

Technical Sales Documentation		- ENGINE DATA -			MTU Project No.			
Printout: (y-m-d) 2008-07-29								
No.		Index	Unit	12V2000G65				
	Application Group			3B				
	MTU data code			13				
	Intake air temperature		°C	25				
	Charge-air coolant temperature		°C	-				
	Barometric pressure		mbar	1000				
	Site altitude above sea level		m	100				
	Raw-water inlet temperature		°C	-				
0. DATA-RELEVANT ENGINE DESIGN CONFIGURATION								
1	Fuel-consumption optimized			x				
2	Exhaust-emissions optimized (limit values see Exhaust Emissions, Chapter 21)			-				
16	Complies with: "TA-Luft" (Edition 1986) (German clean-air standard)			-				
17	Complies with: Regulations for stationary power plants in France (arrêté du 25 Juillet 1997)			-				
18	Complies with: US EPA, regulation for nonroad engines (40 CFR 89 - Tier 1 -)			-				
25	Complies with: US EPA, regulation for nonroad engines (40 CFR 89 - Tier 2 -)			-				
8	Engine rated speed switchable (1500/1800 rpm)			-				
12	Engine with sequential turbocharging (turbochargers with cut-in/cut-out control)			-				
13	Engine without sequential turbocharging (turbochargers without cut-in/cut-out control)			x				
31	Engine with air-cooled charge air			x				
32	Engine with water-cooled charge air (external)			-				
1. POWER-RELATED DATA (power ratings are net brake power to ISO 3046)								
1	Engine rated speed	A	rpm	1500				
3	Mean piston speed		m/s	7.5				
4	Continuous power ISO 3046 (10% overload capability) (design power DIN 6280, ISO 8528)	A	kW	695				
5	Fuel stop power ISO 3046	A	kW	765				
8	Mean effective pressure (MEP) (Continuous power ISO 3046)		bar	23.3				
9	Mean effective pressure (MEP) (Fuel stop power ISO 3046)		bar	25.6				
2. GENERAL CONDITIONS (for maximum power)								
1	Intake air depression (new filter)	A	mbar	15				
2	Intake air depression, max.	L	mbar	50				
3	Exhaust back pressure	A	mbar	30				
4	Exhaust back pressure, max.	L	mbar	85				
5	Fuel temperature at fuel feed connection	R	°C	25				
3. CONSUMPTION								
17	Specific fuel consumption (be) - 100 % CP (+ 5 %; EN 590; 42.8 MJ/kg)	G	g/kWh	202				
18	Specific fuel consumption (be) - 75 % CP (+ 5 %; EN 590; 42.8 MJ/kg)	R	g/kWh	203				
19	Specific fuel consumption (be) - 50 % CP (+ 5 %; EN 590; 42.8 MJ/kg)	R	g/kWh	210				
20	Specific fuel consumption (be) - 25 % CP (+ 5 %; EN 590; 42.8 MJ/kg)	R	g/kWh	230				
21	Specific fuel consumption (be) - FSP (+ 5 %; EN 590; 42.8 MJ/kg)	R	g/kWh	204				
73	No-load fuel consumption	R	kg/h	12				

Explanation:

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	Barometric pressure		mbar	1000			
	Site altitude above sea level		m	100			
	Raw-water inlet temperature		°C	-			
61	Lube oil consumption after 100 h of operation (B = fuel consumption per hour)	R	% of B	0.5			
62	Lube oil consumption after 100 h of operation, max. (B = fuel consumption per hour)	L	% of B	1.0			
4. MODEL-RELATED DATA (basic design)							
3	Engine with exhaust turbocharger (ETC) and intercooler			x			4
4	Exhaust piping, non-cooled			x			
5	Exhaust piping, liquid-cooled			-			
33	Working method: four-cycle, diesel, single-acting			x			
34	Combustion method: direct injection			x			
36	Cooling system: conditioned water			x			
37	Direction of rotation: c.c.w. (facing driving end)			x			
6	Number of cylinders			12			
7	Cylinder configuration: V angle		degrees (°)	90			
10	Bore		mm	130			
11	Stroke		mm	150			
12	Displacement, cylinder		liter	1.99			
13	Displacement, total		liter	23.88			
14	Compression ratio			16			
40	Cylinder heads: single-cylinder			x			
41	Cylinder liners: wet, replaceable			x			
24	Number of inlet valves, per cylinder			2			
25	Number of exhaust valves, per cylinder			2			
15	Number of turbochargers			2			
18	Number of intercoolers			1			
28	Standard flywheel housing flange (engine main PTO)		SAE	0			
43	Flywheel interface		DISC	18"			
46	Engine mass diagram, drawing No.			N			
47	Engine mass diagram, drawing No. (cont.)			N			
5. COMBUSTION AIR / EXHAUST GAS							
39	Pressure differential in external air-to-air intercooler, max.	L	mbar	130			
8	Charge-air pressure before cylinder - CP	R	bar abs	3.2			
27	Charge-air pressure before cylinder - FSP	R	bar abs	3.5			
9	Combustion air volume flow - CP	R	m³/s	0.85			
10	Combustion air volume flow - FSP	R	m³/s	0.9			
11	Exhaust volume flow (at exhaust temperature) - CP	R	m³/s	2.3			
12	Exhaust volume flow (at exhaust temperature) - FSP	R	m³/s	2.5			
15	Exhaust temperature after turbocharger - CP	R	°C	555			
16	Exhaust temperature after turbocharger - FSP	R	°C	565			
6. HEAT DISSIPATION							
15	Heat dissipated by engine coolant - CP with oil heat, without charge-air heat	R	kW	310			
16	Heat dissipated by engine coolant - FSP with oil heat, without charge-air heat	R	kW	N			
26	Charge-air heat dissipation - CP	R	kW	135			

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27	Charge-air heat dissipation - FSP	R	kW	N				
33	Radiation and convection heat, engine - CP	R	kW	40				
34	Radiation and convection heat, engine - FSP	R	kW	N				
7. COOLANT SYSTEM (high-temperature circuit)								
17	Coolant temperature (at engine outlet to cooling equipment)	A	°C	95				
20	Coolant temperature after engine, alarm	R	°C	97				
21	Coolant temperature after engine, shutdown	L	°C	102				
25	Coolant antifreeze content, max.	L	%	50				
30	Cooling equipment: coolant flow rate	A	m³/h	40				
35	Coolant pump: inlet pressure, min.	L	bar	0.4				
36	Coolant pump: inlet pressure, max.	L	bar	1.52				
41	Pressure loss in off-engine cooling system, max.	L	bar	0.7				
47	Breather valve (expansion tank) opening pressure (excess pressure)	R	bar	N				
48	Breather valve (expansion tank) opening pressure (depression)	R	bar	N				
49	Pressure in cooling system, max.	L	bar	N				
54	Cooling equipment: height above engine, max.	L	m	15.2				
53	Cooling equipment: operating pressure	A	bar	2.2				
73	Coolant level in expansion tank, below min. alarm	L		-				
74	Coolant level in expansion tank, below min. shutdown	L		x				
8. COOLANT SYSTEM (low-temperature circuit)								
76	Temperature differential between intake air and charge-air coolant before intercooler	A	K	-				
75	Temperature differential between intake air and charge-air coolant before intercooler, max.	L	K	-				
10. LUBE OIL SYSTEM								
1	Lube oil operating temp. before engine, from	R	°C	88				
2	Lube oil operating temp. before engine, to	R	°C	98				
5	Lube oil temperature before engine, alarm	R	°C	100				
6	Lube oil temperature before engine, shutdown	L	°C	105				
8	Lube oil operating press. bef. engine, from	R	bar	6.2				
9	Lube oil operating press. bef. engine, to	R	bar	7.5				
10	Lube oil pressure before engine, alarm	R	bar	4.4				
11	Lube oil pressure before engine, shutdown	L	bar	3.9				
19	Lube oil fine filter (main circuit): number of units			1				
20	Lube oil fine filter (main circuit): number of elements per unit			2				
21	Lube oil fine filter (main circuit): particle retention	R	mm	0.009				
32	Lube oil fine filter (main circuit): pressure differential, max.	L	bar	0.8				
11. FUEL SYSTEM								

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	Site altitude above sea level		m	100				
	Raw-water inlet temperature		°C	-				
1	Fuel pressure at fuel feed connection, min. (when engine is starting)	L	bar	-0.3				
2	Fuel pressure at fuel feed connection, max. (when engine is starting)	L	bar	+0.5				
37	Fuel supply flow, max.	R	liter/min	8.0				
8	Fuel return flow, max.	R	liter/min	3.5				
10	Fuel pressure at return connection on engine, max.	L	bar	0.5				
15	Fuel prefilter: number of units	A		-				
16	Fuel prefilter: number of elements per unit	A		-				
17	Fuel prefilter: particle retention	A	mm	-				
18	Fuel fine filter (main circuit): number of units	A		1				
19	Fuel fine filter (main circuit): number of elements per unit	A		1				
20	Fuel fine filter (main circuit): particle retention	A	mm	0.005				
21	Fuel fine filter (main circuit): pressure differential, max.	L	bar	1.0				
12. GENERAL OPERATING DATA								
1	Cold start capability: air temperature (w/o starting aid, w/o preheating) - (case A)	R	°C	0**				
2	Additional condition (to case A): engine coolant temperature	R	°C	N				
3	Additional condition (to case A): lube oil temperature	R	°C	+10**				
4	Additional condition (to case A): lube oil viscosity	R	SAE	30**				
9	Cold start capability: air temperature (w/o starting aid, w/ preheating) - (case C)	R	°C	-10**				
10	Additional condition (to case C): engine coolant temperature	R	°C	+40**				
11	Additional condition (to case C): lube oil temperature	R	°C	-5**				
12	Additional condition (to case C): lube oil viscosity	R	SAE	10W30				
21	Coolant preheating, heater performance (standard)	R	kW	3				
22	Coolant preheating, preheating temperature (min.)	R	°C	32				
28	Breakaway torque (without driven machinery) coolant temperature +5°C	R	Nm	580				
30	Breakaway torque (without driven machinery) coolant temperature +40°C	R	Nm	330*				
29	Cranking torque at firing speed (without driven machinery) coolant temperature +5°C	R	Nm	380*				
31	Cranking torque at firing speed (without driven machinery) coolant temperature +40°C	R	Nm	305*				
96	Starting is blocked if the engine coolant temperature is below		°C	N				
37	High idling speed, max. (static)	L	rpm	1660				
38	Limit speed for overspeed alarm / emergency shutdown	L	rpm	1800				
42	Firing speed, from	R	rpm	100				
43	Firing speed, to	R	rpm	120				
44	Engine coolant temperature before starting full-load operation, recommended min. (for emergency/standby sets with coolant preheating: at least the preheating temperature)	L	°C	40				
48	Minimum continuous load	R	%	20				

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	Barometric pressure		mbar	1000				
	Site altitude above sea level		m	100				
	Raw-water inlet temperature		°C	-				
49	Extended low or no-load operation possible (consultation required)			x				
50	Engine mass moment of inertia (without flywheel)	R	kgm²	1.12				
51	Engine mass moment of inertia (with standard flywheel)	R	kgm²	3.92				
52	Standard flywheel mass moment of inertia	R	kgm²	2.80				
69	Speed droop (with electronic governor) adjustable, from	R	%	0				
70	Speed droop (with electronic governor) adjustable, to	R	%	5				
95	Number of starter ring-gear teeth on engine flywheel			160				
13. STARTING (electric)								
12	Starter, rated power (make DELCO) (standard design)	R	kW	9.0				
2	Starter, rated voltage (standard design)	R	V=	24				
14	Starter, power requirement max. (make DELCO)	R	A	1750				
15	Starter, power requirement at firing speed (make DELCO)	R	A	800				
16	Start attempt duration (engine preheated)	R	s	-				
17	Start attempt duration (engine not preheated)	R	s	-				
18	Start attempt duration, max.	L	s	6				
15. STARTING (pneumatic/oil pressure starter)								
5	Starting air pressure before starter motor, min.	R	bar	17				
6	Starting air pressure before starter motor, max.	R	bar	N				
7	Starting air pressure before starter motor, min.	L	bar	N				
8	Starting air pressure before starter motor, max.	L	bar	N				
18	Start attempt duration (engine preheated)	R	s	N				
19	Start attempt duration (engine not preheated)	R	s	N				
20	Start attempt duration, max.	L	s	N				
21	Air consumption / start attempt (engine preheated)	R	m³3n	0.49				
23	Starting air tank for 3 start attempts (max. 40 bar) (engine preheated)	R	liter	N				
24	Starting air tank for 3 start attempts (max. 30 bar) (engine preheated)	R	liter	N				
25	Starting air tank for 6 start attempts (max. 40 bar) (engine preheated)	R	liter	N				
26	Starting air tank for 6 start attempts (max. 30 bar) (engine preheated)	R	liter	N				
27	Starting air tank for 10 start attempts (max. 40 bar) (engine preheated)	R	liter	N				
28	Starting air tank for 10 start attempts (max. 30 bar) (engine preheated)	R	liter	N				
16. INCLINATIONS - STANDARD OIL SYSTEM (ref.: watertline)								
15	Longitudinal inclination, continuous max. driving end down (Option: max. operating inclinations)	L	degrees (°)	5				
17	Longitudinal inclination, continuous max. driving end up (Option: max. operating inclinations)	L	degrees (°)	5				
19	Transverse inclination, continuous max. (Option: max. operating inclinations)	L	degrees (°)	10				

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	Barometric pressure		mbar	1000				
	Site altitude above sea level		m	100				
	Raw-water inlet temperature		°C	-				
18. CAPACITIES								
1	Engine coolant capacity (without cooling equipment)	R	liter	90				
11	On-engine fuel capacity	R	liter	5				
14	Engine oil capacity, initial filling (standard oil system) (Option: max. operating inclinations)	R	liter	77				
20	Oil change quantity, max. (standard oil system) (Option: max. operating inclinations)	R	liter	74				
28	Oil pan capacity, dipstick mark min. (standard oil system) (Option: max. operating inclinations)	L	liter	50				
29	Oil pan capacity, dipstick mark max. (standard oil system) (Option: max. operating inclinations)	L	liter	67				
19. WEIGHTS / DIMENSIONS								
9	Engine weight, dry (basic engine configuration acc. to scope of supply specification)	R	kg	2490				
10	Engine weight, wet (basic engine configuration acc. to scope of supply specification)	R	kg	2660				
20. FAN / FAN COOLER								
3	Fan, pusher-type			x				
18	Fan arrangement: vertical above crankshaft			x				
9	Fan drive: mechanical via V-belt			x				
13	Fan: speed	R	rpm	N				
19	Standard fan cooler, supplied by MTU, design and specific data acc. to case A / B / C			N				
21	(Case A) - fan cooler, designed for: - ambient temperature	A	°C	N				
54	(Case A) - fan cooler, designed for: - site altitude, max.	A	m	N				
22	(Case A) - fan cooler, designed for: - coolant antifreeze content, max.	A	%	N				
55	(Case A) - fan: power consumption at 1 mbar / 100 Pa duct allowance (pressure and suction sides, total)	R	kW	N				
56	(Case A) - fan: power consumption at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)	R	kW	N				
57	(Case A) - fan: power consumption at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)	R	kW	N				
27	(Case A) - cooling-air flow rate at 1 mbar / 100 Pa duct allowance (pressure and suction sides, total)	R	m³/s	N				
28	(Case A) - cooling-air flow rate at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)	R	m³/s	N				
29	(Case A) - cooling-air flow rate at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)	R	m³/s	N				
58	(Case A) - fan: weight	R	kg	N				

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59	(Case A) - fan cooler: weight, dry (incl. pipework)	R	kg	N				
31	(Case A) - fan cooler: coolant capacity	R	liter	N				
32	(Case B) - fan cooler, designed for: - ambient temperature	A	°C	N				
60	(Case B) - fan cooler, designed for: - site altitude, max.	A	m	N				4
33	(Case B) - fan cooler, designed for: - coolant antifreeze content, max.	A	%	N				
61	(Case B) - fan: power consumption at 1 mbar / 100 Pa duct allowance (pressure and suction sides, total)	R	kW	N				
62	(Case B) - fan: power consumption at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)	R	kW	N				
63	(Case B) - fan: power consumption at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)	R	kW	N				
38	(Case B) - cooling-air flow rate at 1 mbar / 100 Pa duct allowance (pressure and suction sides, total)	R	m³/s	N				
39	(Case B) - cooling-air flow rate at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)	R	m³/s	N				
40	(Case B) - cooling-air flow rate at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)	R	m³/s	N				
64	(Case B) - fan: weight	R	kg	N				
65	(Case B) - fan cooler: weight, dry (incl. pipework)	R	kg	N				
42	(Case B) - fan cooler: coolant capacity	R	liter	N				
43	(Case C) - fan cooler, designed for: - ambient temperature	A	°C	N				
66	(Case C) - fan cooler, designed for: - site altitude, max.	A	m	N				
44	(Case C) - fan cooler, designed for: - coolant antifreeze content, max.	A	%	N				
67	(Case C) - fan: power consumption at 1 mbar / 100 Pa duct allowance (pressure and suction sides, total)	R	kW	N				
68	(Case C) - fan: power consumption at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)	R	kW	N				
69	(Case C) - fan: power consumption at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)	R	kW	N				
49	(Case C) - cooling-air flow rate at 1 mbar / 100 Pa duct allowance (pressure and suction sides, total)	R	m³/s	N				
50	(Case C) - cooling-air flow rate at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)	R	m³/s	N				
51	(Case C) - cooling-air flow rate at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)	R	m³/s	N				
70	(Case C) - fan: weight	R	kg	N				
71	(Case C) - fan cooler: weight, dry (incl. pipework)	R	kg	N				

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53	(Case C) - fan cooler: coolant capacity	R	liter	N				
21. EXHAUST EMISSIONS								
307	Regulation: "TA-Luft" (Edition 1986) - CP Nitric oxide (NOx) (5% O2)	G	mg/m^3n	-				
308	Regulation: "TA-Luft" (Edition 1986) - CP Carbon monoxide (CO) (5% O2)	G	mg/m^3n	-				
309	Regulation: "TA-Luft" (Edition 1986) - CP Unburned hydrocarbons (HC)	G	mg/m^3n	-				
310	Regulation: "TA-Luft" (Edition 1986) - CP Dust (5% O2)	G	mg/m^3n	-				
366	Regulation: "TA-Luft" (Edition 1986) - CP Formaldehyde (5% O2)	G	mg/m^3n	-				
311	Regulation: stationary power plants in France - CP Nitric oxide (NOx) (5% O2)	G	mg/m^3n	-				
312	Regulation: stationary power plants in France - CP Carbon monoxide (CO) (5% O2)	G	mg/m^3n	-				
313	Regulation: stationary power plants in France - CP Unburned hydrocarbons (NMHC)	G	mg/m^3n	-				
314	Regulation: stationary power plants in France - CP Dust / particulates (5% O2)	G	mg/m^3n	-				
316	Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 1 -) Nitric oxide (NOx)	G	g/kWh	-				
317	Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 1 -) Carbon monoxide (CO)	G	g/kWh	-				
318	Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 1 -) Unburned hydrocarbons (HC)	G	g/kWh	-				
319	Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 1 -) Particulates	G	g/kWh	-				
320	Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 2 -) Nitric oxide (NOx) + unburned hydrocarbons (HC)	G	g/kWh	-				
321	Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 2 -) Carbon monoxide (CO)	G	g/kWh	-				
323	Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 2 -) Particulates	G	g/kWh	-				
141	Exhaust volume flow, dry - CP (standard conditions)	R	m³/h	N				
143	Exhaust mass flow - CP (reference conditions)	R	kg/h	N				
144	Residual oxygen content (O2) in dry exhaust - CP (standard conditions)	R	% (vol.)	N				
145	Total combustion calorific value - CP	R	kW	N				
37	Smoke index, BOSCH - FSP	R		0.3				
22. ACOUSTICS								
101	Exhaust noise, unsilenced - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798)	R	dB(A)	109				

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Technical Sales Documentation		- ENGINE DATA -			MTU Project No.			
Printout: (y-m-d) 2008-07-29								
No.		Index	Unit	12V2000G65				
	Application Group			3B				
	MTU data code			13				
	Intake air temperature		°C	25				
	Charge-air coolant temperature		°C	-				
	Barometric pressure		mbar	1000				
	Site altitude above sea level		m	100				
	Raw-water inlet temperature		°C	-				
201	Exhaust noise, unsilenced - CP (sound power level LW, ISO 6798)	R	dB(A)	122				
103	Exhaust noise, unsilenced - FSP (free-field sound-pressure level Lp, 1m distance, ISO 6798) Spectrum No.			734 200e				
203	Exhaust noise,unsilenced - CP (sound power level LW, ISO 6798) Spectrum No.			N				
109	Engine surface noise with attenuated intake noise (filter) - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798)	R	dB(A)	100				
209	Engine surface noise with attenuated intake noise (filter) - CP (sound power level LW, ISO 6798)	R	dB(A)	118				
111	Engine surface noise with attenuated intake noise (filter) - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798) Spectrum No.			734 207e				
211	Engine surface noise with attenuated intake noise (filter) - CP (sound power level LW, ISO 6798) Spectrum No.			N				
125	Structure borne noise at engine mounting brackets in vertical direction above resilient engine mounts - CP Spectrum No.			734 226e				
129	Test stand impedance spectrum, Diagram No.			N				
130	Test stand impedance spectrum, Diagram No. (cont.)			N				
23. TBO AND LOAD PROFILE (case A)								
15	Maintenance schedule No.			N				
16	Maintenance schedule No. (cont.)			N				

Explanation:

CP = Ref. value: Continuous power FSP = Ref. value: Fuel stop power

A = Design value G = Guaranteed value L = Limit value, up to which the engine can be operated, without change (e.g. of power setting) R = Guideline value

X = Applicable - = Not applicable N = Not yet defined value Z = See notes provided after "ENGINE DATA"

THREE-PHASE SYNCHRONOUS GENERATOR MJB 355 MB 4

4 POLES

CONTINUOUS DUTY

50 Hz-1500 min⁻¹ / 60 Hz-1800 min⁻¹

AMBIENT TEMPERATURE	40°C	WINDING DATA	
TEMPERATURE RISE	H	Winding code	17
INSULATION CLASS	H	Number of leads	6
POWER FACTOR	0,8	Winding pitch	2/3

FREQUENCY	Hz	50			60				
VOLTAGE	Star	V	380	400	415	416	440	460	480
	Delta		220	230	240	240	254	265	277
RATING		kVA	800	800	800	880	920	950	960
		kW	640	640	640	704	736	760	768
EFFICIENCY (%) @ 0,8 p.f.	4/4		94,9	95,0	95,1	95,2	95,2	95,2	95,3
	3/4		95,4	95,5	95,6	95,5	95,6	95,6	95,7
	2/4		95,7	95,6	95,6	95,6	95,7	95,8	95,8
EFFICIENCY (%) @ 1,0 p.f.	4/4		96,0	96,1	96,1	96,2	96,2	96,2	96,3
	3/4		96,4	96,4	96,5	96,4	96,5	96,6	96,6
	2/4		96,6	96,6	96,6	96,5	96,6	96,7	96,7
SHORT CIRCUIT RATIO			0,38	0,42	0,45	0,34	0,37	0,39	0,42
REACTANCES (%)									
Direct axis synchronous	x _d		285	255	240	310	290	275	255
Quadrature axis synchronous	x _q		155	140	130	170	155	150	140
Direct axis transient	x' _d		23,0	20,8	19,3	25,4	23,7	22,4	20,8
Direct axis subtransient	x'' _d		11,0	9,9	9,2	12,1	11,3	10,7	9,9
Quadrature axis subtransient	x'' _q		13,6	12,3	11,4	15,0	14,0	13,3	12,3
Negative sequence	x ₂		12,3	11,1	10,3	13,5	12,7	12,0	11,1
Zero sequence	x ₀		3,1	2,8	2,6	3,4	3,2	3,0	2,8

TIME CONSTANTS [s]

Open circuit (T' _{do})	2,2	Subtransient (T'' _d)	0,016
Transient (T' _d)	0,18	Armature (T _a)	0,026

MECHANICAL CHARACTERISTICS

D-end bearing/Lubrication	6322 C3 / With grease nipple
N-end bearing/Lubrication	6317 2Z C3 / Prelubricated
Weight (IM B34) [kg]	2050
Inertia (J) (IM B34) [kgm ²]	13,12
Overspeed [min ⁻¹]	2250
Method of cooling	IC 01
Cooling air required [m ³ /s] @ 50/60 Hz	0,93 / 1,12
Degree of protection	IP 23
Type of construction available	B2 - SAE / IM B34
Direction of rotation	CW

OTHER DATA

Phase resistance mΩ @ 20 °C - Star series	3,1
Overloads	10% for 1 hour
3-phase short circuit current	>= 300% (3 I _n)
Voltage regulation accuracy	+/- 0,5% (in steady state condition, speed from -2% to +5%, p.f. from 0,8 to 1)
Radio interference	EN 55011 Class B Group 1
Wave form THF	<2%
Total harmonic content	<2% (at no load)

STANDARDS

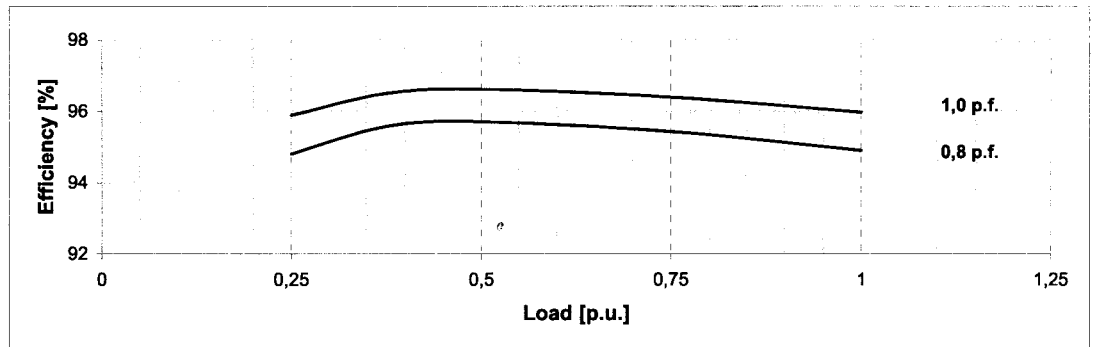
IEC 60034-1; CEI 2-3; BS 4999-5000; VDE 0530; NF 51-100,111; OVE M-10, NEMA MG 1.22.

**THREE-PHASE SYNCHRONOUS GENERATOR
MJB 355 MB 4**

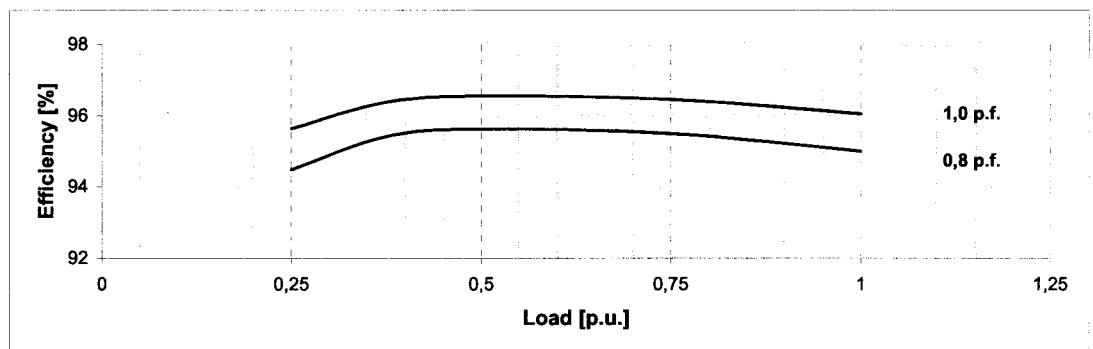
Typical efficiency curves

50 Hz - 1500 min⁻¹

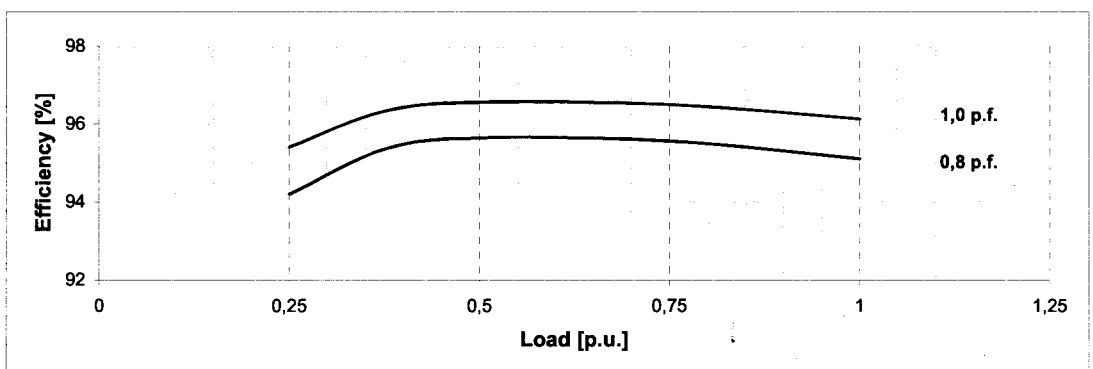
380 V



400 V



415 V

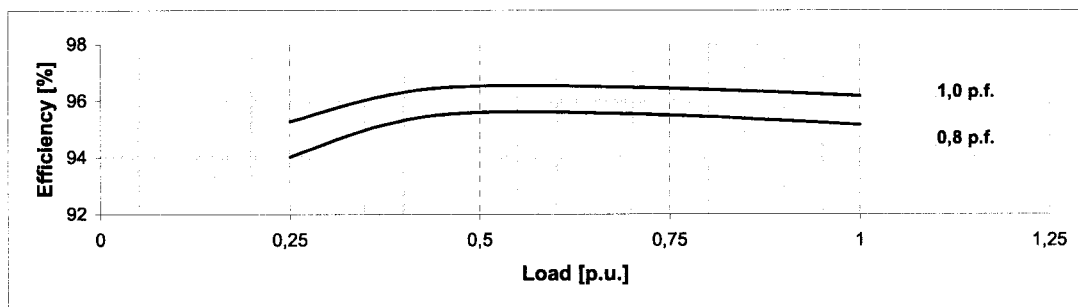


THREE-PHASE SYNCHRONOUS GENERATOR
MJB 355 MB 4

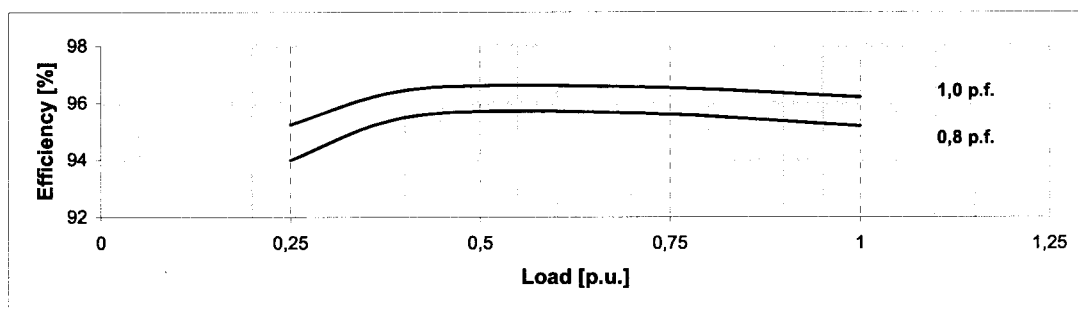
Typical efficiency curves

60 Hz - 1800 min⁻¹

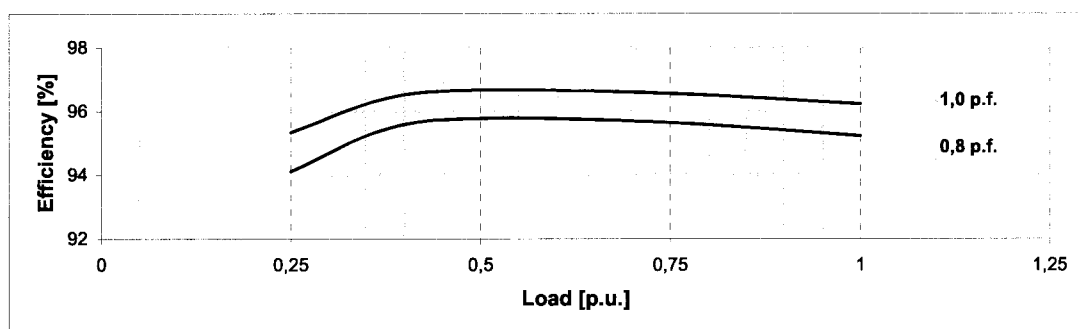
416 V



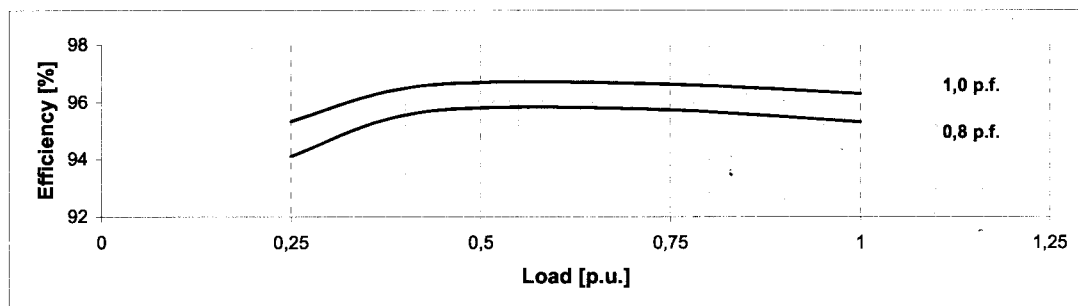
440 V



460 V



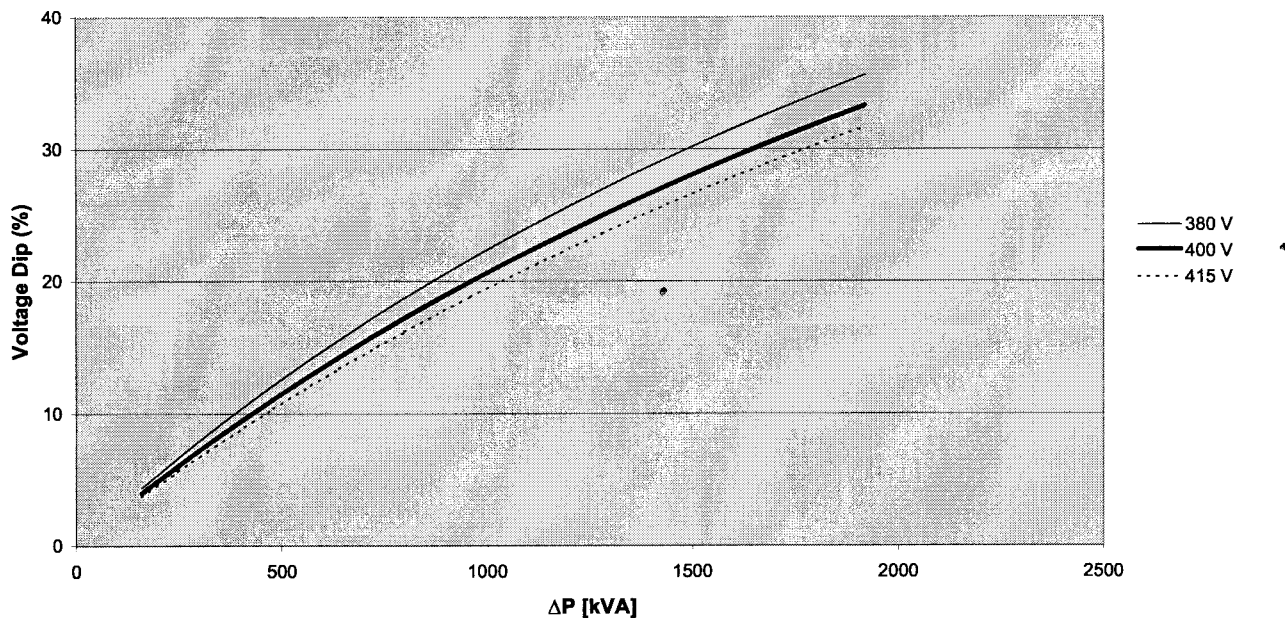
480 V



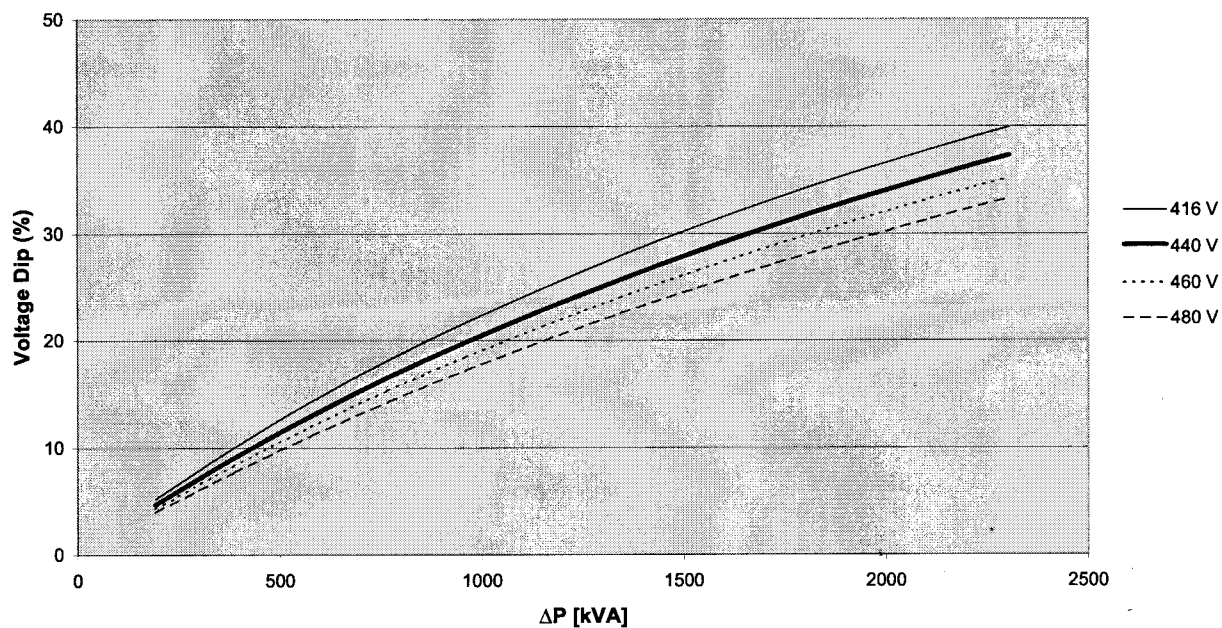
THREE-PHASE SYNCHRONOUS GENERATOR
MJB 355 MB 4

Locked rotor motor starting curves (*)

50 Hz - 1500 min⁻¹



60 Hz - 1800 min⁻¹



$$\Delta P = P_n \times (I_s / I_n) / (\cos \varphi_n \times \eta_n)$$

(*): A coefficient of 0,85 must be applied to the voltage dip if the load has a power factor equal or greater than 0,8.

Data and Technical Specification are subject to change in order to update or improve the products, without prior notice

SISTEMA DI ABBATTIMENTO INQUINANTI SCR

Il sistema di abbattimento degli inquinanti è costituito da :

- reattore DeNO_x dotato di litri 150 di reattore SCR;
- Catalizzatore ossidante montato a valle del catalizzatore SCR per l'abbattimento del CO/THC;
- condotto di iniezione ed idrolisi urea in acciaio inossidabile AISI 316;
- miscelatore statico in acciaio inossidabile AISI 316;
- sckid compatto di dosaggio automatico urea;
- quadro di comando e supervisione con PC eSCADA.
- predisposizione per controllo in remoto.

Il tutto sarà contnuto in una apparecchiatura come da schema allegato alla presente.

GRUPPO ELETROPOMPA ANTINCENDIO UNI EN 12845

Tipo new-unifire "2EN-EMSN2E40/250G-19P"

Il Gruppo pompe antincendio, conforme alle NORME UNI EN 12845 è costituito da una pompa accoppiata a motore elettrico, una pompa accoppiata a motore diesel a 1/2 più una pompa pilota, assemblate su di un basamento in acciaio zincato corredato di collettore flangiato in mandata. Nello specifico il gruppo è costituito da:

- N. 1 pompa centrifuga orizzontale monogirante normalizzata ROVATTI modello SN2E40-250G-GR-TM-SS da **Kw. 19** Corpo pompa in ghisa, girante in ACCIAIO INOX dimensionato secondo le norme EN 733 ex DIN 24255, con bocche di aspirazione e mandata flangiate, supporto corpo pompa-motore in ghisa, albero in acciaio inossidabile, tenuta meccanica, motore ad induzione del tipo chiuso auto ventilato in forma costruttiva "B3" da **Kw. 22** (*maggiorato in considerazione del dato NPSH16 della pompa come da normativa*) adatto per servizio continuo, isolamento in classe F, grado di protezione IP55 accoppiato alla pompa a 1/2 **giunto spaziatore con tasselli in gomma.**
- N. 1 pompa centrifuga orizzontale monogirante normalizzata ROVATTI modello SN2E40-250G-GR-TM-SS da **Kw. 19** Corpo pompa in ghisa, girante in ACCIAIO INOX dimensionato secondo le norme EN 733 ex DIN 24255, con bocche di aspirazione e mandata flangiate, supporto corpo pompa-motore in ghisa, albero in acciaio inossidabile, tenuta meccanica accoppiata a 1/2 **giunto elastico spaziatore con tasselli in gomma** a motore diesel 3 cilindri LOMBARDINI tipo 11LD626-3 con potenza max di **Kw. 28** (*maggiorato in considerazione del dato NPSH16 della pompa come da normativa*) ad avviamento automatico 2900 giri/min. a servizio continuo di almeno 12 ore, completo di scaldiglia olio, doppia batteria a 12V cc, doppia cinghia alternatore, supporti motore rigidi, ventilatore soffiante, filtro olio, filtro aria a secco, filtro combustibile, serbatoio combustibile per **3 ore** di autonomia con bacino di contenimento su cavalletto indipendente in acciaio zincato.
 - N.1 Elettropompa di sostegno pressione del tipo multicellulare verticale della LOWARA tipo 5SV12F22 da Kw. 2,2 cad. Corpo supporti aspirazione e mandata, diffusori, giranti e mantello in acciaio inox AISI 304, albero in acciaio inox, tenuta meccanica per servizio continuo. Motore chiuso auto-ventilato in classe F; grado di protezione IP 55.
- Le pompe sono corredate :
- Valvola a farfalla in mandata con corpo e otturatore in ghisa rivestita in epoxy, asse in acciaio inox, esente da manutenzione del tipo lucchettabile.
 - Valvola di ritegno in mandata di diametro adeguato in ghisa G25 flangiate PN16.
 - n. 1 circuito idraulico per l'avviamento automatico e prova manuale della pompa principale antincendio con doppio pressostato secondo UNI EN 12845
 - Diffusore flangiato concentrico in mandata compreso di attacchi per il ricircolo e l'adescamento.
 - Giunto antivibrante in mandata alla motopompa.

Il gruppo comprende anche i seguenti quadri:

- 1)-i quadro elettrico di comando elettropompa principale costituito da

- Quadro elettromeccanico ad avviamento STELLA-TRIANGOLO per l'elettropompa principale;
 - Ingresso rete 3 ~ 50/60Hz 400V $\pm 10\%$;
 - Trasformatore 400 V/24 V per circuiti ausiliari;
 - Ingresso in bassissima tensione per comando da n° 2 pressostati in serie di chiamata/marcia (contatto NC con impianto in pressione e elettropompa ferma);
 - Ingresso in bassissima tensione per comando elettropompa da galleggiante serbatoio adescamento (contatto NA con serbatoio pieno d'acqua)
 - Ingresso in bassissima tensione per segnalazione da pressostato elettropompa in pressione/moto (contatto NA con impianto in pressione e elettropompa ferma);
 - Selettore a chiave AUT-0-EMERGENZA: in posizione AUTOMATICO avviamento elettropompa tramite centralina elettronica; in posizione EMERGENZA avviamento elettropompa istantaneo;
 - Centralina elettronica di gestione elettropompa;
 - Pulsanti MARCIA/ARRESTO elettropompa per test manuale;
 - Pulsante prova spie centralina;
 - Pulsante scorrimento funzioni centralina;
 - Display LCD retroilluminato per visualizzazione di n° 3 voltmetri di rete, n° 3 amperometri, frequenzimetro, wattmetro, varmetro, voltamperometro, cosfi metro, contaore totale, contaore parziale, storico eventi;
 - Spia verde di motore in funzione (controllata da rilevamento amperometrico);
 - Spia verde di elettropompa in funzione (a motore avviato viene rilevata dalla potenza assorbita e/o dal comando del pressostato di pompa in moto);
 - Spia verde di presenza rete;
 - Spia verde di richiesta avviamento pompa da pressostati di chiamata;
 - Spia verde di richiesta avviamento pompa dal galleggiante del serbatoio di adescamento;
 - Spia verde di elettropompa avviata da pulsante "MARCIA";
 - Spia gialla di mancato avviamento pompa;
 - Spia gialla di anomalia cumulativa;
 - Spia rossa di richiesta avviamento dai pressostati di chiamata;
 - Spia rossa di avviamento automatico escluso;
 - Spia rossa di elettropompa arrestata da pulsante di arresto;
 - Sistema di funzionamento secondo UNI10779 con temporizzazione di ritardo allo spegnimento elettropompa impostabile da 1 a 30";
 - Possibilità di settare le visualizzazioni a display in 5 lingue: Italiano, Inglese, Spagnolo, Tedesco, Francese;
 - Funzioni di ritardo e allarmi specifici impostabili da centralina (fare riferimento al manuale allegato al quadro);
-
- Contattore di comando elettropompa dimensionato in AC4;
 - Fusibili di protezione ausiliari;
 - Fusibili ad alta capacità di rottura di protezione motore;
 - Sezionatore generale con blocco porta;
 - Uscita allarme con contatto in scambio (max 5A 250V AC1) per la segnalazione di "DISPONIBILITA' DELL'ALIMENTAZIONE ELETTRICA";
 - Uscita allarme con contatto in scambio (max 5A 250V AC1) per la segnalazione di "RICHIESTA AVVIAMENTO POMPA";
 - Uscita allarme con contatto in scambio (max 5A 250V AC1) per la segnalazione di "POMPA IN FUNZIONE";
 - Uscita allarme con contatto in scambio (max 5A 250V AC1) per la segnalazione di "MANCATO AVVIAMENTO";
 - Involucro metallico;
 - Uscita con pressacavi antistrappo;
 - Grado di protezione IP55;
 - Temperatura ambiente: -5/+40 °C;

- Umidità relativa 50% a 40 °C (non condensata);

2) Quadro elettrico di comando motopompa principale costituito da:

. . Quadro elettromeccanico avviamento Motopompa;

- Ingresso rete 1 ~ 50/60Hz 230V $\pm 10\%$;
 - Ingresso da n°02 Accumulatori al piombo esterni per comando motorino d'avviamento ed alimentazione circuiti ausiliari;
 - Ingresso in bassissima tensione per comando da n° 2 pressostati in serie di chiamata/marcia (contatto NC con impianto in pressione e Motopompa ferma);
 - Ingresso in bassissima tensione per comando Motopompa da galleggiante serbatoio adescamento (contatto NA con serbatoio pieno d'acqua);
 - Ingresso in bassissima tensione per segnalazione da pressostato Motopompa in pressione/moto (contatto NA con Motopompa ferma);
 - Centralina elettronica di gestione Motopompa;
 - Pulsanti di avviamento manuale Motopompa;
 - Pulsante di arresto manuale Motopompa;
 - Pulsante di ripristino anomalie;
 - Pulsante prova avviamento manuale (attivo in caso di mancato avviamento automatico);
 - Pulsante prova spie centralina;
 - Pulsante scorrimento funzioni centralina;
 - Pulsanti di avviamento di Emergenza Manuale protetti da "Safe-crash";
 - Display LCD retroilluminato per visualizzazione di n° 2 voltmetri batterie, n° 2 amperometri batterie, contagiri, contaore totale, contaore parziale, indicatore livello combustibile, termometro acqua, termometro olio, manometro olio, contavviamenti da batterie e storico eventi;
 - Spia verde di motopompa in funzione;
 - Spia verde di richiesta avviamento pompa dal galleggiante del serbatoio di adescamento;
 - Spia gialla di abilitazione pulsante prova di avviamento manuale;
 - Spia gialla di mancato avviamento motopompa;
 - Spia gialla di allarme riserva combustibile;
 - Spia gialla di anomalia riscaldatore acqua/olio;
 - Spia gialla di allarme per insufficiente pressione olio;
 - Spia gialla di allarme per sovratemperatura;
 - Spia gialla di allarme rottura cinghia;
 - Spie gialle di allarme per Batterie inefficienti;
 - Spie gialle di anomalia rilevata dal caricabatteria;
-
- Spie verdi di caricabatteria in funzione;
 - Spia gialla di anomalia cumulativa;
 - Spia rossa di richiesta avviamento dai pressostati di chiamata;
 - Spia rossa di avviamento automatico escluso;
 - Luce spia gialla di Pompaggio in corso;
 - Sistema di funzionamento secondo UNI10779 con temporizzazione di ritardo allo spegnimento elettropompa impostabile da 1 a 30';
 - Possibilità di settare le visualizzazioni a display in 5 lingue: Italiano, Inglese, Spagnolo, Tedesco, Francese;
 - Funzioni di ritardo e allarmi specifici impostabili da centralina (fare riferimento al manuale allegato al quadro);
 - N°02 caricabatteria 12Vdc 3A (24Vdc 3A per versione a 24V) per il mantenimento accumulatori;
 - Fusibili di protezione ausiliari;
 - Sezionatore generale con blocco porta;
 - Uscita allarme con contatto in scambio (max 5A 250V AC1) per la segnalazione di "MODALITA' AUTOMATICA ESCLUSA";

- Uscita allarme con contatto in scambio (max 5A 250V AC1) per la segnalazione di “GUASTO DEL QUADRO DI CONTROLLO”;
- Uscita allarme con contatto in scambio (max 5A 250V AC1) per la segnalazione di “MOTOPOMPA IN FUNZIONE”;
- Uscita allarme con contatto in scambio (max 5A 250V AC1) per la segnalazione di “MANCATO AVVIAMENTO”;
- Involucro metallico;
- Uscita con pressacavi antistrappo;
- Grado di protezione IP55;
- Temperatura ambiente: -5/+40 °C;
- Umidità relativa 50% a 40 °C (non condensata);

3)- Quadro elettrico di comando elettropompa di compensazione costituito da:

- Quadro elettromeccanico;
- Ingresso rete 3 ~ 50/60Hz 400V $\pm 10\%$
- n°2 Ingresso in bassissima tensione per comando da pressostato o interruttore a galleggiante;
- Pulsanti funzionamento motore in Automatico-Spento-Manuale (manuale momentaneo);
- Luce spia verde di presenza rete;
- Luce spia verde di motore in funzione;
- Luce spia rossa di allarme livello acqua;
- Luce spia rossa di allarme motore in protezione per sovraccarico;
- Protezione termica per sovraccarico motore regolabile;
- Fusibile di protezione ausiliari;
- Fusibili di protezione motore;
- Sezionatore generale con bloccoporta;
- Involucro metallico;
- Uscita con pressacavi antistrappo;
- Grado di protezione IP55.
- Temperatura ambiente: -5/+40 °C;
- Umidità relativa 50% a 40 °C (non condensata).

Il Gruppo inoltre è corredato di:

- N°2 diaframmi per il ricircolo acqua e sfogo aria tarati al 5% della portata massima delle pompe per evitare che queste si surriscaldino;
- N°1 circuito avviamento automatico pompa pilota;
- Pressostati, manometri e vuotometri come previsto dalla normativa;
- N°1 collettore di mandata con n°2 attacchi da 1” per idrosfere;
- Il Gruppo deve essere inoltre munito di dichiarazione di conformità alle norme UNI EN 12845-CE.

CARATTERISTICHE IDRAULICHE

Dato richiesto: portata mc/h 54 prevalenza mt. 70

Portata elettropompa	Mc/h	0	25	35	55	60	65
Prevalenza	mt	78	77	76	69	63	56
Potenza assorbita	Kw	6	11	13	17	18	19
Aspirazione NPSH	mt	2.5	2.6	2.7	3.4	3.8	3.9

Portata motopompa	Mc/h	0	25	35	55	60	65
Prevalenza	mt	78	77	76	69	63	56
Potenza assorbita	Kw	6	11	13	17	18	19
Aspirazione NPSH	mt	2.5	2.6	2.7	3.4	3.8	3.9

Portata pompa pilota	lt/m	0	45	60	100	120
Prevalenza	mt	90	88	83	67	55

Potenza resa dal gruppo Kw. 22+28+2,2

DIAMETRO COLLETTORE MANDATA	DN	80
DIAMETRO BOCCA DI ASPIRAZIONE	DN	65
DIAMETRO DIAFRAMMA RICIRCOLO	DN	3/4"

+ IVA

GRUPPO TRASFORMATORE DI TENSIONE

Trasformatore isolato in resina epossidica a perdite normali avente le seguenti caratteristiche:

-Classe di isolamento:	17,5 – 24 V
-Classe sistema isolante:	F/F
Sovratemperatura:	100/100
-Classi:	C2- E2 – F1
-Conforme alle Norme:	IEC-60076-11
-Potenza nominale:	1000kVA
-Frequenza:	50Hz
-Tensione di ingresso:	Trifase 20kV $\pm 2 \times 2,5\%$
--Tensione di uscita:	Trifase+neutro 400/230
-Gruppo collegamento:	DY n 11
-Perdite di corto circuito sotto carico a 75°C:	P _{cc} =13.200W
-Perdite a vuoto	P _o = 3.000W
Avvolgimento secondario:	alluminio/alluminio
-Dimensioni di ingombro:	(1550x2180x800) mm