOWN 95-PANEL LOCK 96-PRE-HEAT(during preheat timer) 97-PRE-HEAT(until end of cranking) 98-PRE-HEAT(until end of warming) 99-PRE-HEAT(until end safety on) 100-REMOTE START PRESENT 101-RESERVED 102-SHORT CIRCUIT 103-SMOKE LIMITING 104-STARTING ALARM 105-STARTING ALARMS ARMED 106-STOP RELAY ENERGIZED 107-SYSTEM IN AUTO MODE 108-SYSTEM IN MANUAL MODE 109-SYSTEM IN STOP MODE 110-SYSTEM IN TEST MODE 111-UNDER CURRENT PRE-ALARM 112-UNDER CURRENT 113-UNDER POWER PRE-ALARM 114-UNDER POWER SHUTDOWN 115-UNDERSPEED PRE-ALARM 116-UNDERSPEED SHUTDOWN 117-WAITING FOR GENERATOR 118-RESERVED 119-LOAD SUPPLY FROM GENERATOR 120-LOAD SUPPLY FROM MAINS 121-CONFIGURABLE ANALOG INPUT 1 LOW PRE-ALARM 122-CONFIGURABLE ANALOG INPUT 1 LOW SHUTDOWN 123-CONFIGURABLE ANALOG INPUT 2 LOW PRE-ALARM 124-CONFIGURABLE ANALOG INPUT 2 LOW SHUTDOWN 125-CONFIGURABLE ANALOG INPUT 2 HIGH PRE-ALARM 126-CONFIGURABLE ANALOG INPUT 2 HIGH SHUTDOWN 127-CHOKE ACTIVE 128-REMOTE CONTROL ACTIVE 129-REVERSE POWER 130-CABIN TEMPERATURE LOW PRE-ALARM 131-CABIN TEMPERATURE LOW SHUTDOWN 132-CABIN TEMPERATURE HIGH PRE-ALARM 133-CABIN TEMPERATURE HIGH SHUTDOWN 134-HEATER CONTROL 135-REMOTE OUTPUT 136-UNBALANCE LOAD 137-WATER PUMP 138-RESERVED 139-SYNCHRONIZATION FAIL 140-LOAD SHEDDING CONTROL-1 141-LOAD SHEDDING CONTROL-2 142-LOAD SHEDDING CONTROL-3 143-LOAD SHEDDING CONTROL-4 144-LOAD SHEDDING CONTROL-5 145-GOVERNOR MAXIMUM LIMIT ALARM 146-AVR MAXIMUM LIMIT ALARM 147-MAINS ROCOF ALARM 148-MAINS VECTOR SHIFT ALARM 149-MAINS UNDER VOLTAGE COIL 150-GENERATOR UNDER VOLTAGE COIL 151-SPEED DOWN PULSE OUTPUT 152-SPEED UP PULSE OUTPUT 153-VOLTAGE DOWN PULSE OUTPUT 154-VOLTAGE UP PULSE OUTPUT	0	154	49	

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	154	21	

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	154	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	154	9	

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	154	12	

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	154	75	

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	154	54	

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	154	83	

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	154	66	

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	154	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	154	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	154	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	154	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	154	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	154	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	154	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	154	12	

4.2.7 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
004.Pre-heat	Pre-Heat	0	250	3	Sec
005.Pre-heat bypass	Pre-Heat Bypass	0	250	0	Min
006.Safety on delay	Safety On Delay	0	99	5	Sec
007.Warming up time	Warmup Time	0	250	3	Sec
008.Horn duration	Horn Duration	0 (dis)	999	60	Sec
009.Charge excitation time	Charge Excitation Time	0	99(cont)	15	Sec
010.Cooling fan time	Cooling Fan Time	0	250	180	Sec
011.Idle mode time	Idle Mode Time (Smoke Limiting)	0 (dis)	3600	dis	Sec
012.Idle mode time off	Idle Mode Time Off (Smoke Limiting Off)	0	250	5	Sec

07.02.STOPPING TIMERS (Timers->Stopping timers)		Min	Max	Default	Unit
001.Mains return delay	Mains Return Delay	0	3600	30	Sec
003.Cooling time	Cooling Time	0 (dis)	3600	60	Sec
004.Fail to stop delay	Fail To Stop Time	15	99	30	Sec

Note: dis = disable cont = continuous

4.2.8 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	

4.2.9 Synchronization

09.01.GOVERNOR CONTROL (<i>Synchronization->Governor control</i>)		Min	Max	Default	Unit
001.Frequency control	Frequency Control Selection: 0- Disable 1- Analogue 2- Digital (Up/Down)	0	2	1	
002.Manual frequency set	Manual Frequency Set	30.0	75.0	50.0	Hz
003.Minimum output value	Minimum Output Value	0.0	100.0	25.0	%
004.Maximum output value	Maximum Output Value	0.0	100.0	75.0	%
005.Initial value	Initial Output Value	0.0	100.0	50.0	%
006.Output direction	0- Positive 1- Negative	0	1	0	
007.Proportional	Proportional	0.00	99.99	5.58	
008.Integral	Integral	0.00	99.99	0.30	
009.Derivative	Derivative	0.00	99.99	0.01	
010.Frequency control start	Frequency Control Start Value	10.0	80.0	43.0	Hz
011.Frequency control delay	Frequency Control Start Delay	0	999	3	Sec
012.Frequency control ramp	Frequency Control Ramp Value	0.10	60.00	2.50	Hz/s
013.Frequency set value offset	Frequency Set Value Offset	0.00	0.50	0.12	Hz
014.Maximum output limit actions	Maximum Output Limit Actions: 0- Disable, 1- Warning, 2- Electrical Trip, 3- Shutdown.	0(dis)	3	0(dis)	
015.Max.output limit act.dely time	Max. Output Limit Act. Delay Time	0	99	2	Sec
017.Up/Down pulse period	Speed Up/Down Pulse Period	0.1	10.0	1.0	Sec
018.Up/Down pulse time	Speed Up/Down Pulse Time	0.01	5.00	0.50	Sec
019.Up/Down frequency deadband	Up/Down Frequency Deadband	0.02	9.99	0.08	Hz

Note: dis = disable

09.02.AVR CONTROL (Synchronization->AVR control)		Min	Max	Default	Unit
001.Voltage control	Voltage Control Selection: 0- Disable 1- Analogue 2- Digital (Up/Down)	0	2	1	
002.Manual voltage set	Manual Voltage Set	60	600	400	V~
003.Minimum output value	Minimum Output Value	0.0	100.0	37.5	%
004.Maximum output value	Maximum Output Value	0.0	100.0	62.5	%
005.Initial value	Initial Output Value	0.0	100.0	50.0	%
006.Output direction	0- Positive 1- Negative	0	1	0	
007.Proportional	Proportional	0.00	99.99	3.24	
008.Integral	Integral	0.00	99.99	0.30	
009.Derivative	Derivative	0.00	99.99	0.01	
010.Voltage control start	Voltage Control Start Value	60	440	300	V~
011.Voltage control delay	Voltage Control Start Delay	0	999	5	
012.Voltage control ramp	Voltage Control Ramp Value	1.00	99.99	5.00	%/s
013.Maximum output limit actions	Maximum Output Limit Actions: 0- Disable, 1- Warning, 2- Electrical Trip, 3- Shutdown.	0(dis)	3	0(dis)	
014.Max.output limit act.dely time	Max. Output Limit Act. Delay Time	0	99	2	Sec
016.Up/Down pulse period	Voltage Up/Down Pulse Period	0.1	10.0	1.0	Sec
017.Up/Down pulse time	Voltage Up/Down Pulse Time	0.01	5.00	0.50	Sec
018.Up/Down voltage deadband	Up/Down Voltage Deadband	0.10	9.99	1.00	%

09.03.PF CONTROL (Synchronization->PF control)		Min	Max	Default	Unit
001.PF control	Power Factor Control	ENABL/DISBL		DISBL	
002.Proportional	Proportional	0.00	99.99	3.24	
003.Integral	Integral	0.00	99.99	0.30	
004.Derivative	Derivative	0.00	99.99	0.01	
005.PF control ramp	PF Control Ramp Value	0.01	99.99	3.00	%/s
006.PF control set	Power Factor Control Set Value	-1.00	1.00	1.00	

09.05.LOAD SHARE CONTROL (Synchronization->Load share control)		Min	Max	Default	Unit
001.Generator kW rating	Generator kW Rating	1	9999	120	kW
002.Generator kVAr rating	Generator kVAr Rating	1	9999	90	kVAr
007.Active power control ramp	Active Power Control Ramp	0.10	99.99	3.00	%/s

09.06.SYNCHRON CONTROL (Synchronization->Synchron control)		Min	Max	Default	Unit
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	Contacting 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	0.3	Sec

Note: dis = disable

09.08.LOAD SHEDDING CONTROL (Synchronization->Load shed.conf)		Min	Max	Default	Unit
001.Number of outputs in control	Number of outputs in control	0(dis)	5	0(dis)	
002.Number of outputs at start	Number of outputs at start	0	5	0	
003.Trip level	Trip level	0	100	80	%
004.Return level	Return level	0	100	40	%
005.Trip Delay	Trip Delay	0	3600	5	Sec
006.Return delay	Return delay	0	3600	5	Sec

09.10.BREAKER&LOAD CONT. (Synchronization->Breaker&load conf)		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

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

Note: dis = disable

4.2.10 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	

10.02.CONFIGURE OUTPUTS (<i>Logic controller->Configure outputs</i>)		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	

10.03.CONFIG. EXP. OUTPUTS (<i>Logic controller->Config. exp. outputs</i>)		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	

10.04.CONF. LOGIC FUNCTIONS (<i>Logic controller->Conf. logic functions</i>)		Min	Max	Default	Unit
001.Start request in auto:	Start Request In Auto Configuration	Logic Controller		0	
002.Stop request in auto:	Stop Request In Auto Configuration	Logic Controller		0	
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	

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		ENABL	
012.Tuesday disable/enable	Tuesday Disable/Enable	ENABL/DISBL		ENABL	
013.Wednesday disable/enable	Wednesday Disable/Enable	ENABL/DISBL		ENABL	
014.Thursday disable/enable	Thursday Disable/Enable	ENABL/DISBL		ENABL	
015.Friday disable/enable	Friday Disable/Enable	ENABL/DISBL		ENABL	
016.Saturday disable/enable	Saturday Disable/Enable	ENABL/DISBL		DISBL	
017.Sunday disable/enable	Sunday Disable/Enable	ENABL/DISBL		DISBL	

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	

4.2.11 User Adjustment

11.04.BATTERY&CHRG GEN.VOL (User adjustment->Battery&chrg gen.vol)		Min	Max	Default	Unit
001.Battery volt offset	Battery Voltage Offset	-5.0	5.0	0	V---
002.Generator charge volt offset	Charge Generator Voltage Offset	-5.0	5.0	0	V---

11.05.SENDER INPUTS OFFSET (User adjustment->Sender inputs offset)		Min	Max	Default	Unit
001.Oil Pressure offset	Oil Pressure Offset	-2.0	2.0	0.0	BAR
002.Temperature offset	Coolant Temperature Offset	-20	20	0	°C
003.Conf. AI1 offset	Configurable Analog Input-1 Offset	-200	200	0	%
004.Conf. AI2 offset	Configurable Analog Input-2 Offset	-20	20	0	°C

5. 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 Against Mech. Impacts	: 1Joule (IK06).
Protection Class	: 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	: 95 % max. (non-condensing)
Vibration	: EN 60068-2-6 Ten sweeps in each of three major axes 5Hz to 8Hz @ +/-7.5mm, 8Hz to 500Hz @ 2gn.
Shock	: EN 60068-2-27 Three shocks in each of three major axes 15gn in 11mS.
Installation Over Volt. Category	: II Appliances, portable equipment
Pollution Degree	: II, Normal office or workplace, non conductive pollution
Mode of Operation	: Continuous.
Supply Voltage and Power	: 8 to 32 V _{DC} (Peak: 36 V _{DC}) - 7.5W
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
Mains Voltage Measurement	: 5 to 300 VAC Ph-N, 5 to 99.9 Hz. Accuracy: 1 % FS, Resolution: 1 V, Harmonics: Up to 11 th .
Mains Frequency	: 5 to 99.9Hz (min. 20 VAC Ph-N) Accuracy: 0,25 % FS, Resolution: 0,1 Hz.
Generator Voltage Measurement	: 5 to 300 VAC Ph-N, 5 to 99.9 Hz. Accuracy: 1 % FS, Resolution: 1 V, Harmonics: Up to 11 th .
Generator Frequency	: 5 to 99.9Hz (min. 20 VAC Ph-N) Accuracy: 0,25 % FS, Resolution: 0,1 Hz.
Magnetic Pickup Input	: 35 to 10000 Hz (1 to 35 volts peak continuously). Accuracy: 0,25 % FS.
CT secondary	: 5A.
Governor Output	: +/-10V _{DC} , Accuracy: 0.1%, Resolution: 12bit, Isolation:1000V _{DC}
AVR Output	: +/-10V _{DC} , Accuracy: 0.1%, Resolution: 12bit, Isolation:1000V _{DC}
Charge Generator Excitation	: 210mA @12V, 105mA @24V. Nominal 2.5W.
Charge Gen. Vol. Measurement	: 8 to 32 V _{DC} , Accuracy: 1 % FS, Resolution: 0,1 V.
Sender Measurement	: 0 to 1300 ohm, Accuracy: 1 % FS, Resolution: 1 ohm.
Cabin Temp. Measurement	: -50 to +100 °C, Accuracy: 1 % FS, Resolution: 1 °C.
Communication interface	: USB programming and communication port, CanBus communication with 1939 ECU, 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

: Generator contactor output 8A at DC supply voltage

Mains contactor output 8A at DC supply voltage

Transistor Outputs

: Fuel or Configurable output-1 15A at DC supply voltage

Crank or Configurable output-2 15A at DC supply voltage

Configurable output-3,4,5,6,7,8,9 1A at DC supply voltage

Approvals

: 

6. Other Informations**Manufacturer Information:**

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