



Totally Focused. Totally Independent.

Technical Specification

EC046 4 A



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

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 are equipped with **reduced pitch windings (2/3)**. This configuration allows:

- ▶ The elimination of triple harmonics in the voltage waveform
- ▶ Reduction of neutral currents in parallel operation

All models, except the **ECP3 series**, are equipped with an aluminum or copper **cushioning cage** to ensure greater stability during load transients.

- ▶ 12 reconnectable wires:
 - 50 Hz - from 380 V to 440 V and from 220/110 V to 240/120 V (with possible derating)
 - 60 Hz - from 380 V to 480 V and from 220/110 V to 240/120 V (with possible derating)
- ▶ 6 reconnectable wires:
 - 50 Hz - from 380 V to 440 V and from 220 V to 240 V (with possible derating)
 - 60 Hz - from 380 V to 480 V and from 220 V to 240 V (with possible derating)

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)	Typically <3.5% at full load L-L	Typically <3.0% at full load L-L	Typically <3.5% at full load L-L	Typically <3.5% at full load L-L	Typically <4.5% at full load L-N	Typically <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

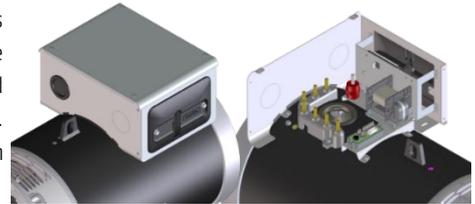
The robust mechanical structure withstands up to 5G in any direction and 9G vertically, and its design allows easy access to connections and components during routine maintenance checks. The mechanical design used the most advanced FEM techniques. The materials used are: DD12 steel for the frame, C45 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](#)

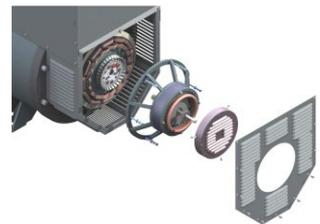


Optional PMG

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 MxKconnect (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 ($\pm 10V$), 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

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

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.

50 Hz		60 Hz			3 Steps	2 L-L phases	1 L-N phase
Voltage	Factor	Voltage	Factor				
380	0.93x	415	0.85x	Instant	1x	0.87x	1.30x
400	1x	440	0.90x	Minimum	1x	1.80x	3.20x
415	1.04x	460	0.95x	Supported	1x	1.50x	2.50x
440	1.10x	480	1x	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.

MeccAlte Tools

This section provides direct access to professional tools developed to support alternator selection, sizing and configuration. These tools ensure solutions that are aligned with the electrical and mechanical requirements of each project.

Key features

With a data-driven approach, you can optimize performance and reduce scaling risks:

- ▶ **Targeted Selection:** Identify the ideal alternator based on load profiles and operating conditions.
- ▶ **Power Calculations:** performs the sizing of the engine and alternator respecting the electrical constraints.
- ▶ **Parameter Verification:** Controls engine starting capability and handling of unbalanced and distorted loads.
- ▶ **PMG Configuration:** Configure permanent magnet alternators for AC/DC outputs or battery chargers.

For more information visit: [MeccAlte Tools](#)

General characteristics

Pole number	4	Insulation class	H
Phase number	3	Protection class	IP23
Number of wires	12	NDE Bearing type	6324.2RS
Execution	Brushless	DE Bearing type	6330
Regulator type	M3K	Maximum Overspeed	2250
Winding pitch	2/3	Altitude	0-1000
Code voltage reference	T0405P3	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	760V	800V	830V	880V	760V	800V	830V	880V	760V	800V	830V	880V	760V	800V	830V	880V	760V	800V	830V	880V	
Parallel Star YY	380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V	
Series Delta Δ	440V	460V	480V	508V	440V	460V	480V	508V	440V	460V	480V	508V	440V	460V	480V	508V	440V	460V	480V	508V	
Parallel Delta ΔΔ	220V	230V	240V	254V	220V	230V	240V	254V	220V	230V	240V	254V	220V	230V	240V	254V	220V	230V	240V	254V	
ECO46 154 A	kVA	1650	1650	1650	1400	1552	1552	1552	1340	1500	1500	1500	1300	1350	1350	1350	1170	1200	1200	1200	1040
	kW	1320	1320	1320	1120	1242	1242	1242	1072	1200	1200	1200	1040	1080	1080	1080	936	960	960	960	832
ECO46 1.554 A	kVA	1800	1800	1800	1620	1700	1700	1700	1545	1650	1650	1650	1500	1480	1480	1480	1360	1320	1320	1320	1200
	kW	1440	1440	1440	1296	1360	1360	1360	1236	1320	1320	1320	1200	1184	1184	1184	1088	1056	1056	1056	960
ECO46 254 A	kVA	1944	1944	1944	1720	1863	1863	1863	1650	1800	1800	1800	1600	1600	1600	1600	1440	1440	1440	1440	1280
	kW	1555	1555	1555	1376	1490	1490	1490	1320	1440	1440	1440	1280	1280	1280	1280	1152	1152	1152	1152	1024
ECO46 1L4 A	kVA	2268	2268	2268	1990	2173	2173	2173	1900	2100	2100	2100	1850	1900	1900	1900	1660	1680	1680	1680	1480
	kW	1814	1814	1814	1592	1738	1738	1738	1520	1680	1680	1680	1480	1520	1520	1520	1328	1344	1344	1344	1184
ECO46 1.5L4 A	kVA	2500	2500	2500	2375	2380	2380	2380	2275	2300	2300	2300	2200	2050	2050	2050	1950	1840	1840	1840	1760
	kW	2000	2000	2000	1900	1904	1904	1904	1820	1840	1840	1840	1760	1640	1640	1640	1560	1472	1472	1472	1408
ECO46 2L4 A	kVA	2700	2700	2700	2450	2588	2588	2588	2350	2500	2500	2500	2280	2250	2250	2250	2050	2000	2000	2000	1824
	kW	2160	2160	2160	1960	2070	2070	2070	1880	2000	2000	2000	1824	1800	1800	1800	1640	1600	1600	1600	1459
ECO46 VL4 A	kVA	2916	3024	2916	2150	2795	2899	2795	2060	2700	2800	2700	2000	2400	2500	2400	1780	2160	2240	2160	1600
	kW	2333	2419	2333	1720	2236	2319	2236	1648	2160	2240	2160	1600	1920	2000	1920	1424	1728	1792	1728	1280

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	830V	880V	920V	960V	830V	880V	920V	960V	830V	880V	920V	960V	830V	880V	920V	960V	830V	880V	920V	960V	
Parallel Star YY	415V	440V	460V	480V	415V	440V	460V	480V	415V	440V	460V	480V	415V	440V	460V	480V	415V	440V	460V	480V	
Series Delta Δ	480V	504V	530V	554V	480V	504V	530V	554V	480V	504V	530V	554V	480V	504V	530V	554V	480V	504V	530V	554V	
Parallel Delta ΔΔ	240V	254V	265V	277V	240V	254V	265V	277V	240V	254V	265V	277V	240V	254V	265V	277V	240V	254V	265V	277V	
ECO46 154 A	kVA	1728	1847	1944	1944	1656	1770	1875	1875	1600	1710	1800	1800	1440	1530	1620	1620	1280	1368	1440	1440
	kW	1382	1478	1555	1555	1325	1416	1500	1500	1280	1368	1440	1440	1152	1224	1296	1296	1024	1094	1152	1152
ECO46 1.554 A	kVA	1870	2030	2140	2140	1782	1936	2040	2040	1730	1880	1980	1980	1570	1690	1780	1780	1384	1504	1584	1584
	kW	1496	1624	1712	1712	1426	1549	1632	1632	1384	1504	1584	1584	1256	1352	1424	1424	1107	1203	1267	1267
ECO46 254 A	kVA	2116	2213	2332	2332	2028	2122	2236	2236	1950	2050	2160	2160	1750	1820	1920	1920	1560	1640	1728	1728
	kW	1693	1770	1866	1866	1622	1698	1789	1789	1560	1640	1728	1728	1400	1456	1536	1536	1248	1312	1382	1382
ECO46 1L4 A	kVA	2480	2582	2722	2722	2370	2473	2608	2608	2300	2390	2520	2520	2070	2150	2280	2280	1840	1912	2016	2016
	kW	1984	2066	2178	2178	1896	1978	2086	2086	1840	1912	2016	2016	1656	1720	1824	1824	1472	1530	1613	1613
ECO46 1.5L4 A	kVA	2613	2829	2980	2980	2508	2715	2860	2860	2420	2620	2760	2760	2150	2330	2460	2460	1936	2096	2208	2208
	kW	2090	2263	2384	2384	2006	2172	2288	2288	1936	2096	2208	2208	1720	1864	1968	1968	1549	1677	1766	1766
ECO46 2L4 A	kVA	2920	3067	3240	3240	2800	2939	3105	3105	2700	2840	3000	3000	2430	2550	2700	2700	2160	2272	2400	2400
	kW	2336	2454	2592	2592	2240	2351	2484	2484	2160	2272	2400	2400	1944	2040	2160	2160	1728	1818	1920	1920
ECO46 VL4 A	kVA	3136	3375	3575	3683	3007	3234	3426	3529	2900	3125	3310	3410	2600	2800	2980	3050	2320	2500	2648	2728
	kW	2509	2700	2860	2946	2406	2587	2741	2823	2320	2500	2648	2728	2080	2240	2384	2440	1856	2000	2118	2182

Reactance & Time constants- Class H / 400V

Unsaturated (ref. EN60034-4)			ECO46 1S4 A	ECO46 1.5S4 A	ECO46 2S4 A	ECO46 1L4 A	ECO46 1.5L4 A	ECO46 2L4 A	ECO46 VL4 A
X_d	Direct-axis synchronous reactance	%	273,5	296,4	273,7	253,8	289,1	270,4	282,9
X'_d	Direct-axis transient reactance	%	26,5	29,3	25,9	25,3	27,9	25,6	21
X''_d	Direct-axis subtransient reactance	%	13,4	14,3	12,7	12,3	13,6	12,4	11,6
X_q	Quadrature-axis synchronous reactance	%	174,7	189,8	170,6	177,8	205,9	191,4	177,8
X'_q	Quadrature-axis transient reactance	%	174,7	189,8	170,6	177,8	205,9	191,4	177,8
X''_q	Quadrature-axis subtransient reactance	%	29,3	32,6	28,9	27,6	29,3	27	22,3
X₂	Negative-sequence reactance	%	19,2	20,5	18,1	17,5	19,4	17,5	14,2
X₀	Zero sequence reactance	%	4,26	4,78	4,06	3,85	4,58	3,89	3,1
Saturated									
X_d	Direct-axis synchronous reactance	%	227	246	227,2	210,7	240	224,4	234,8
X'_d	Direct-axis transient reactance	%	22	24,3	21,5	21	23,2	21,2	17,4
X''_d	Direct-axis subtransient reactance	%	11,1	11,9	10,5	10,2	11,3	10,3	9,63
X_q	Quadrature-axis synchronous reactance	%	145	157,5	141,6	147,6	170,9	158,9	147,6
X'_q	Quadrature-axis transient reactance	%	145	157,5	141,6	147,6	170,9	158,9	147,6
X''_q	Quadrature-axis subtransient reactance	%	24,3	27,1	24	22,9	24,3	22,4	18,5
X₂	Negative-sequence reactance	%	15,9	17	15	14,5	16,1	14,5	11,8
X₀	Zero sequence reactance	%	4,26	4,78	4,06	3,85	4,58	3,89	3,1
K_{cc}	Short circuit ratio		0,44	0,41	0,44	0,47	0,42	0,45	0,43
T'_d	Transient time constant	sec	0,25	0,264	0,258	0,265	0,27	0,275	0,4
T''_d	Subtransient time constant	sec	0,021	0,024	0,023	0,022	0,022	0,024	0,023
T'_{do}	Open circuit time constant	sec	9,5	10,8	10,4	11	10,4	12,5	7,8
T_a	Armature time constant	sec	0,027	0,03	0,029	0,031	0,031	0,034	0,04

Additional information - Class H / 400V

I₀	Excitation current at no load	A	0,7	1,2	0,8	0,9	1,3	1,0	1,4
I_c	Excitation current at full load	A	3,2	3,6	3,2	3,1	3,7	3,1	3,2
Overload									
Overload per 20 sec. PRP or 10 sec. COP						%			
						300			
Heat dissipation		W	47401	50716	53776	59130	62792	66116	71662
Telephone Harmonic Factor - THF		%	<2	<2	<2	<2	<2	<2	<2
Waveform Distors.(THD) full load LL/LN		%	3 / 2,9	3,3 / 3,2	3,4 / 3,3	3,3 / 2,9	2,8 / 2,8	2,7 / 2,8	2,6 / 2,5
Waveform Distors.(THD) no load LL/LN		%	2,5 / 2,4	2,9 / 3	2,9 / 2,8	2,7 / 2,6	2,9 / 2,9	2,8 / 2,6	2,7 / 2,5

Reactance & Time constants- Class H / 480V

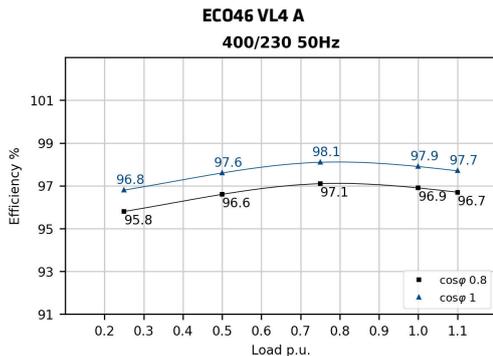
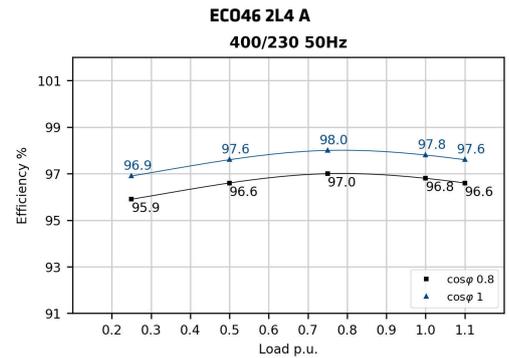
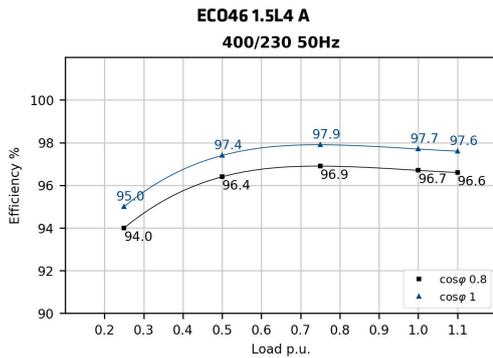
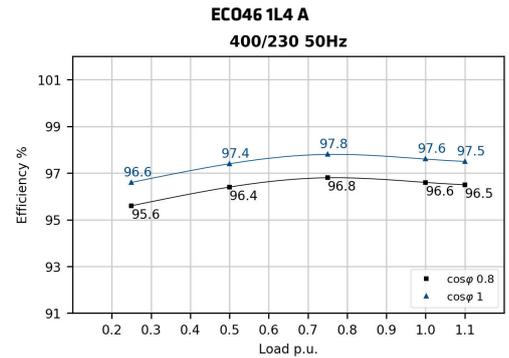
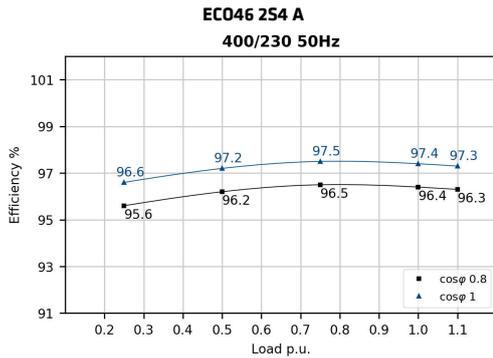
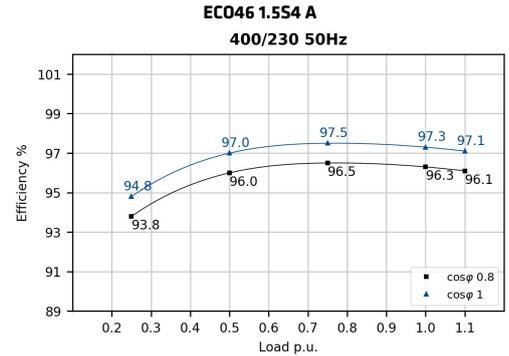
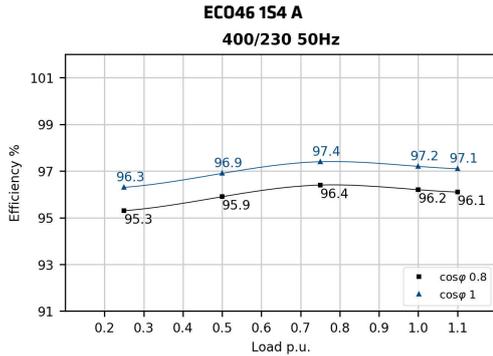
Unsaturated (ref. EN60034-4)			ECO46 1S4 A	ECO46 1.5S4 A	ECO46 2S4 A	ECO46 1L4 A	ECO46 1.5L4 A	ECO46 2L4 A	ECO46 VL4 A
X_d	Direct-axis synchronous reactance	%	273,5	296,4	273,7	253,8	289,1	270,4	287,1
X'_d	Direct-axis transient reactance	%	26,5	29,3	25,9	25,3	27,9	25,6	21,3
X''_d	Direct-axis subtransient reactance	%	13,4	14,3	12,7	12,3	13,6	12,4	11,8
X_q	Quadrature-axis synchronous reactance	%	174,7	189,8	170,6	177,8	205,9	191,4	180,4
X'_q	Quadrature-axis transient reactance	%	174,7	189,8	170,6	177,8	205,9	191,4	180,4
X''_q	Quadrature-axis subtransient reactance	%	29,3	32,6	28,9	27,6	29,3	27	22,6
X₂	Negative-sequence reactance	%	19,2	20,5	18,1	17,5	19,4	17,5	14,4
X₀	Zero sequence reactance	%	4,26	4,78	4,06	3,85	4,58	3,89	3,15
Saturated									
X_d	Direct-axis synchronous reactance	%	227	246	227,2	210,7	240	224,4	238,3
X'_d	Direct-axis transient reactance	%	22	24,3	21,5	21	23,2	21,2	17,7
X''_d	Direct-axis subtransient reactance	%	11,1	11,9	10,5	10,2	11,3	10,3	9,79
X_q	Quadrature-axis synchronous reactance	%	145	157,5	141,6	147,6	170,9	158,9	149,7
X'_q	Quadrature-axis transient reactance	%	145	157,5	141,6	147,6	170,9	158,9	149,7
X''_q	Quadrature-axis subtransient reactance	%	24,3	27,1	24	22,9	24,3	22,4	18,8
X₂	Negative-sequence reactance	%	15,9	17	15	14,5	16,1	14,5	12
X₀	Zero sequence reactance	%	4,26	4,78	4,06	3,85	4,58	3,89	3,15
K_{cc}	Short circuit ratio		0,44	0,41	0,44	0,47	0,42	0,45	0,42
T'_d	Transient time constant	sec	0,25	0,264	0,258	0,265	0,27	0,275	0,4
T''_d	Subtransient time constant	sec	0,021	0,024	0,023	0,022	0,022	0,024	0,023
T'_{do}	Open circuit time constant	sec	9,5	10,8	10,4	11	10,4	12,5	7,8
T_a	Armature time constant	sec	0,027	0,03	0,029	0,031	0,031	0,034	0,04

Additional information - Class H / 480V

I_o	Excitation current at no load	A	0,7	1,2	0,8	0,9	1,3	1,0	1,4
I_c	Excitation current at full load	A	3,2	3,6	3,2	3,1	3,7	3,1	3,2
Overload									
Overload per 20 sec. PRP or 10 sec. COP						%			
						300			
Heat dissipation		W	53776	57451	60820	66645	70638	71679	78584
Telephone Interference Factor - TIF			<40	<40	<40	<40	<40	<40	<40
Waveform Distors.(THD) full load LL/LN		%	3 / 2,9	3,3 / 3,2	3,4 / 3,3	3,3 / 2,9	2,8 / 2,8	2,7 / 2,8	2,6 / 2,5
Waveform Distors.(THD) no load LL/LN		%	2,5 / 2,4	2,9 / 3	2,9 / 2,8	2,7 / 2,6	2,9 / 2,9	2,8 / 2,6	2,7 / 2,5

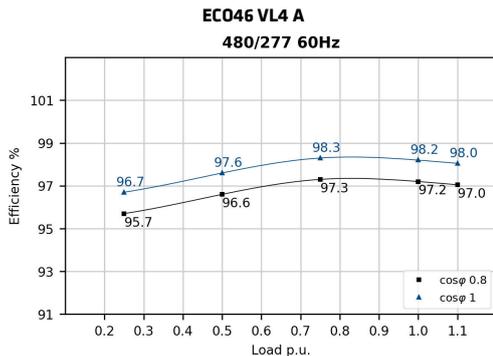
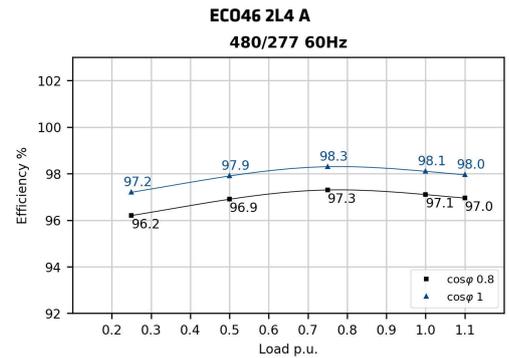
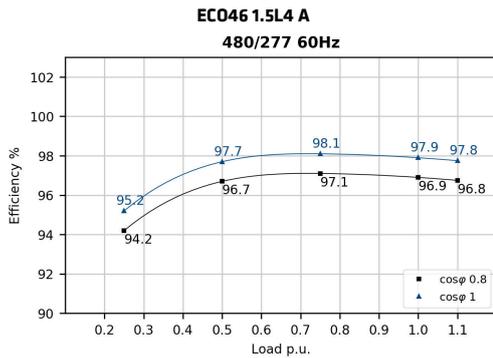
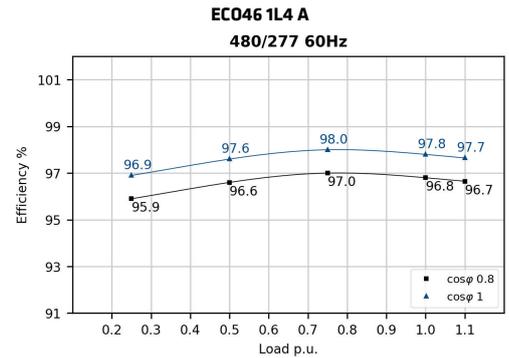
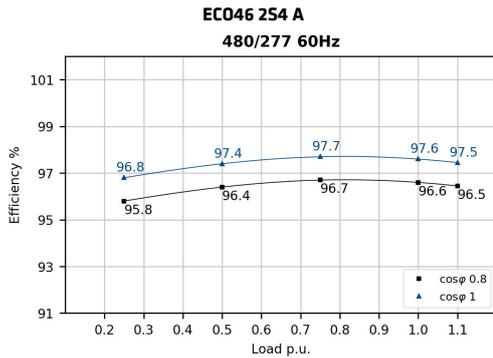
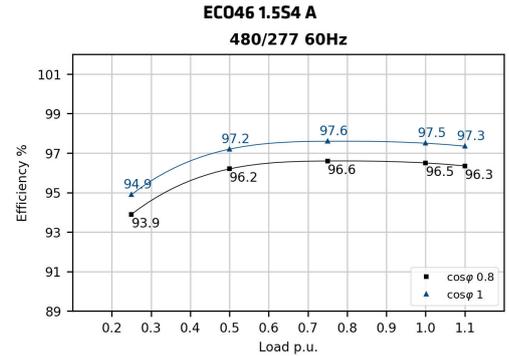
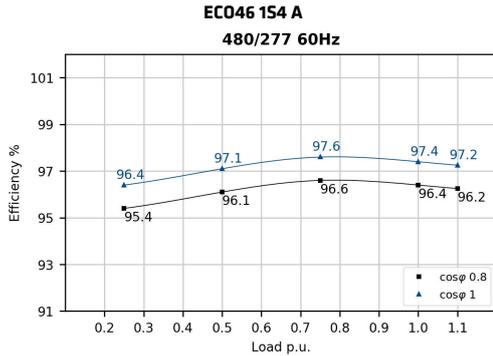
Efficiencies @ 50Hz

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	
ECO46 1S4 A	%	95,3	96,0	96,7	96,3	96,1	95,3	95,9	96,4	96,2	96,1	95,1	95,9	96,5	96,0	95,6	94,6	95,5	96,0	95,8	95,6
ECO46 1.5S4 A	%	93,8	96,1	96,8	96,4	96,2	93,8	96,0	96,5	96,3	96,1	93,6	96,1	96,6	96,1	95,7	93,1	95,7	96,4	95,9	95,6
ECO46 2S4 A	%	95,6	96,3	96,8	96,5	96,3	95,6	96,2	96,5	96,4	96,3	95,4	96,2	96,6	96,2	95,8	94,9	95,7	96,1	96,0	95,9
ECO46 1L4 A	%	95,6	96,5	97,1	96,7	96,5	95,6	96,4	96,8	96,6	96,5	95,4	96,4	96,9	96,4	96,0	94,9	95,8	96,4	96,2	96,1
ECO46 1.5L4 A	%	94,0	96,5	97,2	96,8	96,6	94,0	96,4	96,9	96,7	96,6	93,8	96,5	97,0	96,5	96,1	93,3	96,1	96,8	96,3	96,1
ECO46 2L4 A	%	95,6	96,7	97,3	96,9	96,7	95,9	96,6	97,0	96,8	96,6	95,7	96,6	97,1	96,6	96,2	95,1	96,0	96,5	96,4	96,3
ECO46 VL4 A	%	95,9	96,7	97,2	97,0	96,8	95,8	96,6	97,1	96,9	96,7	95,6	96,4	96,9	96,7	96,5	93,6	94,9	95,8	96,0	95,9

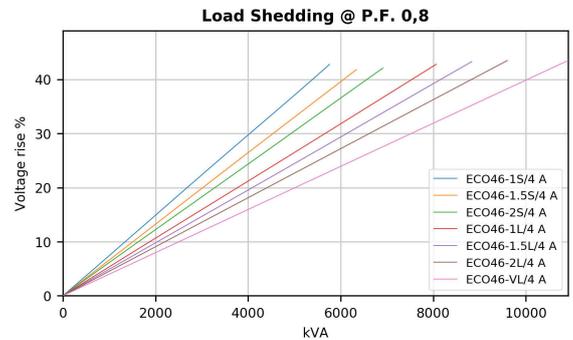
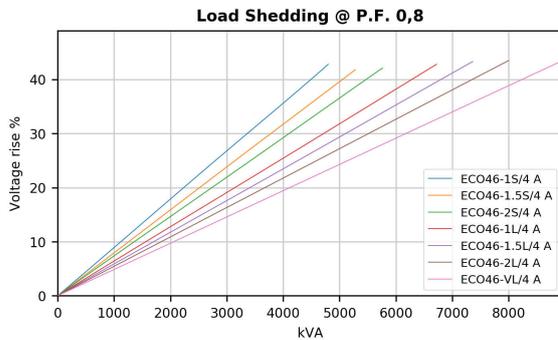
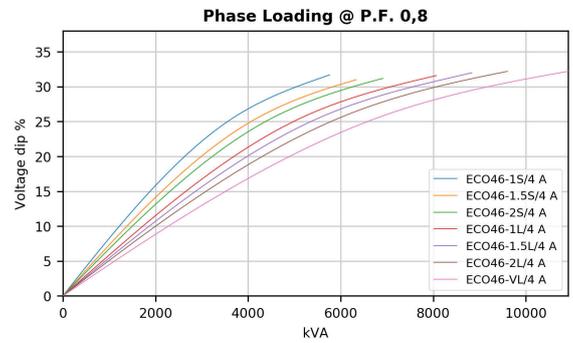
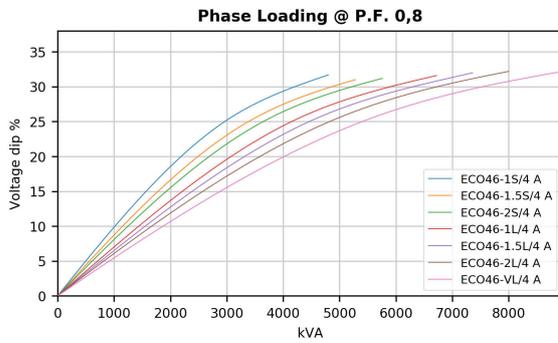
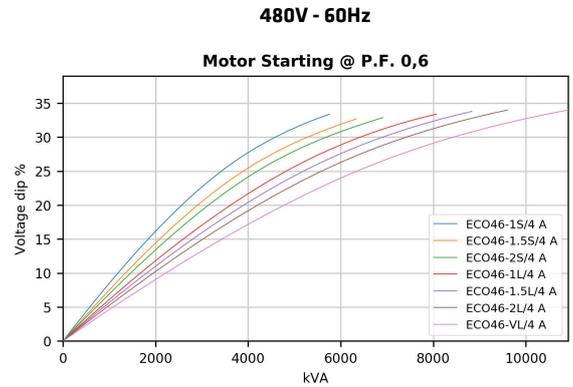


Efficiencies @ 60Hz

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
ECO46 1S4 A	%	94,8	95,6	96,2	96,1	95,9	95,2	96,0	96,5	96,3	96,2	95,3	96,2	96,9	96,5	96,3	95,4	96,1	96,6	96,4	96,3
ECO46 1.5S4 A	%	93,9	96,0	96,3	96,1	95,9	93,9	96,1	96,6	96,6	96,5	93,9	96,3	96,8	96,7	93,9	96,2	96,6	96,5	96,4	
ECO46 2S4 A	%	95,0	95,8	96,3	96,2	96,1	95,6	96,3	96,6	96,5	96,4	95,8	96,5	97,0	96,7	96,5	95,8	96,4	96,7	96,6	96,5
ECO46 1L4 A	%	95,3	96,1	96,6	96,5	96,4	95,9	96,5	96,9	96,7	96,6	95,8	96,7	97,3	96,9	96,7	95,9	96,6	97,0	96,8	96,7
ECO46 1.5L4 A	%	94,2	96,5	96,8	96,5	96,3	94,2	96,6	97,1	97,0	96,9	94,2	96,8	97,3	97,2	97,1	94,2	96,7	97,1	96,9	96,8
ECO46 2L4 A	%	95,6	96,4	96,9	96,8	96,7	96,2	96,8	97,2	97,0	96,9	96,2	97,0	97,6	97,2	97,0	96,2	96,9	97,3	97,1	97,0
ECO46 VL4 A	%	94,8	95,7	96,6	96,5	96,4	95,6	96,5	97,3	97,2	97,1	95,8	96,8	97,5	97,4	97,3	95,7	96,6	97,3	97,2	97,1



Transients voltage



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:

$$PFCC = \sin(\text{ARCCos}(PF_{\text{new}})) / 0.8$$

Example. The PFCC at power factor 0.3 is 1.192 [$PFCC = \sin(\text{ARCCos}(0.3)) / 0.8$]. 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):

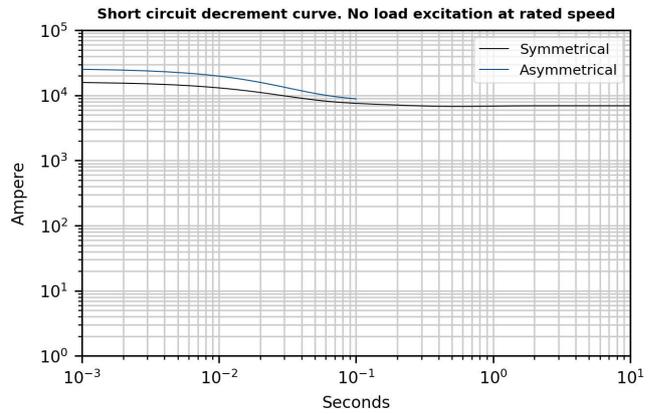
$$VCC = (400/V_{\text{new}})^2 \text{ if } 50 \text{ Hz}; VCC = (480/V_{\text{new}})^2 \text{ if } 60 \text{ Hz}$$

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.).

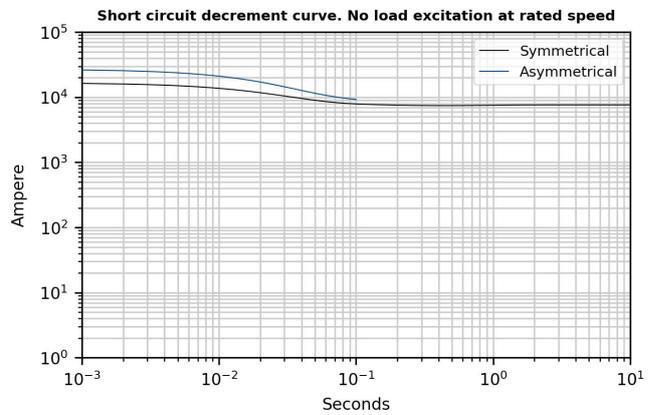
In this example, a 100 kVA load insertion at 415V is equivalent in voltage fall to a 133kVA load insertion at 480V.

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

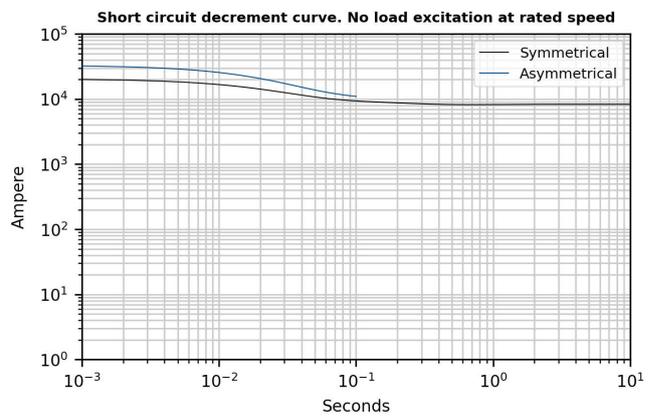
ECO46 1S4 A



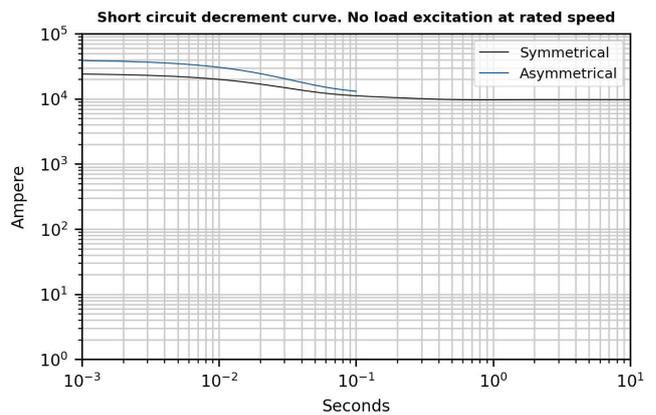
ECO46 1.5S4 A



ECO46 2S4 A



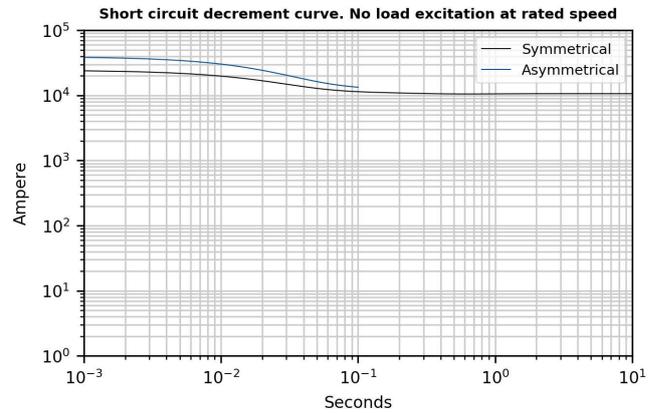
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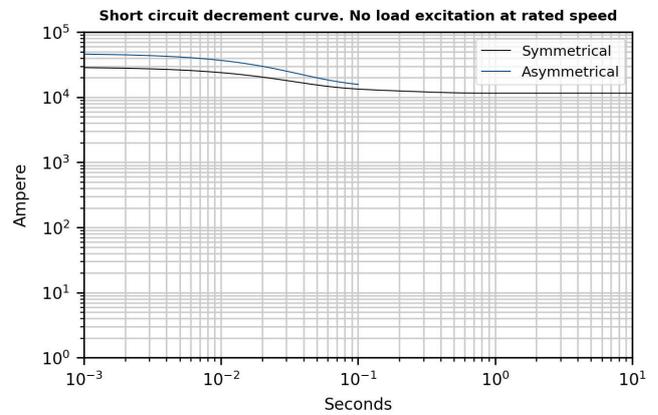
*Please refer to tables at page 6

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

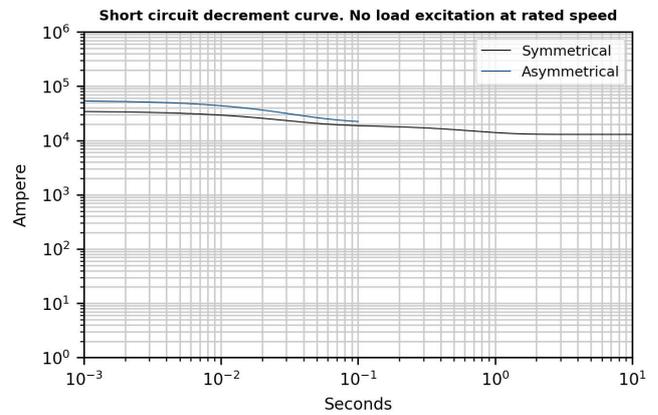
ECO46 1.5L4 A



ECO46 2L4 A



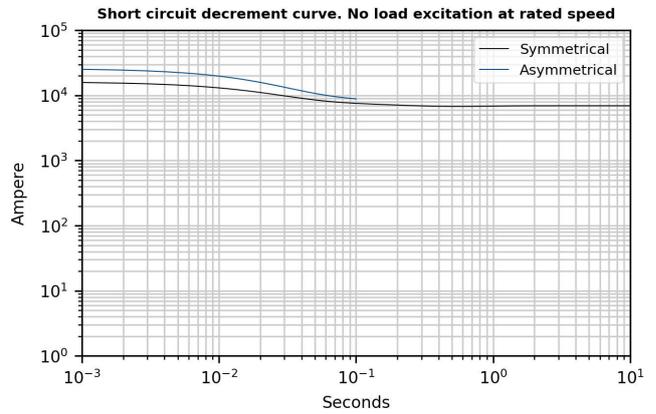
ECO46 VL4 A



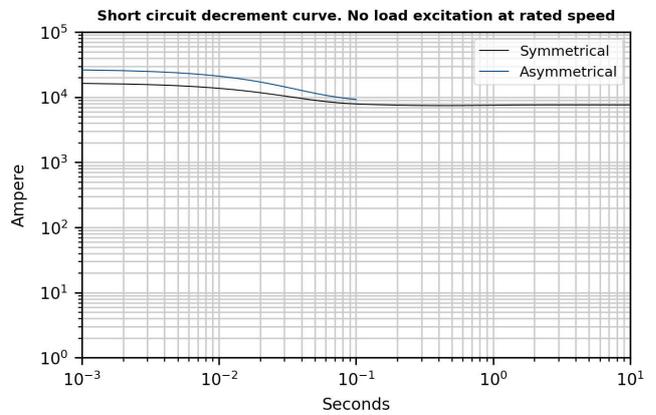
*Please refer to tables at page 6

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

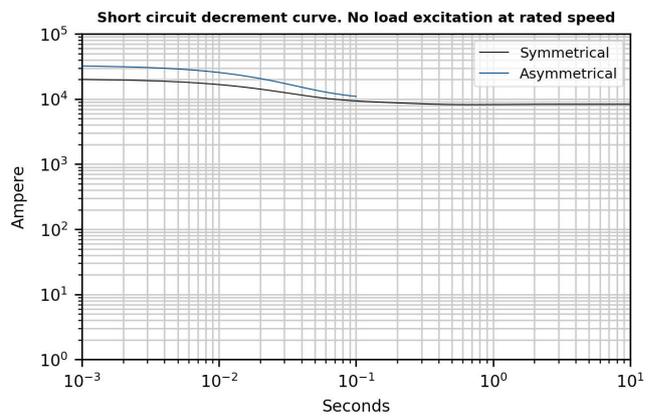
ECO46 1S4 A



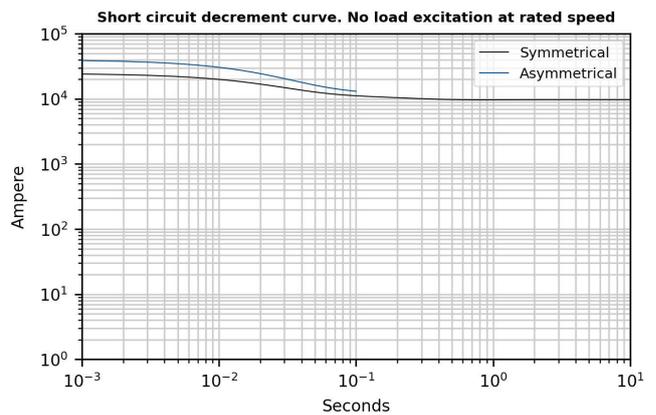
ECO46 1.5S4 A



ECO46 2S4 A



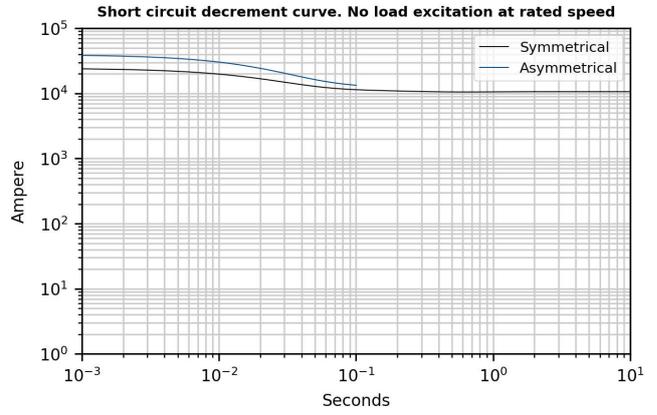
ECO46 1L4 A



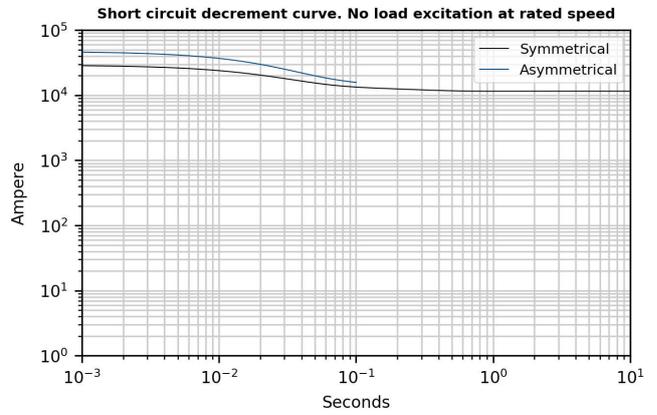
*Please refer to tables at page 6

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

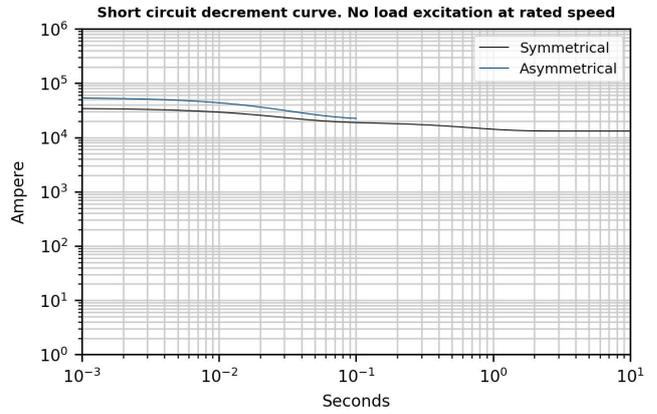
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ECO46 2L4 A



ECO46 VL4 A

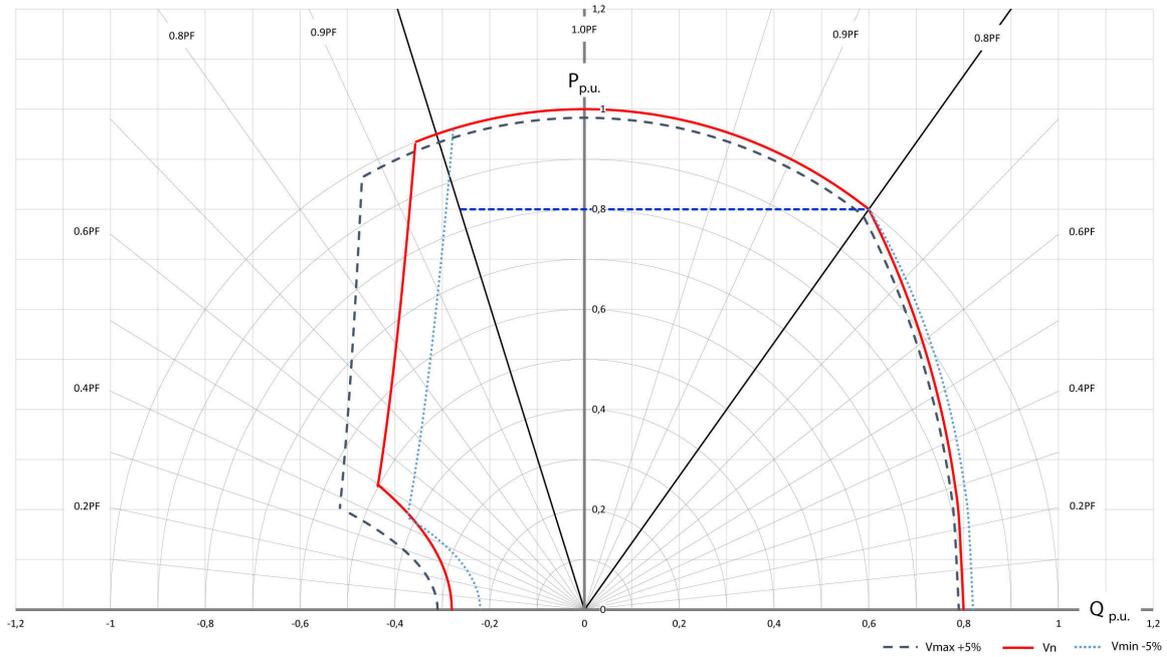


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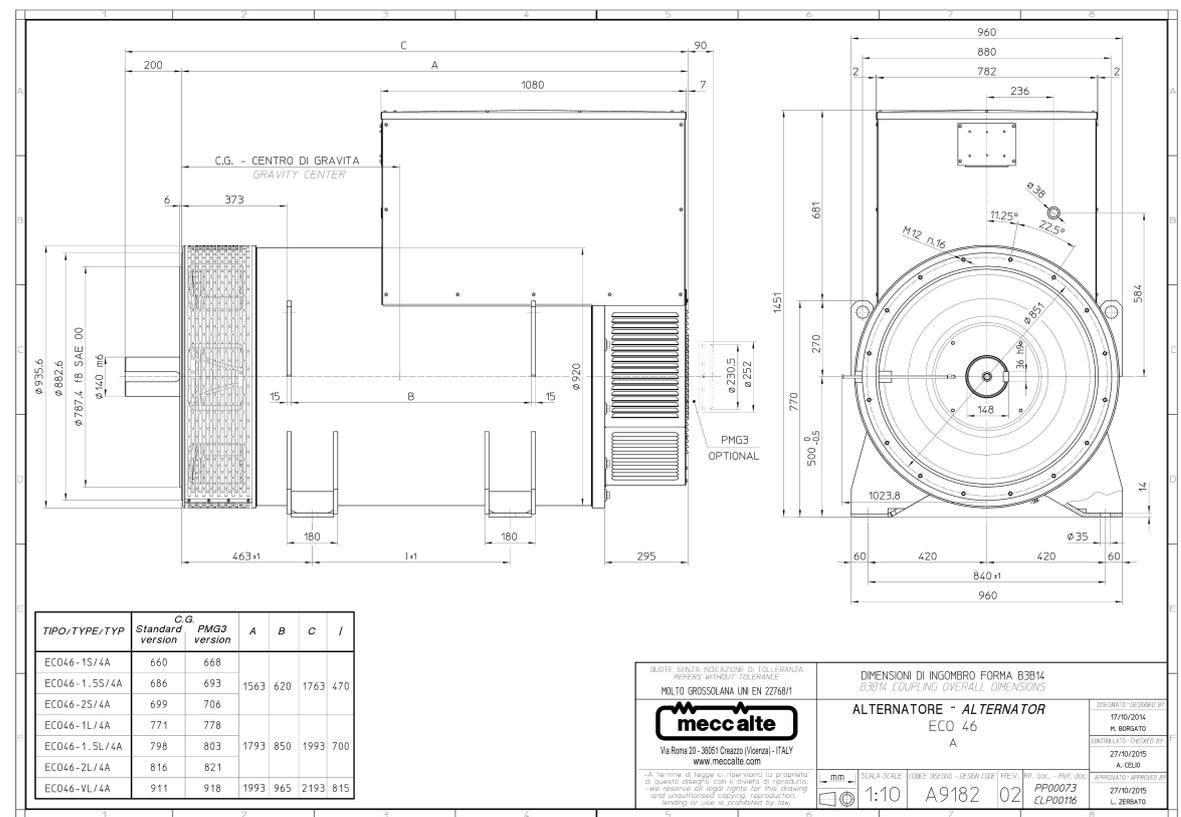
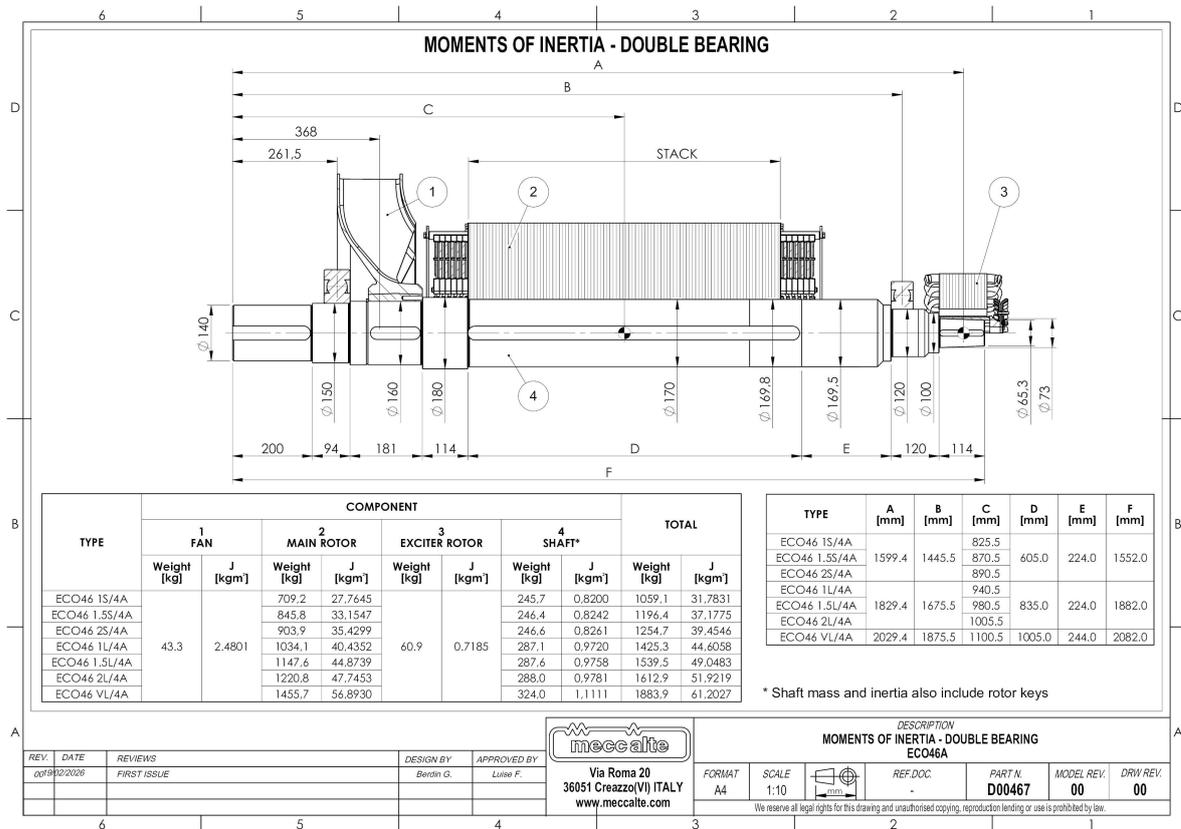
Additional Characteristics

Data	ECO46 1S4 A		ECO46 1.5S4 A		ECO46 2S4 A		ECO46 1L4 A		ECO46 1.5L4 A		ECO46 2L4 A		ECO46 VL4 A		
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	
Damper cage	Copper														
Single stator coil resistance (20°C)	Ω	0,00584		0,00405		0,00304		0,0024		0,00381		0,00234		0,00189	
Rotor Winding Resistance (20°C)	Ω	3,05		3,319		3,5		3,977		4,27		4,5		5,18	
Stator Exciter Resistance (20°C)	Ω	12,9		12,9		12,9		12,9		12,9		12,9		12,9	
Rotor Exciter Resistance (20°C)	Ω	0,12		0,12		0,12		0,12		0,12		0,12		0,12	
Auxiliary Winding Resistance (20°C)	Ω	0,414		0,35		0,33		0,36		0,4		0,39		0,41	
Weight of complete generator	kg	3005,0		3375,0		3560,0		3805,0		4255,0		4375,0		5120,0	
Unbalanced magnetic pull	kN/mm	6,4		6,4		6,5		6,8		6,9		7,0		8,0	
Air flow	m ³ /min	135,0	162,0	135,0	162,0	135,0	162,0	135,0	162,0	135,0	162,0	135,0	162,0	135,0	162,0
Noise level at 1m/7m	dB(A)	97/86	100/91	97/86	100/91	97/86	100/91	97/86	100/91	97/86	100/91	97/86	100/91	97/86	100/91

PQ Diagram



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



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