



Traction motors and generators



ZAKŁAD MASZYN ELEKTRYCZNYCH "EMIT" S.A.

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ISO 9001

Szanowni Państwo

Mamy przyjemność przedstawić Państwu ofertę Zakładu Maszyn Elektrycznych EMIT S.A. wiodącego zakładu w branży maszyn elektrycznych na polskim rynku.

Jesteśmy w stanie zaoferować zaawansowane technicznie i technologicznie produkty, zdolne do zaspokojenia najwyższych wymagań naszych klientów, zarówno w obszarze nowych wyrobów, produkcji części do maszyn, jak również remontów. Nasz program produkcji dostosowujemy do zmieniających się potrzeb rynku, a nasi inżynierowie współpracują z klientami nad rozwiązaniem najbardziej skomplikowanych zadań, jakie przed nami stawiacie. Wszystkie obszary działalności spółki objęte zostały szerokimi przemianami, które umożliwiły firmie nawiązanie i kontynuowanie najlepszych wzorów z ponad 80-letniej tradycji.

Inwestycje w potencjał ludzki oraz najnowsze technologie, jakie poczyniono w ostatnich latach, zapewniają niezwykle dynamiczny rozwój techniczny, ciągle rozszerzanie asortymentu oraz gwarantują najwyższą jakość produkowanych wyrobów. Na osiągnięcie obecnych wyników decydujący wpływ miało ogromne zaangażowanie ludzi przekształcających firmę do działania na konkurencyjnym rynku.

EMIT jest spółką rentowną, o dobrej kondycji ekonomicznej, posiadającą płynność finansową i cieszącą się dobrą opinią odbiorców, dostawców oraz instytucji finansowych. Potwierdzeniem skuteczności naszych działań i właściwej strategii przyjętej w spółce jest ciągle doskonalenie polityki jakościowej zgodnie z wymaganiami systemu jakości ISO 9001.

Mamy nadzieję, że lektura następnych stron pozwoli Państwu lepiej poznać potencjał produkcyjny EMIT-u.

W imieniu Zarządu i Załogi Prezes Zarządu

Władysław Kosiński

Ladies and Gentlemen

We have the pleasure to introduce to you Zakład Maszyn Elektrycznych EMIT S.A., the leading company in the field of electric machines on Polish market.

We are in position to offer to you high-tech products, capable to suffice our clients requirements, either in the field of brand new goods, machine elements or electric machine overhauls. Our production programme is adjusted to changing market demands and our engineers co-operate with clients in solving the most difficult tasks, which you stand before us. We have widely revised all our activities, what enabled our company to refer to and continue the best examples from 85-years of tradition.

Investments in human potential and new technologies that we have done recently assures dynamic technological improvement, extension of range of goods and guarantees high quality of our products. The present success has been only possible thanks to great engagement of our employees involved in market orientation.

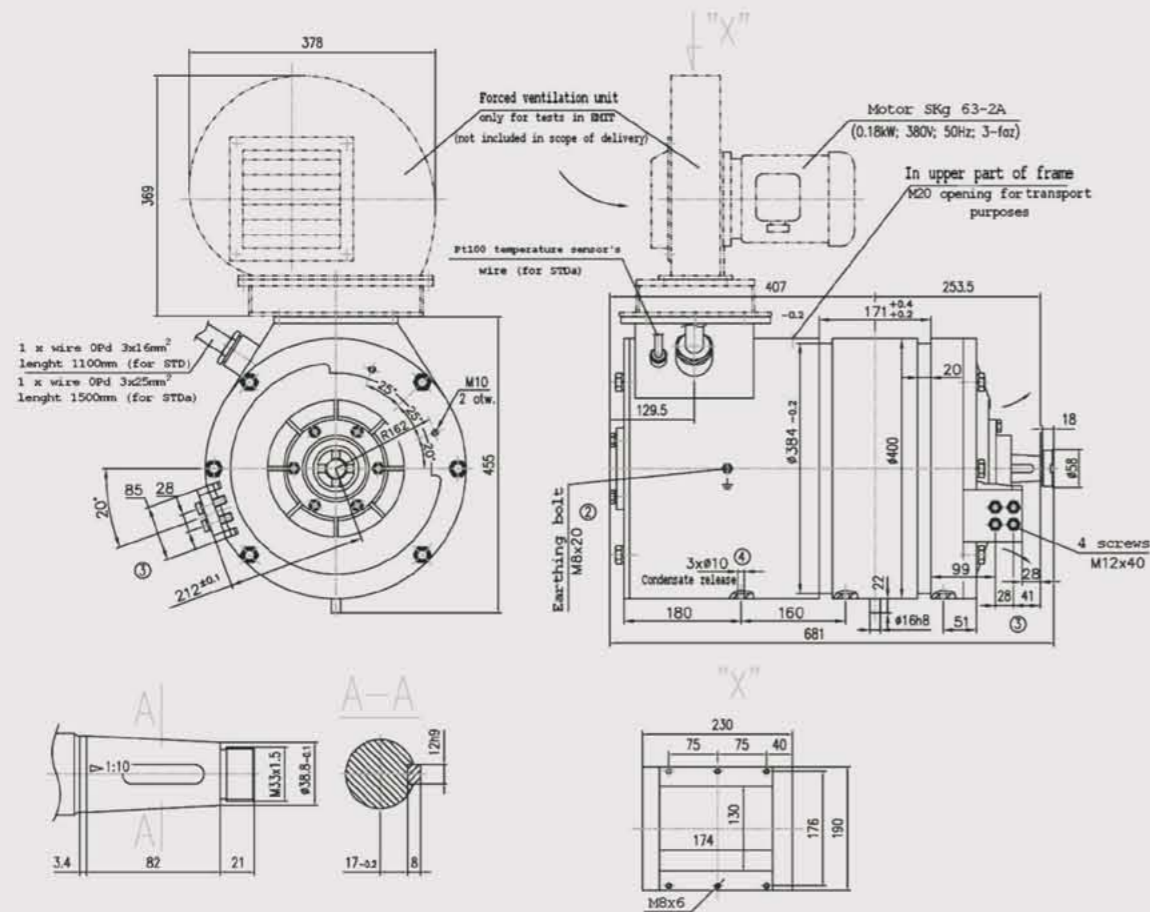
EMIT is a profitable company, in good economical condition, having financial liquidity and a good clients, suppliers and bankers opinion.

The evidence of efficiency of our business activities and a proper company strategy choice is continuous improvement of quality policy as required by implemented and maintained ISO 9001 standard.

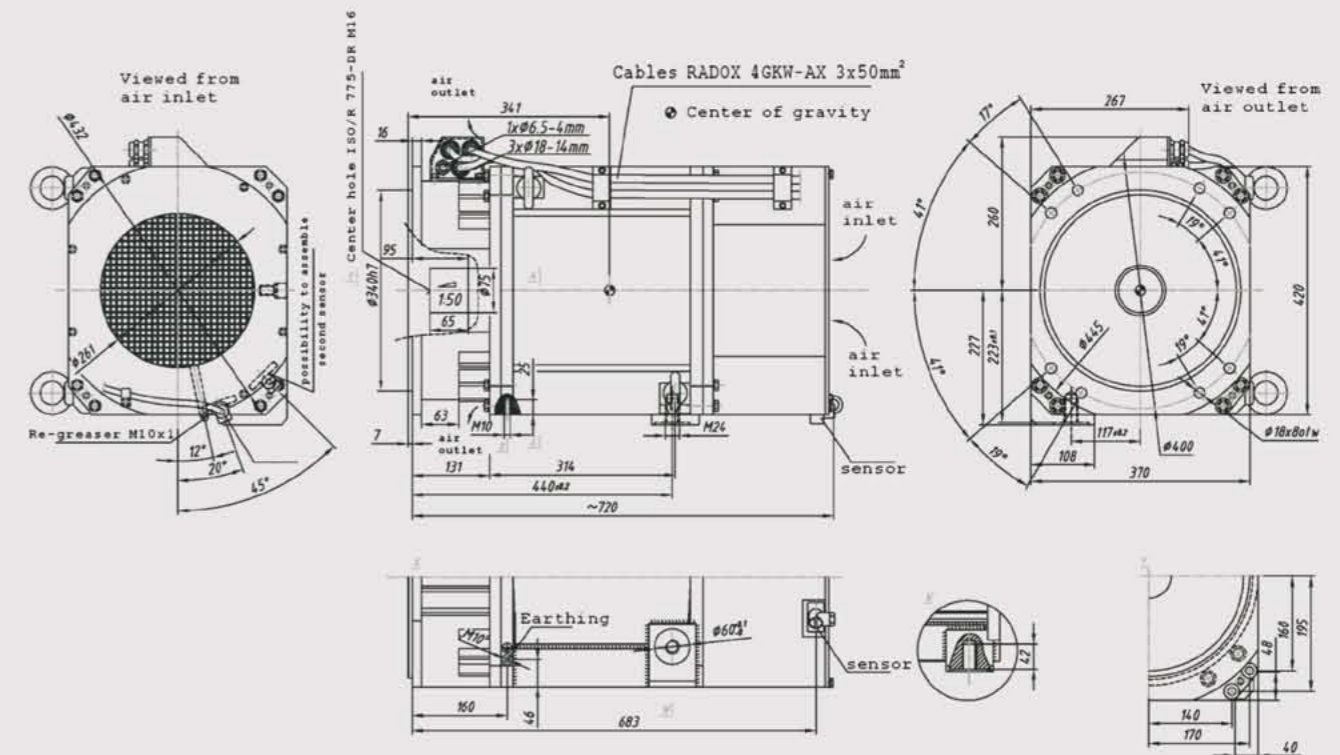
We hope that reading of the subsequent pages will allow you to familiarise with EMIT's production potential.

On behalf of The Management and Staff
Chairman of The Board

Władysław Kosiński



STDa 200-L4



STDa 250-4A

Motor designed for driving tram, supplied from frequency inverter converting DC current for AC current with frequency ranging from 5 to 162,5 Hz. Motor is suitable for operation under undercarriage of tram and is connected to ventilation channel of undercarriage. Motor is driving wheels through Cardan transmission. On shaft's end besides Cardan clutch there is also brake's drum whose brake blocks and pressing device are placed on end shield on DE side.

Motor of STDa250 4A is designed for driving low floor tram. It is mounted on tram's cart. Motor is supplied from frequency inverter.

Power Output	Duty	Current	Voltage	Connection	Number of Leads	Rated Current	Rated Speed of Rotation	Frequency	Efficiency	Power Factor	Weight	Direction of Rotation	Ambient Temperature	Relative Humidity	Maximum Speed of Rotation
kW	-	-	V	-	-	A	rpm	Hz	%	-	kg	-	°C	%	rpm
50	S1	3-phase	380		3	88	1917	65	94	0,92	280	Both	-25 ÷ +45	95	4875

Power Output	Duty	Current	Voltage	Connection	Number of Leads	Rated Current	Rated Speed of Rotation	Frequency	Efficiency	Power Factor	Weight	Direction of Rotation	Ambient Temperature	Relative Humidity	Maximum Speed of Rotation
kW	-	-	V	-	-	A	rpm	Hz	%	-	kg	-	°C	%	rpm
95	S1	3-phase	380		3	180	1924	65	92,8	0,86	450	Both	-25 ÷ +45	95	4250



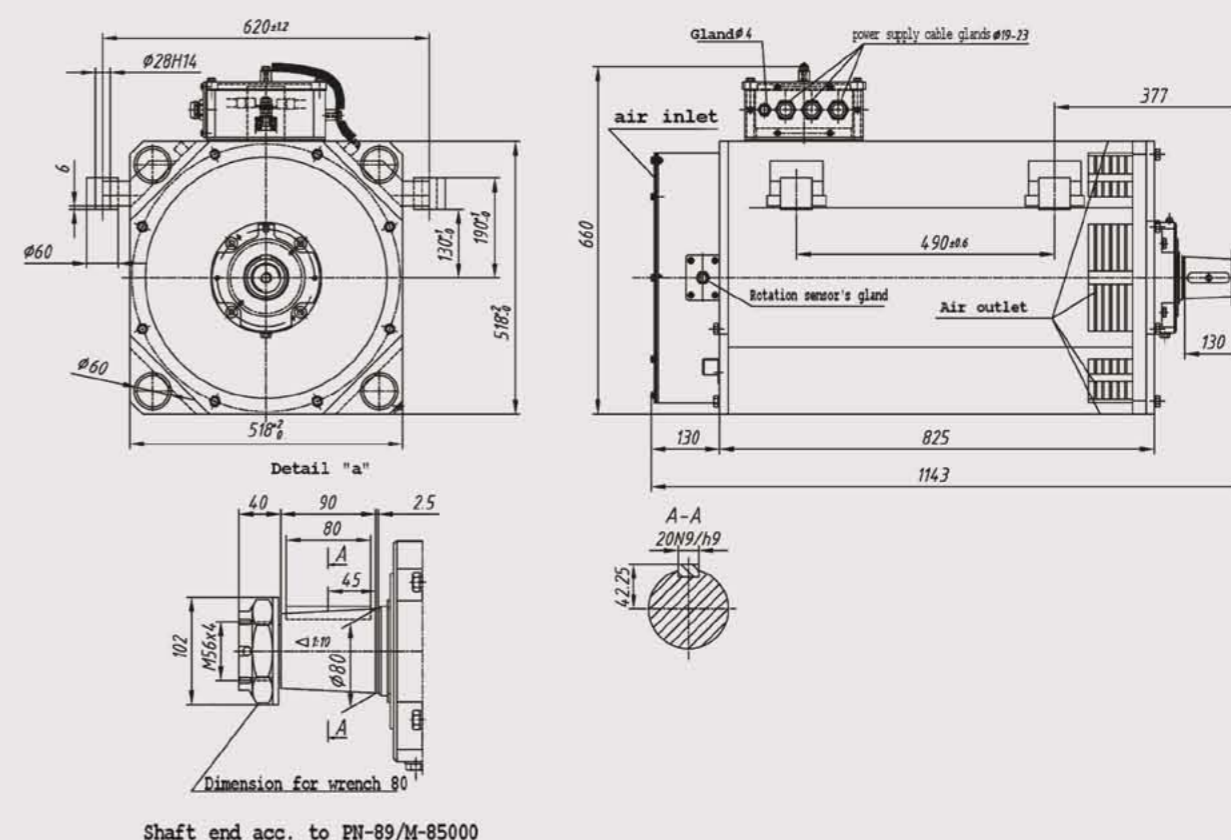
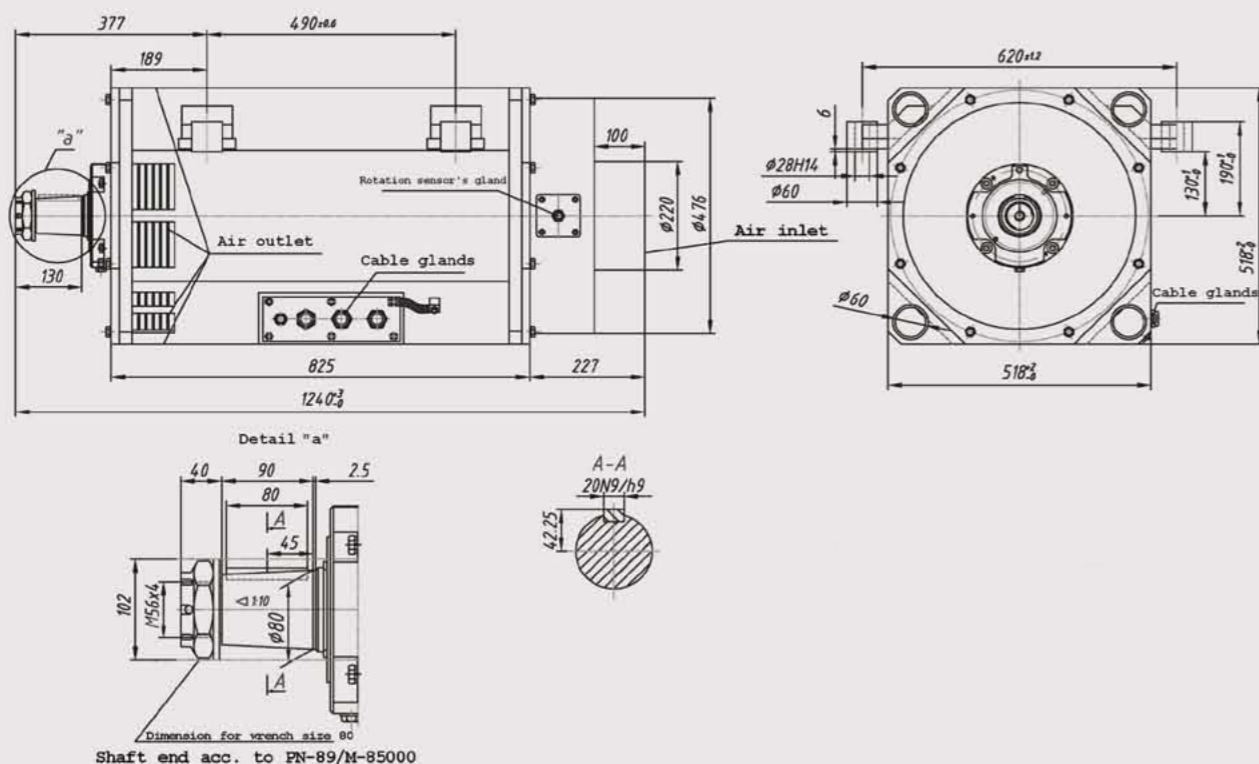
Type of motor - asynchronous, squirrel cage, low voltage
Design - special (for tram driving)
Mechanical execution - for horizontal operation
Shaft end - one, conic
Cooling - external cooling from tram's air-duct. Air inlet through flange on "NDE" side. Air outlet through openings in end shield on "DE" side.

Bearings - roller bearings. "DE" side NU 310ECM3, "NDE" side NJ308EM1C3 + HJ308E
Terminal box - motor made without terminal box. One cable ØPd 325mm² for powers supply is lead out through Big cable gland, through small cable gland Pt100's wire is lead out.
Duty - continuous, taking into consideration starts and stops occurring in electric tram's operation.



Type of motor - asynchronous, squirrel cage, low voltage
Design - closed. After clutch assembly and assembly with transmission on car interior protection degree is IP55.
Mechanical execution - for horizontal operation, with flange
Shaft end - one, conic
Cooling - self cooling, with system of air-ducts, cooling system IC511.

Bearings - single bearing: "NDE" side NU212 EM1 C4
Duty - continuous, taking into consideration starts and stops occurring in electric tram's operation.



STDa 280-6B

STDa 280-6B-1

Motor is designed for driving of trolley bus. It is supplied from frequency inverter speed control range from 0 to 1200 rpm at constant torque and from 1200 to 3100 rpm at constant power output. It is suitable for operation under trolley bus's undercarriage and it's driving wheel through Cardan clutch.

Motor is designed for driving of trolley bus. It is supplied from frequency inverter speed regulation range from 0 to 1200 rpm at constant torque and from 1200 to 3100 rpm at constant power output. It is suitable for operation under trolley bus's undercarriage and it's driving wheel through Cardan clutch.

Power Output	Duty	Current	Voltage	Connection	Number of Leads	Rated Current	Rated Speed of Rotation	Frequency	Efficiency	Power Factor	Weight	Direction of Rotation	Ambient Temperature	Relative Humidity	Maximum Speed of Rotation
kW	-	-	V	-	-	A	rpm	Hz	%	-	kg	-	°C	%	rpm
165	S1	3-phase	400		3	293	1185	60	94,4	0,86	770	Both	-25 ÷ +45	95	3100

Power Output	Duty	Current	Voltage	Connection	Number of Leads	Rated Current	Rated Speed of Rotation	Frequency	Efficiency	Power Factor	Weight	Direction of Rotation	Ambient Temperature	Relative Humidity	Maximum Speed of Rotation
kW	-	-	V	-	-	A	rpm	Hz	%	-	kg	-	°C	%	rpm
175	S1	3-phase	400		3	312	1184	60	94,0	0,86	770	Both	-25 ÷ +45	95	3100



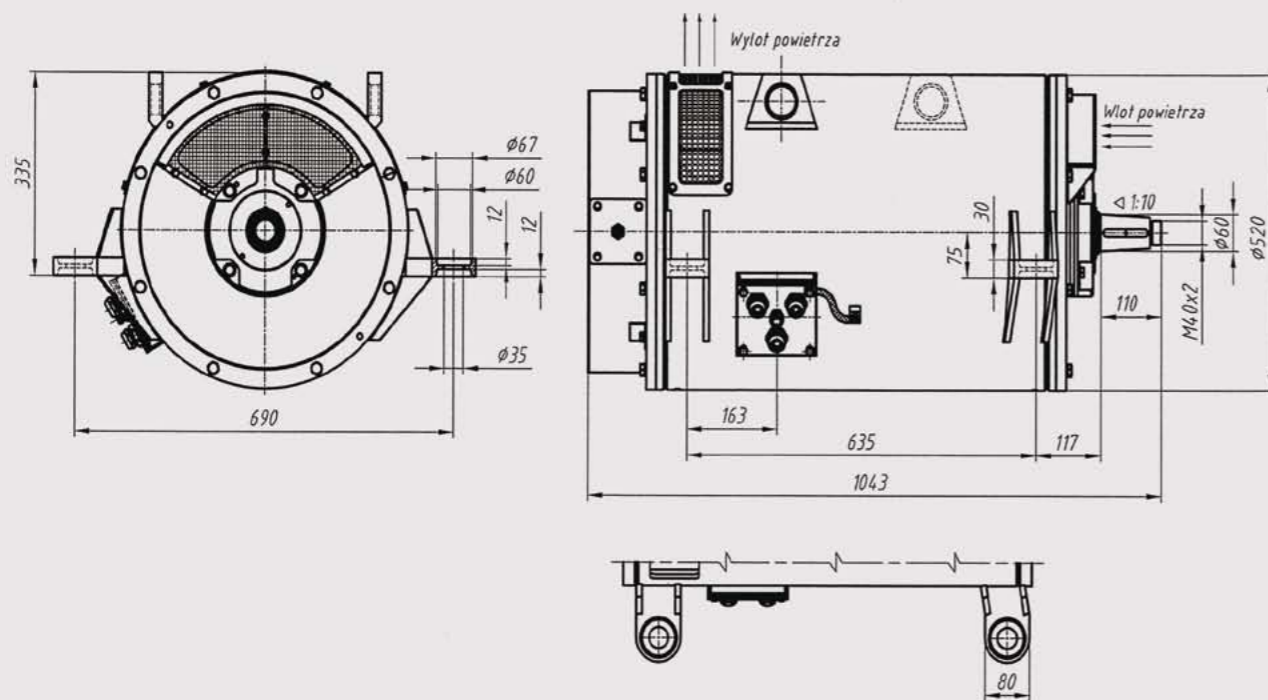
Type of motor - asynchronous, squirrel cage, low voltage
Design - ODP, protection degree IP22
Mechanical execution - for horizontal operation
Shaft end - one, conic
Cooling - self cooling, realized through fan mounted on motor's shaft. Air inlet is placed on cover on "NDE" side. Air flows out through louvers placed on frame's sides on "DE"

Bearings - roller bearings: "NDE" side 6312 C3; "DE" side 6217MC3. On "NDE" side insulated bearing chamber
Duty - continuous, taking into consideration starts and stops occurring in trolley buse's operation.
Terminal box - motor made without terminal box. In lower part of frame, on right side, plate with three cable glands is mounted through which power supply cables are lead in.



Type of motor - asynchronous, squirrel cage, low voltage
Design - cODP, protection degree IP22
Mechanical execution - for horizontal operation,
Shaft end - one, conic
Cooling - self cooling, realized through fan mounted on motor's shaft. Air inlet is placed on cover on "NDE" side Air flows out through louvers placed on frame's sides on "DE" side.

Bearings - roller bearings: "NDE" side 6312 C3; "DE" side 6217MC3. On "NDE" side insulated bearing chamber
Duty - continuous, taking into consideration starts and stops occurring in trolley buse's operation.
Terminal box - on top of the frame, cables lead out on motor's left side (when viewed from "DE" side).



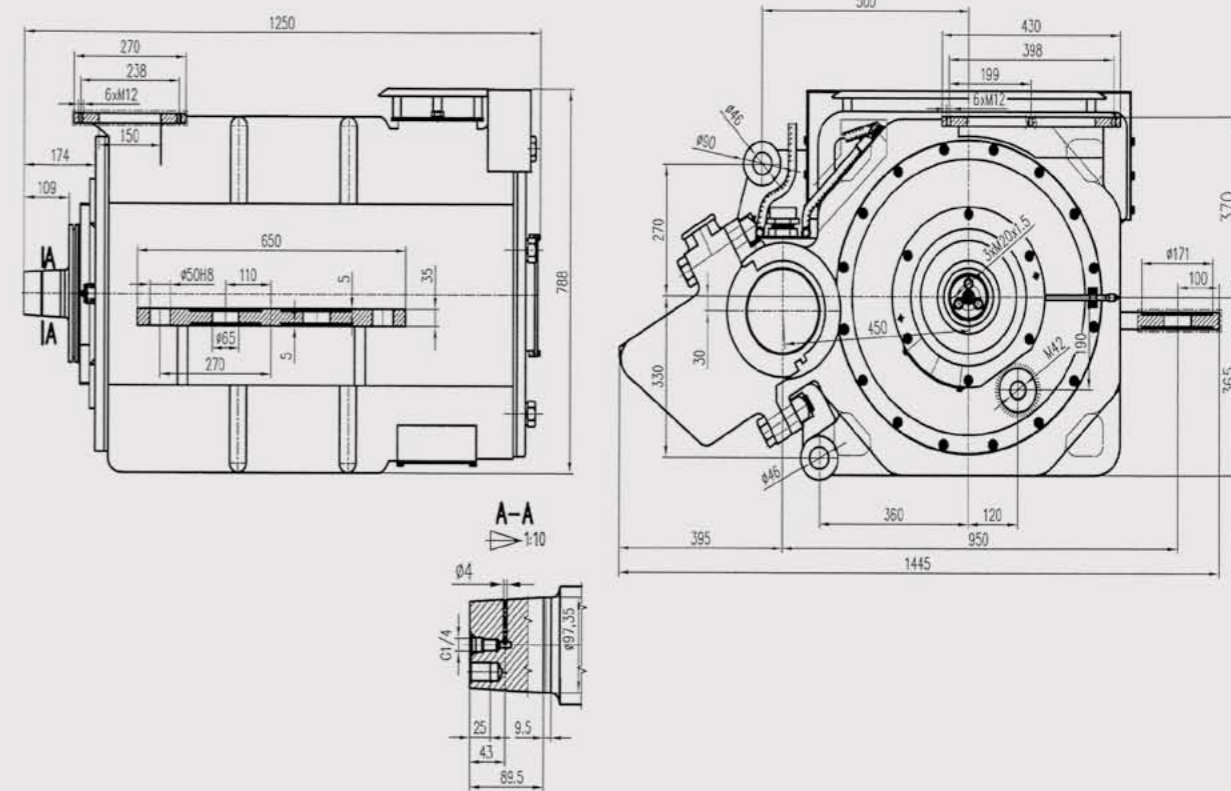
STDa280-4A

3-phase induction motor designed for driving of trolleybus. Motor in special execution, hanging, with feet. Motor desinged for supply from frequency inverter.

Power Output	Duty	Current	Voltage	Connection	Number of Leads	Rated Current	Rated Speed of Rotation	Frequency	Efficiency	Power Factor	Weight	Direction of Rotation	Ambient Temperature	Relative Humidity
kW	-	-	V	-	-	A	rpm	Hz	%	-	kg	-	°C	%
125	S1	3-phase	400		3	226	1784	60	93,8	0,85	650	Both	-25 ÷ +45	95

Type of motor - asynchronous, squirrel cage, low voltage
Design - special
Mechanical execution - for horizontal operation
Shaft end - one, conic
Cooling - IC01

Bearings - roller bearings: "DE" side NU 314 Em1 C3
 "NDE" side 6312 C3
Motor with supply cables type Radox 4GKW-AX-EMC-L
Rotation speed sensor: MHRM 12G2501
Speed control: from 0 to 1780rpm at T=const.;
 from 1780 to 3800 rpm at P=const.



LK450X6

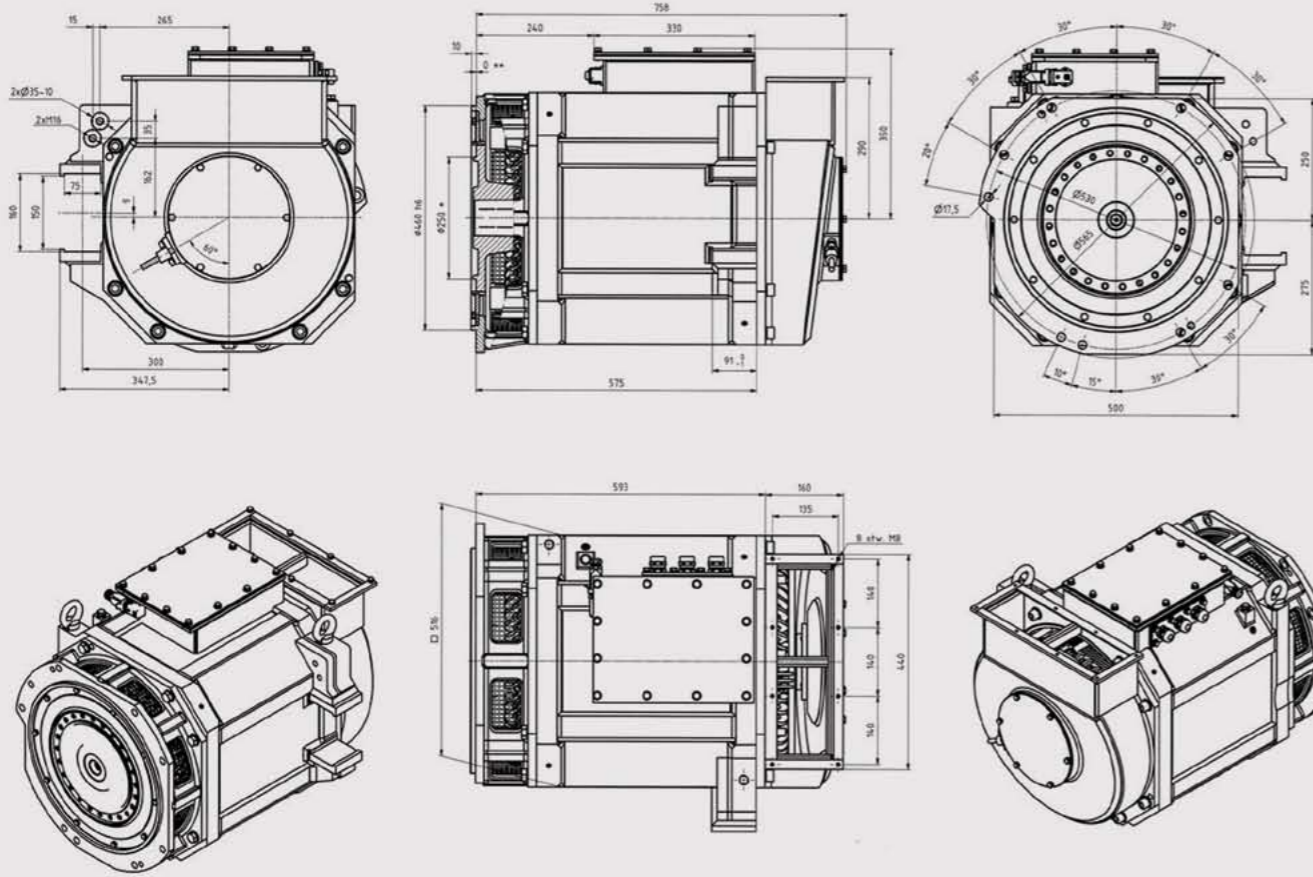
3-phase induction motor with copper bar rotor dedicated for driving of EMU EN-57. In this modernized motor housing of existing DC motor is being used. Motor is suitable for supply from frequency inverter type IGBT2LPWM.

Power Output	Duty	Current	Voltage	Connection	Number of Leads	Rated Current	Rated Speed of Rotation	Frequency	Efficiency	Power Factor	Weight	Direction of Rotation	Ambient Temperature	Relative Humidity
kW	-	-	V	-	-	A	rpm	Hz	%	-	kg	-	°C	%
250	S1	3-phase	2340		3	78	987	50	94,6	0,84	2250	Both	-30 ÷ +45	100

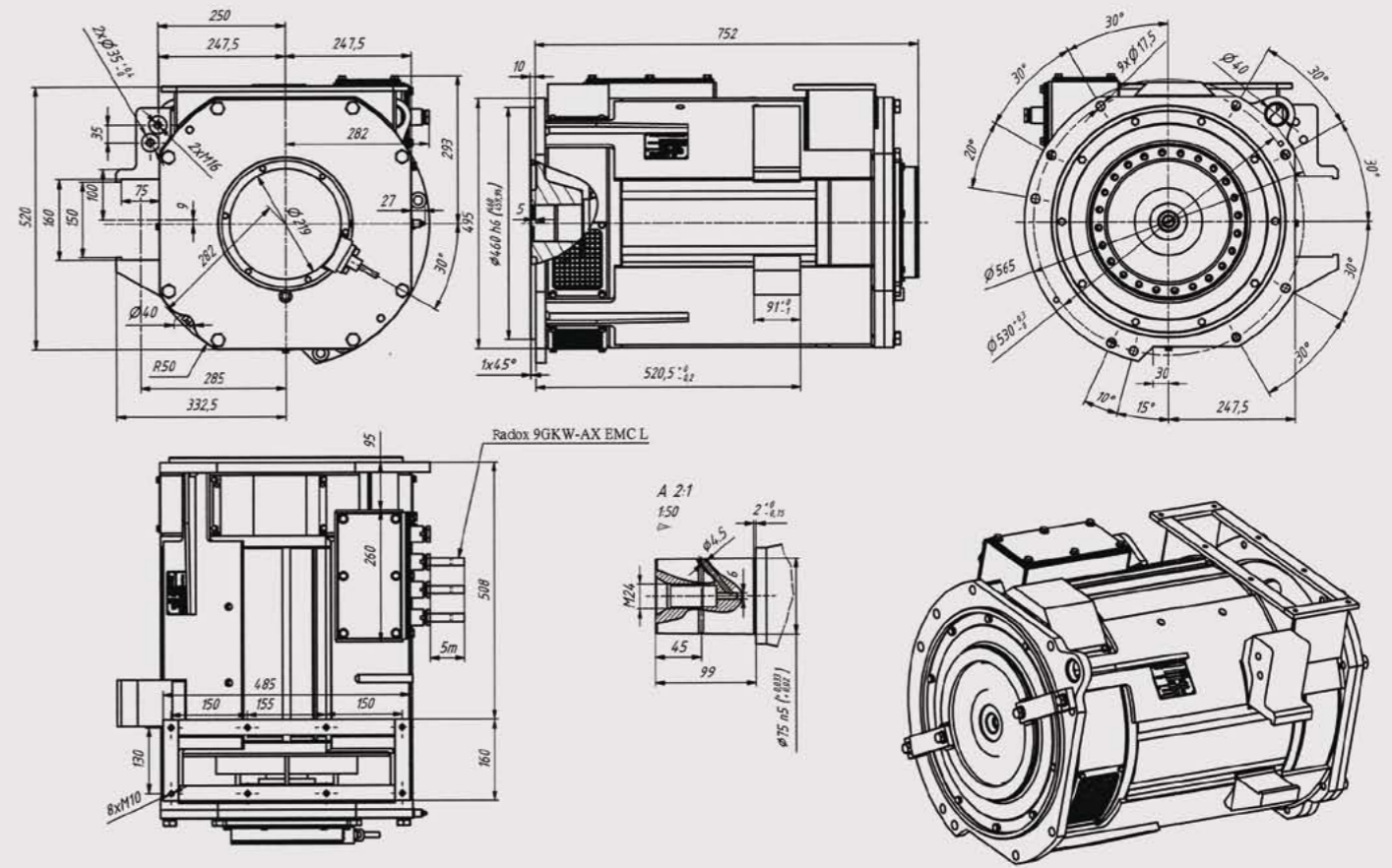
Type of motor - asynchronous, squirrel cage, high voltage
Design - special, modernized DC motor
Mechanical execution -for horizontal operation
Shaft end - one, conic
Cooling - required air flow 1200m³/h at 400Pa

Bearings - roller bearings: "DE" side NU 424 Mp64 TR
 "NDE" side NJ+HJ322 EMC4S00
Motor with 3 screened, power supply cables type Radox 9GKW-AX-EMC-L, 25mm² and one cable 3GKW/S FR EMC 4x2,5mm² for sensors.
Rotation speed sensor: 1 x Lenard+Bauer GEL247-X-1-F-M300-0





SXT 355-4A



SXT 315-4C

Originally intended for modernization of EN57 SXT355-4A motor is designed for driving of various EMU's. It is a single bearing, flanged motor with conic shaft end for horizontal operation. Motor requires forced ventilation (required air flow 30m3/min).

Motor type SXT315-4C is designed for driving of electric multiple unit. It is mounted by flange to transmission and supported by handles on frame's sides placed rubber-metal support. Motor is supplied from frequency inverter.

Power Output	Duty	Current	Voltage	Connection	Number of Leads	Rated Current	Rated Speed of Rotation	Frequency	Efficiency	Power Factor	Weight	Direction of Rotation	Ambient Temperature	Relative Humidity
kW	-	-	V	-	-	A	rpm	Hz	%	-	kg	-	°C	%
350	S1	3-phase	2340		3	113	1463	50	91,3	0,84	870	Both	-25 +40	95

Type of motor - asynchronous, squirrel cage
Design - for EMU driving
Mechanical execution - for horizontal operation
Shaft end - one, conic
Cooling - forced cooling

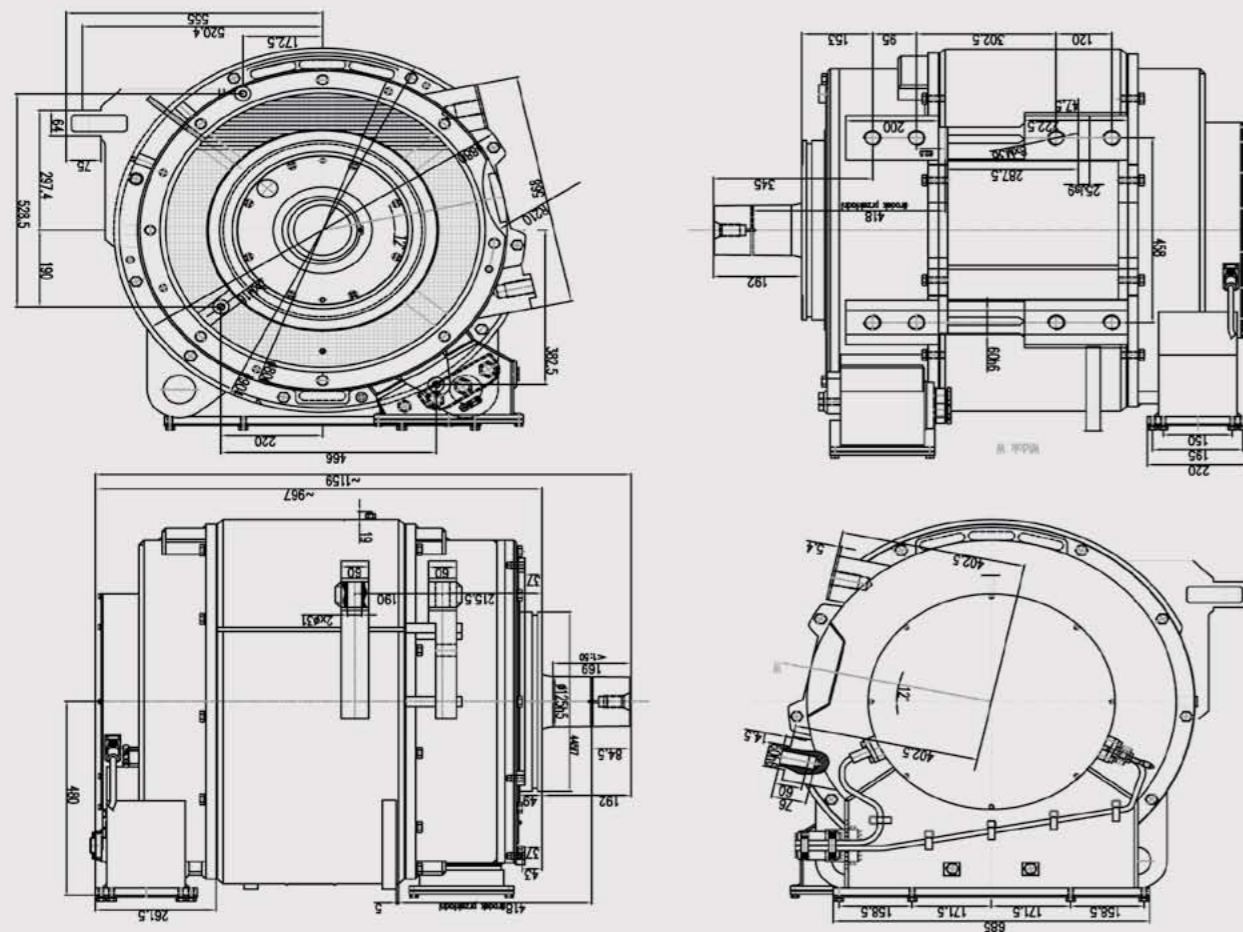
Bearings - single bearing execution, bearing type BC1-7229 CC
Terminal box - placed on top
Duty - continuous

Power Output	Duty	Current	Voltage	Connection	Number of Leads	Rated Current	Rated Speed of Rotation	Frequency	Efficiency	Power Factor	Weight	Direction of Rotation	Ambient Temperature	Relative Humidity	Maximum Speed of Rotation
kW	-	-	V	-	-	A	rpm	Hz	%	-	kg	-	°C	%	rpm
280	S1	3-phase	2200		3	89	1772	60	94,0	0,88	730	Both	-25 +45	95	5100

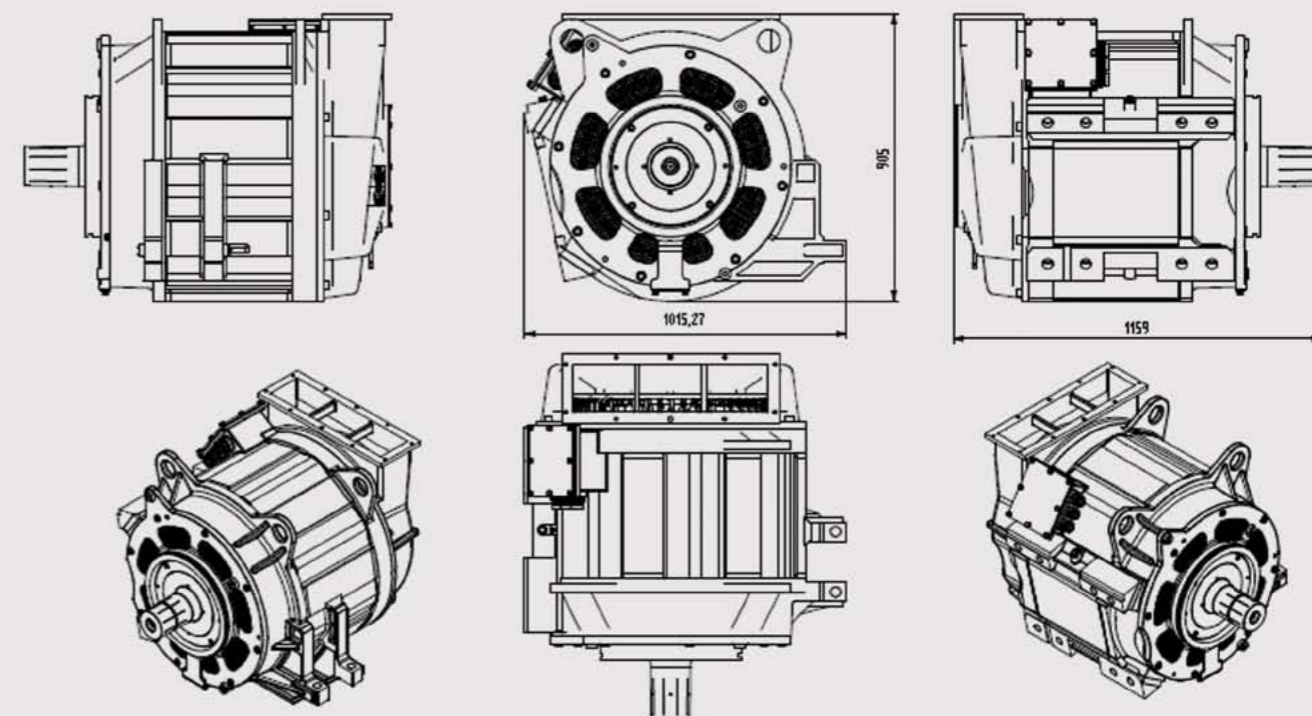
Type of motor - asynchronous, squirrel cage, high voltage
Design - cODP, protection degree IP22
Mechanical execution - for horizontal operation,
Shaft end - one, conic
Cooling - self cooling, realized through fan mounted on motor's shaft. Air inlet is placed on cover on "NDE" side Air flows out through louvers placed on frame's sides on "DE" side.

Bearings - roller bearings: "NDE" side 6312 C3; "DE" side 6217MC3. On "NDE" side insulated bearing chamber
Duty - continuous, taking into consideration starts and stops occurring in trolley buse's operation.
Terminal box - on top of the frame, cables lead out on motor's left side (when viewed from "DE" side).





STX 500-4A



STXm500-4A

Motor is designed for driving locomotive type E6ACT. Motor is manufactured according to technical documentation provided by Zakłady Naprawcze Lokomotyw Elektrycznych S.A. from Gliwice.

STXm500-4A is a traction motor suitable for operation with VOITH SET553 gearbox intended for driving of E6ACT DRAGON locomotive. Motor without feet and flange designed for horizontal operation. It has one conic shaft end. Motor requires forced ventilation (required air flow 100m³/min).

Power Output	Duty	Current	Voltage	Connection	Number of Leads	Rated Current	Rated Speed of Rotation	Frequency	Efficiency	Power Factor	Weight	Direction of Rotation	Ambient Temperature	Relative Humidity	Maximum Speed of Rotation
kW	-	-	V	-	-	A	rpm	Hz	%	-	kg	-	°C	%	rpm
830	S1	3-phase	2150		3	271	1296	44	94,5	0,87	2285	Both	-25 ÷ +45	95	2977

Power Output	Duty	Current	Voltage	Connection	Number of Leads	Rated Current	Rated Speed of Rotation	Frequency	Efficiency	Power Factor	Weight	Direction of Rotation	Ambient Temperature	Relative Humidity	Maximum Speed of Rotation
kW	-	-	V	-	-	A	rpm	Hz	%	-	kg	-	°C	%	rpm
835	S1	3-phase	2150		3	269	1300	44	94,8	0,88	Both		-25 ÷ +40	95	



Type of motor - asynchronous, squirrel cage, high voltage
Rotor - with copper bars
Design - ODP, protection degree IP22
Mechanical execution - for horizontal operation
Shaft end - one, conic
Cooling - forced, flow 100m³/min

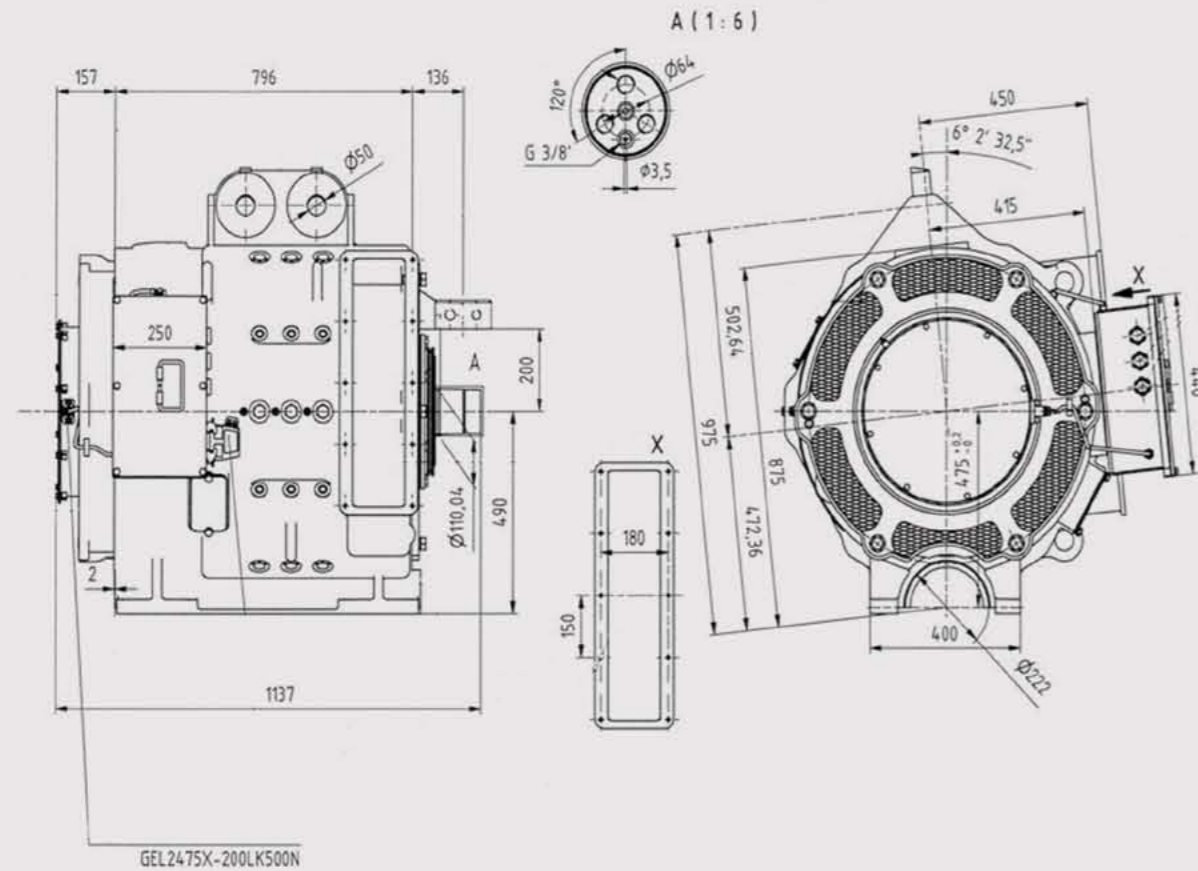
Bearings - roller bearings:
 "DE" side Nu330 EM1P64 + 6330M1P64;
 "NDE" side NU320 EM1P64
 On "NDE" side insulated bearing chamber
Duty - continuous S1
Terminal box - placed on top of frame, with 3 stator winding's
 Terminals and temperature sensors' terminal strip.

Type of motor - asynchronous, squirrel cage
Design - for driving of locomotive
Mechanical execution - for horizontal operation
Shaft end - one, conic
Cooling - forced cooling

Bearings - double bearing execution, bearing type DE
 NU330 ECMRD, NDE 6326 M.
Terminal box - placed on top
Duty - continuous



**Generator set
Ghp400M4C +Ghp315S4K**



Main generator type Ghp 400 M4C is a three phase four pole synchronous machine with rotor made with protruded poles and with system of brushes. It is supplying in line DC motors through system of rectifiers. Generator is self-cooling with a fan mounted on DE side. It is designed for horizontal operation (on feet execution, with two bearings), protection degree IP21. Generator is connected with engine through coupling and SAE 0 flange.

Auxiliary generator type Ghp315S4K is brushless three phase four pole self exciting synchronous machine with rotor made with protruded poles. It is designed to supply through frequency inverters locomotive's auxiliary equipment. Generator is self-cooling with a fan mounted on DE side. It is designed for horizontal operation (on feet execution, with two bearings), protection degree IP21. Machine is connected with main generator through V-belts.

**Nominal data of main generator
Ghp400M4C duty S1.**

For $P_{DC} = 590kW$; $U_{DC} = 491,7V$; $I_{DC} = 1200A$

S _N [kVA]	U _N [V]	n _N [rpm]	f _N [Hz]	I _N [A]	η [%]	cos φ	Excitation	
							I _{rn} [A]	U _{rn} [V]
662	393 (Y)	1800	60	972	94,8	0,85	49,3	74

Reactances (saturated): $X_d = 493\%$; $X_d' = 40,8\%$; $X_d'' = 22,9\%$
For $P_{DC} = 590kW$; $U_{DC} = 800V$; $I_{DC} = 737,5A$

S _N [kVA]	U _N [V]	n _N [rpm]	f _N [Hz]	I _N [A]	η [%]	cos φ	Excitation	
							I _{rn} [A]	U _{rn} [V]
621	600 (Y)	1800	60	597,6	96,0	0,92	42,3	63,5

Reactances (saturated): $X_d = 117\%$; $X_d' = 14,5\%$; $X_d'' = 9\%$

**Nominal data of auxiliary generator
Ghp315S4K duty S1.**

S _N [kVA]	U _N [V]	n _N [rpm]	f _N [Hz]	I _N [A]	η [%]	cos φ
63	400 (Y)	1800	60	91	88,0	0,75
40		600	20	57,7	-	0,95

Exciter APOa465-50-16/4. Control current $I_{SN} = 3,5A$; control voltage $U_{SN} = 20V$

GDTM533F (SXT400-6B)

GDTM533F (SXT400-6B) is three phase, six pole, induction motor designed for driving modernized locomotive ST-43 (060DA). In this modernized motor housing of existing DC motor is being used. It is designed for horizontal operation, with one conic shaft end. Motor with external cooling.

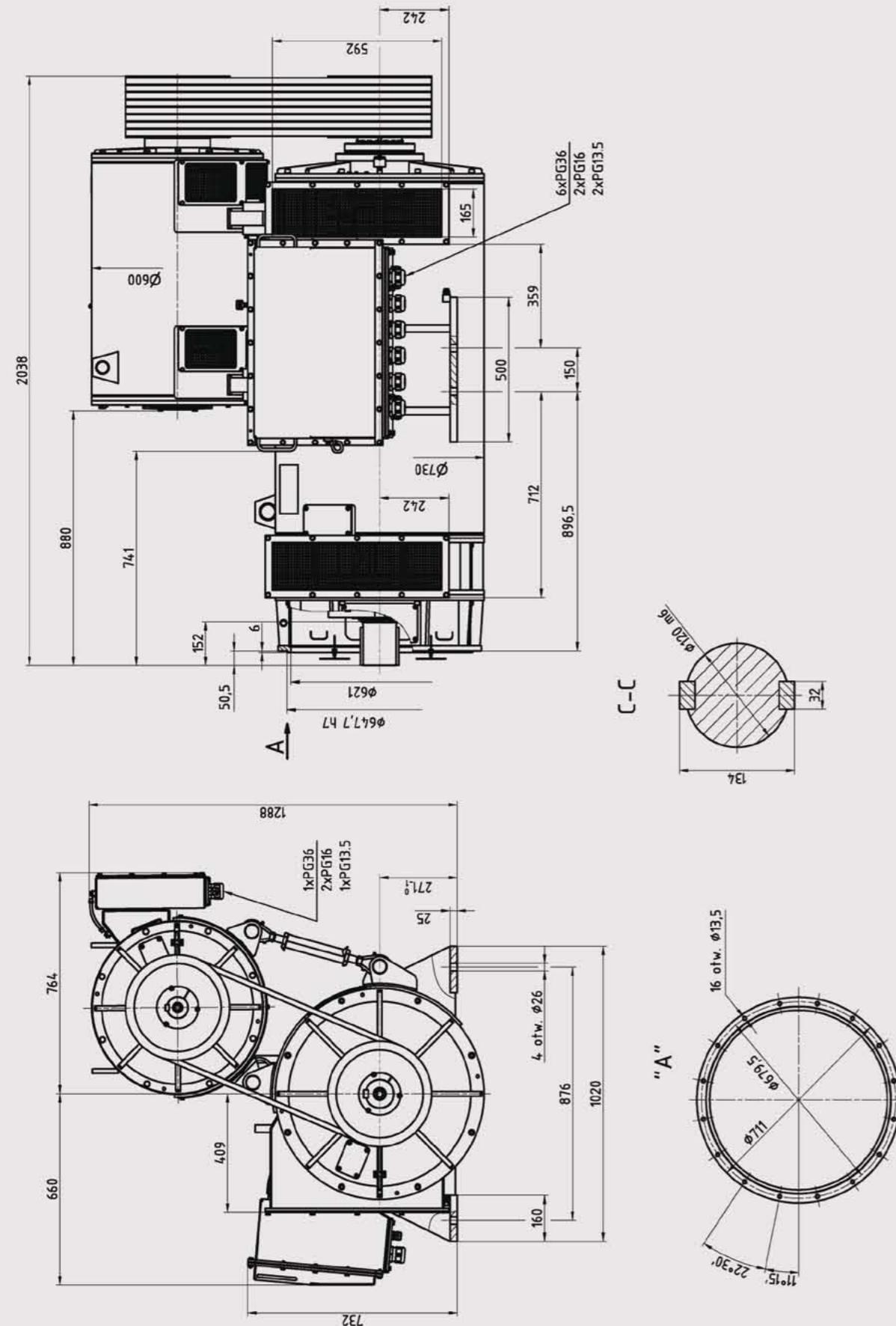
P _N [kW]	U _N [V]	n _N [rpm]	f _N [Hz]	I _N [A]	η [%]	Cos φ	Motor type	Connection	Encoder	Winding protection	Bearings protection	Ambient Temperature	Protection degree
kW	V	rpm	Hz	A	%	-	-	-	-	-	-	°C	-
475	1400	945	48	238	94,7	0,87	3-phase	star	Lenord-Bauer	6xPt100	2xPt100	-30 ÷ +40	IP21

Type of motor - asynchronous, squirrel cage, high voltage
Rotor - with copper bars
Design - ODP, protection degree IP22
Mechanical execution - for horizontal operation
Shaft end - one, conic
Cooling - forced, flow 100m³/min

Bearings - roller bearings:
"DE" side Nu330 EM1P64 + 6330M1P64;
"NDE" side NU320 EM1P64
On "NDE" side insulated bearing chamber
Duty - continuous S1
Terminal box - placed on top of frame, with 3 stator winding's
Terminals and temperature sensors' terminal strip.



**Generator set
GHP400M4C + Ghp315S4K**



**Generator set
GLp500L4 + Ghp315S4K**

Main generator type GLp500L4 is dedicated for SM48 locomotive - it is synchronous, 3-phase, self-excited generator in two-bearing execution. It is executed with feet and one shaft end $\text{AE}140\text{m}6 \times 210\text{mm}$ (with two keys 36mm wide) and flange SAE00 with built in slip ring sleeve and brush device. Generator is suitable for both directions of rotation.

Auxiliary generator type Ghp315S4K is brushless three phase four pole self exciting synchronous machine with rotor made with protruded poles. It is designed to supply through frequency inverters locomotive's auxiliary equipment. Generator is self-cooling with a fan mounted on DE side. It is designed for horizontal operation (on feet execution, with two bearings), protection degree IP21. Machine is connected with main generator through V-belts.

Nominal data of main generator

For $P_{DC} = 1400\text{kW}$; $U_{DC} = 750\text{V}$; $I_{DC} = 1867\text{A}$

S_N [kVA]	U_N [V]	n_N [rpm]	f_N [Hz]	I_N [A]	η [%]	$\cos \varphi$	Excitation	
							I_{rn} [A]	U_{rn} [V]
1572	600	1800	60	1513	96,5	0,95	75,6	78,1

For $P_{DC} = 1400\text{kW}$; $U_{DC} = 375\text{V}$; $I_{DC} = 3733\text{A}$

S_N [kVA]	U_N [V]	n_N [rpm]	f_N [Hz]	I_N [A]	η [%]	$\cos \varphi$	Excitation	
							I_{rn} [A]	U_{rn} [V]
1572	300	1800	60	3025	95,9	0,90	90,6	93,6

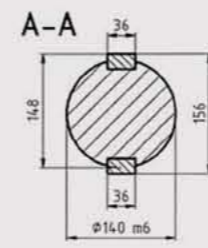
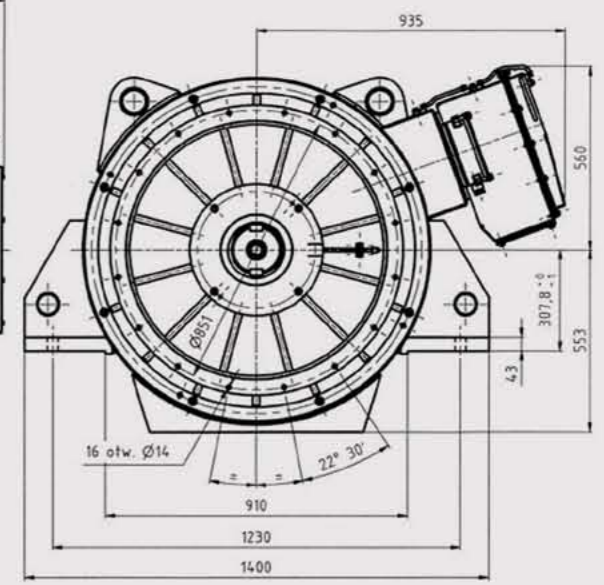
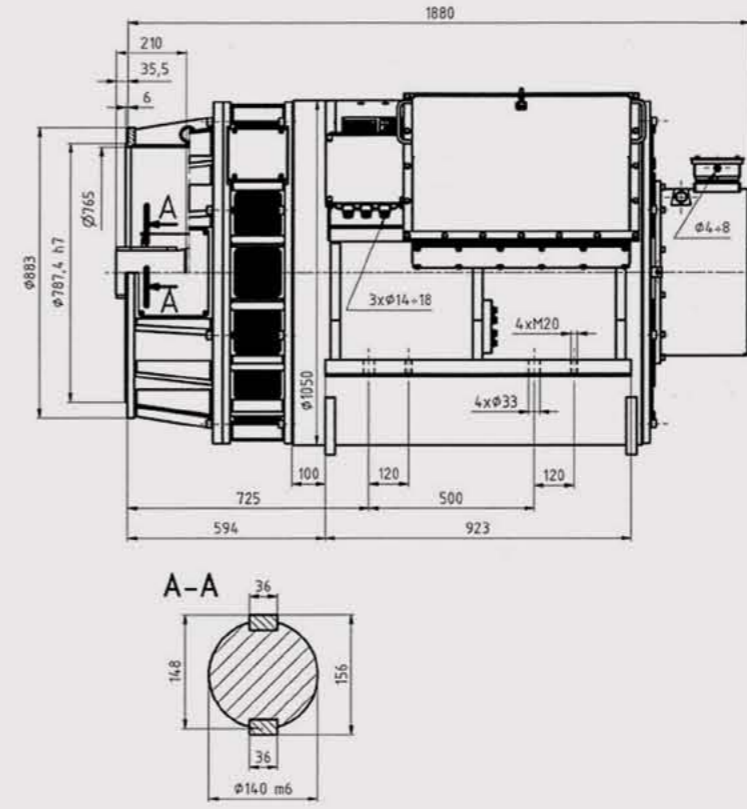
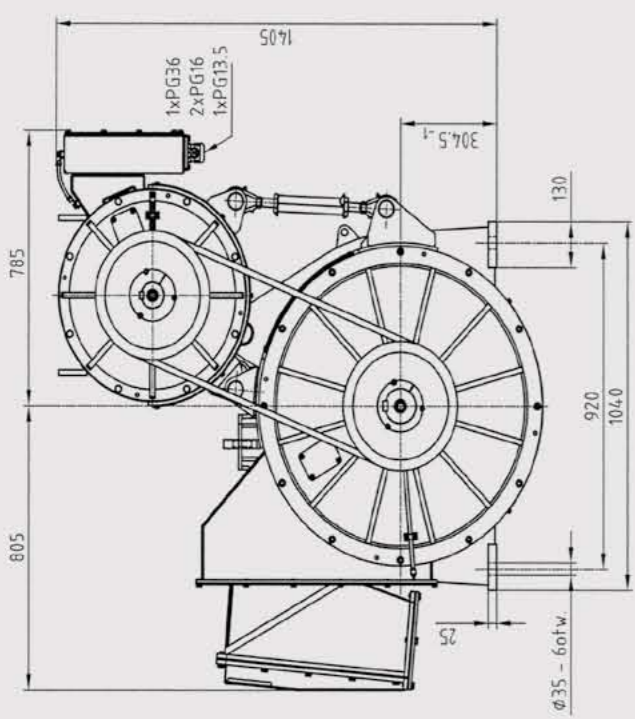
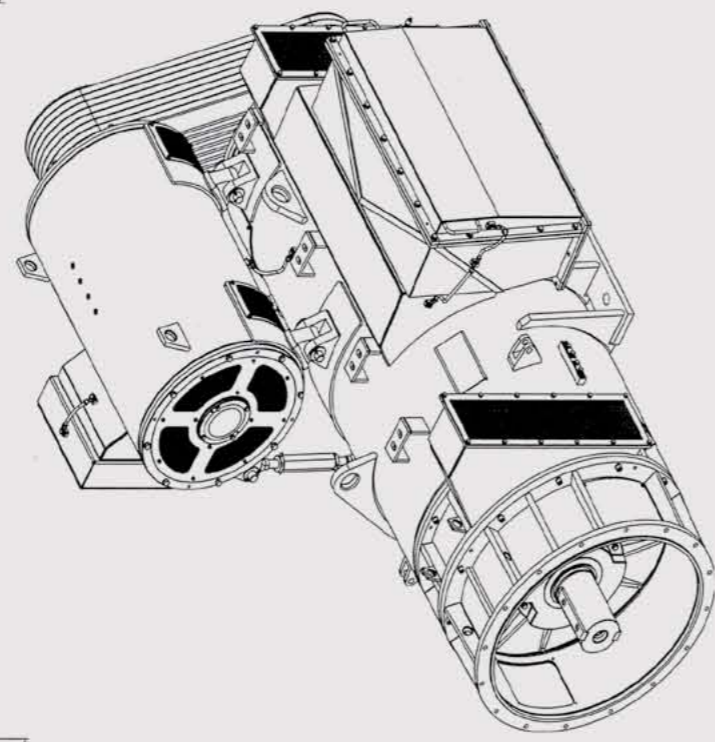
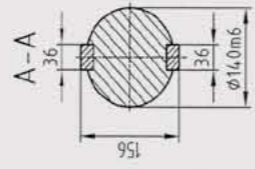
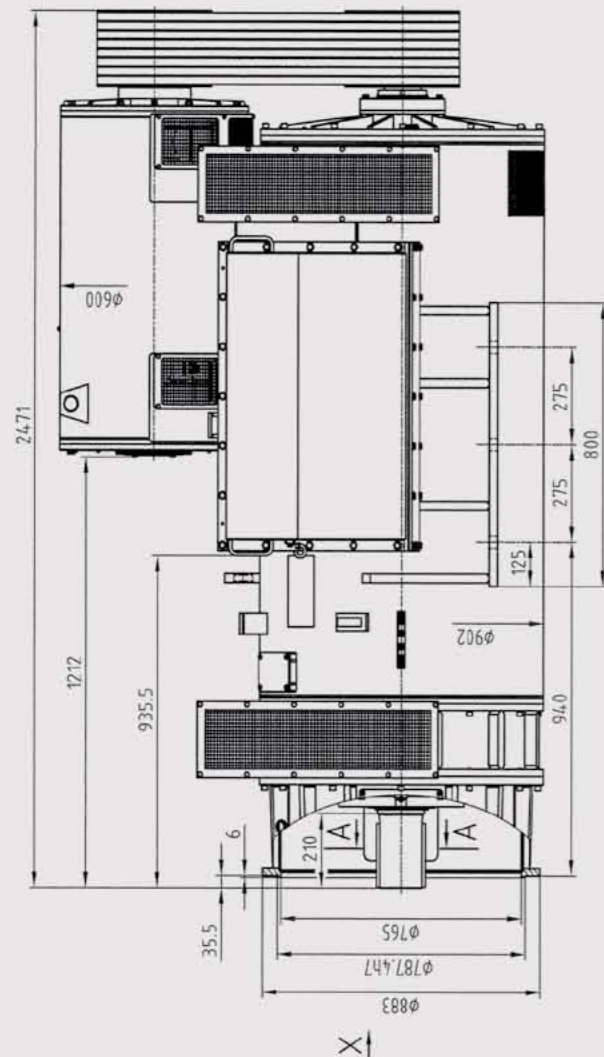
**Nominal data of auxiliary generator
Ghp315S4K duty S1.**

S_N [kVA]	U_N [V]	n_N [rpm]	f_N [Hz]	I_N [A]	η [%]	$\cos \varphi$
63	400 (Y)	1800	60	91	88,0	0,75
40		600	20	57,7	-	0,95

Exciter APOa465-50-16/4. Control current $I_{sn} = 3,5\text{A}$; control voltage $U_{sn} = 20\text{V}$



Generator set
GLp500L4 + Ghp315S4K



Gfp560M8B

Gfp 560 M8 is three phase, eight pole, self-exciting, synchronous generator. It is designed for horizontal operation (on feet execution, with two bearings), protection degree IP20, cooling system IC01. Generator is connected with engine through coupling and SAE00 flange and supplies frequency inverter directly.

P_N [kW]	U_{ln} [V]	n_{mN} [rpm]	f_m [Hz]	I_n [A]	η [%]	$\cos \varphi$	Insulation class	Ambient temp.	Weight	Winding protection	Bearings protection	Execution	Protection degree
kW	V	rpm	Hz	A	%	-	-	°C	kg	-	-	-	-
1800	1400	1800	120	742	95	0,95	H (VPI)	-30 +45	5000	6xPt100	2xPt100	IM 1101	IP21
230	467	600	40	284	94	0,95							

