



Totally Focused. Totally Independent.

Technical Specification

EC040 4 C



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 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 G (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.

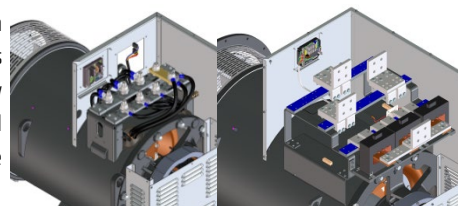
For more information visit: [Insulation_System_Guide](#)

Construction

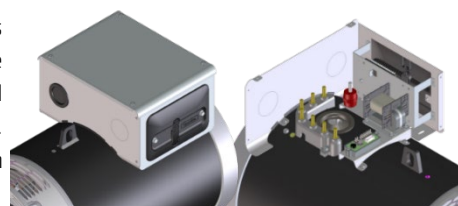
The robust mechanical structure withstands up to 5G in any direction and 9G vertically, and its design allows easy access to connections and components during routine maintenance checks. The mechanical design used the most advanced FEM techniques. The materials used are: DD12 steel for the frame, C45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



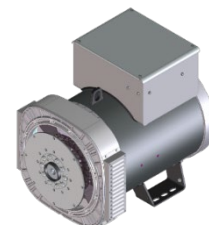
A new AVR panel has been installed on the Type-C family. The terminal blocks have been redesigned in a special "L" configuration, specifically to facilitate connections with customers; With this type of terminal block, a second terminal block can be positioned in order to obtain 12 terminals available. 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](#)



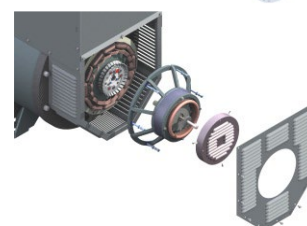
Optional PMG

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



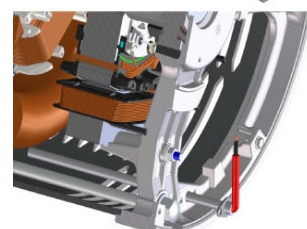
On the ECO 40, 43 and 46 series it is optionally available factory-fitted or retrofitted. On the ECO47 the PMG is standard.

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 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 G (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.

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	6318.2RS
Execution	Brushless	DE Bearing type	6322.2RS
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 Star Y	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	
ECO40 154 C	kVA	440	440	440	404	417	417	417	386	400	400	400	370	370	370	370	342	320	320	320	296
	kW	352	352	352	323	334	334	334	309	320	320	320	296	296	296	296	273	256	256	256	237
ECO40 254 C	kVA	491	491	491	393	468	468	468	375	450	450	450	360	410	410	410	330	360	360	360	288
	kW	393	393	393	314	374	374	374	300	360	360	360	288	328	328	328	264	288	288	288	230
ECO40 354 C	kVA	550	550	550	503	521	521	521	479	500	500	500	460	450	450	450	414	400	400	400	368
	kW	440	440	440	402	417	417	417	383	400	400	400	368	360	360	360	331	320	320	320	294
ECO40 1L4 C	kVA	601	601	590	546	567	567	557	515	550	550	540	500	500	500	490	454	440	440	432	400
	kW	481	481	472	437	454	454	446	412	440	440	432	400	400	400	392	363	352	352	346	320
ECO40 2L4 C	kVA	675	675	675	616	645	645	645	588	625	625	625	570	564	564	564	515	500	500	500	456
	kW	540	540	540	493	516	516	516	470	500	500	500	456	451	451	451	412	400	400	400	365
ECO40 3L4 C	kVA	735	735	735	560	700	700	700	535	680	680	680	520	630	630	630	483	544	544	544	416
	kW	588	588	588	448	560	580	580	428	544	544	544	416	504	504	504	386	435	435	435	333
ECO40 VL4 C	kVA	825	825	825	740	777	777	777	700	750	750	750	680	690	690	690	630	600	600	600	544
	kW	660	660	660	592	622	622	622	560	600	600	600	544	552	552	552	504	480	480	480	433

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	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		
ECO40 154 C	kVA	459	492	525	525	438	469	500	500	420	450	480	480	383	410	440	440	336	360	384	384	
	kW	367	394	420	420	350	375	400	400	336	360	384	384	306	328	352	352	269	288	307	307	
ECO40 254 C	kVA	524	557	590	590	500	532	563	563	480	510	540	540	435	460	490	490	384	408	432	432	
	kW	419	446	472	472	400	426	450	450	384	408	432	432	348	368	392	392	307	326	346	346	
ECO40 354 C	kVA	590	634	660	660	563	604	625	625	540	580	600	600	484	520	540	540	432	464	480	480	
	kW	472	507	528	528	450	483	500	500	432	464	480	480	387	416	432	432	346	371	384	384	
ECO40 1L4 C	kVA	623	669	722	722	587	649	680	680	570	630	660	660	515	570	600	600	456	504	528	528	
	kW	498	535	578	578	470	519	544	544	456	504	528	528	412	456	480	480	365	403	422	422	
ECO40 2L4 C	kVA	720	762	810	810	688	730	775	775	665	705	750	750	605	636	677	677	532	564	600	600	
	kW	576	610	648	648	550	584	620	620	532	564	600	600	484	509	542	542	426	451	480	480	
ECO40 3L4 C	kVA	778	843	882	882	741	803	840	840	720	780	816	816	665	720	756	756	576	624	653	653	
	kW	622	674	706	706	593	642	672	672	576	624	653	653	532	576	604	604	461	499	522	522	
ECO40 VL4 C	kVA	930	970	970	970	885	925	925	925	860	900	900	900	790	830	830	830	688	720	720	720	
	kW	744	776	776	776	708	740	740	740	688	720	720	720	632	664	664	664	550	576	576	576	

Reactance & Time constants- Class H / 400V

Unsaturated (ref. EN60034-4)			ECO40 1S4 C	ECO40 2S4 C	ECO40 3S4 C	ECO40 1L4 C	ECO40 2L4 C	ECO40 3L4 C	ECO40 VL4 C
X_d	Direct-axis synchronous reactance	%	286,7	240,1	258,7	246,3	270	234,9	175,9
X'_d	Direct-axis transient reactance	%	23,3	22,1	21,7	20,1	19,8	18,7	16,7
X''_d	Direct-axis subtransient reactance	%	14,7	12,5	11,8	10,6	10,5	9,52	9
X_q	Quadrature-axis synchronous reactance	%	115,9	110,7	111,8	115,9	157,1	145,9	122,1
X'_q	Quadrature-axis transient reactance	%	115,9	110,7	111,8	115,9	157,1	145,9	122,1
X''_q	Quadrature-axis subtransient reactance	%	29,2	28,4	27,3	24,9	24	16,8	14,8
X₂	Negative-sequence reactance	%	19,1	18,2	17,3	13	12,4	14,6	12,5
X₀	Zero sequence reactance	%	3,62	3,21	3,1	2,9	2,9	2,48	2,28
Saturated									
X_d	Direct-axis synchronous reactance	%	238	199,3	214,7	204,4	224,1	195	146
X'_d	Direct-axis transient reactance	%	19,3	18,4	18	16,7	16,4	15,5	13,8
X''_d	Direct-axis subtransient reactance	%	12,2	10,4	9,79	8,76	8,72	7,9	7,47
X_q	Quadrature-axis synchronous reactance	%	96,2	91,9	92,8	96,2	130,4	121,1	101,4
X'_q	Quadrature-axis transient reactance	%	96,2	91,9	92,8	96,2	130,4	121,1	101,4
X''_q	Quadrature-axis subtransient reactance	%	24,2	23,5	22,7	20,7	19,9	13,9	12,3
X₂	Negative-sequence reactance	%	15,8	15,1	14,4	10,8	10,3	12,1	10,4
X₀	Zero sequence reactance	%	3,62	3,21	3,1	2,9	2,9	2,48	2,28
K_{cc}	Short circuit ratio		0,36	0,5	0,4	0,49	0,45	0,44	0,59
T'_d	Transient time constant	sec	0,16	0,13	0,14	0,14	0,15	0,18	0,18
T''_d	Subtransient time constant	sec	0,019	0,019	0,021	0,021	0,019	0,019	0,015
T'_{do}	Open circuit time constant	sec	2,55	2,7	2,8	2,9	3,1	3,1	3,7
T_a	Armature time constant	sec	0,017	0,03	0,031	0,04	0,04	0,052	0,071

Additional information - Class H / 400V

I_o	Excitation current at no load	A	0,9	0,9	0,5	0,8	0,9	0,7	0,7
I_c	Excitation current at full load	A	4,1	3,7	3,4	3,7	4,3	4,2	4,3
Overload									
Overload per 20 sec. PRP or 10 sec. COP		%	300						
Heat dissipation		W	19703	21356	22833	24135	26316	28632	30915
Telephone Harmonic Factor - THF		%	<2	<2	<2	<2	<2	<2	<2
Waveform Distors.(THD) full load LL/LN		%	2,6 / 2,6	2,7 / 2,8	2,4 / 2,5	2,5 / 2,5	2,2 / 2,4	2,1 / 2,1	2,2 / 2,2
Waveform Distors.(THD) no load LL/LN		%	2,9 / 2,9	2,5 / 2,6	2,6 / 2,5	2,3 / 2,4	2,4 / 2,5	2,4 / 2,4	2,5 / 2,5

Reactance & Time constants- Class H / 480V

Unsaturated (ref. EN60034-4)			ECO40 1S4 C	ECO40 2S4 C	ECO40 3S4 C	ECO40 1L4 C	ECO40 2L4 C	ECO40 3L4 C	ECO40 VL4 C
X_d	Direct-axis synchronous reactance	%	286,7	240,1	258,7	246,3	270	234,9	175,9
X'_d	Direct-axis transient reactance	%	23,3	22,1	21,7	20,1	19,8	18,7	16,7
X''_d	Direct-axis subtransient reactance	%	14,7	12,5	11,8	10,6	10,5	9,52	9
X_q	Quadrature-axis synchronous reactance	%	115,9	110,7	111,8	115,9	157,1	145,9	122,1
X'_q	Quadrature-axis transient reactance	%	115,9	110,7	111,8	115,9	157,1	145,9	122,1
X''_q	Quadrature-axis subtransient reactance	%	29,2	28,4	27,3	24,9	24	16,8	14,8
X₂	Negative-sequence reactance	%	19,1	18,2	17,3	13	12,4	14,6	12,5
X₀	Zero sequence reactance	%	3,62	3,21	3,1	2,9	2,9	2,48	2,28
Saturated									
X_d	Direct-axis synchronous reactance	%	238	199,3	214,7	204,4	224,1	195	146
X'_d	Direct-axis transient reactance	%	19,3	18,4	18	16,7	16,4	15,5	13,9
X''_d	Direct-axis subtransient reactance	%	12,2	10,4	9,79	8,76	8,72	7,9	7,47
X_q	Quadrature-axis synchronous reactance	%	96,2	91,9	92,8	96,2	130,4	121,1	101,3
X'_q	Quadrature-axis transient reactance	%	96,2	91,9	92,8	96,2	130,4	121,1	101,3
X''_q	Quadrature-axis subtransient reactance	%	24,2	23,5	22,7	20,7	19,9	13,9	12,3
X₂	Negative-sequence reactance	%	15,8	15,1	14,4	10,8	10,3	12,1	10,4
X₀	Zero sequence reactance	%	3,62	3,21	3,1	2,9	2,9	2,48	2,28
K_{cc}	Short circuit ratio		0,36	0,5	0,4	0,49	0,45	0,44	0,59
T'_d	Transient time constant	sec	0,16	0,13	0,14	0,14	0,15	0,18	0,18
T''_d	Subtransient time constant	sec	0,019	0,019	0,021	0,021	0,019	0,019	0,015
T'_{do}	Open circuit time constant	sec	2,55	2,7	2,8	2,9	3,1	3,1	3,7
T_a	Armature time constant	sec	0,017	0,03	0,031	0,04	0,04	0,052	0,071

Additional information - Class H / 480V

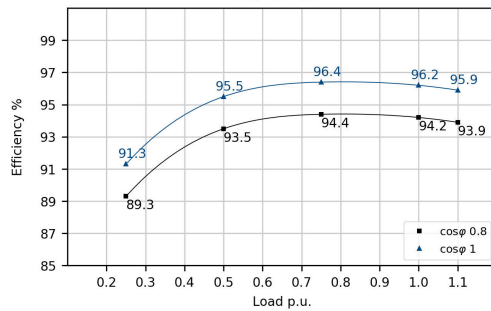
I_o	Excitation current at no load	A	0,9	0,9	0,5	0,8	0,9	0,7	0,7
I_c	Excitation current at full load	A	4,1	3,7	3,4	3,7	4,3	4,2	4,3
Overload						-			
Overload per 20 sec. PRP or 10 sec. COP		%	300						
Heat dissipation		W	19361	21305	22092	23148	23701	24386	25342
Telephone Interference Factor - TIF			<40	<40	<40	<40	<40	<40	<40
Waveform Distors.(THD) full load LL/LN		%	2,6 / 2,6	2,7 / 2,8	2,4 / 2,5	2,5 / 2,5	2,2 / 2,4	2,1 / 2,1	2,2 / 2,2
Waveform Distors.(THD) no load LL/LN		%	2,9 / 2,9	2,5 / 2,6	2,6 / 2,5	2,3 / 2,4	2,4 / 2,5	2,4 / 2,4	2,5 / 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
ECO40 1S4 C	%	89,1	93,3	94,2	94,1	93,9	89,3	93,5	94,4	94,2	93,9	89,2	93,3	94,1	94,0	93,7	89,0	93,1	93,9	93,8	93,5
ECO40 2S4 C	%	89,4	93,5	94,3	94,1	93,9	89,5	93,8	94,6	94,4	94,2	89,4	93,7	94,5	94,2	93,9	89,2	93,5	94,1	93,9	93,7
ECO40 3S4 C	%	90,2	93,7	94,6	94,4	94,3	90,3	93,9	94,8	94,6	94,4	90,1	93,7	94,7	94,5	94,3	89,8	93,4	94,4	94,2	94,0
ECO40 1L4 C	%	90,5	94,0	94,9	94,7	94,5	90,5	94,1	95,0	94,8	94,5	90,3	94,0	94,9	94,6	94,2	90,0	93,8	94,5	94,4	94,2
ECO40 2L4 C	%	91,0	94,1	94,9	94,8	94,6	91,1	94,2	95,1	95,0	94,8	91,1	94,1	94,9	94,7	94,4	90,5	94,0	94,6	94,4	94,2
ECO40 3L4 C	%	91,4	94,1	95,0	94,8	94,6	91,5	94,3	95,2	95,0	94,8	91,3	94,2	95,0	94,7	94,4	90,8	93,8	94,4	94,5	94,4
ECO40 VL4 C	%	91,5	94,2	95,1	94,8	94,5	91,6	94,4	95,3	95,1	94,8	91,4	94,2	95,1	94,9	94,6	90,8	93,7	94,6	94,4	94,2

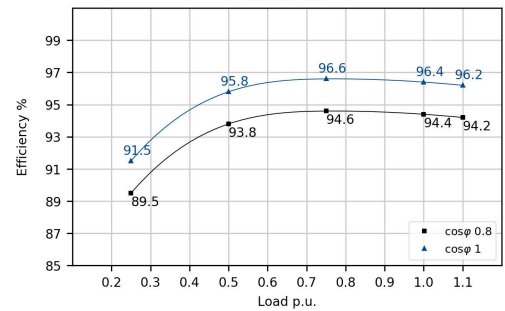
ECO40 1S4 C

400/230 50Hz



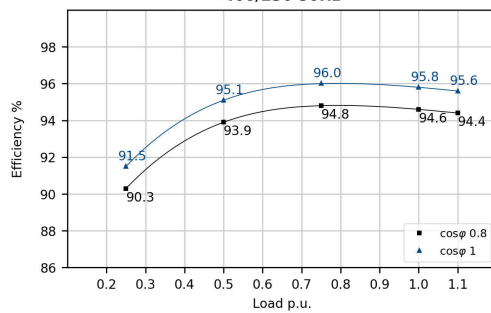
ECO40 2S4 C

400/230 50Hz



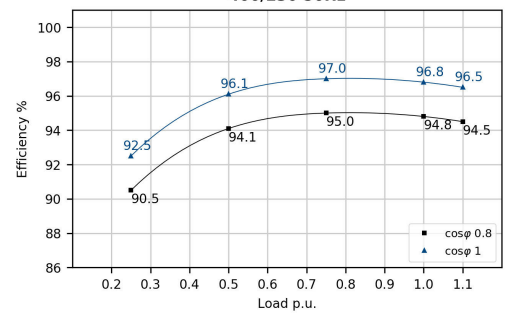
ECO40 3S4 C

400/230 50Hz



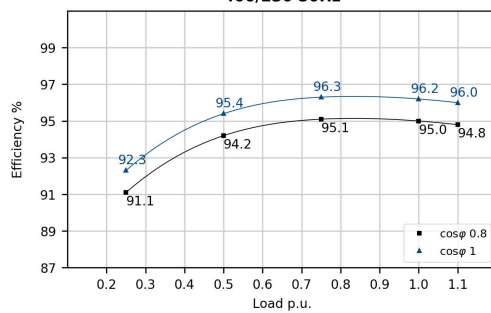
ECO40 1L4 C

400/230 50Hz



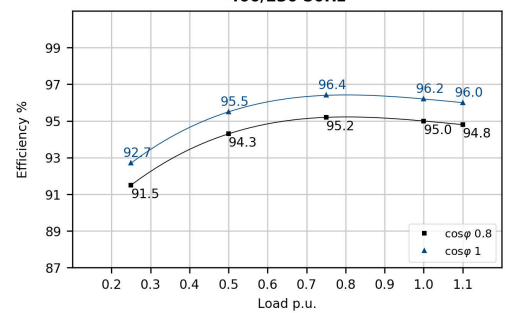
ECO40 2L4 C

400/230 50Hz



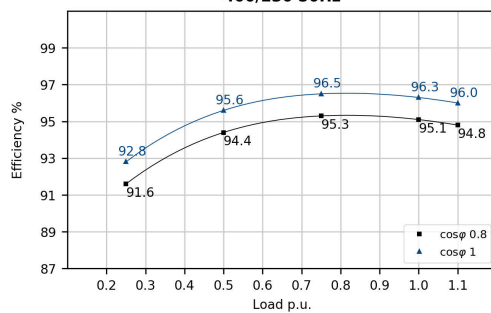
ECO40 3L4 C

400/230 50Hz



ECO40 VL4 C

400/230 50Hz

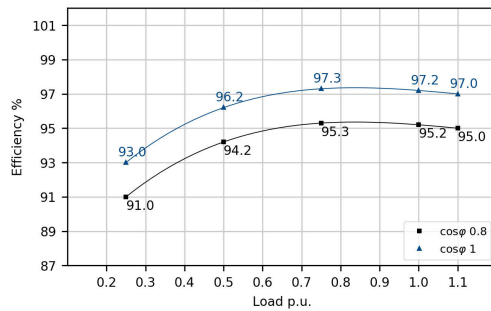


Efficiencies @ 60Hz

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
ECO40 1S4 C	%	90,4	93,3	94,5	94,4	94,2	90,6	93,8	94,9	94,8	94,7	90,8	94,0	95,2	95,1	94,9	91,0	94,2	95,3	95,2	95,0
ECO40 2S4 C	%	90,6	93,5	94,6	94,5	94,3	90,9	94,0	95,1	95,0	94,8	91,1	94,2	95,3	95,2	94,9	91,2	94,4	95,5	95,3	95,0
ECO40 3S4 C	%	90,5	93,9	95,2	95,0	94,7	90,7	94,5	95,5	95,3	95,1	90,9	94,7	95,7	95,5	95,3	91,1	94,9	95,8	95,6	95,3
ECO40 1L4 C	%	91,0	94,7	95,5	95,3	95,1	91,1	94,8	95,7	95,6	95,5	91,1	94,9	95,8	95,7	95,6	91,3	95,1	96,0	95,8	95,6
ECO40 2L4 C	%	92,1	94,8	95,6	95,5	95,1	92,1	94,9	96,0	95,9	95,6	92,2	95,0	96,1	96,0	95,7	92,3	95,2	96,3	96,2	95,9
ECO40 3L4 C	%	91,4	94,8	95,8	95,7	95,3	91,5	95,0	96,1	96,0	95,7	91,7	95,2	96,4	96,2	95,9	92,1	95,5	96,6	96,4	96,0
ECO40 VL4 C	%	91,4	94,8	95,9	95,8	95,4	91,7	95,1	96,3	96,1	95,8	92,0	95,4	96,7	96,5	96,2	92,2	95,6	96,8	96,6	96,1

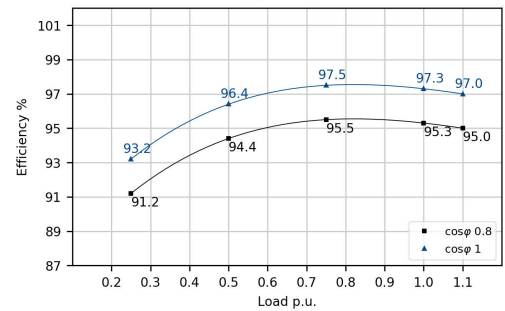
ECO40 1S4 C

480/277 60Hz



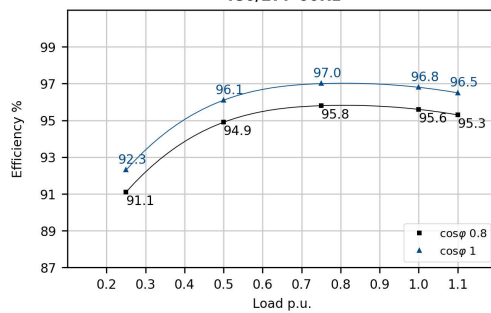
ECO40 2S4 C

480/277 60Hz



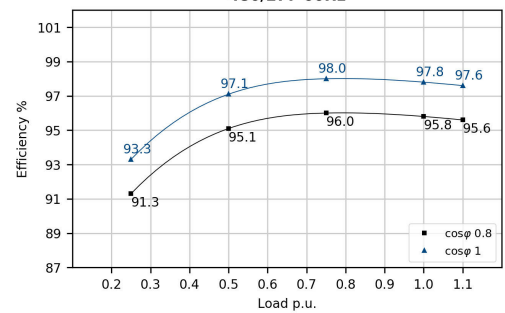
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480/277 60Hz



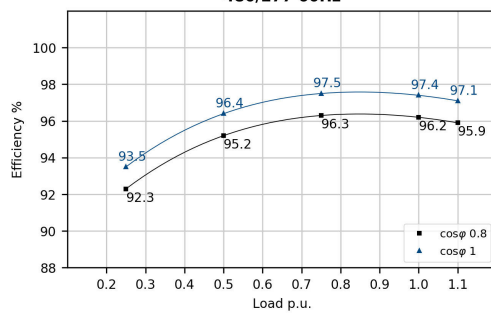
ECO40 1L4 C

480/277 60Hz



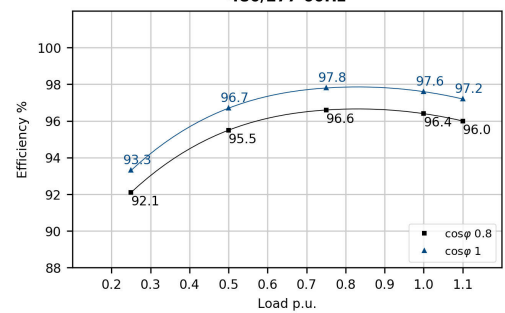
ECO40 2L4 C

480/277 60Hz



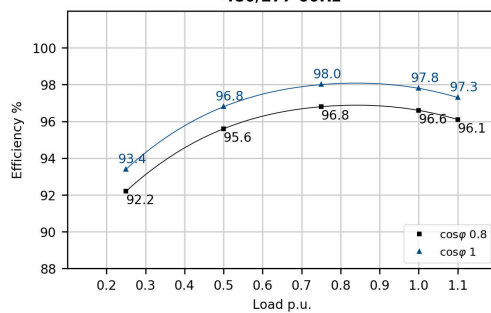
ECO40 3L4 C

480/277 60Hz

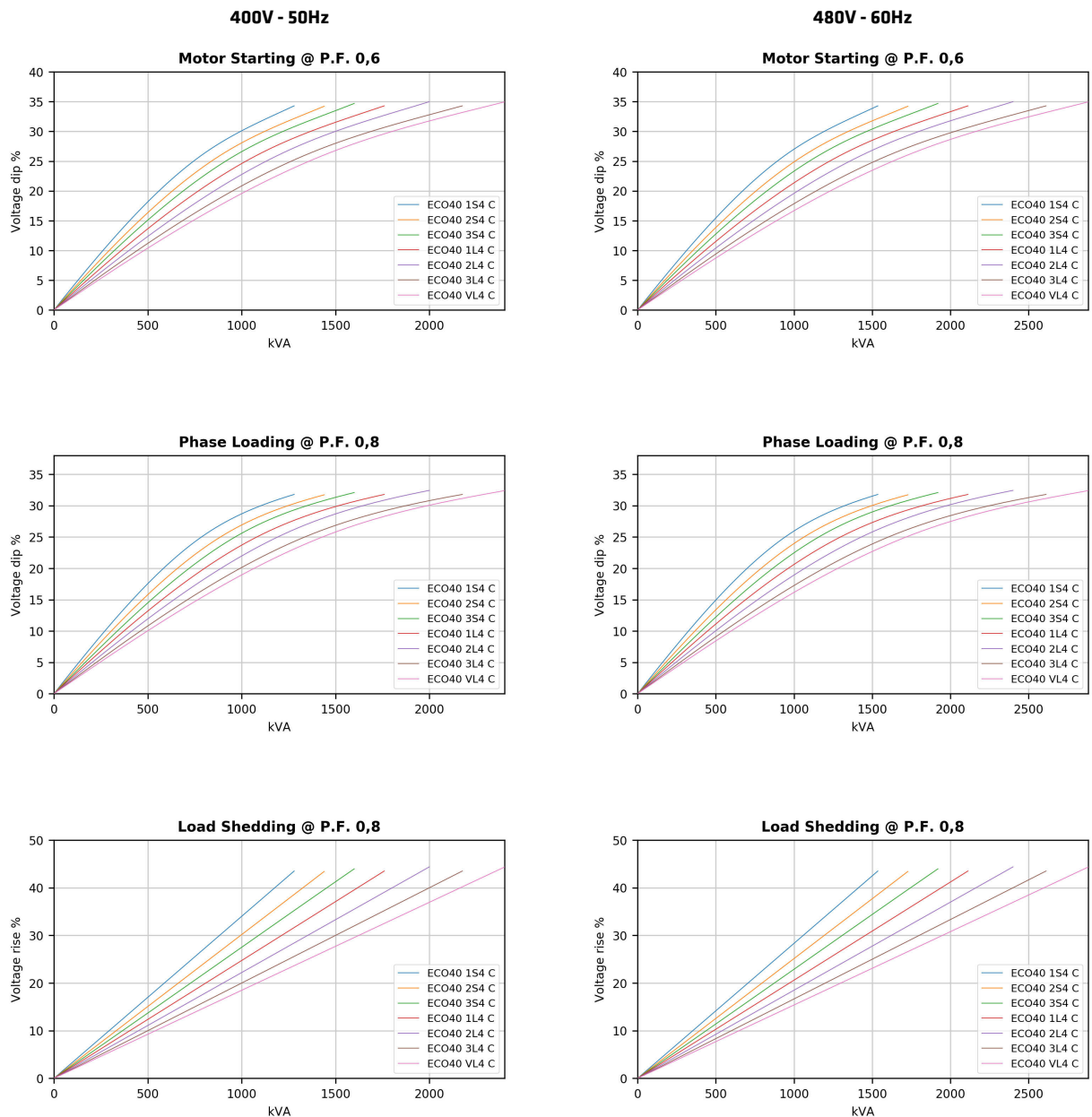


ECO40 VL4 C

480/277 60Hz



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:

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

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):

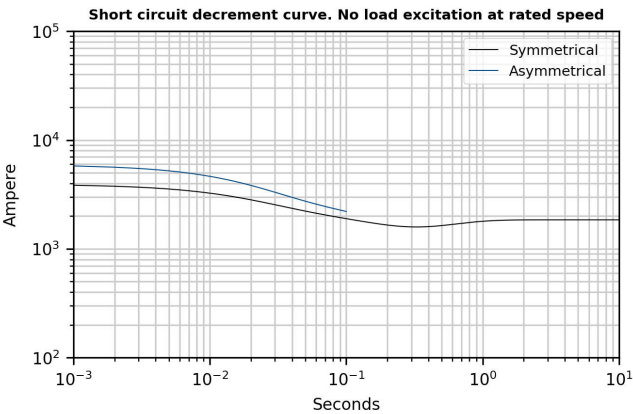
$$VCC = (400/V_{\text{new}})^2 \text{ if } 50 \text{ Hz}; VCC = (480/V_{\text{new}})^2 \text{ if } 60 \text{ Hz}$$

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.).

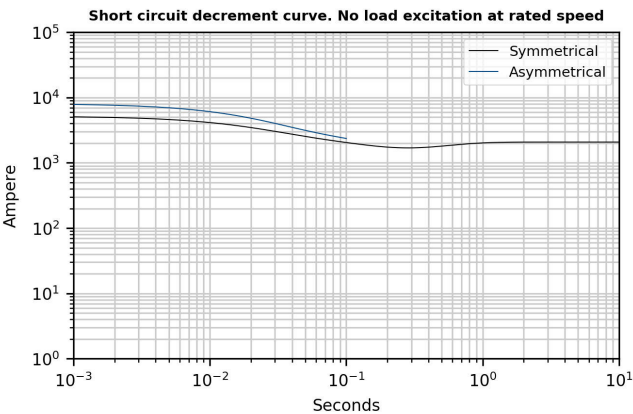
In this example, a 100 kVA load insertion at 415V is equivalent in voltage fall to a 133kVA load insertion at 480V.

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

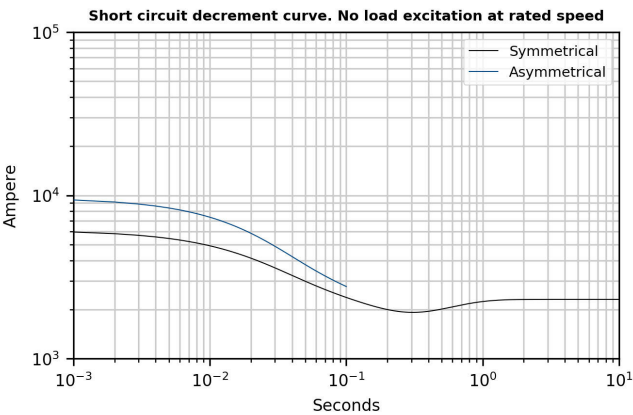
ECO40 1S4 C



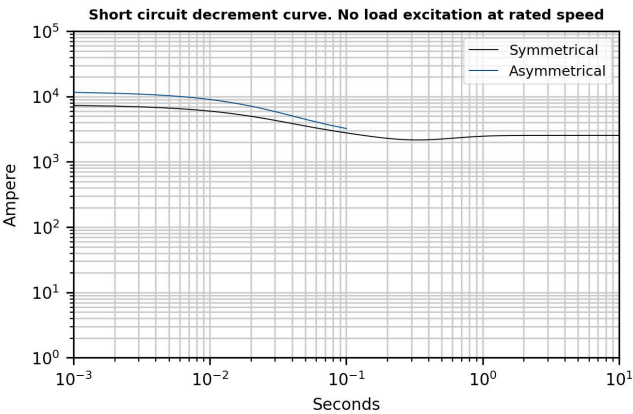
ECO40 2S4 C



ECO40 3S4 C



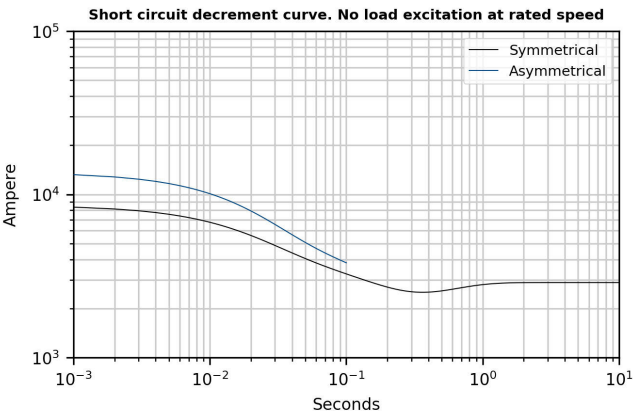
ECO40 1L4 C



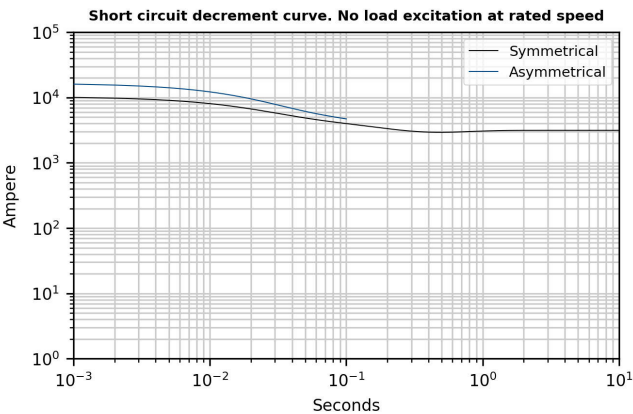
*Please refer to tables at page 6

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

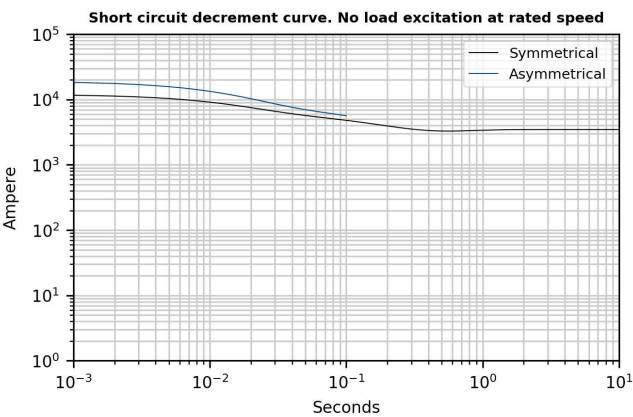
ECO40 2L4 C



ECO40 3L4 C



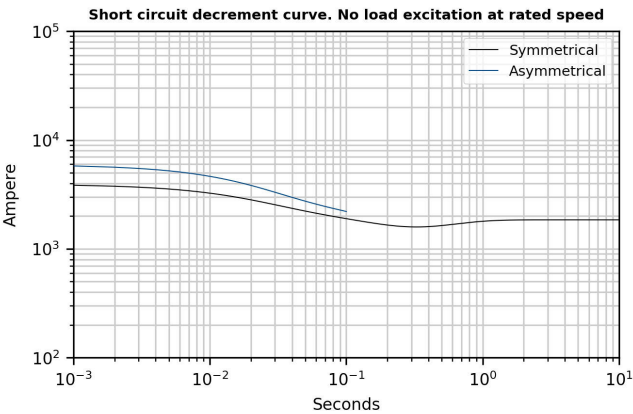
ECO40 VL4 C



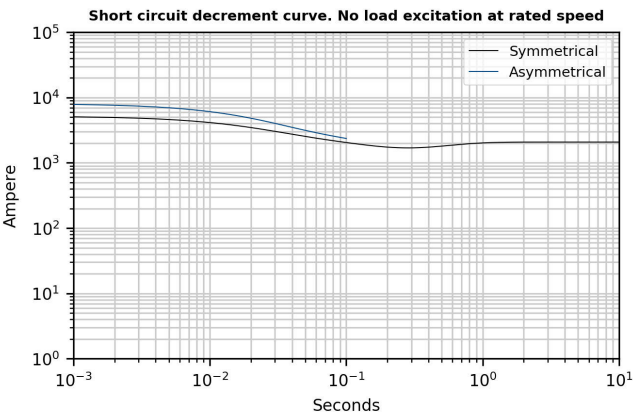
*Please refer to tables at page 6

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

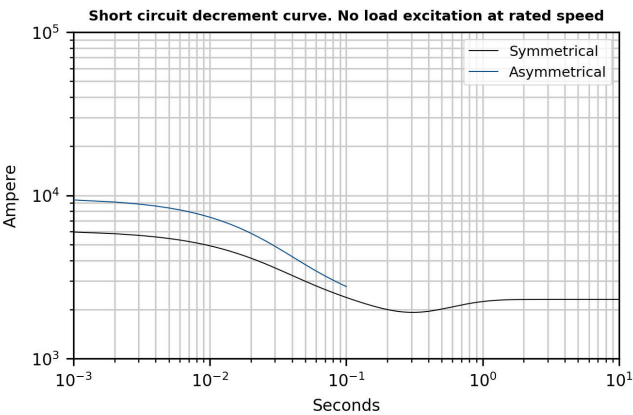
ECO40 1S4 C



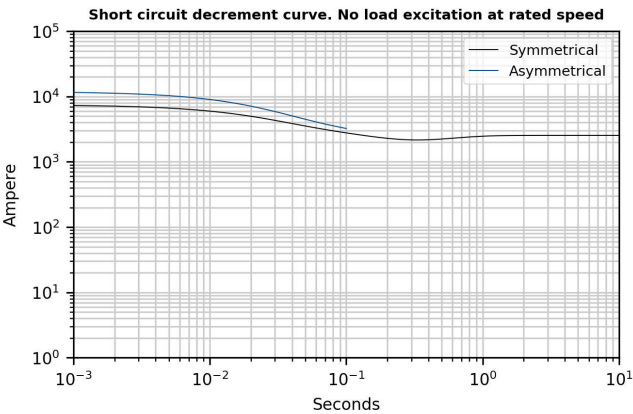
ECO40 2S4 C



ECO40 3S4 C



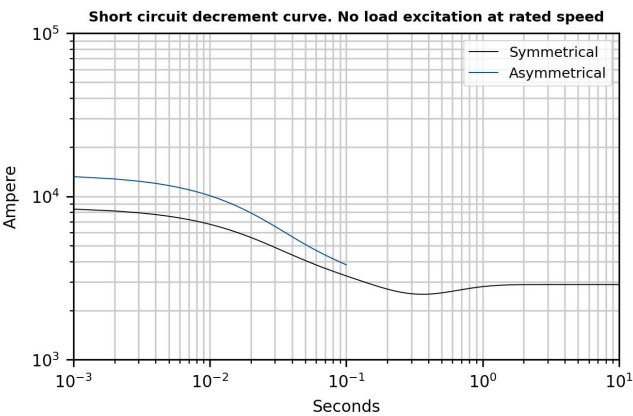
ECO40 1L4 C



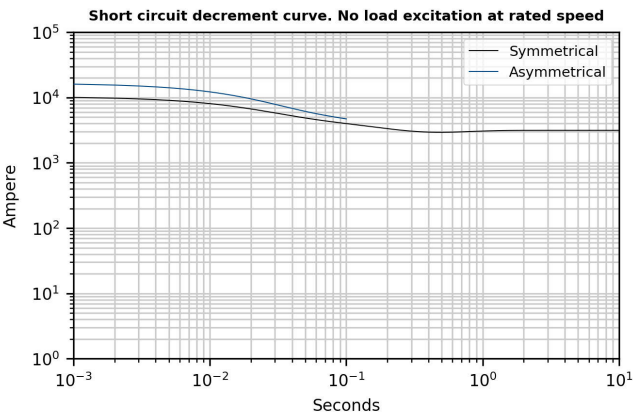
*Please refer to tables at page 6

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

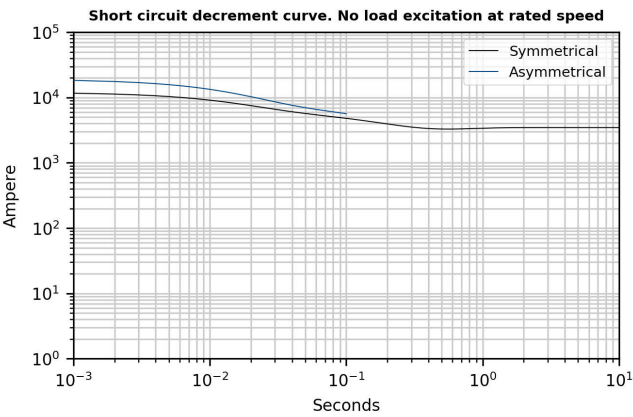
ECO40 2L4 C



ECO40 3L4 C



ECO40 VL4 C

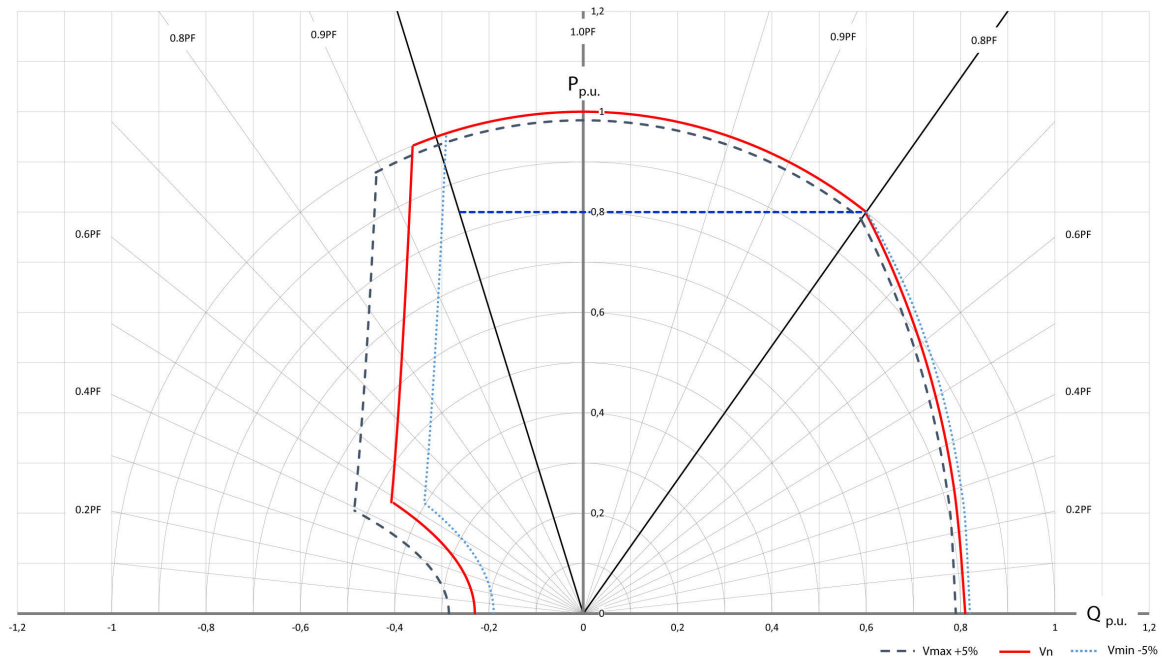


*Please refer to tables at page 6

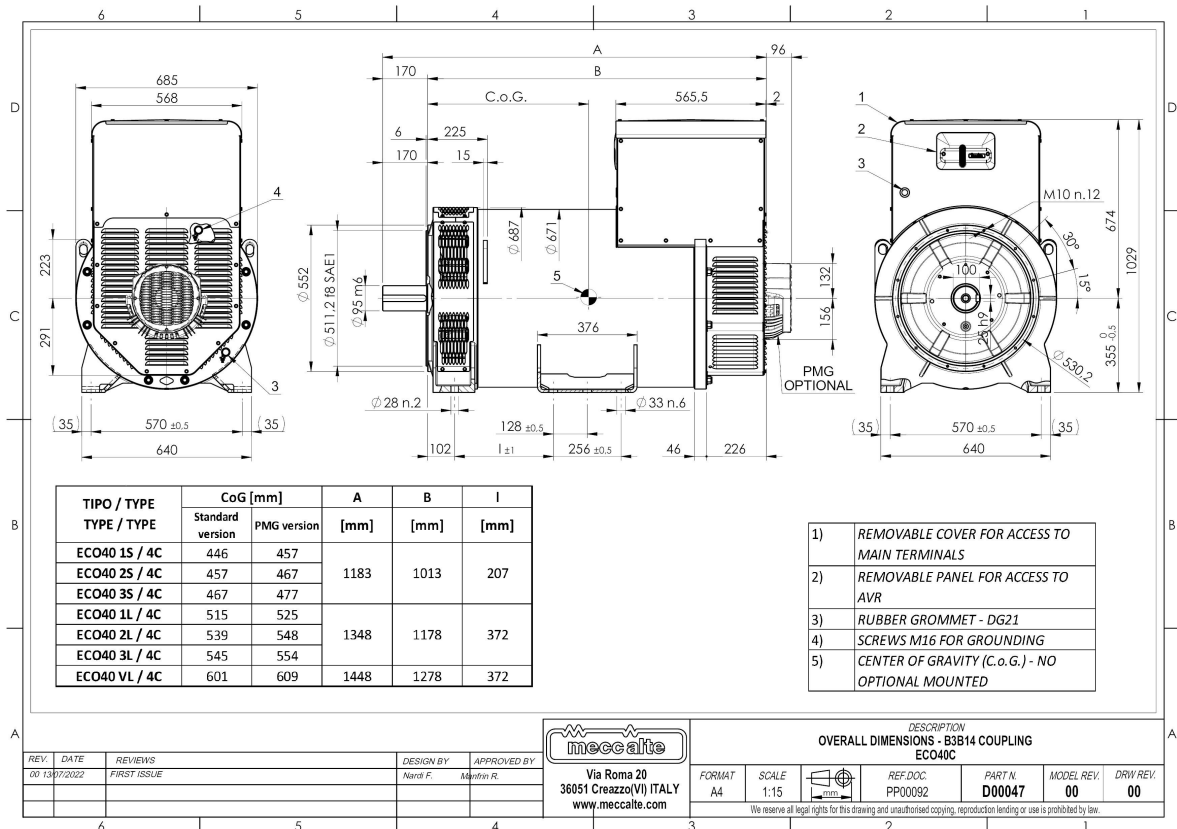
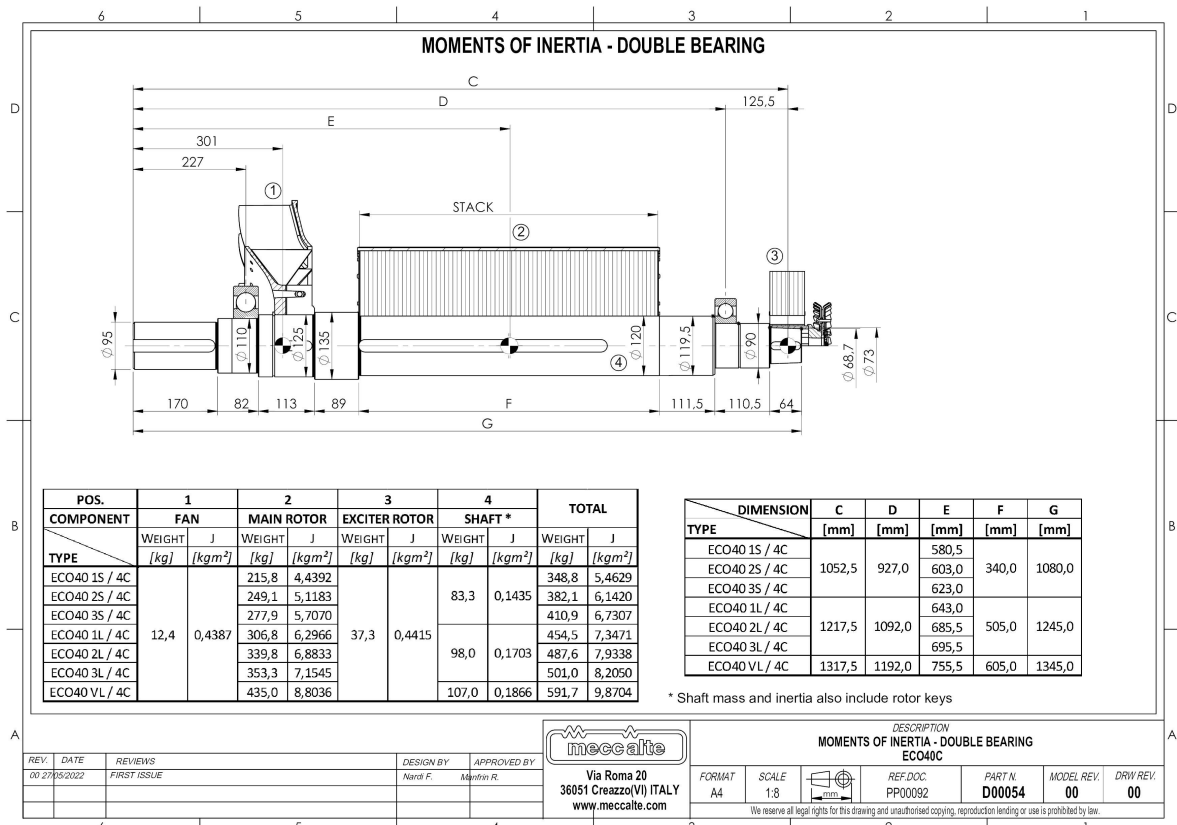
Additional Characteristics

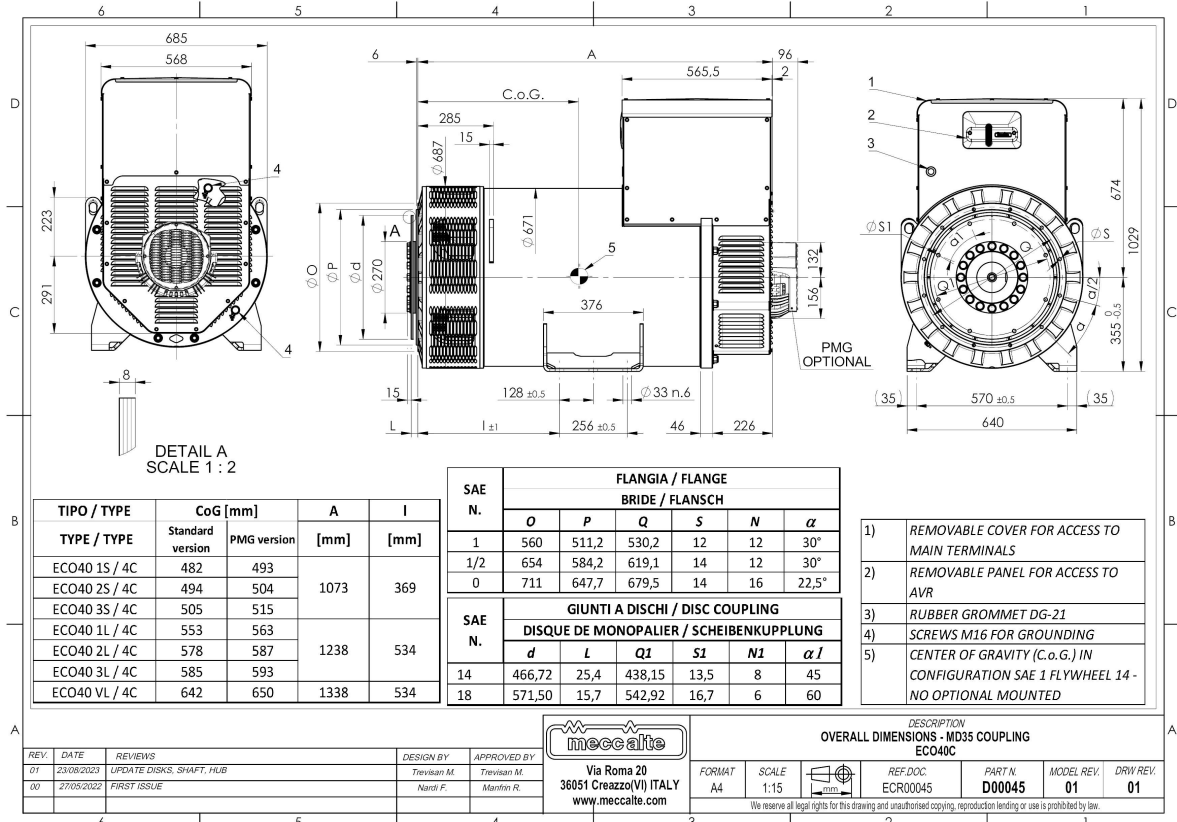
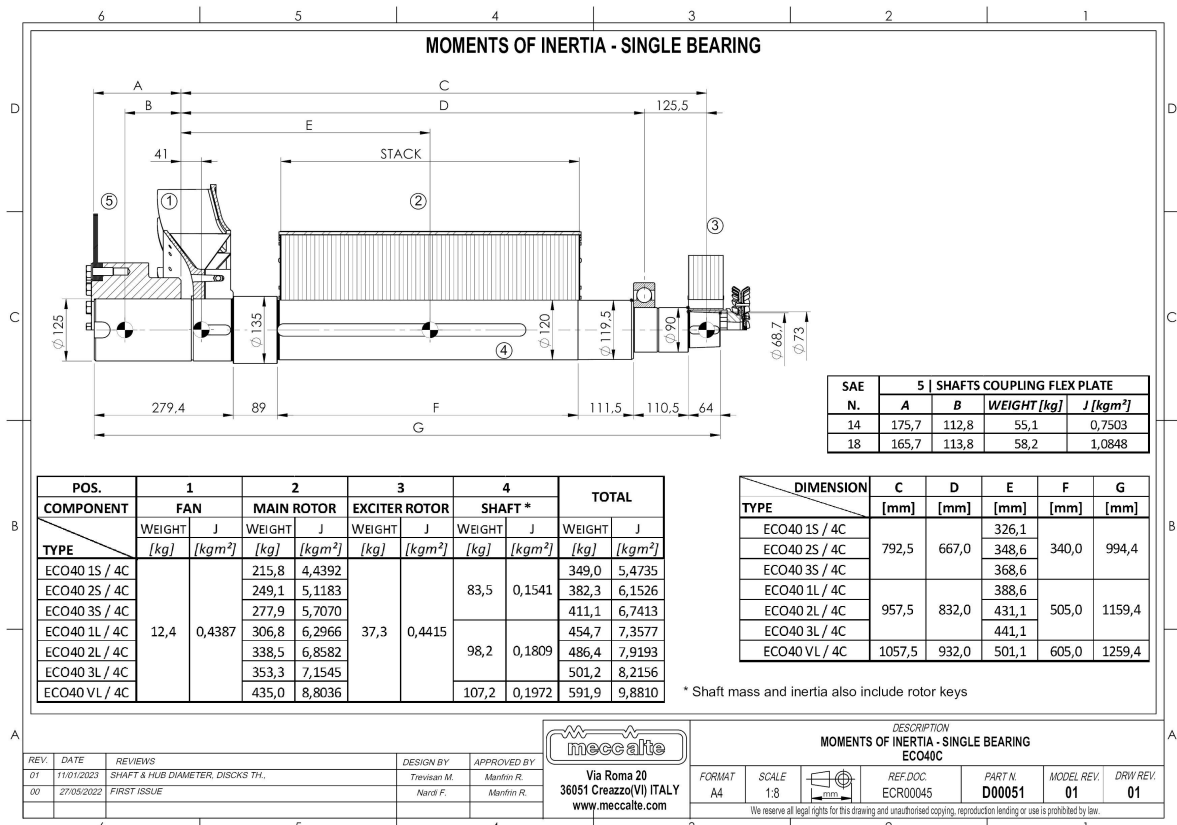
Data		ECO40 1S4 C		ECO40 2S4 C		ECO40 3S4 C		ECO40 1L4 C		ECO40 2L4 C		ECO40 3L4 C		ECO40 VL4 C	
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
Damper cage		Copper													
Single stator coil resistance (20°C)	Ω	0,017		0,013		0,014		0,01		0,0086		0,009		0,008	
Rotor Winding Resistance (20°C)	Ω	4,488		4,881		5,176		6,025		1,376		1,5		1,592	
Stator Exciter Resistance (20°C)	Ω	8,85		8,85		8,85		8,85		8,85		8,85		8,85	
Rotor Exciter Resistance (20°C)	Ω	0,317		0,317		0,317		0,317		0,05		0,05		0,05	
Auxiliary Winding Resistance (20°C)	Ω	0,558		0,521		0,54		0,476		0,55		0,481		0,3	
Weight of complete generator	kg	1049,0		1133,0		1208,0		1323,0		1458,0		1536,0		1752,0	
Unbalanced magnetic pull	kN/mm	5,0		5,9		6,5		6,1		6,5		6,8		6,9	
Air flow	m³/min	54,0	64,8	54,0	64,8	54,0	64,8	54,0	64,8	54,0	64,8	54,0	64,8	54,0	64,8
Noise level at 1m/7m	dB(A)	94/82	98/88	94/82	98/88	94/82	98/88	94/82	98/88	94/82	98/88	94/82	98/88	94/82	98/88

PQ Diagram



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





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