GenSet

BS EN ISO 9001 : 2000

GENERATING SET

MG 20 SS-D

OWNERS MANUAL

MI455-02-00-00
March 2008

1. TECHNICAL SPECIFICATIONS

1.1 GENERATOR

Type	Asincrono / Asynchronous
Three phase power (Cos φ = 0,8)	20 kVA 415 V
Single phase power (Cos φ = 1)	15 kVA 240 V
Frequency	50 Hz
Insulation class	H
Mechanical protection	IP 23

1.2 ENGINE

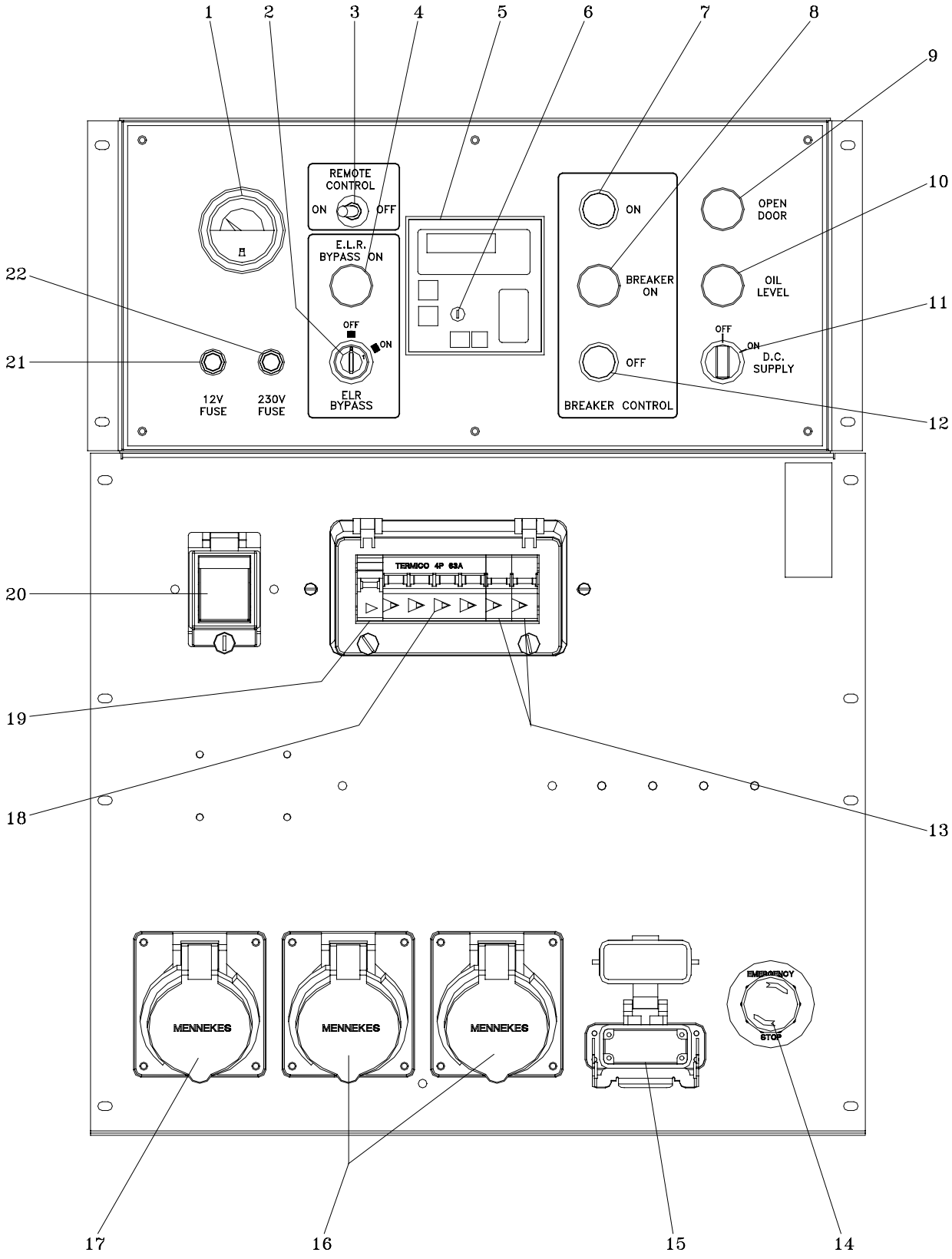
Make/Type	Deutz F3M 1011F
Number of cylinders	3
Displacement	2184 cm^3
Power	20,9 kW
Engine speed	1500 r.p.m.
Cooling	Olio – Oil
Fuel	Diesel
Oil sump capacity	5.5 l
Starting system	Elettrico - Electric
Hour fuel consumption @ 75%	4,167 l/h

1.3 GENERAL FEATURES

Noise level	93 Lwa
Battery	12 V - 62 Ah
Fuel tank capacity	100 l
Average operating hours @ 75%	24 h 30 min.
Dimensions (L. x W. x H.)	1900x800x1100 mm
Dry weight	950 kg
Weight	1030 kg

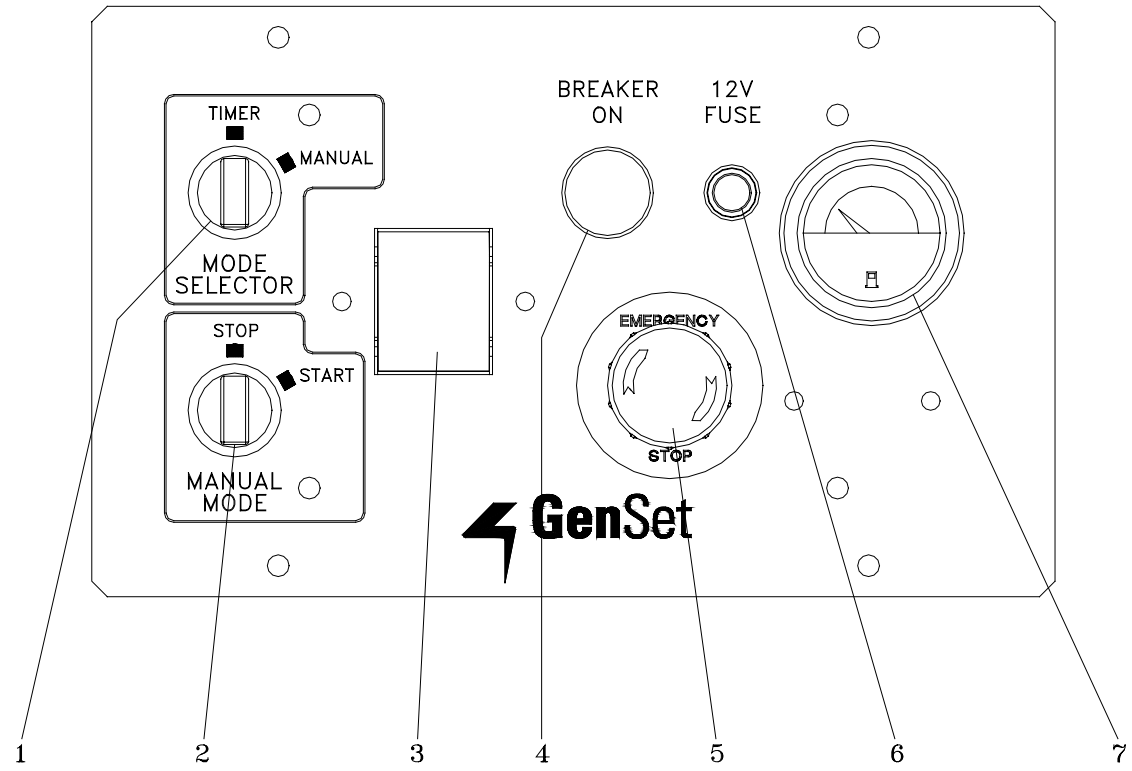
2. CONTROLS DESCRIPTION

2.1 FRONT PANEL



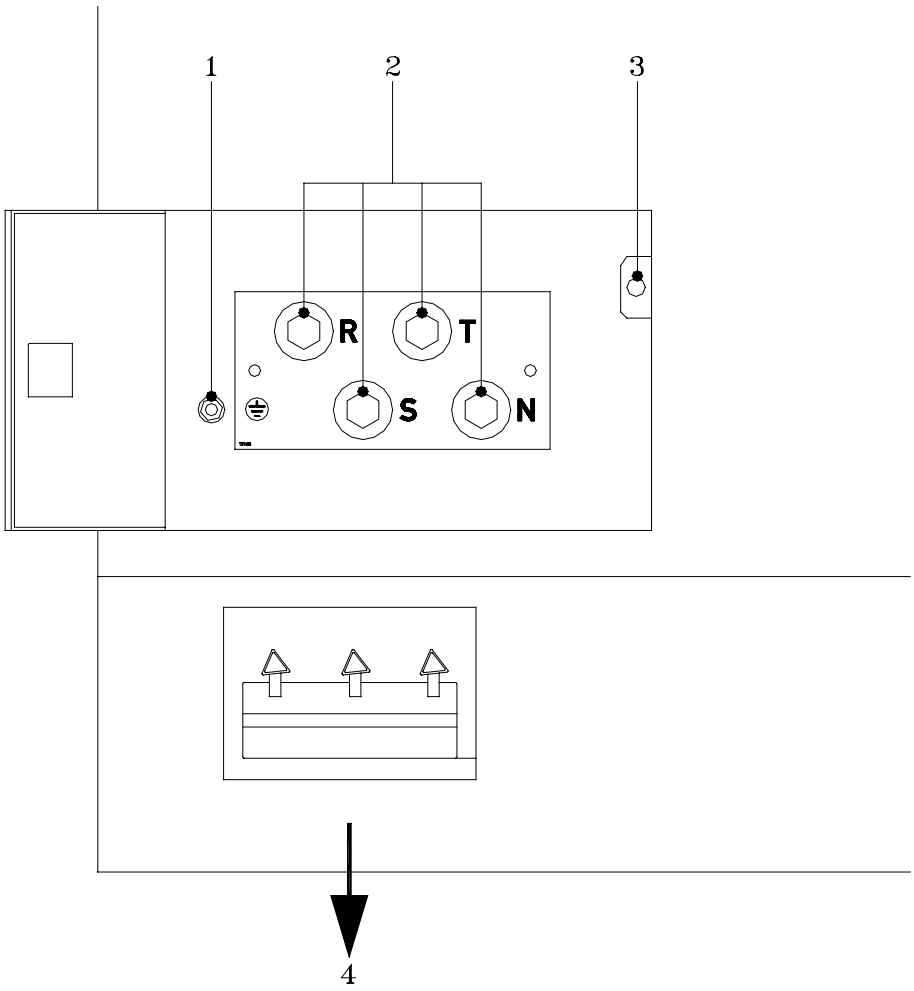
1	Fuel level gauge
2	Earth leakage relay bypass
3	Remote control switch
4	Earth leakage relay bypass alarm lamp
5	MP24 control unit
6	Starting key
7	“Breaker on” push button
8	“Breaker on” alarm lamp
9	Open door alarm lamp
10	Low oil level alarm lamp
11	DC 24 V supply selector
12	“Breaker off” push button
13	32 A 1 pole circuit breaker
14	Emergency stop button
15	Remote control connector
16	240 V 32 A single phase socket
17	415 V 32 A three phase socket
18	63 A 4 poles circuit breaker
19	240 V tripping coil
20	RD2 earth leakage relay
21	12 V fuse
22	240 V fuse

2.2 REMOTE CONTROL PANEL



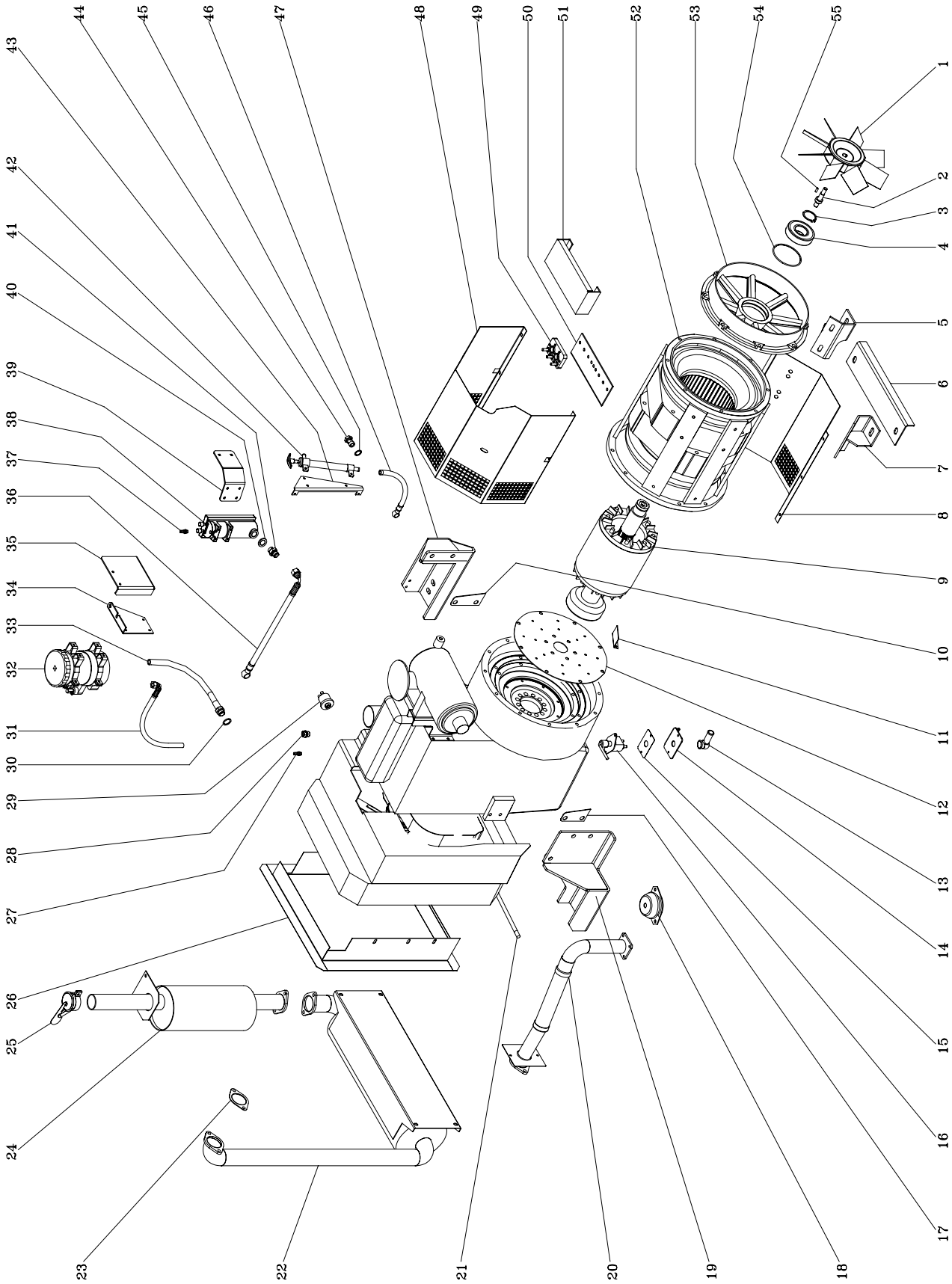
1	Timer / Manual switch
2	Manual mode Stop / Start selector
3	Timer
4	“Breaker on” alarm lamp
5	Emergency stop button
6	12 V fuse
7	Fuel level gauge

2.3 PANNELLO LATERALE / SIDE PANEL



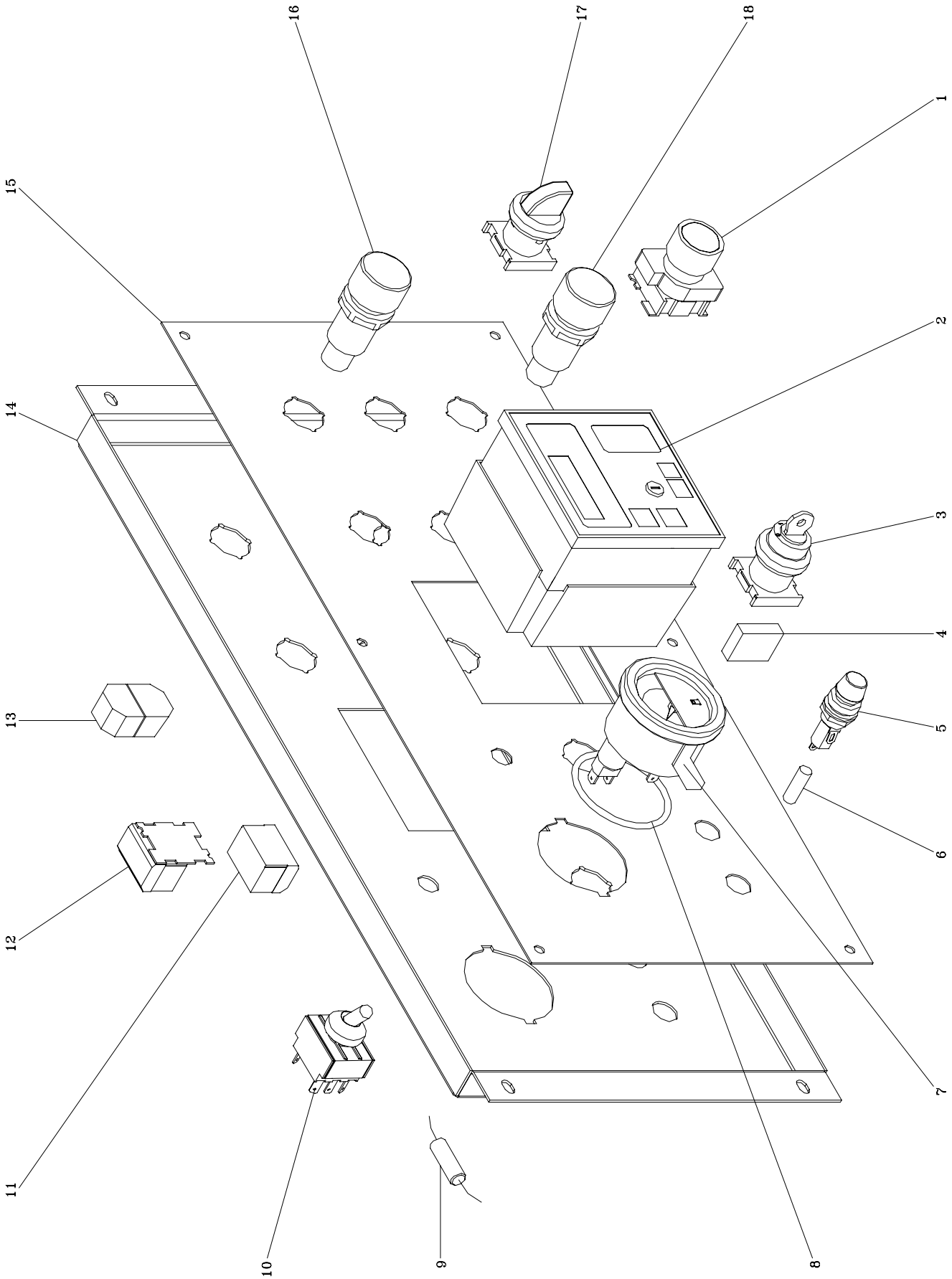
1	Earth clamp connection
2	R,S,T,N output
3	Safety switch
4	R,S,T,N output cables

3. RICAMBI / PARTS LIST



N°	Ordering N°	Denomination
1	6033	Fan
2	6032	Fan pin
3	4235	Seeger ring
4	4026	Bearing
5	115743/DX	Alternator right support
6	114221	Alternator traverse
7	115743/SX	Alternator left support
8	133757	Lower alternator protection
9	114366	Rotor
10	119849	Right engine holder spacer
11	6036	Blade for inox plate
12	105303	Inox plate
13	116222	Battery switch cap
14	140224	Battery switch support
15	139177	Battery switch aluminium plate
16	138686	Battery switch
17	119850	Left engine holder spacer
18	6048/A	T3 shoch absorber
19	119736	Left engine holder
20	120159	Silencer extension
21	119927	M10 L.330 tierod
22	119851	1° part silencer
23	4532	Silencer gasket
24	117442	2° part silencer
25	2962	Silencer flap
26	119738/A	Radiator frame
27	131560	Pipe fitting
28	137578	Cap
29	130678	Pressure sensor
30	131927	10x16x1 ring
31	133968	Puradyn pipe
32	PTF8	Puradyn filter
33	100741	M22x1,5x620 oil drain tube
34	133949	Puradyn support
35	140227	Puradyn support clamp
36	133967	Murphy cup connection pipe
37	131560	M10x1 pipe fitting
38	133356	Murphy oil level
39	135862	Murphy oil level support
40	136115	18x1,5 ring
41	9876	Pipe clamp nipple
42	4830	Oil drain pump
43	133188	Oil drain pump support
44	105096	Perforated screw
45	133933	Ring

N°	Ordering N°	Denomination
46	105089	Oil drain tube
47	119735	Right engine holder
48	133790	Top alternator protection
49	129090	3 poles terminal board
50	133747	Terminal boards support
51	134159	Terminal boards protection
52	133932	Stator
53	6013/A	Alternator flange
54	110129	O-ring
55	5633	Feather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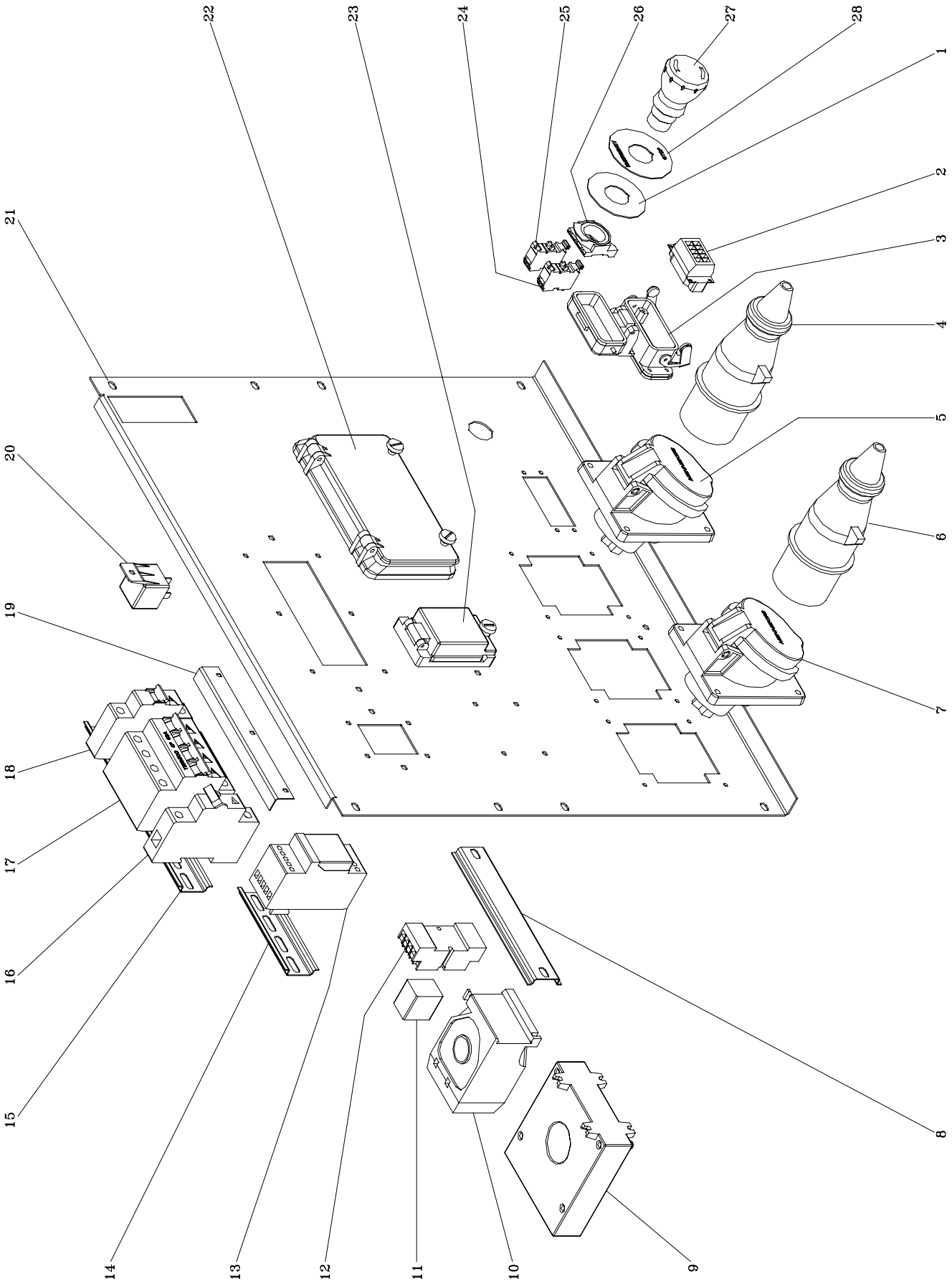
N°	Ordering N°	Denomination
1	137640	D.22 push button
2	133744	MP24 control unit
3	134823	Moeller key switch
4	134825	Moeller auxiliary contact
5	2062	Fuse holder
6	9451	5 A fuse
7	6518	Fuel level gauge
8	118183	O-ring
9	7346	1N diode
10	4456/A	3 poles switch
11	4395	Red auxiliary contact
12	115140	Green auxiliary contact
13	134195	Puradyn fuse
14	141767	Instrument front panel
15	141765	Aluminium front panel
16	133385	D.22 red lamp
17	140660	Moeller selector
18	137639	D.22 green lamp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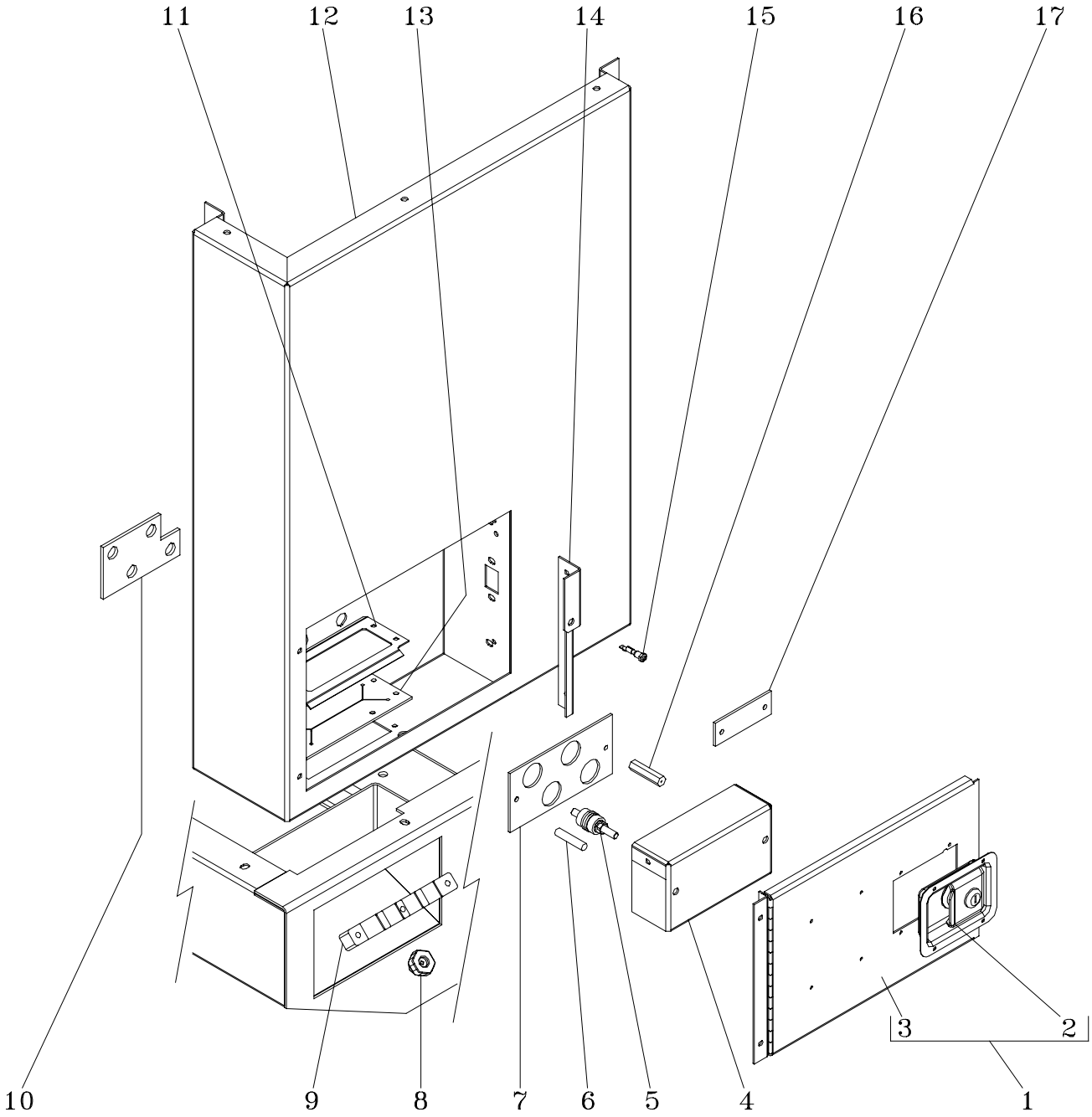
N°	Ordering N°	Denomination
1	135455	Washer for stop button
2	32468	10 poles female connector
3	32471	Immovable cover
4	4082	240 V 32 A plug
5	4061	240 V 32 A single phase socket
6	6266	415 V 32 A plug
7	6258	415 V 32 A three phase socket
8	5828/160	L.160 omega profile
9	105283	Current reduction
10	5856	100/5A transformer
11	133207	12 V DC relay
12	116805	12 V DC relay support
13	129870	RD2 earth leakage relay
14	5828/100	L.100 omega profile
15	5828/200	L.200 omega profile
16	133059	240 V tripping coil
17	103206	63 A 4 poles circuit breaker
18	3311	32 A 1 pole circuit breaker
19	135318	Circuit breakers spacer
20	138183	12 V relay with diode
21	141766	Lower plate
22	108273	8 module transparent cover
23	135136	2 module transparent cover
24	33484	NO contact
25	33485	Contact
26	33483	Stop button base
27	33482	Stop button
28	129871	“Emergency Stop” rating plate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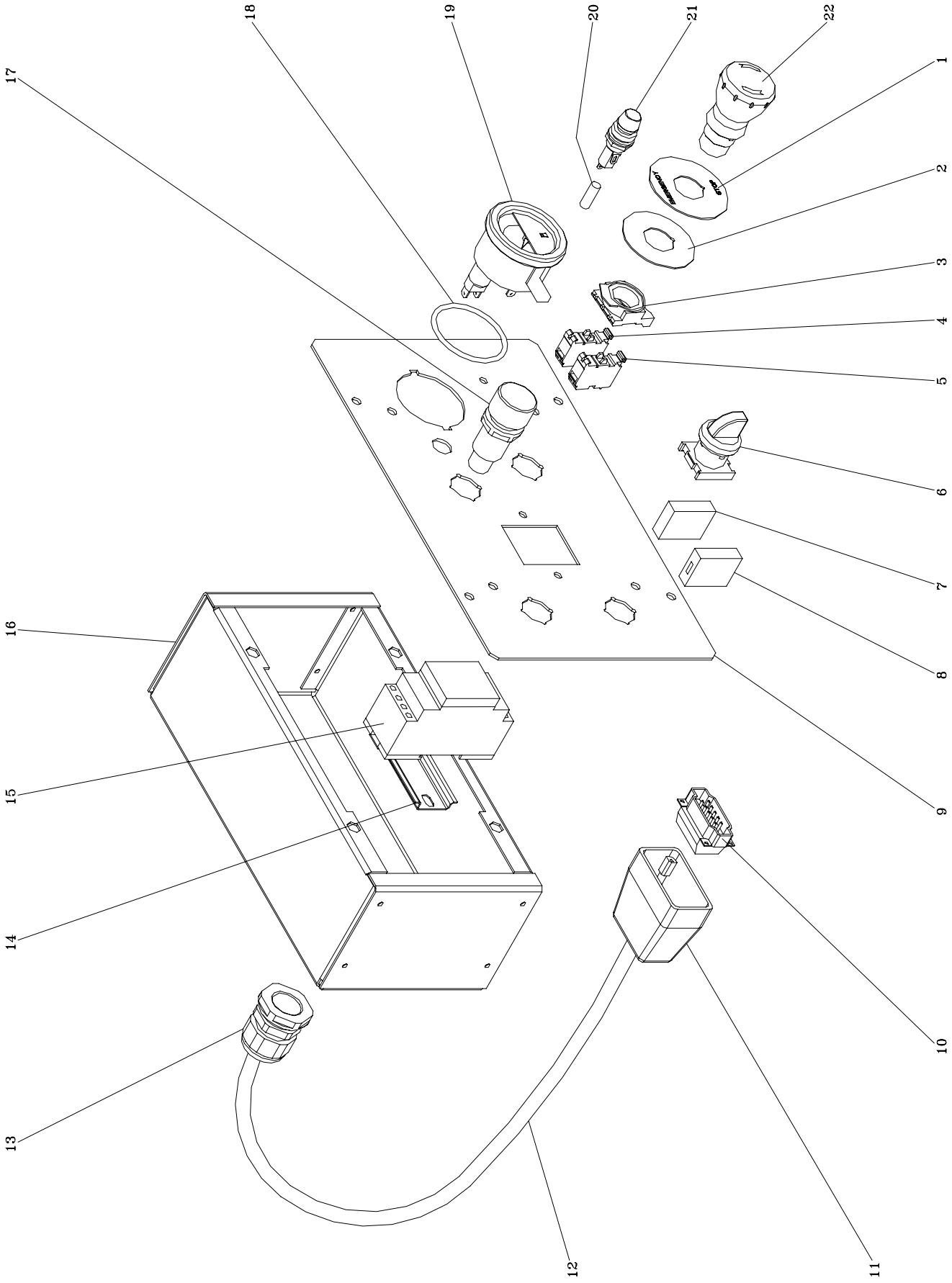
N°	Ordering N°	Denomination
1	129843/Z	Output door assembly
2	112178	Knob
3	129843	Output door
4	116121	Output cover
5	110247	Output insulator
6	110711	8x50 tierod
7	131463	Aluminium front plate for output
8	117623	Screw
9	117345	Wire holder plate
10	132513	Reinforcement
11	117331	Rubber wire holder support
12	134200/R	Right front panel
13	117330	Rubber wire holder
14	129850	Opened door support
15	9881	Safety switch
16	102740	Stud
17	141885	Single phase output aluminium plate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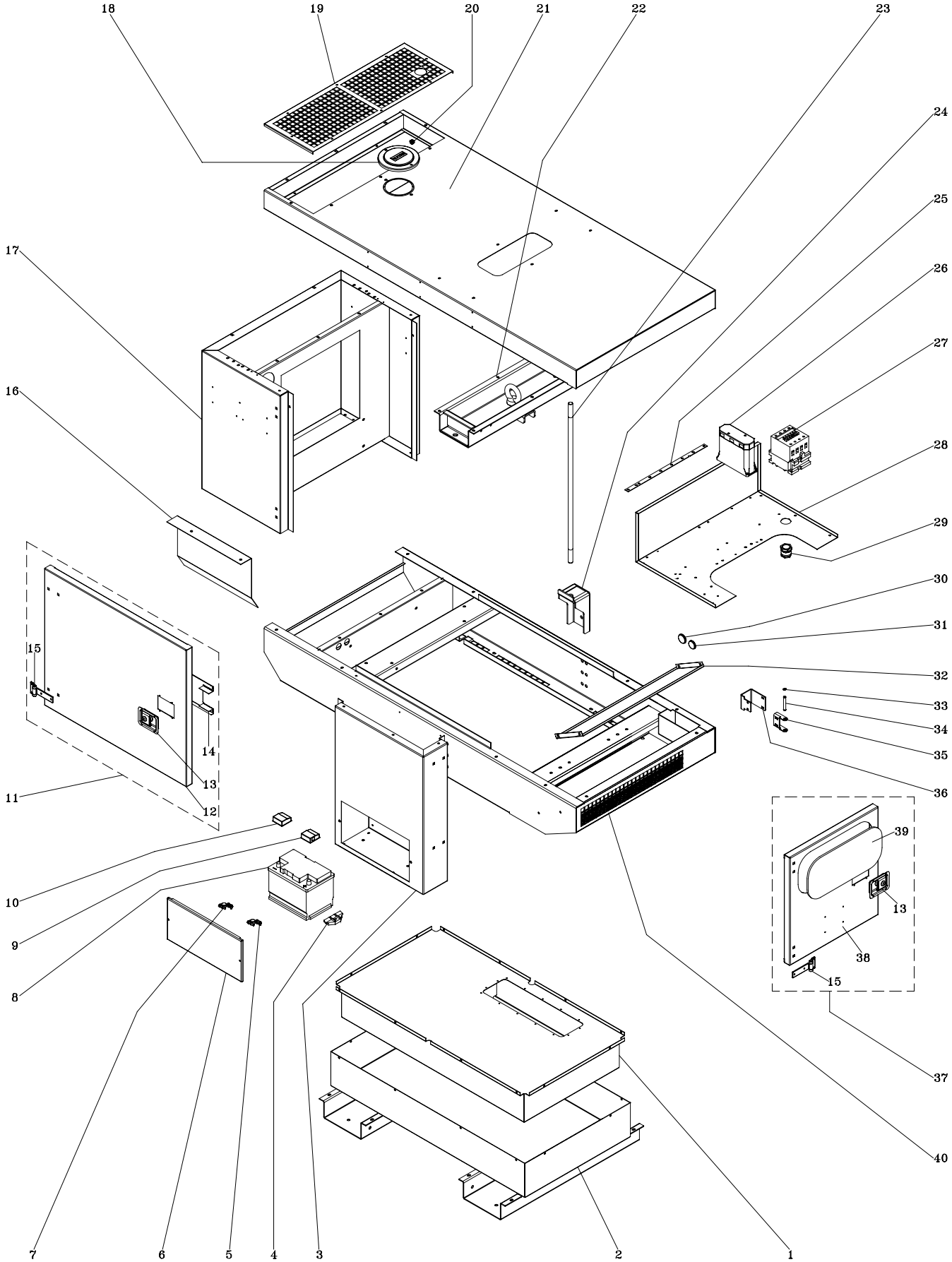
N°	Ordering N°	Denomination
1	129871	“Emergency Stop” rating plate
2	135455	Washer for stop button
3	33483	Stop button base
4	33484	NO contact
5	33485	Contact
6	140660	Moeller selector
7	134825	Moeller NA auxiliary contact
8	134824	Moeller NC auxiliary contact
9	141819	Aluminium plate
10	32469	10 poles male connector
11	33305	Mobile cover
12	3465	Wire
13	120501	PG21 wire holder
14	5828/75	L.75 omega profile
15	141761	Timer
16	137759	Box
17	137639	D.22 green lamp
18	118183	O-ring
19	6518	Fuel level gauge
20	9451	5 A fuse
21	2062	Fuse holder
22	33482	Stop button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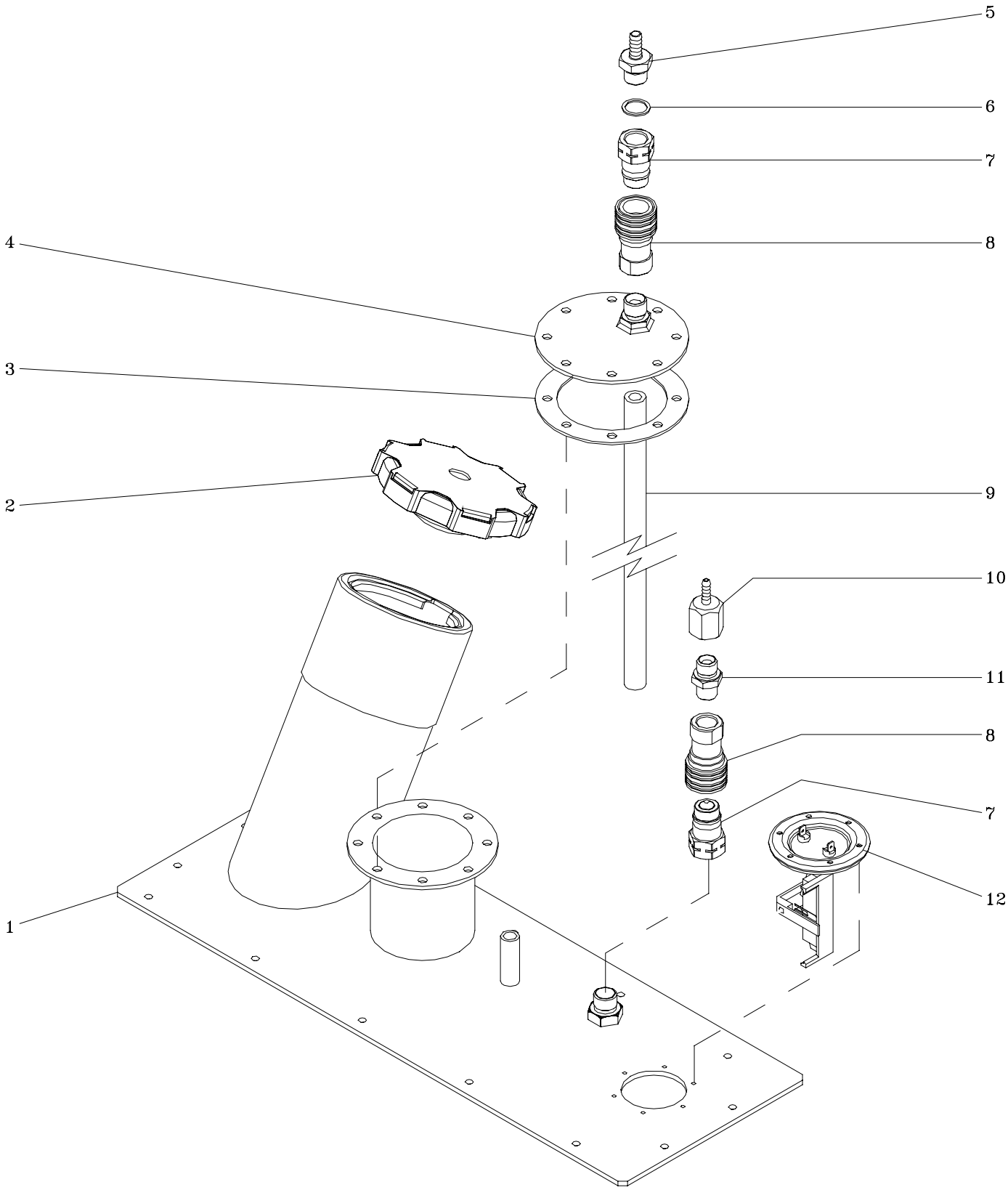
N°	Ordering N°	Denomination
1	118603	Fuel tank
2	118602	Fuel tank box
3	134199/R	Left front panel
4	133064	Battery clamp
5	4351	Positive battery clamp
6	133108	Battery door
7	4352	Negative battery clamp
8	116232	62 Ah 12 V battery
9	109606/R	Red clamp cover
10	109606/B	Blue clamp cover
11	135650/R	Side door assembly
12	135650	Side door
13	112178	Handle
14	135666	Plate
15	2873	Hinge
16	133216	Silencer extension protection
17	119959/R	Rear panel
18	129868/A	Radiator cover
19	117435	Exit air grate
20	115119	Knob
21	140246/R	Canopy cover
22	140230	Lifting bracket
23	140229	Lifting tie rod
24	140228	Lifting tie rod support
25	119747	Conductor
26	137830	3x70 mf capacitor
27	141759	240 V 4 poles contactor
28	117426	Capacitors support
29	120806	PG29 wire holder
30	113637	D.38 cap
31	9098	D.30 cap
32	117428/R	Insulating panel
33	133948	Seeger ring
34	133947	Pin
35	133945	Lock plate
36	135625	Lock plate support
37	129554/R	Front door assembly
38	129554	Front door
39	117831	Lexan panel
40	140226/R	Frame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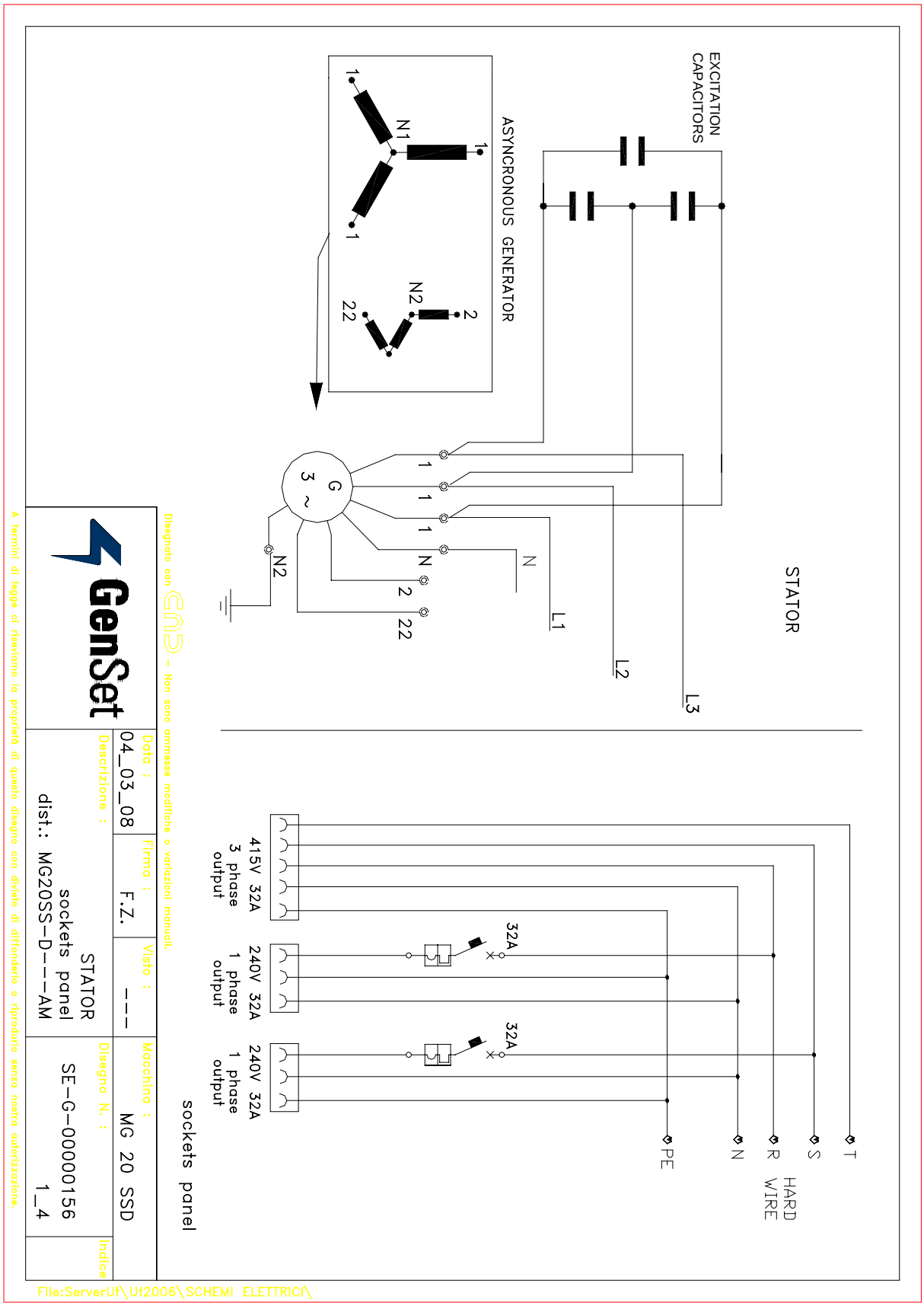
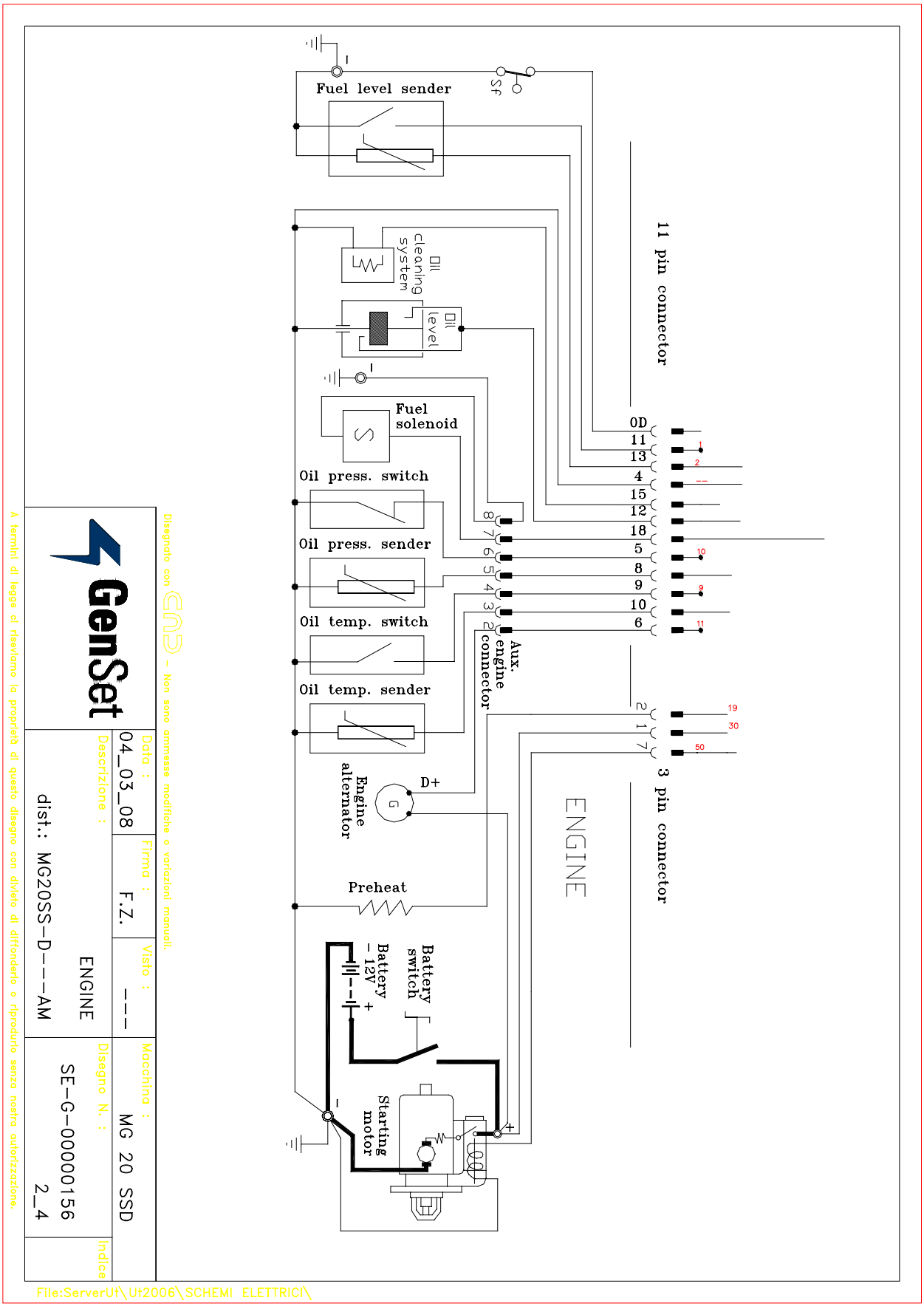
N°	Ordering N°	Denomination
1	141613	Fuel tank plate
2	100546	Fuel filler cap
3	141660	Cover plate gasket
4	141664	Cover plate
5	134029	3/8 pipe fitting
6	135615	17x23x3 gasket
7	117343	3/8 male rapid attachment
8	117344	3/8 female rapid attachment
9	141863	Tube
10	118023	Pipe fitting
11	9669	3/8 nipple
12	116234	Fuel level gauge

4. WIRING DIAGRAM




Fuel level sender
Sf
Oil cleaning system
Oil level
Fuel solenoid
Oil press. switch
Oil press. sender
Oil temp. switch
Oil temp. sender
Engine alternator
D+
Preheat
Battery switch
Battery - 12V +
Starting motor
11 pin connector
0D
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Aux. engine connector
3 pin connector
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ENGINE
GenSet
Data : 04_03_08
Firma : F.Z.
Visto : ---
Descrizione : ENGINE
dist.: MG20SS-D---AM
Disegno N. : SE-G-00000156 2_4
Macchina : MG 20 SSD
Indice
Disegnato con GD - Non sono ammesse modifiche o variazioni manuali.
A termini di legge ci riserviamo la proprietà di questo disegno con divieto di diffonderlo o riprodurlo senza nostra autorizzazione.
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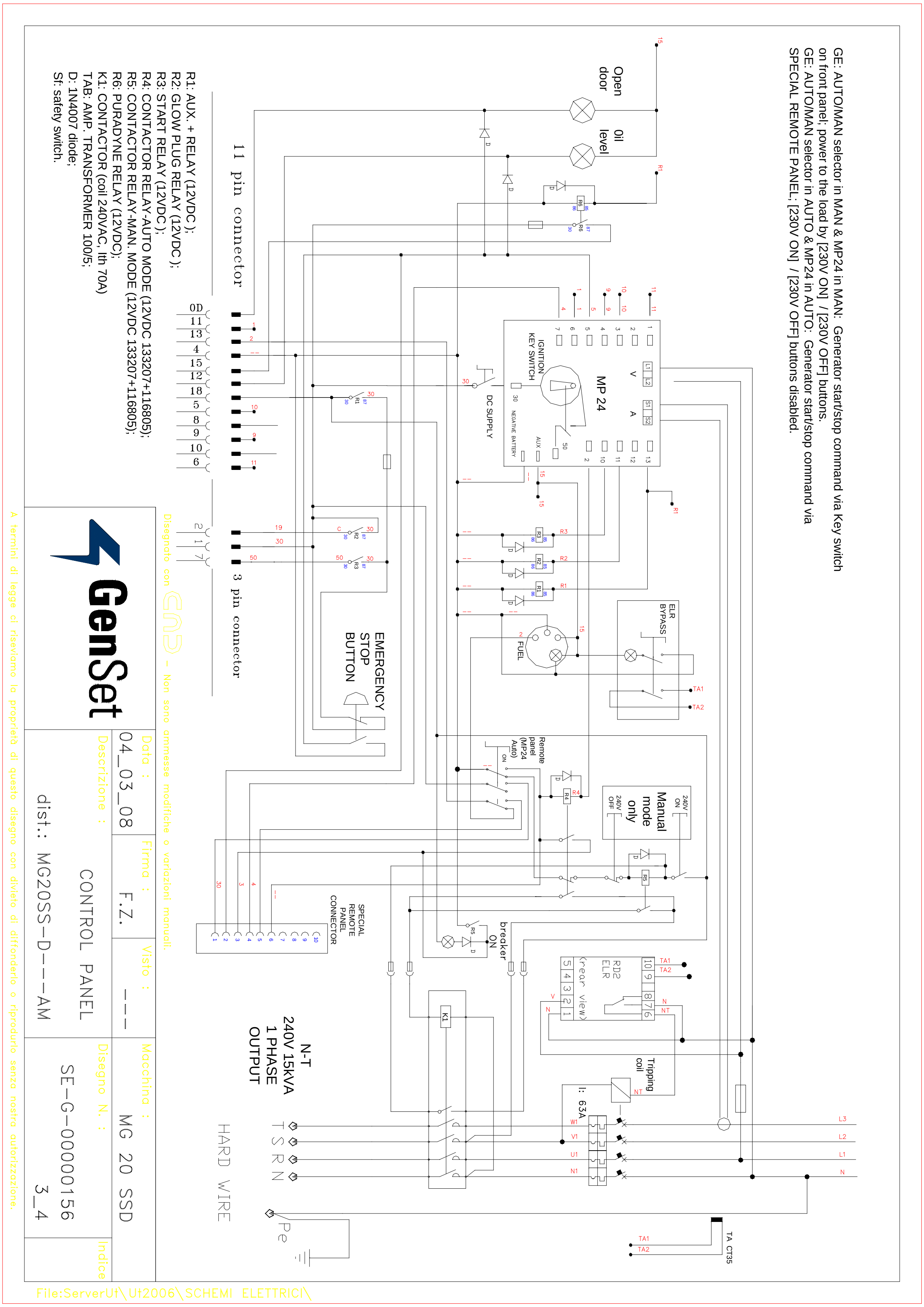
GE: AUTO/MAN selector in MAN & MP24 in MAN: Generator start/stop command via Key switch on front panel; power to the load by [230V ON] / [230V OFF] buttons.
GE: AUTO/MAN selector in AUTO & MP24 in AUTO: Generator start/stop command via SPECIAL REMOTE PANEL; [230V ON] / [230V OFF] buttons disabled.
R1: AUX. + RELAY (12VDC);
R2: GLOW PLUG RELAY (12VDC);
R3: START RELAY (12VDC);
R4: CONTACTOR RELAY-AUTO MODE (12VDC 133207+116805);
R5: CONTACTOR RELAY-MAN. MODE (12VDC 133207+116805);
R6: PURADYNE RELAY (12VDC);
K1: CONTACTOR (coil 240VAC, Ith 70A)
TAB: AMP. TRANSFORMER 100/5;
D: 1N4007 diode;
Sf: safety switch.
11 pin connector
3 pin connector
Open door
Oil level
MP 24
IGNITION KEY SWITCH
DC SUPPLY
NEGATIVE BATTERY
EMERGENCY STOP BUTTON
FUEL
ELR BYPASS
Remote panel (MP24 Auto) ON
Manual mode only
240V ON
240V OFF
SPECIAL REMOTE PANEL CONNECTOR
breaker ON
RD2 ELR (rear view)
Tripping coil
I: 63A
N-T
240V 15kVA
1 PHASE
OUTPUT
HARD WIRE
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Disegnato con - Non sono ammesse modifiche o variazioni manuali
GenSet
Data : 04_03_08
Firma : F.Z.
Visto : ---
Macchina : MG 20 SSD
Descrizione : CONTROL PANEL
dist.: MG20SS-D---AM
Disegno N. : SE-G-00000156
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Indice
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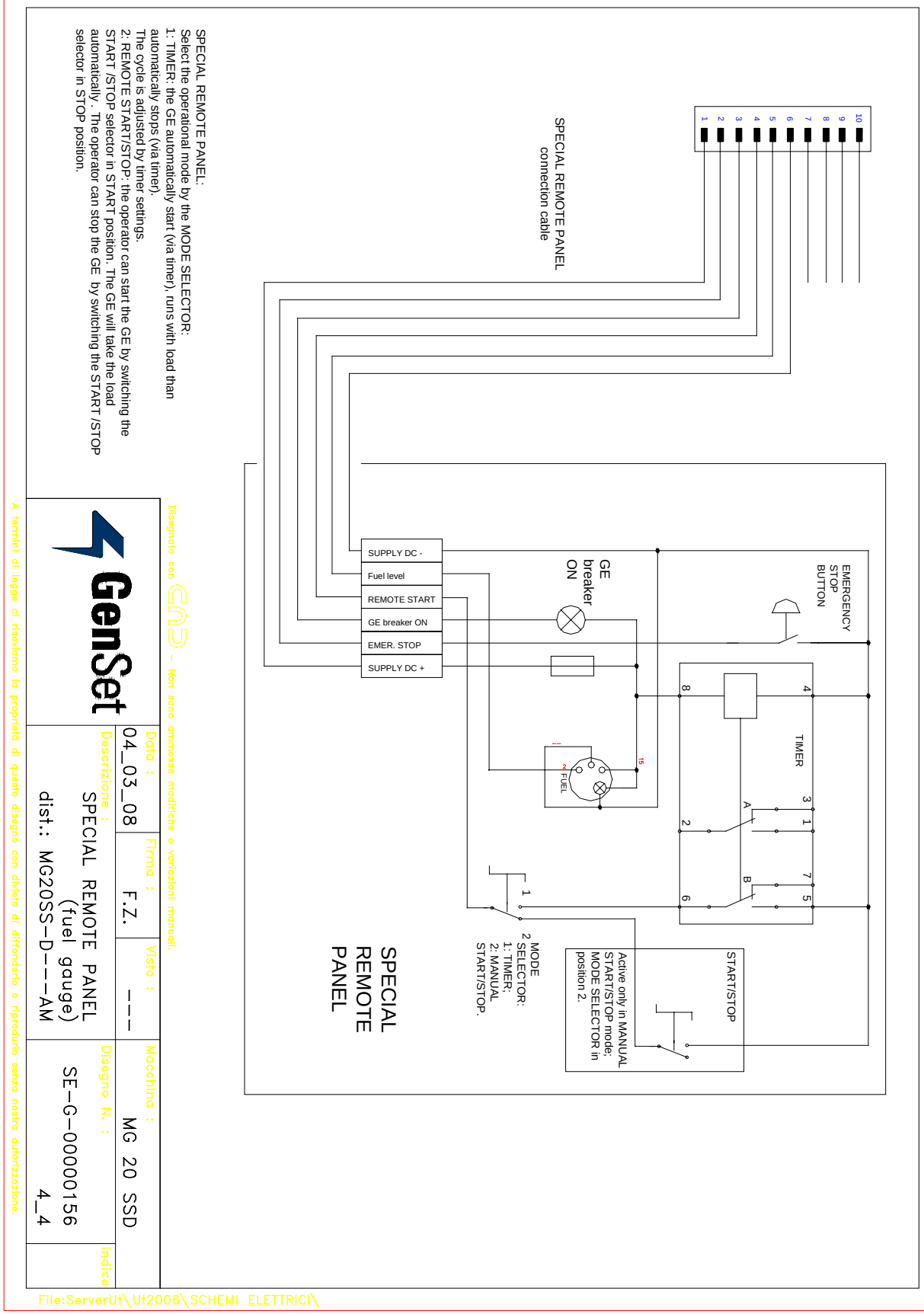
SPECIAL REMOTE PANEL:
Select the operational mode by the MODE SELECTOR:
1: TIMER: the GE automatically start (via timer), runs with load than automatically stops (via timer).
The cycle is adjusted by timer settings.
2: REMOTE START/STOP: the operator can start the GE by switching the START /STOP selector in START position. The GE will take the load automatically. The operator can stop the GE by switching the START /STOP selector in STOP position.
SPECIAL REMOTE PANEL connection cable
SUPPLY DC -
Fuel level
REMOTE START
GE breaker ON
EMER. STOP
SUPPLY DC +
GE breaker ON
EMERGENCY STOP BUTTON
TIMER
FUEL
MODE SELECTOR: 1: TIMER; 2: MANUAL START/STOP.
Active only in MANUAL START/STOP mode; MODE SELECTOR in position 2.
START/STOP
SPECIAL REMOTE PANEL
Disegnato con CAD – Non sono ammesse modifiche o variazioni manuali.
GenSet
Data : 04_03_08
Firma : F.Z.
Visto : ---
Macchina : MG 20 SSD
Descrizione : SPECIAL REMOTE PANEL (fuel gauge) dist.: MG20SS-D---AM
Disegno N. : SE-G-0000156 4_4
Indice
A termini di legge ci riserviamo la proprietà di questo disegno con divieto di diffonderlo o riprodurlo senza nostra autorizzazione.
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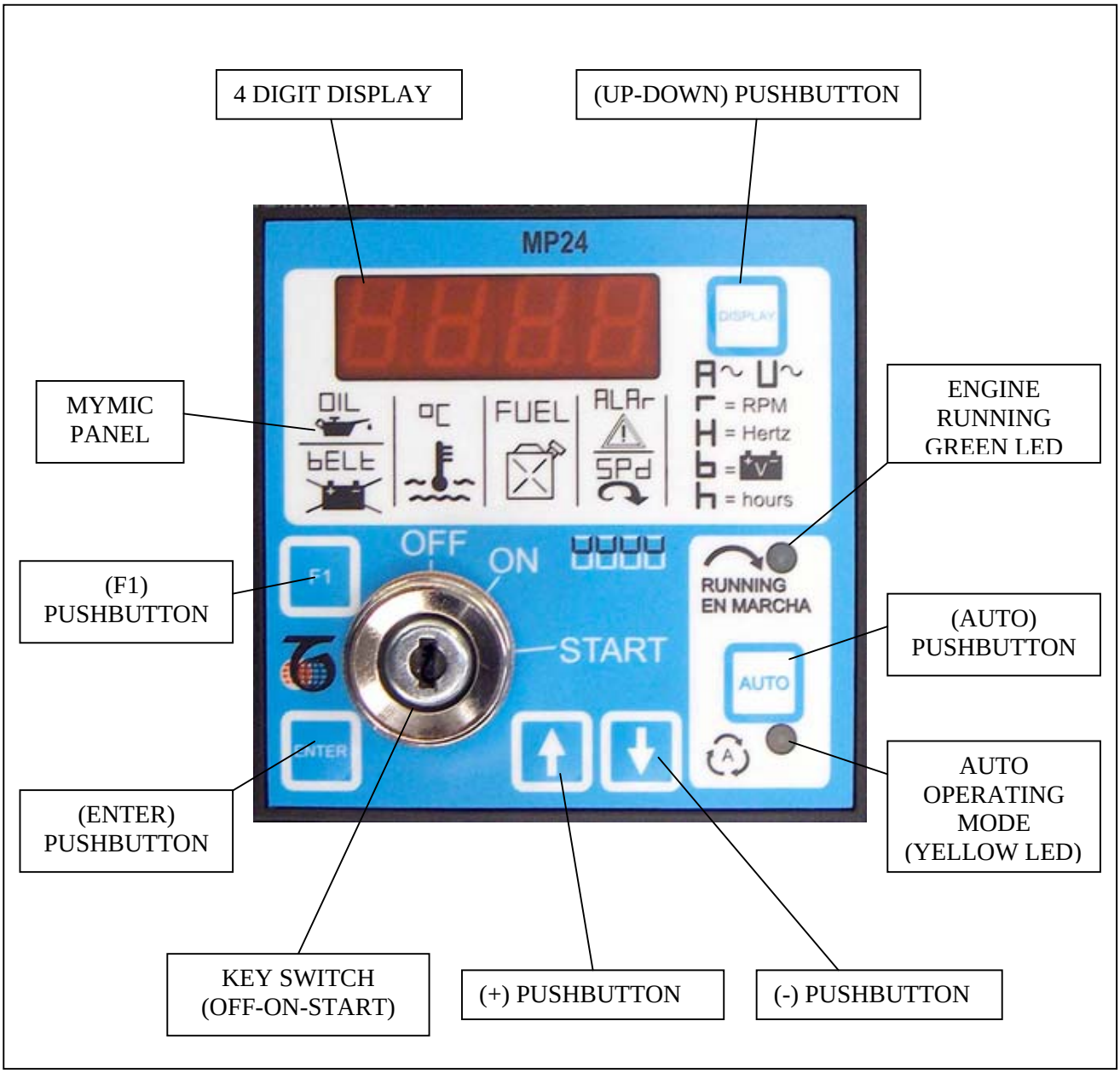
5. CONTROL DEVICES MOUNTED ABOARD

5.1 MP24 CONTROL UNIT FOR GENERATING SET (picture 1)

This controls and commands the genset unit.

5.1.1 CONTROL UNIT PUSH-BUTTON AND LED FUNCTIONS



MP24 features Engine and Generating Set (hereinafter GEN-SET) control and monitoring. The MP24 provides visual indication by means of LEDs and Display. It features OFF-AUTO-MAN operating modes. The display gives Messages for the following failures: Low Fuel Level, Emergency Alarm, Low Oil Pressure, High Temperature, High/Low Battery Voltage, Belt Break/Charger Failure, Over/Under Frequency, Fail to start, Alternator Failure, Over/Under Voltage, Over/Under Speed, Overload.
The following measurements are obtained on the front panel by using the (DISPLAY) pushbutton: Generator Voltage/Current/Frequency, Battery Voltage, Hours Meter, Charger Alternator Voltage and R.P.M.
The MP24 provides static outputs for START, STOP, ALARM (or GENERATOR CONTACTOR), FUEL SOLENOID and PRE-GLOW.
The MP24 features 31 programmable parameters, measurements calibration; the front panel includes 6 pushbuttons, 2 LEDs and a 4-digits DISPLAY.

5.1.2 DAS, AUTOMATIC ENGINE SHUT OFF

Safety device mounted aboard. It shuts off the engine automatically to avoid possible damage, in case of one of the following irregularities:

(OIL) Low oil pressure:
Indication of Low Oi1 Pressure alarm. The input is connected to an external normally closed contact (input #3). The Oil Pressure Switch is by-passed by means of the [P.25] timing.

(°C) High engine temperature:
Indication of High Temperature alarm. This input (terminal #4) Is connected to a normally open or closed temperature switch. The polarity of the contact is selected by means of a code in the [P.18] (option [n.o.] or [n.c.]). The alarm is bypassed 1 second.

(O.SPd.) OverSPEED:
The source of the alarm is derived from the Pick-UP (or “W” of the Charger Alternator). The parameters [P.22]-[P.23] allow full monitoring of the speed. The message flashes to indicate Over (1 second by-pass). To know the Speed that caused the failure push the [F1] pushbutton.

(U.SPd.) UnderSPEED:
The source of the alarm is derived from the Pick-UP (or “W” of the Charger Alternator). The parameters [P.21]-[P.22] allow full monitoring of the speed. The message flashes to indicate Under Speed shut down (6-second timing by-pass). To know the Speed that caused the failure push the [F1] pushbutton.

(bELt) Belt break:
The alarm is enabled by means of the (on) code into [P.15] There is a ‘Belt Break’ alarm when the Generator voltage is within the settings but the output voltage of the Charger Alternator is lower than the threshold of the [P.3]. A 20-second delay prevents false trigger of the alarrn. The [OFF] code, inserted in the [P.15], inhibits the alarm.

(ALAr) Emergency alarm:
This is an indication of External Emergency Stop (input #5). The MP24 stops the engine without delay. The polarity of the EMERGENCY ALARM contact is programmed into the [P.19] (option [n.o.] or [n.c.]).

(FUEL) Fuel alarm:
This is an indication of Low Level Fuel in the tank (input#6).

(FAIL) Starting failure:
This alarm is aciivated if the engine does not start after a
complete starting cycle (see settings of the parameters [P.2]-3]-4]-5]) or after a MANUAL starting cycle.

(E 04) Generator failure:
This message will be displayed if the Voltage or the Frequency of the alternator lacks for 150 seconds after the engine has been started. The alarm monitoring is disabled if the [P.12] contains the [OFF] code or the MP24 is in MANUAL operating mode.

(Hi H) Over frequency:
The Over Frequency setting is programmed into the [P.9]. The protection is delayed 2 seconds. The MP24 shuts down the engine. To know the Frequency that caused the failure push the [F1] pushbutton.

(Lo H) Under frequency:
The Under Frcquency setting is programmed into the [P.8]. The protection is delayed by 6 seconds. The MP24 shuts down the engine. To know the Frequency that caused the failure push the [F1] pushbutton.

(Hi U) Over Voltage:
If the voltage rises above the [P.7] setting for more than 2 seconds, the Over-Voltage alarm energises and the engine shuts down. To know the Voltage that caused the failure push the [F1] pushbutton.

(Lo U) Under voltage or Short circuit, the alarm energises if:
- the voltage drops under the [P.6] setting for more than 6 seconds
- the voltage drops under the [P.6] setting (minus 20%) for more than 1 second

To know the Voltage that caused the failure push the [F1] pushbutton.

(XX.X) Battery voltage alarm:
The alarm settings are automatically fixed to 118/15.0V for a 12V battery or 23,6/30.0V for a 24V battery. The alarm is delayed by 120 seconds and is ignored during Pre-Glow and starting cycles. The engine does not shut down and the user can select other display menus by using the [UP-DOWN] pushbutton.

5.1.3 PARAMETERS DESCRIPTION

DISPLAY	PARAMETERS
[P.0]	**Remote Start Delay Timing** **(Input #7)** Factory default: **[10”]** sec Range: 1-59 secs or 1-15 mins Seconds or minutes of continuous REMOTE START command to initiate the automatic engine start. (see section 9.0 and [P.20] in this section).
[P.1]	**Remote Stop Delay Timing** **(Input #7)** Factory default: **[10”]** sec Range: 1-59 secs or 1-15 mins Seconds or minutes of continuous absence of the REMOTE START command to initiate the stop cycle. (sec section 9.0 and [P.20] in this Section).
[P.2]	**Crank Timing (Output #l0)** Factory default: **[7”]** secs Range:1-20 seconds Maximum insertion time of the Starter motor. The timer is cleared if the engine starts to run.
[P.3]	**Engine Running Trigger (Input #1)** Factory default: **[5]** V Range: 3.0V-24.0V, [inh.] If the voltage of the Charger Alternator rises above the [setting] the Starter Motor is disconnected (see section 12.0). The programming is allowed in step of 1V. The [inh.] code allows the use of engine without Charger Alternator.
[P.4]	**Rest Timing** Factory default **[7”]** secs Range: 3-20 secs Time interval between starting attempts.
[P.5]	**Starting Attempts** Factory default: **[5]** attempts Range: 1-10 The parameter contains the number of automatic starting attempts of the automatic start cycle.
[P.6]	**Generator UnderVoltage, short-circuit** Factory default: **[200]** V Range: 80-400V (5V Step) If the voltage rises above the [setting], the MP24 enable the protection. If the voltage drops under the [setting] for at least 6 secs or under [setting]-20% for 1 sec, the Under-Voltage protection [Lo U] energises The [inh.] inhibits the overvoltage.
	Generator Over-Voltage

[P.7]	Factory default: **[270]** V Range: 110-550V or [inh.](5V Step) If the Generator voltage rises above the [setting] for at least 2 seconds, the MP24 will energise the over voltage protection [Hi U] (see section 4.0) and stops the engine. The [inh.] inhibits the overvoltage.
[P.8]	**Generator Under-Frequency** Factory default: **[47]** Hz [inh.] to 99Hz ([inh.]=disables the under frequency) The protection is delayed by 6 seconds. The MP24 shuts down the engine and the display will show [Lo H] (see section 4.0).
[P.9]	**Generator Over-Frequency** Factory default: **[56]** Hz 45 to [inh.] ([inh.]=disables the over frequency) The protection is delayed by 2 seconds. The MP24 shuts down the engine and the displays [Hi H] (see section 4.0).
[P.10]	**Current Transformer Size** Factory default: **[100]**/5 The range is 10/5 up to 1000/5 The settings are allowed only in steps of 10.
[P.11]	**Generator Overload Setting** Factory default: **[inh.]** (inhibited) Range: [inh.] to 1000 A The MP24 shuts down the engine after a delay of 6 secs and shows the message [E04]. The settings are allowed in steps of 1A (CT 10/5 up to 100/5) and 10A (CT 100/5 up to 1000/5).
[P.12]	**Generator Failure Alarm** Factory default: **[ON]** Selection: [on] or [OFF] The code [on] enables the generator failure alarm. The alarm energises if the voltage (or the frequency) is lower than the UnderV/Hz settings for more than 150 seconds. The MP24 shows the [E04] message and the engine will shut down.
[P.13]	**Glow Plugs/Choke Control** **(Output #11)** Factory default: **[10"] (seconds)** Range: 1 to 99 secs The MP24 energises the output #11 for the programmed time. The [P.14] controls the operating mode of the output #11 (Pre-Glow or Choke section 7.0 and 8.0)
[P.14]	**Output Control** Factory default: **[2]** (none) The following possibilities are available: **[0] None, [1] Choke Control** (section 8.0)**, [2] Glow Plugs Control** **[3] Choke Control** (section 8.0)
[P.15]	**Belt Break Control** Factory default: **[ON]** (inhibited)

	Selection: [on] or [OFF] The Belt Break (or Charger Alternator failure) alarm is indicated by means of the message [bELt] (see section 4.0)
[P.16]	**Stop Solenoid Timing** **(Output #12)** Factory default: **[10”]** secs Range: 2-99 secs Duration of the Stop cycle (output #12). The stop solenoid will remain energised for the programmed time.
[P.17]	**Alarm Output Timing** **(Output #2)** Factory default: **[inh.]** [inh.]-59 secs 1-15 mins and [cont] Time-out of the alarm output #2. The code [cont] disables the time-out and the alarm remains energised until the OFF operating mode will be selected. The [inh.] mode enables the use of the external contactor (see parameter [P.28]).
[P.18]	**Temperature Switch (INPUT #4)** Factory default: **[n.o.]** (normally open) Selection: [n.o.] or [n.c.] **[n.o.]** normally open contact: the engine shuts down if the contact closes. **[n.c.]** normally closed contact: the engine shuts down if the contact opens.
[P.19]	**ALARM Control (INPUT #5)** Factory default: **[n.o.]** (normally open) Selection: [n.o.] or [n.c.] **[n.o.]** normally open contact: the engine shuts down if the contact closes. **[n.c.]** normally closed contact: the engine shuts down if the contact opens.
[P.20]	**Remote Start (INPUT #7)** Factory default: **[n.o.]** (normally open) Selection: [n.o.] or [n.c.] **[n.o.]** normally open contact: the engine starts if the contact closes. **[n.c.]** normally closed contact: the engine starts if the contact opens.
[P.21]	**Under Speed setting** Factory default: **[inh.]** [Inh.] or 100-4000 r.p.m. The MP24 by-passes the protection by 6 seconds to avoid false trigger action. The [Inh.] code (setting <100 r.p.m.) disables the Under Speed shut down.
[P.22]	**Over Speed setting** Factory default: **[inh.]** 100-4000 rpm or [Inh.]. The MP24 provides one second bypass delay. The [Inh.] code (>4000 r.p.m.) disables the Over Speed shut down.
[P.23]	**Number of Teeth of the Flywheel** Factory default: **[Inh.]** [Inh.] or 1-500 teeth.

	The [Inh.] code (setting <1) disables the reading of the Speed (section 3.0), the Over/Under Speed shut downs and the Crank OFF action.
[P.24]	**Crank OFF** Factory default: **[Inh.]** Crank Termination setting: 100-800 rpm This speed threshold terminates crank. One second delay is added to avoid false termination. The allowed range is 100 up to 800 R.P.M. The code [Inh.] inhibits the crank termination.
[P.25]	**Low Oil Pressure Alarm By-Pass** Factory default: **[6"]** secs Range: 0-99 secs By-Pass Delay to ignore the Oil Pressure (input #3) during the engine starting cycle. The input requires normally closed contact.
[P.26]	**Automatic Periodic Test Cycle** Factory default: **[inh.]** (inhibited) Range: [inh.]-99 days This is the interval time between the automatic periodic tests of the engine. The code [inh.] disables the Automatic Periodic Test (see section 22.0).
[P.27]	**Automatic Engine Test Duration** Factory default: **[5']** mins Range: 1-99 minutes This is the duration of the automatic engine test (see section 22.0).
[P.28]	**Generator warm-up timing** Factory default: **[10”]** secs Range [inh.]-15 minutes ([inh.]=No warmup) **Active only** when [P17]= [inh.] the ALARM output is used to drive the GEN-SET contactor.
[P.29]	**Generator cooling timing** Factory default: **[30”]** secs Range [inh.]-15 minutes ([inh.]=No warmup) **Active only** when [P17]= [inh.] the ALARM output is used to drive the GEN-SET contactor.

[P.30]	**Enabling frequency Revolution Counter** Factory default: **[inh.]** Range: 2 = alternator 2 poles 3000 turns 4 = alternator 4 poles 1500 turns Enables the reading of the revolution counter motor drawing the value from the frequency of the alternator.
[P.31]	**Planning Fuel End Alarm** Factory default: **[1']** Range: [99' - 1' - inh.] [inh.] = only optic signaling, no motor stop [from 1' to 99'] = delaty for motor stop

5.2 RD2 EARTH LEAKAGE CIRCUIT BREAKER

The unit is equipped with an RD2 earth leakage circuit breaker capable of ensuring user protection in case of accidental contact with live parts or failure of the insulation system of connected users.
If an earth leak current occurs (differential current), the toroidal transformer supplies a signal to the RD2 differential relay, which processes it and compares it with the set sensitivity value. When this threshold level is exceeded, the set delay is enabled and then the alarm contact is tripped.

On-panel controls
1- Green LED "ON" : power ON
2- Red LED "TRIP" : alarm status the connection between the toroidal transformer and the differential relay is continuously controlled by the latter - if the
connection is interrupted, the differential relay goes into "alarm" status.
3- The **"TEST"** push-button simulates a fault inside the differential relay: when the button is pressed, the differential relay must changeover to alarm status.
4- The **"RESET"** push-button returns the differential relay to its initial "non alarm" status.
5- To select tripping steps I.
6- To select tripping steps in **seconds**.

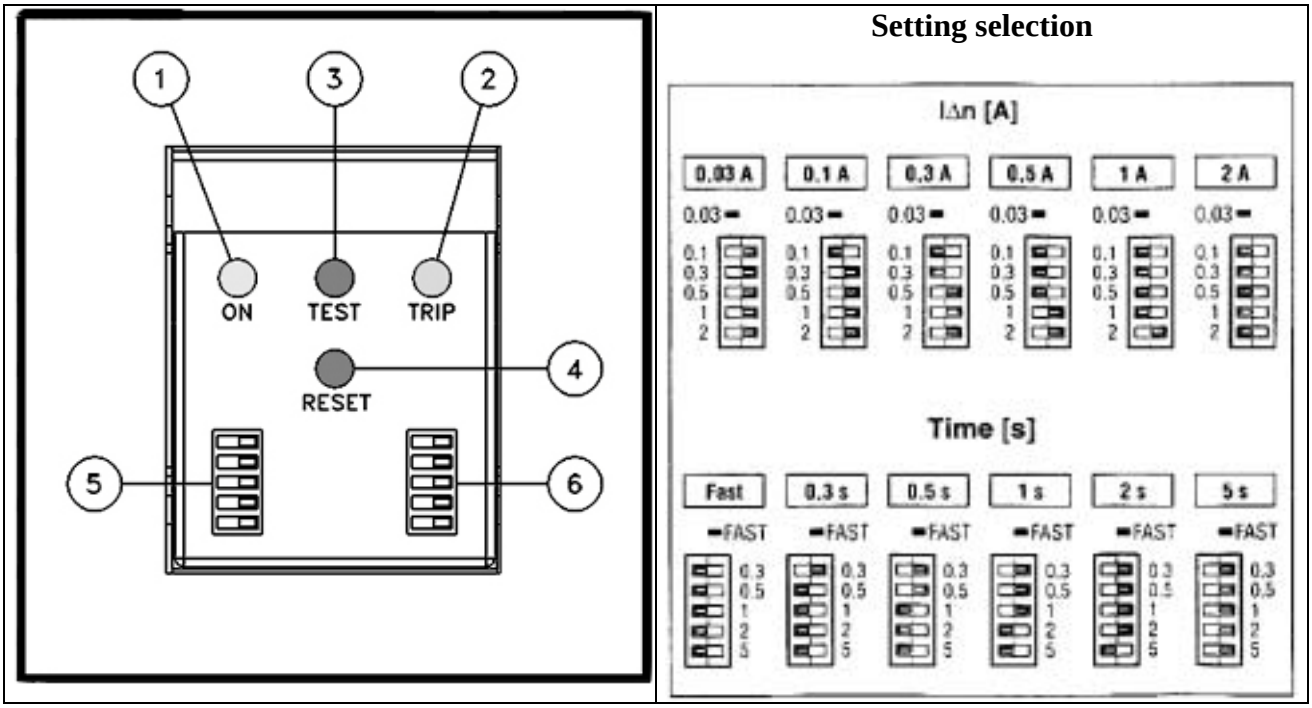
WARNING! Apply only to authorised Gen Set centres for technical service on electrical components.

• Before connecting a load to sockets on the front panel of the unit, make sure that the generator supplies enough power for the tools that are connected.

Beware: electric motors' starting current requirements are considerably higher than rated full load values.

• Before connecting a load to single phase and/or three phase sockets, make sure that the circuit breakers are open.
• At the end of work, before removing plugs from panel sockets, open the circuit breakers.
• Connect loads to generator's sockets only by using cables of suitable size and in good conditions, with plugs fitted for the sockets on the panel. Do not use adapters.

WARNING! This device does not exempt the user from checking the engine oil level by using the dipstick located on the left side of the unit. This check must be done daily.



5.3 EMERGENCY STOP BUTTON

The power generator is equipped with an EMERGENCY STOP device to stop immediately the generator in case of danger. The device is actuated by pressing the red pushbutton located on the front of the generator. The engine stops. To disengage the emergency stop device, rotate the red pushbutton clockwise until it pops out.

WARNING! The generator cannot be restarted if the emergency stop device is activated.

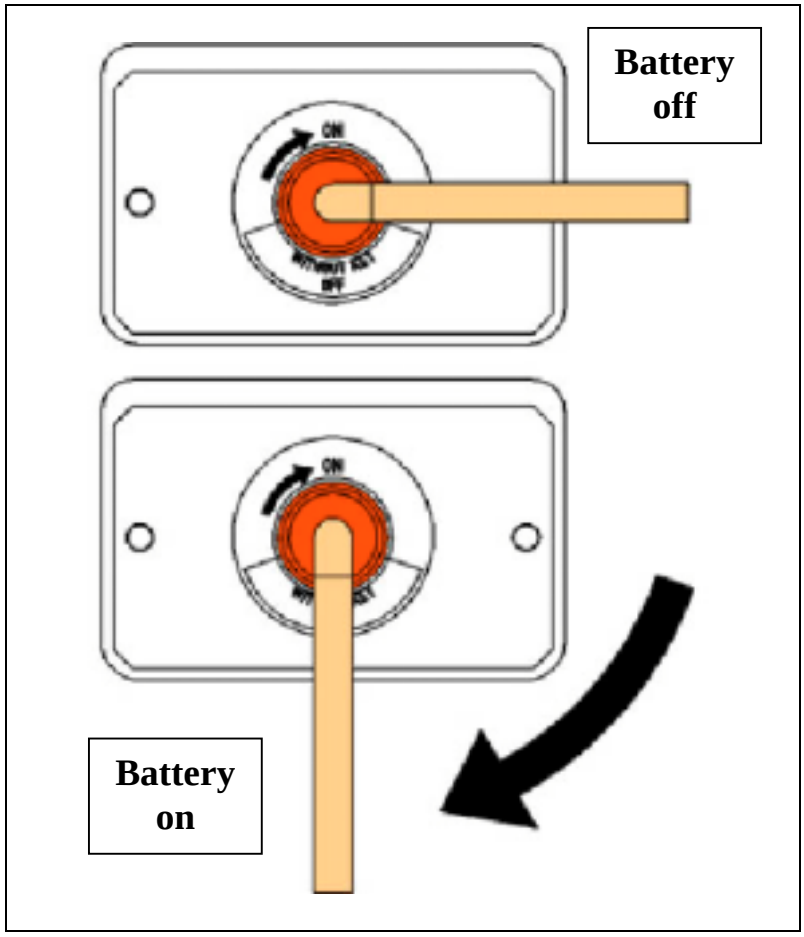
5.4 OPEN DOOR

The machine has been equipped with a “Open door” protection device. Take note that the generator will not operate or start if the indicated doors are open.

5.5 BATTERY ISOLATOR SWITCH

This device placed on the left side of the machine isolates starting system to prevent illegal use of machine or flattening the battery. Please remember to switch off the battery and remove the key from the switch when the machine is not in use. Turn the key clockwise to connect the battery.
Turn the key anticlockwise to disconnect the battery, now is possible to remove the key.

WARNING! The battery must be not switched off when the engine is running.

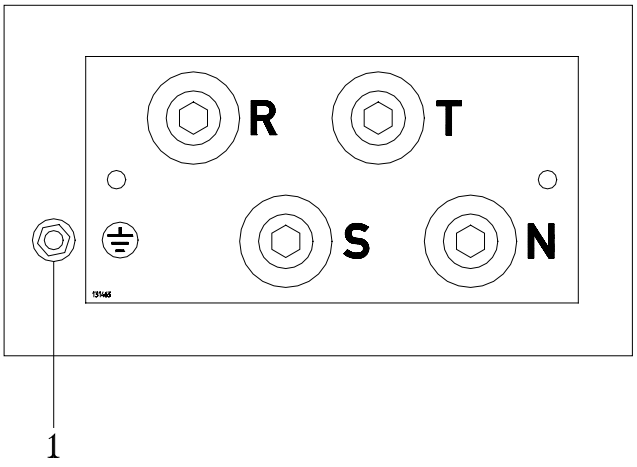


6. EARTHING THE POWER GENERATOR (picture 1)

Before starting the generator, connect it to earth by using the earth connection provided **(1)** and a cable of suitable size without interposing switches or other devices capable of breaking the electrical connection to earth. The earth system must conform to CEI 64-8 regulations.

WARNING! Do always connect the power generator to earth. Check that the cables are in perfect condition.

Picture 1

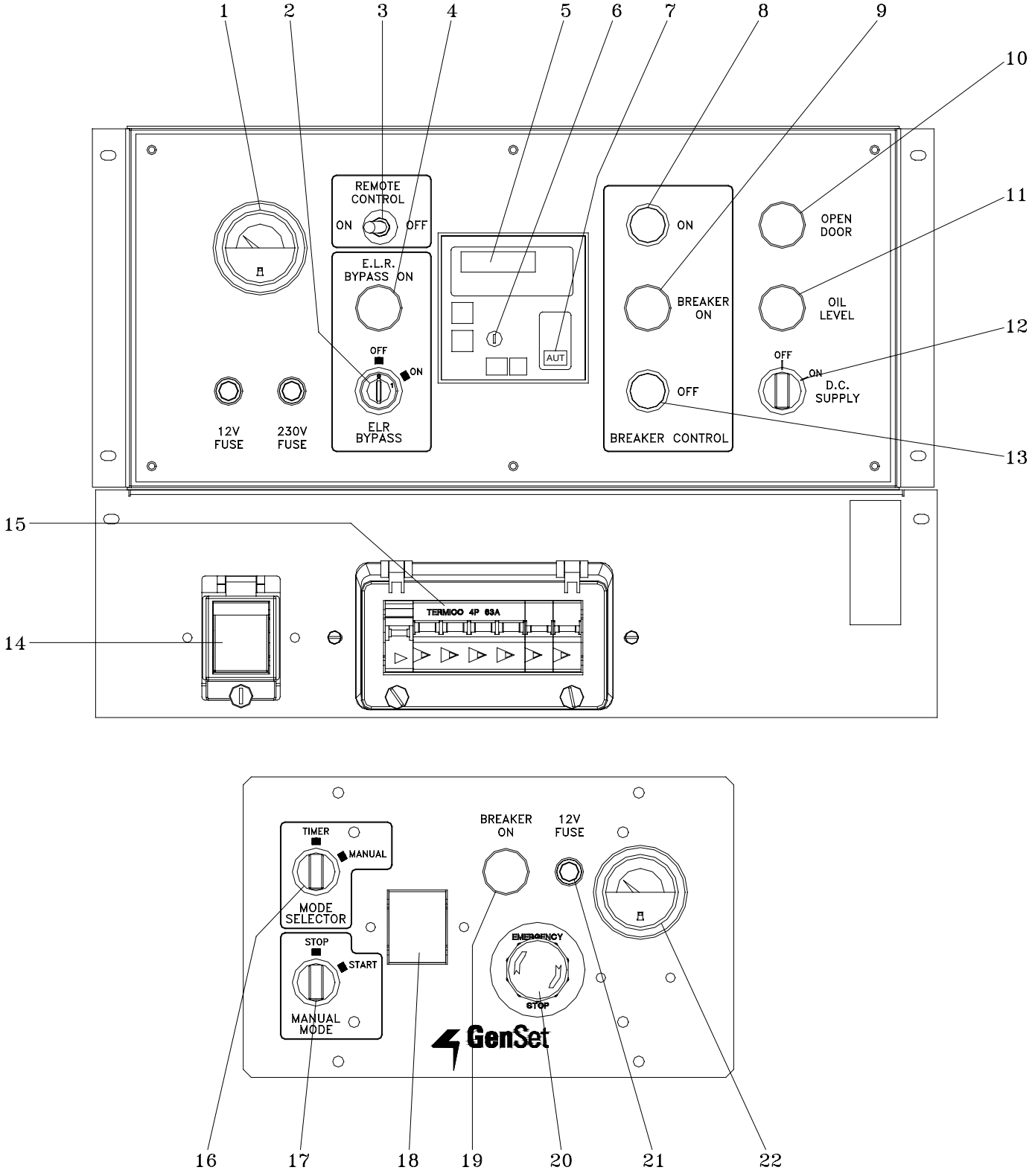


7. STARTING THE MACHINE

7.1 PROCEDURE FOR MANUAL STARTING (WITHOUT REMOTE CONTROL) (picture 2 page 37)

To start the generator proceed as follows:
(a). Make sure that the generator is correctly positioned.
(b). Use the oil dipstick located on the right side of the machine to check that the engine has been filled with the right oil quantity. If it doesn't, then fill as described in this manual.
(c). Check if the radiator contains the right quantity of coolant. If doesn't fill the radiator as described in this manual. Check the right coolant level.
(d). Make sure that the battery insulator switch is in "ON" position.
(e). Make sure that no load is connected to the machine. It is recommended that the main breaker switch **(15)** is disengaged.
(f). Make sure that the differential relay (E.L.R.) **(14)** has been adjusted for the required sensitivity. Make sure that the By-pass key **(2)** is in the position required by the application. The coming on of the By pass warning light **(4)** indicates that the E.L.R. protection **is excluded** from the generating plant.
(g). Switch the DC Supply selector **(12)** to the "ON" position.
(h). Switch the "REMOTE CONTROL ON/OFF" selector **(3)** to the "OFF" position.
(i). Turn the starting key **(6)** to the "ON" position; the MP24 illuminates all LED and Display.
(l). The Display **(5)** shows the flashing message [uuuu]; the MP24 is counting the PRE-GLOW time.
(m). When the Display shows the flashing message [StA-] turn the starting key **(6)** in "START" position (momentary position with spring-loaded return) until engine starts.
NOTE: MP24 shows the flashing prompt message [StA-] for 20 seconds. After this time, if the engine does not start, the MP24 shuts down the FUEL SOLENOID and displays the message [FAIL]. To clear the alarm it is necessary to turn the starting key in "OFF" position.
(n). To press the push button " ON" **(8)**; the green light **(9)** will energise.
(o). Connect the load.

Picture 2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21
22
REMOTE CONTROL
ON
OFF
E.L.R. BYPASS ON
OFF
ON
ELR BYPASS
12V FUSE
230V FUSE
AUT
ON
BREAKER ON
OFF
BREAKER CONTROL
OPEN DOOR
OIL LEVEL
OFF
ON
D.C. SUPPLY
TERMICO 4P 63A
TIMER
MANUAL
MODE SELECTOR
STOP
START
MANUAL MODE
BREAKER ON
12V FUSE
EMERGENCY
STOP
GenSet

8. USING THE REMOTE CONTROL IN MANUAL MODE (picture 2 page 37)

The user can start and stop the machine manually
The following operation must be done on the machine when you have to start the job.

(a). Make sure that the generator is correctly positioned.
(b). Use the oil dipstick located on the right side of the machine to check that the engine has been filled with the right oil quantity. If it doesn't, then fill as described in this manual.
(c). Check if the radiator contains the right quantity of coolant. If doesn't fill the radiator as described in this manual. Check the right coolant level.
(d). Make sure that the battery insulator switch is in "ON" position.
(e). Make sure that no load is connected to the machine. It is recommended that the main breaker switch **(14)** is disengaged.
(f). Make sure that the differential relay (E.L.R.) **(13)** has been adjusted for the required sensitivity. Make sure that the By-pass key **(2)** is in the position required by the application. The coming on of the By pass warning light **(4)** indicates that the E.L.R. protection **is excluded** from the generating plant.
(g). Switch the DC Supply selector **(11)** to the "ON" position.
(h). Switch the "REMOTE CONTROL ON/OFF" selector **(3)** to the "ON" position.
(i). Turn the starting key **(6)** to the "ON" position; the MP24 illuminates all LED and Display.
(l). The Display **(15)** shows the flashing message [uuuu]; the MP24 is counting the PRE-GLOW time.
(m). Press the "AUTO" button **(17)**.
NOTE: Before the starting the Display **(15)** shows the flashing message [uuuu]; the MP24 is counting the PRE-GLOW time.

ON THE REMOTE CONTROL

(a). Switch the MODE selector **(16)** to the "MANUAL" position.
(b). Using the start and stop switch **(17)** you can decide to start and stop the machine. The contactor switch will be closed or opened by the MP24.

WARNING! In case of short circuit, over load or fault to the groud the main breaker will trip off and the user have to remove the fault and than he has to close the main breaker manually.

9. USING THE REMOTE CONTROL IN TIMER MODE (picture 2 page 37)

The timer will start and stop the machine automatically
The following operation must be done on the machine when you have to start the job.

(a). Make sure that the generator is correctly positioned.
(b). Use the oil dipstick located on the right side of the machine to check that the engine has been filled with the right oil quantity. If it doesn't, then fill as described in this manual.
(c). Check if the radiator contains the right quantity of coolant. If doesn't fill the radiator as described in this manual. Check the right coolant level.
(d). Make sure that the battery insulator switch is in "ON" position.
(e). Make sure that no load is connected to the machine. It is recommended that the main breaker switch **(14)** is disengaged.
(f). Make sure that the differential relay (E.L.R.) **(13)** has been adjusted for the required sensitivity. Make sure that the By-pass key **(2)** is in the position required by the application. The coming on of the By pass warning light **(4)** indicates that the E.L.R. protection **is excluded** from the generating plant.
(g). Switch the DC Supply selector **(11)** to the "ON" position.
(h). Switch the "REMOTE CONTROL ON/OFF" selector **(3)** to the "ON" position.
(i). Turn the starting key **(6)** to the "ON" position; the MP24 illuminates all LED and Display.
(l). The Display **(15)** shows the flashing message [uuuu]; the MP24 is counting the PRE-GLOW time.
(m). Press the "AUTO" button **(17)**.
NOTE: Before the starting the Display **(15)** shows the flashing message [uuuu]; the MP24 is counting the PRE-GLOW time.

ON THE REMOTE CONTROL

(a). Switch the MODE selector **(16)** to the "TIMER" position.
(b). The timer will start and stop the machine using the adjustment. The contactor switch will be closed or opened by the MP24.

WARNING! In case of short circuit, over load or fault to the groud the main breaker will trip off and the user have to remove the fault and than he has to close the main breaker manually.

9.1 TIMER SETTING

Default setting:
At 07:00 the machine would automatically start.
At 08.00 the machine would automatically stop.
At 17:30 the machine would automatically start.
At 18:30 the machine would automatically stop.

10. STOP PROCEDURES

10.1 PROCEDURE FOR MANUAL SWITCHING OFF (picture 2 page 37)

(a). To press the push button " OFF" **(13)**; the green light **(9)** will switch off.
(b). Disconnect the load.
(c). Turn the starting key **(6)** to the "OFF" position.
(d). Switch the DC Supply key **(13)** on the OFF position.
Switching off the machine, it disengages the main circuit breaker **(15)** automatically.

WARNING! If none emergency situation occurs, don't use the emergency stop button to stop the machine.

10.2 PROCEDURE FOR REMOTE CONTROL SWITCHING OFF (picture 2 page 37)

In TIMER MODE the machine would automatically stop
In MANUAL MODE switch the selector **(17)** to the "STOP" position.

11. GENERAL USE INSTRUCTIONS

Read the instructions carefully; proceed according to the regulations in use in the country where the machine will operate.

11.1 TRANSPORTATION

The machine must be fixed carefully to the motor vehicle if it has to be moved to the place of use. Raise the machine using the lifting eye if the model foresees it; otherwise, lift it using a forklift, taking care that the weight is well balanced on the two forks. It is advised not to stay in the range of action during these operations; furthermore we suggest not to keep the machine hung up for long.
If the machine is delivered without the wheels on, mount them before switching the machine on.
During the normal use of the machine mounted on wheels (in a building yard or anywhere), the operator must ascertain that the machine is weel placed in order to avoid unforeseen displacement.

11.2 CAUTION

Be careful: the generating set or the welder is furnished WITHOUT lube oil. Provide the machine with **"10 W 40"** multigrade oil indicated for temperatures from - 20° C to 40° C in the quantity indicated in the engine SPECIFICATION section.
Be careful: if the machine is fitted with a water cooled engine fill the radiator circuit with a solution made up by 50% water and 50% antifreeze liquid inthe quantity indicated i the engine SPECIFICATION section.
Be careful: the generating set is furnished with flat battery and without acid. Fill it using sulphuric acid in a 30% - 40% concentrated solution up to the complete covering of the elements. During this operation, we suggest the operator to use the gloves; the accidental contact with the sulphuric acid solution must be washed up immediately with cold water and, if necessari, a doctor must be consulted.
Be carefull: don't disconnect battery cables when the engine runs. This coud result in serious damages to the machine.
Be carefull: BEFORE OPERATING THE MACHINE the neutral, or the equivalen winding point, MUST be connected effectively to the earth (without any switch or other device that may interrupt the electric connection) from the earth clamp available on the machine, and identified by the symbol:

Be carefull: for normal transportation, follow the instructions as specified in the TRASPORTATION section. Make sure that the machine doesn't overturn in order to avoid spill of acids from the battery.

11.3 RUNNING IN

For the first 50 hours of operation of the machine do not employ more than 70% of the maximum power indicated in the technical specifications. In this way, a proper engine running in is guaranteed.

11.4 STARTING AND WORKING

Make the earth connection (see the USE INSTRUCTIONS).
If the machine model IS NOT equipped with a earth leakege circuit breaker the available socket is intended ONLY for connecting the machine to a switch board equipped with all protection devices imposed by current law regulations.
Check the perfect state and efficiecy of the cables.
Make sure that all the switches, electric connections and regulations are inthe right position for the starting (see USE INSTRUCTIONS and CONTROL PANELS DESCRIPTIONS).
While welding, eyes and body must be protected by gloves, maskes Use the machine in well ventilated places, taking care that the exhaust gas and the welding smokes eventually produced (where welders are used) do not stagnate. Keep the machine away from walls or other kind of obstacles i order to avoid air or gas recycling. If the machine is employed in closed places, use aspirators in order to guarantee a proper air recycling.
While welding, eyes and body must be potected by gloves, maskes and proper clothes.
The fuel refill must not be made while smoking or close to flames. This operation must be done when the engine is switched off.
Do not fill the tank at its maximum level and clean up the fuel eventually overflowed.
Check daily if there is loss of fuel or lubrificating oil on the ducts or on the engine.
For machines provided zith liftable canopy insert the foreseen security sistems in order to avoid injures caused by an unexpected closure.

11.5 FORBIDDEN USE

Do not connect the machine to the commercial electric network.
Do not work close to inflammable materials or where there are explosive gas and vapours.
Do not work in narrow and badly ventilated places.
Do not work without using the protections placed in their proper positions and in perfect conditions.
Do not touch the exhaust muffler and the parts of the engine next to it.
Do not make service operations while the engine is running.
Any service made on the electric parts must be done when the engine is stopped and by specialized technicians.
Keep away from the moving parts of the engine while working and do not approach the machine with free and too long clothes.

11.6 SERVICE AND CLEANING

We suggest a frequent cleaning of the machine since the presence of dirt can compromise the efficiency of the machine. The frequency of this operation tightly depends on the place where the machine is used. We advise, anyway. to pay special care to the service of:
OIL LEVEL, OIL FILTER, AIR FILTER, COOLING LIQUID LEVEL, COOLING LIQUID LEVEL, HEAT EXCHANGER, VENTILATION DUCTS AND INTAKES, BATTERY
Consult the ENGINE USE AND SERVICE manual and the SPECIFICATION section to know how and when it is useful to do it. The extraordinary service operations not mentioned hereabove require the aid of specialized technicians (see the assistance centre list).

11.7 ADJUSTMENT AND REGULATIONS

All the necessary controls are located on the main control panel and they are properly explained in the section FRONT PANEL DESCRIPTIONS.
We advise the operator against tempering with the engine or the electric part if not specialized.
Be careful: eventual modifications of the normal parameters originally foressen, can compromise the reliability of the machine.

11.8 TEMPORARY STANDSTILL

If the machine has to be stopped for a long period (more than one year), we suggest to leave the motor oil and the fuel in and the water in the radiator in order to avoid oxydizing effects.
When the machine turns to work again, the liquids must be replaced, the battery must be charged; the belts and their statem the pipes, the rubber hoses and their resistance must be checked and a visual inspections of the electric connections must be done.

11.9 SCRAPPING

In order to preserve the environnement, it is advised to dispose of the oil, the fuel and the bettery that will be destroyed in proper places and ccording to the current laws. For the complete range of the materialsm see the list below:
FERROUS MATERIALS:
steel, cast iron, aluminium, copper, brass are udes in the bearing structure of engine, alternator, transformers, etc.
PLASTIC MATERIALS:
rubber, bakelite, epovit, lexan are used for the instruments, engine pipes, junction boxes and connectors, fuel tank, fuel cap, wheels, antivibration damper, condenser housing, fans, belts, filters and hoses.
ELECTRONIC MATERIALS:
various components, diodes, resistances, electronic panels.
VARIOUS MATERIALS:
rock woll, sound proofing materials.
LIQUIDS:
fuel, gasoline, cooling liquids, battery acid.

12. SYMBOLS

	Battery Charging Condition
	Engine Oil
	Engine Coolant Temperature
	Engine Oil Temperature
	Fuel Level
	Chocke, Cold Starting Aid
	Diesel Pre-Heat
	Welding
	Manual Metal Arc Welding
	Mig/Mag Welding
	Tig Welding
	Positive Polarity
	Negative Polarity
	On (Power)
	Off (Power)
	Protective Earth (Ground)
	Min-Max Regulator
	Alternating Current
	Direct Current
	Single Phase Generator a.c. 230 (240)V - 110V 50Hz
	Three Phase Generator a.c. 400 (415)V 50Hz
	Do Not Touch: High Temperature Zone
	Voltage On

13. EUROPEAN SERVICES CENTERS

ASSISTANCE	ADDRESS	CITY	COUNTRY
Moreweld N.V.	Europark - Noord 15 - 9100	Sint-Nicklaas	Belgium (B)
Ilo Motor APS	Neverland 14	Glostrup	Danmark (DK)
Papadopoulus A. & C.	via Afroditis 22	Salonicco	Greece (BR)
Greymo S.A.	Poligono Igarsa	Madrid	Spain (E)
Blaker S.A.	Recta Los Tarahales 11	Las Palmas de G.C.	Spain (E)
Baier Sarl	48 Rue Docteur Basset	ST.Ouen Cedex	France (F)
Gen Set PLC	Stallcourt Works	Port Talbot	England (GB)
Interlas B.V.	Oranjelaan 56	Rozenburg	Holland (NL)
Genetech AB	Brosslarvagen 13	Ostersund	Sweden (S)
Luna AB	P.O. Box 44100	Alingsas	Sweden (S)
Lundab	Nytorpsvagen 18	Sollentuna	Sweden S)
Gen Set Hungaria KFT.	1116 Bazsalikom U. 27	Budapest	Hungary (H)
Ferto-Tavi Nadgazdi RT.	9444 Fertodi U.1	Fertoszentmiklos	Hungary (H)
Agessa	Chemin Des Fleurettes 33	Losanna	Svizzera (CH)
Paroli SP. ZO.O.	UL. Grojecka 45 M 10 A	Warszawa	Polonia (PL)
CP Mores	Otakarova 48	Budejovive	Rep. Ceca
President Neva	PR. Engelsa 16-2	ST. Ptersburg	C.S.I. (SU)
Costa Y Garcia	Rua da Cavadao 801 - Apartado 23 – 4408	Valdares Cedex	Portugal (P)
Serpantinas LTD	Gelezinkelio 2	Panevezys	Lithuania (LT)

14. WARRANTY

GEN SET warrants its products, provided they have not been modified, for a period of 12 months from the date of handing over to the End User. Within these terms, in all the countries where a service organization is in place **GEN SET** commits itself to replace or repair the defective parts resulting from faulty material, workmanship and/or assembly through its authorized service stations.
The choice whether to replace or repair the defective parts is exclusively reserved to **GEN SET** and/or its authorized service stations.
The warranty in the rest of the world is limited to the supply ex-works free or charge of those parts which will result unsuitable for reuse due to original defects.
The warranty will apply after a check of the defective parts from the factory.
The warranty will apply after a check of the defective parts from che factory.
The travel, board and lodging expenses of the personnel who will perform the repairs are at the charge of the End User as are the packing and transportation costs both for the defective and the replaced parts.
In no case the client can claim the cancellation of the contact or a damage compensation due to the use or the impossibility to use the equipment both totally or partially.
The present warranty does not apply to starting batteries, diesel and gasoline engines mounted on gen set machines for which the respective manufactures will intervene directly.
The warranty will automatically expire:

- if the customer has not fulfilled the contractual payment obligations.
- when the factory seals have been broken.
- when dismantling, repair or modifications have been executed by unauthorized personnel not being part of the GEN SET service organization.
- when the equipment has been subject to negligent or improper use.

The present warranty does not apply to wear and tear parts.
COMING IN FORCE OF THE WARRANTY RIGHTS
Each GEN SET machine is delivered with a warranty certificate which must be filled out in each part and be validated by the stamp and signature of the dealer.

Cut out and send to: GEN SET S.p.A. - Servizio Assistenza Via stazione, 5 - 27030 Villanova D'Ardenghi (Pavia)
The guarantee certificate must be kept and shows before any request of intervention.

15. ENGINE WARRANTY AND SPARE PARTS

15.1 INTRODUCTION

Please follow carefully the engine operation manual, in order to obtain a safe use of the machine.

15.2 ENGINE WARRANTY

On purchase, please fill in the engine warranty certificate and mail it to the engine manufacturer.

15.3 SPARE PARTS

Spare parts have to be ordered as follows:
For the engine: Please contact assistance service giving the reference codes that you find on the engine SPARE PARTS USE AND MAINTENANCE manual.
For the generator and relevant equipment: Please contact directly GEN SET, giving the serial n°. of the machine and the reference codes that you find on the SPARE PARTS.

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