mecc alte

Totally Focused. Totally Independent.

Technical Specification

ECP4 4 C

DDS
Dynamic Data Support

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

Rev. 4

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.

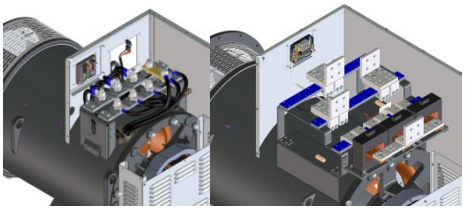
For more information visit: Insulation_System_Guide

Construction

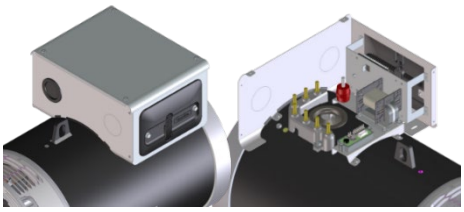
The robust mechanical structure withstands up to 5G in any direction and 9G vertically, and its design allows easy access to connections and components during routine maintenance checks. The mechanical design used the most advanced FEM techniques. The materials used are: DD12 steel for the frame, C45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

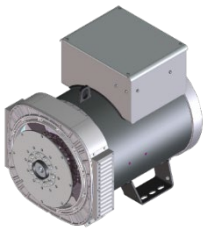
Easy access to the regulators is ensured by a pull-out drawer or drop-down panel to allow for safer adjustment. Large terminal blocks allow easy access of power cables, in the higher power ranges ECO43 and ECO46 terminals allow convenient choice of power cable or busbar connection with input and connection 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

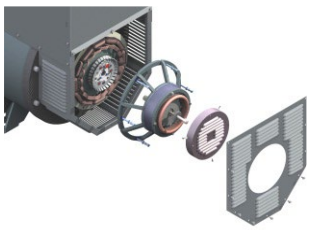
Optional PMG

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



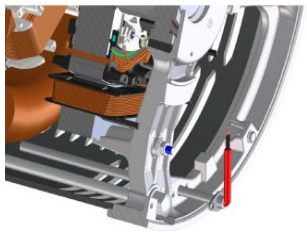
On the ECO 40, 43 and 46 series it is optionally available factory-fitted or retrofitted. On the ECO47 the PMG is standard.

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	6305-2RS
Execution	Brushless	DE Bearing type	-
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
ECP4 1M4 C	**kVA**	7,1	**7,1**	7,1	6	6,8	**6,8**	6,8	5,6	6,5	**6,5**	6,5	5,5	6	**6**	6	5	5,2	**5,2**	5,2	4,4
	kW	5,7	**5,7**	5,7	4,8	5,4	**5,4**	5,4	4,5	5,2	**5,2**	5,2	4,4	4,8	**4,8**	4,8	4	4,2	**4,2**	4,2	3,5
ECP4 2M4 C	**kVA**	8,8	**8,8**	8,8	7,4	8,3	**8,3**	8,3	7	8	**8**	8	6,8	7,5	**7,5**	7,5	6,4	6,4	**6,4**	6,4	5,4
	kW	7	**7**	7	5,9	6,6	**6,6**	6,6	5,6	6,4	**6,4**	6,4	5,4	6	**6**	6	5,1	5,1	**5,1**	5,1	4,3
ECP4 3M4 C	**kVA**	11	**11**	11	10	10,3	**10,3**	10,3	9,3	10	**10**	10	9	9,1	**9,1**	9,1	8,4	8	**8**	8	7,2
	kW	8,8	**8,8**	8,8	8	8,2	**8,2**	8,2	7,4	8	**8**	8	7,2	7,3	**7,3**	7,3	6,7	6,4	**6,4**	6,4	5,8
ECP4 4M4 C	**kVA**	13,7	**13,7**	13,7	12,8	13	**13**	13	11,9	12,5	**12,5**	12,5	11,5	11,6	**11,6**	11,6	10,7	10	**10**	10	9,2
	kW	11	**11**	11	10,2	10,4	**10,4**	10,4	9,5	10	**10**	10	9,2	9,3	**9,3**	9,3	8,6	8	**8**	8	7,4
ECP4 5M4 C	**kVA**	16,5	**16,5**	16,5	15,4	15,4	**15,4**	15,4	14,4	15	**15**	15	14	14,1	**14,1**	14,1	13,2	12	**12**	12	11,2
	kW	13,2	**13,2**	13,2	12,3	12,3	**12,3**	12,3	11,5	12	**12**	12	11,2	11,3	**11,3**	11,3	10,6	9,6	**9,6**	9,6	9
ECP4 1L4 C	**kVA**	20	**20**	20	18,3	18,5	**18,5**	18,5	17	18	**18**	18	16,5	17	**17**	17	15,3	14,4	**14,4**	14,4	13,2
	kW	16	**16**	16	14,6	14,8	**14,8**	14,8	13,6	14,4	**14,4**	14,4	13,2	13,6	**13,6**	13,6	12,2	11,5	**11,5**	11,5	10,6
ECP4 2L4 C	**kVA**	22	**22**	22	20,4	20,5	**20,5**	20,5	19	20	**20**	20	18,5	18,5	**18,5**	18,5	17,5	16	**16**	16	14,8
	kW	17,6	**17,6**	17,6	16,3	16,4	**16,4**	16,4	15,2	16	**16**	16	14,8	14,8	**14,8**	14,8	14	12,8	**12,8**	12,8	11,8

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
ECP4 1M4 C	**kVA**	7,7	8,5	8,5	**8,5**	7,2	8	8	**8**	7	7,8	7,8	**7,8**	6,5	7,2	7,2	**7,2**	5,6	6,2	6,2	**6,2**
	kW	6,2	6,8	6,8	**6,8**	5,8	6,4	6,4	**6,4**	5,6	6,2	6,2	**6,2**	5,2	5,8	5,8	**5,8**	4,5	5	5	**5**
ECP4 2M4 C	**kVA**	9,9	10,5	10,5	**10,5**	9,4	10	10	**10**	9	9,6	9,6	**9,6**	7,5	9	9	**9**	7,2	7,7	7,7	**7,7**
	kW	7,9	8,4	8,4	**8,4**	7,5	8	8	**8**	7,2	7,7	7,7	**7,7**	6	7,2	7,2	**7,2**	5,8	6,2	6,2	**6,2**
ECP4 3M4 C	**kVA**	11,5	12,4	13,2	**13,2**	10,7	11,6	12,4	**12,4**	10,5	11,3	12	**12**	9,5	10	10,9	**10,9**	8,4	9	9,6	**9,6**
	kW	9,2	9,9	10,6	**10,6**	8,6	9,3	9,9	**9,9**	8,4	9	9,6	**9,6**	7,6	8	8,7	**8,7**	6,7	7,2	7,7	**7,7**
ECP4 4M4 C	**kVA**	14,3	15,3	16,5	**16,5**	13,3	14,3	15,5	**15,5**	13	13,9	15	**15**	12	12,5	13,9	**13,9**	10,4	11,1	12	**12**
	kW	11,4	12,2	13,2	**13,2**	10,6	11,4	12,4	**12,4**	10,4	11,1	12	**12**	9,6	10	11,1	**11,1**	8,3	8,9	9,6	**9,6**
ECP4 5M4 C	**kVA**	17	18,1	19,8	**19,8**	15,9	16,8	18,5	**18,5**	15,4	16,4	18	**18**	14,6	15,4	16,8	**16,8**	12,4	13,1	14,4	**14,4**
	kW	13,6	14,5	15,8	**15,8**	12,7	13,4	14,8	**14,8**	12,3	13,1	14,4	**14,4**	11,7	12,3	13,4	**13,4**	9,9	10,5	11,5	**11,5**
ECP4 1L4 C	**kVA**	20,6	21,7	24	**24**	19	20	22,2	**22,2**	18,5	19,5	22	**22**	17	19	20,2	**20,2**	14,8	15,6	17,6	**17,6**
	kW	16,5	17,4	19,2	**19,2**	15,2	16	17,8	**17,8**	14,8	15,6	17,6	**17,6**	13,6	15,2	16,2	**16,2**	11,8	12,5	14,1	**14,1**
ECP4 2L4 C	**kVA**	23	25,3	26,4	**26,4**	22	24	24,6	**24,6**	21	23	24	**24**	19	20	22	**22**	16,8	18,4	19,2	**19,2**
	kW	18,4	20,2	21,1	**21,1**	17,2	18,9	19,7	**19,7**	16,8	18,4	19,2	**19,2**	15,2	16	17,6	**17,6**	13,4	14,7	15,4	**15,4**

Reactance & Time constants- Class H / 400V

Unsaturated (ref. EN60034-4)			ECP4 1M4 C	ECP4 2M4 C	ECP4 3M4 C	ECP4 4M4 C	ECP4 5M4 C	ECP4 1L4 C	ECP4 2L4 C
Xd	Direct-axis synchronous reactance	%	163	177,3	181	216	145,1	150,9	153,8
X'd	Direct-axis transient reactance	%	16	16	16,3	21,6	14,5	15,3	15,6
X"d	Direct-axis subtransient reactance	%	13,5	11,5	11,7	15,3	10,2	10,5	10,7
Xq	Quadrature-axis synchronous reactance	%	57,2	58,5	59,8	69,1	72,4	83,8	85,4
X'q	Quadrature-axis transient reactance	%	57,2	58,5	59,8	69,1	72,4	83,8	85,4
X"q	Quadrature-axis subtransient reactance	%	65,6	62,6	63,9	80,3	54	55,8	56,9
X_2	Negative-sequence reactance	%	14,9	15,8	16,1	18,4	17,3	18,3	18,7
X_0	Zero sequence reactance	%	5,88	5,51	5,6	6	5,8	5,8	5,9
Saturated									
Xd	Direct-axis synchronous reactance	%	138,5	150,7	153,8	183,6	123,3	128,3	130,7
X'd	Direct-axis transient reactance	%	13,6	13,6	13,9	18,4	12,3	13	13,3
X"d	Direct-axis subtransient reactance	%	11,5	9,78	9,94	13	8,67	8,92	9,09
Xq	Quadrature-axis synchronous reactance	%	48,6	49,7	50,8	58,7	61,5	71,2	72,6
X'q	Quadrature-axis transient reactance	%	48,6	49,7	50,8	58,7	61,5	71,2	72,6
X"q	Quadrature-axis subtransient reactance	%	55,8	53,2	54,3	68,3	45,9	47,4	48,4
X_2	Negative-sequence reactance	%	12,7	13,4	13,7	15,6	14,7	15,6	15,9
X_0	Zero sequence reactance	%	5,88	5,51	5,6	6	5,8	5,8	5,9
Kcc	Short circuit ratio		0,72	0,66	0,65	0,54	0,81	0,78	0,77
T'd	Transient time constant	sec	0,024	0,016	0,016	0,035	0,045	0,044	0,045
T"d	Subtransient time constant	sec	0,024	0,01	0,011	0,013	0,009	0,01	0,011
T'do	Open circuit time constant	sec	0,25	0,18	0,18	0,35	0,45	0,43	0,44
Ta	Armature time constant	sec	0,004	0,005	0,006	0,007	0,007	0,008	0,009

Additional information - Class H / 400V

Io	Excitation current at no load	A	0,4	0,4	0,4	0,4	0,4	0,4	0,5
Ic	Excitation current at full load	A	1,7	1,6	1,5	1,6	1,7	1,6	1,9
Overload						-			
Overload per 20 sec. PRP or 10 sec. COP		%				300			
Heat dissipation		W	868	1033	1259	1534	1793	2133	2328
Telephone Harmonic Factor - THF		%	<2	<2	<2	<2	<2	<2	<2
Waveform Distors.(THD) full load LL/LN		%	2,1 / 2,2	2,1 / 2,2	2,1 / 2,2	2,3 / 2,1	2,2 / 2,3	2,4 / 2,1	2,9 / 2,7
Waveform Distors.(THD) no load LL/LN		%	2,4 / 2,3	2,4 / 2,3	2,4 / 2,3	2,2 / 2,3	2,2 / 2,4	2,5 / 2,5	2,4 / 2,1

Reactance & Time constants- Class H / 480V

Unsaturated (ref. EN60034-4)			ECP4 1M4 C	ECP4 2M4 C	ECP4 3M4 C	ECP4 4M4 C	ECP4 5M4 C	ECP4 1L4 C	ECP4 2L4 C
Xd	Direct-axis synchronous reactance	%	163	177,3	181	216	145,1	153,7	153,8
X'd	Direct-axis transient reactance	%	16	16	16,3	21,6	14,5	15,6	15,6
X"d	Direct-axis subtransient reactance	%	13,5	11,5	11,7	15,3	10,2	10,7	10,7
Xq	Quadrature-axis synchronous reactance	%	57,2	58,5	59,8	69,1	72,4	85,4	85,4
X'q	Quadrature-axis transient reactance	%	57,2	58,5	59,8	69,1	72,4	85,4	85,4
X"q	Quadrature-axis subtransient reactance	%	65,6	62,6	63,9	80,3	54	56,8	56,9
X_2	Negative-sequence reactance	%	14,9	15,8	16,1	18,4	17,3	18,6	18,7
X_0	Zero sequence reactance	%	5,88	5,51	5,6	6	5,8	5,91	5,9
Saturated									
Xd	Direct-axis synchronous reactance	%	138,5	150,7	153,8	183,6	123,3	127,6	130,7
X'd	Direct-axis transient reactance	%	13,6	13,6	13,9	18,4	12,3	12,9	13,3
X"d	Direct-axis subtransient reactance	%	11,5	9,78	9,94	13	8,67	8,88	9,09
Xq	Quadrature-axis synchronous reactance	%	48,6	49,7	50,8	58,7	61,5	70,9	72,6
X'q	Quadrature-axis transient reactance	%	48,6	49,7	50,8	58,7	61,5	70,9	72,6
X"q	Quadrature-axis subtransient reactance	%	55,8	53,2	54,3	68,3	45,9	47,1	48,4
X_2	Negative-sequence reactance	%	12,7	13,4	13,7	15,6	14,7	15,4	15,9
X_0	Zero sequence reactance	%	5,88	5,51	5,6	6	5,8	5,91	5,9
Kcc	Short circuit ratio		0,72	0,66	0,65	0,54	0,81	0,78	0,77
T'd	Transient time constant	sec	0,024	0,016	0,016	0,035	0,045	0,044	0,045
T"d	Subtransient time constant	sec	0,024	0,01	0,011	0,013	0,009	0,01	0,011
T'do	Open circuit time constant	sec	0,25	0,18	0,18	0,35	0,45	0,43	0,44
Ta	Armature time constant	sec	0,004	0,005	0,006	0,007	0,007	0,008	0,009

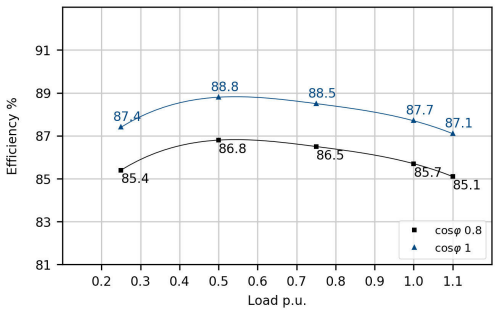
Additional information - Class H / 480V

Io	Excitation current at no load	A	0,4	0,4	0,4	0,4	0,4	0,4	0,5
Ic	Excitation current at full load	A	1,7	1,6	1,5	1,6	1,7	1,6	1,9
Overload						-			
Overload per 20 sec. PRP or 10 sec. COP		%				300			
Heat dissipation		W	966	1158	1409	1699	1927	2310	2325
Telephone Interferance Factor - TIF			<45	<45	<45	<45	<45	<45	<45
Waveform Distors.(THD) full load LL/LN		%	2,1 / 2,2	2,1 / 2,2	2,1 / 2,2	2,3 / 2,1	2,2 / 2,3	2,4 / 2,1	2,9 / 2,7
Waveform Distors.(THD) no load LL/LN		%	2,4 / 2,3	2,4 / 2,3	2,4 / 2,3	2,2 / 2,3	2,2 / 2,4	2,5 / 2,5	2,4 / 2,1

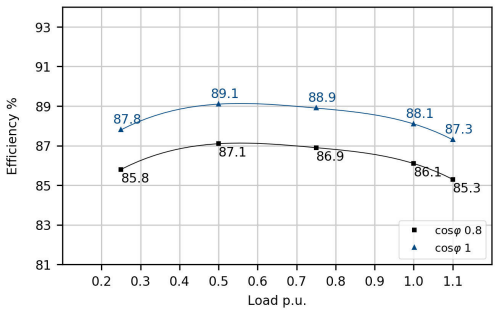
Efficiencies @ 50Hz

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
ECP4 1M4 C	%	85,2	86,9	86,6	86,0	85,4	85,4	86,8	86,5	85,7	85,1	85,6	86,8	86,6	86,0	85,4	85,1	86,5	86,2	85,6	85,3
ECP4 2M4 C	%	85,6	87,2	87,0	86,4	85,6	85,8	87,1	86,9	86,1	85,3	86,0	87,1	87,0	86,4	85,6	85,5	86,8	86,6	86,0	85,3
ECP4 3M4 C	%	86,0	87,7	87,6	86,7	86,1	86,2	87,6	87,5	86,4	85,8	86,4	87,6	87,6	86,7	86,1	85,9	87,3	87,3	86,5	85,8
ECP4 4M4 C	%	86,7	88,2	88,0	87,0	86,4	86,9	88,1	87,9	86,7	86,1	87,1	88,1	88,0	87,0	86,4	86,6	87,8	87,7	86,8	86,1
ECP4 5M4 C	%	87,1	88,8	88,7	87,6	87,0	87,7	88,6	88,2	87,0	86,4	87,9	88,5	88,3	87,2	86,6	87,4	88,2	88,0	87,0	86,3
ECP4 1L4 C	%	88,2	89,0	88,5	87,4	86,8	88,4	88,9	88,4	87,1	86,5	88,6	88,9	88,5	87,4	86,8	89,1	89,2	88,8	87,6	87,1
ECP4 2L4 C	%	88,4	89,2	88,6	87,6	86,8	88,6	89,3	88,5	87,3	86,5	88,8	89,3	88,8	87,6	86,8	89,3	89,4	88,9	87,8	87,1

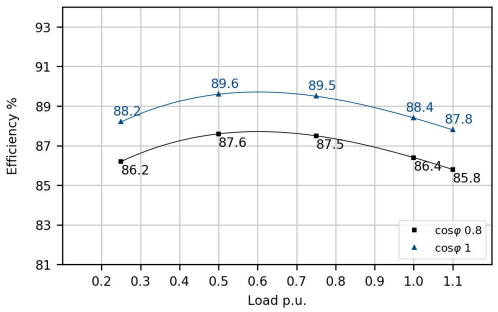
ECP4 1M4 C
400/230 50Hz



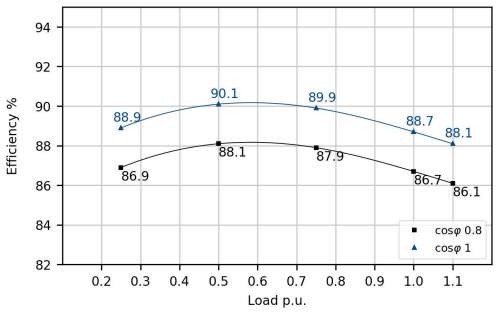
ECP4 2M4 C
400/230 50Hz



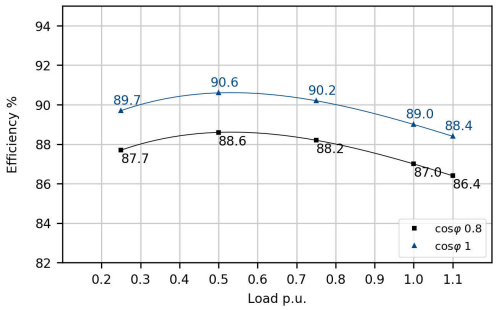
ECP4 3M4 C
400/230 50Hz



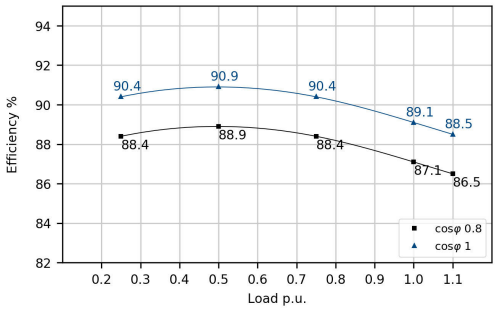
ECP4 4M4 C
400/230 50Hz



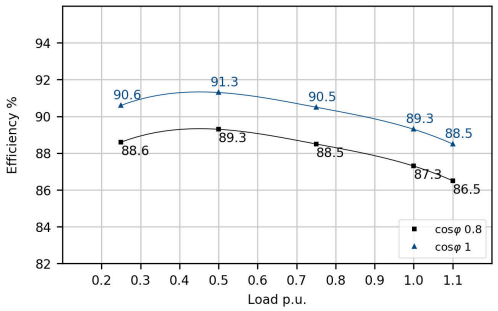
ECP4 5M4 C
400/230 50Hz



ECP4 1L4 C
400/230 50Hz



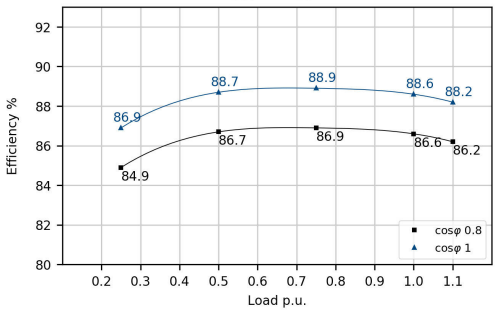
ECP4 2L4 C
400/230 50Hz



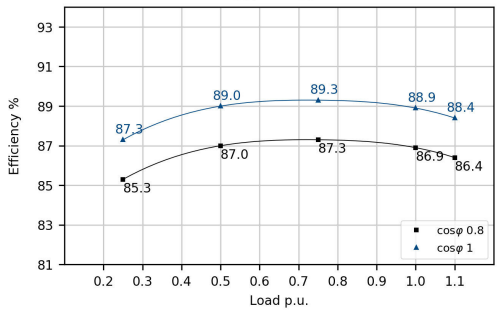
Efficiencies @ 60Hz

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
ECP4 1M4 C	%	84,9	86,8	87,1	86,7	86,2	85,1	86,8	86,7	86,4	86,0	84,8	86,6	87,0	86,7	86,3	84,9	86,7	86,9	86,6	86,2
ECP4 2M4 C	%	85,3	87,1	87,5	87,0	86,4	85,5	87,1	87,1	86,7	86,2	85,2	86,9	87,4	87,0	86,5	85,3	87,0	87,3	86,9	86,4
ECP4 3M4 C	%	85,7	87,6	88,1	87,3	86,9	85,9	87,6	87,7	87,0	86,7	85,6	87,4	88,0	87,3	87,0	85,7	87,5	87,9	87,2	86,9
ECP4 4M4 C	%	86,4	88,3	88,6	87,7	87,3	86,6	88,3	88,3	87,4	87,1	86,3	88,1	88,5	87,7	87,4	86,4	88,2	88,4	87,6	87,3
ECP4 5M4 C	%	87,2	89,0	89,6	88,9	88,5	87,7	89,0	88,8	87,8	87,5	86,8	88,4	89,0	88,3	88,0	87,1	88,7	88,8	88,2	87,9
ECP4 1L4 C	%	87,5	88,9	89,1	88,5	88,1	87,6	88,9	88,8	88,2	87,9	87,3	88,7	89,0	88,5	88,2	87,4	88,8	88,9	88,4	88,1
ECP4 2L4 C	%	89,4	90,0	90,0	89,3	88,7	89,7	90,1	89,7	89,0	88,4	89,1	89,8	89,9	89,3	88,8	89,0	89,9	89,8	89,2	88,7

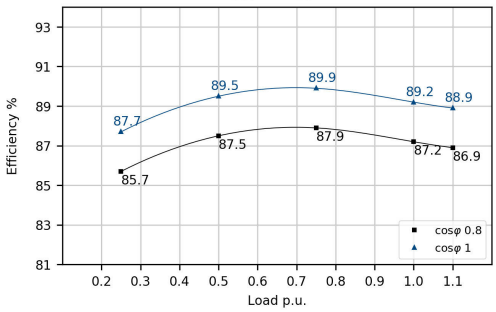
ECP4 1M4 C
480/277 60Hz



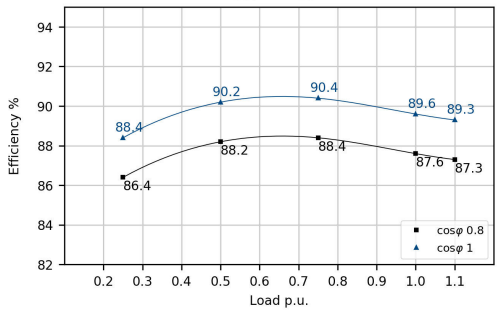
ECP4 2M4 C
480/277 60Hz



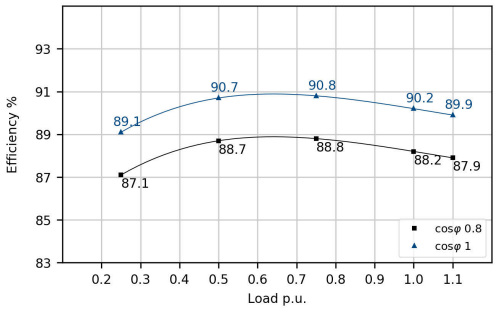
ECP4 3M4 C
480/277 60Hz



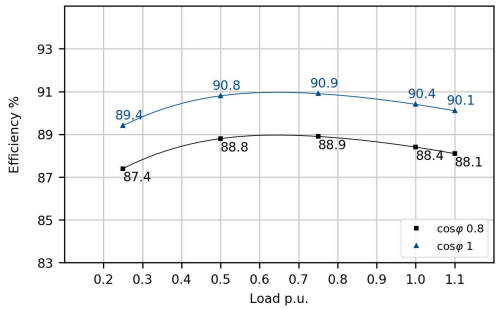
ECP4 4M4 C
480/277 60Hz



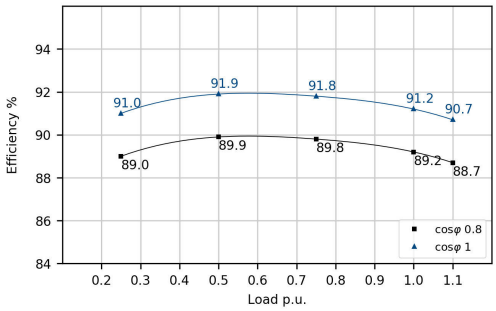
ECP4 5M4 C
480/277 60Hz



ECP4 1L4 C
480/277 60Hz



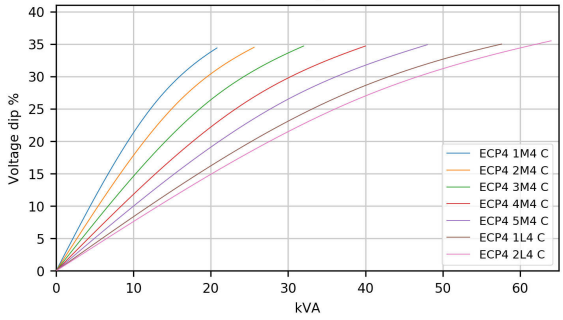
ECP4 2L4 C
480/277 60Hz



Transients voltage

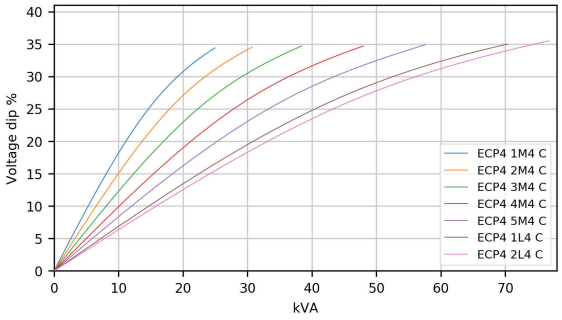
400V - 50Hz

Motor Starting @ P.F. 0,6

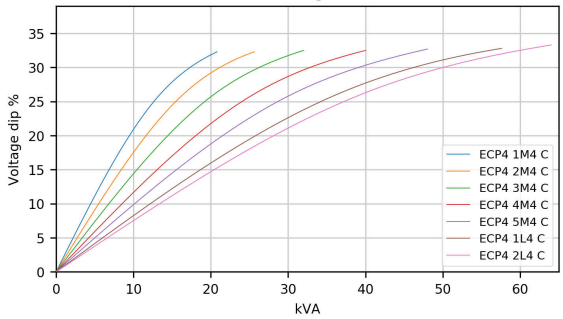


480V - 60Hz

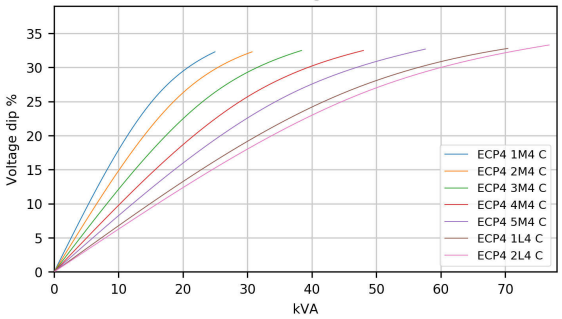
Motor Starting @ P.F. 0,6



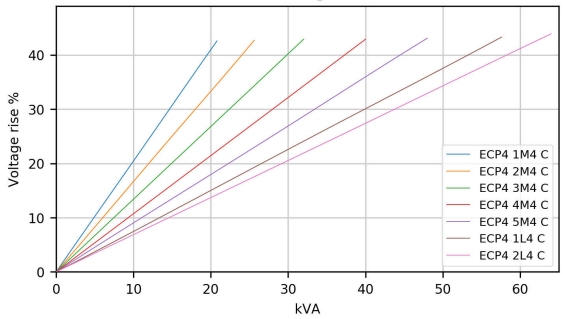
Phase Loading @ P.F. 0,8



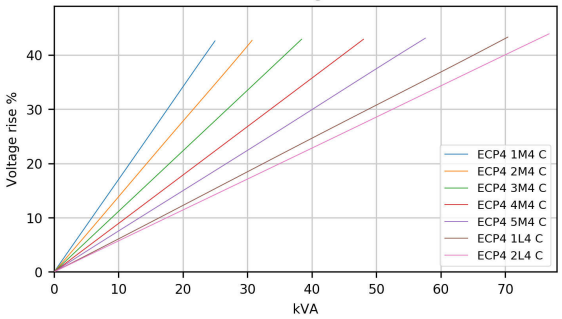
Phase Loading @ P.F. 0,8



Load Shedding @ P.F. 0,8



Load Shedding @ P.F. 0,8



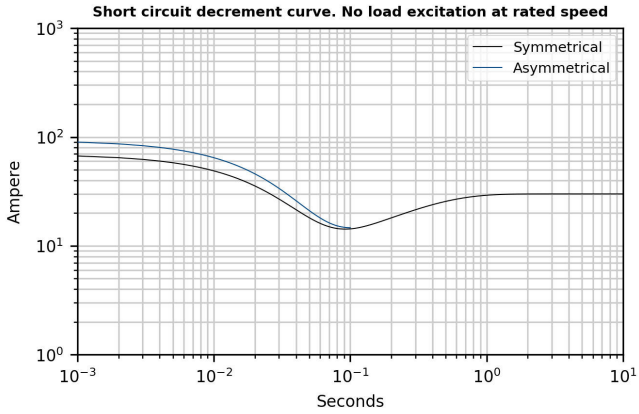
In order to scale transient curves as a function of a power factor or voltage if not indicated, please proceed as follows:

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.

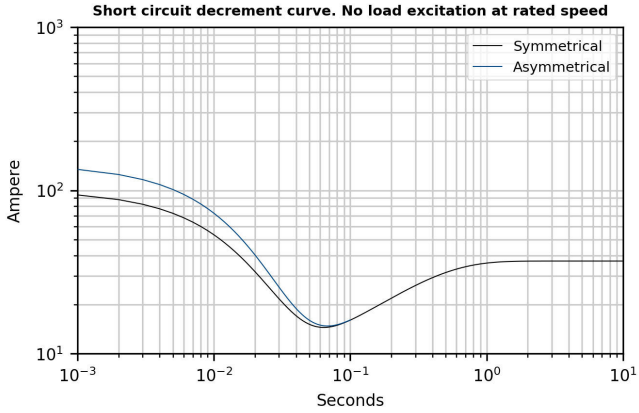
Voltage coefficient corrector (VCC):
VCC=(400/Vnew)2 if 50 Hz; VCC=(480/Vnew)2 if 60 Hz
Example. VCC at 415V 60 Hz is 1.338 [VCC=(480/415)^2]. This means that the voltage fall at a given power at 415V is equivalent to the one that can be read on the power factor 0.6 curve if the load is considered 1.338 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

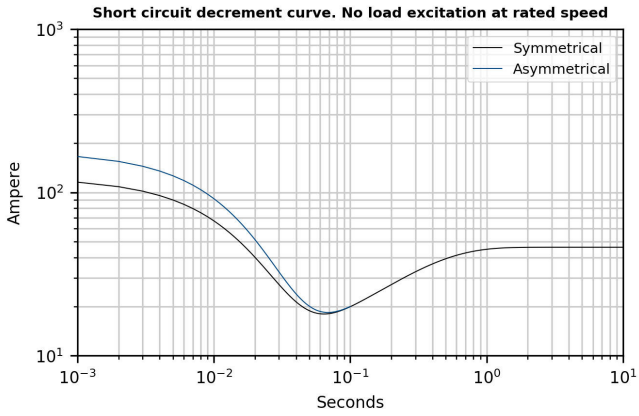
ECP4 1M4 C



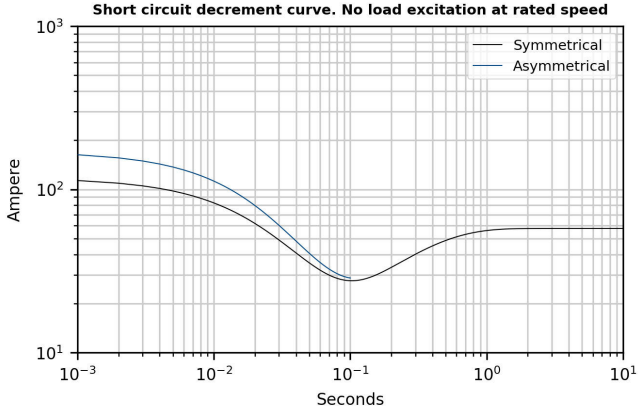
ECP4 2M4 C



ECP4 3M4 C



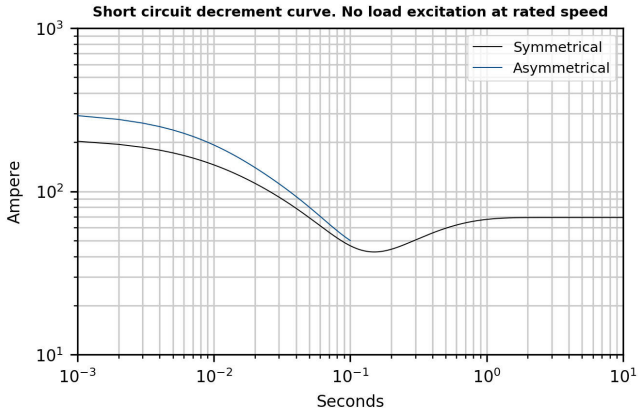
ECP4 4M4 C



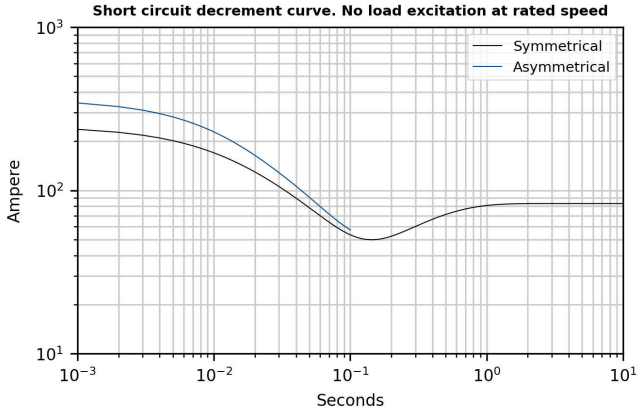
*Please refer to tables at page 6

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

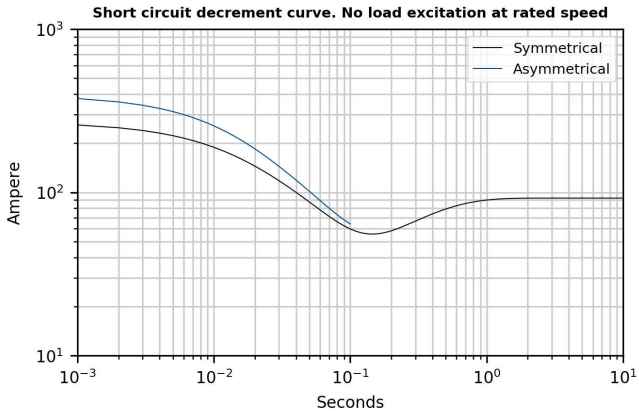
ECP4 5M4 C



ECP4 1L4 C



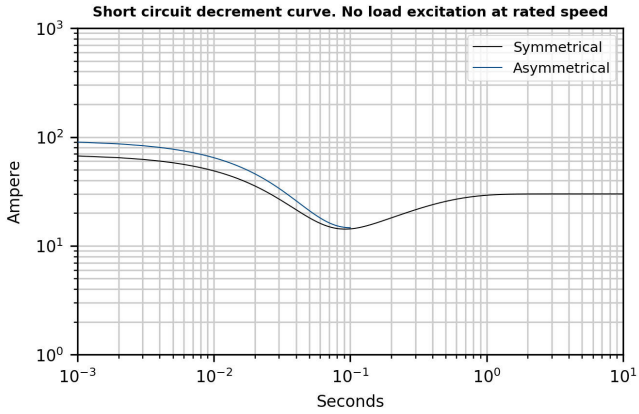
ECP4 2L4 C



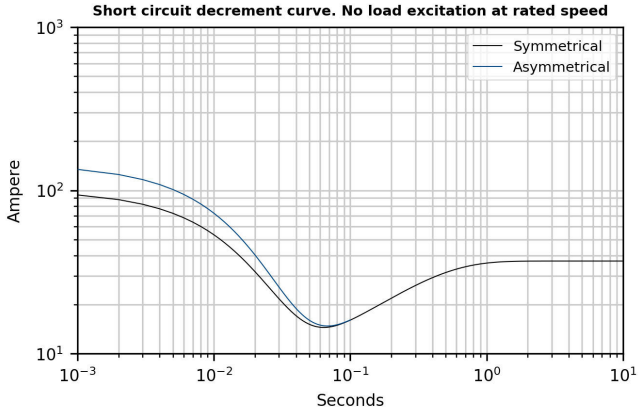
*Please refer to tables at page 6

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

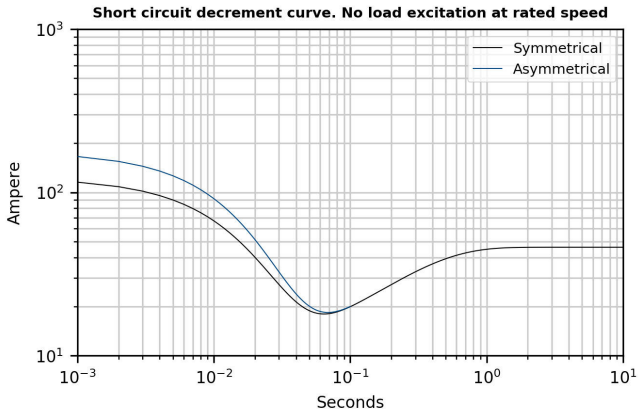
ECP4 1M4 C



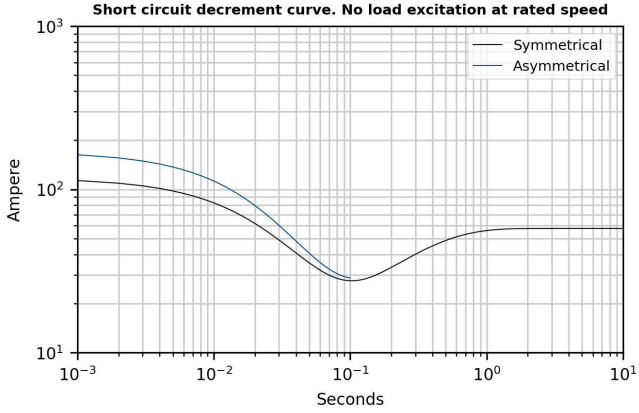
ECP4 2M4 C



ECP4 3M4 C



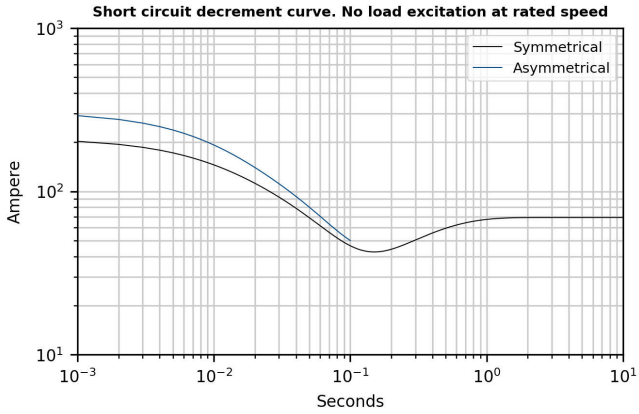
ECP4 4M4 C



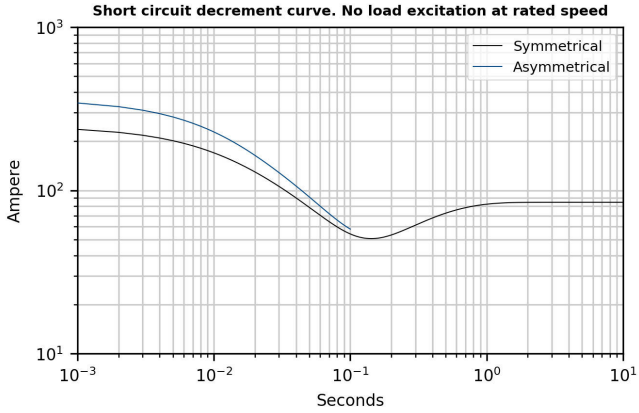
*Please refer to tables at page 6

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

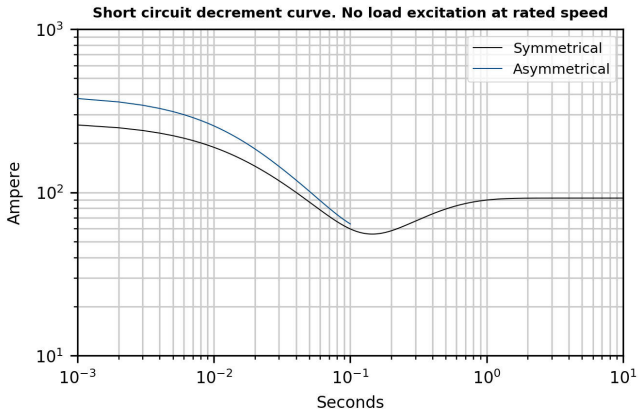
ECP4 5M4 C



ECP4 1L4 C



ECP4 2L4 C

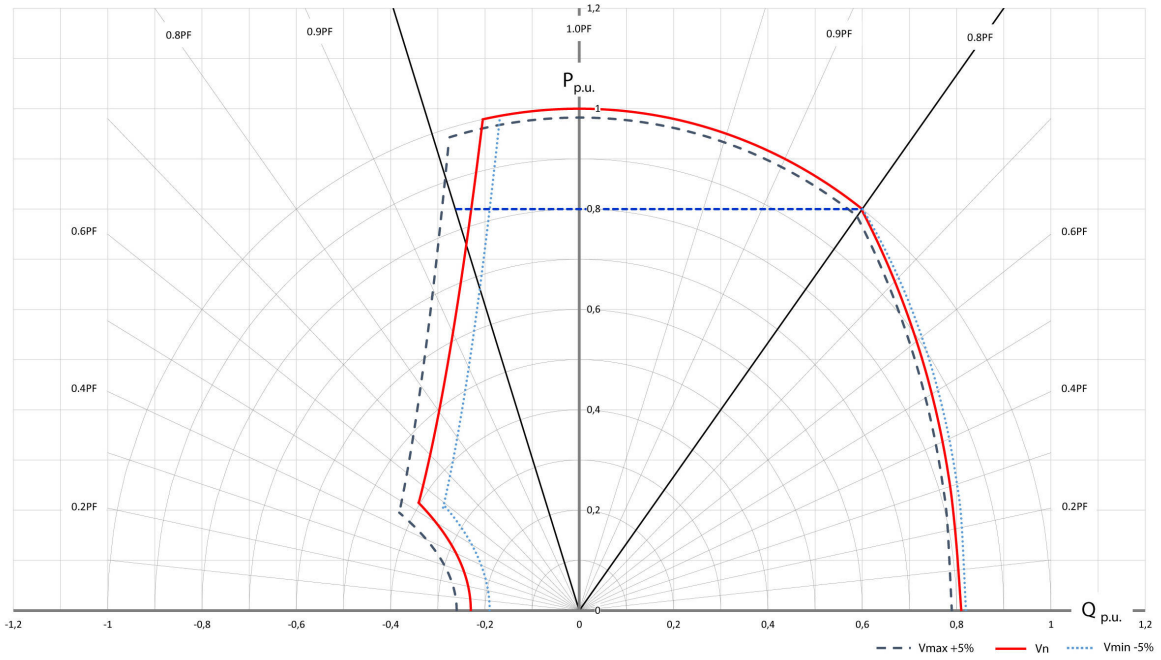


*Please refer to tables at page 6

Additional Characteristics

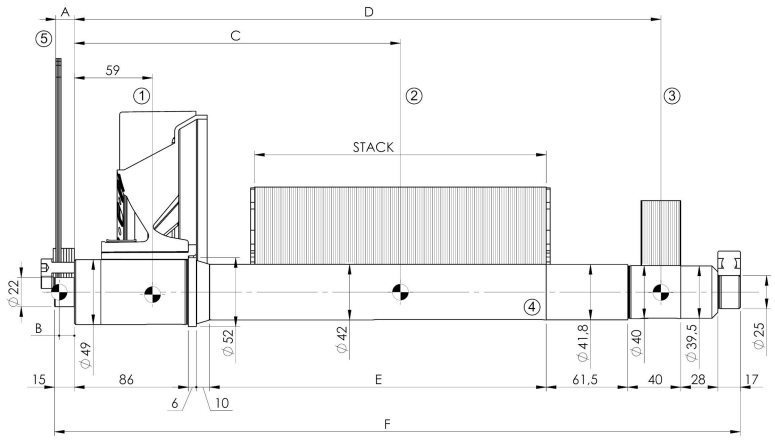
Data		ECP4 1M4 C		ECP4 2M4 C		ECP4 3M4 C		ECP4 4M4 C		ECP4 5M4 C		ECP4 1L4 C		ECP4 2L4 C	
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
Damper cage		Aluminium													
Single stator coil resistance (20°C)	Ω	1,55		1,069		0,765		0,547		0,435		0,316		0,27	
Rotor Winding Resistance (20°C)	Ω	6,3		7,3		8,7		8,8		10,3		11,7		12,3	
Stator Exciter Resistance (20°C)	Ω	14,2		14,2		14,2		14,2		14,2		14,2		14,2	
Rotor Exciter Resistance (20°C)	Ω	2,15		2,15		2,15		2,15		2,15		2,15		2,15	
Auxiliary Winding Resistance (20°C)	Ω	4,02		4,9		3,8		4,2		3,9		3,7		3,8	
Weight of complete generator	kg	56,0		61,0		65,0		72,0		79,0		93,0		97,0	
Unbalanced magnetic pull	kN/mm	2,8		2,8		2,8		2,8		2,8		2,8		3,0	
Air flow	m^3/min	4,4	5,2	4,4	5,2	4,4	5,2	4,4	5,2	4,4	5,2	4,4	5,2	4,5	5,5
Noise level at 1m/7m	dB(A)	70/57	74/60	70/57	74/60	70/57	74/60	70/57	74/60	70/57	74/60	70/57	74/60	70/57	74/60

PQ Diagram



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

MOMENTS OF INERTIA - SINGLE BEARING



Type	Dimension C [mm]	D [mm]	E [mm]	F [mm]
ECP4 1M/4C	248.5	372.6	184	447.5
ECP4 2M/4C	238.5			
ECP4 3M/4C	231			
ECP4 4M/4C	218.5			
ECP4 5M/4C	203.5			
ECP4 1L/4C	253.5	442.6	254	517.5
ECP4 2L/4C	246			

Type	Pos. 1 Component Fan Weight [kg]	Fan J [kg*m²]	2 Main Rotor Weight [kg]	Main Rotor J [kg*m²]	3 Exciter Rotor Weight [kg]	Exciter Rotor J [kg*m²]	4 Shaft* Weight [kg]	Shaft* J [kg*m²]	Total Weight [kg]	Total J [kg*m²]
ECP4 1M/4C	0.69	0.0046	10.53	0.0327	3.33	0.0085	4.81	0.0012	19.36	0.0469
ECP4 2M/4C			12.59	0.0390					21.42	0.0533
ECP4 3M/4C			14.31	0.0443					23.14	0.0585
ECP4 4M/4C			16.79	0.0519					25.62	0.0661
ECP4 5M/4C			20.02	0.0618					28.85	0.0760
ECP4 1L/4C			24.23	0.0747			5.57	0.0013	33.82	0.0891
ECP4 2L/4C			25.86	0.0797					35.45	0.0941

SAE N°	5 | Shafts coupling flex plate A	B	Weight [kg]	J [kg*m²]
6 1/2	4	2	1.25	0.0066
7 1/2	4	2	1.54	0.0103
8	35.6	30.6	2.20	0.0149
10	27.6	24.2	2.76	0.0298
11 1/2	14	11.5	3.36	0.0472

* Shaft mass and inertia also include rotor keys

REV.	DATE	REVIEWS	DESIGN BY	APPROVED BY
02	05/12/2022	NEW STACK LENGTHS ADDED	Pellizzaro A.	Manfrin R.
01	13/07/2021	MODIFY STACK DIMENSIONS	Trevisan M.	Manfrin R.
00	14/06/2021	FIRST ISSUE	Trevisan M.	Manfrin R.

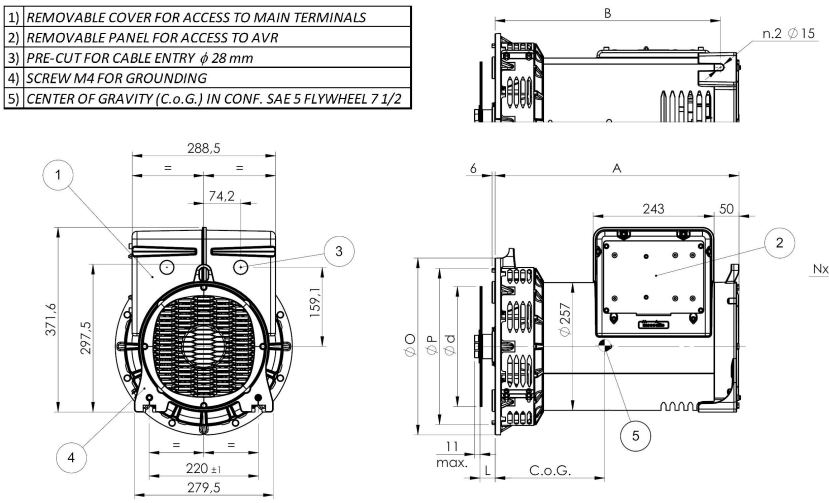
Via Roma 20
36051 Creazzo(VI) ITALY
www.meccalte.com

DESCRIPTION: MOMENTS OF INERTIA - SINGLE BEARING ECP4C

FORMAT	SCALE	REF.DOC.	PART N.	MODEL REV.	DRW REV.
A4	1:3	PP00304	D00055	01	02

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1) REMOVABLE COVER FOR ACCESS TO MAIN TERMINALS
2) REMOVABLE PANEL FOR ACCESS TO AVR
3) PRE-CUT FOR CABLE ENTRY ϕ 28 mm
4) SCREW M4 FOR GROUNDING
5) CENTER OF GRAVITY (C.o.G.) IN CONF. SAE 5 FLYWHEEL 7 1/2



TIPO / TYPE TYPE / TYPE	A [mm]	B [mm]	C.o.G. [mm]
ECP4 1M / 4C	420,8	383,5	231,5
ECP4 2M / 4C			226,0
ECP4 3M / 4C			221,3
ECP4 4M / 4C			212,9
ECP4 5M / 4C			201,9
ECP4 1L / 4C	490,8	453,5	247,3
ECP4 2L / 4C			241,6

SAE N.	FLANGIA / FLANGE BRIDE / FLANSCH O	P	Q	S	N	α
5	356	314,32	333,4	11	8	45°
4	403	361,95	381,0	11	12	30°
3	451	409,58	428,6	11	12	30°

SAE N.	GIUNTI A DISCHI / DISC COUPLING DISQUE DE MONOPALIER / SCHEIBENKUPPLUNG d	L	Q1	S1	N1	α1
6 1/2	215,90	30,2	200,02	9	6	60°
7 1/2	241,30	30,2	222,25	9	8	45°
8	263,52	62,0	244,48	11	6	60°
10	314,32	53,8	295,28	11	8	45°
11 1/2	352,42	39,6	333,38	11	8	45°

REV.	DATE	REVIEWS	DESIGN BY	APPROVED BY
02	21/12/2022	NEW STACK LENGTHS ADDED	Pellizzaro A.	Manfrin R.
01	15/06/2021	GENERAL REVISION	Rostello M.	Manfrin R.
00	02/02/2021	FIRST ISSUE	Rostello M.	Manfrin R.

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36051 Creazzo(VI) ITALY
www.meccalte.com

DESCRIPTION: OVERALL DIMENSIONS - MD35 COUPLING ECP4C - PLASTIC TERMINAL BOX

FORMAT	SCALE	REF.DOC.	PART N.	MODEL REV.	DRW REV.
A4	1:8	PP00304	D00015	02	02

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