mecc alte

Totally Focused. Totally Independent.

Technical Specification

ECO38 4 C

DDS
Dynamic Data Support

The world's largest independent producer of alternators 1 – 5,000kVA

Rev. 1

All electrical and mechanical data contained in this document is provided for reference only and represents typical values under optimal operating conditions.
Actual performances may be subjected to cumulative tolerances or variances due to materials, construction or other specific operating and loading conditions, in accordance with IEC 60034.

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Regulations and Certifications

The alternators are designed, built and tested in accordance with **ISO 9001**, within a certified quality management system. The entire range meets the most common international specifications, including:

CEI 2-3, IEC 34-1, EN 60034-1, VDE 0530

BS 4999-5000, NF 51.111, NEMA MG 1-2011

ISO 8528-3

In addition, they comply with specific regulations for particular markets, such as:

UL 1446, UL 1004-4, UL 1004-B

CAN/CSA-C22.2 No14-95 / No100-95

The ECP and ECO series comply with EEC directives **2006/42/EC (Machinery Directive), 2014/35/EC (Low Voltage Directive), 2014/30/EC (Electromagnetic Compatibility Directive), 2011/65/EC (RoHS 2) and 2015/863 (RoHS 3).**

Windings and performance

- All alternators feature **reduced-pitch** (2/3) windings, which:
  - Eliminate triple harmonics in the voltage waveform
  - Reduce neutral currents during parallel operation
- **Parallel operation** Use alternators of the same model and winding configuration. For different models, contact Mecc Alte Application Engineering to verify compatibility.
- **Damping cage** All models except the ECP3 series include an aluminum or copper damping cage for greater stability during load transients.
- **Reconnectable windings**
  - 12 leads: 50 Hz 380–440 V and 220/110–240/120 V (derating may apply); 60 Hz 380–480 V and 220/110–240/120 V (derating may apply)
  - 6 leads: 50 Hz 380–440 V and 220–240 V (derating may apply); 60 Hz 380–480 V and 220–240 V (derating may apply)

Winding configurations	Standard		Special (dedicated)			
	12 reconnectable wires	6 reconnectable wires	380 V and 600 V 60 Hz	690V 50/60Hz	220-240V 1ph 50Hz	220-240V 1ph 60Hz
ECP3 to ECO38 & (NPE)	●	○	○	○	○	○
ECO40 to ECO46	○	●	○	○	○ *	○ *
ECO47	● 4 wires		○	○	–	-
THD (Total Harmonic Distortion)	<3.5% at full load L-L	<3.0% at full load L-L	<3.5% at full load L-L	<3.5% at full load L-L	<4.5% at full load L-N	<4.5% at full load L-N
Interference suppression	VDE 0875 G/N/K, EN61000-6-3, EN61000-6-2, others available on request					

* Only up to ECO40 series ● Standard ○ Optional

Insulating Materials and Electrical Performance

- **Insulation Class:** H on the entire range
- **Efficiency:** High efficiency as standard
- **Motor Start:** Inrush current >300% for 20 seconds
- **THD (Total Harmonic Distortion):**
  - <3.5% L-L typical (three-phase windings)
  - <4.5% L-N typical (single-phase windings)

Winding protection

Winding protection is crucial to ensure the longevity of the generator based on environmental conditions and electrical stress.

Protection Level	Standard	Standard+	Grey	Grey+	Total+	V-Type
Treated Components	Active parts	Exciter stator	Main stator + exciter	Stator + Exciter	Stator + Exciter + Rotor	Complete system
Type of Treatment	Impregnation resin only	Resin + Grey paint EG43	Grey paint EG43	Stator (EG43) + Exciter (Black severe ep.)	Black protection (stators) + EG43 (rotating parts)	Double VPI, Anti-Corona Wire, Double Layer Black
Series/Typical Application	ECP3, ECP4 (Standard Use)	ECP28, 30, 32	Marine Applications / NPE, ECO, HCP	Harsh industrial environments	Extreme/abusive conditions	Harsh Environments (Extended Warranty)

Detail of specific treatments

- **Grey paint EG43:** Standard protection against moisture and contaminants.
- **Black Protection:** Advanced physical barrier against chemicals and high humidity.
- **V-Type Treatment:** Includes vacuum impregnation (VPI), internal stator insulation, and corona-resistant materials for maximum reliability.

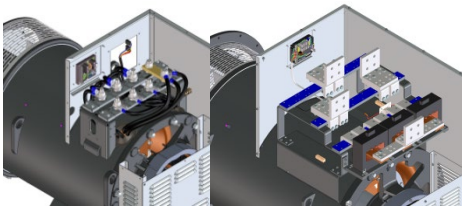
For more information visit: Insulation_System_Guide

Construction

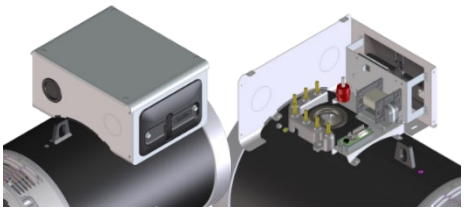
The robust mechanical structure withstands up to 5G in any direction and 9G vertically, and its design allows easy access to connections and components during routine maintenance checks. The mechanical design used the most advanced FEM techniques. The materials used are: DD12 steel for the frame, C45 steel for the shaft and cast iron or die-cast aluminum for the end brackets: the fans are made of die-cast aluminum and nylon reinforced with fiberglass, UL compliant materials. The rotors are dynamically balanced according to ISO 1940-1 grades 6.3 (up to series 32) or 2.5 (series 34 onwards).

Terminals and terminal blocks

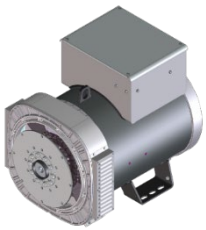
Easy access to the regulators is ensured by a pull-out drawer or drop-down panel to allow for safer adjustment. Large terminal blocks allow easy access of power cables, in the higher power ranges ECO43 and ECO46 terminals allow convenient choice of power cable or busbar connection with input and connection versatility. Current transformers are available as an option on the ECO 40, 43, 46 and 47 series with single or dual output.



A new AVR panel has been installed on the Type-C family. The terminal blocks have been redesigned in a special "L" configuration, specifically to facilitate connections with customers; With this type of terminal block, a second terminal block can be positioned in order to obtain 12 terminals available. Current transformers are available as an option on the ECO38 series with single or dual output.



Protection for the environment



In addition to the protection on the windings themselves, alternators can have a higher degree of protection. The standard level is IP23 but the following solutions are also available: IP23 DP with ingress filters, IP23 with terminal box only in IP45, IP43 and IP45. Downgrades may apply.
For more information visit: Bulletin_IP

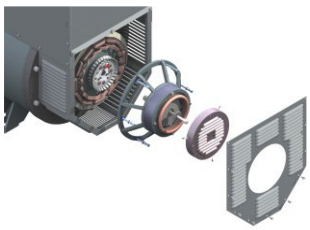
Optional PMG

The MeccAlte PMG is optionally available factory-fitted on ECP28, ECP30, ECP32, ECP34 and ECO38; Alternatively, only the preparation for future mounting is optional.



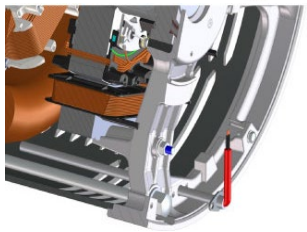
On the ECO 40, 43 and 46 series it is optionally available factory-fitted or retrofitted. On the ECO47 the PMG is standard.

The entire AVR range is fully compatible with MAUX and PMG systems, minimizing spare parts management and inventory flexibility, as one AVR adapts to all applications. The PMG delivers the same amount of kVA as the MAUX.



Anti-condensation heater

Our entire range can be equipped with anti-condensation heaters of adequate power and sized to the alternator. The voltage for heaters must be specified when ordering. New cylindrical cartridge heaters are available on request and can be retrofitted.



Accessories

Additional optional can be mounted on our alternator series, such as PTC or PT100 thermistors on both windings and bearings, anti-condensation heaters, high and low profile terminal blocks (on most series), parallel devices, current and voltage transformers, air filters, IP43 and IP45 protections and many more. For more information visit: C-type-accessories

Excitation and regulation systems

All ECP/ECO series are equipped with MAUX auxiliary winding to power the digital controller.

DxR

Both the DSR and DER1 are available for PC connection via the DxR2 USB interface and DxR TERMINAL software to query/download alarms and settings for analysis or for cloning other controllers. DER2 has a built-in USB connection and can be connected to your PC without any optional connection card. Through the DxR connection, other settings such as LAMS, synchronous external control based on digital RAM, and soft start can be achieved. Simple analog potentiometers are available for the most common adjustments.

MxK

The digital controllers of the MxK series (M2K, M2KS, M3K, M3KS, M3KSHD) are configurable via the MeccAlte App for PC or mobile devices, using the USB2MxK (USB) or MxKonnect (Wi-Fi) accessories. The M3KSHD model integrates a USB port for direct connection to the PC, without the need for optional cards. The M2KS, M3KS and M3KSHD models also support CAN Bus communication (SAE J-1939) for integration with MeccAlte GC controllers. Software-accessible features include LAMS, external voltage control (±10V), soft start, and PID autotuning. The controller records up to 64 alarms in E2PROM memory and provides the current status via A ALARMS address. There are analog potentiometers for VOLT, STAB, AMP, and DROOP (the latter on M3K, M3KS, and M3KSHD models only). The M3KSHD includes High Dynamic Response (HDR) for a quick rush of excitement. All MxK regulators are equipped with protections against over/under excitation, overcurrent, V/f, short circuit and power overvoltage.

Regulator	M2K	M2Ks	M3K	M3Ks	M3KsHD	DSR	DER1	DER2
ECP3 to ECO38 & (NPE)	●	○	○	○	○	○	○	○
ECO40 to ECO46	○	○	●	○	○	○	○	○
ECO47	○	○	○	○	●	○	○	○
Parallel operation	-	-	√	√	√	√	√	√
Network Parallel	-	-	√	√	√	√	√	√
Reference 3 phase (rms)	-	-	√	√	√	-	√	√
Accuracy	+/-0.5%	+/-0.5%	+/-0.5%	+/-0.5%	+/-0.5%	+/-1%	+/-0.5%	+/-0.5%
Remote voltage control	√	√	√	√	√	√	√	√
Alarm log	√	√	√	√	√	√	√	√
Analog and digital configurable	√	√	√	√	√	√	√	√
LAMS (Load Acceptance V/f)	√	√	√	√	√	√	√	√
APO (Active Protection Output)	-	-	-	-	√	√	√	√
Soft start	√	√	√	√	√	√	√	√
High Dynamic Response	-	-	-	-	√	-	-	√
USB connection without external cards	-	-	-	-	√	-	-	√

● Standard ○ Optional √ Available

Derating coefficients

	Ambient temperature (Celsius)							
Altitude (meters)	25	40	45	50	55	60	65	70
≤ 1000	1.07	1	0.96	0.93	0.91	0.89	0.85	0.82
> 1000 ≤ 1500	1.01	0.96	0.92	0.89	0.87	0.84	0.81	0.77
> 1500 ≤ 2000	0.96	0.91	0.87	0.84	0.83	0.79	0.77	0.73
> 2000 ≤ 3000	0.90	0.85	0.81	0.78	0.76	0.73	0.71	0.68
> 3000 ≤ 4000	0.84	0.78	0.75	0.73	0.70	0.68	0.66	0.62
> 4000 ≤ 5000	0.78	0.72	0.69	0.67	0.65	0.62	0.59	0.56
> 5000 ≤ 6000	0.70	0.65	0.63	0.61	0.58	0.55	0.53	0.50

Notes on short-circuit curves

The coefficients indicated must be used to correct the values of the three-phase short-circuit curves as a function of the nominal voltage.

50 Hz		*60 Hz*	
Voltage	*Factor*	*Voltage*	*Factor*
380	0.93x	415	0.85x
400	1x	440	0.90x
415	1.04x	460	0.95x
440	1.10x	480	1x

The indicated coefficient must be used to correct the values of the three-phase short-circuit curves as a function of the type of short-circuit voltage.

	3 Steps	*2 L-L phases*	*1 L-N phase*
Instant	1x	0.87x	1.30x
Minimum	1x	1.80x	3.20x
Supported	1x	1.50x	2.50x
Maximum duration	20 s	10 s	4 s

All curves are shown for star connection in series or parallel at 400V 50 Hz or 480V 60 Hz. If the unit is reconnected from series to star parallel, the additional coefficient is 2x. From the star series to the delta series, it is 1.72x. From star in series to parallel triangle, it is 3.44x.

A smaller generator can be selected for a given engine starting service, as it has lower subtransient reactance values for nonlinear loads. The entire range from 6.5 to 3400 kVA is capable of delivering a sustained short-circuit current of >300% for up to 20 seconds.

Selection & Sizing Tools

Online tools available at select.meccalte.com support alternator selection, sizing and configuration:

- **Sizing Tool** – power sizing, motor starting and electrical verification for industrial alternators.
- **Ratings Book** – complete kVA ratings reference, 50/60 Hz, all standard voltages and temperature classes.
- **PMG Configurator** – model selection and output configuration for permanent magnet generators.
- **3D/2D CAD Library** – STEP models and 2D drawings for alternators and AVR regulators.
- **Winding Resistance** – reference resistance data for all alternator families.

For more information visit: select.meccalte.com

General characteristics

Pole number	4	Insulation class	H
Phase number	3	Protection class	IP23
Number of wires	12	NDE Bearing type	6314.2RS
Execution	Brushless	DE Bearing type	6318.2RS
Regulator type	M2K	Maximum Overspeed	2250
Winding pitch	2/3	Altitude	0-1000
Code voltage reference	T0405S3	Balancing	ISO1940-1

Ratings 50Hz

kVA / kW @ Temp. Rise / Ambient °C - 0.8 PF

		STANDBY-163/27				STANDBY-150/40				H-125/40				F-105/40				B-80/40			
Series Star Y		380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V
Parallel Star YY		190V	200V	208V	220V	190V	200V	208V	220V	190V	200V	208V	220V	190V	200V	208V	220V	190V	200V	208V	220V
Series Delta Δ		220V	230V	240V	254V	220V	230V	240V	254V	220V	230V	240V	254V	220V	230V	240V	254V	220V	230V	240V	254V
Parallel Delta ΔΔ		110V	115V	120V	127V	110V	115V	120V	127V	110V	115V	120V	127V	110V	115V	120V	127V	110V	115V	120V	127V
ECO38 1S4 C	**kVA**	196	**196**	196	180	188	**188**	188	173	180	**180**	180	165	170	**170**	170	155	144	**144**	144	132
	kW	157	**157**	157	144	150	**150**	150	138	144	**144**	144	132	136	**136**	136	124	115	**115**	115	106
ECO38 2S4 C	**kVA**	220	**220**	220	209	211	**211**	211	200	200	**200**	200	190	185	**185**	185	175	160	**160**	160	152
	kW	176	**176**	176	167	169	**169**	169	160	160	**160**	160	152	148	**148**	148	140	128	**128**	128	122
ECO38 1M4 C	**kVA**	250	**250**	250	234	237	**237**	237	221	225	**225**	225	210	207	**207**	207	190	180	**180**	180	168
	kW	200	**200**	200	187	190	**190**	190	177	180	**180**	180	168	166	**166**	166	152	144	**144**	144	134
ECO38 2M4 C	**kVA**	275	**275**	275	253	264	**264**	264	243	250	**250**	250	230	230	**230**	230	215	200	**200**	200	184
	kW	220	**220**	220	202	211	**211**	211	194	200	**200**	200	184	184	**184**	184	172	160	**160**	160	147
ECO38 1L4 C	**kVA**	330	**330**	330	319	315	**315**	315	305	300	**300**	300	290	275	**275**	275	265	240	**240**	240	232
	kW	264	**264**	264	255	252	**252**	252	244	240	**240**	240	232	220	**220**	220	212	192	**192**	192	186
ECO38 2L4 C	**kVA**	370	**370**	370	360	360	**360**	360	350	350	**350**	350	340	320	**320**	320	310	280	**280**	280	272
	kW	296	**296**	296	288	288	**288**	288	280	280	**280**	280	272	256	**256**	256	248	224	**224**	224	218
ECO38 VL4 C	**kVA**	380	**400**	400	370	370	**380**	380	360	360	**370**	370	350	329	**338**	338	319	288	**296**	296	280
	kW	304	**320**	320	296	296	**304**	304	288	288	**296**	296	280	263	**270**	270	255	230	**237**	237	224

Ratings 60Hz

kVA / kW @ Temp. Rise / Ambient °C - 0.8 PF

		STANDBY-163/27				STANDBY-150/40				H-125/40				F-105/40				B-80/40			
Series Star Y		415V	440V	460V	480V	415V	440V	460V	480V	415V	440V	460V	480V	415V	440V	460V	480V	415V	440V	460V	480V
Parallel Star YY		208V	220V	230V	240V	208V	220V	230V	240V	208V	220V	230V	240V	208V	220V	230V	240V	208V	220V	230V	240V
Series Delta Δ		240V	254V	265V	277V	240V	254V	265V	277V	240V	254V	265V	277V	240V	254V	265V	277V	240V	254V	265V	277V
Parallel Delta ΔΔ		120V	127V	133V	138V	120V	127V	133V	138V	120V	127V	133V	138V	120V	127V	133V	138V	120V	127V	133V	138V
ECO38 1S4 C	**kVA**	225	236	236	**236**	220	230	230	**230**	210	220	220	**220**	195	205	205	**205**	168	176	176	**176**
	kW	180	189	189	**189**	176	184	184	**184**	168	176	176	**176**	156	164	164	**164**	134	141	141	**141**
ECO38 2S4 C	**kVA**	253	264	264	**264**	242	253	253	**253**	230	240	240	**240**	210	220	220	**220**	184	192	192	**192**
	kW	202	211	211	**211**	194	202	202	**202**	184	192	192	**192**	168	176	176	**176**	147	154	154	**154**
ECO38 1M4 C	**kVA**	289	300	300	**300**	274	284	284	**284**	260	270	270	**270**	240	250	250	**250**	208	216	216	**216**
	kW	231	240	240	**240**	219	227	227	**227**	208	216	216	**216**	192	200	200	**200**	166	173	173	**173**
ECO38 2M4 C	**kVA**	319	330	330	**330**	305	316	316	**316**	290	300	300	**300**	270	280	280	**280**	232	240	240	**240**
	kW	255	264	264	**264**	244	253	253	**253**	232	240	240	**240**	216	224	224	**224**	186	192	192	**192**
ECO38 1L4 C	**kVA**	358	374	396	**396**	341	357	378	**378**	325	340	360	**360**	300	310	330	**330**	260	272	288	**288**
	kW	286	299	317	**317**	273	286	302	**302**	260	272	288	**288**	240	248	264	**264**	208	218	230	**230**
ECO38 2L4 C	**kVA**	402	444	444	**444**	391	438	438	**438**	380	420	420	**420**	350	385	385	**385**	304	336	336	**336**
	kW	322	355	355	**355**	313	350	350	**350**	304	336	336	**336**	280	308	308	**308**	243	269	269	**269**
ECO38 VL4 C	**kVA**	413	455	455	**465**	401	442	442	**453**	390	430	430	**440**	359	394	394	**403**	312	344	344	**352**
	kW	330	364	364	**372**	321	354	354	**362**	312	344	344	**352**	287	315	315	**322**	250	275	275	**282**

Reactance & Time constants- Class H / 400V

Unsaturated (ref. EN60034-4)			ECO38 1S4 C	ECO38 2S4 C	ECO38 1M4 C	ECO38 2M4 C	ECO38 1L4 C	ECO38 2L4 C	ECO38 VL4 C
Xd	Direct-axis synchronous reactance	%	203,9	207	198,7	214,2	215,3	222,5	226,3
X'd	Direct-axis transient reactance	%	10	11,4	12,7	14,5	15,8	17,8	19,2
X"d	Direct-axis subtransient reactance	%	5,69	6,11	6,72	7,45	8,38	9,73	10,8
Xq	Quadrature-axis synchronous reactance	%	100,3	113,8	109,7	121,1	124,2	130,4	135,6
X'q	Quadrature-axis transient reactance	%	100,3	113,8	109,7	121,1	124,2	130,4	135,6
X"q	Quadrature-axis subtransient reactance	%	20,4	22,2	23	22,8	21,5	20,8	20,1
X_2	Negative-sequence reactance	%	13,2	14,8	15,9	16,6	16,7	16,2	15,6
X_0	Zero sequence reactance	%	2,79	2,59	2,69	2,48	2,38	2,28	2,18
Saturated									
Xd	Direct-axis synchronous reactance	%	169,2	171,8	164,9	177,8	178,7	184,7	187,8
X'd	Direct-axis transient reactance	%	8,33	9,45	10,5	12	13,1	14,8	15,9
X"d	Direct-axis subtransient reactance	%	4,72	5,07	5,58	6,19	6,96	8,08	8,96
Xq	Quadrature-axis synchronous reactance	%	83,2	94,5	91	100,5	103,1	108,2	112,5
X'q	Quadrature-axis transient reactance	%	83,2	94,5	91	100,5	103,1	108,2	112,5
X"q	Quadrature-axis subtransient reactance	%	16,9	18,5	19,1	18,9	17,9	17,3	16,7
X_2	Negative-sequence reactance	%	11	12,3	13,2	13,7	13,8	13,5	12,9
X_0	Zero sequence reactance	%	2,79	2,59	2,69	2,48	2,38	2,28	2,18
Kcc	Short circuit ratio		0,44	0,46	0,45	0,44	0,43	0,42	0,53
T'd	Transient time constant	sec	0,073	0,078	0,083	0,085	0,091	0,099	0,102
T"d	Subtransient time constant	sec	0,011	0,012	0,013	0,013	0,012	0,013	0,012
T'do	Open circuit time constant	sec	0,7	0,9	1,1	1,3	1,4	1,5	1,6
Ta	Armature time constant	sec	0,015	0,016	0,018	0,017	0,016	0,013	0,015

Additional information - Class H / 400V

Io	Excitation current at no load	A	0,8	0,7	0,67	0,71	0,78	0,72	0,6
Ic	Excitation current at full load	A	3,2	3,0	3,0	2,8	3,9	3,9	3,1
Overload						-			
Overload per 20 sec. PRP or 10 sec. COP		%				300			
Heat dissipation		W	11844	12600	13548	14133	16137	19465	20239
Telephone Harmonic Factor - THF		%	<2	<2	<2	<2	<2	<2	<2
Waveform Distors.(THD) full load LL/LN		%	3,1 / 3	3 / 2,9	2,8 / 2,9	2,9 / 3,1	3 / 2,9	3,1 / 2,9	3,2 / 3
Waveform Distors.(THD) no load LL/LN		%	2,8 / 2,7	2,7 / 2,6	2,6 / 2,8	2 / 2,1	2,6 / 2,8	2,7 / 2,7	2,8 / 2,6

Reactance & Time constants- Class H / 480V

Unsaturated (ref. EN60034-4)			ECO38 1S4 C	ECO38 2S4 C	ECO38 1M4 C	ECO38 2M4 C	ECO38 1L4 C	ECO38 2L4 C	ECO38 VL4 C
Xd	Direct-axis synchronous reactance	%	207,7	207	198,7	214,2	215,3	222,5	224,3
X'd	Direct-axis transient reactance	%	10,2	11,4	12,7	14,5	15,8	17,8	19
X"d	Direct-axis subtransient reactance	%	5,8	6,11	6,72	7,45	8,38	9,73	10,7
Xq	Quadrature-axis synchronous reactance	%	102,1	113,8	109,7	121,1	124,2	130,4	134,4
X'q	Quadrature-axis transient reactance	%	102,1	113,8	109,7	121,1	124,2	130,4	134,4
X"q	Quadrature-axis subtransient reactance	%	20,8	22,2	23	22,8	21,5	20,8	19,9
X_2	Negative-sequence reactance	%	13,5	14,8	15,9	16,6	16,7	16,2	15,5
X_0	Zero sequence reactance	%	2,85	2,59	2,69	2,48	2,38	2,28	2,16
Saturated									
Xd	Direct-axis synchronous reactance	%	172,4	171,8	164,9	177,8	178,7	184,7	186,2
X'd	Direct-axis transient reactance	%	8,49	9,45	10,5	12	13,1	14,8	15,8
X"d	Direct-axis subtransient reactance	%	4,81	5,07	5,58	6,19	6,96	8,08	8,88
Xq	Quadrature-axis synchronous reactance	%	84,8	94,5	91	100,5	103,1	108,2	111,6
X'q	Quadrature-axis transient reactance	%	84,8	94,5	91	100,5	103,1	108,2	111,6
X"q	Quadrature-axis subtransient reactance	%	17,2	18,5	19,1	18,9	17,9	17,3	16,5
X_2	Negative-sequence reactance	%	11,2	12,3	13,2	13,7	13,8	13,5	12,9
X_0	Zero sequence reactance	%	2,85	2,59	2,69	2,48	2,38	2,28	2,16
Kcc	Short circuit ratio		0,44	0,46	0,45	0,44	0,43	0,42	0,54
T'd	Transient time constant	sec	0,073	0,078	0,083	0,085	0,091	0,099	0,102
T"d	Subtransient time constant	sec	0,011	0,012	0,013	0,013	0,012	0,013	0,012
T'do	Open circuit time constant	sec	0,7	0,9	1,1	1,3	1,4	1,5	1,6
Ta	Armature time constant	sec	0,015	0,016	0,018	0,017	0,016	0,013	0,015

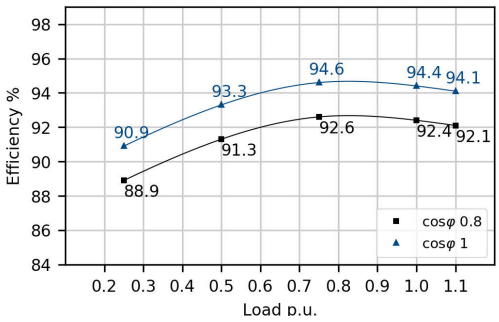
Additional information - Class H / 480V

Io	Excitation current at no load	A	0,8	0,65	0,65	0,7	0,7	0,7	0,6
Ic	Excitation current at full load	A	3,2	2,9	2,9	2,8	3,8	3,9	3,1
Overload						-			
Overload per 20 sec. PRP or 10 sec. COP		%				300			
Heat dissipation		W	12437	12691	13299	13968	16118	20310	20881
Telephone Interferance Factor - TIF			<40	<40	<40	<40	<40	<40	<40
Waveform Distors.(THD) full load LL/LN		%	3,1 / 3	3 / 2,9	2,8 / 2,9	2,9 / 3,1	3 / 2,9	3,1 / 2,9	3,2 / 3
Waveform Distors.(THD) no load LL/LN		%	2,8 / 2,7	2,7 / 2,6	2,6 / 2,8	2 / 2,1	2,6 / 2,8	2,7 / 2,7	2,8 / 2,6

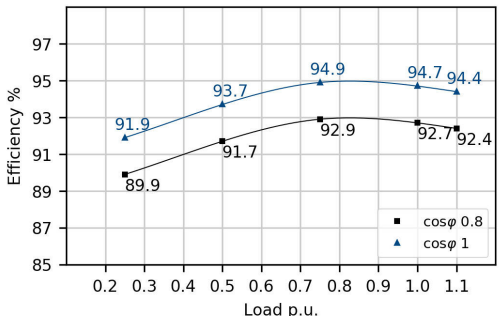
Efficiencies @ 50Hz

Models		380V 50Hz					400V 50Hz					415V 50Hz					440V 50Hz				
		0.25	0.5	0.75	1	1.1	0.25	0.5	0.75	1	1.1	0.25	0.5	0.75	1	1.1	0.25	0.5	0.75	1	1.1
ECO38 1S4 C	%	89,1	91,2	92,3	92,3	92,1	88,9	91,3	92,6	92,4	92,1	88,7	91,3	92,5	92,1	91,8	88,5	91,1	92,2	91,9	91,5
ECO38 2S4 C	%	90,1	91,6	92,6	92,6	92,4	89,9	91,7	92,9	92,7	92,4	89,7	91,7	92,8	92,4	92,1	89,5	91,5	92,5	92,2	91,8
ECO38 1M4 C	%	89,6	91,9	93,0	92,9	92,7	89,4	92,0	93,3	93,0	92,7	89,2	92,0	93,2	92,7	92,4	89,0	91,8	92,9	92,5	92,1
ECO38 2M4 C	%	90,1	92,3	93,4	93,3	93,1	89,9	92,4	93,7	93,4	93,1	89,7	92,4	93,6	93,1	92,8	89,5	92,2	93,3	92,9	92,5
ECO38 1L4 C	%	90,2	92,7	93,8	93,5	93,3	89,9	92,7	94,0	93,7	93,4	89,7	92,7	93,9	93,4	93,1	89,5	92,5	93,6	93,2	92,8
ECO38 2L4 C	%	90,1	92,5	93,4	93,4	93,2	89,9	92,6	93,7	93,5	93,2	89,7	92,6	93,6	93,2	92,9	89,5	92,4	93,3	93,0	92,6
ECO38 VL4 C	%	90,3	92,4	93,5	93,5	93,3	90,1	92,5	93,8	93,6	93,3	89,9	92,5	93,7	93,3	93,0	89,7	92,3	93,4	93,1	92,8

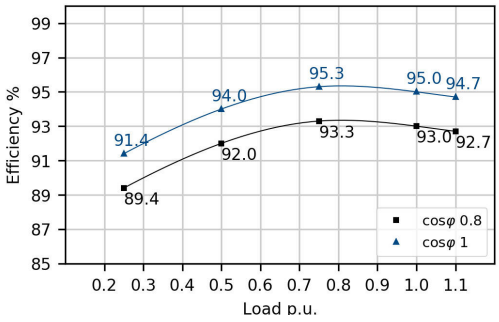
ECO38 1S4 C
400/230 50Hz



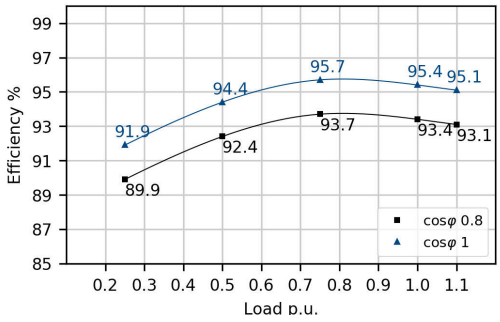
ECO38 2S4 C
400/230 50Hz



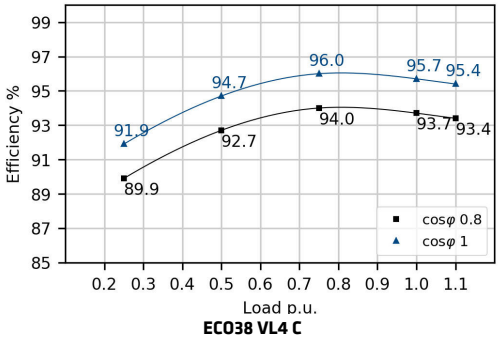
ECO38 1M4 C
400/230 50Hz



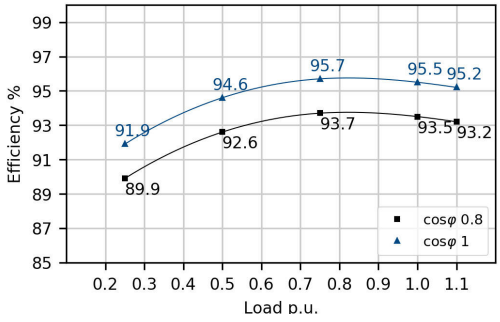
ECO38 2M4 C
400/230 50Hz



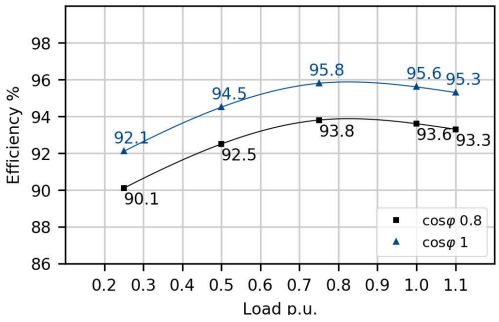
ECO38 1L4 C
400/230 50Hz



ECO38 2L4 C
400/230 50Hz



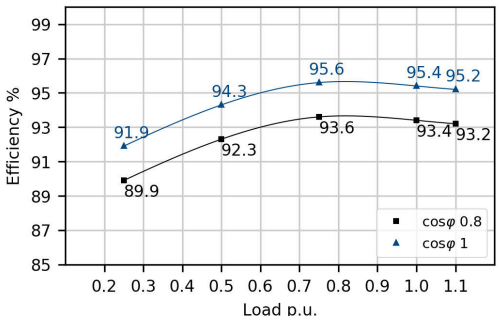
ECO38 VL4 C
400/230 50Hz



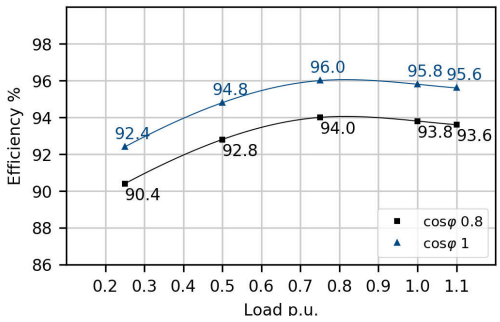
Efficiencies @ 60Hz

Models		415V 60Hz					440V 60Hz					460V 60Hz					480V 60Hz				
		0.25	0.5	0.75	1	1.1	0.25	0.5	0.75	1	1.1	0.25	0.5	0.75	1	1.1	0.25	0.5	0.75	1	1.1
ECO38 1S4 C	%	90,1	92,0	93,0	92,7	92,4	90,1	92,1	93,2	93,2	93,0	90,1	92,2	93,4	93,3	93,2	89,9	92,3	93,6	93,4	93,2
ECO38 2S4 C	%	90,6	92,5	93,4	93,1	92,8	90,6	92,6	93,6	93,6	93,4	90,6	92,7	93,8	93,7	93,6	90,4	92,8	94,0	93,8	93,6
ECO38 1M4 C	%	90,6	93,1	93,9	93,5	93,2	90,6	93,2	94,1	94,0	93,8	90,6	93,3	94,3	94,1	94,0	90,4	93,4	94,5	94,2	94,0
ECO38 2M4 C	%	90,6	93,4	94,3	93,8	93,5	90,6	93,5	94,5	94,3	94,1	90,6	93,6	94,7	94,4	94,2	90,4	93,7	94,9	94,5	94,1
ECO38 1L4 C	%	90,6	93,6	94,5	94,0	93,7	90,6	93,7	94,7	94,5	94,3	90,6	93,8	94,9	94,6	94,4	90,4	93,9	95,1	94,7	94,3
ECO38 2L4 C	%	90,6	93,0	93,9	93,6	93,3	90,6	93,1	94,1	94,1	93,9	90,6	93,2	94,3	94,2	94,0	90,4	93,3	94,5	94,3	93,9
ECO38 VL4 C	%	90,8	92,9	94,0	93,7	93,4	90,8	93,0	94,2	94,2	94,0	90,8	93,1	94,4	94,3	94,1	90,6	93,2	94,6	94,4	94,2

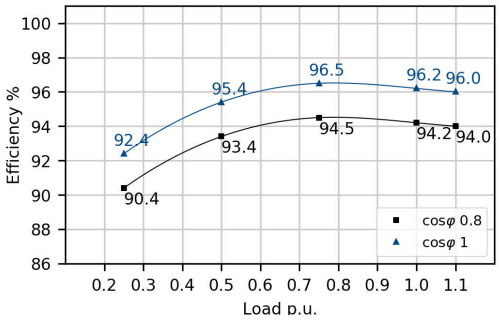
ECO38 1S4 C
480/277 60Hz



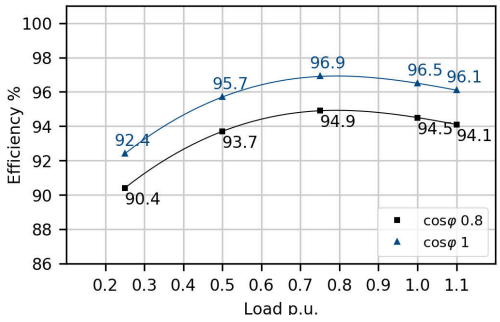
ECO38 2S4 C
480/277 60Hz



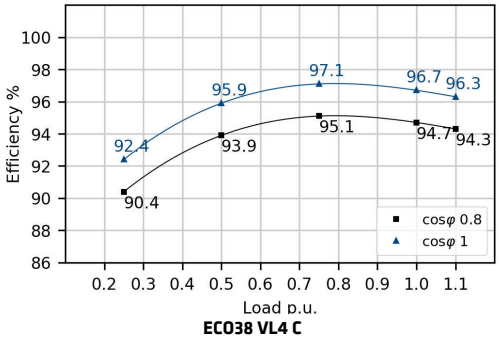
ECO38 1M4 C
480/277 60Hz



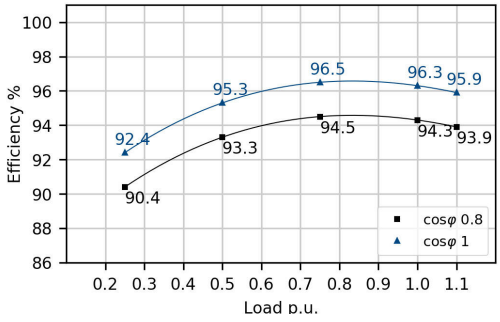
ECO38 2M4 C
480/277 60Hz



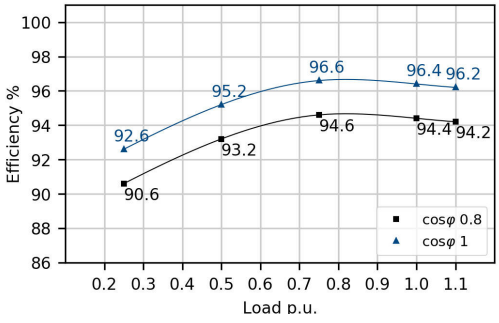
ECO38 1L4 C
480/277 60Hz



ECO38 2L4 C
480/277 60Hz

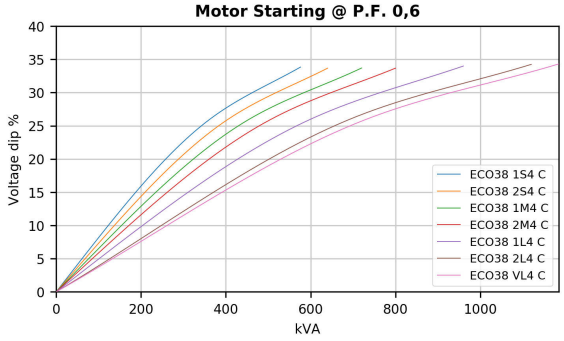


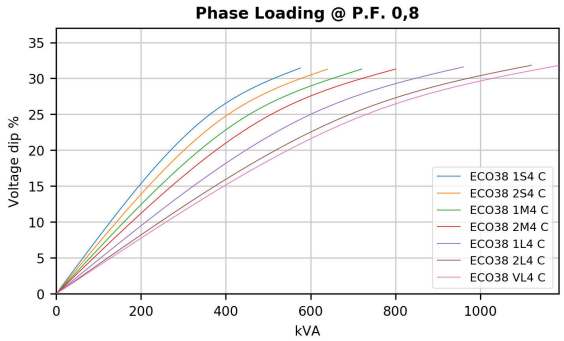
ECO38 VL4 C
480/277 60Hz

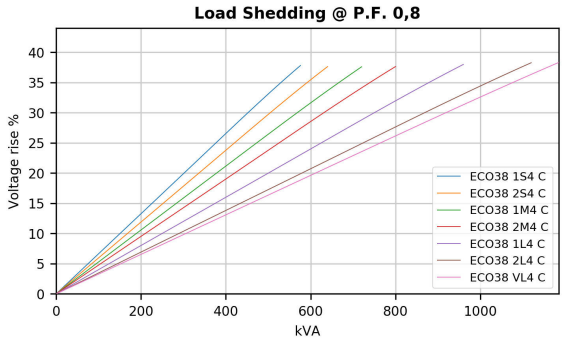


Transients voltage

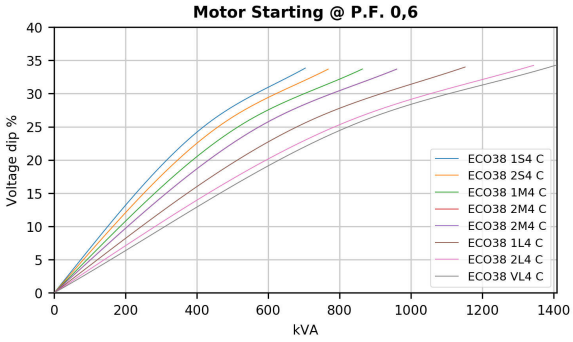
400V - 50Hz

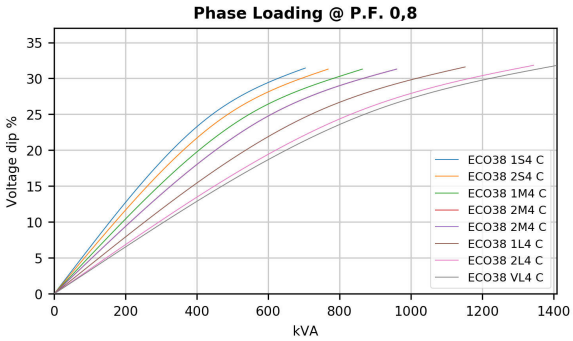


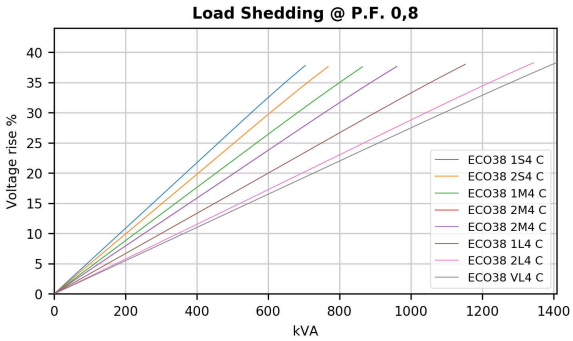




480V - 60Hz







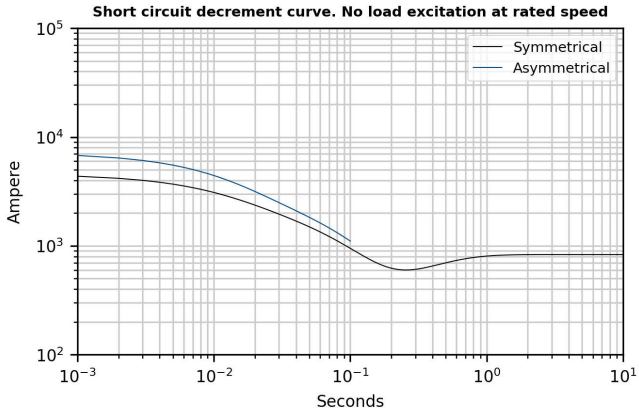
In order to scale transient curves as a function of a power factor or voltage if not indicated, please proceed as follows:

Power Factor coefficient corrector (PFCC), to be used on power factor 0.6 curves:
PFCC=sin(ARCcos (PFnew))/0.8
Example. The PFCC at power factor 0.3 is 1.192 [PFCC= sin(ARCcos (0.3))/0.8]. This means that the voltage fall at a given power at pf 0.3 is equivalent to the one that can be read on the pf 0.6 curve if the load is considered 1.192 times bigger (19% higher value.).
In this example, a 100 kVA load insertion at pf 0.3 is equivalent in voltage fall to a 119kVA load insertion at pf 0.6.

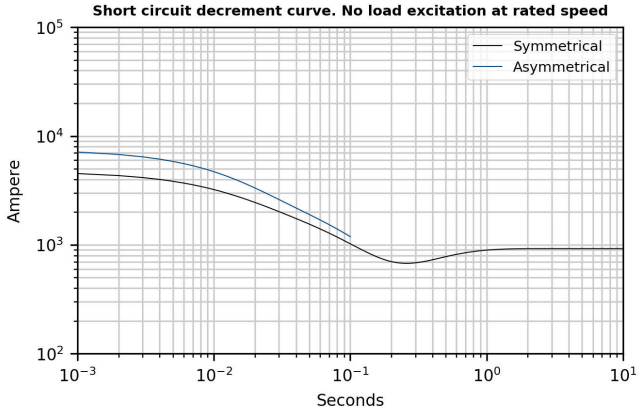
Voltage coefficient corrector (VCC):
VCC=(400/Vnew)2 if 50 Hz; VCC=(480/Vnew)2 if 60 Hz
Example. VCC at 415V 60 Hz is 1.338 [VCC=(480/415)^2]. This means that the voltage fall at a given power at 415V is equivalent to the one that can be read on the power factor 0.6 curve if the load is considered 1.338 times bigger (33% higher value.).
In this example, a 100 kVA load insertion at 415V is equivalent in voltage fall to a 133kVA load insertion at 480V.

50Hz Short circuit decrement curves - No load excitation at rated speed

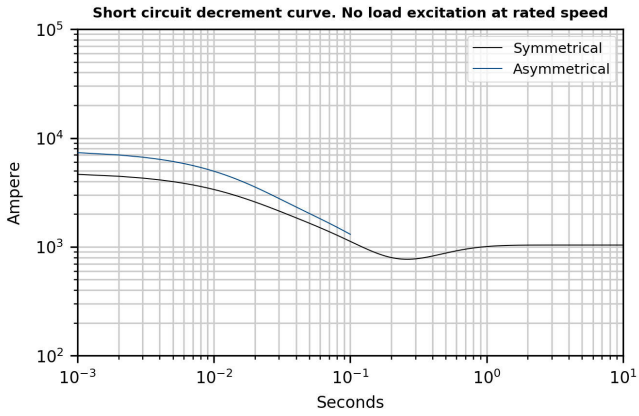
ECO38 1S4 C



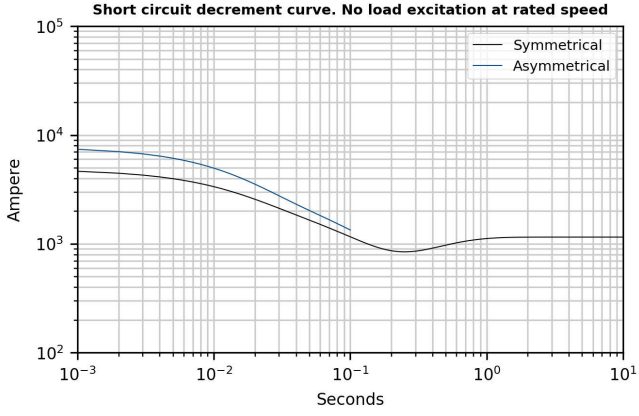
ECO38 2S4 C



ECO38 1M4 C



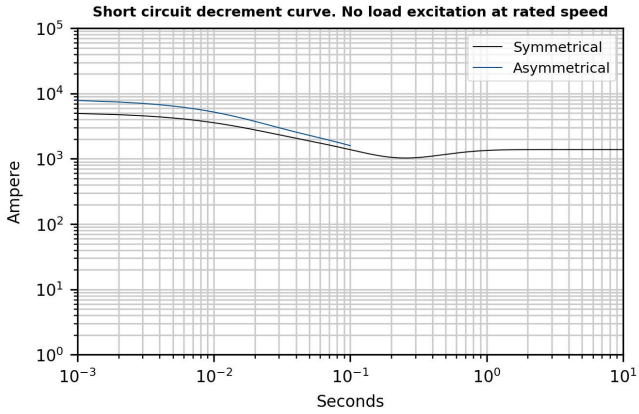
ECO38 2M4 C



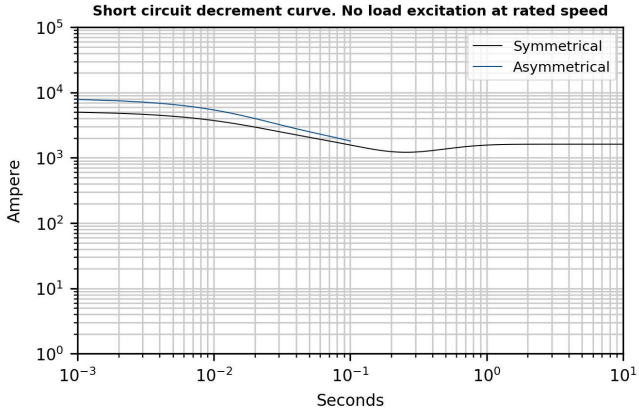
*Please refer to tables at page 6

50Hz Short circuit decrement curves - No load excitation at rated speed

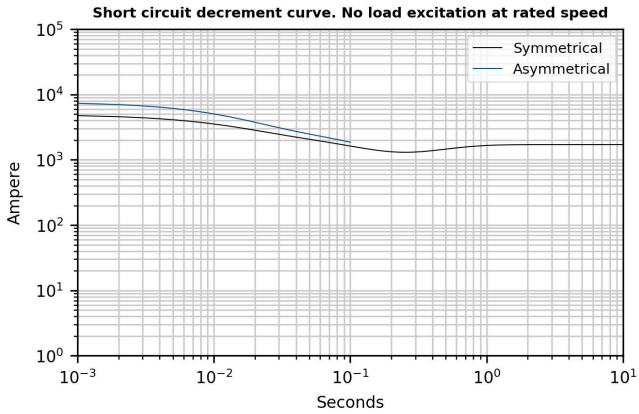
ECO38 1L4 C



ECO38 2L4 C



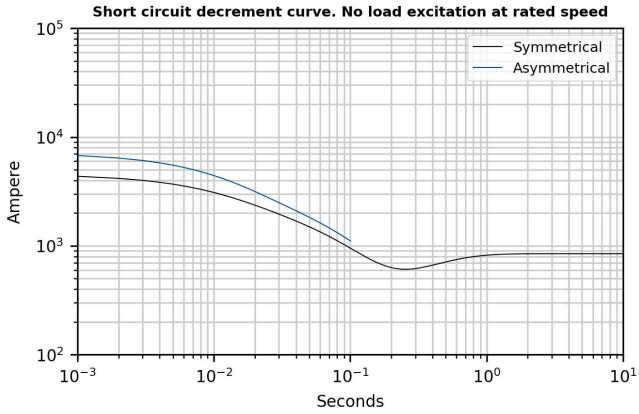
ECO38 VL4 C



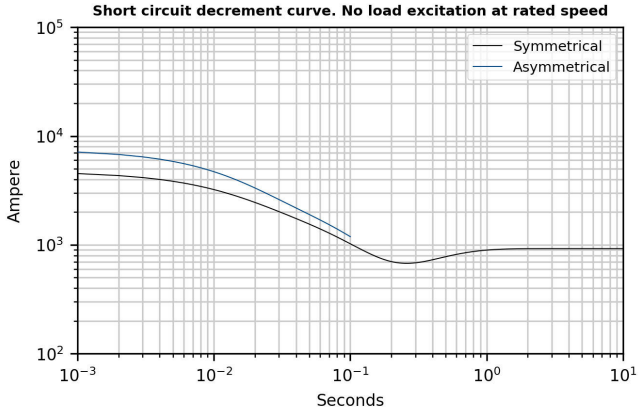
*Please refer to tables at page 6

60Hz Short circuit decrement curves - No load excitation at rated speed

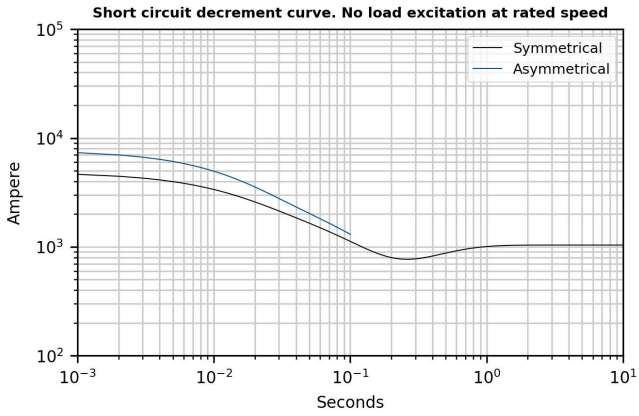
ECO38 1S4 C



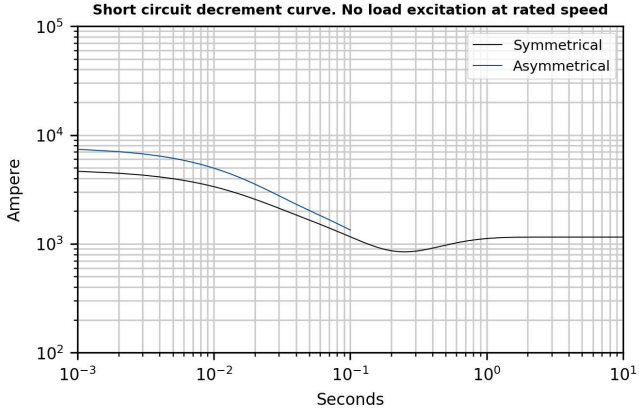
ECO38 2S4 C



ECO38 1M4 C



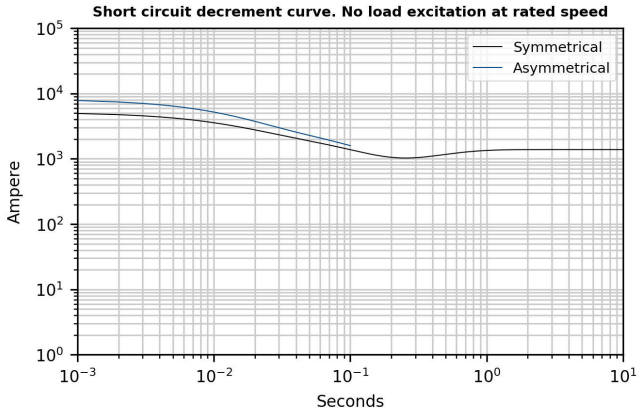
ECO38 2M4 C



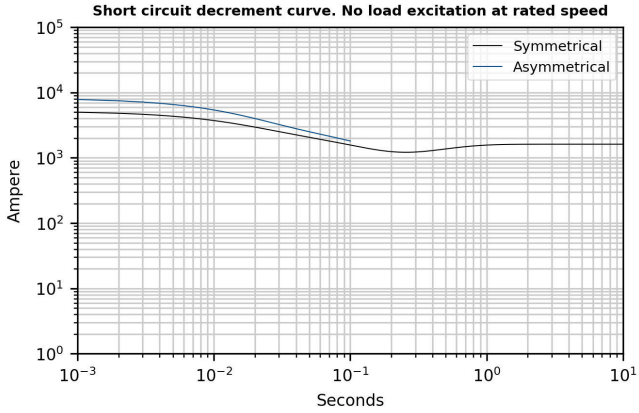
*Please refer to tables at page 6

60Hz Short circuit decrement curves - No load excitation at rated speed

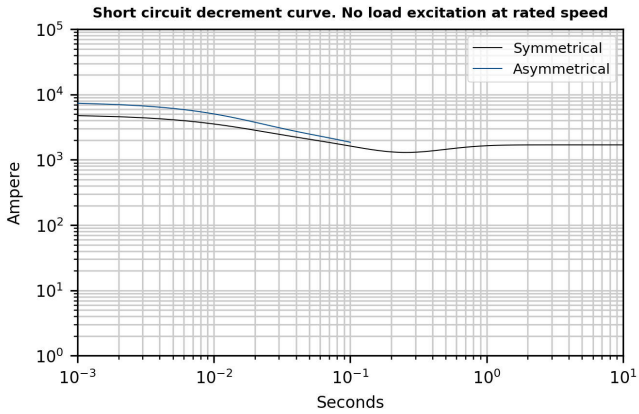
ECO38 1L4 C



ECO38 2L4 C



ECO38 VL4 C

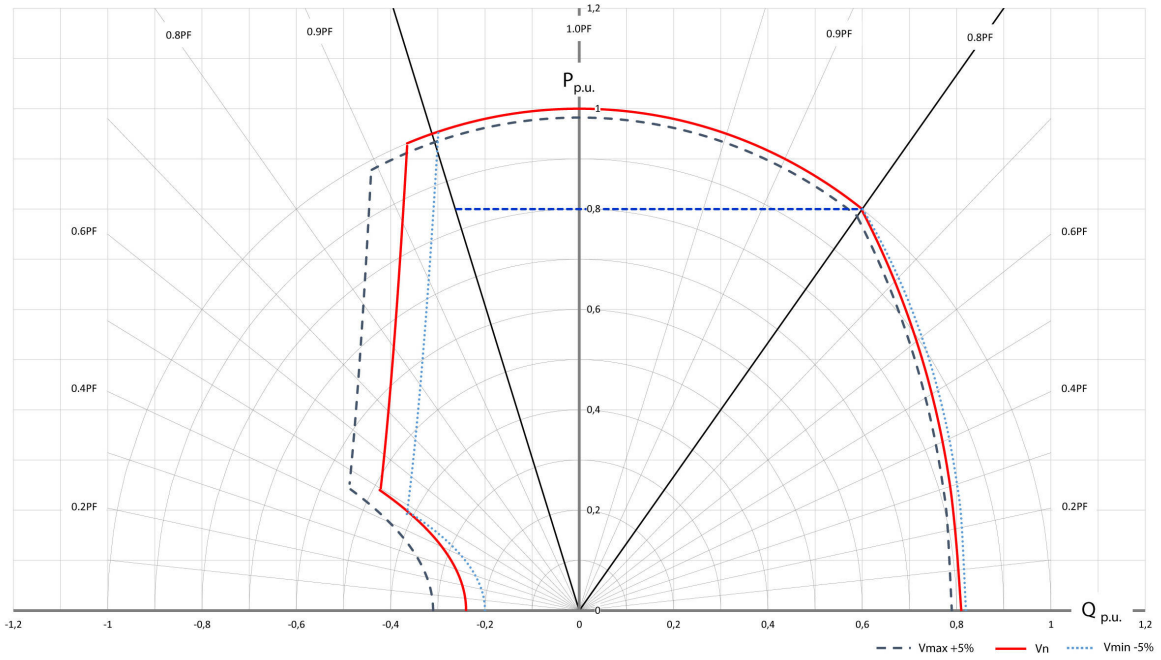


*Please refer to tables at page 6

Additional Characteristics

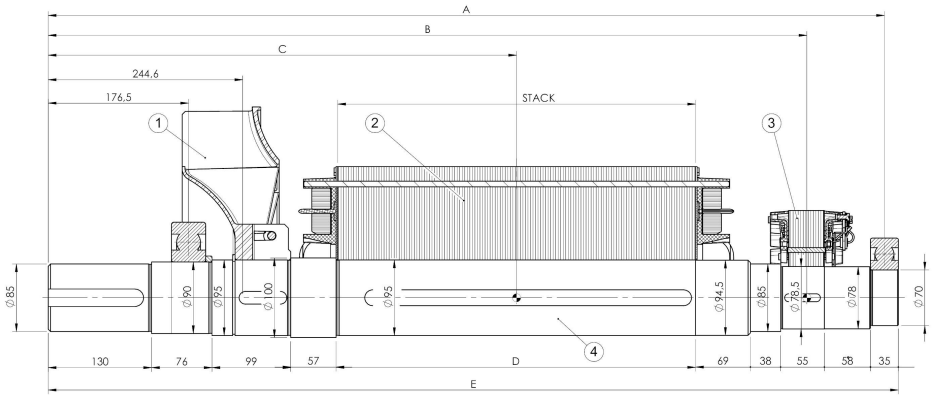
Data		ECO38 1S4 C		ECO38 2S4 C		ECO38 1M4 C		ECO38 2M4 C		ECO38 1L4 C		ECO38 2L4 C		ECO38 VL4 C	
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
Damper cage		Copper													
Single stator coil resistance (20°C)	Ω	0,013		0,0105		0,008		0,0065		0,006		0,004		0,004	
Rotor Winding Resistance (20°C)	Ω	3,905		4,133		4,449		4,887		5,604		6,78		7,383	
Stator Exciter Resistance (20°C)	Ω	13,47		13,47		13,47		13,47		13,47		13,47		13,47	
Rotor Exciter Resistance (20°C)	Ω	0,719		0,719		0,719		0,719		0,719		0,719		0,719	
Auxiliary Winding Resistance (20°C)	Ω	0,854		0,845		0,778		0,796		0,751		0,7		0,7	
Weight of complete generator	kg	525,0		550,0		600,0		653,0		771,0		895,0		957,0	
Unbalanced magnetic pull	kN/mm	4,4		5,2		5,7		5,1		5,9		6,2		6,5	
Air flow	m^3/min	32,0	39,0	32,0	39,0	32,0	39,0	32,0	39,0	32,0	39,0	32,0	39,0	32,0	39,0
Noise level at 1m/7m	dB(A)	82/69	86/73	82/69	86/73	82/69	86/73	82/69	86/73	82/69	86/73	82/69	86/73	82/69	86/73

PQ Diagram



* The PQ diagram above refers to three-phase application only.

MOMENTS OF INERTIA - DOUBLE BEARING



TYPE	COMPONENT								TOTAL	
	1 FAN		2 MAIN ROTOR		3 EXCITER ROTOR		4 SHAFT*			
	Weight [kg]	J [kg*m²]	Weight [kg]	J [kg*m²]	Weight [kg]	J [kg*m²]	Weight [kg]	J [kg*m²]	Weight [kg]	J [kg*m²]
ECO38 1S/4C	6.6	0.1633	106.4	1.4480	11.8	0.0808	40.9	0.0429	165.6	1.7350
ECO38 2S/4C			116.0	1.5782					175.3	1.8652
ECO38 1M/4C			130.5	1.7733			44.8	0.0474	193.7	2.0648
ECO38 2M/4C			150.2	2.0407					213.4	2.3322
ECO38 1L/4C			184.6	2.5051			54.4	0.0583	257.3	2.8075
ECO38 2L/4C			233.3	3.1636					306.0	3.4660
ECO38 VL/4C			253.4	3.4348			56.6	0.0608	328.3	3.7397

TYPE	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
ECO38 1S/4C	811.5	714.4	479.0	212.0	829.0
ECO38 2S/4C			469.0		
ECO38 1M/4C	881.5	784.4	524.0	282.0	899.0
ECO38 2M/4C			504.0		
ECO38 1L/4C	1051.5	954.4	639.0	452.0	1069.0
ECO38 2L/4C			589.0		
ECO38 VL/4C	1091.5	994.4	608.9	492.0	1109.0

* Shaft mass and inertia also include rotor keys

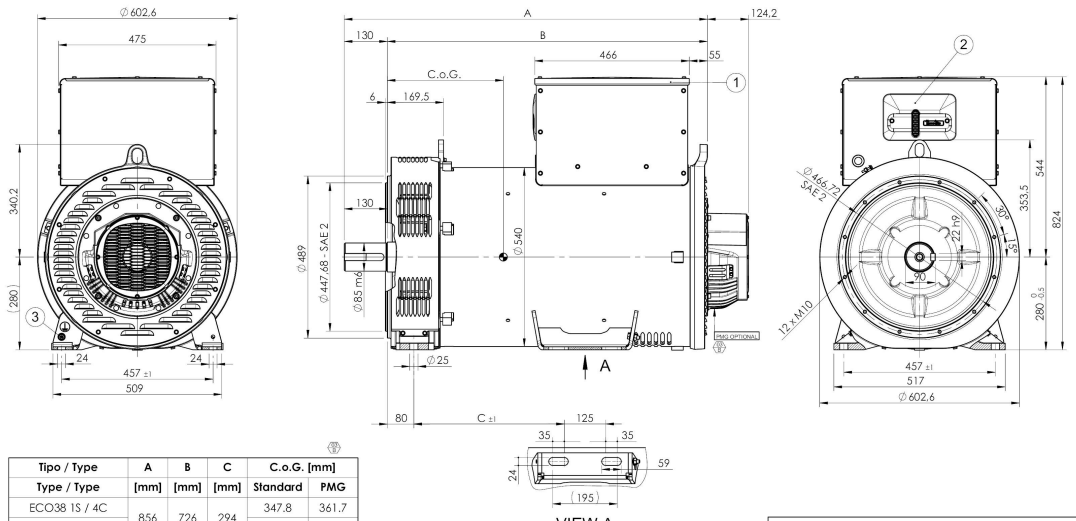
REV.	DATE	REVIEWS	DESIGN BY	APPROVED BY
01	29/04/2024	(A) ADDED VL SIZE	Pellizzaro A.	Manfrin R.
00	30/05/2023	FIRST ISSUE	Pellizzaro A.	Manfrin R.

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DESCRIPTION: MOMENTS OF INERTIA - DOUBLE BEARING ECO38C

FORMAT	SCALE	REF.DOC.	PART N.	MODEL REV.	DRW REV.
A4	1:5	PP00090	D00195	01	01

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Tipo / Type	A	B	C	C.o.G. [mm]	
Type / Type	[mm]	[mm]	[mm]	Standard	PMG
ECO38 1S / 4C	856	726	294	347.8	361.7
ECO38 2S / 4C				342.5	355.9
ECO38 1M / 4C	926	796	294	389.0	402.0
ECO38 2M / 4C				377.5	389.8
ECO38 1L / 4C	1096	966	454	495.6	507.2
ECO38 2L / 4C				463.7	474.3
ECO38 VL / 4C	1136	1006	494	483.9	494.3

1) REMOVABLE COVER FOR ACCESS TO MAIN TERMINALS

2) REMOVABLE PANEL FOR ACCESS TO AVR

3) SCREW M10 FOR GROUNDING

REV.	DATE	REVIEWS	DESIGN BY	APPROVED BY
03	03/05/2024	(A) ADDED VL SIZE (B) ADDED PMG	Pellizzaro A.	Manfrin R.
02	13/06/2023	A) C.o.G. UPDATED	Pellizzaro A.	Manfrin R.
01	26/05/2023	REDRAW PE2	Pellizzaro A.	Pellizzaro A.

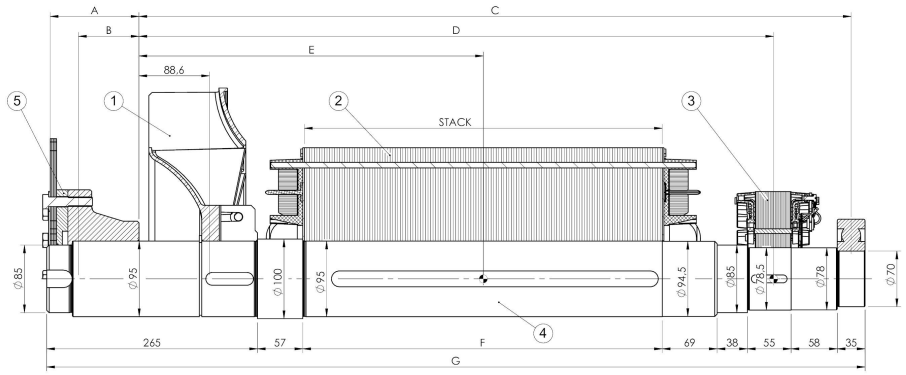
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DESCRIPTION: OVERALL DIMENSIONS - B3B14 COUPLING ECO38C

FORMAT	SCALE	REF.DOC.	PART N.	MODEL REV.	DRW REV.
A4	1:12	PP00090	B1702	03	03

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MOMENTS OF INERTIA - SINGLE BEARING



* Shaft mass and inertia also include rotor keys

TYPE	COMPONENT 1 FAN Weight [kg]	1 FAN J [kg*m²]	2 MAIN ROTOR Weight [kg]	2 MAIN ROTOR J [kg*m²]	3 EXCITER ROTOR Weight [kg]	3 EXCITER ROTOR J [kg*m²]	4 SHAFT* Weight [kg]	4 SHAFT* J [kg*m²]	TOTAL Weight [kg]	TOTAL J [kg*m²]
ECO38 1S/4C	6.6	0.1633	106.4	1.4480	11.8	0.0808	40.2	0.0434	164.9	1.7355
ECO38 2S/4C			116.0	1.5782					174.6	1.8657
ECO38 1M/4C			130.5	1.7733			44.1	0.0479	193.0	2.0653
ECO38 2M/4C			150.2	2.0407					212.7	2.3327
ECO38 1L/4C			184.6	2.5051			53.6	0.0588	256.6	2.8080
ECO38 2L/4C			233.3	3.1636					305.3	3.4665
ECO38 VL/4C			253.4	3.4348			55.9	0.0613	327.6	3.7402

SAE N.	5 SHAFTS COUPLING FLEX PLATE A	B	Weight [kg]	J [kg*m²]
11.5	111.6	76.1	19.4	0.1802
14.0	97.4	74.6	22.6	0.3639

TYPE	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]
ECO38 1S/4C	655.5	558.4	323.0	212.0	789.0
ECO38 2S/4C			313.0		
ECO38 1M/4C	725.5	628.4	368.0	282.0	859.0
ECO38 2M/4C			348.0		
ECO38 1L/4C	895.5	798.4	483.0	452.0	1029.0
ECO38 2L/4C			433.0		
ECO38 VL/4C	935.5	838.4	452.9	492.0	1069.0

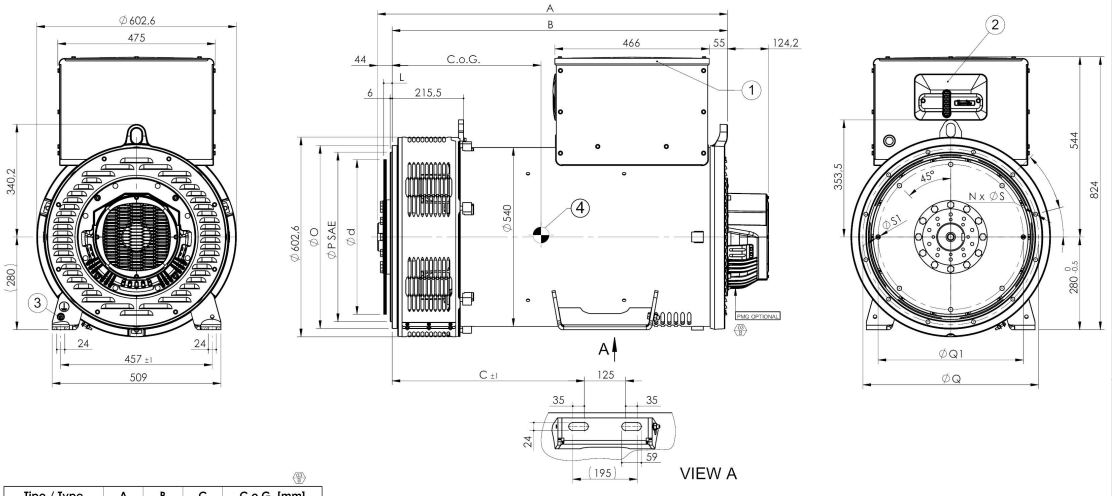
REV.	DATE	REVIEWS	DESIGN BY	APPROVED BY
01	29/04/2024	(A) ADDED VL SIZE	Pellizzaro A.	Manfrin R.
00	30/05/2023	FIRST ISSUE	Trevisan M.	Manfrin R.

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DESCRIPTION: MOMENTS OF INERTIA - SINGLE BEARING ECO38C

FORMAT	SCALE	REF.DOC.	PART N.	MODEL REV.	DRW REV.
A4	1:5	ECR00045	D00175	01	01

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Tipo / Type	A [mm]	B [mm]	C [mm]	C.o.G. [mm] Standard	C.o.G. [mm] PMG
ECO38 1S / 4C	816	772	420	388.8	402.8
ECO38 2S / 4C				383.6	397.2
ECO38 1M / 4C	886	842	420	430.5	443.6
ECO38 2M / 4C				419.4	431.8
ECO38 1L / 4C	1056	1012	580	538.1	549.8
ECO38 2L / 4C				506.7	517.4
ECO38 VL / 4C	1096	1052	620	527.1	537.5

SAE N.	Flangia / Flange Bride / Flansch O	P	Q	S	N	
3	451	409.58	428.62	12	12	30
2	489	447.68	466.72	12	12	30
1	552	511.18	530.22	12	12	30
1/2	648	584.20	619.12	14	12	30
0	711	647.70	679.45	14	16	22.5

SAE N.	Giunti a dischi / Disc coupling Disques de monopalier / Scheiben kupplung d	L	Q1	S1
11 1/2	352.42	39.6	333.37	11
14	466.72	25.4	438.15	13.5

1) REMOVABLE COVER FOR ACCESS TO MAIN TERMINALS
2) REMOVABLE PANEL FOR ACCESS TO AVR
3) SCREW M10 FOR GROUNDING
4) CENTER OF GRAVITY IN CONFIGURATION SAE 1 FLYWHEEL 14

REV.	DATE	REVIEWS	DESIGN BY	APPROVED BY
03	07/05/2024	(A) ADDED VL SIZE (B) ADDED PMG	Pellizzaro A.	Manfrin R.
02	13/06/2023	(A) WAS 59 (B) A DIM. UPDATED (C) CoG UPDATED	Pellizzaro A.	Manfrin R.
01	06/07/2022	REDRAW PE2	Pellizzaro A.	Pellizzaro A.

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DESCRIPTION: OVERALL DIMENSIONS - MD35 COUPLING ECO38C

FORMAT	SCALE	REF.DOC.	PART N.	MODEL REV.	DRW REV.
A4	1:12	PP00090	B1700	03	03

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