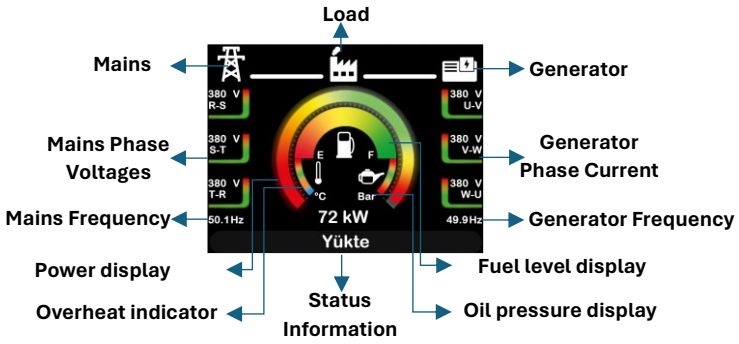
ENKO ELEKTRONİK
AMF-L GENERATOR CONTROL DEVICE

HOME SCREEN AND KEY IDENTIFICATION



START BUTTON: It is used to start the genset when the panel is in Test and Manual modes. At the same time, when the genset is in cooling and stop states in the same modes, pressing this button operates the genset restart procedure.

Emergency Stop Button: The generator switches to cooling while under load, and performs a direct stop when idling. Additionally, pressing this button switches the panel to Off Mode.

Auto Button: Switches the panel to Automatic mode. Under suitable network conditions, it connects the load to the grid; otherwise, it automatically starts the generator.

Manual Button: Switches the panel to Manual mode. It is used to start the generator, followed by pressing the generator contactor button to supply the load. Additionally, a short press switches to Test Mode.

Generator Contactor Button: In Manual Mode, it is used to supply the load with the generator. It disengages the generator while under load.Grid Contactor Button: In Manual Mode, it is used to supply the load to the grid. It disconnects the load from the grid while it is being powered by the grid.

Grid Contactor Button: In Manual Mode on the panel, when the grid is within the appropriate voltage and frequency range, this button is used to supply the load. In the same mode, pressing this button while the load is being powered by the grid will disconnect the load from the grid.

Alarm Mute Button: Deactivates the horn output and clears faults. You can delete individual faults on the active alarm page.

Enter Button: The enter button is used to navigate from monitoring pages to the main menu. In the main menu and submenus, pressing enter accesses deeper menus. On the maintenance page, the maintenance time is selected with the up/down buttons and reset by pressing enter for 5 seconds.

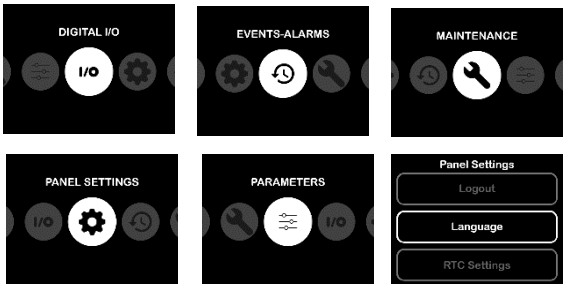
Navigation Down Button: Used to switch from phase-to-phase voltage or current display pages to the phase-neutral voltage display page. In active alarm and menu pages, it moves to the next fault or page heading below.

Navigation Up Button: Used to switch from phase-neutral voltage or current display pages to the phase-to-phase voltage display page. In active alarm and menu pages, it moves to the previous fault or page heading above

Navigation Right Button: Used in monitoring pages and the main menu to move to an adjacent page or menu title. It is used for navigating to pages like parameter changes, RTC settings, and the Ethernet settings page

Navigation Left Button: Used in monitoring pages and the main menu to move to an adjacent page or menu title. On pages where values are set, such as parameter changes, RTC settings, and the Ethernet settings page, it moves the cursor to the left. Additionally, if held down for 1 second, it exits to the upper menu while in any menu or exits from the parameter change stage

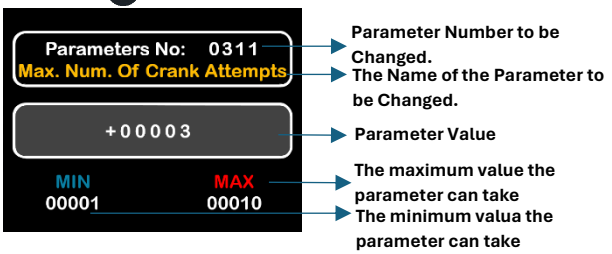
MAIN MENU AND USER INTERFACE



Press the enter button briefly on the monitoring screens to switch to the main menu. The main menu includes five main headings: "DIGITAL I/O", "EVENTS-ALARMS", "MAINTENANCE", "PANEL SETTINGS", and "PARAMETERS". You can navigate through the main menu by briefly pressing the left and right buttons. When you arrive at any main heading and press the enter button briefly, you enter the submenu. To return to a higher page from the main menu and submenus, pressing the left navigation button for 1 second is sufficient. Navigation within the submenus can be done using the up and down buttons.

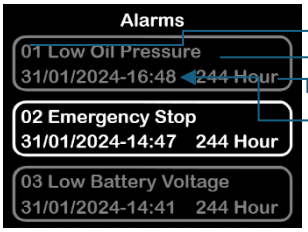
PARAMETER MODIFICATION

Navigate through the main menu to find the "PARAMETERS" heading and press the enter button. Access the "Enter Parameter Number" tab by pressing the enter button.



Press the enter button to activate the parameter number selection. Use the navigation buttons to input and confirm the desired value with the enter button. Then, press the down navigation button to move to the set value field, enter the password screen with the enter button, and proceed if the password is correct. Confirm the new parameter value using the navigation buttons and finalize it with the enter button. To exit the parameter menu, hold the left navigation button for 1 second.

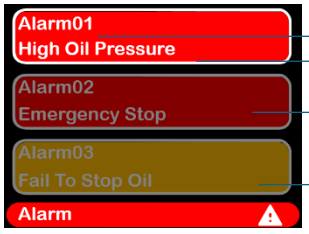
ALARM AND EVENT LOGS



Fault Record Number
Name of Fault Record
Engine Operating Hours at Time of Failure
The date and time ofthe occurence of the fault

Navigate to the "EVENTS AND ALARMS" heading from the main menu and press the enter button. You can access the last 50 event records by selecting "Events" and pressing the enter button, or the last 50 alarm records by selecting "Alarms" and pressing the enter button. The records include time information in day, month, year, hour, and minute format; the generator's operating hours at the time of the event are also recorded.

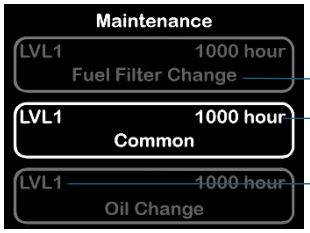
ACTIVE ALARMS



Active Fault Number
Active Fault Number
Errors wiht an action greater than 2 stop the generator. These errors have a red background.
Erros with action less than 3 do not stop the generator, they are at warning level. These errors have a yellow background

From the main screen, use the right and left navigation buttons to go to the active alarms page. Alarms are listed with a red or yellow background. Alarms with a yellow background are at a warning level and do not stop the generator, while alarms with a red background can stop the generator. You can delet e an alarm you wish to clear by navigating to it and pressing the alarm silence button.

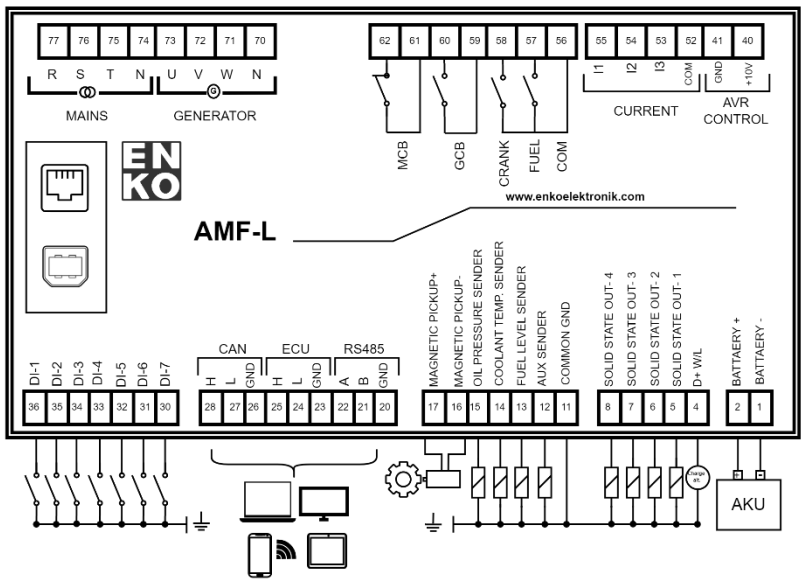
SERVICE TIME RESET



Maintenance Name
Time to Maintenance
Service Level

From the main menu, go to the "MAINTENANCE" option and enter by pressing the enter button. After selecting the service interval to be reset using the up and down navigation buttons, hold the enter button for 5 seconds to reset it.

AMF-L CONNECTION DIAGRAM



NOTE1: If the amount of time equal to the menu exit duration has passed since the last password entry, the password screen will reopen and the user will be asked to enter the password again.

NOTE2: If a fault or warning occurs, a warning symbol will appear in the bottom right corner of the screen, and the word "Alarm" in the status bar will start flashing in red or yellow, depending on the severity of the error.

NOTE3: When the panel is in Manual mode and is being powered by either the network or a generator, the contactor for the source providing the load cannot be disengaged unless its corresponding contactor button is used.

PARAMETERS

	P.	PARAMETER DESCRIPTION	UNI.	L	MİN.	MAX.	DEF
GRID	101	Off Mode Selection		2	0	1	0
	102	High Voltage Alarm Level	%	3	101	150	115
	103	Low Voltage Alarm Level	%	3	50	99	85
	104	High Frequency Alarm Level	%	1	101	150	104
	105	Low Frequency Alarm Level	%	2	50	99	96
	110	Phase Sequence Control Action		3	0	1	1
	111	Connection Type		3	0	1	1
ENGİNE	301	Generator Connection Type		2	0	1	1
	302	Engine Type		3	0	1	0
	303	Module Function		3	0	1	0
	304	Mode Function		1	0	3	0
	305	Pre-Initialization Action		2	0	2	0
	306	Starter Cutoff Level from Generator Frequency	Hz	3	150	750	150
	307	Starter Cutoff Level from Generator Speed	rpm	3	500	6000	500
	308	Starter Cutoff Level from Generator Voltage	V	3	60	500	300
	309	Cranking Cutoff Level from Charge Alternator Voltage	V	3	60	300	60
	310	Starter Cutoff Level from Oil Pressure	bar	3	10	100	30
	311	Maximum Number of Starter Attempts		2	1	10	3
	312	Intermittent Horn Output		1	0	1	0
	313	Oil Pressure Unit	bar	1	0	1	0
	314	Low Oil Pressure Alarm Action		3	0	4	4
	315	Low Oil Pressure Alarm Level	bar	2	5	95	10
	316	Oil Pressure Switch Open Circuit Action		2	0	4	4
	317	Temperature Unit	°C	1	0	1	0
	318	High Coolant Temperature Alarm Action		3	0	4	4
	319	High Coolant Temperature Alarm Level	°C	2	5	150	110
	320	Coolant Temperature Sender Open Circuit Action		2	0	4	4
	321	Low Fuel Level Alarm Action		3	0	4	4
	322	Low Fuel Level Alarm Level	%	2	0	45	5
	323	Fuel Level Switch Open Circuit Action		2	0	4	4
	324	Fuel Pump Lower Limit	%	2	0	90	20
	325	Fuel Pump Upper Limit	%	2	5	95	80
	326	Cooling Fan Low Limit	°C	3	0	240	65
	327	Cooling Fan High Limit	°C	3	5	245	100
	328	Nominal Battery Voltage	V	2	100	260	130
	329	Battery High Voltage Alarm Action		3	0	4	4
	330	Battery High Voltage Alarm Level	%	2	101	125	125
	331	Battery Low Voltage Alarm Action		3	0	4	4
	332	Batarya Düşük Gerilim Alarm Seviyesi	%	2	75	99	75
	334	Charging Alternator High Voltage Alarm Action		3	0	4	4
	335	Charging Alternator High Voltage Alarm Level	%	2	101	125	125
	336	Charging Alternator Low Voltage Alarm Action		3	0	4	4
	337	Charging Alternator Low Voltage Alarm Level	%	2	75	99	75
	339	Motor High Speed Alarm Action		3	0	4	4
	340	Motor High Speed Alarm Level	%	2	110	150	120
	341	Motor Low Speed Alarm Action		3	0	4	4
	342	Motor Low Speed Alarm Level	%	2	50	90	80
	343	Maintenance Alarm (Oil) Action		2	0	4	2
	344	Maintenance Alarm (Air) Action		2	0	4	2
	345	Maintenance Alarm (Fuel) Action		2	0	4	2
	346	Maintenance Alarm (General) Action		2	0	4	2
	348	Number of Flywheel Teeth		2	0	1000	100
	349	Test Mode Load Selection		2	0	1	0
	350	Oil Heater Low Temperature Limit	°C	2	-15	240	-15
	351	Oil Heater High Temperature Limit	°C	2	-10	245	0
	352	High Backup Temperature Alarm Action		3	0	4	4
	353	High Backup Temperature Alarm Level	°C	2	5	150	110
	354	Backup Temperature Switch Open Circuit Action		2	0	4	4
GENERATOR TİMER	501	Generator High Voltage Alarm Delay	s	3	1	1000	10
	502	Generator Low Voltage Alarm Delay	s	3	1	1000	10
	503	Generator High Frequency Alarm Delay	s	3	1	1000	10
	504	Generator Low Frequency Alarm Delay	s	2	1	1000	10
	507	Generator Phase Sequence Error Delay	s	2	1	1000	10
	508	Generator High Current Alarm Delay	s	3	1	1000	10
	509	Generator High Power Alarm Delay	s	3	1	1000	10
	510	Synchronous Switching Maximum Dwell Time	s	3	10	120	60
	511	Synchronous Transition Time	s	3	1	10	1
	512	Synchronous Transition Contactor Delay	ms	3	0	300	10
	513	Synchronous Transition Alarm Delay	s	3	1	1000	1

	P.	PARAMETER DESCRIPTION	UNI.	L	MİN.	MAX.	DEF
GENERAL	2	Factory Password		3	0	9999	1923
	3	Service Password		2	0	9999	1922
	4	User Password		1	0	9999	1934
	5	Parameter Record		1	0	2	0
	6	LANGUAGE		1	0	1	0
	7	Return to Factory Settings		3	0	2	0
	8	Log Cleanup		3	0	1	0
	9	Engine Clock Setting		3	0	32000	0
	10	Menu Timeout	min	3	1	30	5
	11	Exit Menu		1	0	1	0
GENERATOR	202	Number of Alternator Poles		1	0	7	1
	203	Nominal Voltage	V	2	85	240	220
	205	Generator High Voltage Alarm Action		3	0	4	4
	206	Generator High Voltage Alarm Level	%	2	101	150	115
	207	Generator Low Voltage Alarm Action		3	0	4	4
	208	Generator Low Voltage Alarm Level	%	2	50	99	85
	209	Nominal Frequency	Hz	2	300	600	500
	211	Generator High Frequency Alarm Action		3	0	4	4
	212	Generator High Frequency Alarm Level	%	2	101	130	106
	213	Generator Low Frequency Alarm Action		3	0	4	4
	214	Generator Low Frequency Alarm Level	%	2	50	99	94
	219	Generator Phase Sequence Control Action		1	0	4	2
	220	Generator High Current Alarm Action		3	0	4	4
	221	Generator High Current Alarm Level	A	2	1	10000	50
	222	Generator High Power Alarm Action		3	0	4	4
	223	Generator High Power Alarm Level	%	2	110	150	150
	227	Generator current transformer ratio		2	1	9999	20
	228	Synchronous Pass Selection		2	0	1	0
	229	Synchronous Transition Frequency Difference	Hz	2	3	10	3
	230	Synchronous Transition Maximum Frequency Difference	Hz	2	3	15	10
ENGİNE TİMER	601	Initialization Delay	s	1	0	6000	50
	602	Network Stabilization Time	s	1	0	18000	200
	603	Pre-run Time	s	2	0	6000	20
	604	Maximum Cranking Time	s	3	0	600	50
	605	Starter Waiting Time	s	3	50	990	100
	606	Failure Control Delay	s	3	0	1000	100
	607	Choke Duration	s	1	0	600	20
	608	Oil Pressure Switch Starter Interruption Time	s	3	0	50	0
	611	Stop Solenoid Timer		3	0	1200	200
	612	Engine Warm-up Time	s	3	0	3600	0
	613	Cooling Time	s	3	0	18000	300
	615	Transfer Time	s	3	0	6000	7
	616	Horn Duration	s	2	10	900	30
	619	Low Oil Pressure Alarm Delay	s	3	1	600	30
	620	Oil Pressure Sender Open Circuit Delay	s	2	1	600	30
	621	High Coolant Temperature Alarm Delay	s	3	1	600	50
	622	Coolant Temperature Sender Open Circuit Delay	s	2	1	600	50
	623	Low Fuel Level Alarm Delay	s	3	1	600	10
	624	Fuel Level Gauge Open Circuit Delay	s	2	1	600	10
	629	Motor Overspeed Alarm Delay		3	0	600	10
	630	Motor Low Speed Alarm Delay		3	0	600	10
	631	Maintenance Alarm (Oil) Clock	h	3	200	10000	1000
	632	Maintenance Alarm (Air) Clock	h	3	200	10000	1000
	633	Maintenance Alarm (Fuel) Clock	h	3	200	10000	1000
	634	Maintenance Alarm (General) Clock	h	3	200	10000	1000
	635	Service Time Refresh		2	0	4	0
	637	High Backup Temperature Alarm Delay	s	3	1	600	50
	638	Backup Temperature Switch Open Circuit Delay	s	2	1	600	50
ECU PARAMETERS	1001	J1939 Ecu Type		3	0	17	0
	1006	Ecu Speed Control Active		3	0	1	1
	1007	Ecu Oil Pressure Control Active		3	0	1	0
	1008	Ecu Temperature Control Active		3	0	1	0
	1009	Motor Speed Setpoint		3	0	1	0
	1010	Motor Speed Correction		3	0	100	50
	1011	Can Ecu Communication Error Action		3	0	4	1
	1012	Can Ecu Droop Active		3	0	1	0
	1013	Can Ecu Droop Percent	%	3	0	100	0
	1014	Can Source Address		3	0	255	0

INPUT-OUTPUT PARAMERTERS

	Relay 1	Relay 2	Relay 3	Relay 4	Digital Output 1	Digital Output 2	Digital Output 3	Digital Output 4
Output Function	1101	1103	1105	1107	1109	1111	1113	1115
Default Value	10	1	2	8	6	4	0	71
Output Delay	701	702	703	704	705	706	707	708
Default Value	0	0	0	0	0	0	0	0
Output Contact Type	1102	1104	1106	1108	1110	1112	1114	1116
Default Value	NO	NO	NO	NO	NO	NO	NO	NO
0 : Output Inactive	11 : Choke Output	22 : Digital Input-2 Active	31 : Digital Input-11(Analog Input-4) Active	31 : Digital Input-11(Analog Input-4) Active	49 : Coolant Temperature Switch Open Circuit	58 : User Defined Digital Input 8	67 : System in Auto Mode	72 : Oil Heater
1 : Starter Output	14 : Cooling Fan	23 : Digital Input-3 Active	32 : Emergency Stop Alarm	32 : Emergency Stop Alarm	50 : Fuel Level Switch Open Circuit	59 : User Defined Digital Input 9	68 : System in Manual Mode	73 : APU Enabled
2 : Fuel Solenoid	15 : Fuel Pump	24 : Digital Input-4 Active	33 : Engine Failed to Start Fault	33 : Engine Failed to Start Fault	51 : User Defined Digital Input 1	60 : User Defined Digital Input 10	69 : System in Test Mode	74 : APU Malfunctioning
3 : Stop Solenoid	16 : General Alarm	25 : Digital Input-5 Active	34 : Engine Failed to Stop Fault	34 : Engine Failed to Stop Fault	52 : User Defined Digital Input 2	61 : User Defined Digital Input 11	70 : Audible Warning Before Operation	75 : Battle Mode
4 : Horn Output	17 : Electrical Fault Alarm	26 : Digital Input-6 Active	35 : Generator High Voltage Alarm	35 : Generator High Voltage Alarm	53 : User Defined Digital Input 3	62 : Maintenance Alarm (Oil) Output	71 : AMF Ready	76 : APU Shutdown
6 : Generator Contactor	18 : Engine Stop Alarm	27 : Digital Input-7 Active	36 : Generator High Frequency Alarm	36 : Generator High Frequency Alarm	54 : User Defined Digital Input 4	63 : Maintenance Alarm (Air) Output	72 : Oil Heater	
8 : Mains Contactor	19 :Temporary Warning Alarm	28 : Digital Input-8(Analog Input-1) Active	37 : Generator Low Voltage Alarm	37 : Generator Low Voltage Alarm	55 : User Defined Digital Input 5	64 : Maintenance Alarm (Fuel) Output	73 : APU Enabled	
9 : Ready to Receive Payload Exit	20 : Permanent Warning Alarm	29 : Digital Input-9(Analog Input-2) Active	38 : Generator Low Frequency Alarm	38 : Generator Low Frequency Alarm	56 : User Defined Digital Input 6	65 : Maintenance Alarm(General) Output	74 : APU Malfunctioning	
10 : Pre-Initialization	21 : Digital Input-1 Active	30 : Digital Input-10(Analog Input-3) Active	39 : Low Oil Pressure Alarm	39 : Low Oil Pressure Alarm	57 : User Defined Digital Input 7	66 : System in Stop Mode	75 : Battle Mode	

	Digital Input 1	Digital Input 2	Digital Input 3	Digital Input 4	Digital Input 5	Digital Input 6	Digital Input 7	
Input Function	1201	1205	1304	1404	1504			
Default Value	0	1	0	0	0			
Input Delay	701	702	703	704	705			
Default Value	0	0	0	0	0			
Input Contact Type	1102	1104	1106	1108	1110			
Default Value	NC	NC	NC	NC	NC			
0 : Input Inactive	2 : Remote Start/Stop	4 : Panel Lock	13 : Stop Button Simulation	24 : Alarm Disabled	26 : Battle Mode	28 : APU Gate		
1 : Emergency Stop	3 : Remote Operation/Upload	8 : AVR Voltage Selection	14 : Start Button Simulation	25 : Alarm Reset	27 : Blackout	29 : User Configured		

	Analog Input 1	Analog Input 2	Analog Input 3	Analog Input 4
Analog Input Sender Type	1301	1401	1501	1601
Default Value	2	2	2	2
0:None	0:None	0:None	0:None	
1:Digital Input	1:Digital Input	1:Digital Input	1:Dijital Input	
2:Pressure Sensor	2:Pressure Sensor	2:Fuel Level Sensor	2:Temperature Sensor	
Analog Input Switch Selection	1302	1402	1502	1602
Default Value	3	3	3	3
0 : Input Inactive	0 : Input Inactive	0 : Input Inactive	0 : Input Inactive	
1 : Normally Open	1 : Normally Open	1 : Normally Open	1 : Normally Open	
2 : Normally Closed	2 : Normally Closed	2 : Normally Closed	2 : Normally Closed	
3 : VDO 5 Bar	3 : VDO 120	3 : VDO Ohm(10-180)	3 : VDO 120	
4 : VDO 10 Bar	4 : Datcon High	4 : VDO Tube(90-0)	4 : Datcon High	
5 : Datcon 5 Bar	5 : Datcon Low	5 : US ohm(240-33)	5 : Datcon Low	
6 : Datcon 10 Bar	6 : Murpy	6 : GM ohm(0-90)	6 : Murpy	
7 : Datcon 7 Bar	7 : Cummins	7 : GM ohm(0-30)	7 : Cummins	
8 : Murphy 7 Bar	8 : PT100	8 : Ford(73-10)	8 : PT100	
9 : CMB812	9 : Veglia	9 : User Defined	9 : Veglia	
10 : Veglia	10 : Beru		10 : Beru	
11 : User Defined	11 : User Defined		11 : User Defined	