



AMF 3.1

User Manual

Table of Contents

General Descriptions	3
Connection Diagram	4
Front Panel	5
Rear Panel	9
Terminal Connections	9
Alarm Codes & Descriptions	11
Interface Structure	14
MENU SCREEN STRUCTURE.....	16
P2-Alarm Log Screen.....	18
P3-Maintenance Timers Screen.....	18
Digital Input Functions & Descriptions	19
Digital Output Functions & Descriptions.....	21
Document Version.....	22

General Descriptions

AMF 3.1 is a microprocessor-based controller, which monitors single or 3 phase Mains voltage, transfers the load between the Mains and the Generator and checks for system failures. The unit eliminates the need of common panel indicators, hence reduces the cost of the Generator panel. AMF 3.1 has 3 operation modes, which are Automatic, Test and Off modes. The desired operation mode can be set via the buttons located on the front panel. By pressing the Menu button for 3 seconds, the user can edit and save any parameter among the 425 parameters in the unit. This feature allows AMF 3.1 to be easily adapted to any engine without the need of a separate unit.

Functions

- Automatic engine start and stop
- Start the Generator and transfer the load in the case of a Mains failure
- True RMS voltage and current measurement
- Sensing Generator failures
- Automatic load transfer
- Pre-heat function
- Automatic, Test and Off operation modes
- Measurement instruments which reduce the panel cost
- Time stamped log of the last 15 failures
- Record of engine running hours and indicate when maintenance is needed
- Manual control of the MCB and GCB during Test mode
- Ability to connect analog oil pressure and water temperature probes
- Screen saver mode which preserves power
- Comprehensive parameter menu where all the system limits, timers and operation modes can be viewed and edited
- Monitoring and parameter setting via communication port
- Ability to update the microprocessor software via communication port

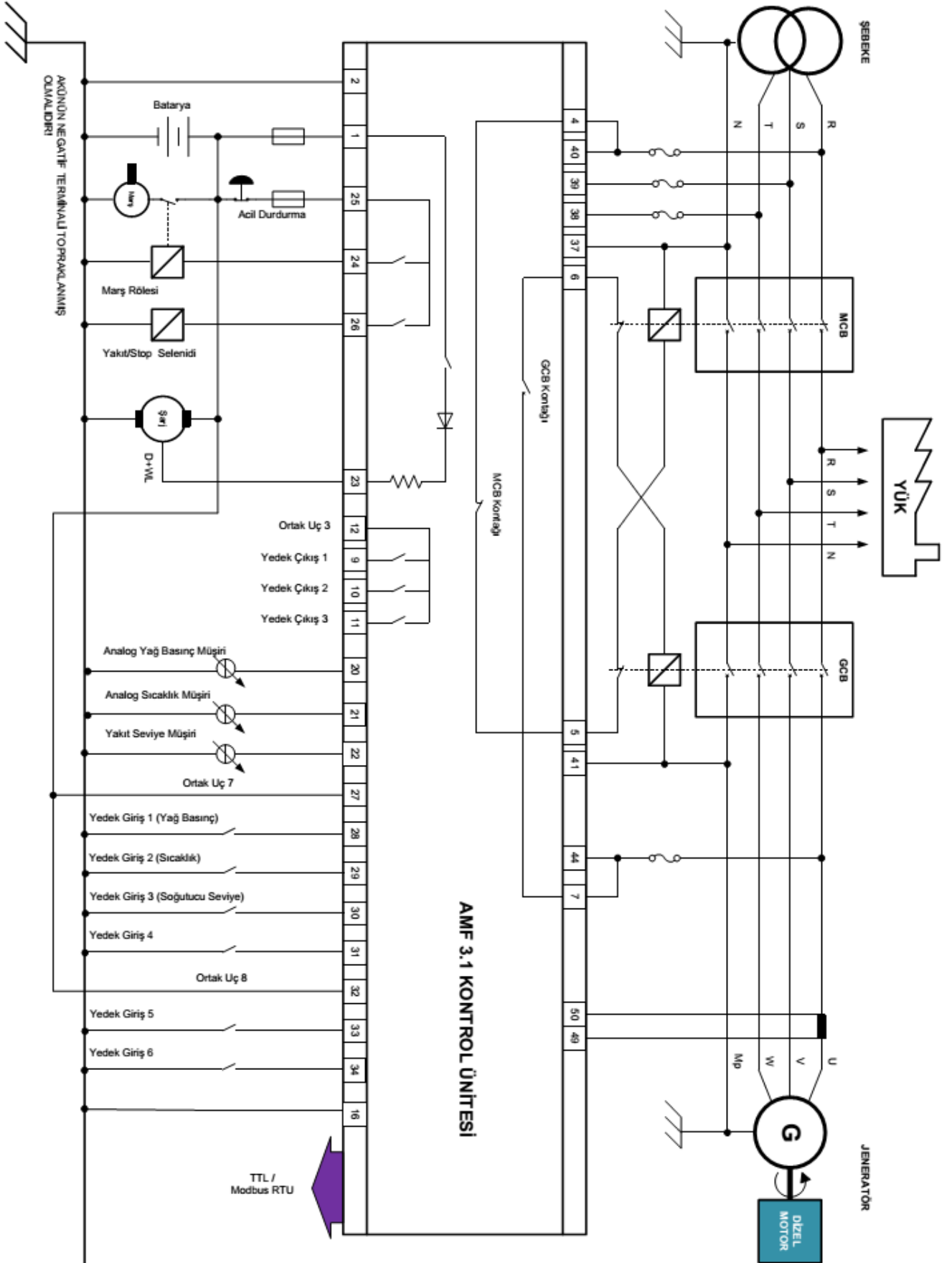
Inputs & Outputs

- 3 phase Mains and Generator voltage inputs
- 1 phase alternator current input
- 12V or 24V power supply
- Oil pressure and water temperature analog inputs
- Charge fail input
- Crank relay output
- Fuel solenoid relay output
- Generator contactor relay output
- Mains contactor relay output
- 3 Programmable Aux. Relay Outputs
- 6 Programmable Aux. Relay Inputs

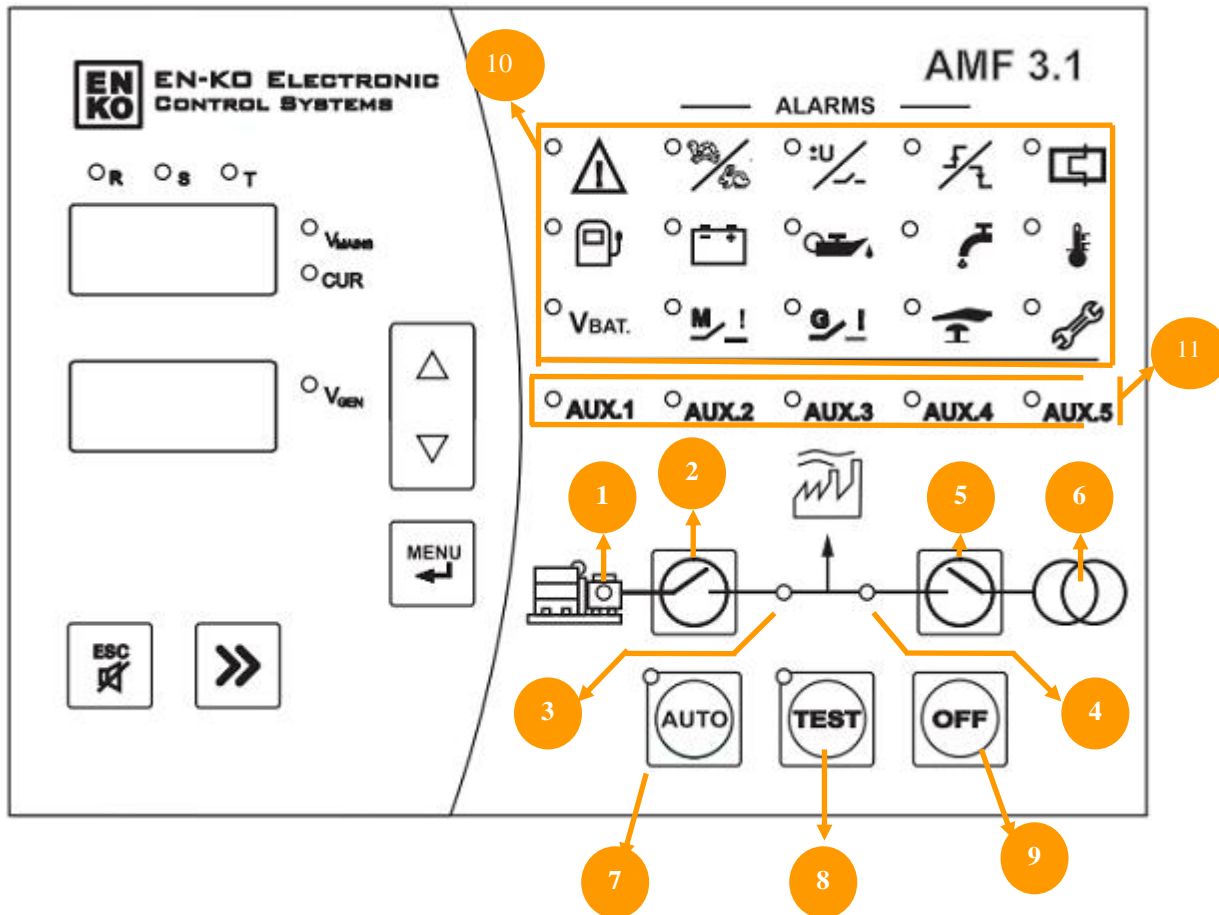
Failures

- Crank and Stop Failure
- Over/Under Speed Failure
- Over/Under Voltage Failure
- Overcurrent Failure
- Battery Over/Under Voltage Failure
- Engine Overheat Failure
- Charge Failure
- Low Oil Pressure Failure
- Service Time
- Aux. Failure

Connection Diagram



Front Panel



Generator Status LED (1):

- Generator idle when the LED is off.
- Generator running when the LED is on
- The LED will be blinking during the failure delay time during Generator initial cranking and cool-down and stop delay timers during Generator stopping. These timers will be explained below.

Generator Contactor Status Button (2): This button is active while in TEST operation mode. This button allows for the load to be transferred to the Generator after start-up. The contactor is open while the generator is idle. The status of the contactor is indicated via the LED indicator. If the LED is lit, the contactor is closed and the Load is fed through the Generator. The Mains contactor must be opened in order to close the Generator contactor.

Generator Contactor Status LED (3): Indicates the GCB status. If the GCB output (terminals 6 and 7) are closed the LED will be lit. If the GCB output is open, the LED will be off.

Mains Contactor Status LED (4): Indicates the MCB status. If the MCB output (terminals 6 and 7) are closed the LED will be lit. If the MCB output is open, the LED will be off.

Mains Contactor Status Button (5): This button is active while in TEST operation mode. This button allows for the load to be transferred to the Mains. The status of the contactor is indicated via the LED indicator. If the LED is lit, the contactor is closed and the Load is fed through the Mains. The Generator contactor must be opened in order to close the Mains contactor.

Mains Status LED (6):

- When off, the Mains values are outside the limits set by the parameters.
- When lit, the Mains values are within the limits set by the parameters.
- The LED will be blinking while switching from Mains Normal condition to Mains Failure condition or while switching from Mains Failure condition to Mains Normal condition which will be explained below.

Automatic Operation Mode Button (7): Pressing this button will put the AMF into Automatic Operation Mode. While in this mode, in case of a Mains Failure, the Generator will be started automatically and the Load will be transferred.

Test Operation Mode Button (8): Pressing this button will put the AMF into Test Operation Mode. While in this mode, in case of a Mains Failure, the Generator will be started automatically, and the contactors will be controlled via the Generator and Mains Contactor Buttons.

Off Operation Mode Button (9): Pressing this button will put the AMF into Off Operation Mode. When this button is pressed once, the Generator will be cooled-down then stopped. By pressing this button for the second time, the Generator will be stopped without being cooled-down.

Failure Indicator LED's (10): Starting from top left corner, the failures go as Failure Active, Engine Under/Over RPM, Alternator Under/Over Voltage, Start/Stop, Over Current, Fuel Level, Charge Voltage, Low Oil Pressure, Coolant Level, Engine Over Heat, Battery Voltage, Mains Contactor, Generator Contactor, Emergency Stop and Maintenance Time LED's can be found.

Auxiliary Input LED's (11): These LED's indicate the status of the digital inputs which are assigned to auxiliary digital inputs.

Display LED's: These LED's can be found on the right hand side of each display. They indicate that measurement is being showed on the displays. The info being scrolled using the Up, Down and Menu buttons.

ESC Button:

This button has several functions which are listed below.

- While not in the Menu, in case of a failure, by pressing once the alarm horn will be silenced. By pressing the second time the failure will be deleted,
- While in the Menu, pressing the button will exit the Menu.
- While in the Parameter menu, if the value entered while editing the parameter, pressing this button will exit without saving.

Menu Button (Enter):

- Used to enter the Menu. The button must be pressed for 3 seconds to enter the Menu.
- Used to acknowledge any changes made while parameter editing.

Up and Down Arrow Buttons:


  buttons have 2 uses.

- While in normal operation, the buttons are used to cycle through the Display LED's. Pressing the Menu Button will acknowledge the display selection and move on to the next display.
- While in parameter menu, after pressing the Enter Button and selecting a parameter to edit, the desired value can be selected by using the Up and Down Arrow Buttons.

◀ Selection Button:

- While in normal operation this button has the same function as the button above.
- While in parameter menu, after pressing the Enter Button and selecting a parameter to edit, the desired digit can be selected by using this button, each press will shift the selected digit to the right.





OPERATION MODES

Automatic Operation Modes: When the Auto Button  is pressed the Generator will enter the Automatic Operation Mode. In this mode, the 3 phase Mains is constantly monitored against the limits set by the parameter values shown below.

P036	Mains Under Voltage
P037	Mains Over Voltage
P040	Mains Under Frequency
P041	Mains Over Frequency

When the Mains is normal, the Load is supplied by the Mains. If the monitored values of the Mains are outside the limits set by the related parameters and the time period specified by the “P039 – Mains Failure Delay Timer” has passed, it means there is a Mains failure. In this case the Mains contactor is opened and the Generator is started. Once the Generator has started, the unit will wait for the time period set by the “P018 – General Failure Delay Timer” and will check for any failures. Then, after waiting for the time period set by “P006 – Generator Contact Delay Timer”, the Generator contactor will be closed and the Load is transferred to the Generator.

Once the monitored values of the Mains are back and stays within the limits set by the related parameters for the time period set by the “P005 – Mains Contact Delay Timer”, the Mains contactor will be closed and the Load is transferred to the Mains. In the case where the Generator has supplied the Load since the engine started, the engine will be cooled down for the time period set by “P007 – Engine Cool-down Timer”. If the Generator has not supplied the Load since the engine started, the Generator will be stopped without cooling down. In the Automatic operation mode, if the AMF unit is receiving a signal that the Generator is running although it is not supposed to, the AMF will try to stop the Generator.

Test Operation Mode: When the TEST Button is pressed the Generator enters the Test operation mode and the Generator will start without checking the Mains. In this mode the Generator Contactor Status Button  and the Mains Contactor Status Button  will become active. If the Generator is running and the Generator Status LED is constantly lit, the Generator contactor can be checked using the Generator Contactor Status Button  as long as the Mains contactor is open. The Generator Contactor Status Button  will energize the GCB if it is de-energized and will transfer the Load to the Generator. If the GCB is already energized, pressing the Generator Contactor Status Button will idle the Load. The same situation is applicable for the Mains Contactor Status Button also. If the Mains status LED is constantly lit and the Generator contactor is open, the Load can be transferred to



the Mains by pressing the Mains Contactor Status Button . The Load can be idled by pressing the Mains Contactor Status Button again.

OFF Operation Mode: When the OFF button is pressed the AMF will stop executing the Generator and Mains control functions and enter sleep mode.

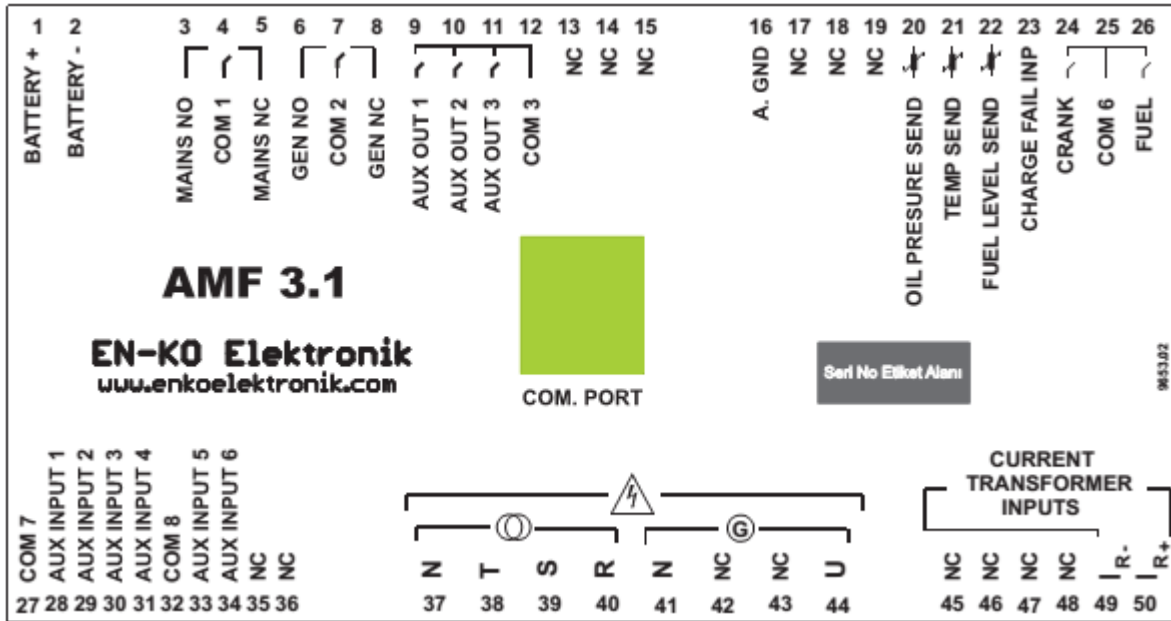
If the Generator is running:

- By pressing the OFF button once, if the Generator has supplied the load once or more times, the Generator will be cooled-down for the time period set by “P007 – Engine Cool-down Timer”, then completely stopped. If the Load has never been transferred to the Generator then it will be stopped without being cooled-down
- By pressing the OFF button twice, the Generator will be stopped without being cooled-down. The LED display will write OFF and measurements and displays will be shut-off.

If the Generator is idle (stopped):

- By pressing the OFF button once, the Generator enters OFF Operation Mode but the measurements will continue to be displayed. If the OFF button is pressed for the second time, the LED displays will write OFF and the measurement displays will turn off. If the user desires to view the measurements while in OFF Operation Mode the measurement screens can be viewed by pressing the Up  or Down  Arrow Buttons.




Rear Panel



Terminal Connections

TERMINAL NO	TERMINAL NAME	DESCRIPTION
1	BATTERY +	The positive terminal of the battery must be connected. The value of the terminal must be between 9 – 30V.
2	BATTERY -	The negative terminal of the battery must be connected. The negative terminal of the battery should be grounded.
3	MAINS NO	The dry contact output, which controls the Mains contactor. This output is Normally Open. (250Vac 10A)
4	COM 1	The common input of Terminals No 3 and No 5 (MCB). (250Vac 10A) Caution: In order to enable the related Terminals to COM 1, this input must NOT be left empty.
5	MAINS NC	The dry contact output, which controls the Mains contactor. This output is Normally Closed. (250Vac 10A)
6	GEN NO	The dry contact output, which controls the Generator contactor. This output is Normally Open. (250Vac 10A)
7	COM 2	The common input of Terminals No 6 and No 8 (GCB). (250Vac 10A) Caution: In order to enable the related Terminals to COM 2, this input must NOT be left empty.
8	GEN NC	The dry contact output, which controls the Generator contactor. This output is Normally Closed. (250Vac 10A)
9	AUX OUT 1	Functional output. Please refer to parameters P254-P255. (250Vac 6A)
10	AUX OUT 2	Functional output. Please refer to parameters P256-P257. (250Vac 6A)
11	AUX OUT 3	Functional output. Please refer to parameters P258-P259. (250Vac 6A)
12	COM 3	The common output for Terminals No 9, No 10 and No 11. Caution: In order to enable the related Terminals to COM 3, this input must NOT be left empty.
13	N/A	Terminal connection is empty, please do not make any connections.
14	N/A	Terminal connection is empty, please do not make any connections.
15	N/A	Terminal connection is empty, please do not make any connections.
16	A. GND	To be connected to Generator chassis for the measurement inputs.

AMF 3.1 USER MANUAL

17	N/A	Terminal connection is empty, please do not make any connections.
18	N/A	Terminal connection is empty, please do not make any connections.
19	N/A	Terminal connection is empty, please do not make any connections.
20	OIL PRESURE SEND.	Analog oil pressure sender is to be connected to this terminal. The settings related to this input can be changed via parameters P084-P144.
21	TEMP SEND.	Analog water temperature sender is to be connected to this terminal. The settings related to this input can be changed via parameters P147-P203.
22	N/A	Terminal connection is empty, please do not make any connections.
23	CHARGE FAIL INP.	Charge alternator excitation winding is connected to this input. The panel excites the charge alternator by feeding constant current during cranking. This terminal feeds 120mA in 24V systems and 200mA in 12V systems. Panel marş sırasında sabit akım basarak şarj alternatörüne uyarım vermektedir. Bu çıkıştan 24V sistemlerde 120mA, 12V sistemlerde 200 mA akım basılmaktadır
24	CRANK	Crank solenoid is to be connected to this output.
25	COM 6	The common input of Terminals No 24 and No 26.  Caution: In order to enable the related Terminals to COM 6, this input must NOT be left empty.
26	FUEL	The fuel or stop solenoid is to be connected to this input. The settings related to this input can be changed via parameters P017 and P028.
27	COM 7	The common input of Terminals No 28, No 29, No 30 and No31. Can be connected to Battery - or Battery+. Because the digital inputs are bi-directional, when connected to Battery - the digital inputs are activated on Battery + voltage level and vice versa.  Caution: If a battery connection is NOT made to COM 7 the related digital inputs will not be operational.
28	AUX INPUT 1	1 st digital input. Can be configured via parameters P206-P211.
29	AUX INPUT 2	2 nd digital input. Can be configured via parameters P212-P217.
30	AUX INPUT 3	3 rd digital input. Can be configured via parameters P218-P223.
31	AUX INPUT 4	4 th digital input. Can be configured via parameters P224-P229.
32	COM 8	The common input of Terminals No 33, No 34, No 35 and No36. Can be connected to Battery - or Battery+. Because the digital inputs are bi-directional, when connected to Battery - the digital inputs are activated on Battery + voltage level and vice versa.  Caution: If a battery connection is NOT made to COM 8 the related digital inputs will not be operational.
33	AUX INPUT 5	5 th digital input. Can be configured via parameters P230-P235.
34	AUX INPUT 6	6 th digital input. Can be configured via parameters P236-P241.
35	N/A	Terminal connection is empty, please do not make any connections.
36	N/A	Terminal connection is empty, please do not make any connections.
37	N	Mains Neutral input
38	T	Mains T Phase input (20-500Vac)
39	S	Mains S Phase input (20-500Vac)
40	R	Mains R Phase input (20-500Vac)
41	N	Alternator Neutral input
42	N/A	Terminal connection is empty, please do not make any connections.
43	N/A	Terminal connection is empty, please do not make any connections.
44	U	Alternator U Phase input (20-500Vac)
45	N/A	Terminal connection is empty, please do not make any connections.
46	N/A	Terminal connection is empty, please do not make any connections.
47	N/A	Terminal connection is empty, please do not make any connections.
48	N/A	Terminal connection is empty, please do not make any connections.
49	IR-	R Phase Current Transformer input - terminal (Max. 5A AC)
50	IR+	R Phase Current Transformer input + terminal (Max. 5A AC)











AMF 3.1 USER MANUAL

COM PORT











Used for ENKO Pro-Link SCADA PC connection

Important Note: For the Low Oil Pressure digital Input, the related activation time must be set a “2”. When this input is assigned, the check will be made after the engine has started regardless of the failure activation time.


Alarm Codes & Descriptions

ALARM LEDS	ALARM CODES	DESCRIPTION
		It indicates that there is an alarm in the system. If it flashes, the alarm is still active. If it is continuously lit, the alarm is not active. It is off when the alarm is cleared.
	F11	F11 is displayed when there is low/high frequency alarm. This alarm is active when the alternator frequency value is less than “P065: Generator Under Frequency” or more than “P066: Generator Over Frequency”,
	F10	It indicates there is high/low alternator voltage alarm when the voltage value is less than or more than the set values (see : P058: Generator Under Voltage, P059: Generator Over Voltage
	F15	It indicates Engine Failed to Start / Stop Alarm. In automatic mode, after there is mains failure, this alarm is displayed if the engine does not start after cranking “P002: Crank Attempts“. Another alarm source is : If one of “Running Feedback signals is still active after AMF releases fuel valve and attempts to stop the engine.
	F24	It indicates “Overcurrent” alarm. This alarm is indicated when the total current is more than “P272: Over Current Failure Value”.
	F22 F23	It indicates “Fuel Level Alarm”. F22 is displayed when it is less than P303: Fuel Under Level or more than P304: Fuel Over Level. F23 is displayed when it is less than the set value for P305: Fuel Level Generator Stop Value. (see: P303: Fuel Under Level, P304: Fuel Over Level, P305: Fuel Level Generator Stop Value).
	F18 F55	It indicates “Charge Voltage Alarm”. F18 is displayed when the charging voltage is less than or more than the set values (see P079: Charge Alternator Trip Value and P080: Charge Alternator Warning Value) while the engine is running.
	F16 F25	It indicates “Low Oil Pressure Alarm”. F16 is displayed when the digital input set as Oil Pressure Switch becomes active while the engine is running. In case oil pressure sender is used, F25 is displayed when the oil pressure value is less than “P89: Analog Low Oil Pressure Value” while the engine is running.
	F21	It indicates “Low Coolant Level Value Alarm”. F21 is displayed when the digital input set for Coolant Level Switch becomes active.
	F17 F51	It indicates “High Water Temperature Alarm”. F17 is displayed when the digital input set for Water Temperature Switch becomes active. In case Analog Temperature Sensor is used, F51 is displayed when the temperature is more than “P150: High Temperature (Flexible Sensor) Alarm”.

AMF 3.1 USER MANUAL

	F19 F20	It indicates "Low Battery Voltage Alarm". F20 is displayed when the battery voltage is less than or more than the set values. (see: P47: Battery Voltage Failure Lower Limit, P48: Battery Voltage Failure Upper Limit).
	F43	It indicates "Mains Circuit Breaker Feedback Failure Alarm". F43 is displayed when the digital input set for MCB Contact Feedback does not become active after the breaker is energized.
	F42	It indicates "Generator Circuit Breaker Feedback Failure Alarm". F42 is displayed when the digital input set for GCB Contact Feedback does not become active after the breaker is energized.
	F44	It indicates "Emergency Stop Alarm". F44 is displayed when the digital input set for Emergency Stop becomes active.
		It indicates "Maintenance Time Passed" alarm. This LED is lit when "P329: Periodic Engine Maintenance Timer Set Value and "P330: Periodic Maintenance Timer Value expire.
	F31	It indicates "Aux. Failure Input 1 Alarm". This alarm is active when the digital input set for External Alarm Input 1 becomes active.
	F32	It indicates "Aux. Failure Input 2 Alarm". This alarm is active when the digital input set for External Alarm Input 2 becomes active.
	F33	It indicates "Aux. Failure Input 3 Alarm". This alarm is active when the digital input set for External Alarm Input 3 becomes active.
	F34	It indicates "Aux. Failure Input 4 Alarm". This alarm is active when the digital input set for External Alarm Input 4 becomes active.
	F35	It indicates "Aux. Failure Input 5 Alarm". This alarm is active when the digital input set for External Alarm Input 5 becomes active.
	F26	It indicates "High KW Alarm". This alarm is active when the measured kW value is equal to or more than P277: KW Failure Value.
	F27	It indicates "High KVA Alarm". This alarm is active when the measured kVA value is equal to or more than P292: KVA Alarm Value.
	F28	It indicates "High KVAR Alarm". This alarm is active when the measured kVAR value is equal to or more than P282- KVar Failure Value.
	F29	It indicates "Power Factor Alarm". This alarm is active when the measured Power Factor value is equal to or more than P287: Power Factor Failure Value.
	F38	It indicates "Seismic Alarm." This alarm is active when the digital input set for Earthquake Sensor becomes active.
	F46	It indicates "Oil Pressure Sensor Failure Alarm". When there is a oil pressure sensor, the reason of the failure may be that the sensor has failed, been damaged or been removed.
	F47	It indicates "Temperature Sensor Failure Alarm". When there is a temperature sensor, the reason of the failure may be that the sensor has failed, been damaged or been removed.

AMF 3.1 USER MANUAL

	F50	It indicates "Generator Self-start Alarm". If the engine is started by an external source other than AMF 3.4, an alarm will NOT be signaled. However if the engine is attempted to start when the AMF is in AUTO or TEST operation modes while the engine is already running, this alarm will be activated.
	F52	It indicates "EEPROM Failure". The parameters in the system should be checked and the Manufacturer must be contacted immediately.
	F53	It indicates "Fuel Level Sensor Failure Alarm". When there is a fuel level sensor, the reason of the failure may be that the sensor has failed, been damaged or been removed.
	F54	It indicates "Reverse Power Alarm". If one of the voltages of any one phase drops below the limit set by parameter P297, this alarm will be indicated.
	F45	It indicates "Thermic Failure". If the input selected as the Thermic Switch is activated, this alarm occurs.



Some alarms have auto-acknowledge functions. The limit to how many alarms can be auto-acknowledged can be set from parameter "P051 – Auto-Acknowledge Limit". Once the limit is reached the alarms will not be acknowledged and will wait in the system. Once the operator manually removes the alarm, the auto-acknowledge counter will restart and acknowledge alarms until it reaches the limit set by parameter P051 again. The table below shows the list of alarms which can be auto-acknowledged.




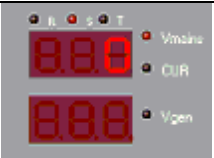
Alarm Code	Alarm Description	Auto-acknowledge Activation/Deactivation Parameter
F51	High Temperature Alarm	P49
F25	Analog Low Oil Pressure Alarm	P50
F15	Engine Failed to Start / Stop Alarm	P53
F19,F20	Low Battery Voltage Alarm	P54
F18	Charge Voltage Alarm	P83
F16,F17,F21 F31,F32,F33 F34,F35,F42 F43,F45	Depends on the function assigned to Aux. Input 1. Oil Switch, High Temperature Switch, Low Coolant Level, Aux. Alarm 1-2-3-4-5, MCB Feedback Alarm, GCB Feedback Alarm, Thermic Alarms can be auto-acknowledged. Parameter P209 is inactive in an Earthquake or Emergency situation.	P209
F16,F17,F21 F31,F32,F33 F34,F35,F42 F43,F45	Depends on the function assigned to Aux. Input 2. Oil Switch, High Temperature Switch, Low Coolant Level, Aux. Alarm 1-2-3-4-5, MCB Feedback Alarm, GCB Feedback Alarm, Thermic Alarms can be auto-acknowledged. Parameter P215 is inactive in an Earthquake or Emergency situation.	P215
F16,F17,F21 F31,F32,F33	Depends on the function assigned to Aux. Input 3. Oil Switch, High Temperature Switch, Low Coolant Level, Aux. Alarm 1-2-3-4-5, MCB	P221

AMF 3.1 USER MANUAL

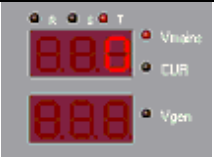
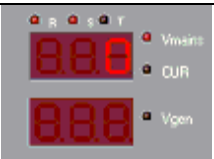
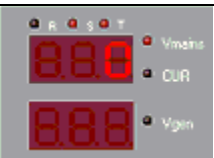







F34,F35,F42 F43,F45	Feedback Alarm, GCB Feedback Alarm, Thermic Alarms can be auto-acknowledged. Parameter P221 is inactive in an Earthquake or Emergency situation.	
F16,F17,F21 F31,F32,F33 F34,F35,F42 F43,F45	Depends on the function assigned to Aux. Input 4. Oil Switch, High Temperature Switch, Low Coolant Level, Aux. Alarm 1-2-3-4-5, MCB Feedback Alarm, GCB Feedback Alarm, Thermic Alarms can be auto-acknowledged. Parameter P227 is inactive in an Earthquake or Emergency situation.	P227
F16,F17,F21 F31,F32,F33 F34,F35,F42 F43,F45	Depends on the function assigned to Aux. Input 5. Oil Switch, High Temperature Switch, Low Coolant Level, Aux. Alarm 1-2-3-4-5, MCB Feedback Alarm, GCB Feedback Alarm, Thermic Alarms can be auto-acknowledged. Parameter P233 is inactive in an Earthquake or Emergency situation.	P233
F16,F17,F21 F31,F32,F33 F34,F35,F42 F43,F45	Depends on the function assigned to Aux. Input 6. Oil Switch, High Temperature Switch, Low Coolant Level, Aux. Alarm 1-2-3-4-5, MCB Feedback Alarm, GCB Feedback Alarm, Thermic Alarms can be auto-acknowledged. Parameter P239 is inactive in an Earthquake or Emergency situation.	P239
F24	Overcurrent Alarm	P273
F26	High KW Alarm	P278
F28	High KVar Alarm	P283
F29	Power Factor Alarm	P288
F27	High KVA Alarm	P293
F54	Reverse Power Alarm	P298

Interface Structure










On the running screen of the unit, the measured values are shown. The operator can navigate through various measurements bu using the up  or down  buttons.

Screen	Definitions	Descriptions
	1 st Row: VR-N Voltage. 2 nd Row: Blank	While on this screen, pressing the up  button will navigate to the screen shown below. While on this screen, pressing the down  button will navigate to the screen shown on the bottom of this table (Fuel Level).
	1 st Row: VS-N Voltage. 2 nd Row: Blank	Please see Note 1.

AMF 3.1 USER MANUAL

 <p>The image shows a digital display with two rows. The top row shows '888' and the bottom row shows '888'. To the right of the display are labels: 'Vmain', 'CUR', and 'Vgen'.</p>	<p>1st Row: VT-N Voltage. 2nd Row: Blank</p>	<p>Please see Note 1.</p>
 <p>The image shows a digital display with two rows. The top row shows '888' and the bottom row shows '888'. To the right of the display are labels: 'Vmain', 'CUR', and 'Vgen'.</p>	<p>1st Row: VR-S Voltage. 2nd Row: Blank</p>	<p>Please see Note 1.</p>
 <p>The image shows a digital display with two rows. The top row shows '888' and the bottom row shows '888'. To the right of the display are labels: 'Vmain', 'CUR', and 'Vgen'.</p>	<p>1st Row: VS-T Voltage. 2nd Row: Blank</p>	<p>Please see Note 1.</p>
 <p>The image shows a digital display with two rows. The top row shows '888' and the bottom row shows '888'. To the right of the display are labels: 'Vmain', 'CUR', and 'Vgen'.</p>	<p>1st Row: VT-R Voltage. 2nd Row: Blank</p>	<p>Please see Note 1.</p>
 <p>The image shows a digital display with two rows. The top row shows '888' and the bottom row shows '888'. To the right of the display are labels: 'Vmain', 'CUR', and 'Vgen'.</p>	<p>1st Row: VU-N Voltage. 2nd Row: Blank</p>	<p>Please see Note 1.</p>
 <p>The image shows a digital display with two rows. The top row shows '888' and the bottom row shows '888'. To the right of the display are labels: 'Vmain', 'CUR', and 'Vgen'.</p>	<p>1st Row: Abbreviation for Frequency. 2nd Row: Mains R Phase Frequency (Hz).</p>	<p>Please see Note 1.</p>
 <p>The image shows a digital display with two rows. The top row shows '888' and the bottom row shows '888'. To the right of the display are labels: 'Vmain', 'CUR', and 'Vgen'.</p>	<p>1st Row: Abbreviation for Frequency. 2nd Row: Generator U Phase Frequency (Hz).</p>	<p>Please see Note 1.</p>
 <p>The image shows a digital display with two rows. The top row shows '888' and the bottom row shows '888'. To the right of the display are labels: 'Vmain', 'CUR', and 'Vgen'.</p>	<p>1st Row: Abbreviation for Power Factor. 2nd Row: Generator U Phase Power Factor.</p>	<p>Please see Note 1.</p>
 <p>The image shows a digital display with two rows. The top row shows '888' and the bottom row shows '888'. To the right of the display are labels: 'Vmain', 'CUR', and 'Vgen'.</p>	<p>1st Row: Abbreviation for Active Power. 2nd Row: Generator U Phase Active Power (kW)</p>	<p>Please see Note 1.</p>
 <p>The image shows a digital display with two rows. The top row shows '888' and the bottom row shows '888'. To the right of the display are labels: 'Vmain', 'CUR', and 'Vgen'.</p>	<p>1st Row: Abbreviation for Reactive Power. 2nd Row: Generator U Phase Reactive Power (kVAR).</p>	<p>Please see Note 1.</p>

AMF 3.1 USER MANUAL

	<p>1st Row: Abbreviation for Apparent Power. 2nd Row: Generator U Phase Apparent Power (kVA).</p>	<p>Please see Note 1.</p>
	<p>1st Row: Abbreviation for RPM. 2nd Row: Generator RPM.</p>	<p>Please see Note 1.</p>
	<p>1st Row: Oil Pressure Value. 2nd Row: Unit of Measurement “bar” or “psi”.</p>	<p>Please see Note 1.</p>
	<p>1st Row: Coolant Temperature Value. 2nd Row: Unit of Measurement “Celcius”.</p>	<p>Please see Note 1.</p>
	<p>1st Row: Abbreviation for Battery. 2nd Row: DC Battery Voltage.</p>	<p>Please see Note 1.</p>
	<p>1st Row: Abbreviation for Charge. 2nd Row: DC Charge Voltage.</p>	<p>Please see Note 1.</p>
	<p>1st Row: Abbreviation for Fuel Level. 2nd Row: Fuel Level (%).</p>	<p>While on this screen, pressing the up  button will navigate to the screen shown on the top of this table (VR-N Voltage).</p> <p>While on this screen, pressing the down  button will navigate to the screen shown above.</p>

Note 1: While on this screen, pressing the up  button will navigate to the screen shown below.

While on this screen, pressing the down  button will navigate to the screen shown above.



MENU SCREEN STRUCTURE

In order to view/edit parameters, the alarm log, the engine running hours and maintenance timers, the menu must be entered. To enter the AMF 3.1 menu, press and hold the Menu Button for 3 seconds while in measurement display mode.

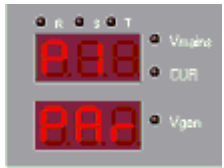


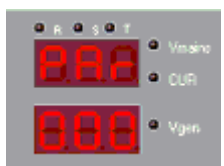

AMF 3.1 USER MANUAL

The AMF 3.1 menu consist of 3 main categories which are:



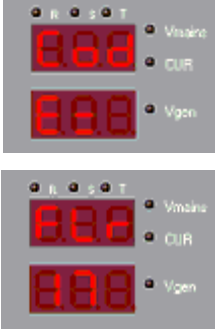

- P1 PAR: Parameter edit screen
- P2 ALR: Alarm log screen
- P3 SER: Maintenance timers screen

The desired category can be selected using the Up  and Down  Arrow buttons.


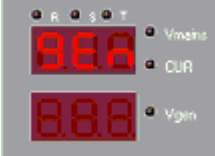
P1: PARAMETER EDIT SCREEN

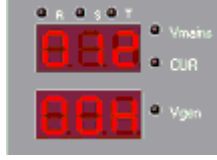





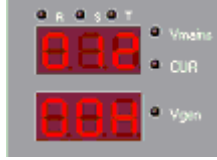
Screen	Description
	The parameter edit screen is the first page that appears after entering the menu. All the parameters are located inside this menu. From here the parameters can be viewed and/or edited. In order to access the parameters press the Menu button to enter the password entry screen located below.
	After pressing the Menu button, the screen will display "Ent PAS" for 2 seconds as seen on the left. The operator will have to enter the correct password which consists of 4 digits. The AMF has 3 user levels which are 1- User, 2- Service, 3- Factory. The operator can return to the previous screen by pressing the ESC button.
	The password entry will be made starting from the leftmost digit. The active digit will be blinking, indicating that it is the selected digit. The up and down buttons can be used to change the numerical value of the active digit, then by pressing the Shift button the active digit can be shifted to the next digit. Once the desired values are entered, the operator can press the Menu button to confirm it. If the password is wrong, the top display will indicate "Err" for 2 seconds then return to the measurement screen. If the password entry is correct, the screen below will appear.
	In order to view/edit a parameter, the parameter number must be entered first. The display indicating "000" shows the parameter number and the leftmost digit will be blinking. Similar to the password entry screen, the desired parameter number is entered by using the Up and Down buttons, and the next digit is selected by pressing the Shift button. Once the desired parameter number is entered, the operator can press the Menu button to confirm it.
	The parameter value is displayed as SET= "Parameter Value". The leftmost digit of the value will be blinking. The desired value is entered using the Up and Down buttons, and the next digit is selected by pressing the Shift button. Once the desired value is entered, the parameter can be saved by pressing the Menu button. The entered value can not be outside the limits set by the minimum and maximum value for the respective parameter. Note : 1 – The "Return to Factory Defaults" operation can not be done while the engine is running. Even though the parameter P30: Return the Factory Defaults is activated, the AMF will not change the settings. 2 – There is a protection buffer between P36 and P37. The difference between the 2 parameters has to be more than 3 times the value of P313. $(P37 - P36) > P313 \times 3$ 3 – There is a protection buffer between P40 and P41. The difference between the 2 parameters has to be more than 3 times the value of P314. $(P41 - P40) > P314 \times 3$ 4 – There is a protection buffer between P47 and P48. The difference between the 2 parameters has to be more than 3 times the value of P315. $(P48 - P47) > P315 \times 3$

P2-Alarm Log Screen

Screen	Description
	<p>The alarm log screen is the 2nd page that appears in the menu and can be navigated by pressing the Up and Down buttons, and pressing the Menu button on the “P2 ALr” screen. The alarm log screen displays the code, date and stamp for the last 15 alarms in the system. After entering the menu, the screen below appears.</p>
	<p>The alarms are listed on this page and the sorting is as last alarm occurred - displayed first, and the previous alarms are listed below that. The operator can scroll through the alarms by using the Up and Down buttons.</p>
	<p>The code of the alarm is displayed here.</p> <p>The screen on the left indicates that the alarm occurred is F17 “High Coolant Temperature”. The running hour time stamp information can be seen by pressing the Down button. The screen similar to the one shown below will appear.</p>
	<p>The total running hours when the at the time the alarm occurred is displayed on this screen. The alarm code screen displayed above can be reached by pressing the Up button.</p>

P3-Maintenance Timers Screen

Screen	Description
	<p>The maintenance timers screen is the 3rd page that appears in the menu and can be navigated by pressing the Up and Down buttons, and pressing the Menu button on the “P3 SEr” screen. There are 4 timer groups which are: General Maintenance Timer, Engine Maintenance Timer, Total Engine Running Hours, Total System Running Hours. The desired timer can be navigated using the Up and Down buttons.</p>
	<p>The first timer is the General Maintenance Timer and is indicated as “gEn” as seen on the screen on the left.</p> <p>A few seconds after this indication the second screen seen on the left will appear. The screen indicates that</p>

	<p>there are 1200 hours left until general maintenance.</p>
 	<p>The second timer is the Engine Maintenance Timer and is indicated as “Eng” as seen on the screen on the left.</p> <p>A few seconds after this indication the second screen seen on the left will appear. The screen indicates that there are 1200 hours left until engine maintenance.</p>
 	<p>The third timer is the Total Engine Running Hours and is indicated as “tEn” as seen on the screen on the left.</p> <p>A few seconds after this indication the second screen seen on the left will appear. The screen indicates that the engine has been running for 1200 hours.</p>
 	<p>The fourth timer is the Total System Running Hours and is indicated as “t0t” as seen on the screen on the left.</p> <p>A few seconds after this indication the second screen seen on the left will appear. The screen indicates that the system has been running for a total of 1200 hours.</p>

Digital Input Functions & Descriptions

The inputs indicating “AUX INPUT” on the back panel are the digital inputs of the panel. These inputs are optically isolated. “COM 7” is the common for auxiliary inputs 1,2,3 and 4. “COM 8” is the common for auxiliary inputs 5 and 6. In typical Generator applications, the COM 7 and COM 8 will be connected to the (+) terminal of the battery, and the auxiliary inputs will be connected with senders connected to the chassis. The following functions can be assigned to the auxiliary inputs using their respective parameters P206, P212, P218, P224, P230 and P236.

Note: The same function should not be assigned to more than 1 input. If there are the same functions assigned to multiple terminals, that function will not work properly.

The following functions can be assigned to auxiliary inputs.

0: Not Used	If no function will be assigned to the digital input, this function should be selected.
1: Oil Pressure Sender	The sender which energizes once the oil pressure drops below a certain limit is to be assigned this function.
2: Coolant Temperature Sender	The sender which energizes once the coolant temperature exceeds a certain limit is to be assigned this function.

AMF 3.1 USER MANUAL

3: Coolant Level Switch	The sender which energizes once the coolant level drops below a certain limit is to be assigned this function.
4: Aux. Alarm 1	If a signal is received, the alarm is sensed and AUX. 1 led found on the front panel will be lit.
5: Aux. Alarm 2	If a signal is received, the alarm is sensed and AUX. 2 led found on the front panel will be lit.
6: Aux. Alarm 3	If a signal is received, the alarm is sensed and AUX. 3 led found on the front panel will be lit.
7: Aux. Alarm 4	If a signal is received, the alarm is sensed and AUX. 4 led found on the front panel will be lit.
8: Aux. Alarm 5	If a signal is received, the alarm is sensed and AUX. 5 led found on the front panel will be lit.
9: Mains Exists	A sort of virtual Mains function. If the Mains is controlled by another controller, this function can be assigned and the Mains can be simulated according to the status of the input.
10: Remote Start Disable	If a signal is received the Remote Start function is disabled.
11: Alarm Disable	The alarm checking will be disabled and any alarm occurring on the generator will be discarded. This function is also known as Fire Pump Application or War Simulator.
12: Emergency Stop	Emergency stop function.
13: Remote Start	This function is to be used if the Generator will be started and the load transferred in AUTO Mode while the Mains exists.
14: GCB Feedback	The feedback function for the Generator Circuit Breaker. Can be used as a safety precaution during contactor operation and maintenance
15: MCB Feedback	The feedback function for the Mains Circuit Breaker. Can be used as a safety precaution during contactor operation and maintenance
16: GCB Disable	This function de-energizes the Generator Circuit Breaker. The system will not control this contactor.
17: MCB Disable	This function de-energizes the Mains Circuit Breaker. The system will not control this contactor.
18: Earthquake	This function is to be assigned if there is an earthquake sensor in the system. This is a Level 5 alarm independent from the system.
19: Keyboard Disable	This function disables all the buttons on the AMF panel. The buttons will not be operational.
20: No Mains	Functions the opposite way the Mains Exists function. The panel acts as if the Mains does not exist regardless of the actual condition of the Mains.
21: Thermic	The thermics from the contactors can be connected to an input with this function assigned in order to define a Thermic Failure in the system.
22: OFF Button Function	Does the function of pressing the OFF button located on the panel. This input is only sensed while changing from "0" to "1" and vice versa. The level is not sensed. This input is only active while on the measurements screen of the panel. If an operator is working on the panel and is in any one of the menus (P1: Parameter Editing, P2: Alarm Log or P3: Maintenance Timers), the input is temporarily disabled. When returned back to the measurements screen, the input is re-enabled.
23: AUTO Button Function	Does the function of pressing the AUTO button located on the panel. This input is only sensed while changing from "0" to "1" and vice versa. The level is not sensed. This input is only active while on the measurements screen of the panel. If an operator is working on the panel and is in any one of the menus (P1: Parameter Editing, P2: Alarm Log or P3: Maintenance Timers), the input is temporarily disabled. When returned back to the measurements screen, the input is re-enabled.
24: TEST Button Function	Does the function of pressing the TEST button located on the panel. This input is only sensed while changing from "0" to "1" and vice versa. The level is not sensed. This input is only active while on the measurements screen of the panel. If an operator is working on the panel and is in any one of the menus (P1: Parameter Editing, P2: Alarm Log or P3: Maintenance Timers), the input is temporarily disabled. When returned back to the measurements

AMF 3.1 USER MANUAL

	screen, the input is re-enabled.
25: Undefined	No function is assigned.
26: Alarm Acknowledge Button Function	AMF31 cihazı üzerindeki Arıza Sil (Korna Sustur) tuşunun fonksiyonluğunu yerine getirir. Bu giriş 0'dan 1'e geçiş sırasında algılanır. Seviye algılanmaz.
27: Undefined	No function is assigned.
28: Undefined	No function is assigned.
29: GCB Close Button Function	Does the function of pressing the GCB Close button located on the panel. This input is only sensed while changing from "0" to "1" and vice versa. The level is not sensed.
30: GCB Open Button Function	Does the function of pressing the GCB Open button located on the panel. This input is only sensed while changing from "0" to "1" and vice versa. The level is not sensed.
31: MCB Close Button Function	Does the function of pressing the MCB Close button located on the panel. This input is only sensed while changing from "0" to "1" and vice versa. The level is not sensed.
32: MCB Open Button Function	Does the function of pressing the GCB Open button located on the panel. This input is only sensed while changing from "0" to "1" and vice versa. The level is not sensed.

Digital Output Functions & Descriptions

The outputs indicating "AUX OUT" on the back panel are the digital outputs of the panel. These outputs are all dry contact relays. "COM 3" is the common for auxiliary outputs 1,2 and 3. The following functions can be assigned to the auxiliary outputs using their respective parameters P254, P256 and P258.

0: Not Used	If no function will be assigned to the digital output, this function should be selected.
1: Engine Running	If the engine has started and alarm delay time has passed this output will be activated.
2: AUTO Ready	If the panel is in AUTO mode, this output will be activated.
3: Mode Selection	If the Menu has been entered from the front panel, this output will be activated.
4: B,C (Class 1 & 2) Class Alarm (Horn) Output	In the Parameter List, the alarm classes are defined as follows; Class A : 0 Class B : 1 Class C : 2 Class D : 3 Class E : 4 Class F : 5 Class A alarms are numerically defined as "0". In the case of a Class 1 or 2 alarm, this output is activated. If the parameter P20 "Alarm Maximum Output Time" is defined as "0", this output will constantly be active. If parameter P20 is set at a value which is >0, then this output will be activated for that time period then be deactivated.
5: D,E,F (Class 3, 4 & 5) Class Alarm (Horn) Output	In the case of a Class 3, 4 or 5 alarm, this output is activated. If the parameter P20 "Alarm Maximum Output Time" is defined as "0", this output will constantly be active. If parameter P20 is set at a value which is >0, then this output will be activated for that time period then be deactivated.
6: B,C,D,E,F Class Alarm (Horn) Output	In the case of a Class 1, 2, 3, 4 or 5 alarm, this output is activated. If the parameter P20 "Alarm Maximum Output Time" is defined as "0", this output will constantly be active. If parameter P20 is set at a value which is >0, then this output will be activated for that time period then be deactivated.
7: Preheat Output	If there is a requirement of pre-heating before engine cranking this function output is used. The preheat time can be set using parameter P19.
8: Generator Loaded Output	If the system is fed through the generator contactor, this output will be

AMF 3.1 USER MANUAL

	activated.
9: Mains Loaded Output	If the system is fed through the mains contactor, this output will be activated.
10: Fuel Pump Output	If there is a requirement of automatic fueling this output will be activated. If the fuel level drops below the limit set by parameter P300 this output is activated and is deactivated when the fuel level reaches the upper limit set by parameter P301.
11: Undefined	No function is assigned.
12: Louvre Control Output	This output is activated when the fuel solenoid is energized and deactivated when the engine stops.
13: Fuel Solenoid Output	The same functions as the Fuel Solenoid output can be assigned using this function.
14: Telecom Running	This output is activated once the battery voltage drops below the limit set by P26 and is deactivated once the voltage reaches the limit set by P27. There is a 5 second delay between levels.
15: Generator Voltage or Speed Alarm	If there is an alarm regarding the generator voltages or frequency, this output is activated.
16: Analog Low Oil Pressure Alarm	If there is an alarm caused by the analog oil pressure sender, this alarm is activated.
17: Digital Oil Pressure Alarm	If there is an alarm caused by the digital oil pressure switch, this alarm is activated.
18: Speed Alarm	If there is an alarm caused by the frequency, this alarm is activated.
19: Undefined	No function is assigned.
20: Start Failure	If the generator failed to start, this output is activated.

Document Version

Versiyon No : 01
Değişiklik Tarihi : 05.05.2014
Değişikliği Yapan : Hasip TUNA
Değişiklik Nedeni : Yayım